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



BIG DATA FOR MRO

MINING

FOR GOLD

Pratt & Whitney has teamed with IBM to build a stronger data analytics and predictive maintenance offering. Shown here (l to r): Daniel Roberson (Pratt & Whitney/MIT), Jerry Lusa (Pratt & Whitney), Shun Liang (Pratt & Whitney), Marcell Babai (IBM).

December 2014 / January 2015

GIANTS

MRO CONTINUES TO GROW AND STRUGGLE AT THE SAME TIME. A LOOK AT SOME OF THE STATS.



TOTAL SUPPORT OR DOM?

THE DEBATE OVER WHICH TO CHOOSE IS HIGHLIGHTED IN THIS STORY



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DETAILS ON THIS NEW EVENT TAKING PLACE IN MUNICH IN MARCH



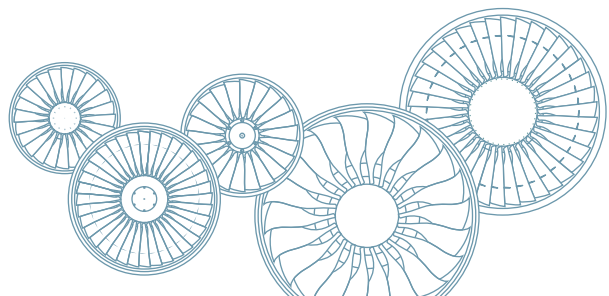


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Big Data

Big data is used to describe analyzing complex sets of information that can find patterns or help make better decisions. Learn how big data is going to impact MRO in this story by Charlotte Adams.

On the cover: Pratt & Whitney and partner IBM are teaming up to find new ways to utilize the prolific amounts of data being generated by Pratt & Whitney engines. Story starting on page 24.
Image courtesy of Pratt & Whitney.



30 DOM vs. Total Service Providers

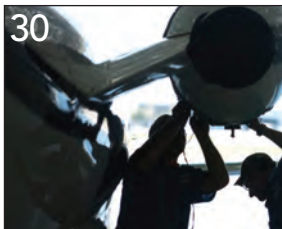
What is the best course to provide for the service and support of the business tool known as a jet. Should you hire a director of maintenance? Or a total service provider? Or both?

38 Giants

Continued fierce competition not only among MROs, but with the OEMs, marks another year among the giants of our industry. We take a look at what MROs are doing to stay in the hunt.

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Aviation Maintenance (ISSN 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.

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The YGS Group
717-505 9701 x100

US Publisher

Daniel Brindley
ASI Publications Ltd

US Publishing Office Address:
5590 N Diversey Blvd #209
Milwaukee
WI 53217



Aerospace & Security Media is a trading arm of ASI Publications Ltd

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UK Company registration no 5999781
UK VAT no GB919525796

Everything's Amazing

BY JOY FINNEGAN
EDITOR-IN-CHIEF



We are closing another year. Does time seem to move faster with each passing year for you as well? Perhaps this is simply a sign of getting older. But one thing is true, with the technology and connectivity of today, business moves at much faster rates than in previous eras and if you are not keeping up with technology, your business won't keep up with the competition.

Earlier this year, in our June/July issue, we highlighted some MRO innovators who shared with us what their companies are doing to improve their operations. We looked at real-time tracking of engine parts, rapid repair processes for composite structures using robotics, customer communications portals and company-wide innovation initiatives at MROs around the world.

In this issue we are taking a look at "Big Data" and how that sector of technology is, or will be, impacting MRO. With the fierce competition of our industry, using all available information is really the only way to survive, compete and improve. The world of big data is futuristic and not going to make an impact on the shop floor immediately but that will change soon.

I remember covering health and usage monitoring (HUMS) for helicopters many years ago when they were first being introduced. The overriding consensus at that time was that the technology was amazing and the data prolific but the process of getting that data in an understandable format to the maintainer to utilize in a predictive way was somehow lacking. Hopefully, those early years of use will benefit the coming tsunami of information that big data for MRO is going to flood the industry with. The need to get the information to those that will ultimately be able to use it is paramount.

To that end, some inroads are being made right now to help manufacturers, operators and maintainers work together to prevent downtime using big data. Engine manufacturers like Pratt & Whitney and GE Aviation are leading the way. Our story on what these companies and others are doing can be found on page 22.

One dizzying fact from the story is that an engine produces a half a terabyte of data per flight. Perhaps you already have a grip on what a byte, megabyte and gigabyte are, so let us add that a terabyte is equal to 1000 gigabytes.

Said another way, it is approximately one trillion bytes. Read the story to learn more about big data and prepare for the influx of information to come.

On a more personal and human level, let me take this time, as we come to the end of 2014, to once again extend my personal thanks to all who dedicate their life's work to keeping our aircraft functioning safely and in the air.

Often the work of the maintenance department and associated personnel is overlooked or forgotten. Seemingly the only time it is recognized is when something goes wrong. But I would like to acknowledge all who work to make flying safe and efficient for the traveling public on a daily basis.

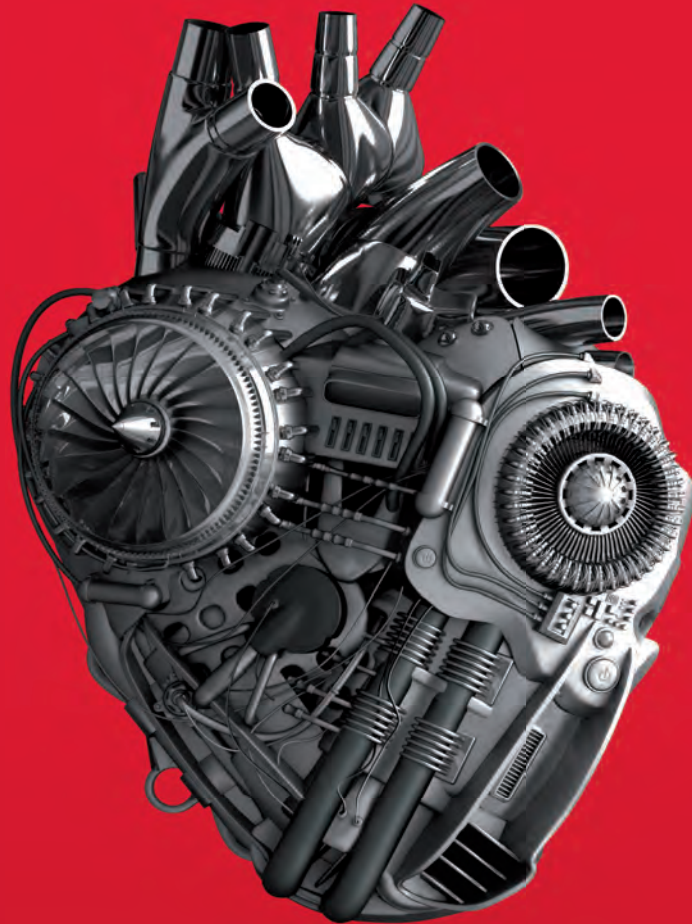
According to the International Air Transportation Associate (IATA) on average, more than eight million people fly every day—3.1 billion in 2013 and estimates are guessing, when the numbers come in for 2014, it will be 3.3 billion. These are staggering numbers when you think about them and add to that we are in the safest period of aviation in history. Of the most significant fatal commercial aircraft accidents that occurred this year, none of those were related to the maintenance of the aircraft.

When you think of airlines with hundreds of aircraft being flown all over the world with demanding schedules and challenging conditions, this is truly remarkable and something every single person who works in the MRO arena should be extremely proud of. I, for one, am proud of all who sacrifice personal time, family events, more lucrative pay in other fields and who give their all to produce those amazing statistics. My hat is off to you.

And for fun, if you haven't seen the comedian Louis CK's take on technology and specifically flying, when you have a free minute Google "Everything's Amazing and Nobody's Happy" and listen to his diatribe about unhappy flyers. He talks about how quickly we take for granted the amazing technology at our fingertips. He truly captures the essence of the miracle of flight. I still, to this day, feel amazed every time I am in an aircraft that slips the surly bonds of earth and I hope you do too. Thank you for making it possible.

Happy holidays and best wishes for 2015! 

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NTSB Recommends Process Improvements for Certifying Lithium-ion Batteries as it Concludes its Investigation of the 787 Boston Battery Fire Incident



NTSB Materials Engineer Matt Fox examines the casing from the battery involved in the JAL Boeing 787 fire incident

Shortcomings in design and certification ultimately led to the fire in a lithium-ion battery installed on a Boeing 787 jetliner that had just completed an intercontinental flight to Boston, the NTSB determined in its final report on the incident, which was released recently.

On January 7, 2013, ground workers discovered smoke and flames coming from an auxiliary power unit lithium-ion battery in a Japan Airlines 787 that was parked at the gate at Boston Logan International Airport. There were no injuries to any of the 183 passengers or 11 crewmembers that had already deplaned after flying from Tokyo's Narita Airport. The battery was manufactured by GS Yuasa Corporation.

Early in the investigation, the NTSB said that the fire began after one of the battery's eight cells experienced an internal short circuit leading to thermal runaway of the cell, which propagated to the remaining cells causing full battery thermal runaway. This condition caused smoke and flammable materials to be ejected outside the battery's case and resulted in excessive heat and a small fire.

"The investigation identified deficiencies in the design and certification processes that should have prevented an outcome like

this," said NTSB Acting Chairman Christopher A. Hart. "Fortunately, this incident occurred while the airplane was on the ground and with firefighters immediately available."

Because the APU and main lithium-ion batteries installed on the 787 represented new technology not adequately addressed by existing regulations, the Federal Aviation Administration required that Boeing demonstrate compliance with special conditions to ensure that the battery was safe for use on a transport category aircraft.

Investigators said that Boeing's safety assessment of the battery, which was part of the data used to demonstrate compliance with these special conditions, was insufficient because Boeing had considered, but ruled out, cell-to-cell propagation of thermal runaway (which occurred in this incident) but did not provide the corresponding analysis and justification in the safety assessment. As a result, the potential for cell-to-cell propagation of thermal runaway was not thoroughly scrutinized by Boeing and FAA engineers, ultimately allowing this safety hazard to go undetected by the certification process.

As a result of its findings, the NTSB is recommending that the FAA improve the guidance and training provided to industry and FAA certification engineers on safety assessments and methods of compliance for designs involving new technology.

"Through comprehensive incident investigations like this one, safety deficiencies can be uncovered and addressed before they lead to more serious consequences in less benign circumstances," said Hart.

NTSB investigators also identified a number of design and manufacturing concerns that could have led to internal short circuiting within a cell.

As a result of the investigation, the NTSB made 15 safety recommendations to the FAA, two to Boeing, and one to GS Yuasa.

"The aviation industry is continually benefiting from technological advances, and we are hopeful that the lessons learned in this investigation will further enhance the industry's ability to safely bring those innovative technologies to market," said Hart.

The complete report is available at <http://go.usa.gov/HJtJ>.

All of the information and resources the NTSB has released for this investigation can be accessed from the following page: <http://go.usa.gov/HSxd>.

ARSA, ATEC Rewrite FAA's Aviation Maintenance Overview

On Dec. 10, the Aeronautical Repair Station Association (ARSA) and the Aviation Technician Education Council (ATEC) jointly submitted a re-write of Federal Aviation Administration (FAA) Advisory Circular (AC) 65-30B: "Overview of the Aviation Maintenance Profession."

The agency solicited input on the draft AC, which had been revised to include updated maintenance career information and details about military to civilian occupational transfers. ARSA and ATEC say they have completely overhauled the circular.

"To ensure the government can do its job, we did ours," said Sarah MacLeod, ARSA's executive director. "A coalition worked to ensure the AC created an informational resource for the entire aviation maintenance industry; a blueprint for American workers to build a rewarding, valuable career. We invested the hours so the aviation

technical community can benefit for decades."

The trade associations had jointly requested an extension of the original Sep. 10 comment submission deadline. ARSA and ATEC used the time to construct a comprehensive document with references to appropriate regulations, career resources including trade organizations, labor and private industry group resources.

"Our submission tells a compelling story," said Ryan Goertzen, ATEC's president as well as president of Spartan College of Aeronautics and Technology. "Aviation maintenance is an innovative, dynamic, prestigious industry that provides employment and careers with potential for limitless growth. Mechanics, technicians, specialists and repairmen enjoy more than competitive pay and interesting work; they guarantee the safety of the flying public worldwide."

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about people

Witzig Appointed CEO of Swiss Aviation Training

Marcel Witzig (45), current head of Ground Services, has been appointed as the new CEO of the Swiss Aviation Training (SAT) subsidiary. He assumed his new duties in May. Witzig succeeded Manfred Brennwald, who stepped down after seven years at the SAT helm. "In Marcel Witzig we have appointed an experienced airline professional to succeed," says Roland Busch Swiss CFO and chairman of the Swiss Aviation Training Board of Directors. Marcel Witzig began his career as an air transport apprentice with the then Swissair back in 1986. He went on to hold various functions within the Swissair Group, particularly in ground services, including Head of Aircraft Handling Zurich. Witzig has been in charge of the Swiss Ground Services organization since their foundation in 2002. He played a vital part in the company's subsequent restructuring, and has also been instrumental in further developing the Ground Services unit, not least by establishing and refining a global quality management and outsourced supplier management system. Witzig holds a Diploma in Business Administration and a Master of Arts degree in Practising Management from the University of Lancaster in the UK.

Eaton Names Carol Saro Director of Customer Service Aftermarket

Power management company Eaton has named Carol Saro director of customer service for the Aerospace Group's Aftermarket Division, where she will lead efforts to provide >>>

Hand-over of Boeing 747 SOFIA Flying Telescope

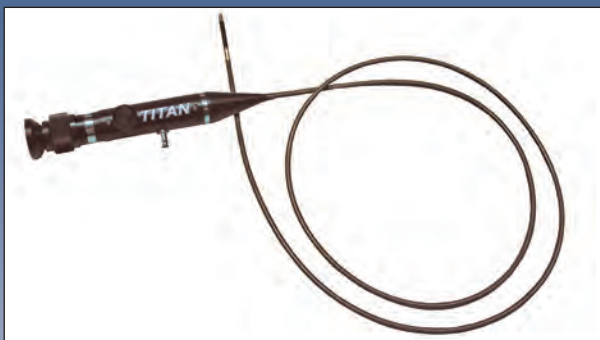


Lufthansa Technik is preparing to handover SOFIA, a modified Boeing 747SP that is operated jointly by the NASA and the German Aerospace Centre (DLR) as a "Stratospheric Observatory for Infrared Astronomy." During the past months Lufthansa Technik performed a major overhaul of the aircraft. There are only a handful of 747SP worldwide still in service and LHT is one of the most experienced at maintaining this aircraft type, according to the company. In parallel, Lufthansa Technik is currently also completing two head-of-state 747-8 aircraft and says it is in talks for completions with additional 747-8 customers.

The finalization of the two 747-8 completion projects bring Lufthansa Technik's completion record on this aircraft model to 19.

Lufthansa started the first interior completion of a Boeing 747, a 747SP model, on the request of a Middle East government customer, in the mid' 80s. Since then, Lufthansa has completed 17 head-of-state 747 aircraft including the models 747SP, 747-300 and 747-400 and has additionally performed a large number of major modifications or refurbishments on the "jumbo" family, the company says.

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Hartzell and Quest Sign KODIAK Sole-Source Propeller Agreement



Hartzell Propeller and Quest Aircraft have entered into a five-year agreement for the supply of Hartzell props for the Quest KODIAK turboprop aircraft.

Hartzell's 96-inch four-blade aluminum propeller has been standard equipment on every KODIAK produced. The new agreement formalizes a relationship established in 2003 when Hartzell was selected by Quest for the prototype short takeoff and landing aircraft powered by the P&W PT6 engine.

"The KODIAK can take off in under 1,000 feet at full gross weight and climb at over 1,300 feet per minute. The robust landing gear and 19-inch propeller clearance allow the KODIAK to easily handle unimproved airstrips," said Quest CEO Sam Hill. "Like the KODIAK, Hartzell's aluminum propellers are rugged, reliable and a good fit for our airplane."

"The Hartzell Propeller family is very pleased to continue our excellent relationship with Quest Aircraft, a leading manufacturer of one of the most versatile airplanes flying today," said Joe Brown, Hartzell Propeller president. "We work hard to prove the performance and reliability advantages of Hartzell props to aircraft manufacturers, like Quest, and it is satisfying when they acknowledge our contributions to their success with long-term commitments."

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Jet Aviation Creates Global Client Relations Position and Announces Two Leadership Team Appointments



Dempsey

Jet Aviation has appointed Gary Dempsey as senior vice president for the newly created segment of Customer Care Worldwide. Dave Paddock will succeed Dempsey as the head of U.S. Aircraft Services as senior vice president and general manager. Both appointments are effective January 2015.



Paddock

In his new position Paddock will be responsible for managing the company's U.S. aircraft management and charter, FBO and staffing lines of business. Paddock will continue to oversee Jet Aviation's Group Business Development & Strategic Planning organization, where he has served as senior vice president since joining the company in January 2007.

As senior vice president Customer Care Worldwide, Dempsey is responsible for providing strategic direction in bettering the customer

experience. Dempsey is tasked with identifying opportunities to introduce customers across the Jet Aviation network and measuring Jet's ongoing customer service initiatives and improvements. He will also serve as a liaison with government organizations and represent Jet Aviation with trade associations such as NBAA and NATA.

"Based on feedback received at various Customer Advisory Board meetings in the U.S. and EMEA and Asia in recent years, we saw a clear need to create this new global client relations position," says Rob Smith, Jet Aviation Group president. "Gary has been with Jet Aviation for more than ten years, understands our client base and has earned their respect. He was the obvious choice for this new position. I am also pleased that Dave will be taking on additional management and operational responsibilities. Dave is highly committed and customer-focused and I am confident he will successfully lead the company as we continue to grow the business in the Americas."



Recently, Lycoming Engines hosted Stu Horn, president of Aviat Aircraft Inc., who flew the company's Aviat Husky CNG to Williamsport, Penn. The innovative aircraft is powered by a Lycoming IO-360-A1D6, which has been modified to be the world's first dual-fuel compressed natural gas (CNG) aircraft, and can be powered by CNG or 100LL aviation gasoline with the flip of a switch. Members of the Lycoming engineering team gathered to examine the engine and its modifications during the visit. *Lycoming photos.*



Rockwell Collins Selected for U.S. Navy Hawkeye Integrated Training System upgrade

Rockwell Collins has been selected by the U.S. Navy to provide an upgrade to the E-2D Advanced Hawkeye Integrated Training System (HITS). The initial contract is valued at \$26 million with a potential total value of \$40 million.

The upgrade includes an operational flight trainer, provided by subcontractor ASI, modifications to the tactics trainer, a modification to the maintenance trainer, and spares.

"Our expertise and experience in developing tactics trainers has been a differentiator, resulting in our customer receiving quality and

value," said LeAnn Ridgeway, vice president and general manager of Simulation & Training Solutions for Rockwell Collins. "When customers have complex challenges, we are able to meet those training requirements with fully integrated systems."

Rockwell Collins was previously selected as the prime contractor for the major training systems on the E-2D Advanced Hawkeye, the Navy's replacement for the E-2C. These training systems include the Hawkeye Integrated Training System for Aircrew (HITS-A) and the Hawkeye Integrated Training System for Maintenance (HITS-M).

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about people

» best-in-class products and services for Eaton's aftermarket customers says the company. She reports to Lasse Ostergaard, vice president, Aftermarket Division, and is based in Jackson, Mich. "Carol's customer focus and industry expertise are key assets in driving growth for Eaton's aftermarket business," said Ostergaard. "Her leadership skills are instrumental in helping Eaton achieve the highest levels of customer satisfaction for our commercial and military aftermarket customers." Saro joined

Eaton in 2005 and most recently was director of customer service for the Fluid and Electrical Distribution Division. She also has served as customer service manager for the Conveyance Systems Division and customer service supervisor for the Aftermarket Division. Before joining Eaton, Saro worked for Northwest Airlines in roles of increasing responsibility, including customer service agent, customer service manager, general manager and director of customer service for ground operations. Saro holds a bachelor's degree in psychology from Kalamazoo College and did graduate work in international studies at UCLA.

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Airbus Helicopters Training Services Marks 50,000 Trainees in 50 Years



Airbus Helicopters Training Services (AHTS) has completed the instruction of its 50,000th trainee. This milestone was achieved during an EC225 rotorcraft T1 type rating course for mechanics, and the accomplishment was celebrated during a ceremony at Airbus Helicopters Training Services' facilities in Marignane, France, in the presence of Hervé Berriet, general manager of the Airbus Helicopters Training Center and Matthieu Louvot, Airbus Helicopters vice president Support & Services.

During the ceremony, Berriet recognized the teams from Era Helicopters and the Chinese State Grid General Aviation Company (SGGAC) who participated in the milestone training course.

"Our instructor and manager at AHTS cared a lot about us, and thanks to them we learned a lot of useful information about the EC225," said Zengbo Guo, mechanic at the Chinese State Grid General Aviation Company (SGGAC). "It was an honor and a surprise to be a part of this 50,000th trainee celebration."

"Safety is the number one factor in our work and this was a major focus in our course, where we were shown the proper way to use the manuals and implement procedures," explained Yann Nervesa, EC225 delegated inspector at ERA Helicopters. "We are very proud to be a part of this great milestone with Airbus Helicopters."

Airbus Helicopters Training Services provides high-quality instruction for pilots and maintenance technicians (mechanics & avionics). Its certified courses utilize the latest multimedia training means and technical documentation; while the team of 82 instructors continuously innovates to keep pace with the changing regulatory environment, evolving technologies and developing mission requirements worldwide.



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Staying Ahead of the Competition in a Growth Market

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

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

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

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

Single European Sky and NextGen continue to dominate the aerospace industry, with targets of ensuring the utilisation of technology to increase traffic, improve aircraft and control communications whilst enhancing safety in an ever increasingly busy sky.

Aviation Electronics Europe will discuss topics and issues of the day and demonstrate and showcase new products, developments, technologies and services available on the market, and also key elements of the upgrades and retrofits market.

We invite you to join us and the Avionics community in Munich, Germany from 25th-26th March 2015, for the largest gathering of avionics and aviation electronics professionals.

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Aviation Electronics Europe will discuss topics and issues of the day and demonstrate and showcase new products, developments, technologies and services available on the market, and also key elements of the upgrades and retrofits market.

Topics of Discussion include:

- Deploying SESAR
- Impact of Performance Based Navigation from Alternate Perspectives
- Standardisation & Certification
- Connectivity & eEnabling from Nose to Tail and Beyond
- Situational Awareness - latest and future challenges
- Open Architecture and COTS Technology
- Future Avionic Innovations and Advanced Concepts

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Who is Aviation Electronics Europe for?:

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

- Airlines and Operators
- End users
- Airframers
- Integrators
- Prime contractors
- Aviation electronics and avionics manufacturers, fixed wing and rotorcraft
- Design & Planning
- International Defence Agencies / Ministry of Defence
- Armed Forces

Why Attend?

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

1. Keep up-to-date with the latest issues, challenges and discussions in avionics and aviation electronics
2. Meet and network with colleagues, peers and experiences professionals from the avionics and aviation electronics industry
3. Discover the latest and future avionics technologies and solutions at the Free to Attend exhibition
4. Develop and forge relationships with potential suppliers/customers
5. Learn about the latest trends facing the avionics and aviation electronics

Munich & BavAIRia

Strategically Munich is an excellent location for Aviation Electronics Europe providing great opportunity for the event to continue to grow, in the heart of Europe, where there is a large cluster of related aerospace industry organisations.

Therefore rather than trying to get the market to come to us, we have taken the event to where the market is. Travel from within the cluster is easy and there are also many relevant companies within easy travelling distance of the event providing exhibitors or attendees the opportunity to arrange on site visits or appointments with many of these companies just before or after the event.



Background

Bavaria is one of two centres of the German aerospace industry, with 1/3 of German aerospace industry based there, whether in terms of employees, companies or turnover:

- 61,000 employees
- 550 separate companies
- €7 Billion - \$9.6 Billion annual turnover

Furthermore Bavaria is one of the few international aviation locations to boast a complete value – added chain:

- 4th tier subcontractors – specialising in production of particular components and specific processes
- 3rd tier subcontractors - produce machine components and sub assemblies
- 2nd tier subcontractors make various subassemblies and sections
- 1st tier subcontractors do major assembly/manufacture without assembling complete units
- OEM – design (develop) and assemble or manufacture complete units
- MRO – maintenance, repair and overhaul

bavAIRia - Local Industry Support

The Bavarian state government has commissioned bavAIRia with the cluster management of the aerospace cluster as well as the satellite navigation cluster. bavAIRia's goal as a cluster management organisation is to bring together the various stakeholders from industry, science and politics on a neutral ground in order to facilitate cooperation projects for strengthening global competitiveness of Bavaria's aerospace and satellite navigation. For this purpose, bavAIRia offers services regarding state funded research projects, and various activities with regard to human resources, marketing, supply chain integration and internationalisation.

Schedule of Events

Wednesday 25th March 2015

9:00am - 10:30am

- *Opening Keynote*

10:30am - 11:00am

- *Networking Coffee Break*

11:00am - 12:30pm

- *Avionics in SESAR*

12:30pm - 2:00pm

- *Delegate Lunch*

2:00pm - 3:30pm

- *PANEL DISCUSSION - Impact of Performance Based Navigation from Alternate Perspectives*

3:30pm - 4:00pm

- *Networking Coffee Break*

4:00pm - 5:30pm

- *Standardisation & Certification*

5:30pm - 7.30pm

- *Networking Reception on Exhibition Floor hosted by Ministry of Economic Affairs*

Thursday 26th March 2016

8:30am - 10:30am

- *Connectivity & eEnabling from Nose to Tail and Beyond*

10:30am - 11:00am

- *Networking Coffee Break*

11:00am - 12:30pm

- *Situational Awareness - latest and future challenges*

12:30pm - 2:00pm

- *Delegate Lunch*

2:00pm - 3:30pm

- *Open Architecture and COTS Technology*

3:30pm - 4:00pm

- *Networking Coffee Break*

4:00pm - 5:30pm

- *Future Avionic Innovations and Advanced Concepts*

Registration Hours

Tuesday 24th March 2015 - 2:00pm - 5:00pm

Wednesday 25th March 2015 - 8:00am - 7:00pm

Thursday 26th March 2016 - 8:00am - 5:00pm

Exhibition Opening Hours

Wednesday 25th March 2015 - 10:30am - 7:30pm

Thursday 26th March 2016 - 9:30am - 5:30pm

Outline Conference Programme

Wednesday 25th March 2015

9:00am - 10:30am - Opening Keynote

Chair: Mark Holmes, Editor, Avionics Magazine

- SES / EASA Regulation update - European Commission (TBC)

- Managing transition between SES and EASA - EASA (TBC)

- Airline (TBC)

11:00am - 12:30pm - Avionics in SESAR

Europe's Single Sky (SES) initiative has entered its third and final phase, which will see implementation of a series of projects in the years ahead. Avionics will be increasingly integrated to the future Air Traffic Management system in Europe and in the world.

This session explores the current and potential future for avionics in SESAR, the main operational challenges and the technical enablers for SES deployment and integration with ATM, from the commercial airline and business jet perspectives.

Chair: Marc Gatti, Thales Avionics

Avionics in SESAR

Marouan Chida, CNS and Avionics Expert, SESAR JU

Changes coming in the communication area?

Niko Fistas, Future Communications Team Leader, EUROCONTROL

4D Navigation

Lucille Revertegat, Airbus

Vanessa Rullier, Sr Manager, European Affairs, EBAA

2:00pm - 3:30pm - PANEL DISCUSSION - Impact of Performance Based Navigation from Alternate Perspectives

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

Moderator: John McHale, Editor, Military & Embedded Systems
- Airline (TBC)

- Frédéric Belloir, Airbus Engineering – Systems, Navigation Systems Manager, Airbus

- DLR (TBC)

- EUROCONTROL - Franca Pavlicevic (TBC)

- Vanessa Rullier, Sr Manager, European Affairs, EBAA

- Dorothee De Villele, FMS Engineering, Honeywell

4:00pm - 5:30pm - Standardisation & Certification

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

Chair: Peter Green, EUROCONTROL

EUROCAE - Secretary General

Data Distribution Service, and its Control in Safety Critical Systems

George Romanski, CEO, Verocel

Applying RTCA DO-254/EUROCAE ED-80 objectives for avionics computer systems referencing software considerations addressed through RTCA DO-178C/EUROCAE ED-12C activities

Ozgur Babur, Electronic Hardware Certification Group Manager, STM A.S.

Worst Case Execution Time for DO-178B/C Applications: How Does Randomization Help?

Andrew Coombes, Head of Marketing and Engineering Services, Rapita Systems

Thursday 26th March 2016

8:30am - 10:30am - Connectivity & eEnabling from Nose to Tail and Beyond

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

Chair: Mark Holmes, Editor, Avionics Magazine

e-enabling @ Lufthansa

Andreas Ritter, Director, Captain A340, Deutsche Lufthansa AG
George Ric, Systems Marketing Manager - OIS & EFB, Airbus SAS
TBC, Boeing

Safely Connecting PIES and AIS domains: Approaches and benefits of sharing aircraft networked resources

William Cecil, Director of Business Development, Teledyne Controls

eEnabling the Aircraft or the Pilot

Declan Boland, Senior Director, Rockwell Collins (ARINC)

11:00am - 12:30pm - Situational Awareness - latest and future challenges

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

Chair: TBC, EASA

ADSB in applications

TBC, Swiss International Airlines

Improving Situation Awareness for Helicopter Pilots with Accurate Air Data across the Complete Flight Envelope

Paul Hart, Chief Technology Officer, Curtiss Wright

Automatic emergency descent function

Florent Lanterna, Auto Flight System Project Leader, Airbus Operations

An integrated approach for Enhanced Flight Vision Operation

TBC, Honeywell

2:00pm - 3:30pm - Open Architecture and COTS Technology

Improvements in the performance and security of modern technology

has enabled the development of new systems and architecture, and applications within new COTS technologies. This session explores the latest approaches for open architecture and component based architecture, as well as the design challenges and compliance issues.
Chair: Lars Lindberg, President, AVTECH Sweden

SoftArcadia : Real Time Components Execution Platform for Embedded Software

Benoit Souyri, Software Architect – SOFTARC Product Design Authority, Thales Airborne Systems

Multicore MILS - Evolution of the Multiple Independent Levels of Security software architecture to enable multi-level secure multicore systems

Paul Parkinson, Principal Systems Architect, Wind River

System Integration and Certification Considerations for IMA Systems

Qin Zhu (Amy), Systems Certification & Airworthiness Engineer, Aviage Systems

Robust Embedded Computing for Advanced Integrated Architectures

Mirko Jakovljevic, Senior Marketing Manager, TTTech

4:00pm - 5:30pm - Future Avionic Innovations and Advanced Concepts

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

Chair: Alex Wilson, Director Business Development, Wind River

Integrating Cloud technology to FMS using Wireless

Prashanth T V, Honeywell

Title TBC

Matthew Jackson, Presagis & Brecht Baert, Barco Defense & Aerospace

IMA and What next?

Marc Gatti, Advanced R&T Director, Thales Avionics SAS

The future of Combined Vision Systems (HUD / Synthetic Vision / Enhanced Vision) and the potential effects on avionics & cockpit

Rockwell Collins

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





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

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

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

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

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Association of European Airlines support Aviation Electronics Europe

The Association of European Airlines (AEA) is supporting Aviation Electronics Europe 2015, and will be hosting their CNS Working Group meeting during the event.

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

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

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

Exhibition

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

- Discover new and latest technologies and solutions in Avionics and Aviation Electronics
- Network with the international avionics community in a great environment

List of Exhibitors at (19th December 2014):

- AES Aerospace
- ASM - Aerospace Embedded Solutions
- Amphenol
- Aim GmbH
- Aitech Systems Ltd
- Airberlin Technik
- ASM – Aircraft Systems & Manufacturing Inc.
- AVD Systems
- Aviation Maintenance Magazine
- Avionics Magazine
- bavAIRia
- CES Creative Electronic Systems
- Curtiss Wright
- DGLR Munich
- DMarkets
- Dspace
- Esterline CMC
- Great River Technology
- Green Hills Software
- Honeywell
- HR Smith - Techtest
- Matt Black Systems
- MBS Electronic
- Men Mikro
- MICCAVIONICS
- Presagis
- Rapita Systems
- Resource Group
- Rotor & Wing
- Royal Aeronautical Society (Munich)
- SD Aviation
- Sysgo
- TE Connectivity
- TechSAT GmbH
- Tecnobit
- TTTECH
COMPUTERTECHNIK AG
- VECTOR INFORMATIK GMBH
- Verocel GmbH
- Wind River

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

Discounts for Members of Supporting Associations

If you are a member of one of the following trade associations, supporters of the Aviation Electronics Europe, then you can benefit from a special discount rate:

- EUROCONTROL
- EUROCAE
- DGLR
- Royal Aeronautical Society (RAeS)
- Institution of Engineering & Technology (IET)
- Technical University of Munich (TUM)

To register visit www.ae-expo.eu and register online or download the Registration Form.


MINING HIDDEN ASSETS:



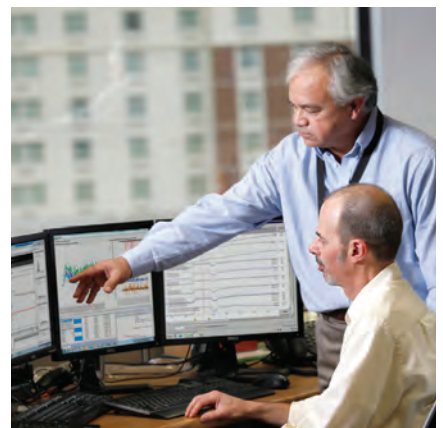
The onboard system for the G650, made by GE Aviation, collects as many as 10,000 data points once a second. In its first year and a half of service, G650 systems have produced about one terabyte of data. Gulfstream photo.

Making the Most of Big Data for MRO

By Charlotte Adams

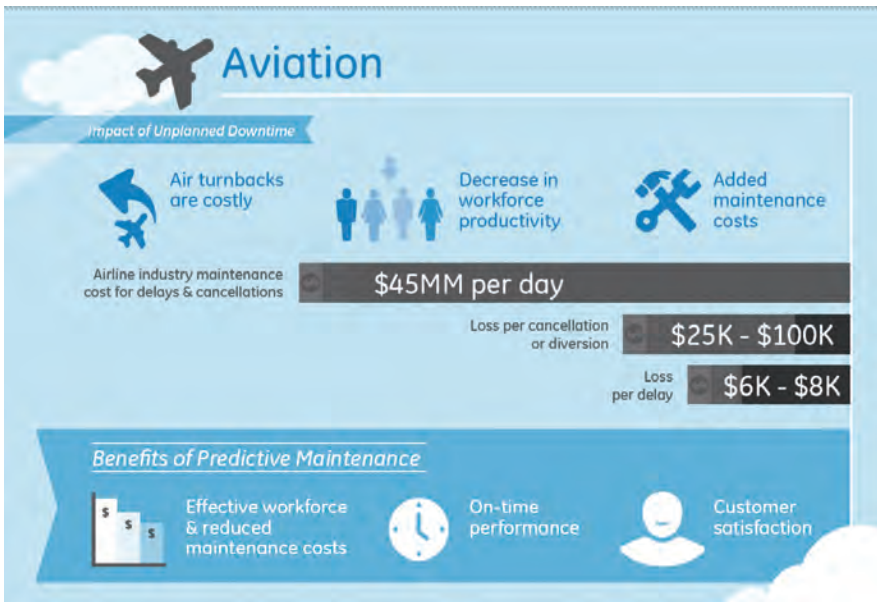


Airplanes generate large amounts of data as they fly, but only a small part of that data is used in the maintenance process. And the historical maintenance information for legacy aircraft, some of it decades old, is also voluminous, varied and difficult to preserve, organize and search. This huge and ever-growing mass of information, aka "big data," challenges the wherewithal of traditional computer systems. Yet these vast collections of information hold out tantalizing possibilities for those who can exploit them. Aviation, along with other industries, is trying to mine these lodes and extract more value from them, particularly in the area of predictive analytics.



Big data is data that is high in volume, velocity and variety, explains Svetlana Sicilar, research director with Gartner Group, the company which reportedly invented the phrase. Opinions differ as to whether it includes structured data that fits into the rows and columns of a relational database, as well as unstructured data like engineering drawings, simulation files and engine telemetry. And experts differ as to the level of maturity of current tools and whether they are essentially prognostic or diagnostic in nature.

GE Aviation, which processes data for commercial and business aviation customers, further describes big data as "extremely large data sets that can be analyzed computationally to reveal patterns, trends and associations, especially relating to machine behavior and interactions." Data analytics, by the same token, is "the process



of examining large data sets containing a variety of data types, including big data, to uncover hidden patterns, unknown correlations, machine behavior and other useful business information," according to the GE unit.

Among other characteristics frequently associated with big data and attempts to harness it are the use of the "industrial Internet" for the automated transfer of data from machines to computers using algorithms that preserve, sift, organize, search, analyze and visualize the data to provide insights and suggest solutions.

The challenges of big data range from dealing with floods of information in real time to making sense of streams of disparate data coming in at variable speeds. Service providers include many startups, such as Splunk, as well as giants such as General Electric (GE) and IBM, which have invested heavily in the field. Estimates of the market size for this growing area of computation vary widely, as it is difficult to measure. But IBM cites a forecast of \$187 billion by 2015 across industries worldwide.

Although it's become a popular phrase, big data has been around a long time, Sicilar says. Financial institutions, for example, have been trying to sniff out fraud as long as they have existed. Big data is also relative, she points out. What's valuable for one company might be worthless for another.

In the aviation industry engine manufacturers are known for their data intensity, but new technologies promise to help them exploit larger portions of these assets. The trend toward engine leasing also drives efforts to anticipate and control maintenance costs. Pratt & Whitney (P&W) has allied with IBM, which has invested some \$24 billion in big data and analytics. GE

also leverages both externally and internally developed technologies. Among the latter is the Predix platform for embedded analytics via the industrial Internet.

Peaxy, one of the many startups in the field of big data analytics, has gained the attention of the Gartner Group as a service provider with deep knowledge of industries rather than a purely entrepreneurial organization built around a new technology. Peaxy's launch customer is GE oil and gas, which is a large a step—horizontally or vertically—towards aviation.

For Peaxy big data is essentially unstructured data. Although some components of big data may be relative, there are "crown jewel" data sets that are common across manufacturers, says the company's CEO, Manuel Terranova. These data sets include geometry (such as engineering drawings), simulations (such as structural analyses), and telemetry, whether off the test bench or in the field, he says. The company's Hyperfiler product helps turn big data into a "readily findable asset," the company says.

Terranova perceives a certain urgency in the issue. He anticipates a transformation in board rooms across the country in the next year or so, as companies begin to realize that their data sets aren't just data—they are "very valuable IP [intellectual property] and need to be treated as assets." This "fundamental shift," which he says he's betting Peaxy on, applies to aviation as well as other industries. Companies soon "will stop viewing data as bits and bytes in some bucket somewhere" and start realizing that it is a very valuable IP asset, he says.

When you look at data as an asset, "everything changes," Terranova says. "I'm expecting senior vice presidents of

Reducing unplanned downtime is a key goal of GE Aviation's big data analytics. GE Aviation image.

engineering and general managers ... to say, predictive maintenance is an existential requirement for us."

Although there are examples of identifying outliers—one of the most intriguing capabilities of big data analytics—these may be the exceptions that prove the rule for current technology. Arguably, the level of art for the aviation industry, in terms of prognostics, is "more really good diagnostics," observes Mark Thomson, a product manager of onboard maintenance systems and aircraft health management systems with GE Aviation.

Industry Recognition

A number of aviation companies have recognized the advantage of wringing more value from their data. Engine manufacturers like Pratt & Whitney (P&W) have a history of scrutinizing their data in order to understand the intricacies of engine behavior over time and to support long-term maintenance plans.

P&W recently allied with IBM, a relationship which the engine maker hopes will allow it "to be more predictive" in engine services, as Jim Pennito, director of engine services for the company's commercial aftermarket business, puts it. The IBM solution is hosted in-house on P&W servers. "They are embedded in our organization," Pennito explains.

The two companies have been working together for about a year now and have launched several pilot projects, some of which already are bearing fruit. P&W has over 10,000 engines in service, generating a lot of data every day, Pennito says. He estimates that maintenance shop records represent some 20 to 30 percent of that information.

P&W, as an engineering organization, already looks at parameters, such as how long an engine stays on wing, to estimate the interval between shop visits. IBM, on the other hand, is bringing a different perspective, with more sophisticated models, relating to factors such as the length of flights, thrust ratings at which engines are run, and environmental factors. Pratt & Whitney does some of that today, but with IBM and its tools, the engine company can develop broader, more sophisticated models of environmental factors and predict how engines are going to perform in operations.

One important thing is to link the data produced to how the engines are flown, Pennito says. The company's Advanced Diagnostics and Engine Management

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Pratt & Whitney has a long history of scrutinizing data to understand engine behavior. But recently, the company partnered with IBM to bring a different perspective and more sophisticated models to help predict how engines are going to perform. P&W says the partnership is beginning to bear fruit. (Left to right): Daniel Roberson (Pratt & Whitney/MIT), Marcell Babai (IBM).

Pratt & Whitney photo.

(ADEM) system tracks how engines are flown—parameters such as altitudes, speeds, pressures and temperatures in huge volumes, he says. But that data is really underutilized, he says.

The challenge is how to link the piles of data generated on wing with what maintainers see in the shops, he says. According to the company's partner, IBM, an aircraft's engines produce up to half a terabyte of data per flight. (Others estimate engine data production to be more than an order of magnitude higher.) The approximately 4,000 engines covered by the Web-based ADEM system generate about 17 million data parameters per day, adds Lynn Fraga, analytics manager for P&W's aftermarket engine services organization.

One project with IBM has yielded some interesting correlations, Pennito says. Engine manufacturers traditionally have correlated hotter temperatures with engine wear. But air quality is also important, he notes. "We're trying to understand whether a certain city pair is more abusive to the engines than another city pair." It's early in the assessment, but investigators are seeing second- or third-order effects, so there is promise in the project. They are trying to see whether there are factors affecting engine behavior that

can't be explained simply by the temperature of the environment they flew under.

Pennito anticipates seeing the results of P&W's big data push in 2015 and beyond. He thinks that the initiative will help to customize maintenance to particular sets of operating conditions. The company uses the term, "intelligent work scope," to indicate that maintenance is not one size fits all. The new tools and methodologies developed for the existing fleet will apply to next-generation engines, as well, he says.

Timing is a critical aspect of predictive technology, says Erick Brethenoux, IBM's director of business analytics and decision management strategy. If something in the engine has been overheating, for example, you need to be able to trace the chain of events in time back to a single factor or a combination of factors.

IBM has worked in aviation maintenance for more than a decade, starting with Sikorsky on the Apache helicopter, a project that ended up saving the Army money on spare parts.

In the interim, however, manufacturers have been putting more sensors in their aircraft. "We can use data from repair and warranty documents," Brethenoux says. "But in order to be more proactive, we can take

data directly from the machinery."

Brethenoux relates an interesting case from his previous work with an insurance company that reveals the insights that analysis can yield. Their data revealed a subset of low-risk young male drivers with very, very expensive sports cars. It turned out that these policy holders owned collection sports cars that they drove very carefully and repaired themselves.

General Electric

GE Aviation has embraced the big data challenge as well. Its two-year-old joint venture with Accenture, known as Taleris, is focusing on predictive analytics for commercial aviation, as well as disruption recovery service, fortes of GE and Accenture, respectively.

Taleris' launch customer is Etihad, the airline of the United Arab Emirates, which went live with the JV's services in November 2013. Taleris looks at big data—including both structured and unstructured data—holistically. Its analytics can crunch live data but currently focuses on ground-based post-processing.

"Data latency is an issue, but we don't need real-time," says Jeff Peterson, Taleris marketing director. "For the big data

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piece we're not just looking at QAR [quick access recorder] and ACARS [aircraft communications addressing and reporting system data link] information," he says. Predictive analytics technology deals with what may happen in the future. It's concerned with what could happen days, weeks or months in advance.

It's like a doctor's predicting that a man will have a heart attack in the next three months with 90 percent certainty, based on data such as sleeping and eating patterns, weight and exercise, compared with other males in the same age range, Peterson says. Diagnostics, on the other hand, would be shorter-term, he explains, based on observations such as numbness in the left arm and shortness of breath.

Sometimes evidence of a problem may be indirect, he says. Rudder corrections of the aircraft's position in taxi might indicate a tire imbalance that is pulling the airplane to one side. But, bottom line, "you have to feed the big data beast," says Bill Mattingly, the JV's product solution leader. "To do good predictive analytics, you need a lot of data." Legacy aircraft are a prime target because they come with a lot of maintenance data. Newer aircraft may produce more data in real time, but they have less historical data and have generated fewer issues to date. "You need both [types of data] for analytics," he says.

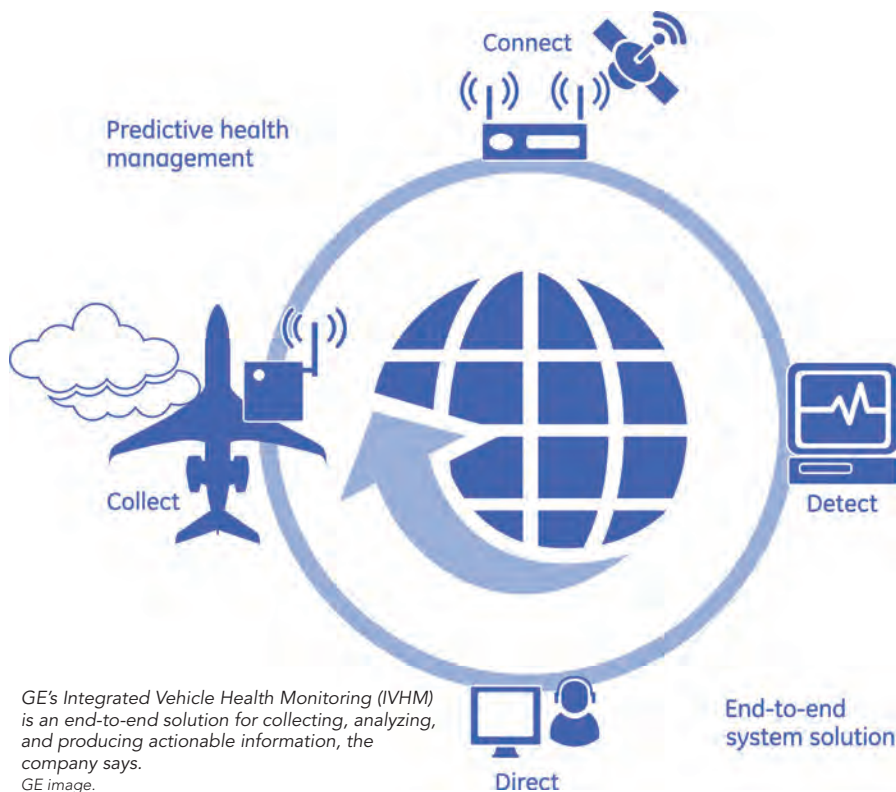
Taleris offers a cloud-based service, in which data can be transmitted from an aircraft via WiFi into the Internet and be securely accessed by Etihad, by Taleris in Dallas, or by Taleris engineers in the UK. The "intelligent operations" service makes use of technologies such as GE's Predix, which includes analytics and data visualization via a user interface. The total Taleris service package is known as the airline service network (ASN).

The system brings the data together in one place, time-synchs it so that it can be correlated, and then visualizes it, so that insights can be derived.

Right now Taleris' data analytics is focused on Etihad's fleet of A320s, A330s and A340s. Seven systems are covered so far, including air conditioning, flight controls, fuel, hydraulics, landing gear, pneumatics and the auxiliary power units (APUs), Mattingly explains. One example of success that Taleris cites is the detection of an anomaly in an APU weeks in advance, enabling maintenance planning.

GE and Gulfstream

GE Aviation also provides health and trend monitoring to Gulfstream for the G650. The onboard system collects up to 10,000



data parameters at least once a second and prioritizes what data should be send down to the ground. The system looks across the aircraft, including areas such as propulsion, avionics and hydraulics.

In its first year and a half of service G650 systems have produced about 1 terabyte of data, Thomson says. (Currently the G650 fleet comprises about 100 airplanes.) GE Aviation also has been chosen for the G500 and G600, which likewise produce on the order of 10,000 parameters.

One thing that distinguishes the Gulfstream system from other efforts in the industry is that it designed as one piece, both the air and the ground side, Thomson says. GE Aviation provides not only the airborne system but also the "back office" for Gulfstream. "We actually have a Ground Services Network [GSN] that catches the data"—via satellite or ACARs for high-priority events—or through cellular or WiFi communications. So the G650 system makes use of the "industrial Internet," with machine-to-machine communications.

Of the total parameters running on the bus in the G650, the analytics system collects about 10 percent, Thomson says. But if you discount the dual redundancies built into the avionics architecture, 30 to 40 percent is collected. But that percentage could change, as data collection is somewhat customer-configurable, he says.

One example of very timely diagnostics concerned an aircraft over the Pacific with an issue the pilots also could see, Thomson

recalls. The aircraft system was configured to send a subset of data to the ground that could be caught by the GSN, and "within minutes" the ground team saw that there was an issue, he says. Technicians requested more data from the aircraft and concluded the issue was a sensor fault. By the time that ground personnel got in communication with the pilots over satcom, the nature of the problem was understood. Based on the data, the pilots decided that it was safe to continue to fly.

While the flight proceeded, a maintenance team was dispatched to the destination point with a substitute part. The team switched the part and signed it off, so that by the time the passenger came back from the business meeting, the plane was ready to go, Thomson says.

This problem ended up being easy to handle because the onboard system extracted the right parameters and sent the information down to the ground, says Dashiell Kolbe, senior sales leader for integrated vehicle health management. Ground personnel were able to make a very informed, speedy decision in time, so that the process was transparent to the user.

The system is also good at finding intermittent faults like unseated connectors, Thomson says. The system can record aircraft data at up to 128 times a second (128-Hz), "so we can see something flicker from one state to another state." You see the whole flight, not just snapshots, Thomson says. GE Aviation is also using GE's Predix tool as a framework to put algorithms into. **AM**



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IN-HOUSE DOMS VS. THIRD PARTY TOTAL CARE PROVIDERS

By Dale Smith



Textron Aviation recently unveiled ProManagement. This program effectively makes Textron the aircraft management company. Textron Aviation photo.

It's no news to anyone reading this that the last 10 or so years have not been kind to business aviation. The reasons? Well, that depends on whom you ask. But, the bottom line is that even steadfast B&GA aircraft owner/operators have had to look for ways to cut costs and "streamline" their operations.

And while I don't have any facts to prove it, from talking to so many people in the industry I'd say one of the hardest hit groups have been the in-house directors of maintenance. (Funny or sad, it seems that when aircraft owners try to save money one of the first things they cut are the folks that are responsible for the safe operation of a valuable asset.)

Of course, even the most dollar-conscious owner/operators can't leave their aircraft with no maintenance support. Their decision to cut DOM overhead is often directly related to the availability of a variety of "contracted" maintenance providers. "Why pay someone on staff to do something I can get a contractor to do for less...?"

And, the fact is, whether it's from the aircraft OEM or a third-party provider, you can get high-quality maintenance support for "less" than it costs to have a full-time DOM on your payroll. Or, at least, that's what you think you're going to get.

I'm not saying that these maintenance alternatives don't have their upside. For many operators they can be the ideal solution. You just have to do your homework and be clear as to what these provider contracts do and don't provide.

"It really all depends on the flight department itself," explained George Kleros, senior VP, Strategic Event Management and Fleet Support, Jet Support Services, Inc., (JSSI). "If you're talking about an owner/operator/entrepreneur—a really hands-on kind of person who basically carries the whole flight department around in their briefcase, then there are fantastic options for these types of owners."

"If they take their aircraft to a factory service center or a large MRO then someone in their QC department is going to go through the aircraft's records to see what's missing or not up to date," he said. "They will construct a list of items like Service Bulletins, ADs, updates that need to be covered. But that level of detail only happens when the airplane is in a larger shop."

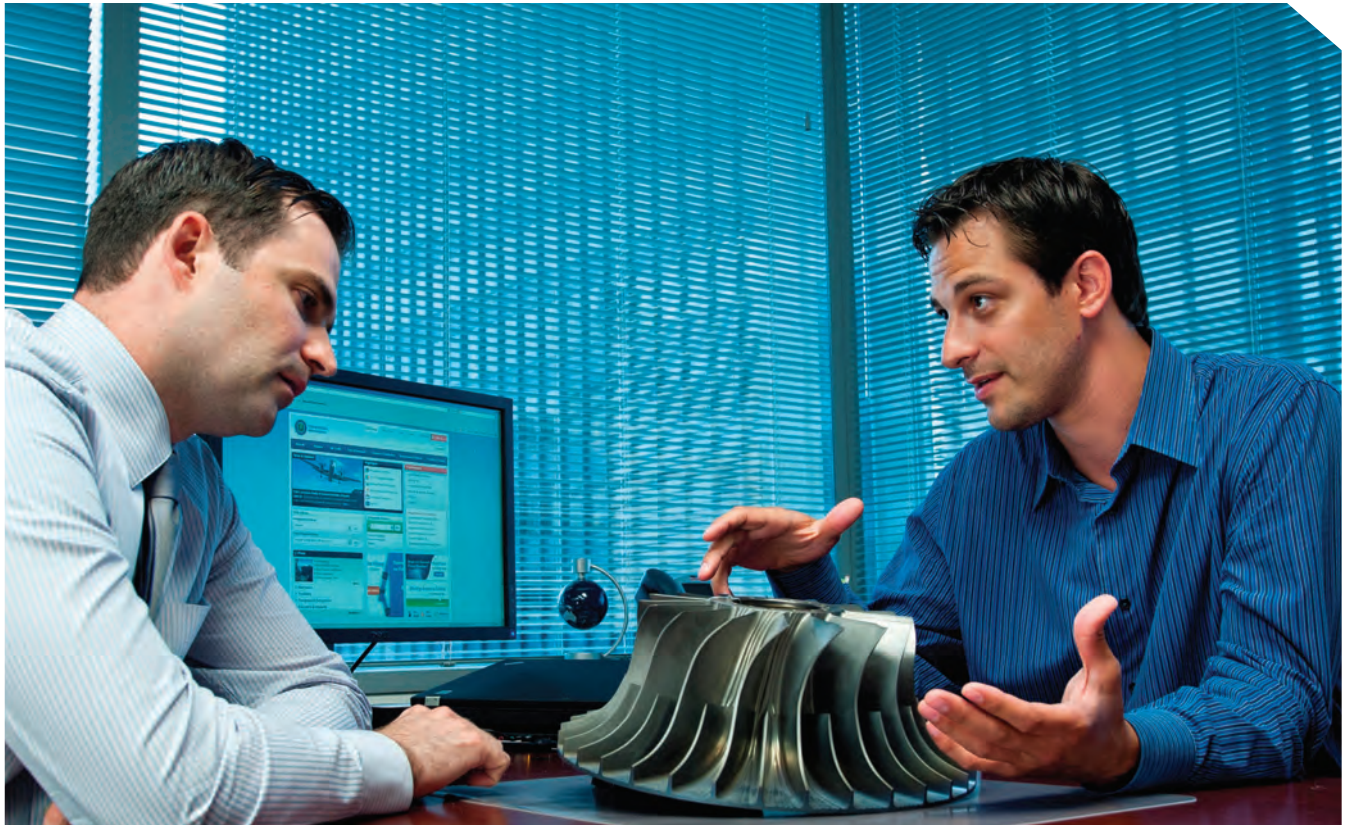
"What happens between those times? What happens if there is an emergency AD note that is a Do Not Fly or Before Further Flight You Must...?" Kleros said. "The typical owner/operator may not see that, which could lead to a violation or something worse."

"The basic issue is you just don't have the level of aircraft care or aircraft history knowledge with these types of contracted programs," stated independent aviation safety consultant, John Goglia. "You are often just an account number. They don't have the time or manpower to get to know what is happening with that aircraft every day."



Jet Support Services Inc. (JSSI) says its programs can stabilize aircraft maintenance costs and increase residual value. Their Tip-To-Tail program is a single source solution for the entire aircraft and covers nearly every assembly and system on an aircraft. The company is celebrating 25 years in business.

JSSI photo.



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JSSI says their staff technical advisors have, on average, 20 years of industry experience and that it is the only provider that offers coverage for most makes and models of business aircraft, engines and APUs.
JSSI photo.

"When the airplane actually goes in for work, tough questions come up and their representatives don't have all the maintenance information available," he said. "So the decisions they make are not always the decisions the operator would have made."

Too true. When was the last time you took your car to the dealer for service and left all the decisions up to them? Probably never. But to be fair, I really can't see any reputable aircraft maintainer making repair decisions without first consulting with the owner. Now, whether or not the owner would know what in the world the MRO representative is talking about is a whole different set of challenges.

Airplane Spoken Here

The fact is communication is one of the biggest hurdles these contracted types of maintenance providers have with so many smaller, individual owner/operators. (Honestly, it's a problem every maintainer has with an aircraft owner, but that's another story.)

"I've seen both sides of it. Owners who have transitioned from a Baron to a King Air and now to a light jet. Some of them don't even know they need to count the landing cycles," Kleros said. "It's not even that money is an issue, they just have no idea what they need to be doing to properly take care of the airplane's operation and not end up flying it illegally."

As the maintenance manager for a popular MRO put it, "You can see it when you start talking to these small owner/operators – the do it all yourself type of guys. You start talking about the details of a repair and their eyes just glaze over," he said. "It's an even bigger problem when you try and get their input to help with troubleshooting. Honestly, it's often better if you don't ask them anything at all."

With a number of first-time owner/operators entering the fold, Textron Aviation recently unveiled ProManagement, the latest part of its popular ProAdvantage portfolio of contracted service offerings.

"As the aircraft OEM, we frequently run into a prospective buyer who has never owned or operated an airplane before. They can easily afford to buy and fly it, but they may not be aware of the details beyond that," explained Brian Howell, V.P. Parts, Programs and Business Development, Textron Aviation. "They need help and guidance with putting it all together."

"With ProManagement, we are effectively their aircraft management company, the maintenance company and the power-by-the-hour company," he added. "We can help with everything involved. It's really a turn-key solution for an owner who doesn't know what they don't know or who does but may not want to be bothered with the details."

Enter the DOM

While programs offered by JSSI or Textron Aviation certainly provide a lot of options for all shapes and sizes of aircraft owner/operators, representatives from both organizations stressed that their programs are not meant to replace an experienced DOM.

"When you have a DOM you have buffer on your side," Kleros said. "Someone who is absorbing all of the details and really looking out for the aircraft on a daily basis. Aircraft owners are busy people and they don't always have time to listen and understand what you have to say pertaining to the airplane's upkeep. They just don't have time for all those details."

"In fact, at JSSI we are really different than many providers," he said. "We won't let anyone come on our airframe program unless they have a DOM or someone with authority assigned to aircraft maintenance. The reason is we are not going to make airworthiness decisions for the owner."

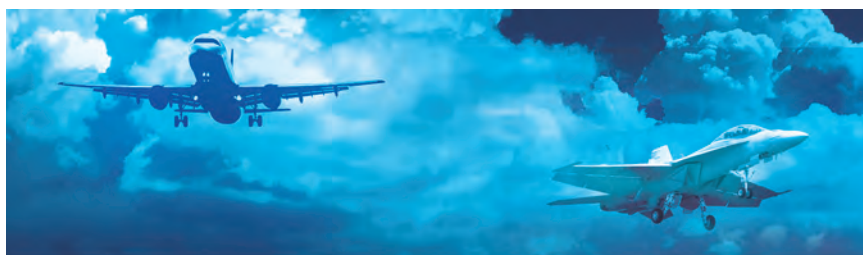
"Another advantage I tell my customers about is if you hire your own DOM, you can send him to school to get trained on your particular airplane," Goglia said. "You get the high-level of day-to-day care your airplane will need and the added advantage of having a knowledgeable representative at the MRO when the aircraft goes in for inspections or maintenance."

"Our programs are not designed to do away with DOMs—they are intended to complement those in-house capabilities," Howell said. "When you have someone who can accurately describe a squawk and help us understand what the aircraft is going through, it makes our maintenance efforts a lot easier."

Textron Aviation can offer services like a fleet of mobile service trucks like the one shown here. Textron Aviation photo.

Howell also said that from Textron Aviation's perspective the DOM is a critical part of making any of their programs work for the end-user.

"The DOM is the one who is logging and turning in all the hours for the airframe and engine coverage programs and he's helping us keep track of all the consumables and parts used," he said. "I



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Textron Aviation has seen many first-time aircraft owners that need help and guidance in regards to the maintainence of their new aircraft. Their new ProManagement program offers a solution. *Textron Aviation photo.*

think when you have programs like ours where we take all the downside risk and share the upside benefits with the owner, the operator looks to his DOM to be the gatekeeper to ensure that the program is tracking to their advantage."

Of course, the DOM can equally benefit from these arrangements. Say, for example, your go-to maintenance shop is booked solid and you need an unscheduled repair to make a critical flight.

"That's one of JSSI's primary services," Kleros said. "It's hard to find a one-stop shop that can do avionics, interiors, paint, mechanical inspections and repairs. We provide our customers with options and help identify alternative shops that can meet their needs and time-frame."

"The final decision always rests with the DOM. They are the ones watching over the aircraft's airworthiness," he said. "They are the ones ultimately in the lead. We can assist them, but we do not make any final selections."

"If it's a small job, we can also help them find qualified technicians in their area that can come to their hangar to do the work," Kleros stated. "As long as they are FAA approved or OEM approved and have the

capabilities, equipment and insurance, it doesn't matter to us."

And, yet, while there are a stack of really good reasons why every operator needs a DOM, many will still just look at the bottom line—cost.

"Many times these operators are still reluctant to add staff," Goglia said. "They have already hired two or three pilots and don't want to add a DOM to the list. There is a very good option—hire a freelance DOM."

"They provide the individual service and support the aircraft needs, but they do it for two or three airplanes at a time," he said. "You get the high-level of care/custody and control of the airplane when it's in maintenance that you just cannot get with a typical contract service provider and you get it at a lower cost."

Connecting with a Contract Maintenance Provider

Okay, so you've decided that a contract maintenance or management provider is the best solution for your operation. What's the best way to find one that's the right fit for you?

"First thing is you want a provider that

is independent from a particular shop or maintenance facility," Kleros explained. "You want someone with expertise with your aircraft type. You also want to know if the provider has dedicated advisors for each customer so you are talking to the same person all the time."

"You're not just buying a dollars-per-hour program, you are looking for support," he said. "You want to know who you can call at three o'clock in the morning when your plane just landed and the anti-skid failed and flat spotted two tires?"

Kleros said that the bottom line is to look at finding a contract provider the same way you'd look if you were hiring someone for a full-time job. You want to be able to hand things off and not have to worry about seeing it through.

"Remember, no matter who does what, the bottom line is the aircraft owner is ultimately responsible for the airworthiness of the aircraft," he said. "Just because you've contracted with a total package provider does not relieve you of those responsibilities. If you miss something and the provider missed it too, you are going to be the one that gets in trouble not them." **AVM**



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How the Giants of MRO Can Repel the OEM Invasion

By James Careless

OEMs are aggressively invading MRO markets, by leveraging the emergence of new aircraft as an opportunity to force airlines to use OEM MRO services—at OEM high prices. But it is possible for airlines and non-OEM MROS to hold back the invaders, by banding together in joint partnerships.

This is the core message contained in the “2014 MRO Survey” compiled by management consultancy Oliver Wyman. Entitled “Signs of New Life” and based on interviews with

airlines, MROs, OEMs and financing/leasing firms—and available for free online at www.oliverwyman.com the 2014 MRO survey provides tangible suggestions for airlines and non-OEM MROs to keep the profit-minded OEMs from taking over the global industry.

Putting the Stakes In Context

According to the aviation consulting firm ICF International (formerly ICF SH&E), in 2013 the world’s MROs supported 123,000 civilian and military aircraft flying about 97 million hours annually, with business and commercial aviation making up 26 percent and 22 percent of the aircraft flown.

Now for the money. In 2013, the global MRO market earned \$131 billion, with about 46 percent (\$60.7 billion) being earned by air transport MROs. North America remained the number one MRO market in 2013 (31 percent of the world demand, in terms of revenue).

Asia/Pacific edged out Europe for the first time (27 percent and 26 percent respectively), followed by the Middle East (7 percent), South America (5 percent), and Africa (4 percent).

Looking ahead, ICF International predicts that air transport MRO spending will grow 3.9 percent annually to 2023, when it will hit \$89 billion. As this is happening, older aircraft such as the A330, B747-B, B767, and B777 will be phased out in favor of new, fuel-efficient models like the A350WXB, B777X and B787.

For airlines and non-OEM MROs, this trend is of fundamental concern, because OEMs Airbus and Boeing are doing everything they can to sew up the after-sales MRO on these aircraft for themselves. Their chances of success will improve once the world’s carriers are reliant on just a trio of their planes.

Even without that edge, the OEMs are already succeeding. In 2014 “Original equipment manufacturers won the market for high-value, aftermarket aviation services, leaving independent maintenance, repair, and overhaul providers scouting for paths to evolve

and grow,” declared the Oliver Wyman 2014 MRO Survey. This is no mere guess: “In our annual survey of airlines, MROs, and OEMs, we confirmed the disparity in engine and component maintenance for new, modern fleets.”

To say the least, the OEMs’ successful push into MRO work is a seismic shift from how they used to view the after-sales market. “For years, the OEMs seemed to regard MRO work as being beneath them,” said Wayne Plucker, Frost & Sullivan’s Industry Manager for Aerospace & Defense.

Now that the global air transport MRO market is worth more than \$60 billion annually and growing, their attitude has changed. With all this revenue available, “Airbus, Boeing and Bombardier can see the very real advantages of providing such after-market support,” Plucker said, “not just for the money it brings, but the chance it offers to keep customers buying their aircraft when fleet renewal time comes.”

The MRO Squeeze Play

The only way the OEMs can truly dominate the MRO market is by keeping non-OEM MROs from being able to work within the



MTU image.

market. Given the number of commercial aircraft currently licensed for non-OEM servicing, this is difficult to achieve.

The way to achieve this goal in future is for the OEMs to not license non-OEM MROs to do work on the A350WSX, B777X, and B787, plus newer versions of their older aircraft lines. Based on its

survey results, Oliver Wyman suggests that this process is already well underway.

According to the 2014 MRO Survey, "56 percent of MRO respondents said they signed license agreements with OEMs during the last three years, down from 82 percent last year." The Oliver Wyman survey report added, "This decline might suggest

OEMs are now finalizing development of their licensed repair networks, and MROs need to look beyond these arrangements for new sources of revenue."

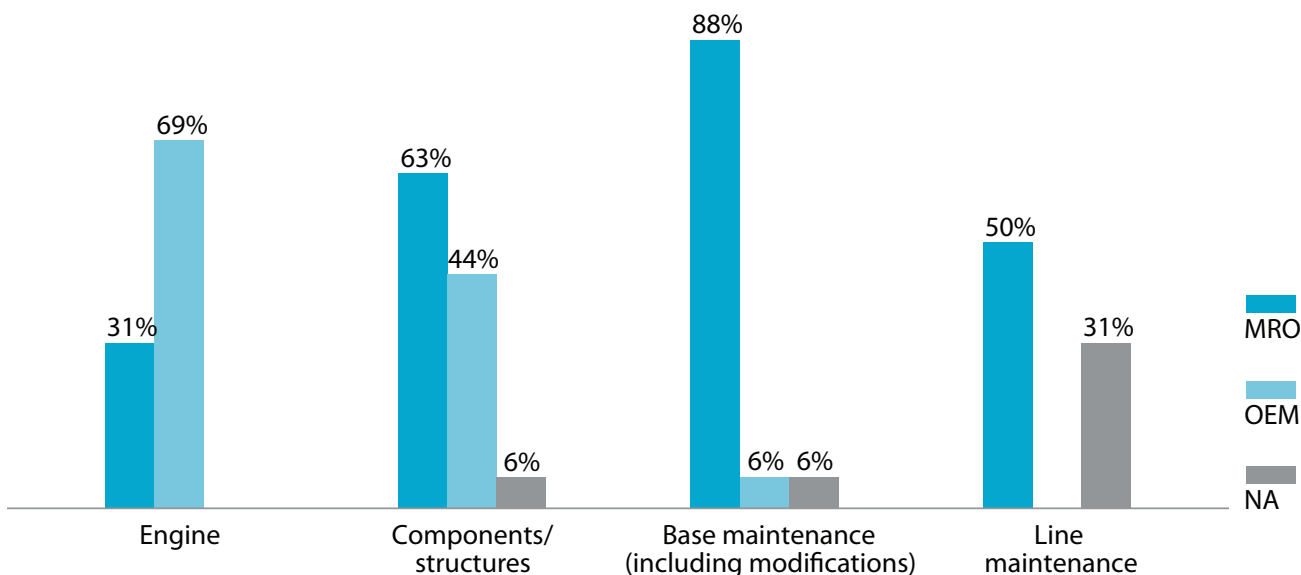
How bad is it? Bad enough that "MROs have all but ceded this territory to manufacturers, and independent maintenance providers are now redefining

EXHIBIT 1: DESTINATION OF FUTURE MAINTENANCE

Who do you expect to predominantly hire for new aircraft maintenance in the future?

Percent of airline responses for types of vendor, by platform (multiple selections possible per category)

POSITIVE RESPONSES



Source: Oliver Wyman 2014 MRO Survey

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AFIKLM E&M, Turkish Technic and Lufthansa Technik images, respectively.

their search for growth within this new paradigm,” the 2014 MRO Survey said. “Many, for example, appear to have either completed or abandoned pursuits of OEM licenses during the past year. They are turning to new forms of collaboration with OEMs and lessors, while considering mergers and acquisitions

to consolidate high-value capabilities, increase efficiency, and broaden reach.”

In a nutshell, what seems to be happening to the global MRO market is analogous to what happened to the computer operating system (O/S) in the early 1990s, when Microsoft grew into a behemoth that crushed its competitors into the dust. By relying on a limited

choice not just of aircraft OEMs, but specific aircraft models, the airlines have made it easy for the OEMs to get into the MRO market and start dictating terms.

How the Airlines and Non-OEM MROs Can Fight Back – and Have

Despite the earlier described trend, the airlines are not keen on the OEMs getting the upper hand in MRO work. In fact, the carriers “won’t let the OEMs take a dominant position in the market,” said Sebastien Weber, AFI KLM E&M’s vice president for marketing, product support and development. The reason? Doing so “would result in higher maintenance costs for airlines,” he said.

Indeed. No matter what the industry, OEMs tend to charge more for parts and services than their independent and in-house competitors; both because the non-OEMs need to provide customers with a financial incentive to go elsewhere, and also because the OEMs typically are trying to leverage their initial development costs into rich, long-running revenue streams. This is the same reason why generic pharmaceuticals cost less than brand-name drugs, even though both deliver the same results.

Unfortunately, it appears that aircraft OEMs have the upper hand nonetheless. This is because the range of commercial aircraft choices has been whittled down to a handful of companies such as Airbus,

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Boeing, Bombardier and Embraer—with Airbus and Boeing being the only real options for the largest airliners. At the same time, the number of OEM choices for new fuel-efficient aircraft has also been reduced, with the A350WSX, B777X and B787 poised to take the lion's share of the market if ICF International's projections to 2023 are correct.

Can airlines and MROs fight the rising tide of OEM domination? The 2014 MRO Survey

offers a resounding "Yes!" Here's how they can do it.

"In last year's survey we suggested MROs partner more actively with aircraft lessors to develop joint aircraft-plus-service value propositions for airline customers at the point of aircraft selection," the Wyman Survey explained. In other words, when airlines are negotiating with OEMs to buy new aircraft, they should insist that their

partner non-OEM MROs be included in the deal. If the OEM wants to sell Airline X 100 planes, then they have to accept that Airline X's MRO of choice will be servicing them—and their MRO partner must be given access to the necessary licensing and OEM parts/support to make this happen.

The 2014 MRO Survey describes this tactic as "a critical juncture in the maintenance selection process." But it is actually the point at which airlines can free themselves from the OEMs' MRO grip, by making the use of their preferred non-OEM MRO a condition of buying the aircraft, or taking their multi-millions of dollars elsewhere.

The precedent exists for airlines to bring the OEMs to heel in this manner, according to the 2014 MRO Survey. This is because "airlines now exploit new equipment selection as their primary source of leverage (i.e., pitting manufacturer against manufacturer)," the 2014 MRO Survey explained. "By partnering with lessors, MROs offering comprehensive labor, technical, program and logistics services may be better able to penetrate these transactions and gain a foothold in the massive market for new aircraft maintenance, rather than ceding further ground to OEMs."

Can this tactic work? It already did when Air-France-KLM ordered 25 A350-900s (with 25 more on option) from Airbus. As part of the contact, Air France-KLM insisted on the right to work the A350's Rolls-Royce Trent engines in their own facilities, as well as through Rolls-Royce. After a long, drawn-out negotiation, Air France-KLM won. Airbus and Rolls-Royce backed down rather than lose the sale.

In June 2013 Air France-KLM signed a Memorandum of Understanding with Rolls-Royce on equipping its A350 with Trent XWB engines, including a section on their maintenance by Air France Industries KLM Engineering & Maintenance according to an Air France-KLM news release that announced that deal. "The Group's aircraft maintenance division intends to be on the market for the maintenance of these engines."

The moral here is clear. It is possible for non-OEM MROs to retain a foothold in their traditional marketplace, through an active partnership with the airlines they serve. Together, both can force the aircraft OEMs to play fair when it comes to providing access to next generation aircraft information licensing and technology. Air France-KLM's success in doing so with Airbus proves this point. **AM**



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

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

The merger of the two MROs has significantly widened the capabilities and extended the scope of each business, ensuring airworthiness, increasing the efficiency and substantially

reducing aircraft downtime for more carriers in more locations.

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

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With customers at the heart of everything they do, every day Iberia Maintenance & Engineering and British Airways Engineering oversee:

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- Three paint lines
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Choosing the right MRO partner has a positive impact on the residual values of carriers' aircraft and significantly lowers risk. The flexibility of this joint proposition means customers can opt for world class management, or can choose from a menu of services from line maintenance to global AOG support.

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Monarch Aircraft Engineering

Established in 1967, Monarch Aircraft Engineering (MAEL) is one of Europe's leading award-winning independent MRO's. MAEL provides important aircraft maintenance services from its principal bases at Birmingham, London Luton and Manchester airports to the Monarch Airlines fleet, and continues to attract new blue-chip third-party customers globally. MAEL operates globally, supporting clients located in east and west Europe, Middle East, Australia and North America. The Company has superior knowledge in maintaining legacy fleets and is also a leading Maintenance, Repair and Overhaul (MRO) organisation for new technology aircraft, including the Boeing 787 Dreamliner, for which it is one of a small group of worldwide Boeing-approved GoldCare providers. Monarch Aircraft Engineering was named MRO of the year in 2013 by the industry at the Aviation 100 Awards and is one of the leading MROs for blue-chip customers in the EMEA region.

In December 2013, MAEL was also awarded first place in the category 'Through Life Engineering' at The Manufacturer of the Year Awards 2013.

Its UK-based training centre, Monarch Aircraft Engineering Training Academy (MAETA) has extensive capability to deliver full EASA and GCAA Part-147 B1 and B2 approved type training for a variety of aircraft including the Boeing 787 Dreamliner.

Heavy Maintenance

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

Line Maintenance

MAEL has an incredibly strong reputation as being one of the leading line maintenance providers in the UK and overseas. With permanent year round stations at London Gatwick, London Luton, Birmingham, Manchester, Leeds Bradford, Glasgow, Dublin, Malaga, Tenerife, Kiev and Warsaw where technical handling is carried out on Boeing 737, 757, 767, 777, 787 Dreamliner, Airbus A300-600, A300B4, A310, A320 family, A330, Embraer 170, 175, 190, 195 and Bombardier Q400 aircraft.

AOG Support and Assistance

MAEL is acutely aware of the significant damage to airline operations and revenue when AOG events are not responded to immediately. In order to ensure necessary action is taken in an AOG situation, they are able to provide SMART (Specialised Monarch AOG Response Team) on a detachment basis to assist with the rescue of grounded aircraft or supply materials and components on a sale, loan or exchange basis. Available 24 hours a day, seven days a week, this service is managed through Monarch's Integrated Operations Centre (IOC).

Component Services

Monarch Aircraft Engineering understands that component reliability and time on wing is critical to keeping your aircraft in the air. So when there is a technical issue with an aircraft you need to speak to the right people to either repair or replace the defective part. We offer our customers a one-stop shop solution to this problem, our Spares Trading team can supply you with the part from our extensive range of consumable and rotatable aircraft parts in stock, while our Component Maintenance Centre can repair the unit in one of our state-of-the-art facilities.

Engineering and Technical Support

MAEL has an industry leading Continuing Airworthiness Management Organisation (CAMO) team which is well set up to provide all aspects

of full engineering management services including maintenance control, defect analysis, planning, reliability programmes, maintenance programme development and records management. With the added advantage of EASA and GCAA Part-21 Subpart J Design Organisation approval to produce modifications on numerous aircraft and specialised experience in producing cost effective In-Flight Entertainment solutions, MAEL can offer a comprehensive suite of services.

Monarch Aircraft Engineering Training Academy (MAETA)

EASA and GCAA Part 147 Approved aircraft type training is delivered by the Monarch Aircraft Engineering Training Academy. MAETA has gained a worldwide reputation for its continuing high standards and provides full B1 and B2 training on the following types; Airbus A320 family, A330, A300, Boeing 737, 757, 767, 787 Dreamliner. MAETA also provides EASA Part 66 category "A" basic training. Our highly skilled and professional instructors are approved under EASA Part 147, the UK Civil Aviation Authority and the United Arab Emirates General Civil Aviation Authority. We are able to complete the training at our Training Academy based at London Luton Airport or in our classrooms at Manchester. If preferred, training courses can be offered at client's facilities worldwide. MAETA can also provide tailored technical and safety management systems (SMS) consulting services to airlines, MROs and supply chain organisations. These services can be offered on a short, medium or long-term basis and can be tailored to specific client requirements.



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MTU Maintenance, a business division of MTU Aero Engines, is one of the world's leading providers of commercial engine maintenance services. By offering custom-ized and alternative solutions over the engine life cycle, airlines benefit from reduced MRO costs while at the same time maximizing their asset value. MTU's engine port-folio covers more than 20 types which cover all thrust classes from small turboprop engines to the largest jet engine ever developed, the General Electric GE90-110B/-115B. Besides OEM repairs, MTU Maintenance has developed a broad range of in-novative high-tech proprietary EASA/FAA-certified repairs, which are branded as MTUPlus repairs. But MTU Maintenance is more than a repair shop: A compelling choice of individually tailored services, ensure cost-effective and efficient solutions for its customers. These include integrated engine leasing options, MTUPlus Engine Trend Monitoring, LRU management, 24h AOG service, on-site support and on-wing repairs up to Total Engine Care (TEC®) packages for all engine types in its portfolio. MTU Maintenance operates a global network of facilities and representatives offices across all continents.

MRO Portfolio at a glance

- Turboprops: PT6A
- Helicopters: PW200
- Business jets: PW300, PW500, CF34-1/-3
- Regional jets: CF34-3/-8/-10E
- Narrow-bodies: V2500 series, CFM56-3/-5B/-7, PW2000*, PW6000, CF6-50/-80C2
- Wide-bodies: CF6-50*/-80C2, GE90-110B/-115B, GP7200
- IGTs: LM2500, LM2500+, LM5000, LM6000

* Including military applications (KC10, C-17)

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airberlin technik GmbH

After merging the three airline maintenance facilities of air berlin, LTU and DBA, air berlin technik was established as the MRO partner within the airberlin group on 1st April, 2011.

The EASA Part 145 organisation with approximately 1.400 employees is today providing maintenance to all aircraft operation within the airberlin group and is continuously extending also services to customers worldwide.

A prosperous cooperation between airberlin and Etihad became the basis for a successful service concept that combines knowledge and experience of teams within the maintenance area that are profoundly trained and had achieved experience with a mixed fleet of aircraft and a variety of engine types through years of operation.

The wide range of maintenance services, such as Total Customer Care, engineering management, component repair, Line and Base



Maintenance can nowadays be tailored to customers with all their special and individual needs in order to keep their aircraft where they belong to: in the air!

In the heart of Europe maintenance facilities in Dusseldorf, Munich, Berlin-Tegel, Berlin-Brandenburg, Nuremberg and Vienna allow flexible planning for maintenance events.

Customers can also benefit from a wide range of engineering services including development of customer's specific maintenance programs and, as being an EASA Part 21 approved design organization, i.e. seat layout changes and cabin modifications can be performed.

As a matter of course, high demands on safety and reliability standards always make sure that customers meet best conditions to get their aircraft dispatched on-time.

Line Maintenance teams ensure service on a 24/7 basis at all airberlin stations. Experienced and well trained teams offer the necessary skills of all what an aircraft needs in Heavy Maintenance including Checks of all levels.

Highly motivated teams are available for a wide range of

- NDT services including implementation of Service Bulletins Full engine video borescope including post bird strike borescopes, APU borescopes and blending
- Sheet Metal teams offer services around most major structural repairs

As a special service, airberlin is extending the range of these services by establishing special teams for Field Services. So also customers who need NDT or borescope service at their own facility or any airport worldwide can be offered special Field Teams and at best conditions to have their aircraft back in service soonest.

Years of experience, special tools and storage facility set the stage for Engine Housekeeping as well - QEC Build ups, blending, routine maintenance, borescope service, inspections and re-assembling of QEC-Kits completed including all relevant logistic services.

As of 2012 the airberlin academy is continuously expanding in the field of technical as well as management trainings. These services are not only provided to their employees but also to airlines, MRO companies and private clients. The training facilities are located in Berlin, Dusseldorf and Munich and can accommodate up to 100 students at the same time. Practical and theoretical technical courses are provided for all of airberlin technik's approved aircraft types. As a partner of Etihad the academy holds also the GCAA Part 147 approval. Due to a flexible team of trainers courses also can be held on-site at customer's preferred location.

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- **BOEING** (B727, B737 CL/NG, BBJ, B767, B777, MD11)
- **EMBRAER FLEETS** (EMB 120, ERJ 135/145, Legacy, E-JET 170/175/190/195)

CARE² ENGINES

Engine overhaul for models:

- **CFMI** (CFM56-3/-5A/-5B/-5C/-7B)
- **PRATT & WHITNEY CANADA** (PW100 Family and PT6)
- **GENERAL ELECTRIC** (CF6-80C2/A/B)

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- **AIRBUS** (A318, A319, A320)
- **ATR** (ATR42/72)
- **BOEING** (B727, B737 CL/NG, BBJ, B747-200/300, B767-200/300, DC10, MD11)
- **EMBRAER FLEETS** (EMB 120, ERJ 135/145, Legacy, E-JET 170/175/190/195)

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As a global player, TAP M&E operates one main centre in Portugal and two in Brazil, with a workforce of about 4.000 technicians and engineering staff.



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Aerospace Export Basics for the New Year

We are always looking for ways to make compliance easier. Aviation is a global business, and sometimes you have to look far and wide for the part you need. Many aircraft parts are regulated by the United States for export purposes, and it is important to ensure that you have an adequate compliance system in place to help promote effective export compliance when your parts supply chain involves an export transaction.

Aerospace companies should have compliance systems that help them identify which regulatory bodies have jurisdiction over your export transaction and how your aircraft parts are regulated for export purposes. They should be able to lead your personnel through the export compliance maze and they should identify when a license may be needed. They should also help support the collection of information needed for an electronic export information (EEL) filing. Such systems should also be able to address common aerospace export issues like deemed export (which can arise even if you do not export articles out of the United States), aircraft parts returned to the U. S. for repair, and license exceptions for AOG (aircraft-on-ground) situations.

Most people know that the United States regulates international trade (exports from the U. S.) through either the State Department (for defense-related articles) or the Commerce Department (including civil aircraft articles).

About a year ago, State and Commerce published new regulations that make it much easier to identify which agency has jurisdiction. Many companies revamped their compliance programs in 2014 in order to reflect the new regulatory regime. If you haven't made export compliance a procedure-based part of your operations, then it is not too late!

But the one agency that has not gotten a lot of notice has been the Treasury Department. The Treasury Department has a number of ways that it limits U. S. exports in order to advance U. S. interests. It has lists of people and parties with whom you may not perform export business, and it also has programs, both country-based (like the Iran sanctions program) and situation-based (like sanctions against those who are part of a transnational criminal organizations).

OFAC

The Treasury Department office with jurisdiction over export programs is the Office of Foreign Asset Control (OFAC). Their name is practically synonymous with exporting; whenever I mention exports, I always hear someone muttering "OFAC."

OFAC is easy to love. They have a limited series of export sanctions programs, and they make their purposes and goals very plain. They try their best to iron out the ambiguities in their programs, as well, by providing plain language information as well as precise regulatory information, and by narrowly tailoring their sanctions programs to achieve their desired goals. Export law is never easy, but I find that the folks at OFAC try hard to eliminate the unnecessary complications.

For those of you involved in international trade in aircraft parts, the U. S. Treasury Department has recently made compliance even easier by consolidating several different lists into one.

This consolidation should make it easier to search to ensure compliance, whether you are searching online or using a computer program to automatically research your business partners. This change is not just for U. S. companies. The change is also important to non-U. S. parties, because (1) it impacts imports from the United States, (2) the U. S. has a history of reaching extra-territorially to sanction non-U. S. companies, and (3) the U. S. rules continue to apply to articles when they are subsequently shipped between third party countries.

OFAC has a list of Specially Designated Nationals (SDNs) as well as several other (non-SDN) sanctions lists. OFAC is now offering all of its non-SDN sanctions lists in a consolidated set of data files called the Consolidated Sanctions List. This consolidated list will include the following:

- Non-SDN Palestinian Legislative Council List
- Part 561 List
- Non-SDN Iran Sanctions Act List
- Foreign Sanctions Evaders List
- Sectoral Sanctions Identifications List

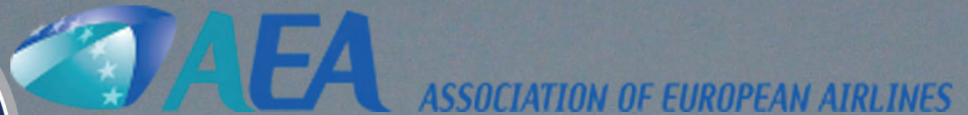
OFAC announced that it plans to discontinue some of these lists as separate lists, so they will only be available as part of the consolidated list.

Persons seeking to check whether there are OFAC sanctions that might apply to their transaction should be sure to check their export business partners (by personal name and company name) against the Specially Designated Nationals List and the Consolidated Sanctions List. You may be surprised at some of the names in those lists! You will find a number of airlines and logistics companies ... even universities ... so don't assume that your export business partner is permitted before you have run their name through the appropriate lists.

One can also use the Sanctions List Search which consolidates both lists into a single searchable database. This tool is useful because it can automatically search for names that are close (but not exact matches) and can be set to find matches with different levels of confidence (which will then be reviewed by a human to assess whether they actually match).

Exporters should also check the details of their transaction (including destination country) against the Sanctions Programs and Country Information page, which list sanctions programs based on country and on certain other criteria. A complete list of sanctions can be found at www.treasury.gov website. More info is also available through The Aviation Suppliers Association at www.aviationsuppliers.org AM





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

Introducing New MRO Systems

From the perspective of continuing airworthiness and aircraft maintenance, fully integrated MRO Management systems have completely revolutionized the means by which we maintain oversight of our aircraft. Migration of airworthiness data including technical records in terms of hours and cycles, a complete and accurate AD Status, not least an un-abridged repository of aircraft technical logs, aircraft task cards, etc., is a long and drawn-out. Any process of data migration presents a minefield of complex issues which have to be navigated both when an aircraft is exiting the fleet, and more so when an aircraft is being delivered and introduced to an existing fleet.

Ensuring data integrity when transitioning from one MRO system to another, is of paramount importance, and, without proficiency in using a new MRO system, maintenance oversight would become difficult at best, and non-compliant at worst.

ENSURING DATA INTEGRITY

To all intents and purposes, data migration in this regard should be as easy as converting a standard word-processor document from the 2010 release to 2013. However, the reality is far more complex, and involves an even more mind-blowing level of complexity when considering the 'black art' of database architecture. A recent migration experience, involving the transfer of aircraft technical records data from one operator to another was thought to be relatively simple, particularly when both operators utilized the same MRO software. Although the first migration attempt was generally successful, elements of the migration indicated that the data was incomplete in places. Ultimately the problem was resolved when it had been realized that the migration had been attempted between two differing releases of database.

Imagine if this had been a data migration between completely differing MRO software applications? Admittedly, data from the old system could be imported to the newer system through a wide range of complex but highly important data clean-up measures, and not least mapping techniques. This is an expensive process, regardless of whether you are the software supplier who has to do the clean-up work, or the operator who has to expend considerable time and manpower ensuring the work is done in compliance with regulatory requirement.

With aircraft remaining in fleet for an average of around three to five years, surely the introduction of a database standard for aviation technical records is not an unreasonable suggestion. In actual fact, aircraft lessors have been proposing this for quite some time. ICAO together with other regulatory authorities and aviation bodies like IATA should consider the possibility of the development of a singular database architectural standard that facilitates a less painful migration process. In the event that a singular standard is too difficult to achieve, perhaps a range of migratory protocols might be an easier and more achievable aim between MRO Software developers.

ONSITE APPLICATION TRAINING

Complaints are received by MRO Software developers of the need to provide better training. Direct classroom based training techniques continue to be a valuable resource, but in all fairness, MRO software trainers cannot cover everything as comprehensively as they would like. The classroom approach does not always allow for new users to familiarize themselves with the application, not least gain proficiency. It is of course recognized that there can be no training or knowledge based solution provided by the developers which is entirely comprehensive, particularly if budgetary restrictions are involved.

Another helpful tool for us would be the development of 'show and do' videos that are easily accessible online. They cannot be a replacement to classroom based training, more so an additional resource for when the MRO system trainer has gone home. Overall, the MRO developers have done a great job producing useful systems to manager the aircraft, can they now help us to ease both data migration, and provide us with the means to gain proficiency more easily. **AM**

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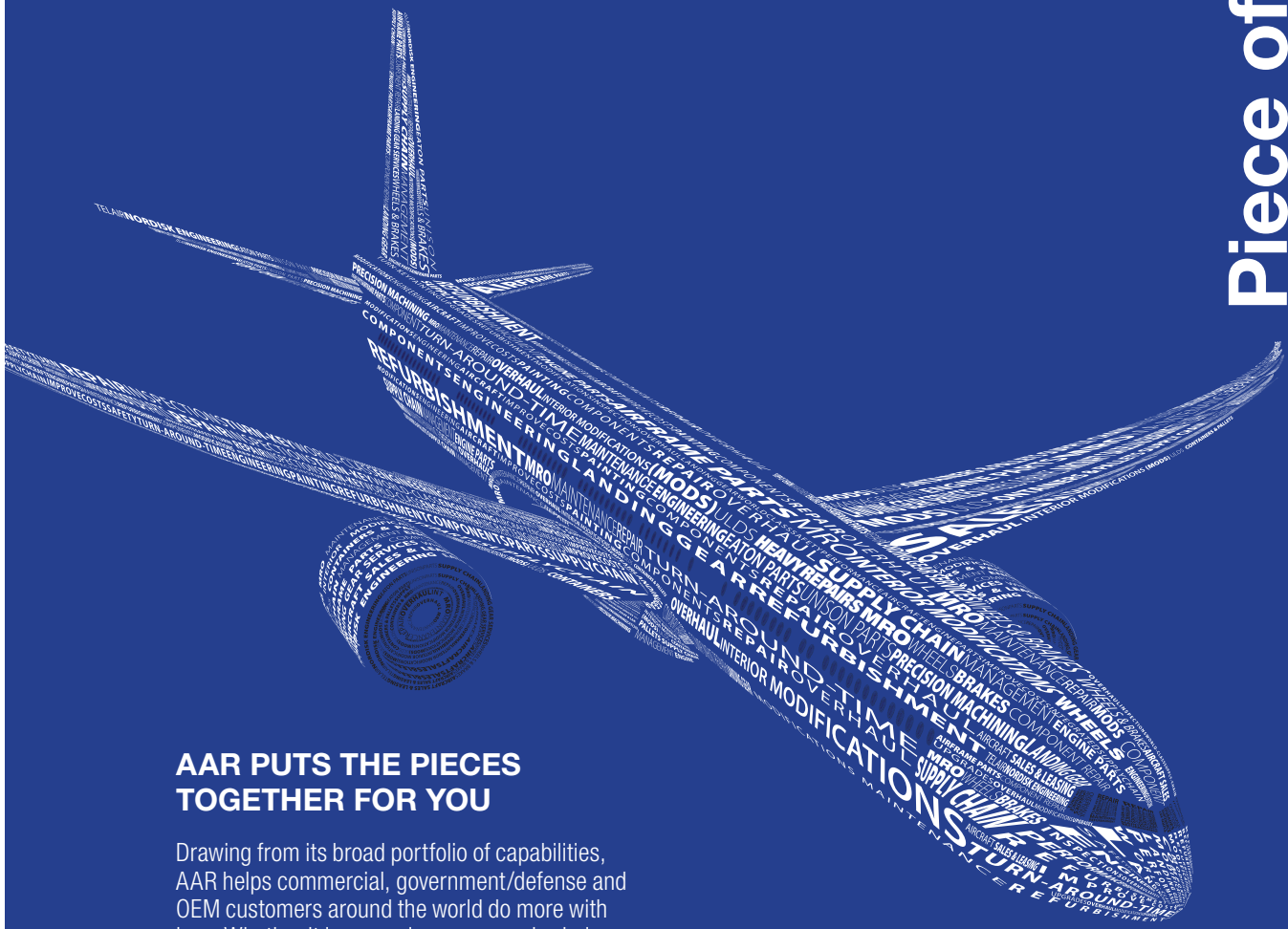
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