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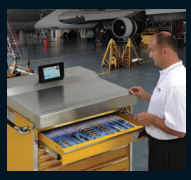


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DECEMBER 2016 / JANUARY 2017 VOL 36 ISSUE 1

Leading Global MRO Journal since 1983

DEPARTMENTS

On the cover: A CFM56-3 being prepared in the test call at MTU Maintenance Zhuhai.
MTU Maintenance image

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

AVIATION MAINTENANCE
avm-mag.com

+44 (0)20 3892 3050
+1 (920) 214 0140

EDITORIAL
Editor-in-Chief
Andrew Drwiega
adrwiega@avm-mag.com

Contributing Editors
Charlotte Adams
James Careless
Jason Dickstein
John Goglia
David Jensen
Douglas Nelms
Dale Smith
David Schober

ADVERTISING/ BUSINESS
Publisher/Owner
Adrian Broadbent
abroadbent@aerospace-media.com

Global Sales Director
Daniel Brindley,
dbrindley@avmain-mag.com

EU Sales
Jina Lawrence
jinalawrence@avmain-mag.com

International Sales
Paul McPherson
pmcpherson@aerospace-media.com

DESIGN/PRODUCTION
small axe studios
mark@smallaxestudios.net
www.smallaxestudios.net

SUBSCRIPTIONS
subscriptions@avm-mag.com

CLIENT SERVICES
Administration
Maria Hernanz Reyes
maria@asi-mag.com

LIST RENTAL
Statistics
Jen Felling
felling@statlistics.com

REPRINT PARTNER
The YGS Group
717-505 9701 x100

US Publisher
Daniel Brindley
ASI Publications Ltd

US Publishing Office Address:
5221 N. Diversey Blvd.
Milwaukee
WI 53217

AEROSPACE & SECURITY MEDIA
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ASI publications ltd
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Aerospace & Security Media
is a trading arm of ASI Publications Ltd

ASI Publications Ltd
"Rydal"
1 Coyners Avenue
Southport
PR8 4SZ
UK

abroadbent@aerospace-media.com

www.avm-mag.com or
www.aerospace-media.com

UK Company registration no 5999781
UK VAT no GB227106044

AVM Launches Dynamic New Website

BY ANDREW DRWIEGA
EDITOR-IN-CHIEF

Delivering up-to-date news, informed opinion and comment, as well as market sector analysis has been the goal of this publication since 1983. The magazine has been a leader in its field and we intend not only to match our previous performance, but to continually find ways of serving you better.

Business professionals today access their MRO information from a wide variety of sources, thanks to the internet and the wealth of social media options available worldwide. As you would expect, Aviation Magazine naturally has launched its own selection of these.

Social media and the internet is broad, but this breadth does not necessarily mean quality. For that we all rely on trusted sources that have proven their worth over time - and have the ability to adapt and change where and when necessary.

The *Aviation Maintenance* magazine (AVM) website (www.avm-mag.com) was previously more of a simple gateway to access the digital PDF version of the printed magazine. It was functional with good content, but lacked the modern dynamic feature-rich design that makes it easy to search, find, read and play the huge variety of information that this continually gathered and presented by us for you to use.

ON JANUARY 1, 2017 THIS CHANGED.

"Our complete redesign of the website now provides dynamic, direct and full access to all the current and archieved content of the magazine, quickly and easily but with the addition of so much more than before," said AVM's owner Adrian Broadbent. Being a hands-on kind of guy, Adrian has driven this change. This is what we have done:

EASIER ACCESS – We have simplified access to all the content. As you read you will only be prompted to enter your email IF you have read more than a few posts in a set period. And the good thing is that you will no longer need a password as our connected database can recognise your email. If your email is not recognised, or you have never previously registered, then you can register free for instant access. Once you do that, then the next time the site will remember your email.

MAGAZINE EDITORIAL CONTENT – ALL sections of the printed magazine are now reproduced within the site without having to access a traditional PDF, although the PDFs are still freely available (including back copies). A selection of our coming features for the printed publication will also be available to read online before publication.

INTELLIGENCE NEWS – In addition to all the news from each issue of the printed magazine, extra breaking news will be added throughout every week, giving you access to news as it happens. Additionally, there is now the ability to filter the news according to your particular preference, whether Commercial, Military, Biz-Jet, Rotorcraft etc.

MRO SEARCH – We have also introduced a useful MRO search facility that not only helps you find anything ever printed in the magazine or listed in our directories but also searches the web as well. This is a very unique research tool.

CURRENT/BACK COPIES – You can now directly view/download/share previous issues/articles back to 2012 as PDF's.

EVENTS – There are so many shows to keep a track off to consider attending and now our site now lists/covers all the major events for this MRO segment in one handy place. You can of course also submit YOUR event for inclusion or suggest any that you think should be included.

VIDEO – Rather than having to trawl the web for MRO content you can now also view our selected content and again submit YOUR clips for inclusion too.

REPAIR CENTER DIRECTORY & BUYERS GUIDE – We publish our extensive and established directories in the February issue of the publication and now this data is searchable within the site. This is a great resource for quickly identifying companies and contact information without having to start from scratch on the web.

We are delighted with the new format of the website and both Adrian and I would welcome your comments too, as would all the members of the AVM team. Try it out today - from a source that you trust! AVM

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AMES Acquires MRO and Conversion Specialists PEMCO

Airborne Maintenance and Engineering Services (AMES), a subsidiary of the Air Transport Services Group (ATSG), has acquired PEMCO World Air Services (PEMCO).

ATSG president and CEO Joe Hete said, "Based on PEMCO's existing domestic and international scale, this acquisition will expand access to maintenance service for customers of ATSG's expanding fleet of Boeing 767 cargo aircraft. It is consistent with our goal to diversify ATSG's revenue and earnings, for an investment in the same price range as our planned and completed stakes in cargo airlines in China and Europe. The combination of PEMCO's conversion and MRO sales of both Airbus and Boeing products with AMES' existing offerings will create a sustained, growth-oriented aircraft maintenance product and services portfolio."

PEMCO was a privately held provider of outsourced heavy maintenance, repair and overhaul (MRO) aircraft services and passenger-to-freighter aircraft conversions based in Tampa, Florida, USA. ATSG did not assume any PEMCO debt in connection with the acquisition.

ATSG will use the acquisition to combine operational strengths, expand capabilities and generate cost savings through shared services. It will market the services established by both organisations worldwide as part of a comprehensive set of ATSG solutions.

Locations will include Wilmington and Tampa for heavy maintenance and modifications, and Tampa, Central America and Asia for passenger-to-freighter conversions. Additional service offerings of aircraft-on-ground field teams, line and turnaround maintenance, component repair and overhaul, engineering repair and design, and extensive manufacturing and kitting capabilities, will be extended from various locations.

AirFlyte Rebrands as Rectrix MRO

Rectrix MRO is the new rebranded name for AirFlyte, the Massachusetts-based aviation services provider. The move follows the acquisition of AirFlyte by Rectrix in 2013, together with its FBO at Barnes Regional Airport in Westfield, Massachusetts.

"AirFlyte has a tremendous reputation as a corporate aircraft maintenance provider. This rebrand to Rectrix MRO purposely affirms our commitment to excellence," said Rectrix CEO Rich Cawley. "Rebranding the name to Rectrix helps position one united brand to our customers, highlights the growth and importance of our MRO services, and strengthens our sense of shared community."

Rectrix MRO's FAA Part 145 repair stations are located at the Westfield-Barnes Regional Airport (KBAF), Sarasota-Bradenton International Airport (KSRQ) as well as an FAA approved satellite repair station at the Worcester Regional Airport (KORH).

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"The MRO Lab" is the program where all the innovations developed by AFI KLM E&M and its network of affiliates converge. Specially tailored to the challenges of aircraft maintenance, the innovations are the fruit of continuous development aimed at satisfying the requirements of airline operating performance.

The know-how deriving from mastery of these technologies benefits AFI KLM E&M clients by generating scale effects and optimizing fleet performance.

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about people

Andreas Tielmann Appointed CEO of LTLS

Tielmann

On January 1, 2017, Andreas Tielmann became the new CEO of Lufthansa Technik Logistik Services (LTLS). He takes over from Dr. Christian Langer, who is moving to Lufthansa Technik as head of Digital Fleet Solutions.

Tielmann has been with Lufthansa Technik since 1998 with experience gained in Dallas, Texas, where he was project manager for the establishment of Lufthansa Technik Component Services, then in Hamburg in 2000 as group leader, Hydraulic Equipment Maintenance. Two years later, he was appointed head of the Business Area Development department within the Aircraft Component Services Division.

In 2006 he became director of Aircraft Base Maintenance, then in 2010 he was made head of the Landing Gear Overhaul product area. Since 2012 he has led the Aircraft Systems Product Division, responsible for all technical services on landing gear and engine casings.

Alfassi Becomes Executive VP Marketing for IAI

Alfassi

Eli Alfassi has been appointed by Joseph Weiss, president and CEO of Israel Aerospace Industries (IAI) as the company's executive vice president marketing.

Having been executive VP for IAI's operations in India for the last four years, this responsibility will now be merged into the overall executive vp marketing role.

Alfassi is a Colonel (reserve), who served for the last 12 years in a range of roles at IAI. In this capacity, he directed marketing and sales efforts in India and led business operations there. Formerly, he was, inter alia, head of the IAI mission in India.

Prior to joining IAI, Alfassi served for 28 years in the IDF. Among his many roles, he was a brigade commander, deputy commander of the Zeelim Training Base, head of the Planning Department at the Operations branch at the General Staff, and was also the IDFs attaché and head of the Ministry of Defense delegation in India. In his new role, Alfassi will direct all sales activities of the various IAI Groups and divisions and relations with its many customers around the world.

Embraer Means Business with new Support Unit

Embraer is creating a new business unit to integrate service and support for its customers. Johann Bordais, currently the director of services and support for Embraer Commercial Aviation, will head up the new entity.

"The new business will bring together capabilities that are currently spread throughout different business areas to offer customers a broad portfolio of solutions," said Paulo Cesar Silva, Embraer president and CEO. "We see an opportunity to expand and integrate services and support."

In will launch for customers in the first half of the year with the aim of developing support solutions for products and services. Daily customer sales and support will remain the responsibility of each business unit; Commercial and Business Aviation as well as Defense & Security.

"We are in a long-cycle business that is naturally demanding on services, favoring long-term relationships with customers," said Johann Bordais. "For the customer, this initiative combines a long experience in customer service, with the agility and competitiveness of a service center. For Embraer, it represents an opportunity to obtain greater operational efficiency and recurring revenues."

Rossinya's Allocates New Livery Work to Engineering Holdings

Engineering Holding, the Russian maintenance services company for western and Soviet-built aircraft, has won a contract from Rossiya Airlines to paint the new complex livery on 13 Airbus A319/A320 and Boeing 737-800 airliners. The work will be carried out at its Mineralnye Vody Airport facility.

The EASA Part-145 approved painting operation of will be carried out by subsidiary S 7 Engineering. The last of the 13 aircraft is scheduled for completion by spring 2017.

Igor Panshin, Engineering deputy CEO Sales & Planning said: "The Rossiya order is important to our workload planning. The carrier's airliners filled in the last remaining slots in the S 7 Engineering painting schedule for the winter and spring of 2017." The company painted the first Rossiya A319 in the spring of 2016 as part of the carrier's continuing rebranding campaign.

New Finance Options for GE Additive Customers

GE Additive is collaborating with GE Capital to sell and finance metal additive machines. A range of customized financial options aim to provide flexible financing for companies wishing to acquire transformative 3D printing technology, with aerospace being one of the target market sectors.

"Our dual expertise both in manufacturing and in equipment finance, allows us to create competitive financial solutions that support our customers' strategic business goals," said Trevor Schauenberg, president and CEO of GE Capital Industrial Finance. "Additive manufacturing is a key contributor to the manufacturing evolution; we're excited to enable its growth."

GE has invested approximately $1.5 billion in advanced manufacturing and additive technologies, in addition to building a global network of Additive centers. GE also recently announced the acquisition of a 75 percent stake in Concept Laser and 76 percent share in Arcam, two producers of metal additive machines.

"Additive manufacturing is the new revolution, changing the way we design and manufacture products faster, more sophisticated and more cost efficient," said Mohammad Ehteshami, vice president for Additive Integration at GE Additive.


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about people

Quaife Promoted to GM of Bainbridge Aerospace

Quaife

The new general manager of Bainbridge Aerospace, a TAI-Global Group companies, is Scott Quaife. Previously he supported sales for several of the group's companies, including Twin Aviation and Dangle Aviation, becoming the government liaison and technical directives manager.

"Scott was instrumental in both the implementation and configuration of our military contracts through the U.S. Army's Aviation Command," said Thomas W. Nokes, president and CEO of TAI-GLOBAL Group.

Quaife is an Army aviation veteran having trained as a UH-60 Black Hawk mechanic. He flew the AH-64D Apache operationally and was a pilot ground instructor on the AH-64D in the United Arab Emirates. After leaving the Army in 2009, he was in technical sales in Texas, providing the U.S. Army, Air Force and Navy aviation corrosion control support.

Werner Appointment for Asia Pacific

Dion Garner has joined Werner Aero Services with a brief to increase business in Asia Pacific, particularly in APUs.

Werner has over 30 years experience in the aerospace industry; much of it spent in the Asia Pacific market. He worked at Honeywell in their APU division for the majority of his professional career.

"Dion's technical background, combined with his sales experience, and broad knowledge of the region, provide a great compliment to our current Asia Pacific team," said Mike Cazaz, CEO of Werner Aero Services.

Management changes at Duncan satellite shops

Duncan Aviation has relocated Bob Hazy to manage its Sacramento and Hayward, California, satellite shops from his post in Denver, Colorado. Install Team lead Wayne Sand, a 28 year veteran of avionics work in the Denver, Colorado area will take over as manager of the Denver and Broomfield Satellite shops.

"We are so pleased because both shops now have the perfect mix of technical experience and team integration," said Matt Nelson, manager of Duncan Aviation's Satellite Operations,. "We have a great core team at the Sacramento Shop, and customers and team members alike will benefit

Strengthening Diagnostics and Troubleshooting

BY ANDREW DRWIEGA

The acquisition of Casebank Technologies by Aircraft Technical Publishers looks set to further boost maintenance process management.

(l-r) ***Chris Lewis****, Chief Operating Officer, CaseBank Technologies;* ***Phil D'Eon****, President and Chief Technology Officer, CaseBank Technologies;* ***Charles Picasso****, Chief Executive Officer, Aircraft Technical Publishers (ATP);* ***Ken Aubrey****, Chief Revenue Officer, Aircraft Technical Publishers (ATP)*

The aquisition of Casebank Technologies by Aircraft Technical Publishers (ATP) in mid-December 2016 was, according to Aircraft Technical Publishers' (ATP) CEO Charles Picasso an opportunity to "expand the value proposition and to leverage the contect…with a maintenance tracking system."

"The acquisition of CaseBank Technologies is an important next step in the evolution of ATP," said Charles Picasso, who became ATP's CEO in 2015. "It will lead the company into a new era of growth."

"When have done extensive analysis of the market and spent time with customers and manufacturing partners, some of whom were using Casebank's products. We looked at what was complimentary and to help customers be more efficient in managing the maintenance process and reducing the cost of their operations.," said Picasso. "We looked at different solutions and Casebank added significant value thorugh their diagnostics and trend analysis. So we had all the information to schedule aircraft maintenance, and now with the acquisition of Casebank we have added capability for unplanned troubleshooting."

According to ATP, its Maintenance Libraries brings together and organizes 'thousands of publications from hundreds of manufacturers and regulatory information from the FAA and EASA to create the industry's broadest set of technical, operating, and regulatory information available from one source.'

It links comprehensive maintenance information directly from 54 aircraft manufacturers and more than 200 component manufacturers to provide its customers with a package for maintenance tracking, parts inventory and troubleshooting, and fault detection solutions.

The companies Aviation Hub Cloud Application also gives customers an 'anywhere, anytime access to such mission critical information.'

CaseBank's solutions include SpotLight and ChronicX. The company describes SpotLight as "an interactive troubleshooting solution that rapidly guides service technicians through the process of pinpointing and resolving problems." It combines a 'reasoning engine with a diagnostic database' which analyses the collective input for field technicians worldwide, resulting in an expanding knowledge of maintenance issues in real-time."

Fleet operators use ChronicX 'to proactively identify and rank recurring defects across aircraft and engine fleets…by using advanced algorithms to analyze aircraft maintenance records and uncover hidden service trends

(continued on page 14)


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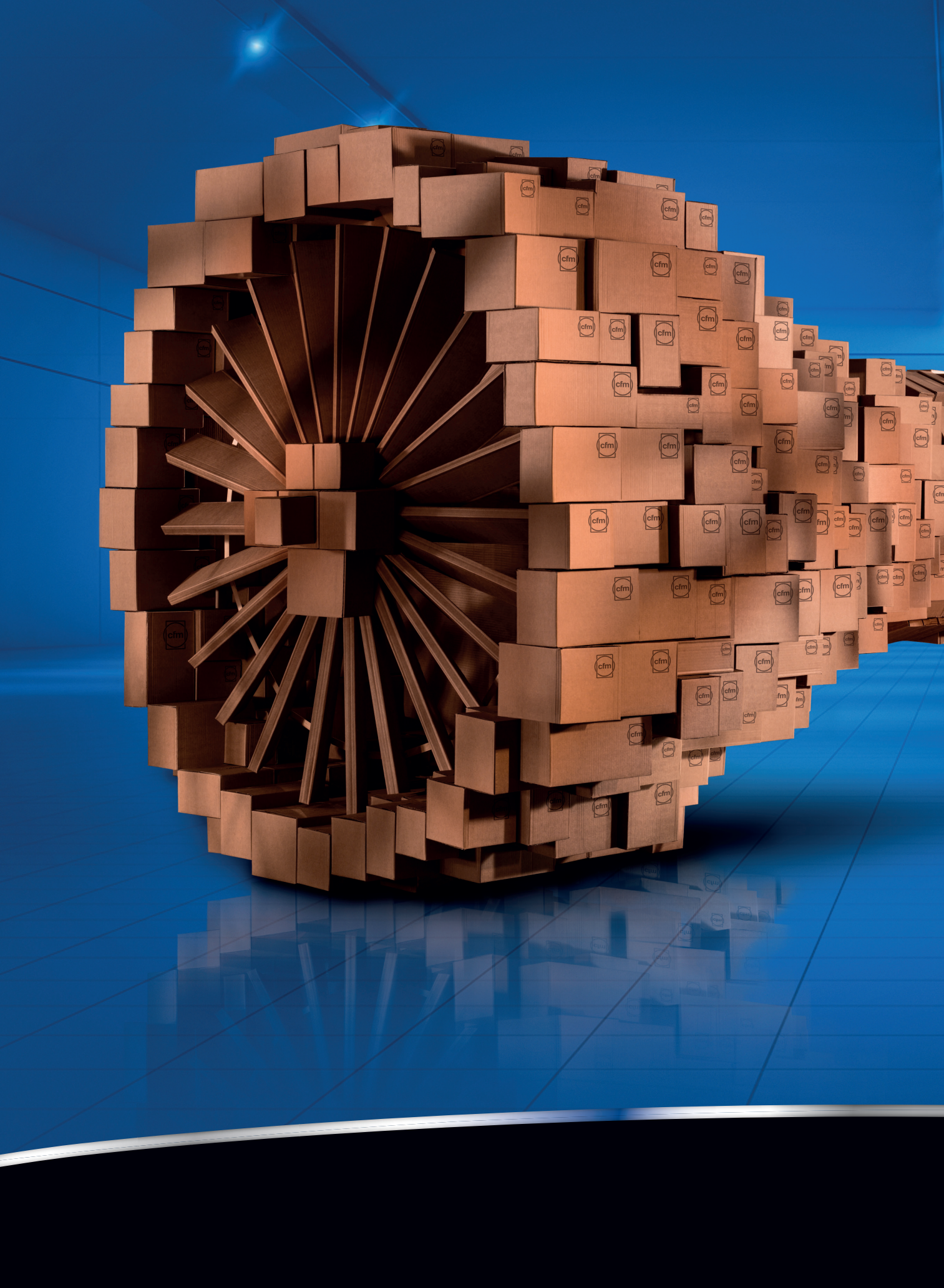

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about people

from Bob's years of technical knowledge and management experience."

"With Wayne taking over as manager, I am confident there won't be any continuity issues. He's worked for Duncan Aviation since 1994, and he knows our customers along the front range very well," said Nelson.

C&L Hires Pikna for Regional Sales

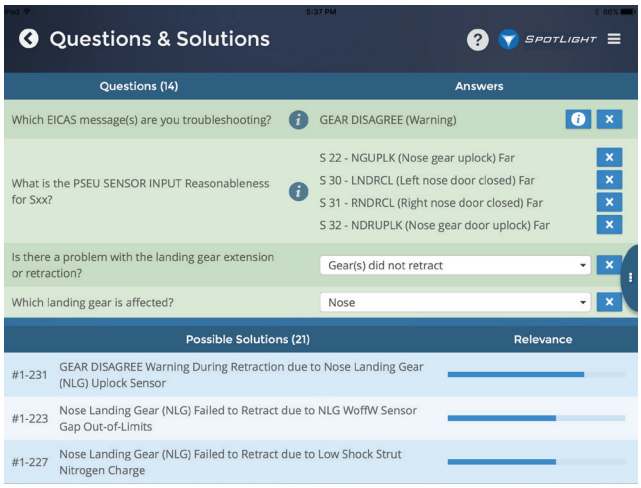
Pikna

C&L has hired Juraj Pikna as regional sales manager to cover the European, Russian and African markets.

Based in Prague, Czech Republic, Pikna has a decade of experience gained in air traffic control, MRO for regional and commercial aircraft, as well as sales and support for aircraft parts.

"Juraj comes to us with a tremendous amount of experience in both the regional and corporate markets," said Martin Cooper, C&L senior VP of Sales. "That experience will be a great asset to our customers in that part of the world."

Strengthening Diagnostics and Troubleshooting *(continued from page 10)*



The SpotLight service rapidly guides service technicians through the process of identifying and resolving the root causes of equipment problems, and improving time, cost and quality of maintenance and repairs.

- such as previously undetected recurring problems, repeat defects/fixes occurring across multiple aircraft and repair stations, as well as emerging failure modes that have not yet reached critical status.'

CaseBank president and CTO Phil D'Eon commented: "The technology is not only pro-active in the sense that you can often see the increasing frequency of problems occuring, but also in a diagnostic sense, it has the ability to capture all of the global experience of technicians around the world and place it directly into the troubleshooting software."

Talking of what the acquisition will mean to customers he said that the modular nature of what they were being offered would allow them "to pick and choose, but the ATP Casebank combination of products will offer the richest integration of products for customers." CEO Charles Picasso added that customers would be presented with "a seemless flow between applications."

Talking of about the post acquisition strategy, Picasso stated that the intent was to offer customers solutions that were both modular and integrated: "Some customers would like to start the new implementation of tools to enhance their maintenance environment but not go with everything at once, which is why we will have a very modular approach."

Picasso added that the resulting organisation will be divided between the corporate level and the development of the applications that would remain in specialist organisations. "We went to leverage best practise in terms of how we develop products and manage their deployment," he stated.

One of the attractions of acquiring Casebank, said Picasso, was the company's existing significant relationships with a number of manufacturers include Bombardier, Gulfstream, Lockheed Martin, Pratt & Whitney and other Fortune 1000 companies. Additionally it also had airline customers include Delta, United, Jazz, Fiinnair and Qantas.

Said Picasso: "In terms of the combined operation we are now a significant player in both business aviation and have a significant footprint in commercial aviation. We have a complementary maintenance solution to help the MRO's, operators and manufacturers to ensure that the maintenance is performed in an efficient and cost effective manner. In the end the availability of the aircraft will be increased."

"We will keep the locations in Brisbane, California and Austin, Texas, as well as in Ontario, Canada," confirmed Picasso. AM

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Safran Signs 10-Year RTM322 NAHEMA Contract

Safran Helicopter Engines has signed a 10-year contract with NAHEMA (the NATO Helicopter Management Agency) to support RTM322-powered NH90s operated by the French Army Light Aviation (ALAT) and French Navy. The contract also covers the NH90s operated by Belgian Army and Navy and the Royal Netherlands Armed Forces. This contract value is €180 million and will cover 130 rotorcraft in the coming years.

It is the first Global Support Package (GSP) that Safran has signed to support NH90 fleet.The GSP guarantees turboshaft availability at a fixed price per engine flying hour. The agreement covers operations while engaged in military operations or search and rescue, both at home and while deployed.

Fortunato di Marzio, NAHEMA general manager, said: "This GSP will allow the French, the Belgian and the Dutch NH90 operators to benefit from a very effective engine-support for their RTM322 engines, especially during their operational tasks. The contract is the result of a very good and fruitful partnership between NAHEMA and Safran Helicopter Engines".

Franck Saudo, Safran Helicopter Engines executive vice president support & services, added: "This contract marks a major new milestone

in our partnership with NAHEMA and French, Belgium and Dutch armed forces. We will deliver world-class services to guarantee their engine availability; thus demonstrating that the GSP model is particularly well-suited to supporting the engine fleets of modern air forces".

MEPC Riyadh Selects IFS Applications

Global enterprise company IFS has announded that Middle East Propulsion Company (MEPC) has selected its IFS Applications software suite to help manage key operations at its Riyadh facility such as MRO, finance, supply chain, document management, HR and payroll.

The IFS solution will allow MEPC to execute all aspects of its MRO operations, from hangar entry to exit—with integrated support for finance and HR. Business intelligence is built into IFS Applications, enabling operators to analyze key performance indicators using predictive analytics to show the full impact of processes on overall MRO performance, as well as the effect a decision has on operations in real time.

MEPC opened its state-of-the-art, 194,000 square-foot MRO facility in Riyadh in 2012, close to the city's King Khalid International Airport. MEPC is the sole military engine shop in the Kingdom of Saudi Arabia and provides MRO support for the Pratt & Whitney F100 engines powering the Boeing F-15 fighter aircraft operated by the RSAF.

"Rather than continuing to use a combination of different business systems, we required a single, integrated solution to manage our complete business operations at the critically important Riyadh facility," said Abdullah Al Omari, chief executive officer at MEPC. "The 360-degree visibility provided by IFS Applications allows us to maximize maintenance efficiency and react quickly to potential performance issues, which is important in the fast-paced military support environment."

Luis Ortega, managing director for Middle East, Africa & South Asia at IFS added, "The selection of IFS Applications to support the MEPC facility, which is integral to military operations in the Kingdom of Saudi Arabia, demonstrates the strength of the engine MRO capability in IFS Applications."

Rockwell Collins Flight2 Avionics for Chilean P-3 Orions

Rockwell Collins' Flight2 integrated avionics system has been selected by IMP Aerospace for the Chilean Navy's cockpit modernization program for its P-3 Orion maritime patrol aircraft.

"Chilean Navy pilots will experience greater situational awareness and communications capabilities with the highly advanced avionics on board these aircraft," said Alan Prowse, vice president and managing director, Americas and global services business development for Rockwell Collins.

The Flight2 integrated avionics suite of communications, navigation and surveillance equipment integrates new-generation avionics with legacy sensors, radios, autopilot and aircraft systems. Flight2 features advanced displays and an integrated military/civil flight management system, and is described as one of the most cost-effective, lowest-risk solutions available. The system is currently flying on more than 900 fixed-wing aircraft.

Aircraft installation, integration and design work is being done within IMP's Halifax, Nova Scotia facilities in Canada. Rockwell Collins will provide dedicated in-country, on-site field service engineering and logistics support to IMP Aerospace during the aircraft modifications and test.

Rockwell Collins' work with IMP Aerospace will support their activities for service life extension and avionics upgrade of the Chilean Navy's P-3 aircraft.

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PMA vs. OEM Parts: Notes from the Front

by Charlotte Adams

In 2016 multiple press reports covered the ending of Boeing's arrangement with Spirit AeroSystems, under which the former Boeing unit had produced and sold Boeing-intellectual property (IP) parts directly to the airlines.

Boeing is hungry for aftermarket revenue. This was signaled by the choice of Kevin McAllister, the former head of GE Aviation Services – perhaps the largest player in the commercial aftermarket – as chief executive officer of its commercial airplanes business and the merging of commercial and military support into a new Boeing Global Services unit with a $50-billion revenues mandate.

Rival Airbus also is expanding its aftermarket footprint, with "build-to-print firms most at risk" in each case, according to a 2016 report on commercial aviation MRO by Cannacord Genuity.

Boeing's pullback from licensed parts manufacturer approval (PMA) was anticipated in the industry as far back as October 2011, said Michael Rennick, manager of component engineering with Delta TechOps, the MRO arm of Delta Air Lines. "Spirit AeroSystems was one of the last ones left," he noted.

Another company affected by the intensification of OEM pressure is Triumph Group, a player in PMA, component design and manufacture, and MRO. "They have impacted our build-to-print OEM businesses, but it has not had an impact on our Product Support business and we have not felt any pressure in this regard," stated Joe Greenwood, vice president of business development at Triumph Product Support.

"Outside of Boeing and Airbus we are unaware of anyone else pulling back licensed PMA," Greenwood said. "We have noticed that OEMs are more aggressively seeking to capture aftermarket, which does put pressure on our business. You have to partner with the OEM or face being locked out."

Boeing personnel also seem to be encouraging smaller PMA companies to sell through Boeing's distribution units, noted Jason Dickstein, president of the Modification and Replacement Parts Association (MARPA). "They are especially interested in finding sources for older parts that they might not regularly obtain from their own suppliers. This allows them to support their air carrier customers who fly older models without having to directly produce those parts themselves under their PC 700 [production certificate]."

Opportunity Knocks

Jeff Dark, vice president of sales and marketing for Jet Parts Engineering, one of the "big four" independent PMA companies that develop their own IP, said that the OEMs have been trying to capture the market for a long time. And with new aircraft, "[the OEMs] are definitely trying to get more 'total care' agreements from the operators."

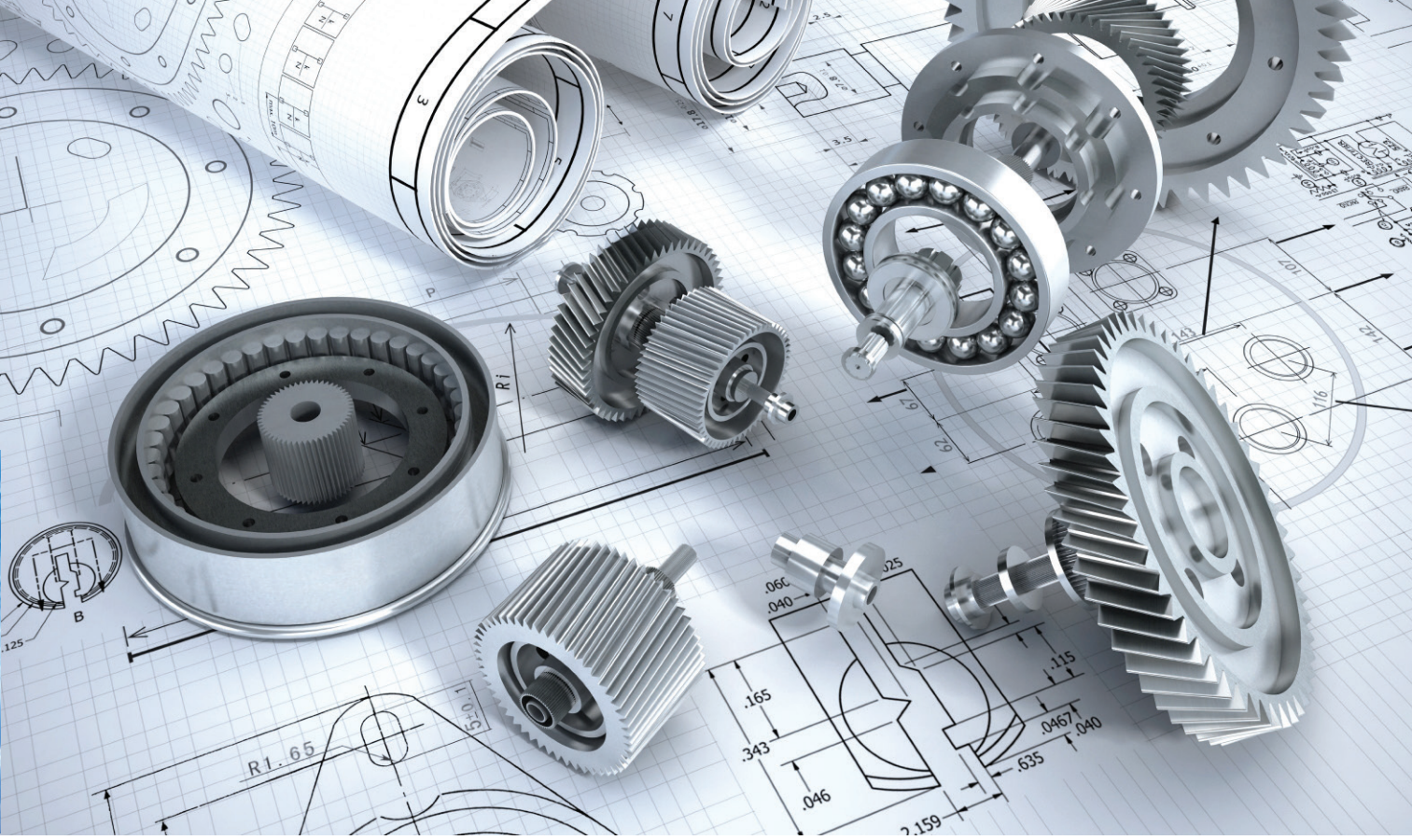
"But there are always ways to get around that – to provide competition to those [OEM] packages," Dark argued. That's what PMA is here for – "to provide competition so that they can't just charge whatever they want." Jet Parts Engineering designs and produces about 100 test and computation PMA parts a year.

Independent PMA companies see Boeing's cancellation of licensed PMA agreements as an opportunity. "Their customers are coming to us," looking for solutions, added Dark. "Right now Boeing is honoring Spirit AeroSystems' pricing, but that's not going to last very long," he predicted.

"A lot of the [test and computation] guys are going out and trying to PMA some of the important Spirit AeroSystems licenses," he said. Jet Parts Engineering is "definitely dabbling in some of those…We're trying to fill the gap."

That seems to be happening already. According to the FAA's PMA database, Seal Dynamics, a HEICO company, PMA'd four Spirit AeroSystems seals for the 737-300, -400, and -500 during 2014 and 2015.

But closer alignment with the OEMs is also an option. "Based on our relationships with large OEMs, we see [the current aftermarket



Boeing has begun to its bid to capture more of the aftermarket business by altering its intellectual property agreements with traditional parts suppliers such as Spirit AeroSystems.

situation] as a huge opportunity to partner and bolster our current OEM support programs," Triumph's Greenwood observed. "We want to align with OEMs because they don't have the capability, footprint, or MRO knowledge we have."

Critical Turn Time

The independents' products perform the same functions as OEM parts – with the same or greater reliability but at a lower price. More important than price, however, are availability, turn times and responsiveness to customers.

Even if Spirit AeroSystems' parts prices rise, the immediate impact on Delta probably will be small, since the PMA parts the airline bought from that company, such as thrust reverser components, were purchased in fairly low volumes, Rennick said.

But the long-term impact is not yet known. According to Rennick, Boeing has said that the move won't affect turn times, but timing is crucial, especially in an AOG (aircraft on ground) situation. One of the things that Delta will be watching closely is how Boeing "manages the time to get material to us," Rennick said. "Right now it's an open question." Delta has a strong, well established PMA base, he confirmed. "So if we lose supply from one area, we can hopefully make it up in another."

Battle Continues

OEM pricing continues to be a sore point with the airlines. In March 2016 the International Air Transport Association (IATA), which represents some 200 airlines, said that it had "become a complainant" in an investigation by the European Commission "into alleged abuses of dominant positions by manufacturers of aviation equipment" through the OEMs' control of aftermarket repairs, including parts and services.

The move to pull back licensed PMAs is part of a bigger trend: the effort by the OEMs "to centralize all maintenance actions, from an airplane to a component, and get those back to the OEM MROs" said Rennick. Delta's philosophy is to keep its options open, he added, whether the channel is PMA, repair, or making the part per FAA regulations. And that means keeping the PMA market healthy.

Parts from the major sub-tier manufacturers like Honeywell and Hamilton Sundstrand are also getting more difficult to buy from third parties on the open market, as the rest of the industry tightens down on components.

Delta is unusual in having only about 150 leased aircraft in its some-850-strong mainline fleet. So far the airline has built the availability of the PMA option into its lease contracts, Rennick said. The airline doesn't restrict PMAs from consideration in any area of the aircraft. It's more of a question of whether the market for a part is large enough for PMA companies to get involved.

Spur to Growth?

In Rennick's opinion PMA providers are "absolutely" more responsive than OEMs if the airline has an issue with a part. In the past the PMA industry typically has been involved in expendable and repairable parts within mechanical systems. But he sees possible growth opportunities for PMAs as components in aircraft electrical and avionics systems.

PMA has thrived, thanks to the demand by the airlines for competition in the parts market. PMA replacement parts prices are 20 to 40 percent less expensive than OEM list prices, according to ICF International (ICFI). The concept is compelling enough to have been copied in other countries, using the U.S. regulations as a basis, Dickstein said. China, for example, has a big PMA program. It has no bilateral agreement with the U.S. but the Chinese "PMA" parts are useful within the latter country's large domestic market, he concluded. AVM

Sentinel Revitalised

by Andrew Drwiega

Arguable the UK's best Information, Surveillance, Target Acquisition and Reconnaissance (ISTAR) asset, four of five are now being prepared to continue service for the next five years.

One of the most operationally valuable and frequently requested aircraft in the UK Royal Air Force (RAF) fleet is not a figher, ground-attack aircraft, transport aircraft or even an unmanned aerial system. It is a modified civilian designed Bombardier Global Express which provides airborne battlefield and ground surveillance intelligence which is not only extremely useful to forces on the ground, but also in forming a wider strategic intelligence picture for military planners.

There are five Raytheon Sentinel R1 aircraft in service, operated by the RAF's No. 5 Army Cooperation Squadron. Four of the aircraft were selected to go through Bombardier's 8C check which is designed to take them through the rest of their planned in-service life, currently set at the end of 2021.

According to Roland Howell, Raytheon's UK Head of Airborne Solutions, the decision regarding the fifth aircraft will not be made until the summer of 2017. Raytheon continues to play a central and crucial role as it delivers the new Integrated Sentinel Support Solution (ISSS) which is currently focused on its UK Airbourne Solutions in Broughton, just inside the Welsh border.

When Aviation Maintenance magazine was invited to visit the facility in October, the first aircraft to undertake deep maintenance had already been finished and the second was being worked on. Roger Shone, general manager of Raytheon Broughton, said that this work was due to be completed at the end of January 2017 after having spent eight months in the shop, four months fewer that the first aircraft.

"Roger and his team have done a tremendous job working with the customer to move it from a 12 month execution period to 8 months," stated Howell adding, "we expect the next iteration to do better than that."

The reason for this narrowing of time spent in the shop is that the first aircraft to be fully inspected takes time; it is the unwrapping of not only the basic aircraft to get to the airframe,

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Designed by software engineers who understand aviation maintenance and operations, OASES is continually being developed - with the active participation of its users - to ensure it remains fully up-to-date with technological progress and fully responsive to the ever evolving mobile needs of both airlines and MROs.

Ensuring those needs are met is also fully embedded in Commsoft's personalised support culture. Customers benefit from a comprehensive maintenance package which includes a dedicated help-desk at local hours, online support and membership of user groups as well as product update and software revision services. The package also includes initial requirements studies, implementation support, user training, system tailoring and forward planning.

The OASES user community currently numbers 110 organisations in no less than 45 different countries and includes national carriers, 3rd party maintainers, regional carriers, leasing companies, cargo specialists, charter operators and specialist rotable stockists in the USA, Europe, The Middle East, Asia, Africa and Australasia. Demand for OASES continues to grow. Commsoft signed contracts with 20 new clients in 2015/16.

Reflecting its client base, Commsoft is a truly global organisation. It has its Head Office in Tiptree in Essex as well as two regional offices in the UK in Derby and Norwich. In addition, the company has support offices in Coimbatore, India and Brisbane, Australia. Adopting a partnership approach to its worldwide business, Commsoft also has an implementation partner in Romania and CAMO partners in several European and Asian countries.

oases

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Raytheon UK has been contracted to perform deep maintenance on four out of five of the RAF's Sentinel R1 ISTAR platforms which will take the aircraft out to the end of their current planned service life in 2021.

"We actually do a C, a 2C, a 4C and an 8C maintenance check all together."

(Roger Shone, general manager of Raytheon Broughton)

but also the extra systems and technology that has gone into making it an intelligence gatherer's dream.

Said Shone: "This is an 10 year check airframe inspection but you need to strip everything out to get to the airframe. We need to take out all the mission equipment, consoles, panelling - of which there is a lot. And when you do that you begin to find issues, whether in the form of electrical connectors, or corrosion or whatever. Then we go in and fix it."

The steepest learning curve is experienced with the first aircraft. Once they had stripped and then re-assembled the first aircraft the second became a known entity, not only in terms of the right way and correct order in whcich to take out the systems, but also where to look for potential trouble spots. "We do this with the ASTOR program team," Shone added.

ASTOR, or Airborne STand-Off Radar, is the key element behind the aircraft's intelligence gathering success and was the original reason for bringing the aircraft into service. The main radar is the Raytheon Systems/BAE Systems dual-mode synthetic aperture radar / moving target indication (SAR/MTI) radar which is otherwise known as the Sentinel Dual Mode Radar Sensor (DMRS). It uses AESA active electronically scanned array which combines ground moving target indicator (GMTI) and synthetic aperture radar (SAR) imagery.

The aircraft typically operates at at over 40,000 feet (12,000 m) which gives it breadth over the battlefield, with a mission endurance of around nine hours depending on the flight time to the target area. It is typically operated by two aircrew, an Airborne Mission Commander (AMC) and two image analysts who can process the information received onboard while also sending it to tactical commanders and strategists.

Keeping it simple

"The 8C is part of the Bombardier maintenance schedule," said Shone. "We actually do a C, a 2C, a 4C and an 8C maintenance check all together. While the aircraft is in [its broken down] state you can do a lot to it - so we repair and upgrade as much as we can while it is on the ground."

Shone said that when each aircraft is received, it also comes with its own particular set of mainteance issues which will be address in addition to the 8C check. However at the end of its time in the shop Shone said "we basically deliver a new aircraft" although he added that certain issues can be deferred if the cost of their resolution is not included in the budget.

The aircraft is tested once the work has been completed, although it still needs to fly to RAF Waddington (it's home base) where the uniformed maintainers will install and test other more sensitive capability equipment.

Howell said that both the OEM Bombardier and Raytheon hold design authority status. "We work very closely with the OEM and have agreements and contracts in place to ensure what we do makes the aircraft airworthy," he said.

"They have flown people over to assist us when we have required it. They work with our own Design Support Services (DSS) team to find and fix each solution, which we then present to the customer for approval. Sometimes we bring in technicians from RAF Waddington who have the skills appropriate to the radar," he concluded.

Aircraft No3 is scheduled to only take six months to check and return to service, such is the growing confidence in the methods and capabilities of the Broughton team. "We have narrowed it down to six months for the third as we learn and understand what we need to do on each aircraft." However, there is a point at with further reductions are unlikely given the budget and number of people allocated for the purpuse, together with the physical requirements of stripping then rebuilding each aircraft. AVM

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MRO Titans – Taking on New Trends

by Charlotte Adams

AVM's annual look at world-renowned MROs who are driving the industry forward.

MRO industry growth will continue over the next decade but will be driven by Asia Pacific and will be marked by greater original equipment manufacturer (OEM) participation.

Other trends are the continuing low price of fuel and the entry of less-maintenance-intensive aircraft like the Boeing 787 and the Airbus A350 into the world fleet. In addition capabilities such as satellite-enabled, high-bandwidth connectivity may make big data analytics affordable for component and even airframe MRO.

The latest aircraft available to airlines have been designed to require less maintenance and have components with longer mean time between unscheduled removals (MTBURS), said Marcel Versteeg, managing director of VZM Management Services. However, the indications are that shop visit "costs of the components and engines are significantly higher due to the more advanced technologies, which will at a later stage 'compensate' for the higher reliability," he added.

In the near term the continuing low price of fuel due to overcapacity and sluggish economic growth has slowed the retirement of older aircraft, with a positive effect for MROs, Versteeg noted.

There have been fewer than expected retirements, primarily of 150-seat-class aircraft, according to Bill Dwyer, general manager of services marketing for GE Aviation. The combination of low fuel costs and high traffic growth probably has increased airline maintenance spending (for the right reasons) and the assets have remained productive, he said.

The global MRO market is worth $60 to $70 billion, growing to nearly $100 billion in the next nine to 10 years, analysts say. Wayne Plucker, director, North America, aerospace and defense, for Frost & Sullivan, estimates the commercial MRO market growing from $65 billion in 2015 to $78 billion by 2020, or a 3.7 percent compound annual growth rate for the half-decade. ICF International (ICFI) forecasts 2015-2025 growth from $64.3 to $96 billion, or 4.1 percent per annum. Oliver Wyman projects growth from $67.7 billion in 2016 to more than $98.9 billion by 2026, or about 3.9 percent a year.

ICFI estimates that engine services demand will grow from 40 to 41 percent of total MRO demand between 2015 and 2025, component MRO services will stay the same, at 22 percent, but that line maintenance will decrease from 17 to 16 percent, and that airframe maintenance will decrease from 14 to 13 percent of total demand. Engines will continue to be the largest – and most OEM-dominated – sector.

The modifications market also will grow strongly as airlines rebadge their fleets, Plucker predicts. Referring primarily to cabin and avionics modifications, he sees revenue growth from $4 billion to $5.5 billion from 2015 to 2020, or about a 7.1 percent compound annual growth rate.

Singapore Technologies Aerospace (ST Aero), a subsidiary of ST Engineering and one of the largest MROs, also regards modifications, including conversions and cabin interior retrofits, as a business opportunity. It expects modifications growth of about 6 percent annually, according to president, Lim Serh Ghee. ST Aero offers not only cabin design and upgrade turnkey solutions, but also seat development via its new joint venture with Tenryu, which recently received a Singapore technical standard order certificate of approval for seats, Lim said.

Pemco's strategy for success includes four cornerstones: teammates, customer service, Lean, and metrics according to CEO Pastor Lopez.

Airline MRO

Lufthansa Technik (LHT) and Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) revenues rose in 2015 against 2014. During the first three quarters of 2016, AFI KLM E&M's third-party maintenance revenues increased 16.4 percent, compared with the same period in 2015. Revenues increased from 3.4 billion euros in 2014 to more than 4 billion euros in 2015. The Franco-Dutch MRO, which describes itself as second among multiproduct players, had an order book value of $8.4 billion at year-end 2015.

LHT's revenues increased in 2015, and increased again in the first six months of 2016 by double digits, revealed Frank Berweger, senior vice president, sales, for the Americas. With over $6 billion revenue and over 800 customers worldwide, Lufthansa Technik is the largest non-OEM provider of MRO services, he stated.

Both stress OEM alliances. AFI KLM E&M's Vincent Metz, director of strategy, cites the MRO's Component Services Program with Boeing for the 777 and 737, including the 737 MAX, and the EPCOR unit's agreement with Honeywell on auxiliary power units (APUs). AFI KLM E&M also has a joint venture (JV) with Safran for airfoil repair.

"Apart from competitive pricing, key factors that will determine success in the MRO business in the future will be the ability to contribute to shaping products and services in the global marketplace," LHT's Berweger affirmed. "Collaboration with OEMs will enable us to share risk and know-how."

Both MROs stress global expansion to provide regional support. LHT, for example, has been adding to its airframe capabilities in Puerto Rico and the Philippines and has opened a new component supply warehouse in Hong Kong. Spairliners, a JV between the two MROs, opened a warehouse and logistics center for component supply in Singapore.

Regionally, Berweger expects highest growth in Asia and the Americas, "where we continue to gain market share." The unit sees "a very positive business environment" for its engine services and also "strong demand" for its component MRO solutions for new aircraft such as the A350, A320neo, and Boeing 737 MAX. Connectivity solutions such as WiFi on board is a third sector of strong demand, he says.

AFI KLM E&M is one of the major power-by-the-hour (PBH) providers worldwide, for engines, components, or full support, Metz says. Some examples: A350 full support for Air Caraïbes, A350 and 787 component support for Thai, 12 customer airlines for 787 component PBH program, A320 component support for JetBlue, GE90 support for Air China, Air Canada, and Aeroflot, and GEnx support for Xiamen Air.

Engine MRO

ICFI projects engine MRO to grow from approximately $25.72 billion in 2015 to $39.36 billion in 2025, or about 4.4 percent annual growth. MTU Maintenance, an independent and OEM-affiliated MRO, sees the sector growing from $21 billion today to almost $46 billion by 2025. MTU Maintenance further predicts an increase in

Evolving the aftermarket: How P&WC is lowering costs and increasing availability through predictive and preventive maintenance

From the enormously popular PT6A turboprop and turboshafts for helicopters to larger turboprops for regional airliners and turbofans for business jets, Pratt & Whitney Canada's engines cover the spectrum. The worldwide fleet of engines has achieved 700 million flight hours and clocks over 30 million more annually.

Maximizing aircraft availability and reducing costs for customers lie at the core of P&WC's service and support initiatives. The company's significant investment in data-driven turnkey diagnostic and prognostic systems increase engine on-wing time and performance, reduce life-cycle costs and maximize the overall asset value to the customer. Wherever possible, technology and servicing advancements that have been devised for the latest engines are cascaded back to the older products.

Deep engine insight

P&WC continues to revolutionize data-driven engine health. The company's FAST (Flight, Acquisition, Storage & Transmission) solution provides deep engine insight on more than 600 P&WC-powered aircraft – including over 230 business jets, 20 regional airlines, helicopters and general aviation platforms.

By delivering near real-time situational awareness about engine health, usage and trends through FAST, P&WC is moving customers toward fully preventive maintenance environments. The visibility the solution provides is allowing for on-condition programs and reduced rates under P&WC's pay-per-hour plans on many platforms such as the Dassault Falcon aircraft family; the Cessna Citation Latitude (chosen by NetJets); PT6A-powered aircraft, such as the Cessna Grand Caravan; and numerous regional applications. P&WC's engine health innovations are helping deliver highly customized solutions while opening up new development opportunities. Its new Oil Analysis Technology Program, for example, is demonstrating the potential to be hundreds of times more precise than other oil analysis methods.

Engine support evolution

In 2018, the PurePower PW800 turbofan engine enters into service on the Gulfstream G500 business jet and with it P&WC is now enrolling customers in its most advanced and all-encompassing service plan yet, ESP PurePower PW800. Based on an evolution of current ESP offerings, the new plan provides a "white glove" approach to engine support that brings a step change in the large-bizjet market.

For those working on the engine there is even more assistance available. Manuals are being produced in 3D and the company is rolling out a new remote collaboration solution to all customers connecting the aircraft technician, customer and remote specialist using live, interactive audio-video technology.

P&WC's pay-per-hour maintenance plans include its Eagle Service Plan (ESP) and Fleet Management Program (FMP), which cover all planned and unplanned maintenance through a simple per-flying-hour cost. Increasingly, operators and airlines are turning to this form of service plan because of the many benefits: Guaranteed service and

OEM parts; carefully managed and planned schedules that minimize downtime; life-cycle cost reductions; rapid access to maintenance; and, above all, predictable maintenance costs. Moreover, enrolling in an ESP or FMP maintenance plan significantly enhances the residual value of the asset, and the plan is transferrable if the aircraft is sold.

P&WC continues to evolve these programs as it looks for new ways to deliver value. For example, the company recently launched the ESPecially for Your PT6 initiative, which provides up to the first 400 hours of coverage under the maintenance plan free to customers of new PT6A engines.

Keeping it SMART

P&WC has introduced more than 30 P&WCSMART maintenance solutions across its product lines, aimed primarily at operators with older engine models. P&WCSMART solutions provide guaranteed fixed and capped costs for major engine maintenance and parts, helping to eliminate price variables and uncertainty.

Under the P&WCSMART program customers pay a flat rate and either receive another freshly overhauled engine or get their original engine back after its 40- to 45-day refurbishment. There is no additional charge for any remedial work resulting from the use of non-OEM parts, or from the effects of erosion, corrosion and sulphidation.

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MyP&WC Power is P&WC's new customer portal. With full e-commerce capability including online parts purchasing and much more on desktop, mobile and tablet devices, MyP&WC Power aims to improve the customer experience by reducing the "touch-point," but not the "touch-time." Every aspect of the portal is designed to make it easier for customers to transact with P&WC online and bring them closer to the product, services and support 24 hours a day, seven days a week.

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IAI's BEDEK Aviation Group is active through the following operating divisions: Aircraft Division, Engines Division, and Components Division.

BEDEK's Aircraft Division has been providing maintenance, modification and overhaul services for standard, modern wide-body and narrow-body aircraft for over sixty years. Its MRO support capabilities include liaison engineering, advanced composite material repairs, interior and completion overhaul, machining, sheet-metal fabrication, NDT level 3, stripping and painting, line maintenance and flight operations.

BEDEK's Aircraft Division is also a world leader in passenger-to-cargo conversions of the B767, B737 and B747 families of aircraft, with more than thirty years of experience and certified STCs from leading Civil Aviation Authorities.
Additionally, BEDEK has produced an extensive line of passenger-to-special freighter conversions. Following modification, these freighters have accumulated more than two million flying hours without issuance of a single AD relating to BEDEK's conversions.

BEDEK's Aircraft Division boasts extensive experience in design-to-cost and design-to-weight efforts. All of these conversions have met their customers' design weight goals while simultaneously providing the best value.

The Engines Division provides repair, maintenance and overhaul services for a wide range of civilian and military aircraft engines, including Pratt & Whitney, General Electric, CFM International, IAE-V2500 and Lycoming. In-house major parts repair and rapid turnaround times are accomplished with the support of a computerized planning, production and inventory control system that provides up-to-date information.

The Components Division is a recognized world-leader in the field of maintenance, overhaul and repair of hydraulic, pneumatic and avionics equipment and over 10,000 individual aircraft component types, including APUs, landing gears, transmission and gearboxes, constant speed drive units and integrated drive generators. The Components Division also offers its customers flexible hourly-rate programs for a wide range of components.

BEDEK has purchased and developed an extensive stock of engines of various types including: CFM56-3, -5, -7, V2500, PW4000, as

well as APUs, LGs and components. These are used to support its customers' on-going service requirements, as well as serve as a basis for BEDEK's ever-growing lease and sale program.

BEDEK has established the following joint ventures to enhance the company's services:
- **M&B – B-767-300** Aircraft Cargo Conversion, located in Ireland.
- **BELINCO** (established jointly by Lingyun Technology Group Co Ltd and Bedek), located in Three Gorges Dam, Yichang City, Hubei Province, China. This company is the first Sino-Israeli civil aviation maintenance enterprise.

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For further information please contact:
BEDEK Aviation Group / IAI
Ben Gurion International Airport
70100 Lod, Israel
t: +972 3 935 3090
f: +972 3 935 9316
e: bedek@iai.co.il
www.iai.co.il

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Key personnel
Yosef (Yosi) Melamed, *Executive Vice President & General Manager of BEDEK Aviation Group*
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A CFM56-3 being prepared in the test call at MTU maintenance Zhuhai, China, home to MTU Maintenance for the CFM56 family.

worldwide shop visits for commercial jet engines of about 4 percent per year between now and 2025.

GE Aviation

Although GE Aviation did not reveal its aftermarket revenues, its estimated commercial aviation engine services backlog including engines not yet in service is $119 billion, Dwyer said. He expects about 4,300 overhauls in 2016 on all models combined, about 35 percent of which GE Aviation performs in its own shops.

Although the OEM and its partners, CFM International and Engine Alliance, account for some 36,000 engines in service with about 700 airlines, Dwyer explained that "there are about 60 other airline or independent MRO shops that compete to win overhauls on GE, CFM, and [Engine Alliance] engines or perform MRO for their own fleets of engines". He describes the GE Aviation and CFMI support models as "open and competitive" adding that less than half of the engines in GE Aviation's new engine backlog have service agreements.

GE Aviation asserts that the level of choice provided to airline customers is a 'unique and differentiating aspect' of the GE and CFM aftermarket model. "Customers have a choice for MRO and the service contract type, whether they want a long-term agreement, time & material agreement, or another structure," said Dwyer. This level of choice differs from "other service providers who require a service [contract] when an engine [is] purchased," he added. Furthermore, "the overhaul and material segments are highly competitive on GE and CFM engines…"

Dwyer points out that engines like the CFM56-5B and CFM56-7B have increased dramatically in durability, compared to their predecessors. A CFM56-5B or -7B typically operates eight to nine years before its first overhaul. This compares with about three years for the CFM56-3 during its mid-life point, he explained.

PEMCO Strategy

Despite challenges in the airframe MRO market, such as perceived overcapacity, fragmentation, and a shrinking pool of qualified mechanics, PEMCO has significantly improved performance in 2016 vs. 2015. The company's strategy for success includes four cornerstones: teammates, customer service, Lean, and metrics, explains PEMCO CEO Pastor Lopez.

Lean has been a performance driver – one of the reasons for the dramatic increase in the year-to-year number of aircraft serviced -- from 181 in 2015 to an estimated near-600 in 2016. "On top of that, our on-time performance improved from 84 percent in 2015 to over 94 percent in 2016," Lopez says.

Business is looking good as the company moves into 2017, he adds. "In 2016 we began three new programs that run into 2017 and beyond. Two programs are with legacy carriers and one is with an LCC [low-cost carrier]. All three programs are tracking well and our customer service, along with quality and on-time performance, has been exceptional."

The "most significant trend in the [narrow-body and regional aircraft] space," where PEMCO specializes, "is U.S. customers … shifting work from South and Central America back into the U.S. as costs continue to rise," Lopez says. "Also, the logistics of supplying parts and representatives to some of these countries represent added costs that can be easily mitigated within the U.S."

PEMCO highlights customer service and Lean process optimization, which come together in energizing the workforce. "We truly believe in having an engaged workforce…," Lopez says.

There is a reason airlines and lessors turn to **PEMCO** for maintenance, conversion, and engineering: **quality workmanship.**

Since CEO Pastor Lopez arrived in 2014, he has articulated a vision of operating on four fundamental cornerstones: teammates, customer service, Lean, and metrics. It is these four cornerstones that drive the company's dedication to providing top-quality service to its customers.

The company's Lean program is led by industry veteran Ben Macre, who has experience on the airline and MRO side. Teams are put together every month to work on week-long transformations of a business area. This has proved very beneficial as all the changes are owned by the teammates. As a result, PEMCO has seen a tremendous morale increase.

"I strongly believe in having an engaged workforce that truly understand the role they play in making a company successful," said Lopez. The company measures all aspects of its business.

Every functional area has a set of metrics reviewed on a monthly basic. "This way, there are no surprises," shared Lopez.

PEMCO offers airframe maintenance, line maintenance at Tampa International Airport, modifications, AOG field support, and support shop services. The company continues to be a world leader in B737 Classic conversion with over 150 aircraft converted and 70-plus STCs.

In 2016, PEMCO celebrated its 100th B737-300 passenger-to-freighter redelivery, was named a preferred MRO service provided for the MRJ by Mitsubishi Aircraft Corporation, and serviced over 500 aircraft at its Tampa facilities.

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Pratt & Whitney gears up for business growth through new engine development.

Pratt & Whitney

Pratt & Whitney (P&W) is ramping up infrastructure for its new geared turbofan (GTF) engine family, which has garnered over 8,200 orders from more than 80 customers. In June of 2016 the company announced a $65-million investment in its engine overhaul facility in Columbus, Georgia, for GTF maintenance. The center's new GTF facilities will include disassembly, inspection, assembly and test capability.

Joe Sylvestro, vice president of aftermarket operations says that P&W has also increased its mobile service capabilities. In an agreement announced in July 2016, P&W named LHT as its principal provider of mobile engine maintenance services for V2500, PW1100G-JM, PW1500G and PW1900G engines. This tailored maintenance offering minimizes the impact on customer operations, he said.

In 2016 the Engine Alliance, a joint venture between P&W and GE Aviation, named Pratt & Whitney's Eagle Services Asia, located in Singapore as a center of excellence for GP7200 low pressure compressor overhauls. P&W also signed an agreement with joint venture partner, China Eastern Airlines, to incorporate V2500 engine overhaul capability into its facility in Shanghai, work that is slated to begin in 2017.

The OEM has a footprint of nearly 18,000 engines in commercial aviation, including regional airlines, according to Sylvestro. For 2016 it expects about 1,500 shop visits from commercial airline customers and 1,350 visits from the regional carriers, with volume increasing in coming years. As of December 31, 2015, the company had a backlog of $52.5 billion, including commercial and military engines, spare parts, and long-term service programs. The company has 450 airline customers and over 100 lessor customers.

P&W also has developed offerings around its mature engines. For mature fleets, it is necessary to drive cost of ownership to a minimum

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Lim Serh Ghee, president, ST Aerospace expects modifications growth of about six percent annually.

to compete with the economics of new aircraft, so flexibility and tailored maintenance solutions are critical, Sylvestro said.

P&W's mature engine portfolio includes engine maintenance and asset management solutions that reduce costs while maintaining residual value with OEM standard parts and repairs. Targeted workscopes for specific time horizons and for meeting lease return conditions, material packages containing a combination of new and serviceable material, high used serviceable part fill rates and innovative life-limited part (LLP) solutions with serviceable LLPs and buyback programs drive down maintenance costs for mature engines, he says.

Rolls-Royce

Rolls-Royce has reorganized its aftermarket networks and added new service lines. The company created a network of Customer Service Centers to accelerate and localize maintenance decisions. The first of these, launched in Singapore in 2015, has improved customer issue resolution responsiveness by more than 50 per cent, according to Lesley So, head of civil aerospace marketing-services. Nodes serving the Americas, Greater China, the Middle East, and Europe 'went live' in January 2016, he added.

The OEM also named an independent MRO, Delta TechOps, to its list of Approved Maintenance Centers (AMCs), the first AMC with no Rolls-Royce equity stake. Another independent AMC, Mubadala, was announced in 2016. Mubadala will build a facility that will work on the Trent XWB which powers the A350 XWB.

Rolls-Royce also has sharpened focus on its older engines. Although the average Trent engine is just over eight years old, some are maturing. In response the OEM has launched programs such as TotalCare Flex for managing engines to final retirement and SelectCare, which involves an agreed-upon number of fixed-price engine overhauls backed by engine health monitoring. American Airlines, which launched Rolls-Royce's revolutionary TotalCare program in 1999, is the first SelectCare customer.

Rolls-Royce's presence in the wide-body sector has grown from a single-digit share in the early 1990s to 45 percent today, So said. At the same time the company's installed engine fleet has grown from 2,160 in 1995 to 4,600 today and will hit 7,450 by 2025, the company predicts, with biggest growth in Southeast Asia, China, and the Middle East.

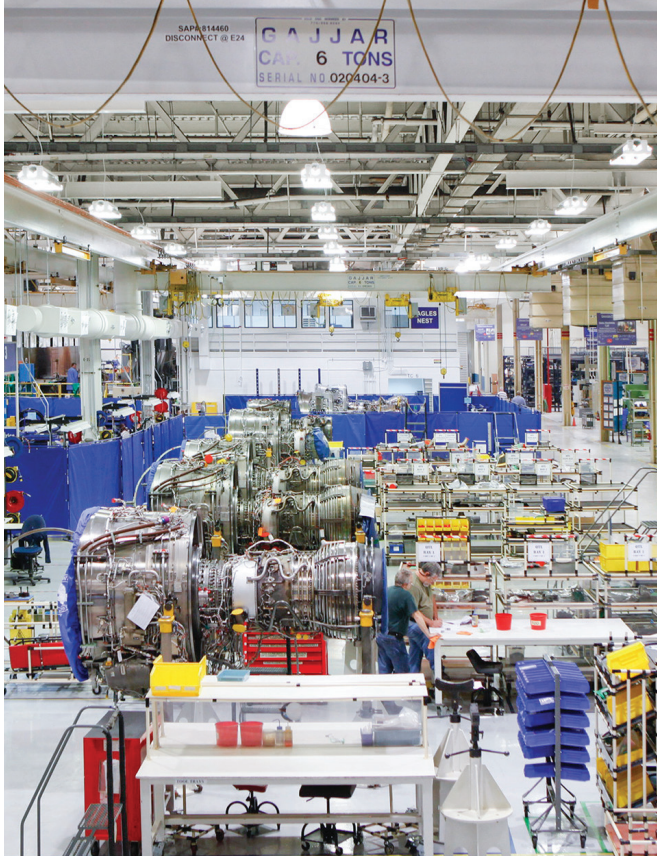
MTU Maintenance

MTU Maintenance enjoys the best of both worlds, both as an independent MRO and as an OEM-networked MRO. Its parent, MTU Aero Engines, is a risk and revenue sharing partner on certain current and next-generation products from International Aero Engines, Engine Alliance, P&W and GE.

Health Monitoring

The most near-term technology-induced shakeup will come via health monitoring. This will be a two-edged sword for MRO, predicts Wayne Plucker, director, North America, aerospace and defense, for Frost & Sullivan. This branch of big data – which will be made cost-effective by the advent of high-bandwidth Ka- and Ku-band satellite constellations – will help to eliminate maintenance missteps and reduce airline MRO needs, he says. The big question will be who owns the data – the operator, the OEM, the MRO, or the third-party doing the analysis of the data. "There's no good answer," he says, "but it's something that eventually will have to be absolutely answered."

The engine MROs are doing this now. But eventually "the whole airplane will be sensored up," Plucker predicts. Data analytics, for example, will make a big difference to providers of components, he says. Because it opens the door to on-condition maintenance, it could save airlines a lot of money.



Mechanics overhaul V2500 engines at the Pratt & Whitney Columbus Engine Center in Columbus, GA.

The commercial maintenance business of MTU Aero Engines increased revenues in 2015 to 1.581 billion euros, or 22 percent over 2014. Key growth programs were the V2500 and CF6-80 engines, said Leo Koppers, senior vice president of MRO programs at MTU Aero Engines. MTU Maintenance performs about 1,000 shop visits a year worldwide.

MTU Maintenance sees itself as well-positioned to address trends such as the growing presence of lessors. The unit cites growing interest in solutions that combine MRO with asset management expertise. MTU's approach compares well with OEM lessor products, Koppers explained, as MTU's solutions, for example, enable lessors to become more involved in maintenance decisions. It has 50 leasing company customers and more than 150 airline customers.

MTU Maintenance also is positioned to profit from the coming surge in Asian MRO. The unit's facility in Zhuhai, China, focusing on the V2500 and CFM56 engine families, completed its 1,000th CFM56 engine shop visit in 2016.

Airframe Maintenance

ICFI forecasts 2.8 percent annual growth for airframe MRO, from slightly over $9 billion to almost $12.5 billion, 2015-2025. Part of the reason for this modest growth is the arrival of new-generation aircraft, which will entail fewer hours of heavy maintenance work and longer intervals. Advances in health monitoring technology also will reduce the time aircraft spend in maintenance facilities, said Plucker.

Airframe maintenance has experienced some consolidation, as acquisitions have moved control of some business to Asia, Plucker notes. HAECO (the Hong Kong Aircraft Engineering Co.) acquired TIMCO, for example, and China's HNA Group acquired SR Technics. Conversely, some U.S. customer wide-bodies and narrow-bodies are returning home for maintenance.

ST Aero

ST Aero is remarkable for its ability "to get into every nook and cranny and to do it very well," observed Plucker. A key differentiator for ST Aero is its proven reliability in on-time delivery, president Lim stated. "Over the years we have always delivered on-time, over and over again."

ST Aero is an integrated service provider and "one of the few MRO providers in the world with an in-house aircraft design engineering capability that can offer … a wide range of customized engineering and design solutions."

The company underlines its relationships with OEMs. Some key partnerships include Boeing and Airbus; GE for On-Wing Support of GEnx-1B and -2B engines; CFM with CFM56 support; P&W on high-tech component repairs; and UTC Aerospace Systems for 787 nacelle systems.

"We see opportunities in the USA, the biggest MRO market globally, and in China, the fastest-growing MRO market," said Lim says. By year-end, 2016, ST Aero expected to complete a second hangar in Guangzhou, China, which can accommodate two wide-bodies and one narrow-body. Another new hangar in Pensacola, Florida, accommodating two wide-bodies, is slated for operation in 2018. ST Aero also supports nearly 900 aircraft worldwide under component Maintenance-By-The-Hour contracts.

Europe is a major target for ST Aero, increasing its share in Elbe Flugzeugwerke GmbH (EFW) to 55 percent, with the remainder held by Airbus. EFW will be ST Aero's center for passenger-to-freighter conversions, aircraft MRO, and engineering services in Europe. EFW, meanwhile, is setting up another company in Germany to produce lightweight components, mainly floor panels and cargo linings, for single-aisle Airbus aircraft.

AAR

AAR describes itself as the largest MRO in the Americas and the third-largest airframe MRO in the world in man-hours and revenues. The company's man-hours grew about 4 percent in FY 2016 over the 5 million recorded in the previous year.

AAR has added capacity for wide-body work, with FAA certification of a new MRO in Rockford, Illinois. What's more, "AAR has also started to see an increase in heavy maintenance work from Latin American airlines and repatriation from Asia," said Dany Kleiman, MRO Group vice president.

The MRO is also growing its power-by-the-hour business. The number of aircraft under contract for PBH component inventory management and repair services has increased from 800 to 1,200 since last year and more are coming soon, said Deepak Sharma, president of AAR supply chain. "Our growth has been with airlines in Europe, the Middle East, Asia, and Africa." AAR customizes its PBH programs, so airlines can choose just rotable pool access or just component repair, he said.

"We can repair components in-house at our … component shops in New York and Amsterdam or manage repairs done by third-parties where we do not have in-house capacity." AAR's subsidiary, UK-based Airinmar, also provides repair management support services.

Many customers use AAR's bundled services to increase efficiency, Sharma said. Most of the company's recent airline PBH contracts include inventory management and repair. For airlines with new fleets, AAR also provides "nose-to-tail contracts" that include not only inventory management and repair, but also airframe maintenance and landing gear. "It is much more efficient for an airline to get all of these services with one vendor under one contract."

AAR opened a supply chain hub in Brussels last year and the company's new contract with South African Airways Technical includes a JV to expand MRO services in Africa. AM

SURVEY SAYS:

2016 Independent Aviation Maintenance Reader Survey

(Source: Survey Monkey)

"This latest survey clearly demonstrates AVM's strong and established reputation and as the publisher we would like to THANK YOU as our readers for your many years of support. Despite being established now since 1983 we are very excited about developing this publication further for you and particularly proud to offer you a fantastic new website (www.avm-mag.com) which went live on 1st Jan 2017. We are also pleased to announce an increase in our print circulation to over 30,000 worldwide."

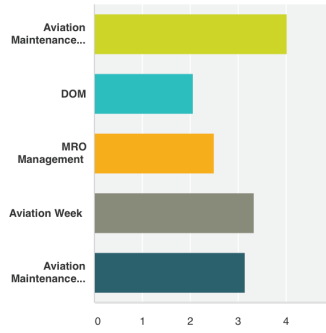
– Adrian Broadbent CEO/Publisher Aviation Maintenance Magazine

Here's a very impressive snapshot of the survey results

1. **DECISION MAKERS** – 78% of readers are decision makers
2. **RANKED NO 1** – AVM is No 1 vs all other MRO titles
3. **GLOBAL** – readers in more than 100 countries
4. **BROAD INDUSTRY SPLIT** – Perfect split OEM, MRO, Repair Stations, Airlines, Mil etc
5. **FULL Representation** from Comm to Biz Jets/GA, including Military and Helicopters
6. **LOYAL READERS** – More than 60% have been reading AVM for more than 5 years, 50% for 2-5 years & 28% for more than 10 years!
7. **PASS ON COPIES** – More than 73% of readers pass their copy to other colleagues to read with more than 26% passing it to 5 or more colleagues. If you applied the same pass on readership %'s prorata from the survey to our new 35K + min circulation, this would equate to an overall READERSHIP of more than 100K individuals of which you can see are hard to reach in any other publication! AVM

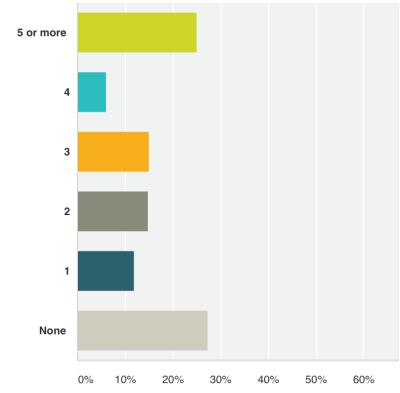
Rank the following magazines in order of importance to you.

Answered: 511 Skipped: 9



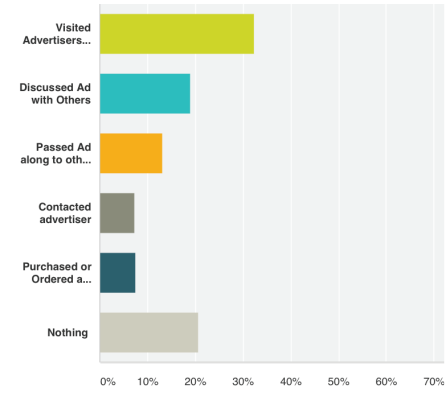
How many people besides you read through your copy of Aviation Maintenance?

Answered: 515 Skipped: 5



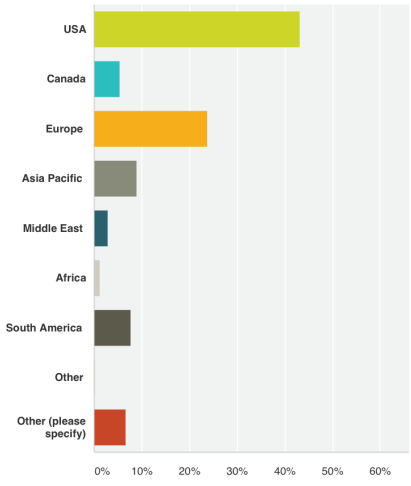
In the last 12 months what action have you taken as a result of seeing ads in Aviation Maintenance?

Answered: 513 Skipped: 7



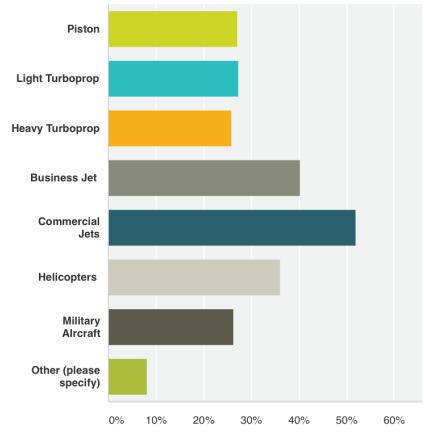
In what Country or Region are you based?

Answered: 519 Skipped: 1



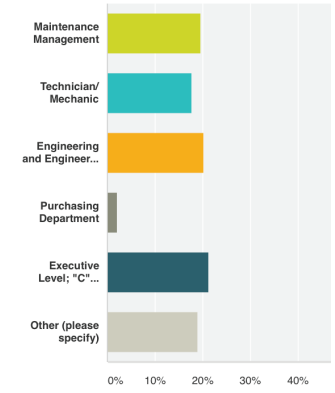
Which type of Aircraft are supported by your business?

Answered: 508 Skipped: 12



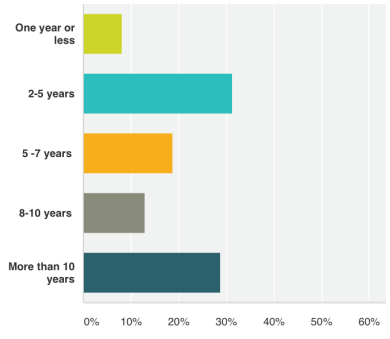
Which of the following mostly matches your job title?

Answered: 514 Skipped: 6



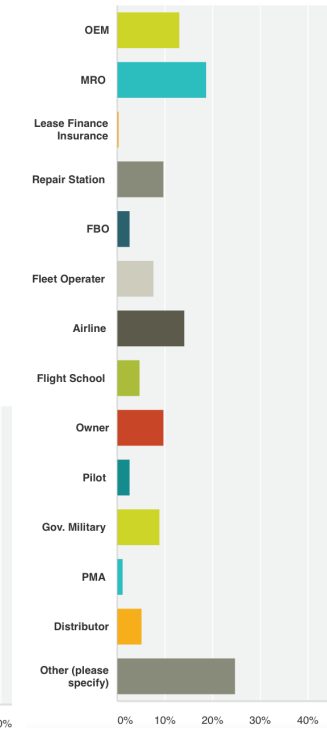
How many years have you been reading Aviation Maintenance Magazine?

Answered: 517 Skipped: 3



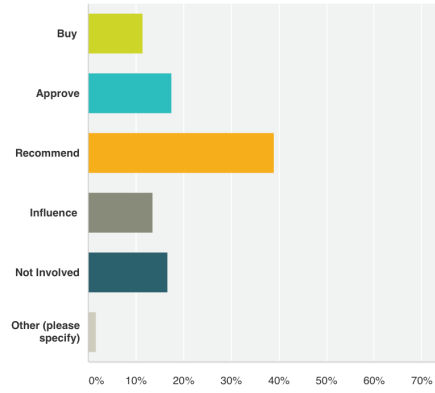
Describe your employer.

Answered: 518 Skipped: 2



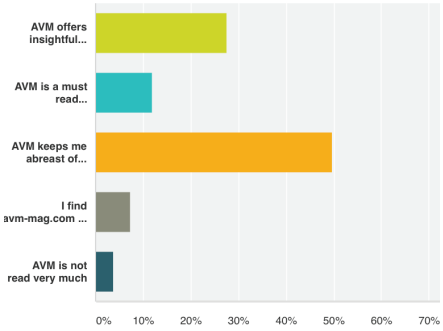
What level of purchasing power do you have?

Answered: 518 Skipped: 2



Please answer the following statements about Aviation Maintenance:

Answered: 513 Skipped: 7



AVIATION MAINTENANCE

avm-mag.com

BY THE NUMBERS

Snap-on Industrial's ATC system uses optical imaging technology in its tool storage to compare real-time images with the original image of the full drawer. (Snap-on Industrial)

by Mark Robins

Take Control of Your AVM Tool Storage

Boost maintenance productivity and decrease FOD damage with AVM tool storage

IN 2011 a Boeing 737 flying over India experienced an engine failure that was due to a technician mistakenly leaving an expander tool inside it. In March 2016, a passenger aboard another 737 noticed a spanner wrench lodged in the aircraft's wing as it was taxiing for takeoff on a flight to Denmark. Thankfully, no one was injured in either of these incidents, but they clearly demonstrate the danger lost or forgotten tools can pose to aviation. Effective tool storage and control may have prevented both of these events.

Tool storage is a critically important strategic element in all maintenance activities aimed at keeping aviation flying. Whether it's for military or commercial applications, proper aircraft maintenance involves the correct storage, protection and identification of valuable repair tools.

"The issue of foreign object damage (FOD) is always top of mind with aviation maintenance operations around the globe," said Jeff Kretzmer, vice president of sales and marketing, HABCO Industries. "Knowing where tools are at all times, coupled with ensuring that they never get left behind during maintenance activities, is paramount."

The PinPoint AeroMASTER RFID Tool Control System has considerable design flexibility with a variety of widths and drawer configurations.
(HABCO Industries)

Tool Storage Selection

AVM tools come in a variety of unique shapes and sizes with multiple functions. To store them, there is a variety of sophisticated, intelligent and intuitive AVM tool storage vessels. These may include tool trolleys, mobile tool chests and carts, hand-carried cabin cases, and other containers, cabinets and boxes.

"Many recommend low profile tool storage in order to fit underneath a wing or tail," said Sammi Shen, commercial director, Stahlwille Tools. "As a vast majority of wrench sizes used are below ¾ inch and mostly ¼ inch drive tools are commonly used in the industry, thinner drawers are preferred by users. It's important for suppliers to be able to equip the industry with a foam inlay system inside multiple types of containers that can guarantee a high level of organization and security, and protect high-quality, expensive tools from damage or from being mislaid."

Tool control is an active component of tool storage. "A tool control program requires a detailed process of tool inspection and accountability, both before and after a job is completed, and most importantly, the process needs to be followed," said Scott Steward, business development manage at Snap-on Industrial. "Any credible tool control system shoul meet five criteria: organization, visibility, security, tracking and accountability. These factors, when added together, give technicians, airlines and MROs the means to fully control their tooling systems, which improves safety."

High-tech Storage

Tool storage has advanced a long way from simple foam cut-outs. Technology today is proving to be a valuable asset by allowing technicians and supervisors to store, track and monitor their AVM tools in real time, which reduces the risk o FOD, while improving safety.

Snap-on's Level 5 Automated Tool Control (ATC) tool boxes use optical imaging technology to monitor and record tool usage and inventory. They can hold hundreds of aviation hand tools, all of which are tracked from the time they are checked

This Stahlwille tool storage trolley is extremely robust and resilient for professional use.
(Stahlwille Tools)

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Tool storage is a critically important strategic element in all maintenance. (Snap-on Industrial)

With Stahlwille's Tool Control System's customized design of inlays, no tool is superfluous; no storage space wasted and there is no unnecessary weight to be transported. (Stahlwille Tools)

out of the box until they are properly returned.

Snap-on's Level 5 Automated Tool Control (ATC) tool boxes use optical imaging technology to monitor and record tool usage and inventory in real time. "Snap-on's Level 5 Tool Control System is unique in that it provides five distinct levels of tool control: organization, visibility, access control, asset management and automation," Steward said. "This system can be customized to provide the level that meets users' specific requirements."

HABCO's PinPoint RFID Tool Control Systems (Radio Frequency Identification Technology) can tag tools individually with RFID technology, from the largest tools all the way to a tiny apex bit. This allows traceability all the way to the pocket level of the tool storage unit. "It helps better understand the individual tool usage metrics of mechanics, even those with multiple users accessing the same tool box," Kretzmer said. "It is especially useful when tools are collected at the end of a shift."

AVM tool storage will remain an industry-proven method of effective control and oversight. Its growing adaption of technology is beneficial, and training and educational programs can overcome initial resistance from individual mechanics. All of this results in increased maintenance productivity and improved aviation safety. AVM

ADS-B is Coming: Deadline January 1, 2020

Advisory from the NBAA warns that Maintenance Professionals Need to be Ready

Although the date may still seem years away, a shortage of shop capacity will make it increasingly difficult for operators to equip in time to meet the FAA's January 2020 compliance date for equipage with Automatic Dependent Surveillance-Broadcast, or ADS-B.

By January 1, 2020, most aircraft operating domestically in the U.S. will be required to have ADS-B Out capabilities to transmit aircraft identification, and GPS-derived position information, to air traffic control. FAR Part 91.225 outlines the specific airspace requirements, and the regulation applies to the vast majority of business aircraft. In many cases, an upgrade or replacement of the aircraft's existing transponder will be needed to make an aircraft ADS-B Out compliant.

Operators flying internationally may already have installed ADS-B Out equipment to meet existing requirements in Australia, Hong Kong, Singapore, Taiwan and Vietnam or those that are scheduled to go into effect in Europe by June 2020. However, in some cases, operators may have installed earlier model transponders that are compliant with certain international requirements but do not meet Part 91.225 standards.

Furthermore, the FAA's ADS-B Out requirements apply regardless of which FAR an operator typically operates under. Whether it's Part 91, 121, 125, 135 or some other regulation, the FAA's ADS-B Out deadline is still January 1, 2020.

"No one will be exempt from the equipage requirement," Doug Carr, NBAA's vice president of regulatory and international affairs has declared. "It's possible some operational aspects won't be ready by 2020. For example, an aircraft parked next to a building might not receive or transmit an ADS-B signal until the aircraft is pushed back. The FAA recognizes the need to keep flights moving, despite the operational standard requiring a signal at dispatch."

The wide-ranging impact of this rule means aircraft owners and operators need to know what ADS-B solutions are available for their aircraft, plan accordingly and consider other upgrade options.

Is There a Solution for Your Aircraft?

NBAA recently looked at what percentage of the business aviation fleet has an ADS-B solution. According to preliminary data, almost 92 percent of business aircraft have an available ADS-B solution, leaving eight percent as what Carr refers to as "orphaned," without an identified solution.

Ric Peri, vice president of regulatory affairs for the Aircraft Electronics Association, said one good way to think of available ADS-B solutions is by generation of ownership.

For example, first-generation owners are likely fully supported by the original equipment manufacturer (OEM) because the aircraft are so closely tied to the OEM due to configuration and aesthetics considerations; second-generation owners are also closely tied to OEM requirements through service bulletins that provide a logical path to compliance.

"Third-generation owners will start to see deviations from the OEM, partly because these owners and operators tend to look at cost-effectiveness as much as configuration control," continued Peri. "This is where you start to see third-party solutions viable in the marketplace."

While first generation owners may seem best positioned to equip quickly for ADS-B, Peri noted they may experience challenges meeting the deadline since the avionics suppliers for those aircraft are also the dominant suppliers for the airlines. For more modern aircraft, Peri doesn't anticipate solutions being available until late 2016 or early 2017.

Also, newer aircraft tend to be maintained at authorized service centers. While there are roughly 950 avionics repair stations in the U.S., approximately 750 are installation shops and only 100 to 150 repair stations support business jets or turboprops. It's not hard to anticipate the overwhelming demand on these repair stations over the next few years.

The shop availability concerns are compounded by the fact that OEMs tend to limit service bulletins to their repair centers only. Now, instead of looking at up to 150 potential repair stations, you might be limited to fewer than a dozen.

"Considering the industry is looking at two weeks of down time for each aircraft, mathematically, it's virtually impossible to meet the compliance date unless we can rely on the full resources of the industry," said Peri.

Planning for ADS-B

Peri encourages aircraft owners and operators to choose repair stations with proper ADS-B test equipment. This equipment can help prevent post-installation issues. Although the shops that have this equipment might not be the cheapest options, they can save operators and owners a significant amount of time by not having to deal with post-installation problems.

The final step in validating [your installation's] ADS-B accuracy is to request a Public ADS-B Performance Report (PAPR) from the FAA. The report is free and there is no penalty or violation assessed if any concerns are identified.

"The future health of your ADS-B system will be judged by what [data] the FAA is receiving," said Peri. "That's it. There's no required maintenance check or continuing airworthiness process." Peri also recommends adding ADS-B checks to your approved maintenance program and conducting them along with transponder checks.

Think About ADS-B In, Too

Aircraft owners and operators should also consider what technology might be required or helpful in the future. For now, the ADS-B mandate is only for transmitting out. However, many operators would benefit from also installing ADS-B In capabilities that bring many of the technology's benefits to ATC onto the flight deck.

"Plan beyond simple rule compliance and consider what comes next," suggested Carr, "which for most aircraft is ADS-B In." ADS-B equipage may also provide operators the chance to further upgrade their aircraft's equipment with Wide Area Augmentation System (WAAS) navigation and other technologies.

Rebates Available to Some Operators

Owners of eligible aircraft may also qualify for a $500 rebate for installing avionics required for ADS-B Out compliance. Eligible aircraft must be U.S.-registered, fixed wing, single-engine piston aircraft that are not currently equipped with Version 2 ADS-B Out.

The FAA estimates a minimal rule-compliant system for this type of aircraft would cost approximately $2,000, plus installation fees. The rebate offer is limited to the first 20,000 eligible aircraft owners that apply. The FAA expects the rebate program to run for approximately one year, or until 20,000 rebates are distributed, whichever comes first.

NBAA encourages aircraft owners to schedule their ADS-B upgrades as soon as possible to avoid the challenges that will occur closer to the Jan. 1, 2020, compliance deadline. Aircraft not properly equipped by that date face grounding or significant operational limitations. The FAA will not be issuing an extension to the deadline or exemptions to the equipage requirement.

A version of this article was published in the Nov/Dec 2016 issue of NBAA's member publication Business Aviation Insider. Download the BAI app at www.nbaa.org/news/insider/app/.

Calspan Urges Owners Not Wait

Calspan Aerospace's Jessica Chapman, director of maintenance services, approached Aviation Maintenance magazine at the NBAA'S Business Aviation Convention and Exhibition (NBAA-BACE) at the beginning of November wishing to warn aircraft operators about the ADS-B issue and the last minute rush that could occur.

Chapman was concerned that too many aircraft owners were not taking the deadline seriously enough. "While knowing repair station capacity is a growing issue, many of Calspan repair station's business jet customers are holding out. Some are waiting for technology to improve to a more integrated solution offering better user interfaces or they simply want to hold onto their cash for another year," she stated. "There's going to be a tipping point when flight and maintenance departments decide to upgrade and I don't believe we've hit that yet, but we need to soon, or there will be a capacity issue."

Calspan Aerospace, among its range of services, supports the aviation industry as an FAA Part 145 Repair Station. The company is licensed for limited aircraft maintenance and repair of Gulfstream G-III and G-IV; Saab 340A and B; and the Learjet 20- and 40-Series airframes, powerplants, accessories, radio, and instrumentation.

With any sudden demand, new players always enter the market seeking to exploit the capacity crunch that can be caused. "It's going to be important for jet owners to make their decisions based upon the experience level of each individual repair stations. As we get closer to this mandate there will be shops starting up with limited experienced technicians."

Talking of her own organisation, Chapman said that Calspan already had experienced avionics technicians, engineers and installers. "This team has completed ADS-B upgrades to business jets, general aviation as well as vintage aircraft for both the civil and military sectors," she said.

Combining scheduled routine maintenance with their ADS-B Out upgrades could save on costs, she stressed. "Some repair stations can also add features such as in-flight internet, passenger entertainment systems, or even electronic flight bags while the aircraft is being updated," she added. AM

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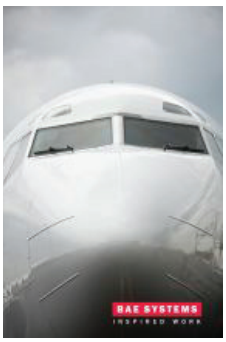

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By Jason Dickstein

Tips for Repair Stations with Foreign Clients

Many repair station professionals think that repairs are not covered by export regulations. This is not the case! Items intended to be repaired, and items that have been repaired, are generally subject to export regulations when they cross international borders. The regulations often offer exceptions and loopholes that make it easy to make these transactions comply with the regulations; but it is important to recognize that these are export transactions because a failure to meet the requirements of an exception can potentially lead to a non-compliance.

When an article is imported into the United States from a point outside the United States for maintenance or alteration, this transaction is considered to be an import. When the same article is returned to the non-US source, then that will be considered an export from the United States.

The first question will be whether the import is subject to import tariffs. Most aircraft parts are not subject to import tariffs, but there are some parts explicitly excluded from that duty-free treatment. If the part that you are importing falls into this category, and it is subject to import tariffs, then you will need to identify an import exception that permits duty-free entry into the United States.

One such exception applies to US goods being returned to the United States. Such articles are usually eligible for duty-free entry into the United States. The harmonized tariff code 9801.00.10.xx allows U.S. made products to return to the U.S. without duty requirements; but one important stipulation is that the articles may not have been increased in value (nor their condition improved) while abroad. In other words, if an item was repaired or altered while it was outside the United States, then the importer may owe an import duty that correlates to the increase in value associated with the foreign repair or alteration.

The more specific code 9801.00.10.12 applies to US goods being returned for repair or alteration. This code can also be applied to foreign goods that were previously in the United States and are returned to the US within three years of leaving.

But what if your articles were not made in the US and have not been in the US within the preceding three years? For example, UK-manufactured aircraft servos being imported into the US for repair? An article like this is likely to be considered an aircraft part subject to the tariff code 8803.30.00.30. This typically falls under the duty-free entry category.

Categorization under the harmonized tariff codes can be complicated and this article is not a complete discussion of the subject, so be sure to seek professional help as necessary to assign the correct tariff code.

Export

The next step is export. Yes, I totally skipped over the intermediate step of performing the maintenance or alteration. That is up to you.

When you are returning an aircraft parts to a non-US customer, you will need to identify whether it is subject to any sort of restrictions, including restrictions that require a license to overcome. For a more complete discussion of how to perform this analysis, you can see one of my articles on general export compliance, or attend one of my export workshops. If your analysis shows no restrictions, then you are free to export in accordance with applicable laws.

If your analysis shows that the export is subject to restrictions, then the next step may be to analyze whether a licensing exception exists that can allow you to circumvent the restriction. This is especially import in situations where time is of the essence in order to maintain an aircraft's operational expectations (such as preventing AOG situations).

Most civil aircraft articles are subject to Commerce Department export jurisdiction (this means it is identified by an export commodity classification number, or ECCN), then one useful exception to the licensing rules is the RPL exception.

Some articles remain subject to the International Traffic in Arms Regulations or ITARs. The ITARs are administered by the US State Department. Articles subject to the ITARs almost always require a license for export – the exceptions are few and narrow. When an ITAR-regulated article is imported into the United States for the purpose of repair, there is a license exception that can apply. The temporary import license exception can apply to unclassified US-origin articles brought into the United States for maintenance or alteration. The article must be identified at the time of import by a declaration on the applicable U.S. Customs and Border Protection document that states

"This shipment is being imported in accordance with and under the authority of" 22 CFR 123.4(a)(1) (for maintenance) OR 22 CFR 123.4(a)(2) (for alteration).

There are many limits and caveats on this ITAR provision so be sure you understand the regulations fully before using this exception. But if the exception is properly used, then it will permit the return of the article to the foreign end-user without obtaining an additional license for that export.

Most civil aircraft articles are subject to Commerce Department's export jurisdiction (this means the article is identified by an export commodity classification number, or ECCN). One useful exception to the licensing rules for these articles is the RPL exception.

RPL requires that the original export of a US-produced article from the United States must have been a legal

export. But if the article is entering the US for the first time (e.g. it is foreign produced) then RPL can also be used for this article.

RPL typically requires that the work you perform on the article cannot change it. This means that some alterations may be forbidden if you intend to use RPL as a license exception. The official metric is whether the alteration improves the basic characteristic of the equipment. An example taken from Commerce Department guidance is:

If a replacement part is predicted to increase the flow rate of a pump from 20 m3/hr to 22 m3/hr - but it still falls within the tolerance design flow range of the original pump - you can use RPL for that replacement part. In contrast, if the replacement part increases the flow rate of the pump from 20 m3/hr to 60 m3/hr (which is beyond the tolerance design flow range of the original pump), then this would be considered a change in its basic characteristics.

Another example would be an upgrade in avionics software that changes the functionality of the unit. For example, the upgrade to TCAS software that permitted aircraft to fly in RVSM space [MOPS 7] changed the functionality of the TCAS unit so this software upgrade would render the unit ineligible for export under the RPL license exception.

How to Use RPL

Once it is determined that the export transaction is eligible for RPL, the following steps are necessary:

- Place a destination control statement on your commercial invoice acknowledging you are in full compliance with the EAR. This statement and the regulations that control it were recently amended – you can find more details about this at https://aviationsuppliers.wordpress.com/2017/01/03/destination-control-statement.
- If the export requires an electronic export information filing (e.g. if the value of the export exceeds $2500), then go to the Automated Commercial Environment (ACE) and enter the ECCN of the item, enter the symbol RPL for the license authority, and enter a description of the item.
- Export your article.
- Maintain all records as required in your files.

There are other exceptions that can apply to an aircraft parts transaction, so if RPL does not work for you, then do not despair. But be sure you are in full compliance before you return the article to your foreign customer.

WARNING: This article discussed basic legal issues to help persons identify possible compliance issues, but it is not legal advice designed to address a specific fact pattern, and actual fact patterns can sometimes generate complicated analyses. For this reason, person seeking legal advice should engage an export lawyer with appropriate experience to assist in identifying your compliance path. Since 1992, Jason Dickstein has supported the legal and regulatory needs of the aviation community, including export advice. AVM

Want to learn more? Then please register for the 2017 MARPA Conference, which will take place October 25-26, 2017 at the B Resort and Spa in Orlando, Fla.

BY DAVID WESTLUND

David Westlund, Research Engineer, Structures and Materials Section, Federal Aviation Administration

David Westlund holds a BS in composite materials engineering from Winona State University and a master's degree in aerospace engineering from North Carolina State University. He joined the FAA in 2009 and is currently the program manager for the FAA's Maintenance and Inspection Research Program.

Uncovering the SAE:
from Automotive to Aircraft Composites

SAE International was initially established as the Society of Automotive Engineers and is a U.S. based, globally active professional association and standards developing organization for engineering professionals in various industries. Its principle emphasis is placed on transport industries such as automotive, aerospace, and commercial vehicles. The Society's history dates back to the 1900s during the early days of the automotive industry when there were dozens of automobile manufacturers in the United States, and more worldwide. The desire to solve common technical design problems and develop engineering standards was emerging. Engineers in the automobile business expressed a desire to have a 'free exchange of ideas' in order to expend individual technical knowledge base. Today, SAE International has more than 127,000 members globally [1].

SAE publishes over 6,400 technical documents for the aerospace industry including Aerospace Standards (AS), Aerospace Recommended Practices (ARP), and Aerospace Information Reports (AIR). Aerospace Material Standards are a subset of Aerospace Standards governing material science and engineering for aerospace applications. Aerospace Recommended Practices are recommendations for engineering practice and Aerospace Information Reports contain general accepted engineering data and information [1].

So, what are 'Standards' and why do we need them? One definition of a standard is a document, developed and used by consensus of the stakeholders, which describes how a produce is to be obtained or used. Standards come to represent best practices and lessons learned by the industry and can also serve as repositories for recent research results. Good standards reduce procurement costs, improve products, expand markets , and lower risk by reducing duplication in effort or overlap and combing resources, bridging technology gaps and transferring technology, reduce conflict in regulations, facilitate commerce, stabilize existing markets and allowing development of new markets, and protect from litigation [2].

The SAE Commercial Aircraft Composite Repair Committee (CACRC) is a technical committee whose focus is on composite repair. The charter of this committee is to develop and improve maintenance, inspection and repair of commercial aircraft composite structure and components. There are seven CACRC task groups including: Repair Materials, Repair Techniques, Analytical Repair Techniques, Design, Inspection, Training and Airline Inspection and Repair Conditions. Members include airline operators, government, and OEMs [3].

With the emergence of transport category aircraft with extensive use of composite materials for primary structure, there was recognition within the industry that repair methods and materials needed to be standardized to the extent possible. While repairs have been successfully performed for years on composite parts, this was usually limited to secondary structure such as control surfaces and performed at a much lower frequency in some cases than were metallic repairs. In 2011, the GAO released a report on "The FAA's Actions to Oversee the Safety of Composite Airplanes [4]." In this report, the GAO expressed concern over the limited standardization of composite materials and repair techniques compared to metals. The report states, "With limited standardization due, in part, to business proprietary practices and the relative immaturity of the application of composite materials in airframe structures, a repair technician could confuse materials or processes, which may result in improper repair. According to one study, only about a dozen common metal alloy materials are used for traditional metal repairs, while over 60 unique materials may be used for various composites repairs [4]."

These concerns, as well as a general desire to work together towards safety and efficiency in the aviation industry, are exactly the reason for standards committees like SAE CACRC. The efforts of these volunteers are making aviation safer and smarter for the traveling public. The FAA works very closely with organizations like this and is currently conducting research which benchmarks the best practices in maintenance and repair. Information about the SAE CACRC is available on their website: https://www.sae.org/servlets/works/committeeHome.do?comtID=TEAAMSCACRC. AM

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4 http://www.gao.gov/products/GAO-11-849

Note: *The 59th Annual A4A/NDT Forum took place September 26-29, 2016 at the Wyndham San Diego Bayside Hotel, San Diego, California (http://a4andtforum.com/)*

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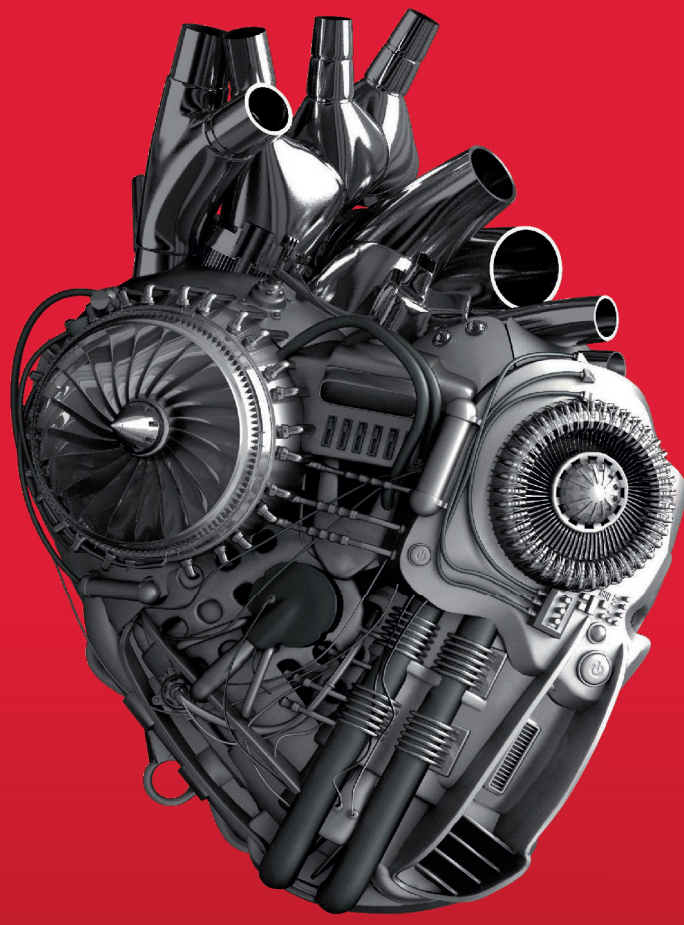

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