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MRO, UPGRADES AND REFURBISHMENT ON COMMERCIAL,
BUSINESS/GA AND MILITARY AIRCRAFT GLOBALLY

EURO MRO OUTLOOK

Leading European MROs share their
expert opinions about the coming year.

October 2014

AVIONICS MARKET

FUTURE COCKPIT
TECHNOLOGIES,
IMPROVING SAFETY
AND SESAR



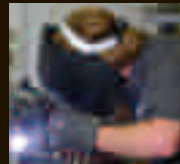
NBAA ROUNDUP

A LOOK AT WHAT A
FEW OF THE MANY
EXHIBITORS OF NBAA
WILL BE SHOWCASING



PMAS HOLD MARKETSHARE

PMAS CONTINUE TO
FIGHT FOR THEIR
RIGHTFUL PLACE IN
THE MARKET



4

4 is the number of significant performance benefits Bell 407 and MD 600 customers will receive with the new Rolls-Royce Value Improvement Kit available through the M250 FIRST Network and Aviall. With this kit, you will **1)** increase your range, **2)** increase your service ceiling, **3)** improve your performance and **4)** consume less fuel. Contact your Aviall representative for details. **Aviall Delivers.**



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European MRO Outlook 2014
MRO leaders from Europe talk about the coming year and how they feel their company, and the marketplace, will fare.

On the cover: Turkish Technic's enormous HABOM facility, now coming on line at Sabiha Gökçen International Airport, is thought to have required more than \$500 million in investment. The MRO's growth figures are impressive. For specifics, see our Euro MRO Outlook story starting on page 24.
Image courtesy of Turkish Technic.



18 The Aviation Electronics Show

The ever-changing aviation electronics market is moving forward at a rapid pace. The Aviation Electronics show has numerous speakers and presentations designed to help you stay connected, current and relevant in the marketplace.

Learn more in this section devoted to the show.

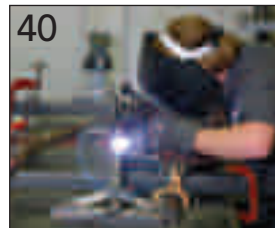
34 NBAA Roundup

Take a look at what a few companies are highlighting at NBAA this year.



40 PMAs are Here to Stay

PMA parts have faced an uphill battle to gain acceptance in the MRO world. These replacement parts are here to stay but the market still faces challenges.



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Collaboration

BY JOY FINNEGAN
EDITOR-IN-CHIEF



Collaboration. What does it truly mean? It's defined as working jointly with others especially in an intellectual endeavor. How is your company encouraging collaboration among its employees? It's a crucial point to consider when working to achieve that competitive edge that is so needed in today's market place.

It's possible to work as a solo act and achieve great things, but most great advances and inventions are the result of a collaborative process. An idea is hatched, but perhaps falls flat at first attempt to implement. Next, someone else who watched the process fail the first time, says, "how about we try this"...and someone else says, "how about we also do this additional thing"...and the next thing you know, with input from multiple sources, something amazing happens.

This is true whether we are talking about inventions of things and products or whether we are talking about business processes and procedures. I'm sure you have heard the old saying "standing on the shoulders of giants" in reference to a person's success. And often, when success is achieved, it is through the efforts of many and the collaboration of a team.

The car, the light bulb and yes, even the airplane were collaborations. Many people worked on these inventions at once in different areas and even shared ideas. If you consider aircraft, it started with DaVinci and moved to Liliental. A small improvement on what ultimately was a failure to achieve the desired result was then incorporated in the next iterations by the next inventor (and the next and the next) until—voilà! Orville and Wilbur's tweaks created a craft that stayed aloft for those amazing 12 seconds. It should also be noted that the Wright Flyer wouldn't have succeeded without the input (collaboration) of famed first mechanic, Charles Taylor, who designed and built the aluminum, water-cooled engine based in part on drawings done by the Wright Brothers.

More recently, we have the creative and brilliant mind of the late Steve Jobs to thank for the strong understanding and encouragement of tech companies to build collaborative work environments. Jobs believed spontaneous, random encounters often lead to the most interesting developments. In the Walter Isaacson biography of Jobs, the president of Pixar, which was owned by Apple and a personal project of Jobs said, "Steve had this firm belief that the right kind of building can do great things for culture." Known for his obsessive ways, he was no different when helping design both the Pixar headquarters, and later, the new Apple complex in Cupertino, Calif.

Both were designed with a huge building around a central atrium designed to encourage those random encounters. "If a building doesn't encourage that, you'll lose a lot of innovation and the magic that's sparked by serendipity," Jobs is quoted as saying in the Isaacson biography, "Steve Jobs." He also insisted that there only be two bathroom locations connected by the atrium. Although he was later talked into adding two more, the design principle worked. People had to walk through the atrium daily and the random encounters that ensued sparked the creativity of the workforce.

A final example from the Apple files is both about collaboration and persistence. A story from the biography tells of a young talent that boldly insisted on a meeting at Apple and he was invited in. The nervous developer got intimidated at the meeting and according to the book it didn't go well. Later Jobs bumped into him (a serendipitous encounter) before he left. The young man was distraught. He explained why and asked to show the legendary Jobs just one of his ideas. It was the ability to scroll over something small on the screen and have it enlarge automatically as though looking through a magnifying glass. This is one of the features that is used by all on all iPhones today. Jobs loved it and hired him on the spot. This same developer ended up being responsible for other features we are familiar with such as inertial scrolling. Collaboration at its best.

That's all well and good for a tech company or a movie studio. But can these collaborative, creative ways help in the hangar? I say absolutely. Even if you don't have the specially designed building with fortuitously placed bathrooms, it can be facilitated by MBWA—management by wandering around.

MBWA is a style of business management which involves managers wandering around, in an unstructured manner, through the workplace, at random, to check with employees about the status of ongoing work. This method has been around for a while. When I worked at Cessna in the 90s, we looked forward to seeing our CEO on a regular basis during his weekly MBWA forays. The company had many buildings located all over the airport and the city of Wichita. But he made an effort to get out of the executive suite regularly and walk the halls, hangars and ramps. I know those walks helped him see and value the work that went on all around the business and believe it provided valuable insight and opportunity for those chance encounters.

Are you encouraged to use this management method where you work? Try it. You might be surprised what you learn and what develops from any random encounters. **AM**



Mobil Jet Oil™ 387: Reducing complexity for fleet maintenance

Since the dawn of powered flight, ExxonMobil Aviation has been at the heart of aviation history.

That's why, today, successful airline fleets all around the world rely on the company's family of Mobil Jet™-branded lubricants and expert services.

With the recent introduction of its most advanced synthetic jet turbine engine lubricant—Mobil Jet Oil™ 387—ExxonMobil has once again set the benchmark for lubricant innovation.

To discuss some of the trends affecting the aviation industry, as well as the performance benefits of Mobil Jet Oil 387, we caught up with the former SAE E-34 Chairperson, Susan Ardito, ExxonMobil Aviation product deployment manager.

What are the main performance enhancements that ExxonMobil Aviation achieved with Mobil Jet Oil 387?

Mobil Jet Oil 387 is the most advanced synthetic jet turbine engine lubricant that we have ever created, delivering the combination of performance benefits that engine manufacturers need most—including exceptional engine cleanliness, outstanding seal compatibility and oxidative stability.

Mobil Jet Oil 387 has consistently performed very well in a range of engine technologies, exceeding our expectations with regard to oil consumption, pressure and condition—even after extensive hours in operation. In fact, we recently completed an inspection on an engine that logged more than 10,000 hours on wing, without a single shop visit. Not only was the engine in excellent condition, but the oil looked brand new.

What are some of the key industry trends propelling interest in Mobil Jet Oil 387?

The growing interest in Mobil Jet Oil 387 stems from two key factors: the need for advanced lubrication solutions that will

deliver superb and consistent performance benefits and the desire to reduce operational complexity.

How will Mobil Jet Oil 387 help reduce complexity in fleet maintenance?

To streamline maintenance plans—as well as plans for lubricant storage—many airlines are looking for a single jet oil solution to manage their fleet needs. In addition, many operators are looking for opportunities to reduce risk associated with managing multiple oils.

With Mobil Jet Oil 387, we are pursuing oil certifications from all major engine manufacturers, as well as for use in a variety of accessory applications, facilitating the consolidation of lubrication needs to a single product. In so doing, ExxonMobil Aviation can help operators streamline their lubricant needs and reduce the potential risk of misapplication across mixed engine aircraft fleets.

What certifications and application approvals does Mobil Jet Oil 387 currently have?

Mobil Jet Oil 387 is approved against some of the most demanding industry specifications, including the SAE AS5780 High Performance Capability (HPC) and the MIL-PRF-23699-HTS. It is certified for use in a range of GE engine applications, as well as numerous Rolls-Royce engines, including the Trent 900 and the company's latest technology, the Trent XWB.

Mobil Jet Oil 387 has been gaining commercial flight experience for several years. Globally, many carriers have reported great success using Mobil Jet Oil 387 in their fleets, some of which have been using the oil on-wing for more than three years.

To learn more about Mobil Jet Oil 387 and how it may be able to help your fleet, visit MobilJetOil387.com or contact an ExxonMobil Aviation representative.

Energy lives here™

TIMCO Names Sokol President MRO Services

TIMCO Aviation Services (TIMCO), a subsidiary of Hong Kong Aircraft Engineering Company Limited (HAECO), announced that Jim Sokol has been named president of MRO Services effective on September 22, 2014.



In this role, Jim will have responsibility over all of TIMCO's airframe maintenance operations, including multi-hangar facilities at Greensboro, North Carolina, Lake City, Florida, Macon, Georgia and at the Cincinnati-Northern Kentucky International Airport. In addition, he will oversee the operations of TIMCO's line maintenance network and its engine services center.

Jim joins TIMCO with 33 years of successful experience in the aircraft maintenance industry, most recently as vice president of Maintenance Operations for Southwest Airlines. There, he led a team of 2,500 mechanics, 20 maintenance locations and multiple third party providers in supporting the maintenance requirements of a fleet of 700 aircraft. Prior to his 20-year tenure with Southwest, Jim held leadership positions with an independent MRO provider and also another airline.

Kevin Carter, CEO of TIMCO, said, "We are very excited to welcome Jim to the TIMCO family. His extensive leadership experience, strong appreciation for aviation technicians and the vital role they play in the success of the organization and his practical knowledge of airline operational requirements, will allow us to continue to build on the value we strive to deliver to our team members and customers."

Sokol will report directly to Kevin Carter and will be based in Greensboro, N. C. at the company's corporate headquarters.

Fortune Ranks Transaero CEO Olga Pleshakova One of World's Most Powerful



Olga Pleshakova, the CEO of Transaero Airlines, has been awarded a leading ranking in Fortune magazine's annual index of the world's most powerful women. She is the only Russian listed by the US business magazine and is ranked 20th most powerful woman in the Europe, Middle East and Africa (EMEA) region.

Fortune's international rankings are published annually based on analysis of global companies' activities. The rankings are compiled by Fortune editors, who consider four criteria: the size and importance of the woman's business in the global economy, the health and direction of the business, the progression of the woman's career and social and cultural influence.

For the first time, Fortune has re-organized its lists on a regional basis, with separate lists for EMEA, Asia-Pacific and North America. It is the third year in a row that Olga Pleshakova has featured in the "Most Powerful Women" listing.

Olga Pleshakova has been CEO of Transaero, the largest privately-owned international airline in Russia, since 2001, becoming the first Russian woman to lead a major airline.

Bussmann Appointed as New Lufthansa Technik Chairman of the Executive Board



Bussmann

During a meeting in September, the Supervisory Board of Lufthansa Technik appointed Dr. Johannes Bussmann the new Chairman of the Executive Board for the company. Dr. Bussmann will take over the position from August Henningsen on April 1, 2015, with Henningsen due to retire in the coming year.



Henningsen

Through the move, Lufthansa Technik says the Supervisory Board has ensured continuity in the management of the company. "Under August Wilhelm Henningsen's leadership, Lufthansa Technik has become a world leader within the Maintenance, Repair and Overhaul (MRO) industry. I would like to thank him for the outstanding contribution he has made to the company," said Carsten Spohr, chairman of the Supervisory Board of Lufthansa Technik AG and Chairman of the Executive Board of Deutsche Lufthansa AG.

"With Dr. Bussmann, an experienced and successful Lufthansa Technik manager will take over his duties in April 2015. I look forward to a trusting and successful working relationship with him," added Spohr.

Dr. Bussmann has been the member of the Executive Board responsible for Human Resources, Engine and VIP Services at the Lufthansa subsidiary since September 2012. In 1999, the Doctor of Aerospace Engineering moved from the ABB Group to Lufthansa Technik and began his career in the Product Development and Sales division. Bussmann was appointed VP Marketing & Sales in 2005 and SVP Component Services in 2007. He was then SVP Engine Services before he joined the Executive Board.

August Wilhelm Henningsen has been the chairman of the Executive Board of Lufthansa Technik AG since 2001. After joining Lufthansa in 1979, he held various management positions in Engineering and Production. He then headed the Component Services division in Hamburg from 1993 until 1997 before he was appointed General Manager of Ameco Beijing, a joint venture between Lufthansa and Air China, in 1997. Between 2000 and 2001, he was the member of the Executive Board responsible for Products and Services.

EPCOR Gains Key Clients for APUs

EPCOR has signed a long-term contract with Air Canada covering maintenance of the APS 5000 APUs installed on its fleet of 37 Boeing 787 Dreamliners already in revenue service or scheduled for delivery through to 2019. The contract also provides for spares provisioning through a dedicated pool of APUs. Repairs will be carried out at EPCOR's Amsterdam facility, which has been repairing the APS5000 since early 2014. "This is a unique contract, both in terms of the long term and the number of aircraft it involves," Romain Helmer, EPCOR managing director says. "Air Canada is a major APU client for us in North America, and this agreement further strengthens our presence in this market. It also marks a very important new phase in relations between Air Canada and AFI KLM E&M."

Additionally, Evolop Airlines has signed an exclusive contract with AFI KLM E&M to organize the repair and overhaul of the APUs equipping its A320-200 and A330-300 aircraft.

Lockheed Martin Commercial Engines Signs Maintenance Agreement with European Aviation



European Aviation has signed a four-year exclusive agreement with Lockheed Martin Commercial Engine Solutions for jet engine maintenance, repair and overhaul (MRO) services for their fleet of 60 CFM56-3 jet engines. The agreement includes extensive CFM56-3 turboprop repair services provided on-site for European Aviation, with most of the MRO work performed in Montreal, Canada and the remainder in San Antonio, Texas.

"I am excited to have signed an exclusive contract with Lockheed Martin Commercial Engine Solutions to support our growing CFM56 operation," Paul Stoddart, owner of European Aviation said. "We chose Lockheed Martin Commercial Engine Solutions because of their professionalism, dedication and for the excellent support we have received over the past 18 months."

"We are delighted that European Aviation selected Lockheed Martin to maintain their fleet of CFM56 engines," said Amy Gowder, vice president of Lockheed Martin Commercial Engine Solutions. "Our Montreal facility has established a successful track record with European Aviation, and we are eager to take the next step in the strong and growing relationship between our two companies."

DART Inaugurates New Center for Emergency Flotation Gear

DART Aerospace opened a new center and manufacturing facility in Vista California. Located near San Diego, the new site is replacing the Oceanside facilities and is expanding local manufacturing capability by more than 30 percent.

The 70,000 sq. ft. facility features a 5,000 sq. ft. repair station, a float and liferaft assembly area, as well as a larger testing area for on-going research and development projects. This modern facility is now consolidating all of its operations under one roof to improve both the flows of material and information. This larger center will help DART better serve customers by providing competitive manufacturing lead-time, increased inventory levels, as well as enhanced quality and operating performances.

"Flotation equipment is an important market for us and we are seeing significant growth opportunities in industry sectors such as the offshore oil and gas" said Bill Beckett, VP of Operations. "We look forward to expanding our presence and continuing to build relationships with customers by providing them with high quality products and a reliable R&O service. This expansion will be paramount to our success."

The new DART facility is at 3030 Enterprise Court, Suite A, Vista, California 92081. Sales services are located at their head office in Hawkesbury Ontario, Canada.

about people

LAUNCH Adds Sanchez

LAUNCH Technical Workforce Solutions announced the addition of Dan Sanchez as vice president Engineering. Sanchez will serve as the newest member of its executive team. Sanchez is a recruiting and labor expert with 10 years experience in the transportation and maintenance staffing industry. Sanchez will oversee LAUNCH'S Engineering Services Division where he will focus on the sales strategy and continual growth for the company across all Engineering specialties. "I have witnessed the expansive growth of LAUNCH in the marketplace and I look forward to utilizing my experience and skills to support and grow our engineering capabilities to further establish LAUNCH as the best labor provider in the industry," Sanchez said. Sanchez most recently served as director of Sales for TransTechs, a transportation staffing firm owned by TrueBlue, Inc.

PAA Hires Lloyd

Professional Aviation Associates announced the hiring of John Lloyd as senior director of Product Line and Customer Service. Lloyd will be responsible for providing leadership and direction for the Product Line Sales and Customer Service organization within the company and all aspects of the company's customer support activities including airframe, avionics, helicopter and engine component support. Additionally, his duties include building upon Professional Aviation Associates' strengths and core capabilities in the business and general aviation markets by developing strategies and processes to grow opportunities in the commercial and military market segments. Lloyd earned a bachelor's degree in Business from Indiana University of Pennsylvania and is active in a variety of philanthropic, educational and athletic endeavors.

AJW Aviation appoints Smith Regional Sales Director USA



Smith

Cari Smith joins AJW Aviation as regional sales director USA. Heading up the organization's component sales and exchange service across North America, Ms. Smith will be responsible for developing relationships with new customers, as well as broadening the current scope of AJW's aircraft component sales with leading airlines and MROs.

With 23 years' experience in aviation, Ms. Smith joins AJW Aviation Inc., from her previous role as National Account Manager at GECAS (GE Capital Aviation Service) where she played a key part in account management and

about people

» planning, including responsibility for an award-winning Boeing Government contract for the past nine years.

Gulfstream Names Kreide VP Final-Phase Engineering



Kreide

Gulfstream Aerospace has appointed Jeff Kreide vice president, Final-Phase Engineering. Kreide reports to Dennis Stulgross, senior vice president, Operations, Gulfstream. In his new position, Kreide is responsible for all Final-Phase Engineering activities in Savannah and has dotted-line responsibilities for Engineering at Gulfstream's Appleton, Dallas and Long Beach Final-Phase Manufacturing facilities. Additionally, he is responsible for Industrial Design, Final-Phase research and development and Final-Phase new product engineering. A 32-year Gulfstream employee, Kreide previously served as the vice president of Business Solutions. In that role, he was responsible for developing and managing integrated business solutions to support all facets of the business, including Product Lifecycle Management and Enterprise Resource Planning.

Prior to that, Kreide was the director of Product Lifecycle Management, leading a team responsible for the design and development of the Gulfstream G650 3D model-based type design environment.

Boecker joins AerSale as Vice President Sales



Boecker

Steven Boecker has joined the AerSale team as vice president Sales to augment the Company's global engine and aircraft marketing efforts. Boecker most recently served as sales director – Global Leasing Team for Pratt & Whitney / International Aero Engines. He began his career in 1986 with the former Presidential Airways, where he gained valuable industry insight while holding several airline operations management positions. He later left to join Pemco World Air Services as Director, OEM Development. "We are very pleased to be gaining Steve's formidable industry sales experience to further accelerate AerSale's expanding aircraft and engine offerings" commented Nicolas Finazzo, AerSale CEO.

Gulfstream Appoints Tait VP SALES OPS



Tait

Gulfstream Aerospace named Jim Tait vice president, Sales Operations and Analysis. He reports to Scott Neal, senior vice president, Worldwide Sales and Marketing. In his new position, Tait leads activities related to »

AJW Technique Keeps up the Momentum

Eighteen months after the AJW Technique facility in Montreal opened its doors, the organization says it is celebrating the performance of its teams of skilled technicians as new platforms and capabilities come on-stream and milestones are achieved. Global approvals include ANAC (Brazil), DGCA (Indonesia) and DCA (Thailand) now complement FAA (US), EASA (Europe) and TCCA (Canada); and CAAC (China) will follow soon.

Gavin Simmonds, general manager, acknowledged the dedication of a workforce that is committed to delivering outstanding levels of service in the pursuit of deserved industry-wide recognition. "We now have a team of more than 150 dedicated repair technicians and support staff. We are on-track to expand to 250 in the next twelve months and it is incredible to experience the work ethic at AJW Technique."

The company equates repairing 35,000 units a year to supporting 600 aircraft, and says the business is on course to achieve this in record time. "We surpassed our 12,500th repair order in September 2014 and more than 4,000 part numbers are now on the AJW Technique capabilities list which currently crosses five platforms: A320 family, A330/340, B737NG, B767, B777NG. We expect to add Bombardier, Embraer and ATR in the near future," Simmonds says.

"Right from the start our focus has been on reducing direct maintenance costs and we do this by engineering-in quality repairs from the outset. If it carries an AJW Technique tag we do not want to see it back in our workshop before it's due, in fact we do our utmost to design new repair procedures that maximise time on wing," Simmonds adds. "A key differentiator for us is that we can underwrite our repair management guarantees via unique access to AJW Aviation's extensive component inventories valued at almost \$500 million."

"We will never stop striving for excellence" says Christopher Whiteside, President, AJW Group. "Building AJW Technique and maintaining our growth trajectory has been an enormous challenge for the Group. Every day we have more obstacles to overcome, but with the support of our OEM partners like Thales, Rockwell Collins, Honeywell and UTC Aerospace Systems we have proved to our competitors, and to our customers, that we can succeed through determination and innovation. Never underestimate what can be achieved with the right teamwork and the 'can do' attitude which exemplifies the AJW philosophy."

USAIRE Board Elects AAR's Pascal Parant as New President

During its last board meeting, members of USAIRE elected Pascal Parant, VP of Marketing at AAR, as the new president. Parant succeeds Philippe Bottrie, who decided not to run for a third term.

"I have all confidence in Pascal to continue the work we have initiated during my presidency," said Bottrie, VP of Public Affairs for Airbus Group. "It also gives USAIRE a president from a U.S.-based company after several years of leadership from European companies."

Michel Dubarry, EVP of USAIRE and president of Rolls France, added, "We elected Pascal as the new president due to his commitment to the aviation industry in France and USAIRE. Even before he was elected president, Pascal has been focused on raising the profile of aviation in France with high-profile speakers and events, and we hope this will continue."

"With the assistance of the members and the board, my goal is to ensure USAIRE keeps rising and shining in Europe, attracting high-profile guest speakers and high-profile new members," said Parant.

USAIRE was founded in Paris in 1959 to bring together a consolidated body of U.S. aerospace industry representatives to interface with government agencies and organizations such as NATO, SHAPE and U.S.A.I.A. USAIRE has over 130 high-profile members and companies.

Aerospace Turbine Rotables Announces AS9100B Certification

Aerospace Turbine Rotables (AeTR) has received AS9100B certification. After more than a year-long effort to update its systems and procedures to meet or exceed the most stringent aerospace standards, AeTR successfully passed its AS9100B certification audit this summer.

AS9100B certification will allow AeTR to compete for several programs supporting both the United States government, and the aerospace industry's leading manufacturers.

"The AeTR team is proud of this AS9100B achievement," says Dave Seavey, VP and GM of AeTR. "Every one of our employees participated in the extensive effort to update AeTR's operations to meet all of the aerospace industry's latest and most stringent quality control standards."

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21 COMPANY-OWNED SERVICE FACILITIES
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AVERAGE **9+** YEARS EXPERIENCE
OF SERVICE CREW



With the largest, most extensive service network of any aviation manufacturer, we keep our family in the air no matter where they fly.

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about people

» sales operations, including customer relationship management, commercial contracts, market research, aircraft pricing, residual value analysis and customer financial support. Tait started with Gulfstream in 1999 as a senior financial controller and was promoted to director, Financial Planning and Analysis, in 2000. He has more than 25 years of experience in the engineering, defense and aviation industries, focusing on long- and short-range business plans, trend analysis, financial outlooks and pricing strategies.

Superior Aviation Appoints Fontes Group Director of International Business Development



Fontes

Tim Archer, CEO, of the Superior Aviation Group announced Ana C. Fontes has been appointed as the group director of International Business Development. "Ana's considerable experience with the international aspects of the general aviation industry and her multi-lingual, multi-cultural background will be a tremendous asset as we initiate those efforts," Archer said. "Ana's current responsibilities of representing the Group's Flagship company, Superior Air Parts in Brazil, will not only be absorbed, but be expanded to include the rest of the world." In addition, Fontes will be heavily involved with identifying and coordinating our efforts with prospective tenant companies interested in participating in the new Superior Aviation Town and Executive Airport development project. Prior to her recent appointment, Ms. Fontes was the Brazilian sales and marketing representative for Superior Air Parts, Inc., a member of the Superior Aviation Group. Before starting her own company, Fontes Marketing Consulting, which specializes in helping U.S.-based companies open new markets in Brazil and South America, she served as Corporate Marketing and Americas Sales Director for Mistral Engines, S.A.

Ms. Fontes is also the Director of International Affairs for AOPA Brazil (APPA). She holds a B.A. in Business Administration from the FCETM-Economic Sciences University of Triângulo Mineiro – Brazil.

Frugier Appointed GM Airbus Corp. Jet Center



Frugier

Airbus Corporate Jet Center (ACJC) has a new General Manager, Joël Frugier. In this role, Frugier is the executive responsible for the firm's operations, sales and marketing and the company's overall performance. Frugier, 42, graduated with an Engineering Diploma from the Ecole Centrale in Nantes in 1994. After 13 years of successful experience as a business consultant for the aerospace,

automotive and metal industries, he joined ACJC in 2009 as Head of Improvement and Information Systems, designing and successfully leading the company's performance improvement plan. In 2011, he was appointed head of the Program Department, leading VIP cabin completion programs. In his role as ACJC General Manager, Frugier reports directly to Benoit Defforge, president of ACJC.

Nevill Appointed Aircell VP Customer Service

Richard Nevill has been appointed vice president of Customer Service Aircell. Nevill brings 30-year aerospace industry career experience. "Richard will lead Aircelle's after-market development, along with the transformation of customer services activities that are essential to our continued growth worldwide," said Aircelle Chairman and CEO Martin Sion. Nevill comes to Aircelle from AgustaWestland Helicopters, where he was responsible for the rotorcraft producer's customer support and services activity since 2010. He initiated the process of global integration in this rapidly-expanding business, covering a comprehensive suite of services and partnered solutions through a network of subsidiaries, joint ventures and distributors. »

Hartzell Propeller Growing China Market; Achieves TC Validations for Cessna TTx, Mooney Acclaim

Hartzell Propeller has stepped up its commitment to extend the company's reach into China's growing general aviation marketplace. Recently, the Civil Aviation Administration of China (CAAC) validated type certifications for Hartzell props flying on Cessna TTx and Mooney Acclaim aircraft.

"Hartzell Propeller worked closely with the Civil Aviation Administration of China to receive these important validations," said Weiqing Wang, Hartzell Propeller managing director for China, based in Shanghai City. "Hartzell Propeller's efforts in China are focused on working with aircraft manufacturers to seek advance approvals for propeller aircraft that are expected to receive certification for operation in this country. We certainly appreciate the professionalism and dedication exhibited by CAAC representatives," he added.



The Y12F, manufactured by Hafei Aviation Industry Co., Ltd., in Harbin City, Heilongjiang Province, features Hartzell props.

To support the increasing globalization of general aviation, Hartzell Propeller has established a dedicated Type Certificate Validation Department, headed by international certification representative Melanie Patton.

"The Validation Department is committed to developing enhanced professional relationships with the CAAC and other airworthiness authorities worldwide. We recently hosted several CAAC representatives who traveled to the United States for detailed technical meetings, in support of our next round of type certificate validations," she said.

Hartzell Propeller's type certificate validation efforts have been a key element to meeting requirements for numerous aircraft to be approved for flight operations in China, including:

Air Tractor AT-802	Maule MXT-7-180
Beechcraft Baron 58	Mooney M20TN (Acclaim)
Beechcraft Bonanza 36	Nanjing AC-500 AirCar
Beechcraft King Air B200, 350	Pilatus PC-6 Porter
Cessna 208B, T240 (TTx)	Piper M-Class
Cirrus SR22, SR20	Quest Kodiak 100
Dornier 328	Thrush S2R-H80
Gippsland GA8 Airvan	Vulcanair P68
Hafei Y12F	

Additionally, Mooney International Corp. recently announced plans to deliver dozens of Mooney Acclaims to customers in China. And Piper Aircraft Inc. announced that its top-of-the-line M-Class Aircraft, the turboprop Meridian and piston-powered Mirage and Matrix, recently received type certificate validation by the CAAC. These aircraft are equipped with props manufactured by Hartzell Propeller.

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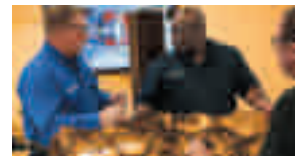


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ARSA Endorses Component Control as Preferred Provider for Third Year in a Row

Component Control announced that it is continuing for a third year as the exclusive preferred provider of MRO and logistics software solutions by the Aeronautical Repair Station Association (ARSA). Component Control's Quantum MRO and Logistics software provides a best practices platform for aviation repair organizations to efficiently and comprehensively manage MRO processes

while promoting adherence to rigorous quality and regulatory standards.

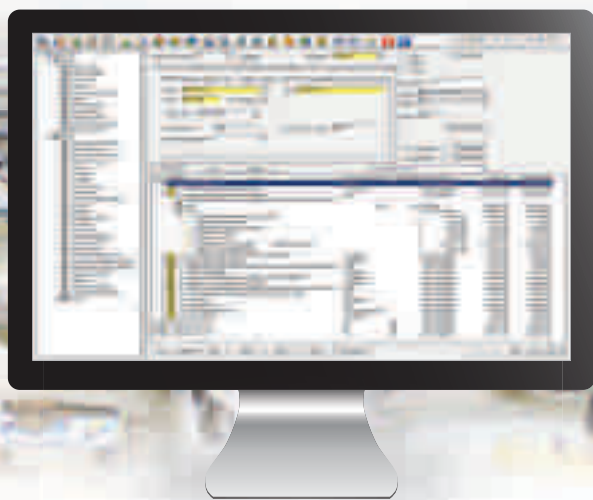
"Over the past two years our membership has shown enormous support for our preferred partnership with Component Control and the value its software brings to their daily business practices," said Crystal Maguire, VP of Operations, ARSA. "The success of our members is paramount so we're pleased to continue this exclusive

preferred partnership that has proven to be a trusted resource for our membership."

ARSA preferred providers must have a reputation for quality, strong and credible industry references, and an established record serving the needs of the ARSA membership.

"Quantum is a proven business software solution for enabling aviation organizations to optimize their operational performance and compete successfully for profit in the market and grow their business," said Z. Baron, CEO of Component Control. "We look forward to continuing and growing our value relationship with ARSA and its membership."

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Shark Meets Crane

Lufthansa Technik is developing a robot-based guide arm for the highly automated application of sharkskin-like aircraft outer surfaces ("riblet" structure). In the future, the new painting system, with a microstructure that reduces drag, is expected to deliver fuel savings of around one percent. Lufthansa Technik is planning the industrial implementation of the application process after the completion of the "FAMOS" research project in March 2017.

The focus of the project is a guidance system for the automated application of multifunctional surface structures.

The "FAMOS" project builds on the findings of the "Multifunctional Coating" research project, which successfully tested the stability of the new "Riblet" structure using small patches in a real-life environment. In cooperation with Bremer Werk für Montagesysteme (bwm) and Airbus Operations, a comprehensive, highly automated system is currently being developed to deploy various individual technologies such as, for example, cleaning, stripping, painting, and the application of drag-reducing aircraft outer surfaces.

Furthermore, the new system is to facilitate the direct printing of photo-realistic images on the aircraft outer skin.

The "FAMOS" research program, funded by the Federal Ministry of Economic Affairs and Energy (BMWi), represents a technological contribution to both fuel cost savings and to the reduction of CO2 emissions. "If, after the successful completion of 'FAMOS', we manage to develop an industrial context with the new functional coatings such as the 'Riblet' structure, Lufthansa Technik will be making a great technological leap in terms of fuel efficiency and environmental friendliness. This brings us significantly closer to our goal of being at the global technological vanguard in terms of environmentally friendly aviation," says Dr. Mathias Nolte, "FAMOS" project manager with Lufthansa Technik.

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about people

»» Boelzner joins Jet Aviation St. Louis



Boelzner

Eric Boelzner has joined Jet Aviation St. Louis as senior director, Supply Chain and Production Control, bringing with him 28 years of management experience in the aviation industry. Boelzner comes to Jet Aviation St. Louis from Dassault Falcon Jet Corp. in Little Rock, Ark., where he spent 19 years as manager of purchasing; manager of planning/manufacturing engineering; director of production control; and most recently as senior manager of cost control (director, internal administration). His focus at Jet Aviation St. Louis will be on working with the Supply Chain and Production Control organizations to continuously improve processes and overall business results.

"We're pleased to add the professional aviation-management experience that Eric brings to the team at Jet Aviation St. Louis," said Chuck Krugh, senior vice president and general manager. He earned an MBA degree at Webster University in Little Rock and a BA at University of Central Florida in Orlando.

Avtrade Appoints new Regional VP Sales – South Africa

Avtrade announced further expansion into the South African region with the appointment of Milenko Krsmanovic in the new role of regional VP Sales-South Africa. Milenko brings a wealth of knowledge with over 25 years of aviation experience and a background in marketing working within leading aviation companies in South Africa.

Skandia Welcomes Barnes as EVP and CFO



Barnes

Skandia has hired James J. Barnes to be the company's executive vice president and CFO. Working closely with Gary Palmer, Skandia's president, Barnes' main objective is to manage growth for Skandia as a leading global company in the aircraft interiors and engineering arena. Prior to joining Skandia, Barnes spent many years in a similar capacity with a multi-state aviation management company that included charter, FBO and maintenance facilities, growing and enhancing its operations. Barnes academic training is in areas of finance and management as a CPA, CMA (Certified Management Accountant), CIA (Certified Internal Auditor) and CISA (Certified Information Systems Auditor).

Sun Air Jets Announces New DOM

Sun Air Jets announced the addition of Greg Paxson to their Maintenance Management team. Paxson will fill the role of Part 135 director of maintenance. Dave Anderson, Sun Air's current Part 135 director of maintenance, will move laterally to fill the role of Part 145 accountable manager. Paxson has been continuously engaged in corporate aviation since graduating from the San Jose State University Aviation Department in roles ranging from technician to pilot to DOM. He founded a FAR Part 145 Repair Station, which eventually became the maintenance department for one of the county's largest Part 135 operators. He will oversee the maintenance management of the Sun Air 135 fleet and aircraft maintained by the 145 Repair Station.

"In our continuous efforts to build the finest and safest charter management company in the world, adding Greg to our maintenance department enables us to offer our aircraft owners and charter customers a level of experience, safety, and professionalism that is second to none," states Brian Council, Sun Air's resident.

New Schweiss Container and Show Trailer Doors Open up Possibilities



A large container has endless possibilities after attaching hydraulic doors to the side or endwalls. Schweiss Doors show trailer has hydraulic doors that open up the sides. It allows set up and take down in a matter of minutes.

Schweiss Doors can make any container, whether it be for storage, rail or ship transport, much more user-friendly by fitting it with one or more hydraulic doors on the sides or both ends for increased, easy access.

"Imagine having to open a container door and then you fill it completely full from front to back. Then you remember you need to get something from the center," a company spokesperson says. "It's really cumbersome and not easy to get things out of a container once it is stacked full. You could use the option of leaving an aisleway down the center, but that makes storage space even smaller."

Containers with side or endwall steel doors can easily be opened and closed for loading or unloading with a forklift or other means. Container doors can be attached to all four sides of a container or even on the top of it. Schweiss Door says their engineers work with clients to design any configuration desired.

Schweiss one-piece hydraulic container doors are prehung on their own frame with a compact pump, strong cylinders and

spherical bearings. They can be opened and closed by remote control quickly and quietly and have very few moving parts. A hydraulic door, which opens from the bottom up, also provides a canopy or awning protecting the inner contents from excessive sun or inclement weather.

All Schweiss doors are custom made to fit your container to exact measurements. These doors can be designed with windows, walk doors or to accept any exterior cladding or insulation desired. When you close the container doors you can also be assured that your product is burglar-proof and secure, but easy to get to.

Schweiss builds these customized containers use at trade shows. A sidewall hydraulic door on a container can also serve as a display booth. "The beauty of this is the container is all self-contained and can be set up or closed down secure and fast. When you arrive at a show site, all you have to do is open the door and you are in business," their spokesperson says.

FL Technics Sets Up Operations in Indonesia

FL Technics announced they won a tender for the rent of 8400 sq. m. aircraft maintenance hangar at Indonesia's Soekarno-Hatta International Airport, the busiest airport in the Southern Hemisphere. FL Technics will operate the hangar for at least five years and will launch its operation with base maintenance services for Airbus A320 aircraft.

The tender for the hangar rent was conducted by PT Angkasa Pura II, a state enterprise of the Indonesian Department of Transport responsible for the management of airports and air traffic services in Indonesia. According to the terms and conditions, FL Technics with partners shall operate a total area of 24,500 sq. m., including a 8400 sq. m. hangar as well as the adjacent ramp, aircraft parking stands and additional facilities, via an established Indonesian company. The new FL Technics MRO center will employ over 150 engineers, technicians, NDT specialists and other qualified personnel, capable of serving up to three narrow-body type aircraft at one time.

In 2013 Soekarno-Hatta International Airport served almost 400,000 domestic and international flights, approximately 59.7 million passengers. It is one of the largest airports in Asia Pacific and the busiest in the Southern Hemisphere. The new FL Technics MRO center will support local operators with including A-to-D-checks, interior refurbishment services, NDT inspections, composite and structure repairs, spare parts supply, etc. All services will be provided in accordance with both local and EASA requirements.

"During the last couple of years we have been thoroughly exploring the Asian market. We are now confident that we possess a deep understanding of its trends and issues, which local carriers are facing in the MRO segment. Following the establishment of successful connections with the region's aviation business community, we have decided to make the step and launch a new modern technical base at one of the main air hubs in Asia-Pacific," shares Zilvinas Lapinskas, the CEO of FL Technics. "In addition to the extensive European experience and technical know-how, we will offer the region our one-stop-shop philosophy, supporting local carriers with base and line maintenance, technical training, spare parts supply, engineering and engine support as well as other MRO solutions."



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GE Launches myGEAviation.com Web Portal



GE Aviation is launching myGEAviation.com, a new customer web portal offering customers streamlined access to relevant information and a modern user interface with a high degree of user customization.

"The design of myGEAviation was driven by our customers, and we are excited to offer a faster, more modern and more efficient way for them to interact with GE Aviation and to quickly and efficiently access the critical information they need to optimize their operations," said Dave Kircher, general manager for Customer and Product Support Operations. "This was an extensive two-year effort to build a new portal from the ground up. The basic architecture of the site is as modern as its look and feel, enabling users to configure the site to best suit their needs."

Work on myGEAviation began more than two years ago with an intensive effort to gather voice of the customer input to shape the new design and functionality. The development team says it was guided by four basic principles: ease of use, one-stop for all relevant information, personalization, and the ability to quickly access online tutorials and other help on the site.

A key improvement according to the company is that most information is just one or two clicks away, compared to 7 to 12 clicks on the legacy portal. A new onboarding application requires just six simple fields, 63 percent fewer questions than the prior version. Navigation on the site is asset-centric, with users able to navigate by engine serial number, engine family, or by specific aircraft, and users will be able to customize the interface using drag and drop widgets and personalized tabs.

The site was developed in conjunction with GE's user experience (UX) specialists housed at the GE Global Software Center of Excellence in San Ramon, California. Beta testing began September 2013, and GE says all customers will be registered by early 2015. The current Customer Web Center will be sunset in early 2015. More information about the new customer portal is available at myGEAviationBlog.com. A series of brief videos introducing the site are available on YouTube: http://www.youtube.com/watch?v=n43kNEkKILl&index=1&list=PLSrlu5PbHgUGn98_ncziDDildc43pbta7

CFM's LEAP engine takes to the skies

CFM International's LEAP engine took to the skies for the first time on October 6 on a modified 747 flying testbed at GE Aviation Flight Test Operations in Victorville, Calif., launching the next phase of testing for the advanced engine program.

The engine behaved well and completed multiple aeromechanical test points at various altitudes during the nearly three-hour first flight. Over the next several weeks, the engine will complete a comprehensive test schedule that will gauge engine operability, stall margin, performance, and acoustics. The LEAP-1A/-1C variants are on track for engine certification in 2015.

"The LEAP engine behaved like a real veteran as we took it through its aerodynamic clearance points," said chief test pilot Steven Crane. "The durability and reliability one expects from a CFM product is clearly there. The flight test data also showed the benefits this engine has gained from leveraging GENx core technology. I think this flight was a very positive foreshadowing of great things to come for the LEAP engine family."

CFM is currently executing the most extensive ground and flight test certification program in its 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 Airbus, Boeing, and COMAC.

Although all three LEAP engine variants will fly on the modified testbed, the configuration currently being tested is a fully integrated propulsion system (IPS). This IPS is an industry first and unique to the LEAP-1C. CFM provides the engine as well as the nacelle and



thrust reverser developed by Nexcelle*. These elements, including the pylon provided by COMAC, were designed in conjunction with each other, resulting in a total system that provides improved aerodynamics, lower weight, and easier maintenance.

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. The company says all this technology brings with it their reliability and low maintenance costs.



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With the global market for commercial avionics equipment set to grow at an annual rate of 4.8 percent through to 2019, the industry has not been this buoyant for some time, setting the scene for some active discussions at Aviation Electronics Europe on the future policies, performances and innovations in the aviation electronics and avionics sector.

With industry forecasts \$21 billion will be spent on commercial avionics systems for fixed-wing commercial aircraft in 2015, and an order backlog of aircraft, the future for the aviation electronics and avionics industry is looking healthy, as the global economic recovery continues to strengthen.

But as more aircraft are set to take to the skies, it becomes increasingly important for the management of the airspace to continue to improve safety and reliability to accommodate the greater number of aircraft, including military and UAVs.

Aviation Electronics Europe will not simply look at the latest and future for cockpit technologies, where airlines aim to deliver the most up-to-date and efficient systems for their pilots and the safety of passengers, but also updates on the Single European Skies initiative, which enters its third and final phase.

The 'Deploying SESAR' session explores the current and future positions for SESAR through to 2020, the main operational challenges and the technical enablers for SES deployment from the commercial airline and business jet perspectives. Speakers from key organisations, including SESARJU, EUROCONTROL and Airbus, involved in the deployment will deliver informative updates on the future for SESAR.

An exciting panel discussion on the 'Impact of Performance Based Navigation from Alternate Perspectives' the panelists will look at the impact PBN will have on airspace from the different perspectives, from the airline to the FSM supplier. Developed by ICAO, Performance Based Navigation (PBN) is an essential component of delivering



the objectives underpinning the Future Airspace Strategy and consequential modernisation of the airspace . PBN provides the opportunity for a significant airspace re-design as future navigation developments, such as three-dimensional (3D) and four -dimensional (4D) user preferred trajectories, evolve.

With the necessity for all systems and software design developed to be fit for purpose and support the deployment of SESAR, the 'Standardisation & Certification' session, speakers from EUROCAE, Verocel, STM and Rapita Systems will explore the latest approaches, analysis and implications in compliance of DO-178B/C - ED-12B/C.

A further key session in the Aviation Electronics Europe conference is the 'Connectivity & eEnabling from Nose to Tail and Beyond' session looking at the trends of airlines and how are they addressing connectivity beyond the aircraft, from pilots utilising tablets in the cockpit to in-cabin communication and how legacy and IT systems can be integrated to be secure via the eEnabled ground network. Speakers from Lufthansa, Airbus, Boeing, Rockwell Collins and Teledyne Controls deliver a high profile session.

More conference details and speakers are soon being announced at the Aviation Electronics Europe conference and exhibition, taking place in Munich, Germany from 25th-26th March 2015, which delivers a premier platform for the international aviation electronics and avionics industry to learn, network and source new information, products, technologies and services at one unique annual event.

Further details of the conference and the full programme can be found at www.ae-expo.eu, but is ensured to deliver the latest industry updates as Europe's only dedicated exhibition & conference for the International Aviation Electronics & Avionics Community.

Speakers include:

Andreas Ritter

Director, Captain A340 - Deutsche Lufthansa AG

Frédéric Belloir

Airbus Engineering – Systems, Navigation systems Manager, Airbus

George Romanski

CEO, Verocel

Paul Hart

Chief Technology Officer, Curtiss Wright

Benoit Souyri

Software Architect – SOFTARC Product Design Authority, Thales Airborne Systems

Paul Parkinson

Principal Systems Architect, Wind River

Qin Zhu (Amy)

Systems Certification & Airworthiness Engineer, Aviage Systems

Prashanth T V

Honeywell

Matthew Jackson

Presagis

Brecht Baert

Barco Defense & Aerospace

Florent Lanterna

Auto Flight System Project Leader, Airbus Operations

Marc Gatti

Advanced R&T Director, Thales Avionics SAS

Ozgur Babur

Electronic Hardware Certification Group Manager, STM A.S.

Andrew Coombes

Head of Marketing and Engineering Services, Rapita Systems

William Cecil

Director of Business Development, Teledyne Controls

Niko Fistas

Future Communications Team Leader, EUROCONTROL

Outline Conference Program

Deploying SESAR

Europe's Single Sky (SES) initiative has entered its third and final phase, which will see implementation of a series of projects in the years ahead. This session explores the current and future positions for SESAR through to 2020, the main operational challenges and the technical enablers for SES deployment from the commercial airline and business jet perspectives.

Impact of Performance Based Navigation from Alternate Perspectives

Developed by ICAO, Performance Based Navigation (PBN) is an essential component of delivering the objectives underpinning the Future Airspace Strategy and consequential modernisation of the airspace . PBN provides the opportunity for a significant airspace re-design as future navigation developments, such as three-dimensional (3D) and four -dimensional (4D) user preferred trajectories, evolve. This panel discussion will look at the impact PBN will have on airspace from the different perspectives, from the airline to the FSM supplier.



For further details on the conference programme and to register online visit www.ae-expo.eu

Standardization & Certification

With the necessity for all systems and software design developed to be fit for purpose and support the deployment of SESAR, we explore the latest approaches, analysis and implications in compliance of DO-178B/C – ED-12B/C.

Connectivity & eEnabling from Nose to Tail and Beyond

What are the trends of airlines and how are they addressing connectivity beyond the aircraft, from pilots utilising tablets in the cockpit to in-cabin communication. How can legacy and IT systems be integrated to be secure via the eEnabled ground network?

Situational Awareness – latest and future challenges

Assisting the flight crew with precise data can help situation awareness and the decision making process be more accurate, enhancing overall safety. What are the future challenges facing aircraft in today's more turbulent and busier sky, and what are the latest technologies and systems to provide aircrew support?

Open Architecture and COTS Technology

Improvements in the performance and security of modern technology has enabled the development of new systems and architecture, and applications within new COTS technologies. This session explores the latest approaches for open architecture and component based architecture, as well as the design challenges and compliance issues.

Future Avionic Innovations and Advanced Concepts

What innovations and concepts are around the corner that could soon become part of today's development in avionics? What technologies and latest thinking in concepts for safer, more cost effective skies?

Association of European Airlines support Aviation Electronics Europe

The Association of European Airlines (AEA) has confirmed its support for Aviation Electronics Europe, which will take place on 25th-26th March 2015 in Munich, Germany.

Based on its extensive knowledge of the industry, AEA is an essential industry platform and is relied upon by policy-makers as a trustworthy contributor to the debates around the decision-making process. AEA works together with the institutions of the European Union and other stakeholders in the value chain to ensure the sustainable growth of the European airline industry in a global marketplace.

The Association of European Airlines is a non-profit industry organisation, bringing together 30 major European airlines as the trusted voice of the European airline industry for 60 years.

The airline community has a key role to play in the future for avionics, with the airline pilots being in the frontline of technological developments, and the AEA is keen to ensure its members have the opportunity to contribute to the discussion in the future developments in aviation electronics and avionics.

Adrian Broadbent, Event Director and owner of Aviation Electronics Europe, said, "We are delighted that the Association of European Airlines is supporting Aviation Electronics Europe conference and exhibition. The Association is leading the discussions for the airline industry across many areas, including Communication and

Navigations Systems, which will see their CNS Working Group come together to host a meeting in Munich at the event."

Early Bird Registration Now Open

Register online today and save €€€ with the Early Bird delegate fees (Early Bird delegate rate deadline is 25th February 2015).

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

Visit www.ae-expo.eu for conference delegate fees, discounts and to register online.

Register online before 31st October and benefit from a further 10% discount by quoting Promo Code: 'AEOCT' at the checkout.

Airline Delegate Package

To assist with making it even more attractive and beneficial to avionics engineers, professionals and managers of airlines and operators, we are delighted to announce a great package for airline/operator delegates.

Airline Delegate Package for only €295 – including 2 nights accommodation

The airline delegate package is a great way to attend the Aviation Electronics Europe conference, keep up to date with the latest technologies, policies and challenges facing the aviation electronics and avionics industry, with a cost effective rate which includes 2 nights accommodation at the event hotel.

For just Euro 295 your delegate fee includes your access to the conference, exhibition, keynote, exhibitor presentations, free seminars and workshops, coffee breaks and lunch breaks for 2 days, as well as 2 nights accommodation – great value!

For further details and to register online visit www.ae-expo.eu/airline-delegate-package

Exhibition Floor Continues to Fill

As business gets back to normal after the summer break, and budgets begin to come up for review, Aviation Electronics Europe should be a serious consideration for your exhibitions schedule.

60% of exhibition space at Aviation Electronics Europe has already been booked, with some great names in the industry due to participate, including Honeywell, TE Connectivity, TTTech, Esterline CMC, Wind River, VECTOR, Verocel GmbH and TechSAT.

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

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

For further information on exhibiting please contact:

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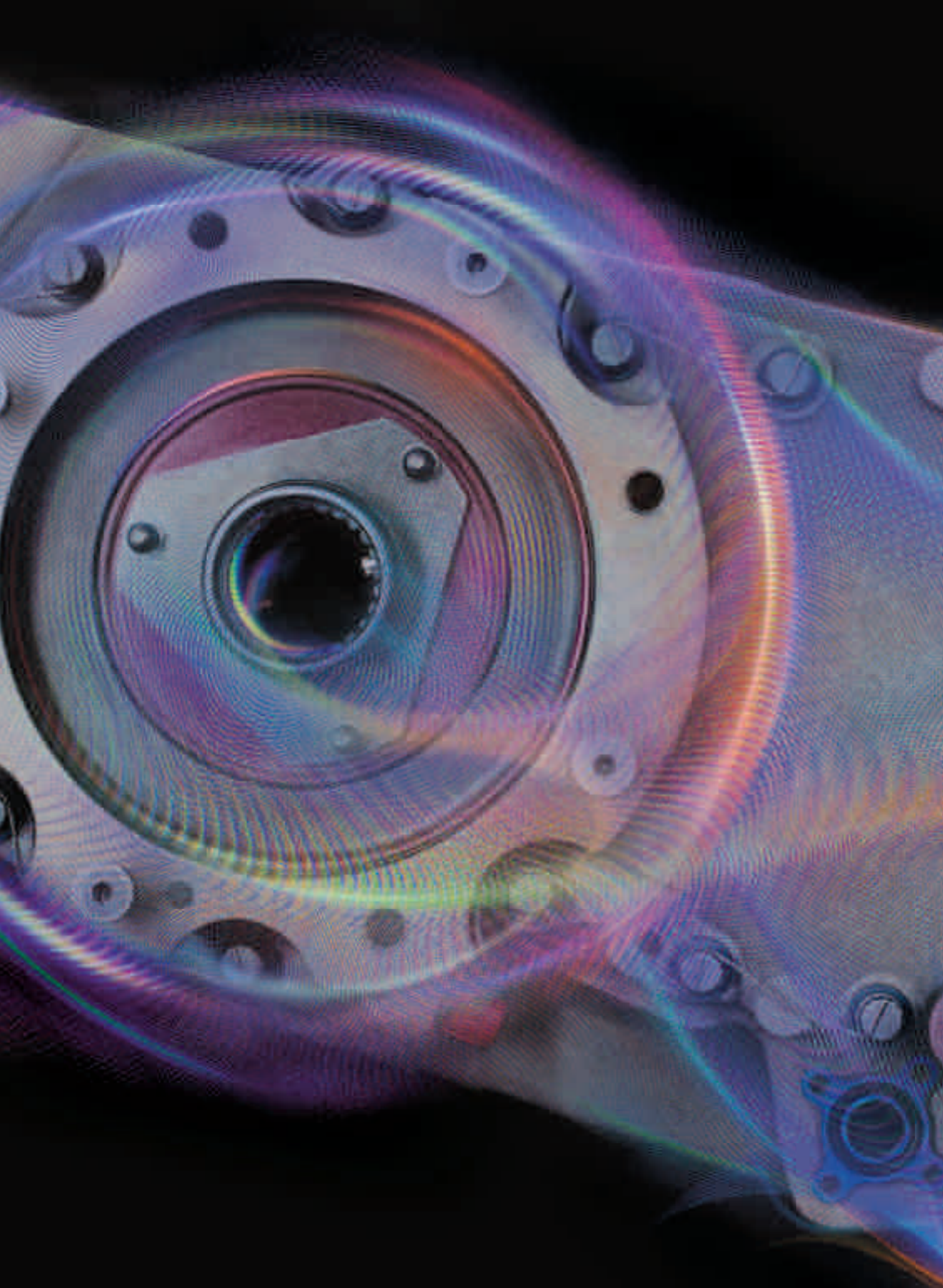
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EUROPEAN MRO OUTLOOK

SLOW GROWTH
AND MOUNTING
CHALLENGES



By Charlotte Adams

The European MRO market is a mature sector, with great technical expertise but with relatively high costs and slow growth rates. It is home to some of the most successful airline, independent and manufacturer-based maintenance, repair and overhaul facilities, which are especially well-versed in the support of aircraft engines and complex components.

Within the approximately \$61 billion global MRO market, Western and Eastern Europe accounted for about \$16 billion, or 26 percent in 2013, says David Stewart, global managing director for aerospace with ICF International.

The Western European MRO market hit about \$12 billion in 2013 and is expected to grow to about \$13 billion—a one percent compound annual growth rate (CAGR)—over the decade through 2023, Stewart estimates. Eastern European MRO is expected to grow from a much smaller base, about \$630 million in 2013, to about \$880 million in 2023, or about 3.3 percent CAGR, he says.

*The European MRO market is home to some of the most successful airline, independent and manufacturer-based maintenance, repair and overhaul facilities in the world.
(Above left, ATR photo. This page, Lufthansa Technik photo.)*



ICF's David Stewart says he expects the strongest growth in the European MRO arena to come from modifications and upgrades during the 2013-2023 time period. Lufthansa Technik photo.

Stewart expects that Europe will show strongest growth in the 2013-2023 period in modifications and upgrades (about 2.5 percent a year). He pegs growth in the European airframe business at about 1 percent per year over the same period.

Last year ((2013)) was a good year for airline MROs, Stewart says. Original equipment manufacturers (OEMs) also enjoyed growth in the period. European engine OEMs—including companies such as Rolls-Royce, MTU, Snecma Services and General Electric (GE) in the UK—add to the region's maintenance strength. OEMs are well-positioned in the engine and component markets, especially on the newer platforms, where they have better control of the parts and knowledge of the technologies, Stewart says. This contrasts with airframe maintenance, which is handled more frequently by the airlines and independent MROs, he says.

Yet growth will be a challenge—especially for independents—in the years ahead. “We see the business in Europe as rather flat and under a constant or even growing [cost] pressure, which results in price wars and payment issues,” says Sébastien Weber, vice president of

marketing, product support & development for Air France Industries KLM Engineering & Maintenance (AFI KLM E&M). “Chasing bright spots only in Europe is virtually impossible,[so] most of the large European MROs have a global footprint.”

Because big airlines like Lufthansa, Air France-KLM, British Airways and Iberia effectively keep their maintenance work in-house, the number of available contracts may not be so high as in other regions of the world, Stewart says. So there is strong competition for every opportunity. One of the sizable contracts coming up for renewal in 2015 is easyJet, Stewart says.

Cost Concerns

Cost reduction is a top challenge, according to August Wilhelm Henningsen, chairman of the Executive Board of Lufthansa Technik (LHT). Further cost reduction is necessary in order to offer best conditions because cost pressures to customers certainly will continue, he adds.

SR Technics also sees cost pressure as the “main challenge...in all areas of the businesses,” according to a spokesperson for the Swiss MRO. This

cost pressure is attributed to the “growing commoditization of the business.” SR Technics also identifies overcapacity and intense competition as problems. The European MRO market is “highly competitive in all segments,” the spokesperson says. In component services, particularly, “the competitive climate has deteriorated severely over the last two years,” so that the company anticipates a “battle for market share” shaping up on a number of platforms.

One of the challenges European MROs face, especially in Western Europe, is relatively high labor and facilities costs, Stewart agrees. The question is how to reduce costs by diversifying activities?

The impact of labor costs on profitability will reduce the market share of European and American MROs, relative to Asian MROs, in the near future, based on market forecasts, says Ahmet Karaman, CEO of Turkish Technic. “Human resources planning is the top challenge for all MRO providers,” he says. “It is really challenging to provide a well-trained and low-cost work force against rapid growth in the MRO industry.”

The bottom line is that it's pretty difficult to be competitive in labor-dominated

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MTU Maintenance says it is continually looking for material-saving solutions to reduce costs for their clients, especially for older engines, according to Leo Koppers, SVP.

maintenance work such as airframe and components like landing gear and evacuation slides when you're in a high-cost area, Stewart says.

"Skilled manpower is now moving at a fast pace, shifting fast from one geographical region to another," notes Nelson Vaz, the vice president of maintenance business for the Portuguese MRO, OGMA. "Aircraft technicians are now changing company and country," leaving Europe and heading for the Middle East and Eastern locations. The European crisis accelerated this trend, he says, "motivating and potentiating levels of rotation never seen before."

With expected increases in air traffic, the retention of skilled labor is a priority, Vaz says. This is the kind of business where expertise plays a crucial role, and it really takes years to train and prepare a skilled mechanic or engineer, he says.

Maintenance costs mean that airlines are "willing to travel far for maintenance purposes, even between distant continents sometimes, if that compensates in terms of additional fuel and aircraft unavailability

due to repositioning flights," says OGMA's Vaz. Thus European MROs are facing the need to reinvent themselves, based on doing better for less in order to attract new business opportunities that typically were out of range before, he says. "This has become vital now." Consolidation is becoming increasingly important in order to compensate for high labor costs in Western Europe, he says.

In the longer term (2020 and out), however, labor rates in North America and Asia are expected to converge, as costs in Asia rise. Eventually, airlines will have to reconsider airframe sourcing, and regional MRO suppliers will enjoy new opportunities, according to ICF. European suppliers already are paying more attention to North America, for example, as labor rates in the southeastern states are now comparable to those in emerging market MROs.

Access to data is another concern noted by many MROs. New-generation aircraft present an opportunity for manufacturers to introduce licensing schemes and limit access to repair data, notes AFI KLM

E&M's Weber. "For the airline community the number one problem is maintaining an open choice for MROs [in the context of] OEM policies [that] might result in reduced competition," he says. "One of the problems that we face is accessing the OEMs' components documentation," agrees Adolfo Gordo, head of commercial Iberia Maintenance. "The challenge is how to manage OEMs' penetration into the MRO market as global solution providers."

Markets

Competition within the region is intense and will become more so. A key challenge will be figuring out how to best to tap into growth markets in the Middle East, Asia and Latin America, Stewart says.

The Middle East is a relatively tough market because most of the growth is being generated by airlines that aren't doing a lot of outsourcing, except for engines and complex components, Stewart says. Latin America, on the other hand, is an opportunity for all the European MROs, he says. There has been some attention in Eastern Europe and North Africa, and these



The image shows a hand holding a tablet that displays a futuristic, blue-tinted interface. The interface features a central 3D model of a mechanical part, likely a brake assembly, surrounded by various data points and labels. On the left, there is a vertical sidebar with icons for different parts. In the center, there is a large circular graphic with the text "INVENTORY" and a bar chart. To the right, there is a "CAPABILITIES" section with a list of items, a world map, and a "DELIVERY" section with an airplane icon. Below the map, there is a "SHIPPING" section with a box icon. At the bottom of the interface, there is a label "101-1002-3 Brake Assembly".

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SR Technics says aircraft and engine life cycles are shortening. The Swiss company says the ensuing increase in spare parts availability requires a review of the operating model with a higher share of replaced instead of repaired parts. SR Technics photo.

areas have a lot of growth potential, but these markets are still relatively immature, he adds.

AFI KLM E&M has been expanding its presence outside of Europe. It recently acquired Barfield, a component repair company in the U.S., and opened a component shop in Shanghai. Previously owned by Sabena Technics, Barfield does a lot of work in Latin America. The Group also set up Bonus, a JV in Miami that focuses on engine teardown and PW4000 overhaul, Weber says.

LHT is also looking south. The German MRO is working on a new MRO facility in Puerto Rico to service short-haul and medium-haul aircraft. Expansion of its involvement in America is a “major new step for Lufthansa Technik,” Henningsen says.

The new company, Lufthansa Technik Puerto Rico, will be based at Rafael Hernández International Airport in Aguadilla, a former U.S. Air Force Base located on the northwest of the island. The company will employ up to 400 workers

and run a total of five overhaul lines. Initially it will operate two lines for Airbus A320 C-checks and D-checks. The first layover is due to take place in 2015.

Turkish Technic

Turkish Technic is an ambitious competitor with Western European MROs. The enormous HABOM facility, now coming on line at Sabiha Gökçen International Airport, is thought to have required more than \$500 million in investment. The MRO's growth figures are impressive. In the decade between 2003 and 2013 Turkish Technic has increased its consolidated revenues from \$183 million to \$602 million. Meanwhile third-party business has grown from 8 percent of total revenues to around 30 percent today, according to Karaman. This increase in third-party revenues is significant, he explains, since the revenues generated by the MRO's main customer, Turkish Airlines, grew rapidly in the same time period. In 2013, Turkish Technic also acquired MNG Technic, the second-largest maintenance facility in Turkey.

The American and Western European markets are saturated, Karaman says. Dominated by large MRO providers, these markets would require a large capital investment in order to establish a foothold. It would be challenging to gain enough market share to sustain a brand new facility.

However, in the emerging markets of Asia and the Middle East, there is a “demand surplus,” making room for development by existing companies and for entry by new enterprises, he says. As a result, there are fewer challenges to entry in these regions—to capture a market share and establish a sustainable business model—resulting in lower capital needs. With its advantageous geographical location, the MRO could attract customers not only in Europe and the Middle East, but also in Russia and the former Soviet states and North Africa, as well.

Other Issues

Globally, commercial aviation MROs are struggling not only with appealing financial proposals, but primarily with aggressive



"Human resources planning is the top challenge for all MRO providers," says Ahmet Karaman, CEO of Turkish Technic. Turkish Technic photo.

turnaround times (TATs), Vaz says. An aircraft that stands one day in the hangar represents the loss of one full day of ticket sales. This is the bottom line for any airline. "Therefore, doing the same good job in the good old way it used to be done last year is no longer attractive...The market screams for improvement and continues to challenge the MRO industry with absolutely no mercy."

New aircraft, which will be joining world fleets in record numbers in the next decade, will be a mixed blessing. Hangar down-time is being reduced, Vaz agrees. The European market also faces faster growth in line and component maintenance, he says. Internally, East Europe is competing with the West, while the Middle East and Russian markets are finding their way through." Consolidation and partnerships, now more than ever, are key factors.

The surplus market is expected to grow from about \$3.5 billion in 2013 to \$6.2 billion in 2023, driven, generally, by engine-related piece parts and LLPs, ICF says, for an annual growth rate of about

5.5 percent. "The trend will increase, as we're currently facing a significant reduction in the new airframe life-cycle operation," says OGMA's Vaz.

The increasing number of available surplus parts and components can help airlines to reduce their maintenance costs by using these or also PMA parts instead of buying new ones. But this decision depends on their business strategy and not on the MRO provider, Henningsen points out.

Aircraft and engine life cycles are shortening, according to SR Technics. The ensuing increase in spare parts availability requires a review of the operating model with a higher share of replaced instead of repaired parts, he adds. But airlines possibly could enjoy maintenance cost savings opportunities of 30 percent or more, according to ICF.

This trend allows MTU Maintenance, for example, to increasingly utilize used serviceable material for engine repairs and thus lower engine MRO cost, especially for high-cost items such as life limited parts. Benefits are obvious, as lowered costs allow customers with

aging fleets to continue running these engines economically. It further facilitates penetration into markets which have traditionally been controlled by the OEMs, says Leo Koppers, senior vice president for marketing & sales with MTU Maintenance.

Engines

Europe is a net exporter for engine MRO, despite the fact that it has neither the lowest cost base nor the fastest-growing demand as a region, Koppers says. "[That] means that more engines are actually being overhauled in European-based shops than local demand actually generates," he explains.

This is the result of two factors, Koppers says. First, larger European airline maintenance and engineering organizations are able to acquire third-party work. Due to economies of scale, this helps them to maintain their own engines at a reasonable cost. Second, Europe has a high density of OEM shops, as well as other key providers, such as MTU Maintenance.

Airline MROs have been strong in this area. In March of 2014, for example, Air



Globally, commercial aviation MROs are struggling not only with appealing financial proposals but with aggressive turnaround times (TATs). SR Technics photo.



Competition within the European community is intense and will become more so. Shown above, one of Iberia Maintenance's paint hangars. Iberia Maintenance photo.

France-KLM selected the GENx engine for its new Boeing 787 fleet. That agreement included the signing of a partnership between GE and AFI KLM E&M on the maintenance of the GENx engine.

Iberia Maintenance, meanwhile, was certified this year on the V2500 engine, Gordo says. The MRO can overhaul and test these engines in its own facility, which required investment in new tools and software. The company expects to expand its customer portfolio.

But this favorable situation may not last indefinitely, Koppers says. MRO work on the newer engines will be more difficult to capture because of technology access hurdles, leading possibly to some consolidation in the engine MRO sector. MTU, with its "hybrid business model," is well-positioned to weather this transition, as a risk/revenue-sharing partner on some OEM programs and as an independent MRO.

The engine OEMs' share of engine work that they do in their facilities is about 45 to 50 percent, Stewart estimates. However, through the OEMs' licensed service centers and through material agreements with other engine MROs, OEMs have a larger share.

Labor costs account for only approximately 20 percent of the total shop visit cost, according to MTU. But total shop visit costs can be reduced by using material-saving solutions rather than by using lower-cost labor, Koppers says. MTU Maintenance is continually searching for material-saving solutions with the potential to drastically reduce costs, he says.

This strategy applies particularly well for the older-engine sector, where the amount of spare parts and material is increasing. But even on newer engines MTU Maintenance believes that repairing parts rather than always replacing them can add true benefits, Koppers says.

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MTU also sees a growing demand for leased engines. The company has entered two JVs with Sumimoto Corp., a Japanese trading house, for short-term leasing and for long-term leasing/financing, respectively.

Independents

Life may be getting tougher for independents, but strong players continue to do well. Lithuania's Avia Solutions Group, the parent of FL Technics, grew aircraft maintenance revenues to external customers by more than 10 percent in 2013, compared with the previous year, according to its annual report. Last year (2013) the group acquired Helisota UAB, a helicopter line and base maintenance company in Lithuania.

Although there is fierce competition with OEMs in the engine sector, there is room for cooperation in the airframe segment, FL Technics executives say.

Avia has pursued an aggressive growth strategy. It launched an 8,900-sq. meter MRO center at Kaunas International Airport this year, bringing the group's hangar and shop space to 30,000 sq. meters, and allowing the company to plan for doubling its volume of heavy maintenance work in the next couple of years. The company also plans to expand its line maintenance network, and expects to add six or seven stations this year.

At the same time the MRO is eyeing Southeast Asia. It already manages spare parts stock for SSJ100 aircraft and provides Cardig Air and Garuda Indonesia with power-by-the-hour and line maintenance support. FL Technics expects to launch a hangar for base maintenance in the region in the next two years. Located as it is in Eastern Europe, FL Technics asserts that its pricing for EASA-certified solutions is "much more attractive...than [that] usually offered by Western European MROs."

SR Technics, the Swiss MRO owned by Mubadala Development Company, an arm of the Abu Dhabi government, sees continuing strength in component and engine services. SR Technics, for example, opened a component maintenance facility in Kuala Lumpur at the beginning of 2014. The MRO is also working on opportunities in Asia and the Middle East as well. With its sister company SANAD, SR Technics has a powerful financing solution as part of their value proposition to help customers optimizing their financial structure, the spokesperson said.

Airframers

Airframe OEMs are also part of the MRO game. Some 25 percent of Airbus' revenue is expected to come from the aftermarket by 2020, while other manufacturers are launching "care intensive" programs that appeal to many airlines, Vaz says.

ATR has long recognized the value of a full maintenance solution for its aircraft customers. Today, one-third of the ATRs in operation are covered by Global Maintenance Agreements (GMAs), and the company expects to expand this number.

In addition, last year ATR added Atlantic Air Industries, in France, and Rheinland Air Service, in Germany, to its network of partner maintenance centers. Fokker Services Asia, which bills itself as the first member of ATR's MRO network, helps provide maintenance for Asian ATRs. The French airframer expects to add partnerships with other MRO providers in Latin America and Africa. ATR monitors the network to ensure the quality of work, full traceability, accuracy and access to all technical records on any parts under GMA contracts.

Canadian airframer, Bombardier, has a maintenance presence in Europe, and is looking to expand there, especially in commercial MRO, in future years via new facilities, partnerships or the company's Authorized Service Facility network. Its Amsterdam service center currently anchors its business aircraft maintenance capability in the region. **AMM**

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NBAA Roundup

By AVM Staff



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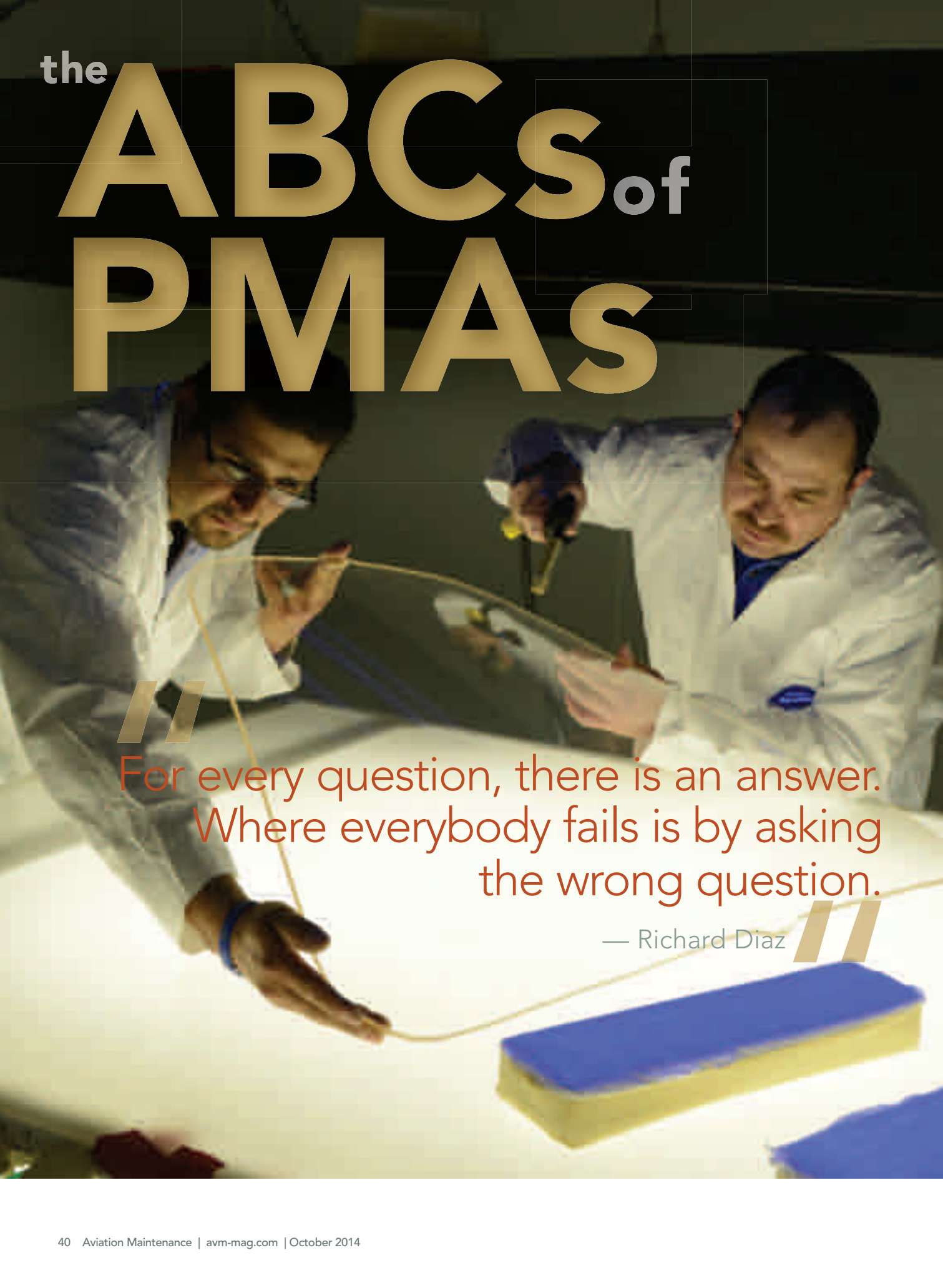
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— Richard Diaz



Ever since the issuance of Civil Air Regulation (CAR) 1.55 nearly 60-years ago replacement parts created under FAA Parts Manufacturer Approval (PMA) rules have suffered with a serious identity crisis: Aircraft owners, operators and maintainers continually struggle with what exactly these parts are and where they come from.

Perkins Aircraft Windows owner Jim Perkins, above left, spent much time, effort and money proving their wind shields were of equal, if not better quality, than the original part, including completing the bird strike test. (Image above and left courtesy of Perkins Aircraft Windows.)

By Dale Smith

The simple definition is that PMAs permit persons other than the original FAA Type Certificate (TC) holder to produce and sell “FAA-approved” replacement parts for installation on airframes and engines. There you go. Class dismissed. Unfortunately, in the 10,000 shades of grey world of aircraft maintenance, things just can’t be that clear-cut. You have to ask, what am I missing?

“While, overall I think the PMA business is pretty good today, the industry’s understanding of what we really mean by that term is not so good,” stated Sarah MacLeod, executive director of the Aeronautical Repair Station Association (ARSA). “PMAs have always been misunderstood and when you try to differentiate between the various kinds of PMAs it gets even more convoluted.”

One area of the PMA maze that seems to give so many ARSA member shops the most cause for concern are what MacLeod calls “captive PMAs.”

“These captive PMAs are actually those an original TC (Type Certificate) holder has another company make for them under license if you will,” she said. “Some suppliers think that creating a PMA part under license eliminates all their responsibility – not even close.”

“For example, lets say this aircraft OEM needs you to PMA a constant-speed drive unit that has to meet a specific set of specifications,” MacLeod said. “So you get a licensing agreement from the TC holder to make that part to meet those precise specifications. Job done, right? Not on your life.”

PMA's from a Piston Engine Manufacturer's Perspective

With over 3,000 PMA's to its credit, few companies know more about what it takes to create successful PMA parts than Superior Air Parts, Inc. But that doesn't mean it can rest on its laurels.

"After all these years, people still think we PMAers just find another product and copy it, put it in a box and put our name on it," explained Keith Chatten, Superior's executive vice president and general manager. "Honestly, I don't know of any situation where you could stay in business very long doing that. We've been at it since 1967, and the only way we can survive and grow is to offer true value and performance benefits to our customers."

In fact, Chatten is quick to point out that Superior's goal is to make its parts better than the originals. Case in point is the company's use of a proprietary electro slag remelt (ESR) process to make its most popular crankshafts.

Of course, this is the aviation industry after all; you can't just change crankshaft metals because you want to.

"This was a two-year development program that had a very high profile within the FAA," he said. "Our metallurgical research showed that the ESR process delivers a superior quality metal for high stress parts like crankshafts. All we had to do was prove it."

Chatten explained that during the development and approval process Superior had to basically convince the FAA that the ESR process truly produced a better metal and that that "better metal" would produce a crankshaft that was equal-to or, in this case, better than the standard.

"We did durability and endurance testing for both crankshaft bending fatigue and torsional twisting fatigue – those are pretty much the two ways you can break a crankshaft under normal operations," he said. "We did those tests at much higher power levels than what is required by the regulations. The FAA approved testing helped us to establish a significant margin of safety. In the end, it exceeded all of the FAA's requirements."

Yet, even with all they can offer, Chatten said aircraft owner/operators still don't understand the value of PMA parts to the industry.

"I have people ask all the time why does the industry need PMA parts? My short answer is for the same reason the auto industry needs aftermarket parts," he said. "If you went to the dealer for every spare part you needed, you couldn't afford to drive your car. PMA parts aren't always the answer, but they are often the only source for innovation and they sure help control the costs of all spare parts."



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All of this begs the question, "Where do we go from here?" Stay with us throughout this, our 25th anniversary year, and we'll share some of our future plans. Because, thanks to you, even after 25 years, we're just getting started.

Ken W. Boon,
President & CEO, JSSI



PMA parts have been crucial to keeping out-of-production aircraft in the air. (Perkins Image)



According to AvFab CEO GR Lowe, getting an FAA PMA is quite an involved process. (AvFab Image)



Most of AvFab's PMA work is in support of one of their STCs. (AvFab Image)

"You need to get your hands on that TC holder's original test data that proved that this particular constant-speed drive meets its requirements. Without it you don't know why the specification was issued or how the TC holder and the FAA found compliance with the applicable regulation when it was installed in the airplane," she said. "Why is this important? We have cases where even years after the aircraft and/or component is out of production, the FAA has forced a supplier to create the testing parameters to show how their approved part met the aircraft's specifications."

"That's a business point many companies fail to understand," MacLeod said. "They get their part selected or get a license to produce, but don't know all the possible ramifications of making that part. It can lead to a very bad situation."

MacLeod said that you not only need that information but you need to fully understand how your part fits into the documentation.

"Even if, at the beginning, you only get access to it (data) or agree that should the FAA request the information later on the TC holder will make it available – that will work also," she said. "All the lawyers understand is the threat to the TC holder's IP (intellectual property). That may be important, but as suppliers we have to be pragmatic about the business aspect of what we are doing."

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Making PMAs for your STC

Aviation Fabricators (AvFab) isn't really in the PMA business, but they do make a lot of PMA parts.

"The majority of our PMAs are in support of our STC efforts, but some of them just happen to work fine as direct replacements for parts on the OEM products," explained AvFab's CEO, GR Lowe. "If it's other than in support of one of our STCs, we really don't see the need for the stand alone part because it's quite an involved process to get an FAA PMA today. For instance, if it's a part that the OEM is no longer making or supporting very well we may look at it if there appears to be a need."

And while most people think of sophisticated parts when they think PMAs, Lowe said the process is just as involved for simple parts.

"They're all the same in the eyes of the FAA," he said. "Our foot fittings for the dividers on legacy King Airliners for example, are very hard to get from the manufacturer today. They haven't made that particular piece for a long time so if you need one, you have to contact Beechcraft and have them make a one-off for you, at a huge price and a long lead time. For this reason we obtained a PMA on this part, which gives an alternate source that we can supply immediately."

"The key is the part you make has to be a direct replacement for the original part. You can't really make any significant changes," Lowe said. "We've done some parts where we have made, what we feel are significant improvements in the materials or techniques, and those generally require an STC."

Lowe said he sees the diminishing availability of parts as a big opportunity for PMA producers going forward.

"As more and more aircraft age and OEMs make fewer and fewer replacement parts and start charging more for the parts they do make, it's going to open the door for more companies to enter the PMA business," he said. "They'll just have to make sure they understand the rules before they get too far into it."

Proving PMA quality

No matter what type of PMA you are producing and it's intended use, even after all the years of continual strides to meet or exceed the TC holder's original quality, PMA parts still carry the stigma of well, just, being cheap copies.

Back in March of 2003, Jim Perkins, owner of Perkins Aircraft Windows, was featured in *Aviation Maintenance* magazine for his company's line of PMA windshields and windows for popular business jets. And while the story was well-deserved and earned his products some much deserved attention, it also riled up two major OEMs.

"One of the companies issued a Service Information Letter (SIL) saying that our transparencies were not approved by the factory and they 'could be unsafe'," explained company VP, Jack Brawley. "True, the factory had not tested them—they don't have to—but the FAA had already approved them under PMA identity."

Brawley said that, as you would expect, Perkins' windshield business for that type went down dramatically after the letter hit the operators.

"That got Jim going so he actually went and bought the nose section of one of their jets, installed our windshield and took it to Canada to the same laboratory that performed all of the OEM's bird-strike tests do the same for us," he said. "They set the nose in the rig and fired the four-pound bird at the windshield—it passed the test with flying colors. Once that story got out it pretty much ended any further negative stories by any of the OEMs."

"Jim spent a lot of money to prove that these products were

as good as the OEM," Brawley said. "It was as much about pride as it was business. It proved that all these parts meet the same standards, it just comes down to dollars and cents."

"PMA's are definitely more accepted today than they were 15 years ago," he said. "The OE's are running out of darts to throw at us. We've been around long enough and proven enough so that our name has become synonymous with high-quality transparencies."

PMA's are here to stay...

While the TC holders aren't going to be sending PMA producers any thank you cards, it's really time they took a more realistic approach to what these parts really mean to their bottom line. And I don't mean in direct replacement parts sales.

By helping owner/operators keep their long-out-of-production aircraft in the air, these PMAers are really helping build on the quality and dependability image of each of these brands. Imagine the hangar talk if suddenly you couldn't get a replacement part for a 10- or 15-year old aircraft or engine—a relative youngster in today's world—just because the original manufacturer decided that it wasn't economically viable to continue to make and stock that part?

Those owners would get their collective tails in a major twist and that brand would get a beating. No doubt that would have an impact on sales—especially in the re-sale market. And since many owners of Brand A, just move up to next bigger and faster model that brand makes, well you can see that a move that that would be hard to market away.

Are PMA parts for everyone? No. Some owner/operators trade-in their aircraft so frequently that they're covered by the warranty so spares availability and cost is of no consequence. But for aircraft owners and maintainers who have learned to question the status quo, PMA parts have proven themselves to be excellent options. AM

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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.

Human Factors in Hangar Maintenance

Can humanizing hangar design promote safer and better practices?

Development, or redevelopment of hangars and workshops is one of those necessary evils where aircraft maintenance is concerned. During the 30-plus year life of large maintenance facilities, those involved with the specification and ultimately implementation of any hangar or workshop based solution needs to get it right on so many levels. Topping the list is long-term capability planning for the facility. However, when speaking to a number of commentators, a lack of balance in terms of safety protection against production still seems apparent.

Hangar or workshop design, particularly for those aircraft/component MROs that work through the night is "very much neglected." History has often proven in this regard that if anything does go wrong, the origins of the incident, more often than not, start during the night-shift and in a hangar. Good examples include the BAC 1-11 incident and the engine cowling latches episode, earlier this year. A great number of these incidents can be ironed out through better aircraft and component design, and to a greater extent through the introduction of human factors influenced training.

However, there is a limit to just how much can be designed into an aircraft or a maintenance procedure. If human factors issues are to be further resolved, maintainers and operators must now consider other areas of aviation infrastructure with regard to procedural design as well as concentrating on the actual facility itself.

When it comes to the way we operate and maintain aircraft, good ergonomic design, well thought-out maintenance practices and procedures are already in place, and have had very positive influences on aviation over the years. We have even further studied the effects of fatigue, and have installed effective policies in that regard. Yet, there is little research regarding hangar/workshop development or re-development that considers maintenance human factors as a part of the design specification. Surely, a well thought out hangar/workshop specification, would make all of our lives easier when it comes to combating some, if not all of the "Dirty Dozen"? Not only that a well laid out hangar solution must also promote best maintenance practice, and contribute to the overall safety objective of aviation.

Convenient layout can help reduce the rate of worker fatigue.

Although it may seem blatantly obvious, sufficiency in terms of numbers of staff would actually seem to be the first port of call, once the

30-plus year business plan for the MRO has been specified. Knowing the numbers of personnel that the business intends to acquire as it grows, does, for all intents and purposes, mean planning for adaptable facilities within the hangar environment. Therefore planning for accessibility of the basics in terms of tooling, parts and a place to consult technical data is important. However, having to walk 15 minutes to acquire parts and tooling, and then having to take the stuff back to where the aircraft or workshop is located would take time and energy which quite often engineers will deplete quickly if they are asked to repeat the process numerous times within the shift. In a lot of cases, engineers are already exhausted before doing the job that they are asked to do!

Tooling is also another increasingly important issue, with MROs being required to maintain aircraft with TC holder approved equipment. We aren't just talking about specialist stuff that we utilize once in a while, but an increasing amount of standard tooling that engineers require on a daily basis. None more so than tooling that requires calibration and re-calibration. This equates to a substantial increase in required storage space for this new maintenance reality. Hangars would then need to be designed to plan for easy access to controlled tooling and equipment. With increased importance on controlled and approved tooling, the enlargement and re-purposing of the stores facilities will be critical.

Making Hangars Healthier Places

Most aviation professionals (particularly those of us who work there) would generally agree that the hangar environment is not the healthiest of places. Key threats to engineering and non-engineering personnel are easily identified in the form of noise and distractions, temperature and humidity and lighting levels.

Unfortunately, noise and distraction are considered unavoidable...or are they? There is a popular belief that hangar design in terms of specified materials and clever architectural formats may contribute to the damping-down of some (if not all) sources of noise that a typical aircraft hangar is prone to.

Off-course, re-designing the hangar would mean starting again from scratch, and may not necessarily be an option. However, modern building materials, which are carefully applied to existing hangars, will go some, if not all of the way to making the hangar less noisy.

Where temperature and humidity are concerned, designers of hangar solutions often have to wrestle

with local climatic conditions, a problem that is made worse where the meteorology is highly variable and unsettled, or is prone to extremes. This simple fact does go a long way to explaining why there is no standard to hangar design that ensures the correct levels of temperature and humidity.

Generally speaking, there should be, and most commentators also point-out that such standards have always existed in the stores environment, and are utterly amazed that these policies do not extend beyond the stores facility. The reality is that budgetary constraints tend to overshadow these environmental concerns. As such the environment is a consideration but lacks sufficient importance to warrant further investigation, much less investment. Better lighting solutions that are cost-effective and promote best practice would actually benefit maintenance managers in terms of improved productivity and the avoidance of many incidents and accidents which have been, and could be the result of misinterpretation caused by poor lighting levels.

The BAC 1-11 incident all those years ago only proves the point that things never look the same in subdued lighting or the night environment, when compared to looking at the same article during the day. Add to that fatigue, an element of complacency and the effects of the circadian rhythm, and we quickly realize that engineers become guilty of seeing what they want to see!

Hangar Specification

Re-specifying existing hangars will always be a difficult and expensive business. Managers are usually reluctant to make the necessary investments. These sorts of projects do tend to have a heavy price tag associated with them. However, what is the cost if something goes wrong? Noted commentators suggest that the price tag for a more humanly conducive maintenance environment need not cost the earth. Perhaps, a better understanding of maintenance practice through time and motion studies will undoubtedly reveal weaknesses in the hangar solution, and provide the basis for better, more convenient and humanly conducive hangar layout solutions.

Most engineers will tell you that even a modest loss of productive time means a radical increase in pressure to get the job done, not least, the aircraft out on time. The key to solving this particular issue is not easily quantified. Facilities and facilitation work must be a combination of well thought-through procedures coalescing with well laid-out hangars/workshops and the application of common sense.

A commonly held belief is that hangar design should also be influenced by the design of maintenance procedures and practices. Perhaps the real solution will be to consider hangar development whilst developing or redeveloping the MRO's Maintenance Organization Exposition. It is also essential that hangar designers should work "hand-in-glove" with the designers of maintenance procedure, thereby providing a more joined up answer to the human factors issue.

The utopian ideal in terms of the hangar solution would be to design the new or existing building in context of procedural or expositional requirements, human needs as well as approved capabilities. The trick will be to do all of this whilst keeping the profitability of the MRO firmly in sight. Architects by their very nature produce solutions that manage the space around the aircraft to excellent effect. Although this is not incorrect, it is perhaps not the only approach if human factors have to be considered. Perhaps architects should attend the same maintenance human factors courses as the rest of us. This will provide them with a much needed understanding of the human factors challenges faced by the aviation maintenance industry, with a view to designing the best possible environment for planning, and implementing aircraft maintenance.

Old versus New?

Demolishing and re-building new hangars in place of old ones, is the last resort. As previously indicated, careful study on the part of all concerned with hangar development, and the modification of existing facilities would invariably be the more cost effective option. In all truth the only reason why hangars should be replaced with new facilities, is based around the argument of aircraft size exceeding the physical capabilities of the old hangar. It is important for aircraft to be fully enclosed, as this would contribute to a positive maintenance human factors environment, and will undoubtedly promote best practice and a higher performance return. If a hangar door remains open such that it allows the tail section to remain outside, and admits the outside elements to come in, then any work that has been done to optimize the hangar environment with a view to human factors will unfortunately be lost.

In closing, the message for those MROs considering upgrade of their facilities is to ensure that you have sufficient Maintenance Human Factors oversight, as this will facilitate a better hangar design, which in turn will lead to better and safer aircraft maintenance practice. However, on a cautionary note, the human capacity to err can never be entirely designed out of any hangar or workshop solution. **AM**

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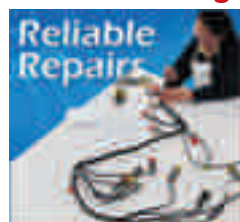


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Could Aircraft Parts Bring Iran and the US Back Together?

In “The Tempest,” Shakespeare wrote “Misery acquaints a man with strange bedfellows.” This was the inspiration for the nineteenth century comment from Charles Dudley Warner that “Politics makes strange bedfellows.”

And what stranger bedfellows could you find in the twenty-first century than the United States and Iran. Yet these two nations have set aside (some of) their differences in order to permit the sale of aircraft parts from the United States to Iran.

With skirmishes between our maritime vessels, disagreement over the Gaza Strip, and differences of opinion concerning nuclear material, it might seem unlikely for the two nations to set aside their differences and permit trade – especially in an area as strategically sensitive as aerospace – yet that is exactly what is happening right now.

In an agreement signed late last year, Iran and the United States agreed that sanctions would be relaxed with respect to certain trade in civil aircraft parts. The Agreement between the United States and Iran provides that the U.S. would license (i) the supply and installation in Iran of spare parts for safety of flight for Iranian civil aviation and associated services and (ii) safety related inspections and repairs in Iran as well as associated services. Licenses applications will be reviewed on a case-by-case basis, though, and there is no guarantee that a license will be issued in any case. Nonetheless, following this agreement, Iran’s Civil Aviation Organization head Alireza Jahangirian asked the Iranian National Development Fund to release \$400 million to purchase aircraft parts from the West.

Aircraft parts exports from the United States still require licenses from the Treasury Department’s Office of Foreign Asset Control (OFAC). Treasury issued guidance on its Iran Licensing Policy that clarified that “license applications will also be evaluated in light of the Iran-Iraq Arms Non-Proliferation Act and any other relevant statutes, as appropriate.

The first iteration of this agreement was short-lived (it was scheduled to expire June 20) but it has already been extended once, through November 24.

OFAC published guidance explaining that the U.S. Government will permit financial institutions to facilitate financial transactions relating to the covered aircraft parts transaction.” In other words, U.S. sellers will also be able to get paid. One important caveat is that these payments will only be authorized if the activities are initiated and completed entirely within the period covered by the agreement (the period beginning on January 20, 2014, and ending November 24, 2014).

Another important factor in the payment licensing policy is that the favorable treatment of payments will only be granted if the transaction does not involve any party on the Specially Designated Nationals (SDN) list. As a special exception, SDN-party Iran Air ^{is} permitted to engage in transactions (as are certain SDN banks).

The Commerce Department’s Bureau of Industry and Security

(BIS) has published its regulations on Iran which permit a single license from OFAC to cover BIS requirements as well as OFAC requirements. There are limitations on this authority – for example the subject of the license must be an article subject to OFAC limitations – but most aircraft parts that are licensed for export to Iran by OFAC ought to be exempt from any further licensing obligations under the BIS regulations.

What political factors may be driving this thaw between Iran and the U.S.? Iranian concern of the growing power of the Islamic State may be a factor. The Islamic State is a Sunni organization that has occupied significant territory in both Iraq and Syria and threatens to kill all Shia Muslims. Iran is a majority Shia nation. The U.S. has called the Islamic State a terrorist organization. So perhaps the two find common cause in defense against this growing entity.

It is possible that Iran may see other security benefits in closer ties with the United States – particularly related to security from Russia. Russian incursions into Ukraine and Russian support of the break-away Moldovan territory known as Transdniestria (not to mention annexation of the Crimean peninsula) are likely triggering some post-WWII memories in Iran.

During WWII, Britain and the Soviet Union took control of strategically important Iranian rail lines and also occupied key areas related to Britain’s oil interests in Iran. Later, the U.S. joined in the Allies’ defense of these assets. While the U.S. and Britain withdrew after WWII (as they’d promised the Iranians), the Soviets remained in northern Iran (also known as “Iranian Azerbaijan”). The Soviets established a short-lived puppet government known as the Autonomous Government of Azerbaijan (located southwest of modern-day Azerbaijan), but the territory was ultimately reclaimed by Iran (which enjoyed the post-war political support of both Britain and the U.S.). This incident has been described as an important precursor to the cold war between the United States and the Soviet Union.

Expansion of Russian influence may remind Iran of their own vulnerability to conflict with the Azerbaijani minority in Northern Iran, and closer relations with the United States could help discourage Russian intervention in Iran.

The opening line of Philip Jose Farmer’s book “The Fabulous Riverboat,” is “Resurrection, like politics, makes strange bedfellows.” It makes you wonder whether the current relationship between the U.S. and Iran signals a resurrection of the close relationship enjoyed by both countries in the post WWII era. Even if it does not, though, it is a business opportunity for U. S. companies seeking to sell aircraft parts to Iran. **AM**



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