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BUSINESS/GA AND MILITARY AIRCRAFT GLOBALLY



# MRO INNOVATORS

TAP M&E'S MEERA  
PROJECT USES  
RFID TO TRACK  
ENGINE PARTS

June / July 2014

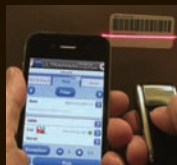
## GA TO THE RESCUE

AN INJURED SEA  
TURTLE IS RELOCATED  
TO IOWA WITH  
VOLUNTEERS' HELP



## SOFTWARE SHOWCASE

SO MANY TYPES OF  
SOFTWARE, SO LITTLE  
TIME-WE SORTED AND  
CATEGORIZED THEM



## GUEST EDITORIAL

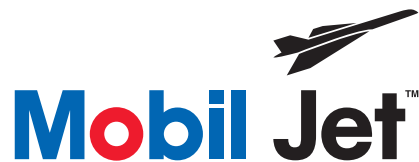
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## COVER STORY

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### The Innovators

To stay competitive in the MRO business requires continual innovation. How does your company encourage innovation? Here are some examples of innovators in our industry to inspire you.

Cover image shows TAP Maintenance and Engineering's MEERA (Mobile Enabled Engine Repair Application) RFID engine parts tracking solution. TAP M&E photo.



## 28 MRO Software Showcase

There are probably more than 100 types of software products specifically for the MRO industry. Sorting through what each one does and which one might be right for your operation can be daunting. We take a look at some of the leading software developed for MRO, sorted into categories to give you some help with your decision.

## 40 Abrasives

Can something as simple as the abrasives you use improve your efficiency on the shop floor? We take a look at the St. Gobain and Norton team's new abrasives to see.



## CATEGORIES

- GENERAL AVIATION
- COMMERCIAL
- BUSINESS JET
- MILITARY
- ENGINES
- TECHNOLOGY
- PRODUCTS/ TOOLS
- SPECIAL REPORT
- AFTERMARKET

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# Innovation Inspiration

BY JOY FINNEGAN  
EDITOR-IN-CHIEF



Google Glass. The Tesla electric car. 3D printing. Innovations in our world just keep coming. Technology is advancing at breakneck speed. Is innovation happening in MRO? Or are things still happening in the hangar with the old school thinking and technology of the 50s and 60s?

In this issue we wanted to take a look at the amazing things MROs are doing to stay on top in what is one of the most competitive but necessary business sectors in aviation—MRO. We were not disappointed. The leading MROs around the world shared some of the most innovative ideas they have put into practice at their facilities. They are impressive.

How much time is spent searching for parts? On the cover you see the MEERA (Mobile Enabled Engine Repair Application) project implemented by TAP M&E. This project uses RFID to track engine components during overhaul with the goal of optimizing the turn-around time. The handheld device can be swept over a storage or shelving unit and, when it senses the part being searched for, an audible alarm goes off. Time saved equals money saved.

An OEM procedure to check the abrasable engine shroud on the GE90 engine required 48 hours to perform, if a run-up was required. A clever technician at AFI KLM E&M's engine facility devised a low-tech alternative procedure using a roll of tape, a pen and a ruler. Hats off to that technician, Claude Dubois, for his creative thinking that reduced the procedure to a quick three hours and doesn't require fan blade removal, special tooling or a run-up.

Lufthansa Technik told us about their CAIRE program. Initially developed through a research project that focused on finding a complete, reproducible process for repairing composites using a stationary robotic device. Once that process and machine were produced, a further research project began to make the process mobile. Composite Adaptable Inspection and Repair, or CAIRE, was the result. A version of the robot was developed allowing mobile teams to diagnose and repair large areas of fuselage and wing damage on wing, once again saving time and money.

AAR, a leading U. S. MRO, explained their StAAR system. StAAR stands for Strategic Tools for AAR and allows customers access to the system so they can view the status

of their projects as they happen. The ERP-style system was developed in-house by AAR's own IT department to meet their very specific needs.

In our "State of the Industry" cover story in April we asked those who participated about the current state of technology and innovation in MRO. The question asked if the MRO industry is lagging in its technology use and implementation. We got a variety of answers from, "Couldn't disagree more," (Mario Lobato de Faria, EVP, TAP M&E) to "Not only is the MRO industry lagging, but the entire aviation industry is behind," (Neil Book, president and CEO, Jet Support Services, Inc.) to "MRO technology has lagged...with radically new aircraft put into service while 30-40-year-old aircraft continue to operate," (Ed Dolanski, president/CEO Aviall).

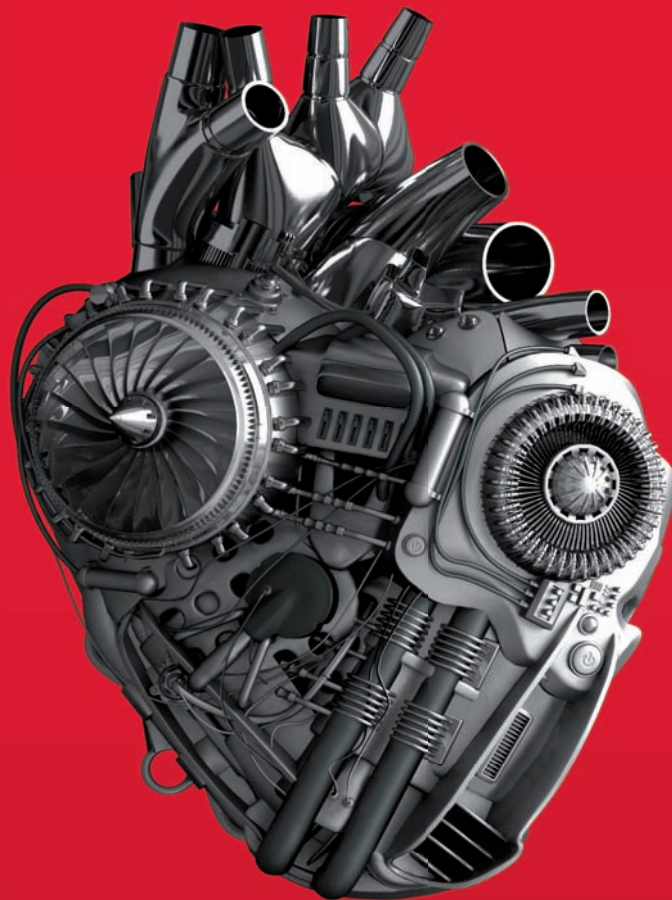
Some companies seem to be doing more than others. How is your company encouraging innovation on the shop floor, by your back shop employees, by your middle managers and up the chain? Does your company offer incentives to those who innovate or do you hear frequently, "This is the way we've always done it." There is some benefit to the tried and true method but a lack of innovation is surely the kiss of death in this ever-changing business. Check out our innovations feature story starting on page 20.

Along similar lines, we also have a software showcase feature in this issue starting on page 28. There are a plethora of software choices for maintenance providers and the capabilities and offerings can be confusing. We have taken a look at quite a few and broken them down into categories to help you weed through what each company offers.

Last, we are delighted to have a guest editorial by Matthew Bromberg, president, Aftermarket at Pratt & Whitney. Coincidentally, as if we planned it—but we didn't, much of his piece has to do with innovation and the better use of technology to help MROs succeed. You will find Bromberg's piece on page 50.

For those of you headed to Farnborough in July, stay cool on the ramp there and look for our owner/publisher Adrian Broadbent and our sales team who will be at the show. For those headed to vacation—enjoy and have a cold one for me. **AM**

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## Gulfstream Enhances Customer Support with New Website/Mobile App

Gulfstream has enhanced its customer support with the redesign of MyGulfstream.com and the launch of a corresponding iPad app.

"Gulfstream strongly believes that when it comes to communicating with our customers via mobile tools, more is better," said Mark Burns, president, Gulfstream Product Support. "The website and app are designed exclusively for customers and operators and offer greater mobility when it comes to obtaining information from Gulfstream. We see the advantage of being mobile and know that technology will continue to shape how we do business."

MyGulfstream.com, the company's secure, password-protected customer website, offers improved performance, search capabilities, content organization and navigation. It is also optimized across mobile platforms. Additionally, customers can receive critical information right in the palm of their hands with the MyGulfstream app.

The site, built using all-new hardware and software platforms, features a comprehensive collection of product support materials; access to the Gulfstream Network, a multimedia network featuring videos, discussions and tutorials; the latest aircraft information; a connection to the online Computerized Maintenance Program; as well as a technical publications library and the latest Gulfstream news.

In addition to the customer- and aircraft-specific data available on MyGulfstream.com, the site provides customers with access to customer bulletins, maintenance and operations letters and Gulfstream events. Customers also can access weather, stocks and other customizable links through MyGulfstream.com.

"We are dedicated to giving customers what they need to ensure the continued successful operation of their aircraft," said Burns. "Gulfstream is a worldwide company and communication never stops. MyGulfstream.com gives us the opportunity to share important, time-sensitive information and visual communications around the clock. It's that kind of innovation that propels Gulfstream to the forefront of supporting its customers."

The MyGulfstream app brings Gulfstream's customer portal to the iPad and gives customers access to important articles. The app includes technical bulletins, aircraft documents and alert notifications. Other features include the ability to download and save documents on the mobile device for offline viewing, personalized push notifications that alert the user when specific information is updated, and the ability to view the latest news from Gulfstream.

The MyGulfstream app can be downloaded from the App Store, or at [mygulfstreamapp.com](http://mygulfstreamapp.com). An account with the MyGulfstream customer portal is required to view secure content on both the app and [MyGulfstream.com](http://MyGulfstream.com).

## GA Volunteers Help Rescued Sea Turtle Find its Way to New Aquarium Home in Iowa



Dubuque, Iowa's newest resident could live to be one of the city's oldest. A rescued, non-releasable, threatened green sea turtle will be the newest animal in the National Mississippi River Museum & Aquarium's collection and will reside in the Gulf of Mexico exhibit after a quarantine period of approximately 30 days.

The juvenile green sea turtle was transported from the Georgia Sea Turtle Center (GSTC), a hospital for ill and injured sea turtles located on Jekyll Island, GA. They stopped at DeKalb Peachtree Airport at Atlantic Aviation in Atlanta as she was transferred to the second leg of the flight that brought her to the final destination in Iowa.

The turtle's flights were orchestrated by Angel Flight Soars as a result of the

effort and involvement of Leslie Weinstein, founder of True-Lock and board member of the University of Florida's Archie Carr Sea Turtle Research Center. A biologist from the aquarium traveled alongside the turtle for its 1,178-mile trip to his new home in Dubuque. The U.S. Fish & Wildlife Service issued a special permit to the aquarium that requires specific travel arrangements to ensure the health of the turtle.

The juvenile green sea turtle was found stranded on Little Cumberland Island, Georgia in July of last year. The turtle had suffered from an old fracture to the mid-caudal carapace, also known as its shell, most likely resulting from a boat strike. The wound was completely healed; however the

*General aviation came to the rescue of this injured green sea turtle. The turtle was unable to be released back into the wild and the National Mississippi River Museum & Aquarium agreed to take it. The next step was organizing a series of flights to get the turtle to Dubuque, Iowa. Volunteers lined up to help. Photos by Clayton Finnegan*

turtle is not able to use her rear flippers and floated with her hind end up. Damage to the spinal cord caused partial rear flipper paralysis and decreased mobility within the GI tract. The turtle is receiving physical therapy to her rear flippers. The three volunteer pilots participating in the turtle transport were Jerry Latvala, Bob Krueger and Bill Bailey.

## FL Technics Jets Signs Support Agreement for 30 Hawker Jets



FL Technics Jets signed a three-year aircraft maintenance agreement with one of the European private aviation carriers. According to the agreement, FL Technics Jets will provide base and line maintenance as well as spare parts support for the carrier's Hawker 750/800XP fleet.

*Darius Saluga, the CEO of FL Technics Jets, says FL Technics is looking forward to supporting the Hawker fleet of a European based private carrier.*

Under the newly signed contract, FL Technics Jets specialists will provide the customer a comprehensive set of aircraft maintenance services, including but not limited to A-to-D-checks, NDT, engineering, avionics and structure repairs as well as component support and spare parts supply. The MRO provider says it will render AOG line maintenance support for the carrier's fleet during the 2014 June-September peak season by deploying its technicians and engineers to any location required by the customer.

"Previously we had already supported the VIP carrier by providing various AOG and line maintenance solutions for several of its aircraft. Through continuous provision of high quality and exceptionally flexible services, we earned the customer's trust and were eventually awarded with a more comprehensive contract," comments Darius Saluga, the CEO of FL Technics Jets. "FL Technics Jet's team will do everything that it takes to exceed the carrier's expectations thus ensuring that this cooperation has a solid potential for even further development."

## New Board Members for ERAU

Embry-Riddle Aeronautical University's Board of Trustees has elected four new members to help shape the future of the world's top aerospace and aviation academic institution: Dr. Charles D. "Chuck" Duva, president and CEO of DuvaSawko; C. Jeffrey (Jeff) Knittel, president of CIT Transportation Finance; David B. O'Maley, chairman emeritus and retired president and CEO of Ohio National Life Insurance Company; and Jon W. Slingerup, an executive advisor to Moelis Capital Partners.

"We're excited to welcome these new trustees with their wide variety of experience and solid records of leadership in their industries and communities," said Dr. John P. Johnson, Embry-Riddle president. "Jeff and Jon are also Embry-Riddle alumni, giving them additional insight into the university's challenges and opportunities."

## Euravia Receives TCCA Approval

Euravia Engineering has received Transport Canada Civil Aviation (TCCA) Approval No. 814-03. This approval compliments Euravia's EASA, FAA, MOD UK Design, ISO9001, AS9100, AS9110, NATO Manufacturer & Supplier Approvals and various OEM and other National Airworthiness Approvals.

"This new approval completes Euravia's International Accreditations for PT6 Engine Maintenance, Repair and Overhaul, Engine Sales / Exchange and Mobile Repair Team services for all PT6 Engine Operators throughout Canada," Dennis Mendoros, Euravia's Managing Director, said.

Euravia says the TCCA Approval will enhance and underpin their existing MRO activities across Canada.

## about people

### Wassmuth Joins Unical



Wassmuth

Roger Wassmuth has joined Unical Aviation to lead and expand its newly formed Military Division. As vice president, Military Division, Wassmuth is responsible for developing and implementing a strategy that will drive sales and fuel aggressive growth. In addition to leading the organization, key areas of focus will include establishing partnerships, license and distribution agreements, and sustainment and repair programs. Under Wassmuth's leadership, Unical says it has already signed multiple license agreements with United Technologies Aerospace Systems (UTAS), most recently for key F-16 systems and components. Wassmuth's background includes 35 years of military and commercial aerospace experience, starting with the U.S. Navy and, later, the U.S. Air Force Air National Guard. He joined Kaman Aerospace Corporation in 1984 and most recently led business and strategic alignment initiatives for the Power Controls & Sensing Systems military organization at United Technologies Aerospace Systems. Wassmuth holds a bachelor's of science degree in professional aeronautics and master's degree in aerospace management from Embry-Riddle Aeronautical University.

### Euravia Appoints New After-Sales Support Director

Euravia has appointed of Dave Wark as the North America and Asia-Pacific After-Sales Support director. "Euravia is entering an exciting development period requiring a focused approach to managing the increases in volume associated with the continuing success of our PT6A, PT6T and PT6C engines MRO business. Dave Wark has extensive experience on PT6 engines and will ensure that Euravia continues to offer customised and total support to its Customers," says Dennis G. Mendoros, the company's managing director. Wark brings experience from previous roles at Mint Turbines, Vector Aerospace and North Star Aerospace. He will provide consolidated engine support to new and existing customers, thus further strengthening Euravia's global after-sales activities.

### Windings Announces Adds Barna

Windings has named Tom D. Barna as their new regional sales manager. For the past



Barna

two years, Barna served as the national sales support manager for Truck Bodies & Equipment International (TBEI). Before that, Barna spent five years as the director of Marketing & Sales with VSI, Mankato, Minn., a national >>>

## about people

technology solutions company. His previous employment also includes serving with the Minnesota Department of Transportation District Seven management team and the United States Marine Corps.

### Professional Aviation Associates Adds Sales Manager

Professional Aviation Associates, a Greenwich AeroGroup company, announced the hiring of Craig Harris as a regional sales manager. Harris will be responsible for the development of new and existing opportunities in the southeast region including Alabama, Georgia, North Carolina and South Carolina, Tennessee and Mississippi as well as the state of Kansas. Harris previously served in sales and marketing with Greenwich AeroGroups' Matrix Aviation in Wichita, Kan., and in similar capacities with Beechcraft, Aerotex International and Aero-Mach Labs. His background also includes serving as a technical illustrator/writer, customer solutions manager and customer support. Harris holds a bachelor's in Business Management from Friends University in Wichita, Kan., as well as an associate's degree in digital media.

### West Star Appoints McKillips as Regional Sales Manager



McKillips

West Star Aviation recently announced they have appointed Dan McKillips as regional sales manager. McKillips will be responsible for the Southeast region of the U.S., which includes: Arkansas, Florida, Louisiana, and Mississippi. He has 20 years in the aviation industry, and developed his expertise through a variety of positions including A&P, and corporate director of maintenance. He also previously held the positions of manager of Paint and Interior and technical sales manager at West Star. "Dan's solid background and diverse skills make him the ideal candidate for this position," says Jim Swehla, cofounder/EVP, West Star Aviation. He will be responsible for sales activities for the Southeast Region as well as maintaining and building new customer relationships.

### Ametek SFMS Names West Global Distribution Sales Manager

Paul West has joined the Sensors and Fluid Management Systems (SFMS) business unit of Ametek Aerospace & Defense as global distribution sales manager. In this role, West will have responsibility for managing the growth of Ametek SFMS' aftermarket sales and distribution channel. "Paul is a great addition to our team, and we are pleased >>>

## Transaero Airlines CEO Olga Pleshakova Awarded National French Order of Merit

Transaero Airlines CEO Olga Pleshakova was honored with one of the highest awards of the French Republic, the National Order of Merit. The award ceremony took place at the French Embassy in Moscow on May 28, 2014. Mrs. Pleshakova was awarded for her contribution to the development of the economic and cultural connections between Russia and France.



On behalf of the French authorities the sign of the Officer of Order of Merit was handed to Olga Pleshakova by the French Ambassador Extraordinary and Plenipotentiary to Russia Jean-Maurice Ripert. He said that the activities of Transaero CEO correspond to the idea of the French pilot and writer Antoine de Saint-Exupery who said that aviation is the most beautiful profession in the world bringing people closer to each other. He highlighted that Mrs. Pleshakova plays an important role in strengthening relations between Russia and France. Transaero transported more than 100,000 Russian citizens to France in 2013. The Ambassador expressed his confidence that the figures will continue to grow as the development of economic and cultural connections between the two countries remains an important objective.

"Your determination, energy and bold decisions allowed Transaero to become Russia's second largest carrier enjoying great popularity and overall recognition," said Ripert. He also highlighted that Transaero, led by Olga Pleshakova, was the launch customer in Russia of the Airbus A380.

"It is a great honor for Transaero Airlines to contribute to the development of the air transportation between Russia and France. Transaero will stay loyal to its wonderful mission, which is to shorten the distances, connect people and serve a reliable bridge between the nations," Mrs. Pleshakova said. She highlighted that behind all of the achievements of the airline is the efficient work of a great team, whose main criteria have always been a high level of professional skills and responsibility. "That is why the highest award of the French Republic also belongs to 11,000 Transaero employees."

## Hartzell's Library of Maintenance Manuals Available Exclusively Through ATP

Mike Disbrow, president of Hartzell Engine Technologies, announced that the company has entered into an exclusive arrangement with ATP to provide all of HET's maintenance publications and regulatory documents through the ATP Knowledge information services platform including the ATP Aviation Hub cloud application and NavigatorV desktop application.

"Timely access to update information is critical for aircraft maintainers and now through ATP's cloud-based solutions, they will have access to the most current inspection and repair information for Hartzell Engine Technologies' products literally at their fingertips," Disbrow said. "ATP's variety of online tools will also make our manuals much more user-friendly."

"In addition, we are continually working to update and improve all of our maintenance manuals, so we anticipate making more frequent revisions and updates," he said. "By migrating to ATP's subscription-based ATP Aviation Hub cloud application and NavigatorV desktop application, we are taking steps to ensure that all of our users will have immediate access to the latest updat Disbrow also explained that giving maintainers virtually real-time access to the latest information is a major contributor to assuring FAA compliance.

"Instead of waiting for us to send out a printed revision, technicians can just type in a part number or task and the ATP Aviation Hub will deliver all the current information right to their laptop, tablet or smartphone," he said. Along with instant access to information, ATP's single integrated, cloud-based solution offers several advantages for users including learning one, simple software platform for publication access, daily revision updates to all content, and eliminating the cost of installing and managing software. . . >>>





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## AAR Lands Supply Chain Deal with Kenya Airways

AAR has become the first aviation company to land a multi-year deal under the Obama administration's "Doing Business in Africa" initiative. AAR is announcing a five-year multi-million dollar agreement with Kenya Airways to provide power-by-the-hour component support for its fleet of 737NG aircraft. AAR will place inventory on site in Nairobi while offering additional rotatable pool support from its newly established supply chain hub in Brussels.

With assistance from U.S. Department of Commerce leadership and staff in Washington, D.C., Chicago, and the U.S. Embassy in Kenya, AAR's top executives were able to connect with key government and business officials beginning last year during a visit to Nairobi, Kenya; meet legal requirements; establish business protocols; and cultivate relationships. The successful advocacy strategy was also supported by several inter-agency partners including the State Department.

"The advocacy and access AAR gained through the Commerce Department's program gave us an advantage in the face of stiff competition from European companies," said David P. Storch, AAR's chairman and CEO. "The administration's support was key to enabling us to navigate the business landscape. This deal with Kenya Airways has helped to progress AAR's expansion across the African continent."

Doing Business in Africa (DBIA), first announced in December 2012, was designed to close the opportunity gap between American business and emerging markets in Africa, home to seven of the fastest-growing economies in the world. Obama administration efforts include enhanced outreach from Commerce and interagency partners to provide American companies with leads and introductions; and advocate for and connect businesses with distributors and potential customers.

"The success of AAR in Kenya is an excellent example of how the National Export Initiative is working to help U.S. businesses leverage new export opportunities in emerging markets and around the world," said U.S. Secretary of Commerce Penny Pritzker. "I know from my recent trade mission that many U.S. companies are selling to Africa, but it can be a challenging market for many American businesses. That is why the Commerce Department is assisting American businesses as they navigate new markets, reach new customers, and develop new opportunities in existing markets. When U.S. companies succeed, the benefits are mutually shared in the form of new economic opportunity at home and abroad."

This deal builds on AAR's recent progress in establishing a foothold in Africa. Last year, AAR fulfilled a contract to service landing gear on Kenya Airways' Boeing 777s. AAR also supplies cargo systems for South African Airways and participated in the MRO Africa Conference and Exhibition in Ethiopia, focused on the build-out of Africa's aviation industry.

## JSSI Names Weiser to New Helicopter Specialist Role



Jet Support Services, Inc. (JSSI) has engaged helicopter industry veteran, Raymond Weiser, Jr., in a newly created position as helicopter program specialist.

"Ray's exceptional knowledge and experience within the helicopter segment of our industry is a perfect match for JSSI as we aggressively expand into this market," commented Neil Book, President and CEO of JSSI. "We believe there is a wide cross section of industries such as Oil & Gas, Medevac and Law Enforcement that can benefit by enrolling their engines and airframes onto JSSI programs to streamline their maintenance budgets and reduce their overall cost of operation. We are honored to have Ray join us at JSSI and I look forward to working with him to further grow our helicopter business."

As Helicopter Program Specialist, Ray will be responsible for developing and growing JSSI's presence in the helicopter market by directing and supporting business development initiatives around the world.

## about people

»»» to have him join Ametek. The global distribution sales manager position is critical to the continued success of our business. Paul brings extensive experience in aerospace distribution and an excellent background in technical sales and service to the position," comments Andy Brandenburg, VP and business unit manager for Ametek SFSM. West most recently served as director of sales at API, an aerospace maintenance, repair and overhaul (MRO) services provider and a major distributor of aerospace aftermarket products. He also holds a Bachelor's Degree in Mechanical Engineering from Clarkson University.

### New VP of BD at ATP

ATP announced the appointment of Matthew Krueger as their new vice president of Business Development, effective June 2, 2014.

As vice president of Business Development, he will lead the business development team to deliver ATP's vision of enterprise cloud solutions to the general aviation industry. Before joining ATP, his most recent role was as principal at Paiute Consulting focusing on technology and partner optimization and prior Krueger held various business development and channel-focused leadership positions at Network Equipment Technologies. Krueger's family history also includes a rich exposure to and participation in general aviation. "We could not be more fortunate than to have Matthew joining us with his experience spanning both technology and general aviation," said Caroline Daniels, ATP CEO.

### AMS Appoints Troccoli Senior Vice President

Aviation Management Systems (AMS), recently announced Jeffrey J. Troccoli has joined their team as senior vice president. Troccoli will be based at their Connecticut location and will begin his new position immediately. Jeff will play a leading »»»

## Harris Williams Advises Wencor Group on its Sale to Warburg Pincus

Harris Williams & Co., a middle market investment bank, announces the sale of Wencor Group, LLC (Wencor), a portfolio company of Odyssey Investment Partners, LLC (Odyssey), to Warburg Pincus LLC (Warburg Pincus). Wencor, headquartered in Springville, UT, is a leading designer, repair provider and distributor of aftermarket aerospace components. Harris Williams & Co. acted as the exclusive advisor to Wencor. The transaction closed on June 19, 2014 and was led by Jon Nemo, Chris Rogers, Doug Kinard and Chris Smith from Harris Williams & Co.'s Aerospace, Defense & Government Services (ADG) Group.

"Wencor is a truly unique commercial aerospace business serving the aftermarket maintenance needs of its large and growing customer base," said Jon Nemo, managing director in Harris Williams & Co.'s ADG Group. "This successful transaction reflects the strong demand for differentiated platforms in commercial aerospace."

"Wencor management and the Odyssey team have built an impressive platform with deep aerospace part design, component repair and distribution expertise," commented Chris Rogers, managing director in Harris Williams & Co.'s ADG Group. "Wencor will continue to take advantage of the many organic and acquisition-based growth opportunities created by the compelling value proposition it provides to its customers as well as benefit from the industry expertise and global reach of its new partner, Warburg Pincus."

## SoCal Logistics Airport Approaching 100 Percent Leased



The City of Victorville's Southern California Logistics Airport (SCLA) is nearly 100 percent leased, prompting the airport to determine its next growth areas. Since becoming SCLA in 1999, the City of Victorville has overseen the build-out and leasing of approximately 3.5 million square feet of industrial space at SCLA. Phase Two of the City's industrial growth plan for the airport involves attracting build-to-suit tenants to continue the development of this growing industrial and aerospace hub.

"Industrial growth at Southern California Logistics Airport is a testament to the pro-business climate and unique utilities offerings that we have worked to create in the City of Victorville," said Keith Metzler, assistant city manager at the City of Victorville. "We are excited to enter this next phase of growth to help companies like Dr. Pepper Snapple Group leverage the benefits of Victorville through build-to-suit industrial development."

Milestones of SCLA's industrial growth began with its first major industrial transaction in February 2001, with a 22-acre ground lease to the High Desert Power Project to construct a \$350 million, 750-megawatt power generating facility. From there, SCLA attracted a 13.5-acre ground lease with General Electric in 2002; a 450,000-square-foot lease with Newell Rubbermaid in 2007; four build-to-suit hangar projects for Leading Edge Aviation Services, Pratt Whitney, FedEx and Victorville Aerospace in 2007; and a 300,000-square-foot lease with Plastipak Packaging in 2009.

In 2010, Dr. Pepper Snapple Group completed the construction of its 850,000-square-foot manufacturing and warehouse facility at SCLA to serve the company's entire West Coast beverage-consuming demand. In 2011, M&M/Mars relocated its refrigerated candy warehouse operation to approximately 500,000 square feet of building space at SCLA.

Recent development at SCLA has included a 500,000-square-foot lease with United Furniture Industries in 2012 and a 100,000-square-foot lease with The Boeing Company in 2013.

Upon the successful leasing of nearly 100 percent of SCLA's industrial and hangar space, SCLA's launch of this next phase of industrial development represents another milestone in the City of Victorville's growth. The next phase involves identifying build-to-suit opportunities for new users, both inside and outside of the airfield fence.

## about people



Troccoli

role in the continued growth and development of AMS' industry prominence. With nearly twenty years of experience in the business aviation industry, Troccoli brings an extensive background in organizational leadership and risk management-mitigation to the AMS team. His leadership career began in the late 90s serving as a director of Flight Operations with oversight and responsibility of all operational, financial and maintenance related matters. Most recently, he served as chief pilot for a leading national provider of aircraft management and worldwide jet charter services in the New York Metro Area. He holds an ATP license with several turbojet type ratings and a Certified Flight Instructor certificate. He has logged 9,000 flight hours.

### Witzig Appointed CEO of Swiss Aviation Training

Marcel Witzig (45), our current head of Ground Services, has been appointed as the new CEO of the Swiss Aviation Training (SAT) subsidiary. He assumed his new duties in May. Witzig succeeds Manfred Brennwald, who decided last summer to step down after seven years at the SAT helm. "In Marcel Witzig we have appointed an experienced airline professional to succeed," says Roland Busch Swiss CFO and chairman of the Swiss Aviation Training Board of Director. Marcel Witzig began his career as an air transport apprentice with the then Swissair back in 1986. He went on to hold various functions within

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## Saint-Gobain Seals' OmniGasket Used in Deicing System

Saint-Gobain Seals' OmniGasket sealing solution is being utilized in the aerospace market as a flanged sealing component on aircraft wing slats and their deicing telescopic duct system. Retained in a gasket, this sealing solution is machined from a Meldin 7001 polyimide plate with a static OmniSeal seal installed inside, and is mounted at the interface between the telescopic duct and the wing leading edge. When flying at high altitudes in subzero temperatures, ice forms on the wing of aircraft and a deicing protection system destabilizes the ice using hot air coming from the engine, thus allowing the slipstream to dislodge it and remove it from the wing. The OmniGasket component is currently installed on the Dassault Falcon 7X (a large-cabin, long range business jet) and being tested for use on a new mid-size jet.

Because the product is composed of two of Saint-Gobain Seals' high-performance product lines (Meldin 7001 thermoset polyimide materials and OmniSeal spring-energized seals), the company says it is capable of handling extreme service conditions and ideal for the aerospace market. Recent research and development from the Saint-Gobain Seals manufacturing team has led to a change in the OmniSeal seal shape from round to oval and optimizing the limited space. Within the same plate size, the oval shape supports a larger surface area, which increases airflow intake.



Saint-Gobain Seals' OmniGasket is already being used on the Dassault Falcon 7X and is being tested for use on other jets.

## AOPA Refutes USA Today's Report on General Aviation Safety

This Aircraft Owners and Pilots Association (AOPA) responded to a USA Today article written by reporter Thomas Frank. The article paints a misleading picture about the safety of general aviation. AOPA says it gets the general aviation safety record wrong, it ignores efforts by the industry to make general aviation safer and it violates basic tenets of fairness and accuracy when it comes to good journalism.

The article leads one to believe that general aviation is an unsafe form of transportation, but in truth, says AOPA, general aviation has demonstrated significant progress in safety. AOPA cites the National Transportation Safety Board who says the number of fatalities has declined by over 40 percent since the early 1990s.

General aviation is enveloped by a robust safety system that is more extensive than any other recreational activity in the United States. This system addresses everything from aircraft certification to pilot training, aircraft maintenance and flight operations. AOPA stresses that this results in a general aviation system that provides for 21 million flight hours annually while carrying 170 million passengers per year safely and efficiently.

"In comparison to other forms of recreational transportation, the annual number of fatalities for general aviation is about 30 percent fewer of that of the recreational boating industry, and not even 10 percent of motorcycles," says AOPA.

AOPA says the entire GA industry and they have been pro-active and aggressive in seeking solutions by pressing the FAA to make it easier and more affordable for new technology and safety-enhancing equipment to be installed in the existing fleet of 209,000 general aviation aircraft.

In 2013, the general aviation industry, including airplane and equipment manufacturers and operators, provided the FAA with extensive recommendations which, when implemented, will expedite the process for the development, certification, introduction and installation of safety-enhancing equipment on existing and new aircraft. The FAA has begun the implementation of these recommendations and needs to ensure that all of the recommendations are acted upon.

In addition, President Obama has signed the Small Airplane Revitalization Act into law, directing the FAA to implement the recommendations by December 2015. AOPA says that, too, was omitted from Mr. Frank's story, though they insist they spoke extensively with him about it.



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## Open House Celebration for Business Aviation's Newest State-of-the-Art Facility at Duncan Aviation Lincoln

On July 15, 2014, Duncan Aviation is opening its state-of-the-art aircraft maintenance hangar to the business aviation community with an Open House celebration.

A full day of activities is planned with informational sessions, tours of the Lincoln facility and visits with industry vendors and OEMs. The event will continue into the evening during a reception with music, food, drinks and great conversation.

In the Fall of 2012, Duncan Aviation broke ground on its largest construction expansion project at its headquarters in Lincoln, Nebraska. The 175,000-square-foot facility is comprised of two 40,000-square-foot maintenance hangars and a 95,000-square-foot office and shop space.

## CFM Begins LEAP-1B Engine Ground Test Program

CFM International has initiated ground testing of the first LEAP-1B engine at Snecma (Safran) facilities in Villaroche, France. The testing launches a two-year program that will culminate in engine certification in 2016 and entry into commercial service on the Boeing 737 MAX airplane in 2017.

The LEAP-1B engine, which is the exclusive powerplant for the 737 MAX family, fired for the first time on June 13th, three days ahead of the schedule set when the program was launched in 2011. After a series of break-in runs, the engine has been operating smoothly and has reached full take-off thrust.

"We are really excited to have this engine on test. Now that we are running at full power, we can really see what it is capable of," said Cédric Goubet, executive vice president for CFM. "All of the testing we have done to date has validated the technology choices we made and we look forward to the LEAP-1B expanding our knowledge base. Our team has done a fantastic job of keeping this program on schedule and, with each day, our confidence grows. The LEAP engine will deliver everything we have promised and more."

The engine will be on test for the next several weeks, during which CFM will verify its mechanical operation, its operability (stall margin), engine starts, and further validate the advanced technologies incorporated in the engine, including the woven carbon fiber composite fan, the Twin-Annular, Pre-Mixing Swirler (TAPS) combustor, ceramic matrix composite shrouds in the high-pressure turbine and titanium aluminide blades in the low-pressure turbine.

"The reason we chose such an aggressive maturation and certification schedule is to wring out any issues and solve them long before the engine ever enters a customer fleet," said Allen Paxson, CFM executive vice president. "What the plan has also done is validate our philosophy of extensive component and rig tests well in advance of full engine testing. We had thousands of hours under our belt before we ever assembled the first engine. This engine is right where we want it to be."

This LEAP-1B engine is part of the most extensive ground and flight test certification program in CFM's history. The total program, which encompasses all three LEAP engine variants, includes 28 ground and CFM flight test engines, along with a total of 32 flight test engines for Boeing, as well as Airbus and COMAC. Over the next three years, these engines will accumulate approximately 40,000 engine cycles leading up to entry into service. By the time this engine enters service, CFM will have simulated more than 15 years of airline service with 60 different engine builds.

CFM officially launched the LEAP engine, which is the company's first all-new

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Testing of the LEAP-1B engine has begun.

centerline engine in nearly 40 years, in 2008. The engine was being designed to bring double-digit improvements in fuel efficiency, emissions and noise, while maintaining the legendary reliability and low cost of ownership of its predecessor, the ubiquitous CFM56 engine family.

In 2011, Boeing selected the LEAP-1B as the sole powerplant for its new 737 MAX, extending a more than 30-year relationship. CFM has been the only engine provider for the 737 aircraft family since the 737 Classic entered service in 1984.

The foundation of the LEAP engine is heavily rooted in advanced aerodynamics, environmental, and materials technology development programs. It will provide double-digit improvements in fuel consumption and CO2 emissions compared to today's best CFM engine, along with dramatic reductions in engine noise and emissions. All this technology brings with it CFM's legendary reliability and low maintenance costs.

## about people

» the Swissair Group, particularly in ground services, including Head of Aircraft Handling Zurich. Witzig has been in charge of the Swiss Ground Services organization since their foundation in 2002. He played a vital part in the company's subsequent restructuring, and has also been instrumental in further developing the Ground Services unit, not least by establishing and refining a global quality management and outsourced supplier management system. Witzig holds a Diploma in Business Administration and a Master of Arts degree in Practising Management from the University of Lancaster in the UK.

### PFERD Names Head Applications Sales Engineer

Jeffrey R. Kwasny was appointed applications sales engineer and tasked with implementing the PFERD Tool Mobile program in the U.S. Kwasny comes to PFERD from AkzoNobel where he served as a technical service representative. He will report directly to John Thompson, PFERD's national technical sales manager.



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## Boeing Selects Rockwell Collins Micro-GPS Receivers for Search and Rescue Radio System

Boeing has selected Rockwell Collins to provide its industry leading micro-GPS receivers for the Combat Survivor Evader Locator (CSEL) radio system.

CSEL is the U.S. Department of Defense (DoD) Program of Record for Joint Search and Rescue. This fully qualified, next-generation survival radio system provides a survivor/evader with precision Global Positioning System (GPS) based geolocation and navigation data, over-the-horizon communication relays, line-of-sight voice communication and beacon capabilities. Today, CSEL is in full-rate production and providing global coverage for U.S. DoD forces worldwide.

"Rockwell Collins is an industry leader in providing anti-spoof, anti-jam, micro-GPS solutions for military users," said Mike Jones, vice president and general manager of Communication and Navigation Products for Rockwell Collins. "We've built a strong relationship with Boeing over the years and we believe our micro-GPS receivers will provide unmatched capability for the CSEL program."

As part of the program, Rockwell Collins is providing its next generation military SAASM (Selective Availability Anti-Spoofing Module) GPS, which allows decryption of precision GPS coordinates. This device is the smallest, lightest and lowest power-consuming SAASM GPS available today. It enables the creation of GPS receivers that provide significant size, weight and power reduction for military systems in use around the world.

More than 35 years ago, Rockwell Collins assisted the U.S. Air Force in developing GPS technology and that legacy continued when the company created the world's first all-digital miniature GPS receiver under contract with DARPA. Over the years, Rockwell Collins has produced more than 50 GPS products and delivered more than 1 million GPS receivers for commercial avionics and government applications. The micro-GPS technology being provided for the CSEL program will continue this legacy of providing leading edge GPS solutions.

## SITA Announces New Chair of Board from United



SITA's Board of Directors appoints Bill Miller of United Airlines

SITA's Board of Directors recently announced the appointment of Bill Miller of United Airlines as the new chair of the SITA Board for a one-year term. The appointment was made following SITA's Annual General Assembly (AGA). Out-going chair Paul Coby will remain on the Board of Directors. In addition, the Board confirmed that Francesco Violante will continue as CEO of the organization.

"I am honored to be named chair of the Board of SITA and look forward to overseeing the organization's continued growth," Bill Miller of United Airlines said. "At this time, I would like to thank Paul [Coby] for his dedicated and visionary leadership as Chair of the SITA Board for 11 years. Working closely with the SITA Board, Council and management, he has overseen the evolution of SITA into the world's leading specialist in air transport communications and IT solutions, providing services for the airline and airport community around the world. As chair, I will work closely with Paul to ensure a seamless transition."

Paul Coby, the out-going Chair of the Board said: "I have been privileged to lead SITA as Chair for over a decade. SITA is a unique organization that exists to serve the Air Transport Community – its strength lies in its members, who are both customers and owners."

In addition to naming a new Chair, the Board along with the SITA Council voted to support a governance review, as provided for when the current governance structure was approved in 2011. The results and recommendations will be presented back during the organization's AGA in 2015. The Board has requested Francesco Violante to continue to serve as CEO with its full support and endorsement, and has decided to defer the process to identify his replacement until the governance review is complete.

"I am fully committed to continue to lead SITA and work with the new Chair, Board and Council to deliver our business performance in line with our strategic vision," Francesco Violante, CEO of SITA, said. "We will continue the transformation in our portfolio and capabilities to further strengthen SITA's value for its air transport owners."

The change at SITA has come in the year that the organization is reporting strong business results and company-wide growth. Paul Coby led the Board through 11 years that saw SITA transform its business model to the commercial-cooperative approach, which is delivering benefits back to its air transport industry members and confirming SITA as a key asset to its owners. The value of SITA, as assessed by an independent valuation methodology, has increased from \$525 million in 2005 to \$2-2.5 billion in 2013.





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## FltPlan Completes Rapid Decompression Testing for Android Tablets

FltPlan has conducted rapid decompression testing for Android tablets at National Technical Systems (NTS) in Boxborough, Mass.

In order to use an electronic device as a replacement for paper charts in the cockpit, Part 135 and 121 operators must receive formal approval from the Federal Aviation Administration. This testing is one component of the approval process detailed in the FAA's Advisory Circular AC 120-76C.

NTS tested tablets to 51,000 feet in compliance with the FAA's requirements for authorized use in the cockpit. Testing was performed on four different Android powered tablets made by two different manufacturers, Samsung Galaxy Note 10 and Galaxy Tab 3, Nexus 10, and ASUS Memo Pad HD7.

"No inconsistencies were discovered during testing of any of the four Android models," said Ken Wilson, founder and president of FltPlan, the largest flight-planning service in North America that supports 145,000 active pilots representing over 65 percent of all business aviation. Earlier this month, FltPlan released FltPlan Go for Android, the mirror image of its iPad Go app, giving pilots the choice to use which ever device fits their needs.

"We find that our pilots' habits vary greatly and in order to meet their needs we needed to create apps for more than just one device," Wilson said. "And now with the testing finished we can help them obtain FAA approval as well."

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## Saab and UK Ministry of Defense Sign New Contract

Defense and security company Saab and the UK Ministry of Defense have, signed a three-year new contract for a managed training service for British Army Overseas Training Exercises utilizing Saab's DTES system.

Saab's Deployable Tactical Engagement Simulator (DTES) system provides the infrastructure, instrumentation and resources to enable force elements to conduct realistic, live, force-on-force training while the movements and combat performance of individuals, vehicles and equipment are tracked and monitored for After Action Review. The UK Ministry of Defense has, after a competitive process, chosen Saab for this solution which is structured for light-role Infantry Battle Groups training. The exercising troops conduct collective training from Platoon level to Brigade HQ.

"Since 2009 our technical training staff have effectively been an embedded resource within the British Army and have supported up to seven exercises per year. Saab sees this new contract as recognition of the strong working relationship we have developed with the British Army" says Henrik Höjer, MD, Saab Training & Simulations.



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## Google Glass at Copenhagen

Copenhagen Airport has given Google Glass the "thumbs up" following a successful trial by its passenger services team. Working with SITA Lab, the technology research group at SITA, Copenhagen Airport is the first airport in the world to trial Google Glass. Results from both passengers and the airport service team have been positive, with the innovative technology enabling superior passenger service.



Marie-Louise Lotz, Director Customer Care, Copenhagen Airport, said: "The feedback from our passengers and service team has been overwhelmingly positive. We found Google Glass very easy to use and more user-friendly than other devices such as tablets. We can reduce the amount of paper our Duty Managers need to carry to give great customer service, such as duty rosters, desk allocation sheets, peak prognosis, passenger numbers and cruise arrivals. And because the devices are hands-free, our managers are not focusing on a screen and can engage better with our passengers."

The team also noted that having access to services like Google Translate and gate, baggage or flight information would help them improve the dialogue with passengers. Sharing information with other colleagues on duty by using the camera for documentation purposes and publishing photos on a closed work forum promotes instant interaction between Duty Managers.

Speaking at the Air Transport IT Summit in Brussels, Jim Peters, Chief Technology Officer, SITA, said: "SITA has led the way with airlines and airports in the trials of wearable technology, including Google Glass. The killer benefit is that this technology is hands-free and enables a new way of working. At Copenhagen Airport we have seen real benefits for both passengers and service staff. From an operational point of view, the ease of adoption and the user-friendliness of the Glass devices are great – it only takes a day for staff to familiarize themselves with the new equipment."

There are, however, still some technical issues to iron out. Peters commented: "The devices need improved scanning capability, battery life and reduced heating during operation. But the potential for widespread usage in the air transport industry is great. SITA will continue testing and researching the best ways for this innovative technology to be embraced by airports and airlines." The Google Glass project builds on established services at the airport including common-use check-in, self-service bag drop and self-service boarding gates.

## SNC and FLYHT Renew Relationship

Sierra Nevada Corporation (SNC) and FLYHT Aerospace Solutions have renewed their strategic relationship by updating their license and manufacturing agreement and adding a value-added reseller agreement.

The relationship involves FLYHT's Automated Flight Information Reporting System, or AFIRSTM product and services. The AFIRS system operates on multiple aircraft types and provides functions including aircraft position, on-demand streaming of black box data, voice and text messaging, and data collection and transmission. AFIRS sends that information to its companion, UpTime, the ground service product, which stores and transfers the data to the customer in real time. Aircraft operators can use this information to increase safety, improve service, and enhance profitability.

FLYHT will continue to lead sales and service activities in all civil aviation markets, and SNC will lead sales in the United States and NATO military and government manned and unmanned aircraft markets.

"We are pleased and excited to renew our relationship with FLYHT. We believe that the need for AFIRS in the military and government aircraft industry is significant and the multi-feature offering of the AFIRS unit is critical in today's budget-constrained environment. AFIRS' can improve the efficiencies of operating and maintaining aircraft while also reducing the operation and maintenance cost and improving flight safety," said Greg Cox, corporate vice president for SNC's Communication, Navigation and Surveillance/Air Traffic Management business area.

"We look forward to a long, beneficial relationship with SNC," said Bill Tempany, CEO of FLYHT. "We are truly motivated by reframing our relationship with SNC in a way that will see both companies thrive from the work we have done on AFIRS. We are particularly excited to have SNC as a strong partner to bring the benefits of AFIRS to both the military and unmanned aircraft marketplaces which would otherwise be out of reach for our company."



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"Innovation is taking two things that already exist and putting them together in a new way."

*Tom Freston, Entrepreneur*

# Insights into MRO Innovations

In a world of apples-to-apples capability comparisons, leading MROs are actively looking for new and innovative offerings to set themselves apart from the competition.



by Dale Smith

# W

hen you look at the MRO business today, you'd think that it would be very hard for one shop to really differentiate itself from another. After all practically every step of every inspection or maintenance procedure is spelled-out in the aircraft OEM's approved maintenance manual. And those are "rules" you just can't afford to break.

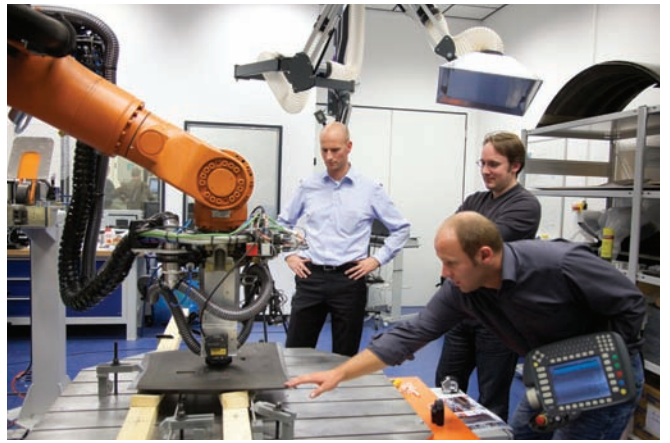
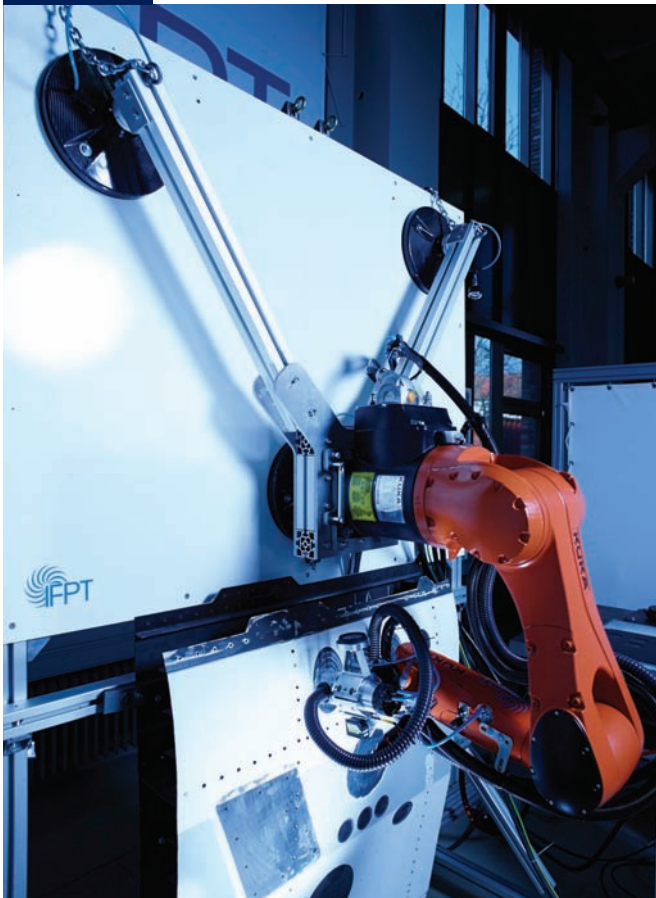
But thankfully, innovation is alive and thriving at MROs around the world. To stay ahead of their competition, leading shops are examining and rethinking every aspect of their daily

business to find new and innovative processes to save time and money.

Whether it's shaving a few minutes off of a task or developing a new tool or software application to streamline a process, even a small innovation can reap huge savings for its customers and translate into a significant advantage for the shop.

## **Innovation Is Where You Find It**

Back in the day "innovations" just sort of happened. You'd



A multi-year research project at Lufthansa Technik resulted in a rapid repair process for composite structures. Once the repair process was determined, further development adapted that process, enabling mobile application of the new repair method. The end result is significant cost reductions. Lufthansa Technik photo.

find a better way to do something and it became part of a company's culture. There's too much riding on it to leave innovation to chance today. Leading MROs are making innovation part of their corporate culture.

"Our entire motivation for innovation comes from our Chairman down," stated Dany Kleiman, aviation group VP, repair and engineering for AAR Corp. "We are always working in three key areas: One is to stay close to our customers. Second is to be innovative. And third is to execute. That's the golden trio we follow in our planning."

Kleiman said that AAR's large airline customers are encouraging the MRO to look for ways to innovate and improve processes. "We actually got a mandate from one to re-plan their scheduled maintenance in a way that will drive their turn-times down and save on some routine inspections," he said.

"As an MRO we are really selling labor and any way we can reduce labor time becomes direct savings to our customers," explained AAR's VP & CIO, Kevin Larson. "One way we're reducing turn time is through our StAAR work card and labor collection system. One of its big benefits is touch-screen access that drive the functions

around time, attendance and quality assurance."

"We recently had a new airline customer bring their nose-to-tail fleet and they were very excited to be able to directly leverage the real-time tracking benefits of StAAR," he said.

### **Innovation on a Global Scale**

Obviously AAR is not the only MRO that's putting an emphasis on innovation. European giants AFI KLM E&M and Lufthansa-Technik AG have both taken masterful strides in turning innovation farming into key business initiative.

"In order to further differentiate from our competitors, we decided to approach innovations even more systematically and at a larger scale," explained Dr. Helge Sachs, head of Corporate Innovation Management and Product Development, Lufthansa Technik AG. "Thus, our R&T (research & technology) budget was quadrupled to €200 million (\$272,000,000 U.S.) through 2018."

"Furthermore, we set up the unit 'Corporate Innovation Management and Product Development,' which coordinates all innovation activities together with specialized innovations teams in the different product divisions," he said.

As part of its Lean Six Sigma strategy, AFI KLM E&M launched the "Moonshine" program designed to stimulate team based creativity and innovation. (Moonshine is a Japanese lean manufacturing philosophy that seeks innovative methods to improve ergonomics and safety.)

"Starting with what we call participative innovation, i.e., innovations conceived by the workforce, we currently have a structured system in place in which we strive at supporting our employees maximally to use their creativity and craftsmanship to improve their own processes," Jennifer van Horn, program manager Moonshine, AFI KLM E&M said. "We continuously work on improving this system and we are at this moment in the process of integrating the existing participative innovative programs into one system."

"This way we will create an enormous leverage which will be beneficial for our employees and which will improve our processes," she added. "We are currently exploring ways to get the best of both worlds, i.e., our own employees for our internal innovation and in the outside world for implementing new technologies in our own processes."

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## Lufthansa Technik

More mobility for the world



AAR has put in place an IT-based application called "Strategic Tools for AAR" (StAAR), allowing the company to communicate both internally and externally with each customer. AAR photo.

AFI KLM E&M sees such great value in encouraging its technicians and engineers to find innovative approaches the company holds annual "Innovation Days" in Paris and Amsterdam. According to the company, the competition is organized to reward the best ideas from employees that can help the company and boost its competitiveness.

And apparently AFI KLM E&M employees take it very seriously. This year's competition drew over 4,000 suggestions.

While Lufthansa Technik AG also relies heavily on innovative ideas from its technicians and engineers, they also go outside the company for inspiration and development. For example, in 2009 the company engaged extensively in the "excellence initiative" from the German Federal Ministry of Education and Research.

"Within this 'Spitzencluster' program we launched 13 publicly funded R&T projects," Dr. Sachs said. "In parallel, LHT increased its R&T activities with a number of projects funded by the Federal Ministry for Economic Affairs and Energy within the framework of the German Aviation Research Program."

"All-in-all, we have launched more than 40 R&T projects in the past five-years with an overall budget of more than 50 million Euros (\$68,000,000 U.S.)," he said. "These activities will be quadrupled by now."

"Often innovations start out small, like the idea to develop the engine washing technology 'Cyclean,' which initially started as a master thesis," Dr. Sachs explained. "Now it is a very successful product, which we are still improving through ongoing R&T activities."

## The Future is Innovation

With so much at stake for MRO's of all sizes, it's no surprise that innovation in any of its forms is front and center of everyone's activities from the shop floor to the executive suite.

"As part of our process, we looked at how we could innovate our business management and operations processes in a way that would enable us to be more efficient and competitive while bringing a higher-level of value in terms of quality and turn-times to our customers," AAR's Kleiman said. "Our general managers and leadership team provide the tools and resources for our quality action teams, which are run by our floor people who determine what kind of quality actions we need to put in place to create ways to provide higher value to our customers."

"Continuous innovation is definitely the way forward," Ms. van Horn said. "We consider both applied and fundamental research crucial for our business and specifically in relationship with our strong CSR program."

## A Look at Some Significant Innovations

In today's world innovations can take a variety of forms. From the simple to the complex, here are a few that MRO's have recently introduced.



Claude Dubois, an AFI KLM E&M technician, created an innovative process that enables on-wing erosion measurements of the abrasion shroud found on GE90-110B/115B engines. AFI KLM E&M photo by Patrick Delapierre.

### ▪ A StAARing Role

To streamline and track virtually every step of an aircraft maintenance project or inspection, AAR has put in place an IT-based application called "Strategic Tools for AAR" (StAAR). While most MROs outsource these kind of systems, AAR's IT group developed StAAR specifically for the company's particular requirements.

According to the company, StAAR has more than 350 user interface screens and 550 database tables, providing the breadth and depth required by a comprehensive enterprise resource planning system.

"The system allows AAR to communicate both internally and externally with each customer, expanding its value proposition across business segments and enabling the company to work closely with the customer to optimize their specific goals," AAR's VP & CIO, Kevin Larson said. "Customers access the system through the Online Partner Services (OPS) area on AAR's website and can view the status of any project in real time."

### ▪ MEERA Tracks Engine Parts

Keeping real-time track of all the hundreds of individual components needed during jet engine maintenance is a monumental task – especially if you try to do it with pen and paper. Portugal's TAP Maintenance and Engineering has initiated the use of an innovative solution called MEERA (Mobile Enabled Engine Repair Application).

When an engine comes in for maintenance, ultra high frequency Radio Frequency Identification (RFID) labels are codified, printed and attached to individual components. As the components travel throughout the subsequent maintenance processes, each part's unique identity can be easily tracked with a handheld RFID reader. Parts that come in with a particular engine stay with that engine.

According to the company, this innovative mobile solution enables fully visible and secure tracking of all components through the disassembly through reassembly of an engine, which generates greater efficiencies through the entire process. The company also uses MEERA to streamline individual workshop processes including inventory, "mini module kitting," and parts search.

### ▪ A Roll of Tape

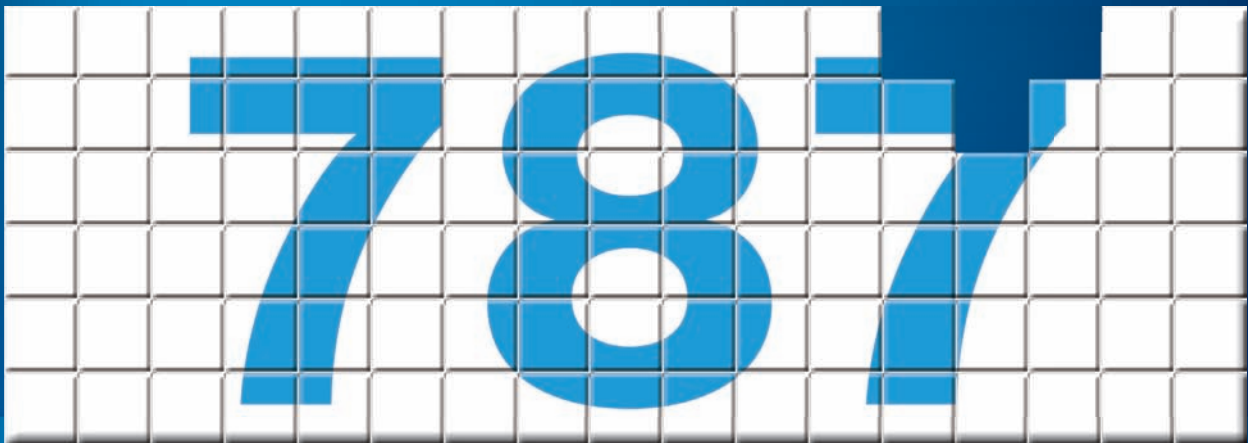
AFI KLM E&M has introduced an innovative process that enables easy, on-wing erosion measurements of the abrasion shroud found on GE90-110B/115B engines. Created by Claude Dubois, an AFI KLM E&M technician as an alternative to the OEM's process, enables the MRO to do the "inspections faster, cheaper and requires no custom tooling other than tape, a marker pen and a graduated metal ruler."

"The principle is simple," Dubois explained. "All you need to do is use a fan blade as a reference and measure the distance separating it from the axil joint location between the two abrasion shroud zones.





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MEERA (Mobile Enabled Engine Repair Application) uses RFID to allow secure tracking of all components through the disassembly through reassembly of an engine. TAP M&E photo.

This reference is used to measure and log the erosion at around 20 other points on the shroud. The results can then be used to determine the engine's continuing service time by means of an Excel formula."

According to AFI KLM E&M, this innovation has a number of advantages: it eliminates the need to remove a fan blade, use a special tool or require a post-inspection engine run-up. The new process also takes only three man-hours instead of the OEM's method, which took up to 48-hours (in the event that an engine run-up was needed), thus reducing AOG time by up to 75 percent.

### ▪ CFRP Repairs go Mobile

Lufthansa Technik AG has recently developed an automated process for rapid, reproducible repair of carbon fiber reinforced polymer (CFRP) materials. Recently introduced by Lufthansa Technik AG, the new Composite Adaptable Inspection and Repair (CAIRE), is an extension of the MRO's in-place CFRP capabilities. Jan Popp, CAIRE project manager stated, "Thanks to the new robot we can even repair large surface damage on the fuselage or wing in an 'on wing' procedure. Repairs that were barely imaginable until very recently are now possible," he said.

CAIRE's mobile robot is equipped with the software needed to actually recognize free form, 3D surfaces up to 1,000 x 1,000 millimeters. After scanning the damage and modeling the surface area, the CAIRE robot will calculate a pattern for the scarfing and milling path. The robot then grinds out the damaged material, and then produces pre-cut materials to fit that pattern.

The materials are then manually inserted, glued and cured in the 3D scarfing surface created by the robot on the fuselage. According to the MRO, "With the help of CAIRE, pure gluing repairs to critical high-performance composite structures can now be made certifiable."



AFI KLM E&M is using anti-FOD toolboxes with foam liners pre-cut shadows.

AFI KLM E&M photo by Patrick Delapierre.

### ▪ Tracking with RFID

Another shop innovation introduced by AFI KLM E&M is the use of anti-FOD (foreign object damage) toolboxes for use by its team of mechanics that overhaul evacuation slides. Each of the new toolboxes has foam liners with pre-cut "shadows" corresponding to each of the tools it contains. Then if a tool is missing from the box, the mechanic can immediately identify it.

As an added safety step the MRO has also began using Radio Frequency Identification (RFID) tags on individual tools. It's an innovation that the company says is the first of its kind in the industry.

"All the tools used by our evacuation slide mechanics are fitted with them, making the overall process as reliable and secure as possible without increasing the length of the overhaul process," stated AFI KLM E&M R&D manager, Patrick Peureux. "Once they have been repacked, the sliders are put through a 'tunnel' where they are scanned by 14 antennas. With this combination of anti-FOD toolboxes and RFID chips, here is no way a stray tool can slip through this high-tech net."

### ▪ "Moonraker" Universal Cart

A major challenge for any airline or MRO maintaining a mixed fleet is the trade-off/dilemma to have standard or specialized equipment. AFI KLM E&M has created Moonraker; a "dedicated" service cart that improves safety, ergonomics and cuts up to 60 percent off the time of the average nose wheel change.

Moonraker has been designed to be as low as possible so that the warehouse employee can load and unload it without having to lift the wheels, which is more ergonomic. In addition, all maintenance operations carried out by the ground engineers, like retrieving their tools or inflating the tires, are performed on only one side of the cart, which eliminates unnecessary movements and reduces the chance of injury. **AM**

“Even though our maintenance team is highly experienced, we learn something new from FlightSafety each time.”

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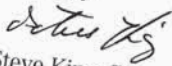
My father, an A&P technician for Delta Airlines, took me to the hangar when I was young to see the aircraft and explain what he did. I was fascinated and soon wanted to work in aviation as well. Early on in my career, I realized that it takes both personal dedication and training to be the best, and to stay ahead of the constant changes in technology.

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Sincerely,



Steve King, Director of Maintenance, Cox Enterprises



# Aviation Maintenance Software: A WORLD

# of CHOICE

By Charlotte Adams

**A**Aviation maintenance software is pervasive today, as managers shift from pencil and paper to some degree of digital assistance. And there's a world of choice. At last count some 100 different maintenance and engineering applications occupied this space, and now there are probably more. There's something for everyone—it's just a matter of finding out what the options are.

Although there is much overlapping between offerings, there are certain broad classifications. Some applications, like enterprise resource planning (ERP) systems, include financials and human resources. Others, which are extremely broad within the maintenance arena, may call themselves aviation or MRO ERPs. Many applications inhabit the middle ground, helping users to manage a wide range of maintenance functions. The differences, however, seem to be somewhat a matter of interpretation.

Other applications are more specialized to maintenance, focusing, for example, on

tracking the status of projects or regulatory and business documentation. As a minimum, most maintenance software applications do job tracking at some level. Others monitor the supply chain—parts, pricing and availability. Still others help managers to keep a very granular view of project status, so that resources can be shifted based on need.

The processing structure and the interface also vary. Some applications are installed on the user's internal servers. More and more applications developers also are offering remote cloud-based processing, as well, along with applications geared to mobile devices and interfaces that are specialized to job functions.

We take a look at almost 20 companies, some of which feature multiple offerings. It is intended to give readers an idea of the scope and variety of maintenance software offerings available today.

## ▼ ERP and ERP-Like

### Ramco Systems (ramco.com),

established in 1999 and headquartered in Chennai, India, entered the aviation maintenance market in 2003. Some 260 of the company's more than 1,700 employees work in the aviation area. Ramco considers its Aviation Suite—which includes HR and finance/accounting modules—as an ERP solution.

The software focuses on maintenance management for fleet operators and MRO service providers. It includes functions such as maintenance & engineering, materials, finance, sales & HR, along with corporate performance management and collaboration capabilities. Among other offerings are electronic signatures, reliability management, document management and mobile data collection. The maintenance and engineering module helps in the management of aircraft/component configuration, programs, service bulletins/airworthiness directives (SBs/ADs), planning and execution (line, hangar, engine and component shop), cost tracking, task cards.

The software runs on the SQL2012 database and can be hosted at a customer site or remotely via the cloud. One differentiator is the software's "workspaces," which personalize interaction with the software to specific roles in the organization.

## FUSION of Transactions, Analytics , Optimization and Visualization WorkSpaces



## ▼ ERP and ERP-Like

### Pentagon 2000 (pentagon2000.com),

headquartered in New York City, has offices in the U.S. and Singapore. It addresses aerospace, defense and other industries.

The company describes its software, PENTAGON 2000SQL, as an ERP. It classifies modules as core, add-on, general and material management. Core modules include functions like inventory, quotes/sales, vendor requests for quotes (RFQ)/purchasing, shipping/invoicing, claims, e-catalog, virtual warehouse manager, tools/equipment manager, barcoded documents and electronic forms. The product uses the SQL database.

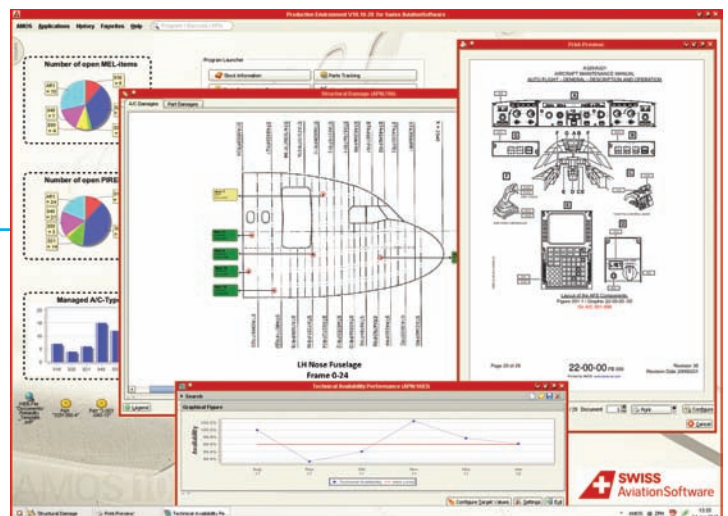
## ▼ ERP and ERP-Like

### Swiss AviationSoftware (swiss-as.com),

founded in 2004 and headquartered in Basel, serves some 130 customers worldwide, with branches in Miami and Singapore. Most users of its AMOS software—developed earlier by a predecessor company—are from commercial aviation, but also include business and general aviation operators.

AMOS is considered an "MRO ERP," according to CEO Ronald Schaeuffele. A fully integrated set of modules, the software is installed on customer site servers over a period of four to 18 months, depending on the complexity and size of the business. AMOS is used with Sybase and Oracle databases and is often interfaced to larger ERP systems. It can support up to several thousand concurrent users per site.

Among its functions, AMOS provides engineering, material management, planning and production modules. Schaeuffele



cites the system's high degree of integration, functional depth and ease of use.

Regarding the latest release, AMOS 10, Schaeuffele stresses improvements in advanced planning and resource management functions that will continue to evolve over the next several releases. AMOS 10 also introduces a "central workstep repository" that reduces manual input and consolidates certain data into a single view. There is also additional support for international operations with financially independent units and with multiple operators.

## ▼ ERP and ERP-Like

### Rusada (rusada.com),

is a Swiss company with offices in Europe and the Far East. Its customers include airlines, business aviation, factory MROs, defense forces and other entities.

The company's Envision software suite—a self-described “aviation ERP”—covers fleet management, maintenance, materials and tooling, quality, labor management, flight operations and financial transactional control, and provides data warehousing and reporting.

Envision can run on customers' servers or be hosted through a third-party cloud provider. Installations vary in time from four to eight months, depending on the complexity of the company. It is built on Microsoft.Net, using a SQL database, but it integrates with SAP and Oracle.



The latest release, version 1.8, adds functions such as custom fields and the attachment of multiple images to interactively record damage. The company has also developed Android applications for flight logs and order management that are fully interactive with Envision.

## ERP and ERP-Like

### Decision Software

### Systems (decisionsw.com),

located in Wellington, Fla., started in 1989. Its AvPro software (avprosoftware.com) offers customers the option of choosing specific functions or a suite that is integrated into the company's ERP accounting solution. AvPro focuses on business and government fleets, small charter airlines, MROs, and repair stations.

Among the AvPro modules are: airframe, engine and component maintenance,

inspection and tracking; inventory management; work orders/task card, time tracking; parts quotes, sales orders, accounts receivable/payable, and asset management. New features include support for partial billings on large in-process work orders; tool calibration management, time control, weight & balance calculations, teardown quotes and vendor/purchasing analysis.

Gerry Merar, company president, stresses affordability, customizability and ease of use. The software is accessible via customer servers or cloud-based methodologies. The applications are priced



at under \$3,000 for a single user/computer up to \$36,000 for all application options integrated with an unlimited number of users and airframes, he says.

## ▼ All-in-One

### EmpowerMX

### (empowermx.com),

based in Dallas, has more than 100 employees in London, India and the U.S. The privately owned company, with more than 12 years in the business, focuses on commercial and military aviation.

EmpowerMX offers three vertical solutions: FleetCycle Aero for airline maintenance operations, FleetCycle MRO for third-party MROs and FleetCycle TS (technical services) for process outsourcing. FleetCycle Aero includes modules for the program manager, the planning manager, line manager, production manager and material manager, as well as an electronic logbook. FleetCycle MRO includes modules

for the MRO manager, the line manager and the material manager. It also has a billing and invoice module that allows options such as daily or progress billing. The TS solution includes tools for programs, planning, configuration and materials management.

In Q3 of 2014 the company plans to release “100 percent digital,” “mobile-native,” versions of its Aero and MRO software, which will run on Apple, Android and Microsoft tablets. An eLogbook application (part of FleetCycle Aero) will be available on iOS and Android phones as well as tablets. Both Delta Airlines and Delta TechOps plan to use FleetCycle mobile software, says Dinakara Nagalla, EmpowerMX's CEO. The software is accessible via the cloud, and some fleet operations are now 100 percent cloud-based, he says.

Nagalla cites ease of use as a major differentiator. EmpowerMX has found that



technicians require less than an hour of training and managers, about four hours. The solutions also “support Lean and Six Sigma on the shop floor,” he says. Information flows up as well as down, as the software is used by everybody in the organization. Users also can buy only the modules that they need, rather than taking “all or nothing,” Nagalla says.

## ▼ Maintenance Superset

Miro Technologies

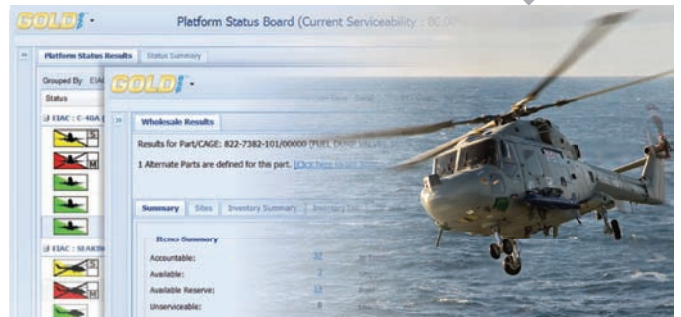
(mirotechnologies.com),

established in 1981 and now a Boeing subsidiary, bills itself as providing a vertically integrated, end-to-end logistics and asset management solution. It focuses on defense and commercial aviation, including contractors and manufacturers as well as government entities.

Miro's GOLDesp software manages maintenance, supply, repair and logistics issues, such as supply chain.

Among specifically maintenance functions, the application covers functions such as planning, job management, labor rate and materials cost tracking, and operational statistics.

GOLDesp is installed on client servers and is a browser-based solution. A forthcoming product will integrate transportation management with the maintenance and supply solution.



## ▼ All-in-One

Commsoft (commsoft.aero),



founded in 1971, is based in the UK with offices there and in Australia, with partners in India and Singapore. Its flagship product, the Open Aviation Strategic Engineering System (OASES), is used by more than 50 organizations, including airlines and MROs worldwide.

OASES is a self-described "best-of-breed MRO IT system." The software uses an Oracle database, and installations range from PC networks to large LINUX environments. Modules cover a range of maintenance functions, such as inventory control, purchase and repair order processing, technical record keeping, forecasting, defect management, shop data collection, work-in-progress and time/attendance monitoring, scheduling, line maintenance control, and evaluation of regulatory and technical publications. The application also collects and collates operational data to generate reliability statistics.

OASES is installed at the client site and runs on discrete servers. Access is based on a monthly subscription, with a "continuous release model," allowing customers to use the latest software release at no additional charge.

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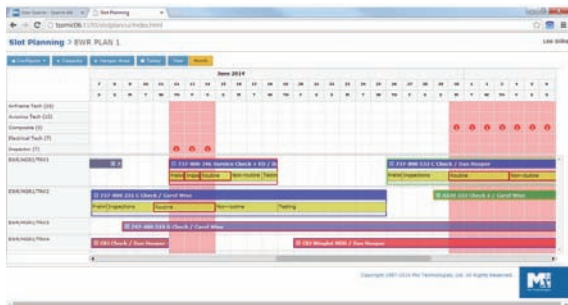


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## ▼ Process Management

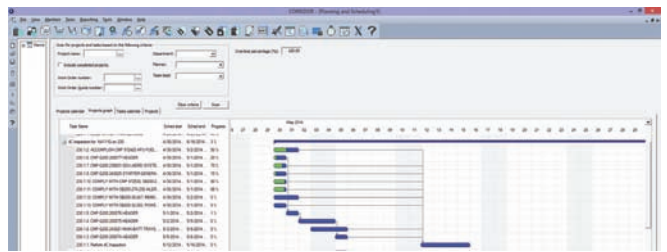
Mxi Technologies (mxi.com),



based in Ottawa, Canada, supports some 44 customers, representing over 11,000 aircraft and aviation assets worldwide. Its products are supported by more than 200 employees in Canada, the U.S., Europe and Asia.

The company offers two solutions: Maintenix Operator Edition and—new this year—Maintenix MRO Edition. The Operator Edition targets asset management organizations handling maintenance as a cost center by enabling collaboration, control, and continuous improvement. Key modules include line maintenance, heavy maintenance, material support, and quality, compliance and return on experience.

The MRO Edition is an “end-to-end business management tool” for independent repair stations and service providers that focuses on maintenance as a profit center. It covers business activities such as bidding/quoting, planning/prep, executing to contract, release/invoicing/reporting, inventory and workforce management, and quality management.



## ▼ Process Management

Continuum Applied Technology  
(corridor.aero),

based in Austin, Texas, has developed and deployed CORRIDOR Aviation Service Software since 1996. Customers include MRO shops, FBOs, operators, component shops and refurbishers.

The CORRIDOR suite provides process automation—from quoting through job execution and invoicing. Key features include: maintenance quoting, planning and scheduling, work orders and shop floor execution, job costing and invoicing, procurement and inventory (including integrated rotatable management), regulatory compliance, parts sales and quoting, FBO support, and subledger.

CORRIDOR is a Windows application using an Oracle database. The interface streamlines processes, and many actions can be performed through barcoding, including labor collection, job starting/stopping, and parts transfer and issuing. The interface is also personalized to specific job functions. CORRIDOR can be installed at the client's site or be hosted, backed-up, and maintained by Continuum and accessed via a secure Internet connection.

The latest, version 11 software introduces tool crib, time & attendance and planning & scheduling modules, as well as incremental work order billing, inventory kitting, support for multilingual entry and mobile apps that target specific job functions.



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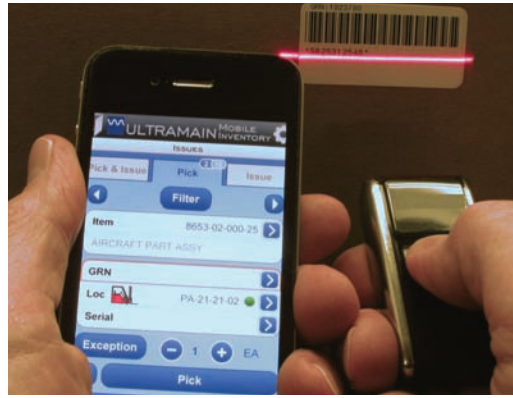
## ▼ Process Management

TracWare ([tracware.co.uk](http://tracware.co.uk)),

established in 1999, focuses on third-party MRO organizations. Located in the UK, the company has more than 60 customer sites worldwide and representatives in Australia and Singapore.

AeroTrac covers Part 145 aircraft maintenance, continued airworthiness maintenance planning, engine and component overhaul, piece part processing, Part 21 manufacturing and aircraft modification, and parts distribution, including the technical, commercial, logistical and financial business processes they involve, the company says. Among its differentiators, TracWare cites the "unusual policy of adding in enhancements to the software under the support contract at no additional cost."

AeroTrac is a client/server application, using the Microsoft SQL Server database. It includes optional and mandatory modules. The company currently is working on a seamless upgrade, with a fresh look and feel, and a Web interface.



## ▼ Process Management

Ultramain Systems ([ultramain.com](http://ultramain.com)),

based in Albuquerque, N.M., provides integrated maintenance and logistics software to military, commercial aviation and other sectors. It has been in business more than 20 years.

The company classifies its aviation maintenance software into onboard systems, maintenance, supply chain, financial and iOS apps. Under maintenance it includes functions such as configuration management, modification control, programs and planning, capacity modeling, aircraft health and reliability management, line, base and workshop maintenance, labor management, and scheduling. The software uses Oracle, SQL, and other databases.

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\*Based on CFM, GE and independent third-party research.

## ▼ Maintenance Management: Workflow

### AV-BASE Systems (winair.ca)

develops and supports WinAir, a workflow management application covering all the typical maintenance business processes. It also is a project management tool with maintenance scheduling and production management functions. The more than 30-year-old company employs a work force of about 50 people in London, Ontario. AV-BASE serves hundreds of organizations in 30 countries, according to the company. It also performs audit services.

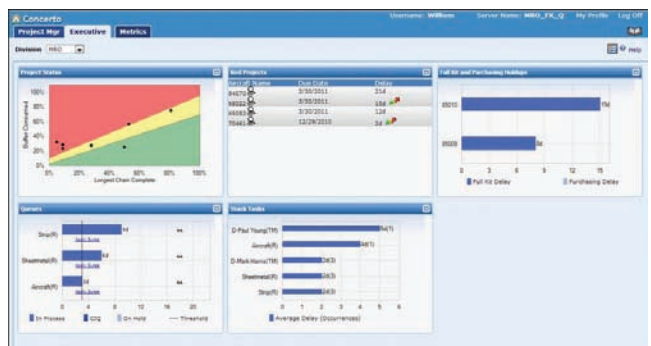
The WinAir maintenance system is template-based, meaning that for each aircraft type, the manufacturer's maintenance manual or specific operator requirements are loaded into the system and then applied. The software is built on the Microsoft SQL Server database.

WinAir is available in three progressive packages to suit operations' evolving needs. The software is modular, and customers can select elements. It can either be run internally or hosted externally and accessed via client-side and Web-based applications. WinAir 6.1 is the company's latest browser-based application.



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## ▼ Project Management

### Realization Technologies (realization.com)

Concerto software is built around critical chain project management/ theory of constraints. The private company, headquartered in Sunnyvale, Calif., has offices in India, France, Japan and South Africa. Its work force ranges from 50 to 100 employees.

Concerto is a multi-project management system that allows large projects to be monitored, so that bottlenecks can be identified and corrected as they emerge, reducing cycle time and cost and increasing efficiencies and throughput. The software has been used in aircraft and engine repair and overhaul by military and commercial maintenance centers, some of which employ thousands of people and work on hundreds of aircraft a year. Examples are the USAF's Ogden and Oklahoma City Air Logistics Centers.

Concerto enables the day-to-day managing of shared resources between projects and multi-project scheduling and execution. It works with standard databases such as Oracle and SQL Server and integrates with ERP software like SAP. Software installation takes a few days although business processes implementation takes about two months, according to the company.



## ▼ Data Communications

Aerexchange  
(aerexchange.com),

in Irving, Texas, focuses on the ecommerce side of maintenance. It is a "supply chain solution" that provides an electronic business network supporting MRO business processes from order creation to final invoicing.

Aerexchange supports automated document exchange, tracking requests for quotes, orders/invoices, and parts loans and exchange transactions, as well as many other functions.



## ▼ Maintenance Management: Workflow

Aviation InterTec Services  
(aviationintertec.com),

a 16-year-old Canadian company, provides maintenance management software and workflow consulting to enterprise maintenance organizations. Its Remote Access Aviation System (RAAS) is "perfectly suited to regional narrow-body commercial operations," the company says.

RAAS functions include management of stores, inventory, purchasing, planning, production, technical records, and reliability analysis for fleet operators, MROs and CAMOs. New features include paperless task signoff, automated airframe time updates, labor tracking via tablets or smart phones, dispatch planning, electronic maintenance log via iPad for the cockpit, and wireless barcode scanner apps for stores room.

The software is built around the Microsoft SQL database. It can run on customer sites or over the Web. It is "100 percent browser-based, according to the company.

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## ▼ Documentation

Tdata (tdata.com),

AD	Effective Date	Description
94-10-04	06/15/94	FOREIGN OBJECTS AND DEBRIS UNDER FLOOD
94-11-06	07/07/94	AILERON DRIVE QUADRANT SUPPORT STRUC
94-13-01	07/20/94	WIRING HARNESS AT WING REAR SPARS/
94-14-07	09/09/94	REVISED BY AD 94-14-07 R1/
94-14-07 R1	07/26/95	ELEVATOR CONTROL SYSTEM MOUNTING STF
94-17-12	09/09/94	SUPERSEDED BY AD 95-26-10/
94-21-03	11/25/94	PLACARD - ELEVATOR CONTROL DECOUPLE M
94-24-09	02/09/94	REVISED BY AD 94-24-09 R1/
94-24-09 R1	04/10/95	OVERWING FABRICS/
94-25-11	01/17/95	DECOMPRESSION VENTS/
94-26-04	01/26/95	AILERON QUADRANT BALL BEARINGS/

located in Powell, Ohio, provides document repositories, maintenance tracking/reporting and inventory software tools.

IApproach and AVANT are repositories of regulatory and technical documents. Lycoming manuals provides overhaul manuals, parts catalogs, service bulletins, letters and other publications. MTrax and iTrax supply maintenance tracking/fleet reporting and inventory tracking, respectively.



## ▼ Documentation

Flightdocs (flightdocs.com)

is an on-line service that helps operators track maintenance information. Started in 2003, the service now is used to track more than 3,500 aircraft worldwide, the company says.

Among Flightdocs' on-line suite of tools, the information center provides access to records such as "due list," logbooks, work orders, inventory and budget data. Operators can also pinpoint regulations, airworthiness directives, service bulletins, and manufacturer schedules. Every feature is accessible in "two clicks or less," Flightdocs says, and customer support is available 24x7x365, according to the company. A second product, eLogbooks, provides support that is customized to an operator's documentation structure.



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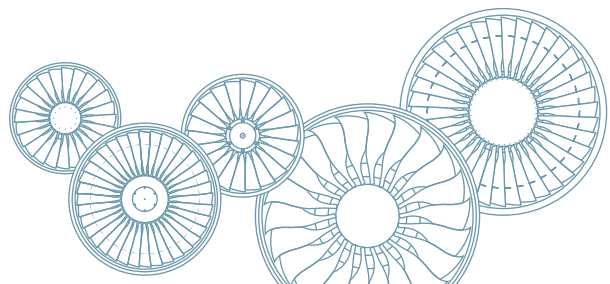


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# FLYING HIGH: Advanced Nonwoven Abrasives Help Airline Maintenance Facility Increase Productivity and Efficiency



by Jim Kraus

**M**ROs are under constant pressure to raise productivity while controlling costs. Specifying the right surface finishing product can allow airline MRO facilities to achieve the performance they need to maintain efficient and effective operations.

Recently, Saint-Gobain Abrasives worked closely with a major U. S.-based commercial airline to demonstrate the performance of their abrasives solutions. A three-part test was conducted at the airline's maintenance facility to compare the cycle time and performance of Saint-Gobain's Norton Multi-Air A975 NorGrip Multi-Air Discs, Norton Vortex Rapid Prep quick change discs and Norton Vortex Rapid Prep non-woven quick change discs against conventional competing products.

Designed for demanding dual action (DA) sanding applications, Norton Multi-Air A975 combines dust extraction with a patented ceramic aluminum oxide (A/O) abrasive. This combination results in a vacuum disc product that helps increase productivity and eliminate harmful dust.

Norton Vortex Rapid Prep non-woven products combine high-performance patented Vortex abrasives grain and proprietary smear-free resin technology allowing for faster throughput and reduced labor requirements. "Three-dimensional" construction allows all three faces of the disc to be involved in the finishing, as opposed to conventional products that use just the bottom layer of abrasive. Discs can be used down to the button with consistent cut-rate throughout an extended product life. Norton Vortex Rapid Prep can perform several times better than conventional discs on aircraft repair work including epoxy adhesive removal from carbon fiber inner

skin, carbon fiber and copper removal, and aircraft airframe blending mismatch and corner break on aluminum spars.

## Paint Removal

The first step was the initial removal of paint containing chromium from the aircraft exterior. For sanding applications in which toxic materials are involved, it is important to use vacuum dustless systems in order to safely and effectively remove harmful particulates from the air. The test was run comparing a 6" Norton Multi-Air A975 NorGrip disc against a competing clean sanding disc product. Using a Clayton Warthog Random Orbital Sander with a clean sanding back-up pad, one operator compared the two products head-to-head for surface area sanded and time spent.

The competing clean sanding product sanded 32 square inches in 2 minutes and 19 seconds—a cut rate of .24 inches per second. The Norton Multi-Air A975 NorGrip disc was able to sand 90 square inches in 7:56 (a cut rate of .19 inches per second) and then another 136.5 square-inch area in 6:48 (a cut rate of .33 inches per second). With four times the active performance time, the Norton Multi-Air A975 also demonstrated a 20 percent better cut rate.

## Paint/Carbon Fiber/Copper

Using a relatively common job—paint-removal from an aircraft exterior—another test was run pitting a 3" Norton Vortex Rapid Prep extra-coarse quick change disc against a competing coarse product. Each 12" x 12" marked-off test area was sanded by one operator using a Dotco die grinder with a 3" medium back-up pad.

The competing product took more than a minute longer to remove paint from the aircraft exterior (5 minutes and 29 seconds). Norton Vortex Rapid Prep extra-coarse quick change disc took only 4 minutes and 22 seconds. One minute and 7 seconds per 12" x 12" area can really add up when looking at the size of a plane and a carrier's fleet.

Finally, one last test was performed comparing a 3" Norton Vortex Rapid Prep extra-coarse quick change disc to a competing coarse product for the much more challenging task of carbon fiber and copper removal from inner skin of an aircraft exterior. As with the other three tests, two 12" x 12" marked-off areas were sanded by the same operator using a Dotco die grinder with a 3" medium back-up pad.

The competing coarse product took 14 minutes and 6 seconds to remove one layer of copper and two layers of carbon fiber. The operator went through 9 quick change discs. Using only 3 Norton Vortex Rapid Prep extra-coarse quick change discs, the operator was able to perform the same job in just 12 minutes and 43 seconds, demonstrating a 3:1 ratio in product life and a 15 percent faster cut rate.

## The Bottom Line

Working with the airline to establish a baseline for the three-step maintenance process, showed that on just one process, the airline could save approximately 19 percent per square inch, or more than \$46,000 dollars each year by replacing their existing surface finishing products with high performance Norton products. (To see info on the third test, epoxy removal, go online to [avm-mag.com](http://avm-mag.com)). **AM**



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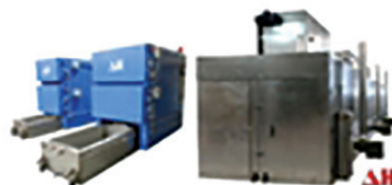
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RUSTOM SUTARIA is director of Content & Knowledge Services for Avia Intelligence, a provider of aviation training and consultancy services founded in 2013. Sutaria has spent 20 years in aircraft engineering and maintenance, of which 15 years has been spent working for various high-profile aviation businesses in technical Services functions. Sutaria's aviation consultancy (ARCGlobal.info) provides training and consultancy support predominantly within civilian aviation disciplines, and specializes in aviation safety and regulatory training development and delivery. Sutaria is a graduate of Kingston University with a B.Eng. (Hons.) in Aerospace Engineering, and also holds an MSc in Aircraft Maintenance Management from City University in London. He is also an active member of both the Executive Council & Technical Committee of the International Federation of Airworthiness (IFA), and a Member of the Royal Aeronautical Society.

## POOLED PARTS ON LEASED AIRCRAFT

The mere mention of sourcing aircraft components from pooling silos to an aircraft lessor will be met with a somewhat pregnant pause and a firm yet professional response: "Not on our aircraft!" The question is, why there is so much caution with regard to the utilization of pooled spares? Let's take a look at the concerns. Is a mutual lessor/operator balance possible?

### The Leasing Perspective

The lessor's mission is to maintain asset value. That means redelivering the aircraft with as many of the original titled parts as possible. Lessors recognize that operators dip into pooled spares in order to get out of an operational corner. The principle is even more prevalent with large fleets. To this effect, the regional and low cost carrier model, where cost control is critical, are more likely to utilize pooled parts than their somewhat more cash-rich legacy or full-service counterparts. In the main, lessors prohibit the use of pooled components onboard. However some lessors do cite notable exceptions to the rule, where pooling agreements are with Tier 1 OEMs and major international airlines, and do not reject pooled parts on their aircraft. If an operator wants to utilize a spares pool, there is no reason this cannot be incorporated into the leasing agreement.

However, the lessors' main concern is the utilization of rogue parts, which demonstrates both safety and reliability issues when examined closely in terms of the component trace. Not least, the more commercial objective of "time-value and utility" forces them to avoid pooled parts on their aircraft. Low reliability and rogue status may not be entirely down to the human element but more so that of the issue of piece parts in terms of the quality and robustness of the components utilized during maintenance and repair. Regardless, a good level of approved aircraft maintenance may restore reliability levels, and hopefully elevate these components above rogue status.

When asked what would it take to make pooled parts more acceptable to lessors, the answer lies within the components' ability to demonstrate "similar time-value and utility" in comparison to the components that were originally supplied by the lessor with the aircraft. Regardless, if pool parts were to be supplied, then most lessors provide an age tolerance of no more than 110 percent of the life of the leased aircraft.

Complications begin to set in where complex assemblies are concerned. None more so than with engines. Lessors are absolutely resolute that they will not accept an aircraft redelivery without the original engine serial number that the aircraft was delivered with in the first place. However, engines, like any component can wear out or sustain damage that put it beyond economical repair. As such, lessors are offered replacement engines which may well come from a pool. Due diligence is strictly applied in these circumstances, and leasing organizations spend a lot of time and resources ensuring that time-value and utility criteria, a full "back-to-birth" trace investigation on all of the engines offered to them. Quite rightly, they must satisfy themselves that the engine offered is as good, if not better, than the one originally issued.

A key element of the due-diligence focuses around the LLP stack. There are three elements to this. The first

element ensures that the entire stack has come from reputable sources, and has not been involved in any event, incident or accident. The second element ensures that the LLP stack is properly certified in terms of its components. The third element ensures that cyclic data is correct, up to date and can be easily validated. Here is where assessment of the time-value and utility is accomplished.

Finally, the fourth element is confirming who actually owns the engine and whether or not it is legally held and comes from a reputable source. Engine due diligence is a complex issue and the majority of lessors usually have a dedicated power plant organization that is exclusively charged with this task.

On the face of it, it does seem that the perceived inflexibilities and cautious approach to the application of pooled parts on-board leased aircraft is perhaps not as acute as first thought. However, commentary from the perspective of the operator still suggests that lessors can do more. Now let's address that which operators would like to see from lessors.

### The Operators Perspective

It goes without saying that any utilization of pooled components corresponds with the operators' duty to safety and airworthiness. Every operator should be taking every effort in reducing the risk of an incident or accident. Operators frequently forget that an aircraft can be redelivered to the lessor with nearly (if not) new spares fitted to the aircraft. In this regard the lessor more than likely would say, "Thank-you very much and do that again with the next aircraft." However, operators are becoming increasingly vocal with regard to a lack of recognition during redelivery negotiations of these new or newer parts, and are questioning why lessors are unable to offer operators off-sets against other components that perhaps have either reached or even exceeded the 110 percent rule, and dismiss lessor rationale for the avoidance of rogue components as "just an excuse."

Parts break for a variety of reasons and operators suggest that lessors need to assume a less prescriptive stance in favor of a balanced approach. If there are younger parts on the aircraft, why not take that into consideration. Then both the operator and the lessor can balance-up the average age of all of the components. Add to this, the application of greater common sense to any definition of reliability and the reliability program would go some of the way towards making the redelivery process less painful where pooled parts are concerned.

The importance of spares pooling to any maintenance/airworthiness strategy is on the increase. Not many operators can afford to tie up millions in materials for their fleets and numerous commentators cannot see how start-ups or even established LLCs and regionals can afford to do anything but lease aircraft spares from pooling silos.

The ability to find that mutually acceptable compromise is underway. However with the changing face of the modern airline operation, lessors might find themselves isolated from all of the lucrative leasing contracts, simply because their competitors are willing to compromise further or even accept operator terms with regard to leased aircraft. **AM**



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(Aristoteles, 384 BC – 322 BC)

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# FAA-Approved Parts: What Does This Mean?

**W**hat is an approved part? Many mechanics rely on their company's receiving inspection systems to ensure that they have the parts that they need, when they need them. But the real responsibility for airworthiness rests in the hands of the mechanic, so an understanding of what the FAA considers to be "approved parts" can be important to making sure that the job gets done, right.

When we are installing parts, we often refer to those installed parts as replacement or modification parts. That is, they are either directly replacing a prior part, or they are modifying the configuration with a different part that accomplishes the intended goals. It is normal for us to refer to the "good parts" that we want to use as "approved parts," but what does this term really mean? Which aircraft parts are really "approved parts?"

In 2009, the FAA created a new regulation for replacement and modification parts. That regulation greatly expanded the scope of who is covered by the FAA's production regulations.

The old rule only applied to persons who produced parts for sale for installation on a type certificated product. This meant that many categories of parts were not covered by the old FAA rule, including parts produced for installation by a repair station (not offered for sale) and parts made for other industries (not intended for installation on a type certificated aircraft).

The new rule applied to any person who knows, or reasonably should know, that at least one of their parts will end up on type certificated aircraft. This much broader scope was intended by the FAA to better cover the wide gamut of parts that are produced and used in civil aviation.

In the preamble to the rule, the FAA confirmed that "[t]he provisions of § 21.9 apply to the producer of any part that may be used as a replacement or modification article, not just parts that were produced." The FAA stated that their regulatory intent was to ensure that installers only install parts for which a suitability determination has been made (either by the producer or by the installer).

At the time of the 2009 rule change, the FAA felt that articles were not acceptable unless they fit into one of these categories:

- Produced under a TC;
- Produced under an FAA production approval (PC, PMA or TSOA);
- Standard parts;
- Commercial parts;
- Produced by an owner or operator for maintaining or altering that owner or operator's product.
- Produced by an appropriately rated certificate holder with a quality system (like a repair station), and consumed in the repair or alteration of a product or article.

The FAA's intent was to create an enforceable standard that helps ensure that parts that are used on type-certificated products are produced under an approved quality system or otherwise acceptable for use on that product.

The term "standard parts" generally means parts produced under either a U.S. government standard or an industry standard. Thus, parts produced to a proprietary standard will usually not fit into this category and may need to be produced under a production approval, like a production certificate, a PMA or a TSOA.

A TSOA, you say? When would you produce a proprietary standard part under a TSOA? Well, the FAA has issued Technical Standard Orders (TSOs) for fasteners bearings and seals. They issued these TSOs specifically to provide an approval path for fasteners bearings and seals that used to be considered "proprietary standards" and that today are known to need a form of production approval in order to be legally produced for the aviation marketplace.

The category for parts that are produced by an owner or operator can be a tricky one. FAA interpretive guidance states that the owner/operator needs to control the design, the quality system, or

both in order to be characterized as an owner/operator-produced part. Ordering a part by its part number, with no more involvement, is NOT sufficient to make it an owner-operator produced part, even if the producer claims to have the right production and design documentation to produce it!

It is easy to see why the FAA considers that parts made under FAA production approval are acceptable, but many people wonder why maintenance-produced-parts and owner/operator-produced-parts are considered acceptable to the FAA. The most basic answer to this query is that these parts are parts that have other regulatory oversight ensuring that they are adequate. In each case, the same party that is producing the parts is also responsible for their installation. The installer has a regulatory obligation to ensure that the parts will return the product to the appropriate (airworthy) condition (this obligation can be found in 14 C.F.R. § 43.13(b)). Therefore, the installer will need to generate (or be provided with) sufficient

data to support this airworthiness finding. Because the installer is also the constructive producer, he or she is in a position to be able to generate and review the airworthiness data for the produced parts that demonstrates their airworthiness.

One important category that was left off of the list of acceptable part in 14 C.F.R. § 21.9(a) was other articles approved by the FAA under other mechanisms. 14 C.F.R. § 21.8(d) permits the FAA to approve articles using any method that the FAA chooses to use, but 21.9(a) does not list them as approved parts.

As an example, in the 1990s, the FAA recognized a need to encourage compliance to the PMA rules (the "Enhanced Enforcement Program"). As a means of doing this, they permitted manufacturers meeting certain criteria to treat their parts as approved parts even though the parts had been produced in advance of PMA issuance. Under today's rules, this program would have violated the regulations.

The solution to this issue is easy. 14 C.F.R. 21.9(a) should be amended to

include a clause that permits any other fabrication mechanism authorized by the FAA (similar to 14 C.F.R. § 21.8(d)).

We've discussed this with the FAA as a regulatory incongruity because the FAA can approve an alternative approval path for parts under 14 C.F.R. § 21.8(d), but production of those parts would then violate 14 C.F.R. § 21.9(a)! The FAA recognizes this incongruity and they have discussed correcting the incongruity with the next major revision to Part 21. **AM**



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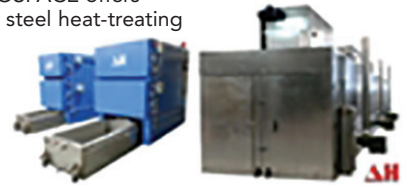
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Matthew Bromberg, president, Aftermarket at Pratt & Whitney spoke about the changes coming in the MRO industry this spring at the MRO conference in Phoenix, Ariz.

We asked Bromberg if he would share some of the insights from his presentation with our readers. Here are his thoughts.

## The MRO Inflection Point

**M**aintenance, Repair and Overhaul (MRO) is a \$60 billion business and growing and right now the industry is at an inflection point. The aircraft industry is building a fleet of younger, more reliable, more maintenance-friendly aircraft. Today, the average aircraft is 15 years old and the fleet is only going to get younger. Since younger aircraft require less maintenance, the demand for MRO services will also drop. At the same time, our existing MRO infrastructure is benefiting from economies of scale. Consequently, the industry will require less diversity among parts, tools and shops. This means less capacity is required to deliver the same MRO services. In spite of these factors, we are adding MRO capacity worldwide at a furious pace, particularly in emerging markets. The current demand for MRO services is strong, but its growth is slowing. On the other hand, the capacity to deliver MRO services is sufficient, yet it is increasing.

### Just Add Innovation

Addressing this supply and demand issue is going to require the industry to incorporate innovation in new ways to meet and exceed customer needs in a challenging environment.

Historically, the MRO industry has been slow to adopt new technologies. Walk into any MRO facility, including those at Pratt & Whitney, and you see mountains of paper, job tickets, boxes of inventory and hardbound engine manuals.

Over the past decade, engine turnaround time across the industry has actually increased from 62 days to 71 days—a 15 percent erosion. But more rapid adoption of technology will enable the MRO industry to drive productivity. We have access to great resources like electronic work instructions, real time feedback from tools and visual recognition technology. We also need to commit to paperless environments, truly integrated supply chains, and data sharing across the value stream.

### Big Data

Today's aircraft and engines are generating more real-time data than ever before. MRO providers can capture and share this data in a fashion never before thought possible.

Pratt & Whitney is using the increase in data to predict engine in-flight shutdowns. We are using this data to improve our technical support. Looking forward, we believe this data will connect the entire MRO network. It will align airlines, MROs and original equipment manufacturers (OEMs). Together we will anticipate repairs before the aircraft lands.

In addition, Pratt & Whitney data analytics allows us to customize maintenance. Pratt & Whitney intelligent work scopes optimize the maintenance cost with the airlines' operations.

### 3-D Printing

Another trend we are seeing is additive manufacturing, also known as 3-D printing. It is transforming manufacturing worldwide and will have a pronounced impact on the aviation industry.

3-D printing dramatically reduces time from design to production. It decreases manufacturing waste, reduces inventory, and virtually eliminates lead time. For engine parts, it can account for a 30 percent weight reduction, improve fuel burn, and lower cost of ownership.

For the MRO industry, the impact of 3-D printing will be significant. One day, overhaul shops will print their replacement parts. That is an exciting concept: no inventory, no lead time. Yet, questions remain regarding certification, regulation and intellectual property.

### Conclusion

As MRO providers, we should compete aggressively in the global marketplace, challenging ourselves to execute core strategies through operational excellence. It is the lifeblood of our industry. It makes for healthy customers and it challenges everyone to improve.

Airlines should seek the best service provider worldwide, demand the best service, and expect the lowest cost. An airline should not have to trade maintenance cost with dispatch reliability, total cost of ownership with risk management, or technical support with customer service.

As an OEM, it is important to focus on balancing supply and demand, while maintaining the end goal of providing value to our customers. To do this, at Pratt & Whitney, we are transforming our business by reorganizing to give our customers a simplified way to work with us—One Company, One Contact. We also are focusing more heavily on supporting engine fleets through long-term maintenance agreements, which provides operators with predictable maintenance costs, optimized engine performance and increased residual value.

At this turning point in the industry, with slowing demand for MRO services but an increase in the capacity to provide those services, it is clear that the service providers who will do well are the ones who innovate, create more efficient processes and provide the best customer value. **AM**

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