

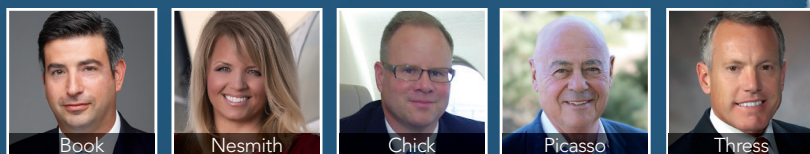
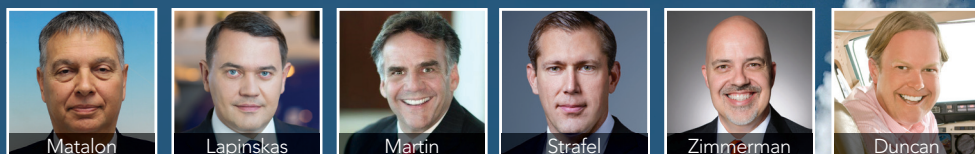


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# STATE OF THE INDUSTRY

THE TOP MRO LEADERS SHARE THEIR WISDOM

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April 2016

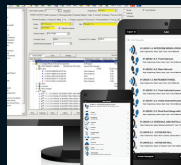
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### COVER STORY

**The State of the Industry**  
Top leaders in the aviation maintenance business share their thoughts on where the MRO world is as a whole and where the industry is going next. What these leaders have to say is truly enlightening.



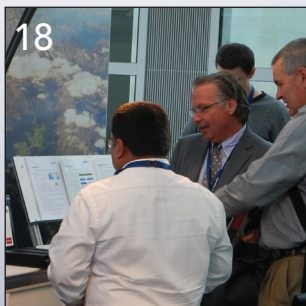
**On the cover:** The participants of our State of the Industry feature story. Images courtesy of each individual's company. Cover image designed by Cavich Creative.

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In aviation maintenance, as in other industries, automation continues driving towards higher-speed, lower-cost processing and to deeper levels of integration. Learn about the latest technology to help give your company a competitive edge in our tight-margin business.

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There's a lot more to achieving a great paint finish than picking the right color. Training and keeping pace with the latest formulas, equipment and techniques is crucial.



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# Crystal Ballin'

BY JOY FINNEGAN  
EDITOR-IN-CHIEF



**R**ecord low oil prices. Record high airline profits. Slow growth in the U. S. and slower than predicted in China. Workforce retirements. Big data. More electric aircraft. Unmanned aircraft systems (UAS). New technologies.

All of those factors and many more impact the MRO marketplace. Every year at this time, industry forecasts are released by the FAA and consulting groups. Let's take a look at some of the forecast numbers and see what they are saying about our industry.

2015 was the fifth consecutive year of profitability for the industry. The FAA Annual Forecast says, "The 2016 FAA forecast calls for U.S. carrier passenger growth over the next 20 years to average 2.1 percent per year, slightly faster than last year's forecast. The sharp decline in the price of oil in 2015 is a catalyst for a short-lived uptick in passenger growth in 2016." The report goes on to say even though oil prices are projected to fall to around \$43 per barrel in 2016, their forecast assumes that they will rise thereafter to exceed \$100 by 2023 and \$150 by 2036, the end of the forecast period.

"Although the U.S. and global economy continued to sputter in 2015, stable demand and lower energy prices resulted in record profits for U.S. airlines. U.S. carrier profitability should remain steady or increase as the recovery leads to strengthening demand," the report goes on to say. The U.S. commercial fleet is forecast to increase from 6,871 in 2015 to 8,414 in 2036. That is an average annual growth rate of 1.0 percent a year. See the FAA Forecast here: [https://www.faa.gov/data\\_research/aviation/aerospace\\_forecasts/media/FY2016-36\\_FAA\\_Aerospace\\_Forecast.pdf](https://www.faa.gov/data_research/aviation/aerospace_forecasts/media/FY2016-36_FAA_Aerospace_Forecast.pdf)

Dave Marcontell, VP of Oliver Wyman's Cavok Group, presented the Oliver Wyman 2016-2026 Global Fleet & MRO Market Forecast at the recent MRO Americas conference in April, agreed with the FAA saying, "Record net profits are due in large part to the glut in the oil market." Interestingly, their report says that this will not impact the fleet plans of operators. They predict new aircraft deliveries and backlogs will continue to grow. But, Marcontell cautioned, economic growth, interest rates and oil prices could disrupt the equilibrium at any time. See their report at [www.oliverwyman.com](http://www.oliverwyman.com).

The Aeronautical Repair Station Association (ARSA) in conjunction with Oliver Wyman released a joint MRO market report with the following MRO specific figures. Airframe MRO will account for \$16 billion in 2016 and grow to \$19.2 billion in 2026. Engine MRO will be around \$25.7 billion in 2016 and grow to \$43 billion in 2026. Component MRO is on track for

\$13.1 billion this year and headed for \$18.6 billion by 2026. And finally, line MRO is targeted at \$12.8 billion in 2016 and aiming for \$18.1 billion in 2026. The total forecast for the 2016 year is \$67.7 billion growing to \$98.9 billion by 2026.

The Executive summary of the joint MRO market report says, "Modern aircraft are also self-monitoring, with the capability to report on the condition of hundreds of systems and components, creating gigabytes of data from each flight. Properly harnessed, this data will provide the operator and the MRO information on the health of the aircraft, as well as provide prognostications of impending issues."

New technology aircraft like the 787 will have 65 percent fewer airframe heavy maintenance checks than legacy aircraft. These new generation aircraft are already producing vast amounts of data, big data is the buzzword, but what will be done with all that data? Is the MRO world ready for it? One chart in the Oliver Wyman forecast shows that today's operational fleet produces about a billion gigabytes of data a year. That will quadruple in just three years as the fleet changes. But what is truly phenomenal the report says, is that by 2026, a mere ten years from now, the aircraft fleet will be producing 98 billion gigabytes of data year. What is done with this data, where it is stored and kept secure is an area of potential growth for the MRO IT community.

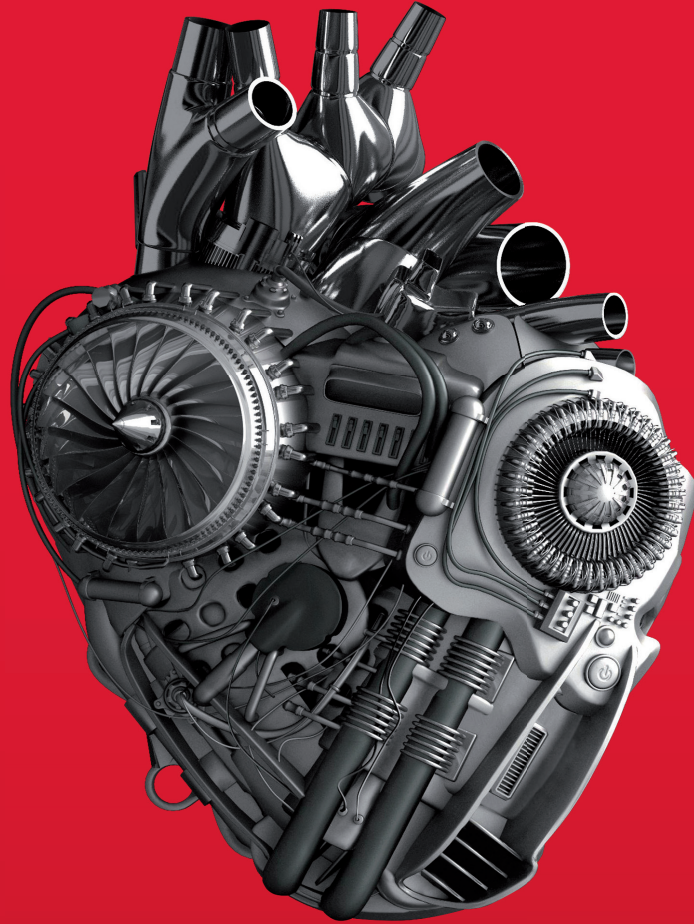
The FAA report says that unmanned aircraft systems will be the most dynamic growth sector within aviation. The potential sales of commercial small UAS requiring registration was forecast to be over 600,000 for 2016, growing to 2.7 million by 2020. "Venture capitalists are already investing considerable amounts of money into this emerging industry," the forecast says. FAA has developed the UAS Focus Area Pathfinders initiative which addresses many areas of operation for UAS but what about maintenance? How will these aircraft impact the maintenance world? It is yet to be determined.

According to an ICF presentation at another recent conference, the consultancy expects the MRO market to grow by 4.1 percent per annum between now and 2025 to \$96 billion. Strongest growth, according to ICF, will be the Asia Pacific MRO market, which they say will nearly double to \$32.2 billion by 2025.

Another highlight from the ARSA/Oliver Wyman summary gives these figures: "In the United States, approximately 3,900 firms with more than 184,000 employees operate in the civil MRO market (including airline and affiliated MRO employees). There are 136,000 technicians in the U.S. and approximately 37% are certificated." The summary can be found on the ARSA website, [www.arsa.org](http://www.arsa.org). **AVM**



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## GE Aviation, Services Launches TrueChoice Product Suite



Kevin McAllister, president and CEO of GE Aviation, Services gives keynote address at MRO Americas. *GE image.*

TrueChoice, a suite of engine maintenance offerings for the commercial aviation industry from GE Aviation, Services was unveiled in April. GE says the program emphasizes their breadth and depth of capabilities and customization across the entire engine lifecycle.

"The TrueChoice brand reflects the foundation of our services business," said Kevin McAllister, president and CEO of GE Aviation, Services. "True represents our commitment to our airline, lessor and MRO customers to continually invest in product and services technology throughout the engine lifecycle.

"Choice belongs to our customers, who are at the heart of our offerings," he continued. "Choice reflects our unparalleled scope of offerings for customers, and GE's tailored services options for each customers' unique and evolving needs across the entire engine lifecycle. It also speaks to our long-standing support of MRO choice in which customers have the freedom to choose among GE, GE-licensed, or fully independent, third-party maintenance providers."

The TrueChoice suite includes four families of products and services offerings. TrueChoice Flight Hour consisting of customized offerings that help optimize cost of ownership over the entire lifecycle with flexible risk transfer and payment options. TrueChoice Overhaul which is a time and material overhaul option with tailored worksopes specific to shop visit objectives, economic priorities and ownership horizon. TrueChoice Material which encompasses new and used OEM parts, repairs and technology upgrades for airlines and MROs. And TrueChoice Transitions, a range of options for changing ownership,



including green time leases, exchanges and material buy-back, plus custom worksopes with shorter builds and maximum used material.

For lessors, GE offers products specifically designed to accommodate a change in owner or operator.

GE Aviation say they will use their emerging capability and experience with data analytics to offer insights in each of the TrueChoice offerings with the goal of a reduced maintenance burden and fewer service disruptions for customers.

"Big Data is transforming our business," McAllister said. "It combines our depth of aviation product knowledge with rapidly growing digital capabilities. This marriage of physics and analytics is delivering better customer outcomes faster." More insights from GE's Kevin McAllister can be seen in our State of the Industry feature on page 25.



## Aviall Makes Key Appointments

Eric Strafel has been named president and CEO of Aviall, a wholly owned subsidiary of The Boeing Company. Previously Strafel served as vice president of Boeing Defense, Space & Security Autonomous Systems for Boeing Military Aircraft.

"Eric brings 20 years of leadership experience back to Aviall," said Lynne Hopper, vice president Material Services within Boeing Commercial Airplane's Commercial Aviation Services. "He understands its core values, embraces the Aviall culture and shares Aviall's long tradition and passion for customer service. Eric is a proven leader, and his experience in international operations and general, business, defense and commercial aviation align very well with Aviall's strategic focus."

"I am honored to have been selected as Aviall's president and CEO. It is a privilege once again to be part of an organization that delivers the industry's highest quality products, services and innovative solutions to more than 26,000 customers and invests in developing the most talented team members in aviation," said Strafel. "We are an organization led by an 84-year-old purpose of 'proudly keeping the world in flight.' I will do my best to serve our original equipment manufacturer (OEM) partners and customers by strengthening our team members' ability to fulfill that purpose."

Previous to his role at Autonomous Systems, Strafel was the senior vice president for Operations & Business Development at Aviall. In that role, he had executive leadership responsibility for Aviall's commercial and defense operations, including demand planning, procurement, warehouse operations, global quality and the Lean Six Sigma program.

Before his roles of increasing responsibility at Aviall, Strafel was the vice president of Supply Chain Management for L3 Communications and held leadership positions with Honeywell International, Precision Conversions, and United Technologies. His international assignments included responsibilities in Europe, the Middle East, Africa and Asia.

Strafel holds a Master of Business Administration degree from Carnegie Mellon University and a Bachelor of Science in Mechanical Engineering from Binghamton University. He also is a member of the USA Leadership Corps, a national volunteer-based strategy consulting group that caters to the needs of emerging small businesses and nonprofits.

William Ampofo has been named senior vice president, global operations and supply chain for Aviall, a wholly owned subsidiary of The Boeing Company. In this role, Ampofo will have leadership responsibility for operations, supply chain, capital facilities, quality and the chemicals management business.

Ampofo comes to Aviall from United Technologies Corporation (UTC) and brings more than 22 years of aerospace experience, having held roles with increasing responsibility in finance, information technology, corporate strategy and operations at Pratt & Whitney, Sikorsky, and Corporate HQ. Most recently, William served as vice president, Supply Chain Commodity & Cost Management for UTC Aerospace Systems (UTAS) and was responsible for driving sourcing and cost reduction strategies across its \$5B supply chain.

"William's extensive management experience will be leveraged to bring continued supply chain innovations and operational effectiveness in delivering value to our original equipment manufacturer (OEM) partners and customers," said Aviall President and CEO Eric Strafel.

Ampofo has a bachelor's degree in finance from Adelphi University, an MBA from George Washington University and has completed executive education coursework at both University of Virginia's Darden School of Business and INSEAD.



*Eric Strafel, above left is Aviall's new president and CEO. Right is William Ampofo, Aviall's new SVP, global operations. More insights from Eric Strafel can be found in our State of the Industry feature on page 36.*

## about people

### PEMCO Appoints Teters Senior MRO Manager

Dan Teters has been named senior MRO manager at PEMCO World Air Services. Teters will be overseeing maintenance, repair & overhaul in the company's two main hangars, located at Tampa International Airport. Teters relocated from Tulsa, Okla., where he had been in fleet management with American Airlines for the past six years. "I really missed the maintenance side," he said of joining PEMCO. "That's where I feel the most at home." Teters reports to Shane King, PEMCO's VP of Maintenance. In 1989, then-TWA hired Teters as a painter. During his career at TWA/American, he worked as a mechanic in virtually every specialty, as well as in backshops and aircraft structure. He spent 18 years in management, including director of Overhaul in Kansas City. At American, Teters became immersed in Lean management, which is PEMCO's philosophy. "I'm a big lean supporter," he said.

### Blackhawk Promotes Holder to VP Marketing



*Holder*

Blackhawk Modifications has promoted Donnie Holder to VP of Marketing as the company expands the marketing department. Holder has been with Blackhawk since 2004 and most recently served as the company's vice president of Information Technology. "Donnie's strength in leadership and marketing has lifted Blackhawk to the forefront of the turboprop aftermarket upgrade conversation," Edwin Black, SVP Sales and Marketing, stated in announcing the promotion, which was effective April 1, 2016. "Donnie's transition to the role of vice president of Marketing will expand Blackhawk's existing line of upgrades and influence the direction of new technologies we are currently developing."

### Thomas Rueckert is New Head of Aircraft Overhaul Services



*Rueckert*

Thomas Rueckert has become head of aircraft overhaul services at Lufthansa Technik. The 45-year-old industrial engineer has replaced Soeren Stark, who has been appointed to the Executive Board of Lufthansa Cargo as COO. In his new function Rueckert will lead the international overhaul network of Lufthansa Technik with eight sites in Europe, Asia and the Americas. Thomas Rueckert was latterly vice president of the overhaul services production network, based in Hamburg. Since joining Aircraft Maintenance at Lufthansa Technik AG in Frankfurt in 1997, Rueckert has had various roles, including >>>

## about people

» as Vice President Aircraft Maintenance at Lufthansa Technik Philippines and CEO at Shannon Aerospace. From 1990 to 1998, he studied industrial engineering in Darmstadt and managed his family's own company on a temporary basis.

### Power Systems Adds Young as VP



Young

Brent Young has joined Langley, BC-based Power Systems in the role of vice president, Sales. An aerospace professional with a focus in sales, service and customer support, Young has been in the industry for 20 years. With strong relationships and considerable experience in the Asian and South American markets, Young will be tasked with expanding Power Systems current customer base and build new business in those markets.

"As we have now changed our company name and settled into our new facility in Langley, one of our forefront goals is to establish stronger relationships in aviation hotspots around the world, including the Asian and South American markets. With Brent's knowledge, determination, and relationships, we look forward to supporting new customers in these markets," says co-owner Corey Steinberg. Going forward, Young will be travelling the world to visit new customers promoting Power Systems' current and developing MRO capabilities in hydraulics, components, wheels & brakes, tooling and NDT.

### Duncan Selects Nail for Challenger/Global Service Sales

Duncan Aviation recently selected Troy Nail as the company's newest Airframe Service Sales representative for Challenger and Global aircraft models. In this position, Nail will be responsible for assisting customers with the preliminary tasks associated with large airframe inspections, including the writing of detailed technical quotations and answering their service and capability questions. Nail began his career at Duncan Aviation in November 2001 as an airframe mechanic, working his way in the Challenger program to a lead mechanic in 2007 and a team leader for a Challenger/Global team in 2012.

### HAITEC Appoints Steinberg as CCO



Steinberg

HAITEC has strengthened its Senior Management Team with the appointment of Mathias Steinberg as Chief Commercial Officer and member of the Executive Board. He brings vast experience with 18 years in Business Development, Sales and Marketing during which he held management positions in the aviation industry with RUAG »

## De Juniac Recommended for Director General/CEO of IATA



Alexandre de Juniac, chairman and CEO of the Air France-KLM Group will become the next director general of IATA. Air France image.

Alexandre de Juniac, chairman and CEO of the Air France-KLM Group, has received a recommendation from the Board of Governors of the International Air Transport Association (IATA) to become the next director general and CEO of the organization. Alexandre de Juniac indicated he would accept the proposal, which is due to be discussed at the IATA general meeting 1-3 June 2016.

The Air France-KLM Group's Board of Directors has prepared a plan to appoint a successor to de Juniac, given his imminent appointment. According to the Air France-KLM Board's internal rules, the Air France-KLM Appointments and Governance Committee - with the help of an international recruitment consultancy - has initiated the process of identifying the best executive able to continue the Group's consolidation and development.

Alexandre de Juniac will be the first person coming from a French airline to lead IATA. "I would like to thank all those at Air France-KLM who, for almost five years now, have been fully committed to achieving together our recovery and restoring the conditions for growth," de Juniac says. "Working for Air France-KLM is a source of great pride. I will continue to fulfill my responsibilities until I hand over to my successor at the end of July, and I will continue to defend air

transport and all airlines - including Air France-KLM - in my new role. On the strength of the skills of its teams, the prestige of its brands and of its European roots, Air France-KLM has all the qualities it needs to compete with the world's leading airlines."

In a statement released by the company, members of the Air France-KLM Group's Board of Directors extended a tribute to "the outstanding work of Alexandre de Juniac in achieving the Group's economic and financial recovery, enhancing its range of services and winning back customers. The Air France-KLM Board is delighted that these accomplishments have been recognized in the confidence of the IATA Board of Governors' recommendation for Alexandre de Juniac to lead their global association."

## HAECO Americas Announces Senior Leadership Transition

HAECO Americas announced recently that CEO and Group Director Cabin Solutions Kevin Carter will be resigning his position effective the end of May 2016, and Richard Kendall, current deputy CEO HAECO Americas, will take his place at that time. Carter has agreed to continue in a non-executive, senior advisory role to the company through the end of November 2016, to ensure a smooth transition.

Carter has been CEO of HAECO Americas (formerly TIMCO Aviation Services) since 2008 and was also appointed group director Cabin Solutions, the HAECO Group's aircraft interiors business, in 2015. Previously, he had served as TIMCO's CFO from 2005 to 2008. During his time with the company, he helped manage a significant financial turnaround and led the launch of a growing aircraft interiors division.

Kendall was appointed deputy CEO of HAECO Americas in 2015, and has already been handling many leadership responsibilities for the company's MRO and aircraft interiors business. Previously, he was director and general manager of Hong Kong Aero Engine Services Limited, a sister company in the HAECO Group specializing in aircraft engine MRO. Prior to that appointment, Kendall held other management positions within the Swire Group, the parent company of HAECO.

"We are sad to see Kevin leave and have appreciated his many achievements," Augustus Tang, HAECO Group CEO, said. "HAECO Americas is regarded by its customers and partners as a market leader in each of the sectors in which it competes - a position attained through no small effort on Kevin's part. I wish him success in his future endeavors. I am confident that, under Richard's experienced leadership, HAECO Americas will continue to grow from strength to strength. Kevin's agreement to stay onboard in an advisory role will also help assure a smooth transition as we continue to focus on growing aircraft support for our customer base worldwide."



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about people

» Aerospace Services, STTS Germany GmbH, Thomas Cook Austria AG, TUI Austria AG and LTU Group.

**Rectrix Aviation Names New GMs in Sarasota, Bedford**

Rectrix Aviation has named Chris Mundy the general manager of their Aerodrome Center at Sarasota-Bradenton International Airport (KSRO).

Additionally, Chris Shewokis has been named GM of the Rectrix Aerodrome Center at Hanscom Field (KBED). As general managers for Rectrix at these two locations, Mundy and Shewokis will be responsible for overseeing all Rectrix Aerodrome Center day-to-day operations associated with serving commercial, corporate and private aviation customers. This includes line operations, aircraft fueling and fuel sales, aircraft storage (short and long term hangar leases) and management of their respective facility.

**Brian Barber Named Advent Aerospace VP**



Barber

Brian Barber has joined Advent Aerospace as its vice president of sales and marketing. "As part of Advent's strategic plan to expand its offerings to a broader market beyond VIP completions, it became clear that we needed someone like Brian to lead the way. He is uniquely qualified to assist the Advent management team in identifying new markets for Advent's composite structures capabilities," stated Steve Jourdenais, Advent Aerospace president. Barber's appointment is effective immediately. He will report directly to Steve Jourdenais.

Prior to joining Advent Barber was VP sales & marketing with Lufthansa Technik's BizJet, responsible for sales of VIP completions, airframe maintenance, modification and refurbishment services to the narrow-body, corporate and commercial aircraft market.

**Iberia Snags Andre Wall**



Wall

Andre Wall has joined Iberia Maintenance as chief technical officer responsible for MRO for the Iberia fleet, as well as Iberia Maintenance's more than 100 airline customers. Wall was most recently CEO of SR Technics and is a specialist in business transformation through simplification of design and production processes.

**Hutchins is Named President of Staco Systems**

Patrick Hutchins has been named president of Staco Systems. His tenure began Feb. 22, when he succeeded retiring outgoing president »

**ATR Introduces Smart Galley, Expands Seat Offer with Expliseat**



ATR and Expliseat have a new titanium seat that can save 300 kg/661 pounds per aircraft. ATR image.

ATR recently introduced the Smart Galley, a new galley concept developed by ATR in response to the needs and expectations of the airline community. ATR says the new Smart Galley features an increased storage capacity while offering greater operational flexibility due to its quick and easy reconfiguration. This new concept allows operators to improve aircraft efficiency by saving weight and space in the aircraft cabin.

The first Smart Galley will be installed on Lion Air's regional airline Wings Air ATR 72-600, scheduled for delivery in May 2016. The new equipment will be available for line-fit installation as well as for retrofit on the fleet in-ser

Additionally, ATR and the France-based aircraft seat manufacturer Expliseat have signed a buyer-furnished equipment (BFE) agreement for the supply of a new ATR aircraft seat type, the titanium seat. ATR says the agreement enables customers and operators to have a broader choice when configuring their aircraft cabin layouts.

The new titanium seat allows operators to save up to 300 kg/661 pounds as compared to current ATR-600 series cabin configuration. The new seats will enable fuel savings and enhance payload capacity and operational flexibility at short runways or at hot and high environments. In addition, the new seats feature only 30 parts per seat, thereby reducing maintenance costs. The titanium seats are provided as an option for new aircraft, and are also available for all ATR aircraft types in retrofit.

Air Tahiti is the launch customer of the seats, with an entry into service of the titanium seats on a retrofitted ATR aircraft in May 2016. The seats will be available on new ATR aircraft produced at the ATR manufacturing plant by the end of the year.

David Brigante, ATR's Senior vice-president Procurement highlighted that "the aim is to provide our operators with a broader scope of customization possibilities. The signature of this contract perfectly fits into our philosophy of continuous improvement of our aircraft, its performances and the services we bring to the 200 airlines operating ATRs worldwide.

**Jet Parts Engineering Announces FAA Approval on 20 New PMA Parts**

Jet Parts Engineering recently received FAA approval on 20 new PMA parts. The most recent additions to Jet Parts Engineering's offerings include bushings, washers, shaft guides, latches, bumpers and FADEC resilient mounts. These fit on a variety of applications ranging from regional jet engines, all the way up to 747-400s. The newly approved PMA parts are available directly from Jet Parts Engineering and can be found on the Jet Parts Engineering website, [www.jetpartsengineering.com](http://www.jetpartsengineering.com).

For pricing, PMA supplements, order tracking, NHA information the company recommends using their e-commerce portal.



Jet Parts Engineering continues to add PMA parts to their offerings. The latest include bushings, shrouds, washers and bolts among others. Jet Parts image.



## World Aero Wins FAA Part-145 Cert

Aircraft wheel and brake MRO World Aero has achieved FAA certification as a Part-145 Repair Station for their UK-based facility, near London's Gatwick, Heathrow and City Airports. The wheel and brake repair facility is now EASA/FAA dual release certified.

FAA certification allows World Aero to carry out maintenance of wheel and brake components for aircraft registered in the United States in accordance with 14 CFR Part-145. Certification means that World Aero will be held to the FAA's rigorous standards, ensuring that the repair station's programs, systems, and methods of compliance are continuously reviewed, evaluated, and tested.

World Aero says having FAA, to add to EASA certification, seals their credentials as a globally recognized wheel and brake repair facility, with dual release. Operators, stockists, leasing companies and MROs requiring dual release on stock items can now utilize World Aero for all repairs, saving time, minimizing administration.

"Having undergone extensive preparation prior to obtaining certification, we are delighted to have World Aero's wheel and brake maintenance capabilities and the expertise of our skilled technicians recognized," Phil Randell, World Aero's managing director says. "FAA certification means that World Aero can now approach customers at a different level with a totally comprehensive capability. With the expertise and facilities to accommodate growth, we can increase our output with no loss of efficiency, making our work flow and lean processes available to a much wider range of customers.

"Dual release certification means that we are now the optimum choice for wheel and brake MRO services. With our newly constructed energy efficient facility in West Sussex with easy accessibility from London, constant evaluation of machinery and procedures, and our track record with many of the world's largest airlines and aircraft spares dealers, choosing World Aero is a sound business decision."

The company says its workshop routinely delivers more than 130 overhauled units a week. World Aero is privately owned by Phil Randell, managing director.



## Avtrade Expands PBH Contracts In Multiple Areas

Avtrade has increased its Power-by-the-Hour support to aircraft around the world. In the last three years, Avtrade say it has tripled its aircraft under contract. By supporting Boeing and Airbus fleets on an advance exchange basis, Avtrade is able to offer an extensive pool of rotatable inventory.

In the first quarter of 2016, Avtrade signed a new component support contract with an established Thai operator. Within the framework of the contract, Avtrade will provide support to the airline's entire fleet of B767s. The company says an increase in CAAC approved inventory, regional component repair services and dedicated local account management has enabled them to offer customers in Asia a range of local aircraft component support solutions.

Avtrade further expanded existing contracts in Scandinavia and mainland Europe with Swedish and Spanish operators. Avtrade will provide full support to a range of Boeing 737 and 767 aircraft.

Avtrade has also signed a new lease contract with a South African airline, with whom Avtrade had an existing relationship. Providing support to the Airlines B737NG fleet, the company says it will position inventory at the main base of operation in Johannesburg, for their exclusive use.

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## about people



Hutchins

»» Bruce Gray. "It has been my pride and privilege to lead this company for nine years," Gray said. "I know Patrick will have the support of a great team."

Hutchins has extensive experience providing high technology products and services for commercial electronics, wireless communications and power solutions for industrial and aerospace markets. He most recently served as a VP/GM for LISI Aerospace.

### Kelly Storey Promoted at Spectralux Avionics



Storey

Kelly Storey has been promoted to Spectralux Quality manager. In this role she is responsible for promoting customer requirements and making sure they are implemented throughout the company. She also ensures quality related issues with customers are tracked, coordinated and resolved.

Prior to this position, Storey had been Quality supervisor since 2007. Kelly has completed formal training in lean manufacturing, SPC, DOE, and Kaizen and is also a certified Designated Manufacturing Inspection Representative (DIMR) for the FAA.

### ATS Announces First CCO

Aviation Technical Services (ATS) has announced that Paul Dolan has joined the company as chief commercial officer (CCO). As the company's first CCO, Dolan will oversee the commercial strategy at the MRO with facilities in Everett and Moses Lake, Wash.; Kansas City, Missouri; and »»

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about people

» Fort Worth, Texas. "As we continue to grow our company and expand our integrated service offering, it became apparent that we needed a senior commercial leader to tie all our services together and approach the marketplace on a global scale," said ATS President Brian Hirshman. "As such, we created the CCO position and I'm thrilled to have someone of Paul's caliber join our leadership team. His forward-thinking approach combined with 20 years of aerospace leadership experience is perfectly suited for this critical role." Dolan holds an M.B.A. from the Marshall School of Business at the University of Southern California, a Master of Science in aeronautical engineering from the Georgia Institute of Technology and a Bachelor of Science in mechanical engineering from the U.S. Naval Academy.

**AJW Aviation Appoints New Chief Commercial Officer**

AJW Aviation has appointed Daniel Watson, to the role of chief commercial officer as the organization identifies a new executive team to lead the growth and development of the business worldwide. He will be responsible for AJW's PBH program, sales, commercial tenders/proposals and key account management. Watson will work across the AJW customer base developing relationships with key airlines. Watson will report directly to Boris Wolstenholme, CEO of AJW Aviation and will work closely with Christopher Whiteside and the Executive Management team.

**Chromalloy Appoints Feely VP**



Feely

Chromalloy has announced the appointment of Rich Feely as vice president, Global Sales, accountable for new customer growth around the globe. "Rich has distinguished himself as a leader both in product engineering as well as key roles in strategic business development and sales," said Carlo Luzzatto, president. "His tremendous expertise will further build Chromalloy's global sales activities as we continue to partner with aircraft owners and operators to deliver reduced cost of ownership and maximum value." Feely joins Chromalloy from Goodrich/UTC where he worked for more than 15 years in several market-facing roles. Most recently he was Director, Business Development & Strategy, focused on the commercial aftermarket. Earlier he held a top business unit management role focused on the company's strategic relationship with Airbus.

**Valair Announces New DOM/Manager of Compliance**

Valair Aviation has expanded its management team, designating Nic Hawker Director of Maintenance and Michael Dussault »

**Delta TechOps Chooses WiN MS Advanced Cable Fault Detection Solutions**

Delta TechOps has ordered 10 WiN MS AERO Smart-R kits to support the main Delta TechOps' aircraft maintenance repair and overhaul (MRO) facilities worldwide. The AERO Smart-R kit is a troubleshooting tool that helps maintenance teams to quickly locate in situ any faults in an aircraft's wiring harness.

Troubleshooting faults during maintenance overhauls is extremely complex, time-consuming and expensive. WiN MS says its AERO Smart-R kit solution can detect and locate both permanent and hard-to-locate transient faults without dismantling components to inspect the cables. The company says their tool cuts service time by a factor of five, reducing aircraft downtime and increasing the productivity of the electrical maintenance teams, as well as helping to avoid unnecessary replacement of components.

"AERO Smart-R is already used by many leading aeronautic companies throughout Europe, the Middle East and Asia, so we are confident that Delta TechOps will quickly see the cost-savings our tool enables," said Arnaud Peltier, CEO of WiN MS. "We also look forward to working closely with Delta TechOps as we continue adding features and innovations to our solutions."

The WiN MS unique technology was developed by the CEA LIST, a public research institute near Paris specialized in digital systems design. The initial meetings between WiN MS and Delta TechOps were brokered by the French Tech Hub, which under the aegis of the French Ministry of Finance, helps small and medium sized French companies with high-growth potential enter U.S. markets.



The WiN MS Cable Fault Detection System. WiN MS image.

**Gulfstream Brazil Services First Argentina-Registered Aircraft**

Gulfstream Aerospace announced that its service center in Sorocaba, Brazil, recently performed maintenance on its first Argentina-registered aircraft. The large-cabin



The Sorocaba, Brazil-based Gulfstream facility. Gulfstream image.

Gulfstream business jet is based at Ministro Pistarini International Airport near Buenos Aires. Gulfstream Brazil earned maintenance authorization approval from Argentina's Administración Nacional de Aviación Civil in August 2015. The certification allows Gulfstream Brazil's technicians to work on any Gulfstream aircraft registered in Argentina.

"Anytime we can add a maintenance authorization from one of our neighboring countries, we are thrilled because it means additional service options for our operators," said Derek Zimmerman, president, Gulfstream Product Support. "Most of our South America-based customers are from Brazil, and we have approximately 50 more aircraft based in other countries on the continent, so we will continue to look at enhancing our capabilities."

Gulfstream Brazil is located at Bertram Luiz Leupolz Airport about 56 miles/90 kilometers from downtown São Paulo, one of the world's largest cities. The company site comprises a centrally located 38,000-square-foot/3,530-square-meter facility, including a 34,768-sf/3,230-sm hangar and a parts warehouse with approximately \$10 million in inventory. In 2015, Gulfstream Brazil's 10 technicians performed work on 92 aircraft, which included off-site maintenance for customers located at airports in Argentina, Chile and Uruguay. The site has maintenance authorization approvals from Brazil, the U.S., Argentina and Bermuda.





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## about people

» manager of Compliance and Continuous Improvement. "We're pleased to welcome experienced professionals like Nic Hawker and Michael Dussault to our team," said Daryl Wilkerson, president of Valair Aviation. "Both share our values and have a passion for innovation and delivering excellent customer experience. I am confident that Nic and Mike will be extraordinary leaders in implementing high-quality solutions for our clients." Hawker is an aircraft MRO management professional with over 15 years of experience. He brings extensive knowledge and training to this role where he will provide overall direction to Valair's MRO functions, ensuring that quality and production goals are met. In his most recent role as Director of Maintenance for Commuter Air Technology (CAT), Hawker was responsible for all maintenance performed on CAT's CONUS and OCONUS Special Mission/ISR King Air fleet. During his tenure with CAT, he established and supervised the CAT Oklahoma City maintenance facility with a team of two aircraft technicians and the multiple CAT OCONUS Maintenance sites with 12 aircraft technicians and six avionics technicians.

### Honeywell and Jet Airways Sign B777 APU Contract

Honeywell Aerospace has been selected by Jet Airways to provide maintenance for APUs on board its fleet of 10 Boeing 777 airplanes. Honeywell says the five-year agreement will help Jet Airways better predict and manage maintenance cycles, allowing the India-based airline to reduce unscheduled downtime and improve reliability.

Honeywell says their latest APU maintenance agreement for the GTCP331-500 is designed to keep servicing costs under control while maintaining equipment at the latest modification standard. The agreement is an extension of Jet Airways' APU maintenance programs already in place for its B737NG and A330 aircraft.

"We recognize that unplanned maintenance is an essential yet sometimes costly procedure," said Arijit Ghosh, president, Honeywell Aerospace India. "Our APU maintenance program coupled with Predictive Trend Monitoring Diagnostic service provides Jet Airways the tools to simplify budget planning and mitigate unexpected costs that may arise due to unscheduled removals."

### Honeywell and Jet Airways Sign B777 APU Contract

STS Aviation Group has been named by Gogo as its preferred WiFi systems installation partner.

For the past five years, STS Line Maintenance (STSLM), a division of STS Aviation Group, has worked with Gogo to install modern internet systems on more than 1,000 commercial aircraft.

### Duncan Aviation Launches New myDuncan Feature: Electronic Logbook Entries

Duncan Aviation recently added an electronic logbook feature to its web-based project management system, myDuncan. Customers are now able to view their logbook entries in real-time, categorized by airframe or engine, while at the same time communicate directly with inspectors through the system.

Duncan Aviation Quality Inspector Jerome Sveeggen says allowing customers to have access to logbook entries through myDuncan gets conversations started sooner, saving time later. "Often, customers will have questions or issues surrounding logbook entries," he says. "Being able to address those early means they are not left until delivery day and helps to ensure an on-time and high-quality delivery of the project."

myDuncan, launched in 2006, allows customers to monitor progress of any maintenance or upgrade event, giving them greater access and better control of their projects from anywhere in the world.

Customers receive email alerts, job status reports and updates from their Project Manager with hour and cost estimates for all phases of the project. Through myDuncan, they are aware of items that needed attention and approval and are able to view and comment on reports and photos.

- By the end of 2016, there are two other myDuncan enhancements scheduled to release:
- A quote review and approval feature allowing customers to view sales quotes through myDuncan, including options to compare quotes, see revisions, and electronically approve an agreement.
  - A flowchart/calendar feature that will allow customers the ability to watch as their aircraft progresses through project milestones.

myDuncan is available to all Duncan Aviation customers with aircraft projects in work at a Duncan Aviation facility.

### Gulfstream Introduces Diagnostics Tool to MyCMP Maintenance Tracking Program

Gulfstream Aerospace has enhanced its MyCMP maintenance tracking program with a feature that integrates a customizable diagnostic reasoning engine and a database of known equipment faults and troubleshooting procedures. Gulfstream says MyCMP customers who subscribe to the tool will benefit from reduced maintenance costs and fewer flight schedule interruptions because of improved fix performance.

"Adding integrated diagnostics to MyCMP will enable customers and Gulfstream personnel worldwide to share best practices and field experience," said Derek Zimmerman, president, Gulfstream Product Support. "The MyCMP diagnostics tool starts with user input of an initial observed symptom, which launches a 'troubleshooting dialog,' similar to an expert on a call-in help desk, to arrive at a solution.

"By dynamically generating decision logic based on fault-isolation technical data and user-submitted solutions, the program quickly identifies the cause of issues to guide the user to the corrective action."

The MyCMP diagnostics tool, which is based on the SpotLight platform developed by Mississauga, Ontario-based CaseBank Technologies, is available for G650/G650ER and G550 operators. It will also be available for operators of Gulfstream's new clean-sheet aircraft, the G500 and G600, which are scheduled to enter service in 2018 and 2019, respectively.

"The collaborative, information-sharing ability of MyCMP diagnostics represents a significant leap forward in fault isolation and the value of MyCMP," Zimmerman said. "For the G650/G650ER, for example, the knowledge base contains more than 10,000 established fault isolation procedures. By collecting and sharing best practices and field experience, and customers entering newly identified solutions into the knowledgebase, Gulfstream will provide an unprecedented level of diagnostic capability for operators."

More than 2,300 Gulfstream operators subscribe to Web-based MyCMP. MyCMP was developed by Gulfstream partner Teton Aviation Group of Littleton, Colorado.

"The team at STS Line Maintenance is dedicated when it comes to installing Gogo WiFi systems. We do it as fast, or faster, than anyone else in the business, and our work is top notch. These facts help ensure the quickest return to service possible for every aircraft we

work on," says Mark Smith, Group president of STS Aviation. "We are extremely proud to continue our work with Gogo, and we look forward to being able to provide the every-day air traveler with the best in-flight entertainment options available."

work on," says Mark Smith, Group president of STS Aviation. "We are extremely proud to continue our work with Gogo, and we look forward to being able to provide the every-day air traveler with the best in-flight entertainment options available."



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## Banyan Completes Agreement With ATP To Begin Transitioning Technical Publication Libraries to Online Access

Banyan Air Service has completed an agreement with ATP to begin transitioning their entire technical information library from CD-based services to the ATP Aviation Hub, the company's cloud-based SaaS (Software as a Service) application.

"We pride ourselves on the highest levels of service excellence and the ATP Aviation Hub represents a considerable source of advantage in a highly competitive market," said Lewis Homsher, Quality Assurance manager. "Meeting and exceeding the expectations of our customers means not only getting the job done right as quoted, but also working as productively as possible to minimize aircraft downtime. With hassle-free access to the most current maintenance and regulatory information at our fingertips, we can deliver on that promise with confidence."

Banyan Air Service decided to make the shift from disc-based information service to the SaaS application after testing the ATP Aviation Hub. ATP says Banyan's maintenance staff can now access technical and other information on any internet-enabled device, while managers have flexibility in assigning access and permissions to specific staff members based on the type of work they are assigned.

In addition to instant scalability, upgrading to the cloud-based application also lifted the burden on staff who were previously required to maintain and update dedicated servers and hardware, as well as managing content updates received every two weeks on publication revision discs. With ATP Aviation Hub the company says technicians have instantaneous access to the most accurate and up-to-date technical and regulatory information available from any computer with Internet access.

Homsher explained: "Obviously we don't want access to this type of mission-critical information to be a bottleneck in getting aircraft back up in the air. ATP Aviation Hub is truly a turnkey solution that does the heavy lifting for us and frees us up to focus on what we do best. By integrating all of this constantly updated information for us, ATP takes that complexity out of the equation and helps us speed and streamline our maintenance operations."

According to ATP their new unified SaaS platform enables maintenance providers to manage processes, including maintenance tracking, parts inventory tracking, ordering information, tool compliance, and employee training/certifications..

## Bell Helicopter's Aeronautical Accessories Brand Promotes New Bell 206 Polycarbonate Windshield

Bell Helicopter has received an FAA Supplemental Type Certificate (STC) for its polycarbonate windshields on Bell 206A, Bell 206B, and Bell 206L series aircraft, which will be distributed exclusively under its Aeronautical Accessories brand.

Developed by Bell Helicopter, the new 206 polycarbonate windshield is impact resistant, offering superior impact performance compared to acrylic windshields. The patent-pending windshield was designed in response to the success of the Bell 407 Polycarbonate windshield and offers several safety benefits. The windshield deflects objects away from the cockpit and decreases the likelihood of objects breaching the windshield upon impact.

Designed as a replacement kit for existing Bell 206 series models, the windshield kit contains an exclusive mounting system of composite edging, adhesives and fasteners to provide increased flexing. The strapped edging and independent corner support design allow for improved impact resistance. The kit is also available for installation on new aircraft during customization. The new 206 polycarbonate windshield is available individually or as a set.

The new Bell 206 polycarbonate windshield was developed in response to our customers requesting a design to increase the reliability, safety and performance of their aircraft," said Jennifer Lunceford, manager of Sales for Aeronautical Accessories. "The product offers an impact resistant solution for Bell 206 customers who want only one polycarbonate windshield installed, or for customers who want to upgrade both the pilot and co-pilot side of the aircraft."



ALOFT AeroArchitects (formerly PATS Aircraft Systems) redelivered a 737-800 Boeing Business Jet (BBJ2) interior completion project. This is the sixteenth VIP completion by ALOFT at its facility in Georgetown, Del.

ALOFT says it delivered the aircraft, on schedule, to His Majesty the Sultan of Johor of Malaysia. The project outfitted the new BBJ2 with an interior designed in a partnership between ALOFT and Edese Doret Industrial Designs of New York. The custom-designed interior incorporated cutting edge interior equipment and systems and exclusive finishing materials.

"Once again, our experienced team of VIP interior experts have partnered with our customer to deliver on a beautiful vision. With each new project, we take on the challenge of artfully creating an aerial extension of our clients' life on the ground," John Martin, ALOFT's president and CEO, remarked. "We are entrusted to ensure that the tone by which they live, work and relax is meticulously maintained during their valuable time in the air. We also drive to exceed the clients' lofty expectations. Our customers' trust and satisfaction is a byproduct of the skill and dedication of our entire team and the pride they take in delivering the highest quality product to each valued client. This is the perfect aircraft to be our first redelivery under our new moniker, ALOFT AeroArchitects."

ALOFT says the interior weight and noise suppression both exceeded customer expectations. The project was certified by the ALOFT on-site Organizational Designation Authorization (ODA) who issued the FAA Supplemental Type Certificate (STC) and validated through the customer's local airworthiness authority in Malaysia.

## Glebar Opens Parts Distribution Facility in Ireland

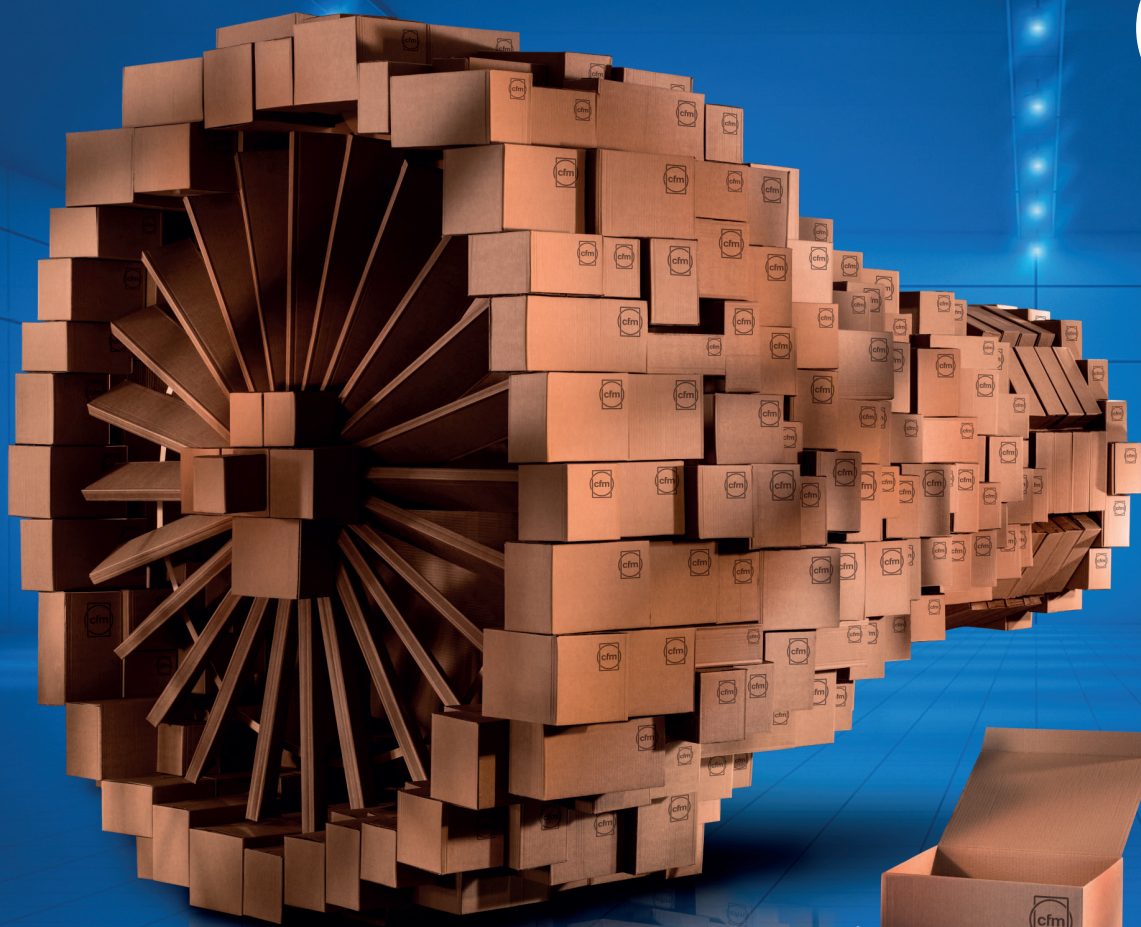
Glebar Company opened a new parts distribution facility in Dublin, Ireland, providing 24-hour turnaround for critical machine components for European customers. The facility is the company's third rapid-response parts distribution outlet, in addition to its Tokyo, Japan location, which provides next-day

delivery of critical components to its Asian customer base, and its headquarters facility in Ramsey, N.J. Glebar will be opening another distribution facility in Costa Rica to service its many medical customers in the region.

"Approximately 35 percent of our overall revenue, on average, is international," said

Adam Cook, CEO, Glebar. "We pride ourselves on being a global service leader, and this necessitates being able to provide essential parts on a 24-hour turnaround basis. We sell solutions at Glebar...and service and the availability of next-day parts is one of those critical solutions."





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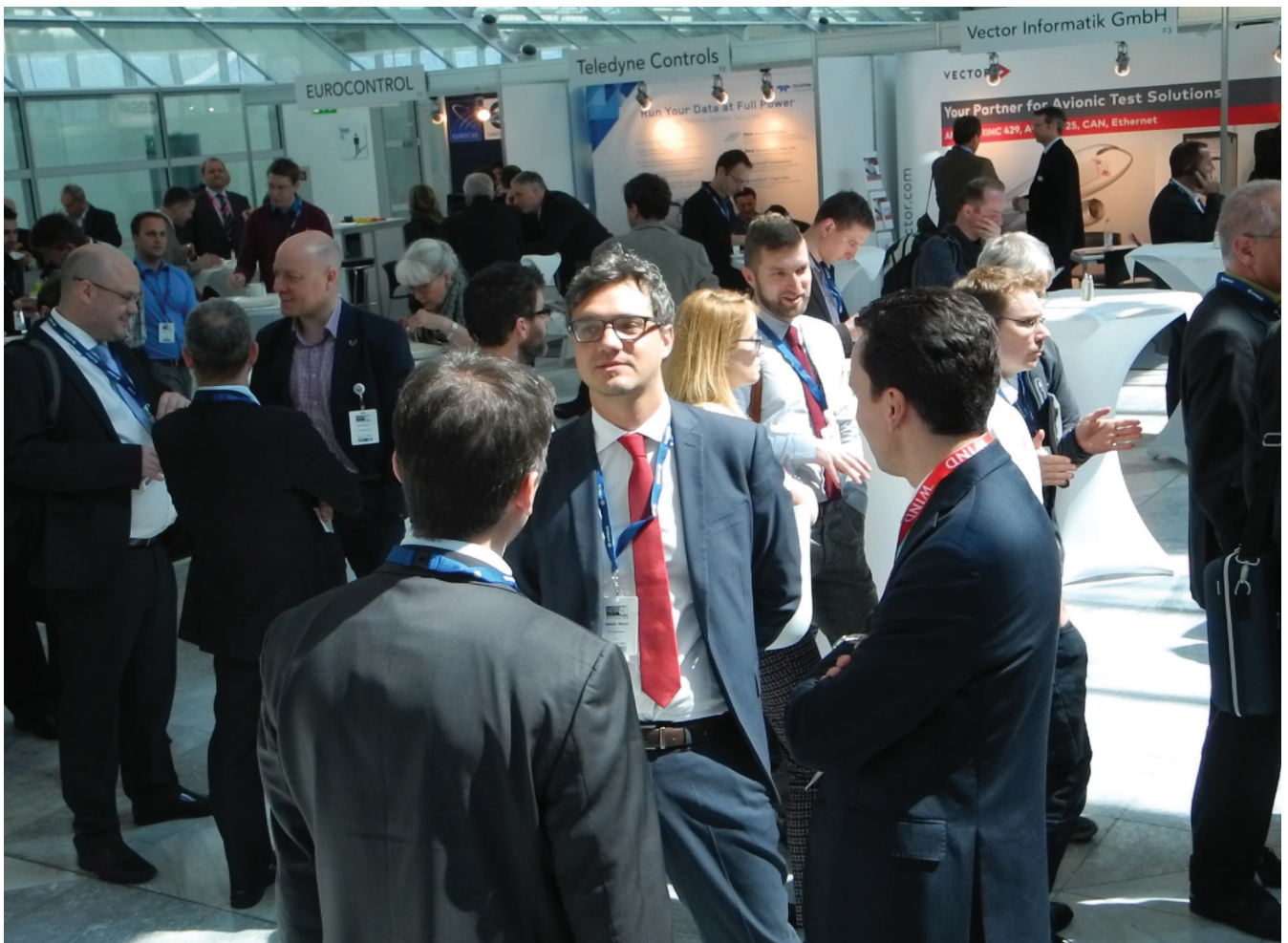
# Success at the Annual Gathering of the Avionics Industry

**Aviation Electronics Europe, the premier global conference and exhibition for the international avionics and aviation electronics community, met in Munich, Germany on 20th & 21st April for its latest annual industry gathering.**

The event delivered a highly focussed Main Conference Programme, as well as a series of Technical Workshops and Certified Training Courses as well as the largest exhibition in aviation electronics.

Following the Opening Keynote, which saw EUROCAE Secretary General Christian Schleifer, and Lufthansa's SESAR Program manager, Sven Kutschera, deliver insightful overviews, key updates on the SESAR and NextGen programmes from Rick Heinrich of Rockwell Collins, Dung Nguyen from Boring and Thomas Maier at Airbus, enabled delegates to gain a greater understanding of the current position and future developments.

With nearly 1000 registered industry professionals over the two days, who discovered the latest issues, challenges and technologies, and listened to some of the leading international experts in relation to SESAR, NextGen programmes, as well as topics including ADS-B, Cyber Security, Satellite based solutions and Standardization and Certification.



Close to 1000 industry professionals over the two days discovered the latest issues, challenges and technologies and heard leading avionics experts speak.





Above, Christian Schleifer, Secretary General, EUROCAE - keynote speaker - gives his presentation called "EUROCAEs Avionics Standards Update" at Aviation Electronics Europe. Below Mark Schultz, CFO of Aircraft Systems & Manufacturing speaks with attendees.

Sven Kutschera, Flight Captain B747, SESAR Program Office, Lufthansa Airlines - keynote speaker - gives his presentation "Single European Sky: the airspace users perspective"



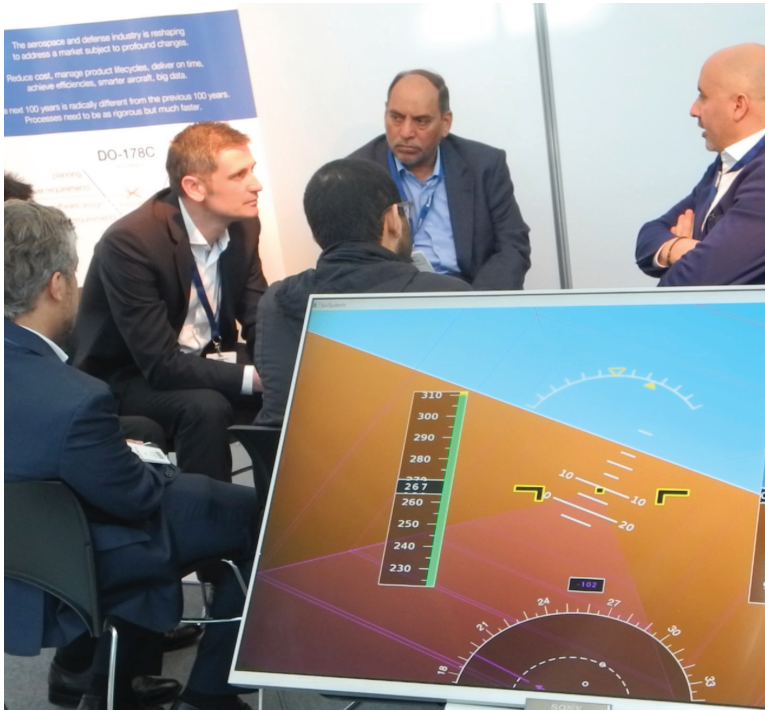
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Exhibitors showcased the latest in avionics and cockpit technologies. Delegates and visitors learned about new systems and solutions for fixed wing, rotary wing, commercial and military.



Willie Cecil, Teledyne Controls, a workshop speaker, gives his presentation "Enabling Connected Aircraft" applications e.g. wireless data distribution, AID / EFB interfacing, ACARS over IP and more on in-service airliners utilizing existing Avionics hardware."

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Two great Certified Training Programs, delivered by AFuzion's Vance Hilderman, also drew great interest in the latest understandings of ADS-B, DO-178C and ARP-4754A.

The exhibition, with over 40 exhibiting organizations showcasing the latest technologies in avionics and cockpit technologies enabled delegates and visitors to discover and source new systems and solutions for fixed and rotary wing commercial and military aircraft and UAVs.

Adrian Broadbent, Event Director and owner of Aviation Electronics Europe, said, "We were delighted at the overall outcome of this years Aviation Electronics Europe. To see so many industry experts attending, sharing their knowledge and experiences to the whole avionics community, and so many industry professionals benefiting from their presence is great."

"We wish to thank our many supporters of the event, including BavAIRia, EUROCONTROL, EUROCAE, SESAR, The Royal Aeronautical Society, Germany Aerospace Society, Institution of Engineering & Technology, as well as key sponsors L-3, Honeywell and Aviage Systems. We look forward to welcoming everyone back next year to the next annual gathering of the avionics and aviation electronics industry on 25th-26th April 2017," concluded Mr Broadbent.

**For further information on Aviation Electronics Europe visit [www.ae-expo.eu](http://www.ae-expo.eu)**



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## Maintenance Depts Meet Requirements of 'Pop-Up' Intl Trips

In today's global, always-on business environment, flight departments are under significant pressure to provide on-demand service to their companies, often with shorter and shorter notice. Companies need flexibility to react to new opportunities, revenue retention threats and other that come up in a matter of hours, not days, and that places greater stress on the aircraft maintenance professionals tasked with keeping these aircraft flying.

The safe, professional, and timely handling of such demands will be among the topics discussed during the 2016 NBAA Maintenance Management Conference (MMC2016) coming May 3-5 to the Kansas City Convention Center in Kansas City, MO. MMC2016 is business aviation's single, dedicated event for individuals responsible for, and involved in, aircraft and facility management.

The conference benefits anyone involved in aircraft maintenance, hangar facility management, or personnel supervision – and able juggling of all those aspects of a flight operation is required in order to successfully coordinate a pop-up international trip. "In the last few years we've seen a dramatic increase in short-notice international requests," said the aviation director for a California-headquartered multinational company. "We used to get 30 to 40 days' notice for international destinations. Now it's more like one to five days."

It's not uncommon for many multinational companies today to have some international trips pop-up with as little as 24 hours' notice, as meetings are often scheduled at the last minute. That has led to some big changes to how many company flight operations coordinate their maintenance requirements, particularly when these short-notice trips start to overlap. "We've had to put the infrastructure and processes in place to work more like an on-demand charter operation, providing a high level of service on short notice," said the aviation director. "We hired more technicians and brought more maintenance in-house, [and] we had to improve our aircraft availability and be able to dispatch within hours." Rather than simply adding more personnel to address these issues, the director also cited the importance of strategically placing resources in a popular region to better meet on-demand needs during those trips.

This level of coordination also entails working with maintenance providers and OEMs to respond more quickly to aircraft-on-ground (AOG) issues. Improved aircraft systems monitoring, upgraded avionics, and satellite communications technologies have also enabled faster response times to issues that may arise in the middle of a trip.

While pop-up trips are the exception rather than the rule at Moline, IL-based Deere & Company, the company's aircraft are heavily

utilized and perform frequent international trips, which places similar challenges on the company's flight department.

"A lot of things can put a stop to a pop-up trip," noted Dorette Kerr, manager of flight admin for Deere & Company, from maintenance inspections to immunizations, crew availability, and landing permits. "We plan as much in advance as possible. If we get a pop-up request, we have to speed up our normal processes."

To cope with these challenges, Deere's schedulers refer to a spreadsheet listing all the international trips they know about for one year ahead. Additionally, the company's spreadsheet and scheduling software allows dispatchers to work with the maintenance department to plan inspections around these trips, in addition to scheduling crew training and vacation time, reserve contract flight attendants, and managing crew visas.

Steve Thorpe, a pilot and former chair of NBAA's International Operators Committee, also emphasized the importance of preparing dedicated checklists to better manage the multitude of tasks involved in preparing for a pop-up trip.

"Many formats [for international trip checklists] work well," Thorpe concluded. "The key is everyone understands their responsibilities and the timeframe for each task. Following the checklist is the best way to catch issues early."

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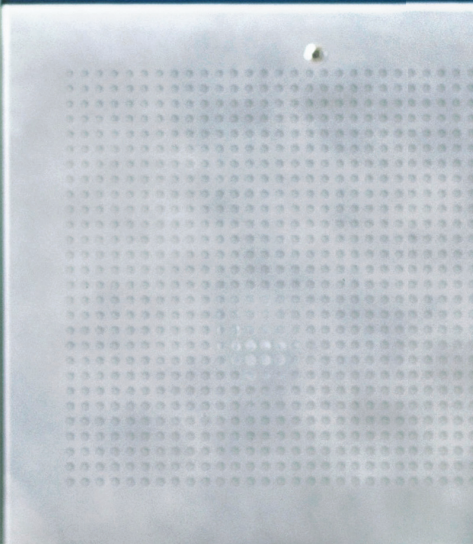
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# THE TOP MRO LEADERS SHARE THEIR WISDOM

by Joy Finnegan

# STATE OF THE INDUSTRY



Dr. Johannes Bussmann Chairman of the Executive Board, Lufthansa Technik



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** I cannot remember the last time the aviation industry experienced a dynamic on such a scale. There are more new aircraft types with new technologies, materials, components, and engines entering flight operation now than for decades. Due to these new developments, aircraft, components, and engines are more reliable and require less maintenance. At the same time, manufacturers are also increasingly competing in the service business and competition among traditional MRO providers has become more intense, too. This of course has major consequences also for the MRO market, which on an overall level is continuing to grow, primarily in Asia and South America, despite the serious ongoing cost pressure being experienced by the airlines.

**What do you consider keys to success in MRO?** Apart from competitive prices, key factors in determining the success of the MRO business in the future will be the abilities to help shape the market and meet the challenges of global competition. This includes a global location network, for example, which can offer customers regional services as well as new partnerships and development of innovative technologies. Lufthansa Technik's goal is to continue to play an active role in shaping the MRO market in the future, too.

**What trends are impacting or will impact MRO in the near future?** New materials and the development as well as automation of appropriate repair or production processes are important keywords in this respect. Moreover, digitalization in the sense of paperless maintenance and increased use of mobile applications is a major topic. The combination of collecting, analyzing and use of large volumes of data is a further essential trend that is set to change our industry significantly in the coming years.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?**

"Big Data" is a mega trend of our industry. To manage and shape this topic successfully is crucial for our future success. Therefore we are active in a number of areas, for example in the development of preventative and predictive measures in component maintenance. Also airlines have to use their data more intensively in the sense of self-optimization and have to understand that this data belongs to them and not to the manufacturers.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** Additive manufacturing will also be used more intensively in our sector in the future. At Lufthansa Technik we are currently looking into the possibility of using the technology with the goal of supporting cost reductions for our customers, for example through weight reduction or component improvements in order to extend durability.

**How does your company encourage innovation?** Lufthansa Technik has been involved in developing a wide range of innovation activities in recent years. These include, for example, a central innovation management, numerous R&D projects with a three digit million amount of invested money, which are carried out in-house or also with external partners from industry and universities. Other examples are Lufthansa Technik's participation in the Hamburg Center of Applied Aeronautical Research (ZAL), a new business division "Original Equipment Innovation," and internal innovation days to promote the idea exchange within our organization. Last but not least, we are evaluating co-operation possibilities with start-ups/companies from other business sectors, in order to think outside the box and to develop new approaches to the benefit of our customers.





**Kevin McAllister** President and CEO, GE Aviation, Services



**As an industry, from your perspective, how is commercial MRO doing- what is the state of the industry?** The industry health indicators remain positive with strong global traffic growth and capacity adds in line with demand, resulting in strong airline load factors. From an MRO perspective, we see steady shop visit growth. The combination of low fuel pricing and traffic growth is also a tailwind for current generation and mature fleets. This is reflected in the significant drop in aircraft retirements in 2015 vs. the 2013 peak and in the net return of 100+ parked fleet into service last year. So the macro indicators we watch are generally positive.

**What do you consider the keys to your company's success in MRO?** It boils down to our commitment to our airline, leasing and MRO customers to provide the lowest engine cost of ownership throughout the lifecycle. Our continuous investment in technology enables new engines like GENx, the CFM LEAP and GE9X to achieve the double digit fuel burn improvements, as well as the reliability and durability improvements our customers expect. These learnings also enable upgrades back into the installed base that improve fuel burn, reliability and time between shops visits through the lifecycle. This is good for airlines and MROs because it keeps GE and CFM fleets flying cost-competitively, and it improves engine residual values. Our commitment to customers also means we need to understand their unique expectations and challenges so we can better simplify how we do business and tailor our offerings to meet their evolving needs. This simplified, customer-centric approach is the catalyst for the recent launch of our TrueChoice suite of customized service offerings throughout the lifecycle for our airline, lessor and MRO customers.

**What trends are impacting or will impact MRO in the near future?** This is an exciting time as new, more efficient aircraft and engines enter the market and as airlines and leasing companies globally redistribute cost-competitive used aircraft. These transitions in aircraft ownership create new opportunities for MROs. Customers expect services offerings tailored to their unique needs throughout the engine lifecycle. TrueChoice Flight Hour provides a wide range of flexible risk transfer options to minimize lifecycle cost. TrueChoice Overhaul provides time and material shop visits with customized worksopes. And, as aircraft and engines move between operators, TrueChoice Transitions includes offerings developed for mid-life to mature engines like engine exchanges, green time leases, customized worksopes with shorter builds, and lessor portability products. Finally, customers want freedom to choose an overhaul provider. We're committed to a competitive MRO model that includes a full range of MRO providers. TrueChoice Material offers a suite of material options for these MROs, including OEM qualified new parts, component repairs and used materials.

**Is Big Data being used by your company and, if so, how is that improving your business?**

Absolutely, but the value here is in the marriage of analytics and physics. Today we are working together with GE Digital to unlock data trends through better analytics coupled with our engine expertise. The combination of analytics and physics drives more predictive intervention, reduces maintenance burden and improves reliability and fuel.

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**Franck Terner** Executive Vice President, AIR FRANCE KLM Engineering & Maintenance



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** Our industry is experiencing major technological changes, which create the need to constantly adapt and develop technical skills. More than ever, the latest generation of aircraft entering fleets are computers with wings. This translates into e-operations and big data opportunities. There is also a wider use of composites, which we anticipated by opening last year a cutting edge aerostructures facility in Paris CDG.

In recent times there's been the impact of consolidation. In the market, there are now bigger airlines and bigger OEMs than there were before. Size counts when you are dealing with majors. In areas such as OEMs licensing schemes, our profile as an airline and MRO combined with our long standing relationship with OEMs helps us to cope with this for the benefit of our customers, who want to have a choice when it comes to selecting a maintenance support provider.

**What do you consider keys to success in MRO?** Airlines are facing continuous changes. In this perspective, deeply understanding their needs is a must. Being an airline ourselves, we experience the same challenges and we are well placed to offer adaptive answers and to share the cost effective solutions we are putting in place on the maintenance field. Developing our worldwide MRO network allows us to answer the increasing need for competitiveness, proximity and dedication.

Another key is the ability to innovate and to put in place up to date capabilities. That's why we invested more than €400m in the last decade to modernizing our industrial base. As an example, based on our cutting edge facilities we were able to smoothly and quickly introduce GENx engine maintenance capability.

**What trends are impacting or will impact MRO in the near future?** We already see the impact of the current trends: new technologies, e-aircraft, consolidation... This results in a need to offer creative solutions to meet market expectations, and to innovate. It is what we are doing with comprehensive parts provisioning schemes, from advanced repairs to tear down and trading; new cabin modification solutions; research & development... On the airframe maintenance business, lower man-hours may result into a more regionalized market for new generation aircraft.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?**

The most obvious opportunity brought by big data is predictive maintenance. As an airline we know how much we can save by avoiding operational disruptions. Anticipating a part's failure will contribute to the whole airline continuity.

An example of successful analytics we've developed on the A380 is the fuel system. For the 787, we will start applying predictive tools to the cabin air system. This knowledge will be highly beneficial to our 787 and A350 customers.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** Additive manufacturing is helping us to be more agile and to create tools and prototypes faster than before. One challenge remains to accelerate the certification process for parts

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## Matthew Bromberg President, Pratt & Whitney Aftermarket



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** I see two major shifts happening in the MRO industry. First, as next-generation engines enter the market, MRO must evolve to incorporate high-tech solutions to service these innovative products. In the last 10 years we have invested more than \$300 million in repair R&D with more than 300 dedicated repair development engineers yielding more than 25,000 part repairs. We are also incorporating new data collection capabilities, such as our eFAST system available on the Bombardier C Series, which is an onboard, near real-time integrated data acquisition and transmission unit that automatically downloads, processes and stores data, then securely uploads it to a customer portal. Second, in the past few years, operators have shifted their maintenance strategy from a traditional transactional approach to a more long-term focus supported by fleet management programs (FMPs). Pratt & Whitney managed engine fleets provide customers with predictable maintenance costs, 20 percent longer time on wing, the highest levels of reliability, and 20 to 50 percent higher residual value.

**What do you consider keys to success in MRO?** The keys to success in the MRO industry are quality, speed and value. With a global network of 19 high-tech, high-volume MRO facilities and more than one million part repairs completed each year, Pratt & Whitney provides the highest value service on Pratt engines. The most important component is providing aircraft operators with the flexible and comprehensive services they need. Pratt & Whitney provides long-term fleet management programs to transactional engine overhaul and part repair, innovative asset management solutions, new and used serviceable material and a pool of 200+ lease engines.

**What trends are impacting or will impact MRO in the near future?** The biggest impact to the MRO industry in the near future will be the surge of next-generation engines coming in for their first overhaul. Over the next 15 years, it is anticipated that there will be more than 45,000 regional and mainline jets in operation and two-thirds of these will be powered by next-generation engines. These high-tech engines will require high-tech repairs, such as innovative processes and coatings to repair fan blades and HPT airfoils, to improve part durability and establish optimum blade tip clearances for better performance. Pratt & Whitney also is building an IT infrastructure to facilitate sharing information amongst our network.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?** Big data has been impacting MRO for years. At Pratt & Whitney, we've been capturing and analyzing data on our 13,000 installed commercial engines for decades. Now, with the help of new collaborators and new technologies, we are investing in data analytics to optimize our customers' operations. By leveraging big data, we will be able to plan maintenance, and schedule and mitigate engine removals without compromising reliability. We allow our customers to focus on their business and we keep the engine flying.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** Pratt & Whitney will be the first to use additive manufacturing technology for production parts, including compressor stators and synch ring brackets, in new jet engines that will enter service on the PW1500G engine for the Bombardier C Series aircraft. We are a leader in 3D printing in aerospace, having made more 100,000 additive manufactured prototypes (including tooling and development engine hardware) over the past 25 years, and

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## Mário Lobato de Faria Executive Vice President, TAP Maintenance and Engineering



**As an industry, from your perspective, how is commercial MRO doing (the state of the industry)?** Generally speaking I still see commercial MRO doing well and will continue to do well since we continue to see growth worldwide, more in some regions than other. The Industry will continue to be dominated by the OEM's pushed by the airframers to make their business in the aftermarket and by the big MRO Groups that have size and financial "muscle" to compete. Smaller MRO's will continue to strive and will have to find market niches and associate with the bigger players if they want to survive.

**What do you consider keys to success in MRO?** As in any other business you have first to be reliable and trusty delivering at least what you promise. More and more you need to have financial "muscle", if we're talking about engines and components, since most Customers expect value propositions that redraw risk from them regarding capital to invest on spares, special tooling, etc. You need to be "suit up" with an array of solutions and flexibility that fills the Customer needs and for that you need experienced, skilled and well trained professionals at the different MRO functions and have the technological capacity to provide such solutions. Last but not the least you need to have in the commercial department the capacity to "read" the market and the Customer needs, anticipate the opportunities and be very quick about it.

**What trends are impacting or will impact MRO in the near future?** I would say OEM's presence in the aftermarket. I'm curious about the outcome of EU Commission enquiry; increasing reliability and new technology; partnering and associating and finally rulemaking.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?** First of all you need to be prepared for it and properly manage it and a lot of independent MRO's will have difficulties here. Then there is a question about how much OEM's, in the future, will give access to MRO's and will that be for free and for everyone. The usage of Big Data helps you to be preventive, more responsive and at the same time to fine tune your troubleshooting abilities. This builds up expertise that is many times appreciated by Customers, building trust in our know-how. On another hand helps to understand what happened in case of a problem.

**How will additive manufacturing impact MRO?** This is for sure a growing activity. The impact in MRO is still to be determined in my opinion since we need to understand on how these products will behave in time and what will be, if any, the constraints in terms of repair techniques.

**How does your company encourage innovation?** First of all we need to develop and sustain an innovative culture. We need to create an organization environment that is collaborative and that sees errors as normal in the innovation process. One of the programs we're involved in as coordinators is about preventive maintenance under the Clean Sky 2. We also hold a continuous improvement program where we involve workers in solving their own problems by changing processes or introducing new tools or technology. The results tie back to the management kpi's.





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**Sarah MacLeod** Executive Director, Aeronautical Repair Station Association



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** It's possible to be both an optimist and a realist in looking at the industry right now – I'm an optimist constantly mugged by reality – because maintenance businesses have seen some good years and are looking ahead to more. ARSA's 2016 member survey is still in the field, but early returns show that nearly half the respondents saw growth over the past two years and 70 percent expect it to continue over the next 12 months. On a broader scale, the association's annual market assessment projects three to four percent growth worldwide over the next decade. These are all good signs for companies with solid technical capabilities and competent management.

The reality is that even with great long-term numbers, there will be down cycles. If you can withstand the ups and downs of this cyclical industry, there is going to be long-term profitability in your future. When companies push too hard, some promising double-digit growth as a "norm," they put too much pressure on both themselves and the industry. Goals that over-estimate long-term impact beget both individual mistakes and industry-wide problems. You can be going gangbusters one day and cutting staff 18 months later if you lose sight of your foundational technical competencies. In an industry populated mostly by small to medium sized enterprises with 50 or fewer employees, being able to withstand the cycles can be a daunting challenge. It's a necessary one, though, because the big "industry leaders" may be a little more insulated from the ups and downs but they can't survive without smaller shops across the supply chain.

**What do you consider keys to success in MRO?** Sound technical capability with an innovative, stable management profile. When a management team is competent and stable, it can establish and maintain strong technical capabilities and innovation. Within an established technical envelope, companies can find new methods and customer markets while taking advantage of capital improvements. The key to success for any business is exactly the same: Be very, very good at what you do and find new ways of doing it; be active and participatory in business operations, industry policymaking and politics. Of course, that doesn't mean jump on every new thing that comes along, but even Charles Taylor would have to evolve to stay in business today.

**What trends are impacting or will impact MRO in the near future?** The maintenance industry is excellent at crisis management – so it can withstand whatever challenges arise in the immediate future. It is the long-lead time items that create the largest impact. For example, as Congress tries to reauthorize the FAA (two extensions of the current law already, and we're just getting started) industry is again facing the congressional propensity to legislate safety rules (activism is particularly important in fending off Washington's micromanagement). The skills gap and the technically-skilled worker shortage is another long-term threat that we need to address. In every recent ARSA survey (and we're seeing it again this year) members have reported difficulty finding the right people; it's part of a larger crisis facing the industrial economy. Finally, we have to manage the friction between OEMs and repair stations as larger businesses fight for control of data, software and maintenance instructions (Instructions for Continued Airworthiness).

**What were ARSA's key accomplishments last year?** This year, ARSA's value was best displayed by what

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**Dany Kleiman** AAR, VP of Repair & Engineering



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** In MRO, we continue to see an increase in demand for wide-body aircraft maintenance, which AAR can accommodate at most of its five aircraft maintenance facilities in North America. There is also heightened demand for cabin upgrades and retrofits. AAR's strong in-house engineering staff is uniquely equipped to augment airline customers' technical engineering requirements and the upgrades can be then be done at our MRO facilities.

**What do you consider keys to success in MRO?**

Diversification of services is key to running a successful MRO operation, as is establishing long-term partnerships with major legacy carriers. AAR's broad range of services and multiple facilities allow us to maintain the fleet from tip to tail including heavy airframe maintenance, landing gear overhaul and component repair. We have long-term contracts with major legacy carriers that have locked in capacity for a few years, which enables us to provide two-way insurance both from the carrier side and our side – a true partnership.

**What trends are impacting or will impact MRO in the near future?** OEMs are expanding into the engine and components markets. At AAR, we have strategic relationships with OEMs around contract maintenance support and parts distribution. Sometimes we collaborate with the OEMs; sometimes we compete against them. It's a balance, but it comes down to what provides the best value to the customer. The return of wide-body work to the U.S. As the labor wage gap narrows, more U.S. companies are going up against Asia Pacific providers and AAR has benefited from this trend given our ability to accommodate wide-bodies at most of our MRO facilities. Airline consolidation. I expect to see more consolidation in the industry because there are still too many players in component and airframe MRO, particularly as it relates to narrow-body work. Phasing out, bringing in new fleets. Airlines are phasing out old/classic aircraft and introducing more and more NG and future generation aircraft, which impacts the scope and the interval / frequency of the heavy maintenance required, as well as investment in new technology to support the next generation fleets. And AAR is making these investments including the opening of a sixth wide-body repair station in Rockford, Illinois, later this year that is specifically designed for next-generation aircraft

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?**

Big data is obviously impacting MRO and increasing our ability to provide customers with more than just labor. At AAR, we anticipated this opportunity to add value, and we developed the 1MRO Software Suite of customer-facing, integrated IT solutions to manage every step of an aircraft MRO project, including labor tracking, inventory and performance reporting with improved metrics to reduce costs and ensure on-time delivery. And we just recently debuted mobile apps that allow customers to see and approve this information in real time from the palm of their hand. Utilizing our IT tools, we see opportunities for our customers to provide a higher reliability in their fleet and reduce their costs. As the largest MRO network in the U.S., AAR's ability to fully equip and/or interface our customers with our IT tool box, as well as quality and reliable engineering, provides more value to our customers, especially large carriers we work with over the long term.

**How does your company encourage innovation?** At AAR we recently launched an innovation campaign

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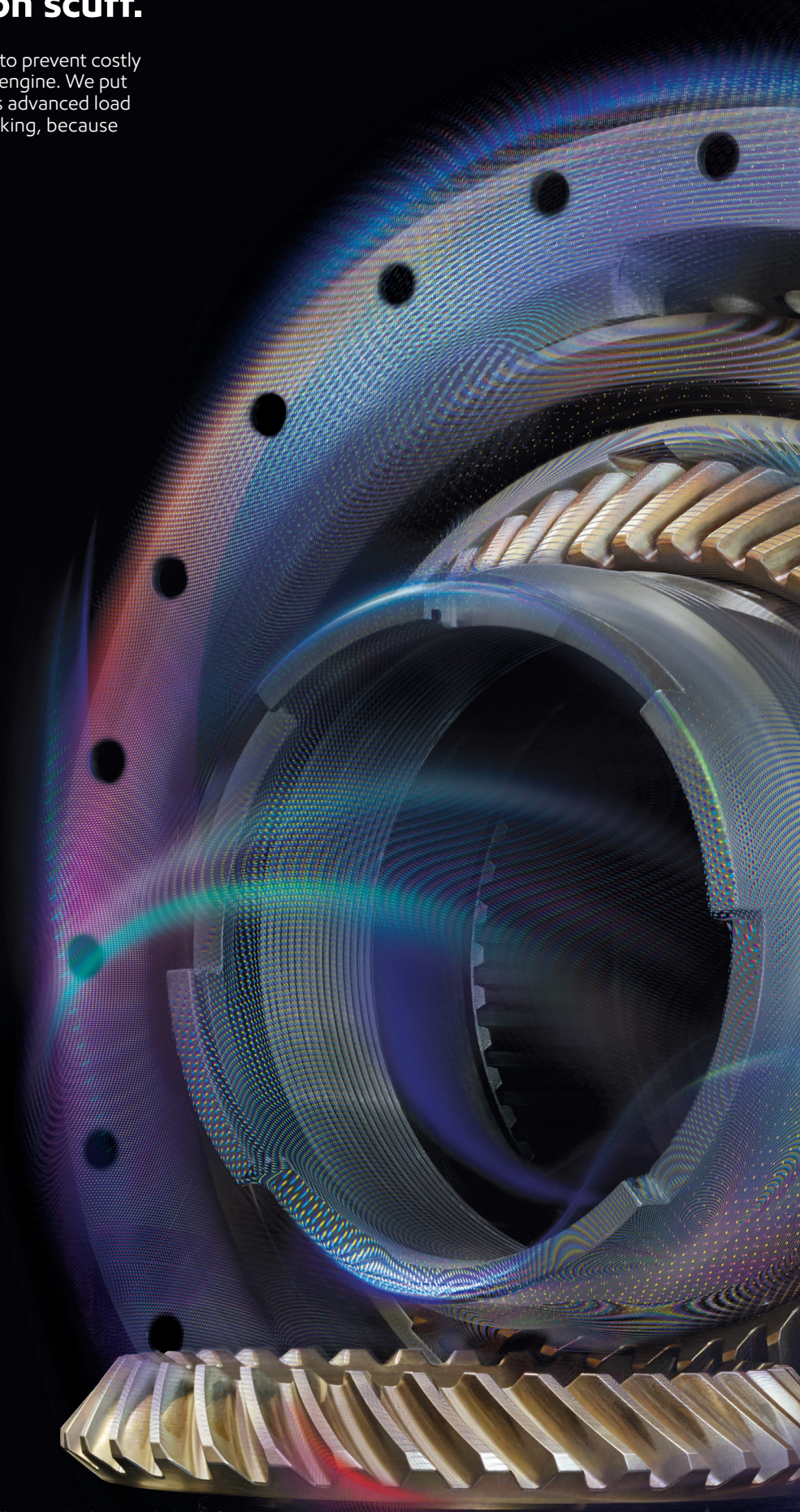
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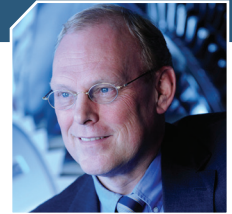
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**Leo Koppers** SVP Marketing & Sales, MTU Maintenance



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** I think that commercial engine MRO is doing very well, at least as far as MTU Maintenance is concerned!

As a matter of fact, 2015 was the most successful year we had in history: MTU's commercial maintenance business increased its revenues by 22% to about €1.6 billion – the highest growth within the MTU Aero Engines group. Further, we signed over 250 MRO contracts valued at around \$2.1 billion, a new record and an increase of roughly 25% over 2014. From a market perspective, commercial MRO is a fast growing market. In our latest forecast, we estimate that shop visits for commercial jet engines above 100 seats will grow at just above 4% p.a. over the next ten years – from ~7,200 scheduled visits in 2015 to ~10,700 by 2025. MRO revenues should grow with a solid 7% p.a. when taking price escalation into account. Growth will be strongest until the end of this decade, with a slowdown expected thereafter as today's volume programs get mature and increasingly replaced with newer engine technology with longer time-on-wing.

**What do you consider keys to success in MRO?** From a market perspective, I would say that there are several levels of key success factors: first, hard facts related to MRO operations such as competitive pricing and logistics (turnaround times and on-time delivery) as well as high quality levels. Also a must, from a soft fact perspective, is the ability to provide support that matches, or better exceeds, customer expectations. Once these basics are met, success certainly depends on the provider ability to develop additional and innovative products and services that differentiate the company from its competitors. Our motto is "We offer more". This explains MTU Maintenance's USP in a nutshell. As the world's leading independent MRO provider, it is our aim to provide our customers with individually tailored, one-stop-shop solutions which run over the entire engine lifecycle and allow them to benefit from minimized operational costs and maximized engine value. Apart from traditional MRO services, we offer on-site and on-wing services, spare engine support, engine trend monitoring as well as accessory and LRU management. But we also go one step further. With MTUplus Mature Engine Solutions, we offer customers who are operating aging engines alternative MRO solutions that combine customized workscoping and material salvation. In addition, alternatives to MRO, for example lease or exchange engines, provide them with immediate thrust. The latest addition to our services beyond MRO is MTUplus Asset Value Maximization which provides asset owners seeking a return of investment for their end-of-life engines innovative solutions which either optimize the engine's usage if it can still be operated or maximize the material value through the remarketing of its individual parts.

**What trends are impacting or will impact MRO in the near future?** What's really interesting is the potential impact of low fuel prices on the engine MRO market. The positive trend is that the phase-out process of mature aircraft has slowed down and some of our customers are now flying their mature assets longer. We are not yet sure though whether this is just anecdotal evidence, or not.

What also remains questionable is whether this trend will ultimately lead to a pick-up on MRO work for mature engines, or if MRO demand can be met by instant power solutions such as engine exchange or leasing as an

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**Jeff Bartlett** Director - Airlines, BAE Systems



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** Our industry has become more efficient and competitive in response to the recession and higher fuel costs. Lessons learned have not been forgotten with the improved economy and lowering fuel costs. Used serviceable material and pooling are game-changers for the parts segment. Component OEMs that relied on spares sales to pay back development costs must now offer new solutions. Overall, the aircraft manufacturer push into the aftermarket has sharpened each channel's focus on defense of their share, with MROs seeking to grow demand for integrated solutions and OEMs seeking to leverage their product expertise.

**What do you consider keys to success in MRO?** The key is to understand where you sit in the value chain, which channels are natural for you, and where you need partners to deliver the new solutions that the airlines expect. Underpinning all this is the need to be more agile and responsive with real-time solutions.

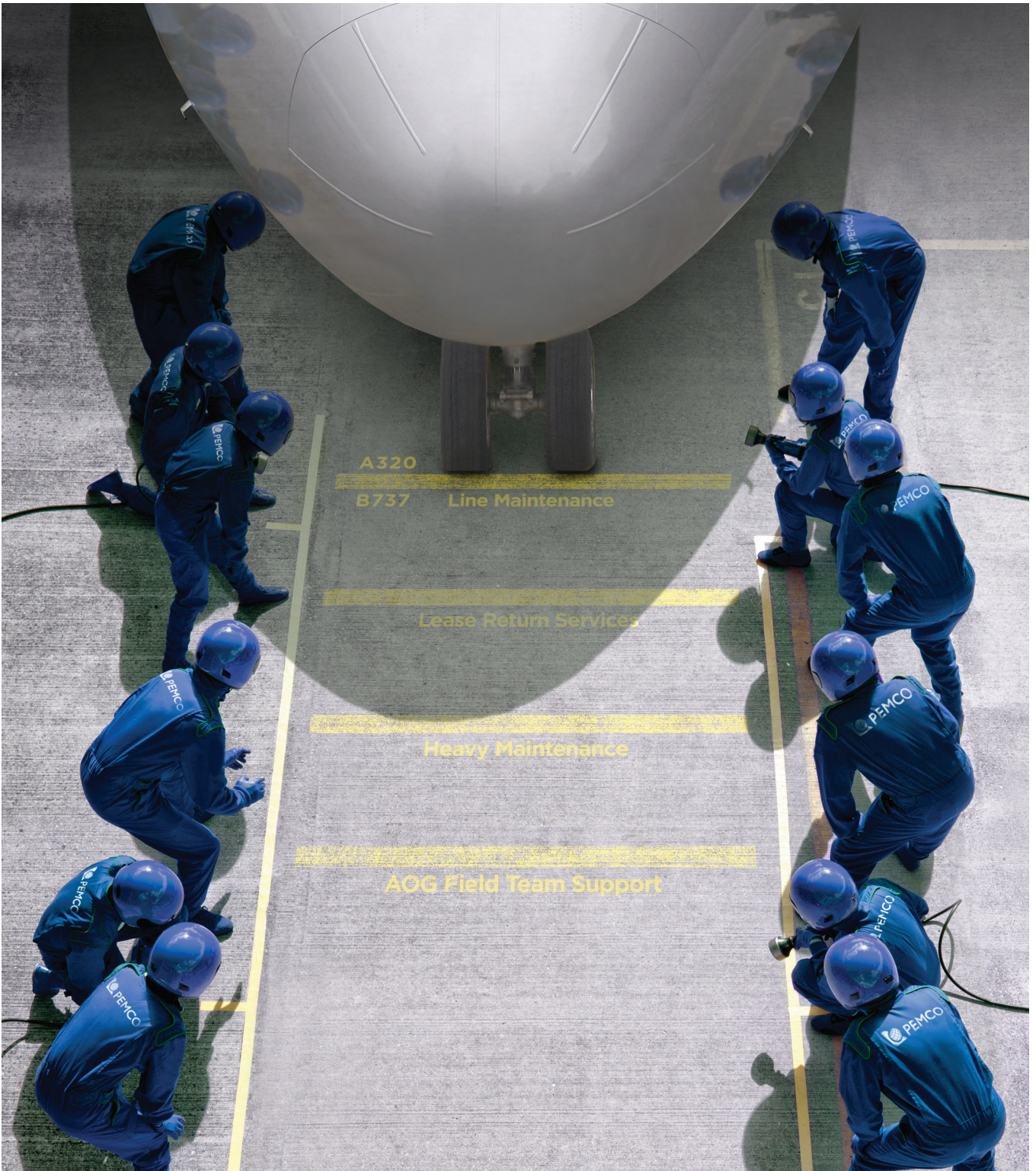
**What trends are impacting or will impact MRO in the near future?** Expect to see more partnerships and alliances. No one can be all things to all market segments. To defend share in our competitive environment, companies need strategies for multiple channels to market, and this can be achieved efficiently through teaming. Another trend is forecast volatility. There have always been many variables at play in forecasting our business, but add the structural changes in the market, and the dynamic market responses, and it's becoming harder to forecast. Flight hour agreements help, as does the further use of analytics.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?** Big Data generally refers to the massive amount of data captured on new platforms, but it's also interesting to see how analytics are transforming older platforms. Inventory management, economics around used serviceable material, and product reliability are all becoming more data driven. As a component OEM, "big data" includes how product expertise is leveraged to develop innovative product improvements to improve on-wing reliability and life extension.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** Additive manufacturing is geared for mechanical parts and not the electronics world, so it has not been a factor yet. However, it will be interesting to see how additive manufacturing might address obsolescence issues with the mechanical elements of electronics products.

**How does your company encourage innovation?** As a component OEM, innovation is our lifeblood, not just in developing new products like IntelliCabin, but also in using field data to improve performance. Two areas where we see this are modification programs to standardize fleets, and Full-authority Digital Engine Controls (FADEC) overhauls to prevent unscheduled removals. As the market evolves, we are complementing product innovation with service innovations in asset management.





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## Pastor Lopez CEO, PEMCO World Air Services



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** 2016 will be a busy year for MROs. Airlines are spending capital in upgrading and standardizing their fleets. At PEMCO, all of our bays are sold out for the remainder of the year — except for the slow period in July. We have an entire hangar dedicated to one carrier, with four to five lines depending on schedule. In the other hangar, we have four lines of mod for a legacy carrier and two lines of checks for two different low-cost carriers.

**What do you consider keys to success in MRO?** Aside from quality and on-time performance, we believe that customer service is essential to what we do. At PEMCO, we have taken a hard look at our entire operations and developed a strategy around four cornerstones: Teammates, Customer Service, Lean, and Metrics. It all has to start with our team. We have made great progress in getting team members to buy in to our vision, and we are empowering them to make necessary changes via the Lean program. We then place rigorous metrics around each function, which we review on a weekly basis. Customers are the reasons we exist. They want us to provide information in real-time and be very transparent. Again, transparency comes from empowering our team to connect directly with customers.

**What trends are impacting or will impact MRO in the near future?** Lower oil prices will have a short-term impact — unless prices remain fixed at current levels. This means retirements will slow down, as happened in 2015, by most assessments. Most airlines executives I speak with do not believe the current oil price levels are sustainable in the long run. Moreover, airlines take a long-term view when planning for future growth. The labor pool is and has been an issue for a long time. On a recent visit to Phoenix, two of us from PEMCO took an Uber ride to the airport. We were discussing our MRO business as we encountered the typical morning rush-hour traffic. The driver turned to us and said, "I have an A&P." He stopped working as an aircraft mechanic because he is making more money as a contract driver for a limousine service and driving for Uber in between jobs. Other industries are recruiting A&P mechanics with better offers. This places a burden on our "ecological" system. As a result, we're working hard to create an environment where people truly want to work for PEMCO because of the kind of company we are, rather than for just a paycheck. The MRO industry remains fragmented. While airlines have consolidated in the last 10 years (11 carriers at the turn of the century have now folded into five), the MRO industry has been very slow to react. Yet some companies are creating additional supply by building new hangars instead of using the consolidation approach. This will have a negative impact on prices, which in turn reduces the labor pool's desire to enter this industry — which is why I call it an "ecological" system.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?** In 2015, we added an analyst to our staff. Adam Butler's job is to analyze every single check type to help us improve our performance. Thus far, we've had some successes, some reasons to celebrate. For instance, there is one C-Check type for one specific carrier that we used as a loss leader. This changed through data analysis. That check is now very profitable and we were able to reduce the span time as well.

**How does your company encourage innovation?** We have a great employee base with terrific technical depth and airline background. Our customer base is well diversified with four major customers operating similar

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## Christopher Whiteside President, AJW Group



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?**

The component MRO industry has changed significantly in the past few years and continues to evolve. Regional specific factors are forming a real divide between geographical locations, often due to foreign exchange fluctuations mainly driven by the USD on the back of oil pricing. We are seeing markets mature and OEMs looking for larger after-market share particularly on the newer platforms like the A350. Independent MROs who, unlike AJW, do not have OEM approval, are struggling to get into the new fleet types. We are also seeing a shift towards credible integrators of multiple OEM offerings with the ability to give nose-to-tail MRO coverage or, at least, complete ATA chapter coverage with multiple OEM content. The other shift is towards greater emphasis on reliability with more focus on total costs, rather than individual repair prices.

**What do you consider keys to success in MRO?** Quality, price, reliable TAT and responsiveness – in that order - and partnering with the OEMs. Cost, and by cost I mean total cost, is always a factor. MRO evolves with time, often through technology advances, or adapting to new airline methodology. Our success has been driven by matching our solutions with the needs of the customer. The needs of an LCC are dramatically different to those of a large global legacy carrier.

**What trends are impacting or will impact MRO in the near future?** Global boundaries are disappearing, and new aircraft manufacturers are breaking into the market, along with the new aircraft types entering their first cycle of maintenance. The trends of MRO are driven by the needs of the operators and as more operators reduce their internal supply chain resource to concentrate on the core business of operating the airline, the MRO provider is being asked to provide a total solution. AJW is seeing changes in airline behaviour as they move away from the ad hoc repair market, towards our more financially stable flexible PBH contracts. AJW Group is more frequently being asked to provide not only MRO support, but also pooling and logistics functions combined. Another trend is for OEM manufacturers to increasingly look for partners who specialise in aftermarket support to improve the service angle of aircraft post-delivery - that is an integration of the OEMs and AJWs services.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?** AJW has been collecting real life data in order to improve reliability and cost for our customers for more than 20 years. The analysis of this historical maintenance data is extremely important when it comes to forecasting the cost and profitability of potential PBH contracts. We have invested in state of art data mining tools and interfaces, in addition to employing professionals with data visualisation skillsets. We are able to perform advanced data mining in various ways because we have a consistent data structure at the point of data entry. With our big data, we can run part-usage statistics based on any commercial aircraft type. We have usage statistics on over 800,000 unique part numbers in our database giving us the competitive edge in the marketplace. We can also measure a repair shop's performance and costs based on any specified part number to ensure we meet the service level of expectation for our airline customers. One example is the use of our data to recommend additional work scopes over and above the CMM (Component Maintenance Manual) at our own MRO facility AJWT Technique. We are also using data to formulate soft life proposals to our customers. As big data becomes more

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**Jeremy Remacha** CEO, SR Technics



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** The global commercial MRO market is estimated to continue growing by 4% per annum for the foreseeable future. Whilst this provides a positive trend, the industry continues to realign itself with cost, technology and service delivery challenges. Furthermore, although operators may be benefiting from lower fuel prices, the cost pressure on MRO services continues to create harsh competition and pushes companies to seek more radical measures to meet customer expectations. In some cases, it will require new business models, innovation and greater flexibility in order to succeed. New aircraft platforms and engine types coupled with older generation retirements and OEMs expanding into the aftermarket services is dramatically changing the landscape for traditional MRO providers.

At SR Technics, we acknowledge the need to be more nimble, ensure a global presence and continue to focus on the key factors which are important to all our customers. This also includes closer alliances with our major customers, strong OEM partnerships and a total commitment to service delivery.

**What do you consider keys to success in MRO?** We are competing on a truly global market, where cost is a major driver. In this environment, customer retention and satisfaction become increasingly important along with the ability to deliver high quality at competitive prices. At SR Technics, we are focused on developing strong, long-term partnerships and co-operations with airlines, leasing companies and OEMs, delivering tailored solutions that add real value. We have also expanded our global footprint, offering greater proximity to customers.

**What trends are impacting or will impact MRO in the near future?** In response to price competition, companies are constantly looking to improve their cost structure seeking economies of scale. As a consequence, this may lead to changed service models, different geographic locations (with lower costs) and further industry consolidation. The aviation industry is transitioning between mature and new aircraft platforms. However, the lower fuel costs provide an opportunity for some operators to extend their fleet and defer capital expenditure, prolonging the core traditional MRO work activity. The expectation is that the price to operators will continue to realign with market forces and MROs will thus need to continue to innovate, relocate or consolidate. At SR Technics, we have seen some airline operators moving to in-source activities such as line maintenance and engineering while start-up airlines, especially in Asia, are looking more to a total outsourcing model for their MRO activities.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?**

Big Data has the potential to fundamentally change the MRO industry as well as aviation in general. Access to data and the ability to interpret and analyze information can lead to improved reliability, greater predictability, lower costs and ultimately, improved safety outcomes. None of this can be achieved without significant investments and time. At SR Technics, we are successfully using Big Data for inventory optimization supporting over 1000 aircraft. Customers provide us with live data, giving us with instant visibility on the location and conditions of managed inventory whether it is owned by SR Technics, the customer or the supplier. Combining

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**Jim Sokol** President MRO Services, HAECO Americas



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** 2016 has started off well – trending better than 2015. We’re seeing positive trends as a result of modifications. Airlines are looking at cabin modification with a higher density. We’ve meeting a greater demand for ergonomic factors. We’ve also seen carriers respond to lower fuel prices by holding on to their older planes.

**What do you consider the keys to your company's success in MRO?** Adding the international recognition of the HAECO brand has been helpful. We are truly an international company which allows us to manage demand globally. HAECO is unique in that we provide airframe, engine, complete cabin solutions and line maintenance – one-stop shopping. There are very few companies who can do the engineering, certification, manufacture, and installation of interiors during aircraft reconfigurations. That sets us apart.

**What trends are impacting or will impact MRO in the near future?** Airlines holding onto older narrow bodies as they get ready for NEO and Max. Record airline profits allow operators to differentiate their cabins through reconfiguration. Airlines are seeking true differentiation from their competitors.

**Is Big Data being used by your company and, if so, how is that improving your business?** There’s so much different data. What do you track? We always strive for operational excellence, by tracking KPIs: Key Performance Indicators measure people, performance, safety and cost. We’re rolling out those measurements to the hangar in the same format – makes it simple for employees and not overwhelming by using key visuals everyone can understand. The key to Big Data is avoiding analysis paralysis by focusing on the key issues that impact the business.

**How is additive manufacturing impacting MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** We have yet to see any significant changes here on the MRO side. Our composite shop is naturally required to do certain things in specific ways due to regulations.

**How does your company encourage innovation?** We actively solicit employees to bring good ideas about operational efficiencies. We are open to addressing concerns and have a feedback loop to vet and close every issue. That openness is built into HAECO’s culture and has brought about positive changes as we respond.



**Refael Matalon** Senior Director & GM Marketing and BD, IAI/Bedek Group



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** The last year had been very prosperous for the aviation industry due to various global economical reasons which have pushed forward many of the industry players. There is no doubt that this strong, positive atmosphere has been reflected in many aspects of the MRO operation where we have all seen a strong, growing demand for MRO services, both in the field of Engines overhaul and Base Maintenance, as well as a very sharp climb in the PAX TO CARGO CONVERSIONS of B767-300 & B737CL/NG. In fact IAI BEDEK has been lucky enough to enjoy these days an increasing wave of conversions projects, in parallel to the growing demand for MRO Base Maintenance Services which are not only seen today as stand-alone projects but also appear as a completion service for our customers which had originally contracted with IAI BEDEK on Conversions projects.

**What do you consider keys to success in MRO?**

We believe that IAI BEDEK’s long history of over 60 years of experience in providing comprehensive MRO services under “one roof” , through its three Divisions for Aircraft, Engines and Components, has enabled our MRO center to develop very efficient pre-planning procedures to be used as a key factor in providing these services in the most efficient manner. We believe that a key factor to secure a smooth MRO project requires the combination of a strong core of experienced and knowledgeable Engineering personnel together with well advanced preparation of the required measures and properly preparing the facility for each and every Aircraft, Engine, LG & APU prior to its induction, from the logistics aspect as well as properly allocating the designated resources for each project respectively. This of course has to be performed in parallel to continuously monitoring and constantly developing an internal Quality Assurance program together with constant development of new measures and an in-house modernization program of the facility capabilities. This combination creates a “machine” which constantly strives for excellence in any aspect of our operation.

**What trends are impacting or will impact MRO in the near future?** The trend of the OEMs being more involved in MRO with comprehensive total support will definitely affect the independent MRO suppliers who will need to look for cooperation and JVs with the OEMs. New generation engines have more on-wing life and the shop visit cycles are less frequent when LLP’s are replaced for full on-wing potential. Using remaining green life on engines is primarily one stage before end-of-life dismantling. Regarding airframe MRO the trend is for less structure and increasing composites support needs. IAI BEDEK is in an ongoing process to develop advanced composites’ capabilities to support composites’ maintenance needs. Taking into account that IAI is a manufacturer of composite parts for both military and commercial aircraft is giving IAI BEDEK a significant advantage in the composites MRO field.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** The additive manufacturing is not in use yet by our company. However it is evaluated for special tooling manufacturing which will definitely save cost and will justify the initial investment. Moving forward we foresee that the additive manufacturing will enable MRO’s to manufacture non-structural parts primarily interior parts once the certification of such parts will be regulated.

**How does your company encourage innovation?** IAI BEDEK management is in an ongoing process of encouraging innovation. A dedicated innovation director is coordinating the innovation efforts and activities. Each idea is evaluated by in-house experts in complimentary fields. The ideas which are found qualified are brought to an innovation committee led by IAI BEDEK GM. Each employee is aware that he has an open door for presenting innovative ideas.



## **Zilvinas Lapinskas** CEO, FL Technics



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** Considering the overall growth of spending on MRO-related services, some may state that in general the industry couldn't have been better. But as the industry grows larger, so does the pressure from airlines for MROs to lower the prices.

Also, a lot of other issues and challenges remain unsettled. These challenges include, but not limited to:

- Entrance into service of new generation aircraft which have longer maintenance intervals and thus have lower demand for shop visits;
- New generation aircraft as well as their operators become smarter, more advanced with regards to IT solutions – all of which drives MRO providers to invest additional funds into upgrading their IT infrastructure and the qualification of the work force; with regard to using all the benefits of new IT solutions and exploring more efficient business processes (e.g. LEAN), MROs also encounter the “mind set” issue whereas more experienced but yet less flexible work force doubts or opposes the implementation of new solutions
- Growing concern of some emerging markets, including Indonesia, over the quality and safety of local MRO providers (both independent and airline in-house units) and their readiness to invest into process improvement and certification according to EASA/FAA standards;
- Increasing pressure on MROs as legacy carriers continue cost reductions in their intense competition with the LCC segment; the ability of an independent MRO to offer a wider package support or any other added value (i.e. develop new, more accurate business and cost models) – this will define who will stay in business for at least another 10-15 years; otherwise they will be merged, sold or shut down;
- Continuous growth of OEM presence in the MRO market which will only increase in the future as new generation aircraft (and engines) will replace the current generation; MRO market players should accept the fact that OEMs are here, and they are here for long; there are many ways how MROs and OEMs can cooperate; independent MROs also have something that many OEMs do not – flexibility and wider geographical coverage; in some cases, independent MROs can also offer more favorable pricings, particularly for small and mid-size airlines.

**What do you consider the keys to your company's success in MRO?** One of our main advantages – one-stop-shop services. We offer base and line maintenance, engine/APU/LG maintenance management, spare parts and components supply, training, engineering, DOA. The ability to support an airline with comprehensive set of services provides us with larger pricing flexibility as well as allows airlines to save own resources while managing all the vendors and separate MRO projects.

Another factor is becoming more LEAN and IT advanced. Shifting both hangar and office processes to LEAN standards has allowed us to reduce daily resource consumption and fasten turnaround times. Together with new IT solutions, some of which we have developed in-house, we are able to offer our customers more transparency and accountability with regards to actual man-hour consumption.

The third major factor – diversification. We do not limit ourselves to one specific market or region. Local economies (and aviation markets as well) are always exposed to global and regional risks. If you focus on one single market (e.g. base maintenance or North America only), it will be quite a challenge to start exploring new customers outside the market should something happen. We, at the same time, are present in all major MRO segments while having customers and partners in all world regions. Such business diversification allows us to correlate our sales force and adapt products without any “death or life” scale risks.

**What trends are impacting or will impact MRO in the near future?** Less checks per aircraft, but more aircraft overall; tighter competition between MROs as well as with OEM; more joint programs by OEMs and MROs; stronger pressure from airlines and the struggle for higher efficiency; increasing role of advanced IT solutions.

**Is Big Data being used by your company and, if so, how is that improving your business? How does your company encourage innovation?** Without a doubt, smart metering, Big Data and Internet of Things are the key to efficient resource distribution, more accurate TAT planning and thus shorter customer's aircraft downtime. However, these technologies are still in progress of winning the industry's recognition as the market needs more successful examples (case studies).

At FL Technics, we prefer not to wait, and develop our own IT solutions which allow us to track man-hours and

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## **Jim Martin** Founder & Managing Partner ACM Aviation Staffing and President & CEO, Marana Aerospace Solutions



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** The industry is in transition with many facilities being built in North America and Latin America. The chief constraint in North America remains qualified labor. This problem has become more acute as there are not enough mechanics entering the market to replace the ones who are retiring.

**What do you consider keys to success in MRO?** Managing the maintenance schedule for the customer so that the heavy check is returned on time, within budget, and without defects.

**What trends are impacting or will impact MRO in the near future?** Consolidation has already impacted the industry, and will continue to do so, as will the labor constraint. Additionally, airlines are retiring aircrafts faster than they used to. This can have an adverse impact to maintenance providers, but will prove to be a benefit to the tear down facilities and companies buying aircrafts to part out.

**Should maintenance training be changed? If so, how?** I think that there should be better oversight on foreign MROs. I don't believe that these facilities maintain the same quality and training standards as the North American facilities. I also think its next to impossible to have the same FAA oversight overseas as exists in the States.

**What challenges are you encountering in finding the right people for the MRO environment?** There is already a shortage of skilled labor and it is getting worse. Many young people who opted for trade schools in years past are now opting to enroll in online universities. Unfortunately, many of these young people end up with substantial student debt and no real opportunities for employment after graduation. So it's a double whammy. And it's not just the aircraft industry that is experiencing this shortage, but also HVAC, automotive, electrical and plumbing.



## Turkish Technic Senior Official, Turkish Technic



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** Maintenance, repair and overhaul providers (MROs) play an essential role in sustaining the world's airline fleets. Today, it is estimated that the global market is worth up near to \$67 Billion and will grow to \$100.4 billion by 2025. The aircraft fleet is growing year by year. Today, total number of commercial aircraft fleet reaches around 24,000 aircraft and will expect to grow by 3.7% cumulative annual growth rate to 34,408 aircraft in 2025. In this 10 year period, the narrow body jets will continue to dominate the market.

It is clear that maintenance repair and overhaul demand will increase with the rapid increase in aircraft fleet. It is certain that the main challenge for all MRO providers to supply is to respond to the rapid growth in demand by providing maintenance services with a highly qualified workforce.

**What do you consider the keys to your company's success in MRO?** Sitting on the crossing point between East and West, Turkish Technic believes geography and its history are all in its favour as it seeks to gain more and more business from outside. Key to being able to win business, of course, are the MRO's capabilities. We have a nose to tail service for many types of aircraft. We are an airline-owned MRO where priority pushes us in one direction or another; which enables us to have a multi purpose approach and flexibility. Last but not the least, the ambition to achieve goals and seal the success is one of the most valuable keys to our success.

**What trends are impacting or will impact MRO in the near future?** Being an early adopter of the 787/A350XWB new generation technology aircrafts will be a leverage, this is valuable experience and expertise; where Turkey is limited with lack of infrastructure and airport, which is being under construction; to be finished 2018, and be the largest of Europe. Big Data is the way to go for the MRO performance (streamlining maintenance data aids innovation and increase efficiency. Our insight/experience in that it may significantly impact maintenance cost and increase efficiency. And last, cabin interior modification is getting very popular with the latest influx of IFE and internet based products. In our opinion there is opportunity, because passengers are requesting immediate content and comfort vs. money paid for ticket.

**Is Big Data being used by your company and, if so, how is that improving your business?** Regarding the Big Data, I think there is not enough data collected in MRO market. At Turkish Technic we focused more on predictive maintenance. We cultivate all data, including components, flight data and etc., for forecasting the remaining service period. So it would be better to name this "Big Data Processing."



## Eric Strafel President and CEO, Aviall



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** The commercial MRO airline market segment is indeed healthy and continues to be very positive for Aviall. Fuel prices continue to be down and airlines are more profitable in current conditions.

In addition, many airlines are now extending the life of their aircraft which in turn, creates the need for additional parts. At Aviall, we pride ourselves on our ability to deliver exceptional customer service along with the right part, at the right time with our extensive market basket of ~2 million part numbers from more than 240 original equipment manufacturers (OEMs). As the market evolves to support the rapid pace of new aircraft deliveries, we will continue working to align our parts and services offering with MRO needs.

**What do you consider the keys to your company's success in MRO?** The keys to our success start with our customer-first mentality and our ability to deliver better value, convenience and a higher level of service for our customers. As a result of our wide-ranging capabilities in both the parts and repair (MRO) business, we have a diversified global footprint in providing aftermarket support in the general aviation, business aviation, commercial aviation and military market segments. This large footprint allows us to be in global locations where our 26,000 customers need us most, making us an invaluable business resource.

**What trends are impacting or will impact MRO in the near future?** As airlines move toward extending the longevity of aircraft, there is a growing trend for airlines to also increase the utilization of power-by-the-hour programming, thus increasing the level of business activity for MROs in the commercial, business and general aviation markets. This increased utilization will continue to produce a growing space for the MRO industry, as direct business from airlines continues to decrease. These trends will indeed cause a positive impact on the MRO industry and we look forward to being the supplier of choice for the industry, and watching the increasing momentum in these segments.

**Is Big Data being used by your company and, if so, how is that improving your business?** Nearly three years ago, Aviall went live with a new enterprise resource planning system, SAP, across all 40 of our global locations. The implementation of SAP has allowed us to positively transform how we do business, as we are now in a position to better connect, as well as receive and analyze important data from the industry, our customers and suppliers. With the SAP foundation in place, we have been able to make significant investments in analytics tools, technical skills, technology partners and external data sources to better anticipate the growing needs and business demands of our customers and suppliers. Since its implementation, we have experienced improvements in supply chain planning and forecasting, product availability, electronic integration, value-added services and overall partner satisfaction in meeting the business goals and objectives of our customers and OEMs.

**How does your company encourage innovation?** Innovation is built into the Aviall culture and is a core component of how we operate as a business. We strive to understand our customer's business objectives and problems and secondly, find ways to apply innovative solutions using data analytics and technology to create value. This overall spirit is embedded in the way we think and assists us every day as we build continued supply chain innovation and operational effectiveness that deliver value to our OEM partners and customers.





**Derek Zimmerman** President, Gulfstream Product Support



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** The Gulfstream Product Support organization is a growing and vibrant part of Gulfstream Aerospace Corp. The continued growth of our fleet – now at more than 2,500 aircraft – and increased flight hours in the second half of 2015 helped keep the average loading at our 11 company-owned service centers worldwide at capacity for the year. For a good portion of 2015, our facilities were full of aircraft, and that included space provided by recent expansions. In May 2015, we opened a nearly 110,000-square-foot/9,290 square-meter hangar in Brunswick, Georgia, more than doubling the site's under-roof capacity to as many as 16 large-cabin aircraft. In late November, we opened a renovated 19,000-sf/1,765-sm maintenance hangar at our site in Long Beach, California. Also, in August we opened a nearly 90,000-sf/8,361-sm paint facility dedicated to in-service aircraft.

**What do you consider keys to success in service and support?** There are several, including people, parts, facilities, technology and customer engagement. For well over a decade, we've invested considerably in training, tooling, technology and positioning parts, materials and employees closer to our customers. Since General Dynamics bought Gulfstream in 1999, we've expanded our facilities at company headquarters in Savannah, opened U.S. service centers in West Palm Beach, Florida, and Las Vegas, added international service centers in England, Brazil and China, and appointed authorized warranty repair/line service facilities all over the world. We also offer maintenance, repair and overhaul services for our operators at Jet Aviation's Teterboro Airport facility in New Jersey. In terms of customer engagement, we have made a number of enhancements to our customer support channels that open new lines of communication between Gulfstream and our operators, regardless of where they are located. In 2012, we opened a full-service multimedia center, Studio G, that we use to enhance communications with customers. Last July, we used the studio as part of the company's first virtual Operators and Suppliers Conference, an interactive event to ensure that customers have the most up-to-date information on their aircraft. During the three-day online conference, Gulfstream experts stationed in Studio G in Savannah provided updates on model-specific programs, regulatory mandates, select aircraft systems and critical inspections to pilots, technicians, flight attendants and other flight operations personnel worldwide. Gulfstream operators submitted questions prior to the conference, viewed the presentations and participated in live question-and-answer sessions. The event supplements Gulfstream's biennial Operators and Suppliers Conference, which will be held in June in Savannah, and the operators forums we hold around the world throughout the year. As for parts, we recently built a new state-of-the-art 337,500-sf/31,355-sm Product Support Distribution Center at company headquarters in Savannah, Georgia.

**What trends are impacting or will impact business jet service and support in the near future?** One trend is the shift in aircraft systems — from mechanical to more electrical — and the specialized training and tooling involved with that transition. The three-dimensional model-based type design that we used to design the G650 is now an integral part of servicing that aircraft. What's happening in aviation is similar to what happened in the automobile industry.

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**Todd Duncan** Chairman, Duncan Aviation



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?**

The good news is that business jet flying hours are stable. The bad news is that they are not rising. In many preowned markets, aircraft transactions are occurring at a decent rate and we are seeing a good number of pre-buy evaluations in our maintenance hangars. Poor economic conditions, mostly outside the U.S. borders, combined with the strong dollar, are also pushing international business down. That means competition among business jet MRO providers right now is strong.

**What do you consider keys to success in your service and support business?** The success of Duncan Aviation can be explained in one word: people. We invest in our team members and we trust them to take care of the customer. Our team members are passionate about their work and they make careers here. Of our more than 2,150 team members, 235 have been with the company for 25 years or more. That allows them to develop deep technical experience and really get to know the aircraft and our customers. Other major contributing factors would include the investment we make in the business and our long-term commitment to our people, our customers and the industry. Over the last 20 years, Duncan Aviation has invested nearly \$175 million in facilities/tooling and nearly \$48 million in training. In addition, we develop strong partnerships with the OEMs and strive to provide our mutual customers with the best possible service experiences. Our team members play integral roles in advisory and technical committees for a majority of the OEMs we support.

**What trends are impacting or will impact business jet service and support in the near future?** Connectivity has impacted business aviation for several years now, and it is something that continues to be a hot button for operators. They want the same experience in their aircraft as they have in their office. The NextGen mandates will have a big impact on the industry over the next few years. We are performing some upgrades at our facilities, but as an industry, it is obvious that there won't be enough industry capacity to complete all of the necessary upgrades before the 2020 deadlines. And we are of course all closely watching and participating in the developments from Washington, D.C., regarding regulatory oversight and funding for certification and support.

**Is Big Data being used by your company and, if so, how is that improving your business?** We are definitely using technology and data in new ways today, and some are having a huge impact on our business. Our senior team takes time every year to look at a long-term, 10-year plan for the business. To do this, we rely heavily on economic projections and aircraft demographics. That data helps us determine what we will need in terms of facilities, capabilities, training and staffing. As I mentioned, we are committed to business aviation. We plan to be here for the long-term and every decision we make is done with the future of our company, our team members, our customers and the industry in mind. We have invested in a comprehensive, internally built Customer Relationship Management system to better track customers and ensure we are meeting their needs and keeping them informed of our ever-changing capabilities and services. In addition, our Work Order System allows us to look at the work we perform and capture repair trends, helping us to identify parts with higher fail rates. This information can then be used to provide repairs and maintenance that will provide longer lasting solutions for customers.

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**Neil W. Book** President and Chief Executive Officer, Jet Support Services, Inc.



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?**

New aircraft deliveries are down, pre-owned aircraft valuations are falling, flight hours are flat and a volatile world economy has created a challenging environment for business aviation. This type of environment benefits the consumer. The OEMs are fighting for fewer buyers of new aircraft and looking to aftermarket services to help bridge the gap. With an increasing emphasis on these service offerings, prices have stayed relatively flat, and the focus on service has intensified. It is a great time to be a buyer / consumer.

**What do you consider keys to success in service and support?** I try to keep things simple. First and foremost, work hard every day to deliver a world class service experience to the customer. The best ambassador you can ask for is a satisfied customer. Of course, you cannot deliver a world class service experience without having the right people in the right jobs, delivering for the company day in and day out. It's my job to work hard to create a corporate culture and work environment where we can attract the best and the brightest.

**What trends are impacting or will impact business jet service and support in the near future?** One trend we have been seeing is that until a few years ago most buyers of new production business aircraft would rarely consider enrolling their aircraft onto an hourly cost maintenance program when they were accepting delivery. Today, buyers are more educated about the risks of unscheduled maintenance costs that are not covered by an OEM warranty, they recognize the need to begin accruing reserves for scheduled maintenance at time of delivery and they also recognize the increase in residual value a maintenance program provides.

Another trend which fills me with pride for our industry is some of the innovative services which are coming to market that have attracted an entirely new segment of the population to business aviation. The "shared economy" model has allowed companies to offer access to business jets at prices never before seen in the industry. Giving the consumer the business aviation travel experience will have a wildly positive impact on our industry in the coming years.

**Is Big Data being used by your company and, if so, how is that improving your business?** The simple answer is yes we use Big Data, and yes it continues to improve our business. JSSI collects data points on the nearly 2,000 aircraft enrolled on a JSSI program. By leveraging our data, we effectively forecast both the timing and cost of maintenance events with real precision. We have been able to streamline the process of developing maintenance programs for new platforms in a fraction of the time that it took just a few short years ago.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in service and support, if applicable)?** Technology across all industries is reshaping the world that we live in. Additive Manufacturing will ultimately have a profound impact on the business aviation sector by bringing parts to market more quickly and less expensively. Of course, there will be regulatory hurdles to face and the necessity for quality controls, but long-term, I fully believe that this new technology will ultimately have a positive impact, by creating greater competition among manufacturers and additional availability of parts.

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**Malissa Nesmith** Senior Vice President/COO, Global Parts.aero



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?**

From GlobalParts.aero perspective, we see a promising market place. Aircraft OEMs appear to be more open to outsourcing support for their legacy, out of production aircraft, while they focus on new product development, production, sales and support. The legacy market is a good niche for us. We now have a proven track record with Bombardier's recent acknowledgment of GlobalParts as a strategic partner. And now we provide comprehensive support to the more than 2000 Learjet 20, 30, and 50 series aircraft operators.

**What do you consider keys to success in service and support?** From a parts distribution standpoint, success begins with having the right parts on the shelf, available to ship immediately as well as being available to our customers around the world 24/7. GlobalParts customers get a live person on the other end of the phone, no matter what time it is, and our ability to ship counter-to-counter is only limited by the airline's schedule and availability. To enhance our Wichita based distribution, we have added warehouse capabilities to our hub in Atlanta, Georgia, and it has impacted our international success as well as supported our stateside responsiveness. Also, we continue to be successful by focusing on being a single source solution for the industry. Customers like service that is convenient, therefore we are always looking for more parts and services to offer to make it easy to do business with us.

**What trends are impacting or will impact business jet service and support in the near future?** I see the market more open to PMA parts than ever before, and PMA seems to be losing the negative stigma that it had in the past. There remains a resistance to PMA parts overseas, but many OEMs do not even have the tooling available any longer for some legacy parts, therefore, PMA is the only option. The worldwide acceptance of PMA should continue to grow in the next few years and hopefully will include more reciprocating of FAA approved STCs and PMA's by international regulatory groups so that the overseas operators of legacy aircraft can benefit.

**Is Big Data being used by your company and, if so, how is that improving your business?** We have been using add-on modules developed by 3rd party providers to enhance the efficiencies of our ERP system. Also, we continue to develop custom dashboards from our large databases to create more measurable feedback which in turns helps us make more informed business decisions in a shorter time.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in service and support, if applicable)?** There has been some tooling work accomplished here at GlobalParts using Additive Manufacturing or 3-D methodology. Our engineers continue to learn about this advanced technology and how it will be applied to our industry. We expect other MRO businesses will continue to have a watchful eye on these advancements as well.

**How does your company encourage innovation in the service and support sector?** We recently added a full Engineering department to help provide solutions to customers with certain on-going challenges. This specialized Engineering team can address issues on both the repair side and manufacturing side. The team is tasked with finding the right resolution to a customer problem or concern they may have dealt with for years, ineffectively. This process opens the door to innovative discussions we can have with our clients that might not happen otherwise.





**Geoff Chick** Vice President of Customer Service, Dassault Falcon



**What do you consider keys to success in your service and support business?** It all comes down to the people in the organization: from a supportive executive management to passionate employees with the right attitude. That's the key driver to any measure of success in business. Of course, we do this to create the best experience for our Customers. We continuously look for Customer input, especially our Operator Advisory Board. They offer valuable advice and feedback on how we're doing and we take their input very seriously. It was the OAB that helped us define Falcon Response and the feedback on that program is almost universally positive.

**What trends are impacting or will impact business jet service and support in the near future?** The biggest change we've seen over the past ten years is fewer operators have their own flight department and support structure. Most customers are relying on OEMs for additional support even with the elementary things. So, we're now more mobile: going where the customers are. And, mobility extends to both scheduled and unscheduled maintenance. Our Go Team programs and Falcon Airborne Support are a direct result of this trend. We're also seeing cabin connectivity as being such a crucial need that aircraft are being declared as AOG when connectivity is not functioning.

**Is big data being used by your company and, if so, how is it improving your business?** The first tool that we have is something called 'FalconScan' which will be available soon. FalconScan is an on-board real-time self-diagnosis system. Previous Falcons incorporated onboard diagnostics to monitor hundreds of parameters, FalconScan will connect to all onboard computers and monitor more than 10,000 parameters. The ultimate benefit is an aircraft that can analyze data and detect faulty equipment thanks to patented algorithms. Operators, even in remote locations, will be able to autonomously troubleshoot the aircraft, identify needed parts, if any, and coordinate the quickest possible remedy. We also process and analyze both historic data and event specific data to put parts in key locations. For the major distribution centers we use a combination of the historical demand in region as well as the most critical parts – parts which cause the most flight delay and cancellations as well as parts with the most removals. For the smaller distribution centers we stock the most critical parts. We also analyze every flight delay and cancellation — no matter where it happens — and then decide in which location we should stock the parts that were needed to return the aircraft to service.



**Charles Picasso** CEO, Aviation Technical Publishers



**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?**

Overall, the MRO business seems to be doing well, showing good growth in the Corporate Aviation sector with many of our clients growing, in employees and space. A healthy business-aviation segment helps the MRO business and these days that segment is doing well. The best sign of how the industry is doing comes from multiple MROs we visited through the year that were expanding hangar space to accommodate their growth. Trends I see include continuing consolidation of MROs: growth despite a continuing contraction in customers servicing small, piston aircraft.

**What do you consider keys to success in MRO?** There are several. Managing the employee shortage challenge, embracing technology opportunities to improve processes, data access, and quality. I can share three critical insights for success we have observed when visiting our customers. First, was a model for predictive revenue; second, was an openness to exploring how technology could improve their operations; finally, an open-mindset, specifically in the ability to talk with and learn from others in the industry. Honestly, over my career these keys to success are not just in the MRO market, but everywhere and it is great to see our leading customers succeeding with that mindset. GA is notoriously hard to grow a new business – so MROs need to get very focused around how to best serve the customer including enhancing their customer service and pricing. The old business adage, that remains universally true, is that repeat business is the best business.

**What trends are impacting or will impact MROs in the near future?** I think digitization is the key trend that will impact MROs in the near future. The Internet, as a distribution channel, introduced the industry to digitization and ATP's early work digitizing publications helped move MROs to use software to track maintenance and run their workflow. Today's advances in digitization are moving MROs to stage information and data. And the future is in the Cloud, which can help them better integrate with the software used to run the MROs, leading to more collaboration between the players in the value chain – Manufacturers, Owner/Operators – and improve access to technical and regulatory changes. Mechanics w/tablets can be equipped with mobile apps to access relevant information at the time of need, rather than having to prepare work packages in advance of the airplane visit and then having to research for missing information. Mobile computing will deliver aircraft maintenance "at-the-asset." In the future, we also see MROs adopting more on-line technologies. They are becoming used to using cloud-based systems to reduce their IT costs.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?**

More is not better if not used smartly. As part of Big Data we need improved data accessibility and employ smarter usage. There is a lot of good information on processes, trends, efficiencies and other data if it is mined intelligently. As companies incorporate technology into their systems, they are building Big Data stores they can start to mine for new business opportunities, greater inventory optimization, and to reduce purchased inventory by returning to JIT inventory management – Just in Time. Another area where Big Data will have an impact is in the harnessing the knowledge in an aircraft and fleet's logbooks. We are already seeing access to eLogbooks helping the efficiency of maintenance operations, but with Big Data we can start to see trends across fleets that help in troubleshooting discrepancies and improving the uptime of an aircraft.

**How does your company keep pace with the ever-changing needs of the MRO community?** As with any business, the best way to keep pace with the ever-changing needs of the MRO community is to be focused on understanding the MRO providers inside and out. Where are they struggling, where are they succeeding, what do their processes look like, where are their challenges – then using this knowledge in the market, along with our technical skills, to continually help customers improve performance. As ATP continues a constant dialog with both the manufacturers and customers we can help them manage digital technical and regulatory data so they can integrate it with their maintenance data, to improve their performance.

**How does your company encourage innovation?** You have to foster a company culture that embraces

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**Brad Thress** Senior Vice President, Customer Service, Textron Aviation


**As an industry, from your perspective, how is commercial MRO doing (what is the state of the industry)?** It is a remarkably competitive time in the industry right now. Not only are we competing on business terms, but we are also competing on customer experience. At Textron Aviation, we are focused on providing superior service and offering innovative solutions to meet our customers' needs.

**What do you consider keys to success in your service and support business?**

We believe we are only successful if our customer is successful. We also think that no one can serve a Textron Aviation customer like Textron Aviation team members — customers have the direct access to factory expertise. We have worked hard to grow the capabilities and convenience within our company-owned network so that we can grow and maintain our direct relationship with the customer. We have grown our company-owned footprint to 21 service centers around the world, including 14 in the U.S., six in Europe, and one in Singapore, and we have also increased our MSU fleet to provide convenient service to customers. This past year, we restructured our parts distribution network to increase parts availability and expedite delivery worldwide, and we launched an eCommerce site that gives our customers an online option for ordering parts. And earlier this year, our 1Call solution was launched, providing customers streamlined and expedited AOG service.

**What trends are impacting or will impact business jet service and support in the near future?** More than ever before, customer satisfaction is key to winning business. Customers expect impeccable service and reliability each and every time — and rightly so. It challenges us to consistently deliver the highest quality product and service to every customer who comes through our door. We recognize that delivering superior service starts well before delivery of an aircraft, making maintenance a key part in the design of our aircraft. Through our MSG-3 efforts, we are designing products that don't require as frequent scheduled maintenance. We are certifying products with expanded calendar and time intervals. We are also constantly evaluating our internal processes to ensure we remain agile to customer issues as they arise. And of course, upcoming ADS-B requirements are on the minds of many of our customers. We have been hard at work developing solutions covering most of our aircraft models and we are here to help our customers navigate the options available to them.

**Is Big Data being used by your company and, if so, how is that improving your business?** As the OEM, we have access to a vast amount of data, which only enhances the support our customers receive. One example of how we use data is through our Linux system. Extensive, real time diagnostic information is coming off the aircraft via satellite. With that data, we can effectively identify potential reliability issues and to expedite repairs. We also analyze a host of other data — whether it be warranty claims, component reliability, or unusual parts sales — to identify whether a customer out in the field is having an issue that we can solve for them.

**How does your company encourage innovation?** We push to continuously innovate and be responsive to evolving customer needs and new regulatory requirements. From a product side, we have certified more new products than any of our competitors. From our recently announced Longitude to the single engine turboprop, we are continually innovating across our product lines to provide the highest level of value to our customers. Within the aftermarket, we were the first in the industry to roll out the MSU concept. And since then, we have continued to grow that service for our customers. And today, we continue to innovate in both small and large ways. From cost competitive aftermarket solutions for WiFi capability to certifying an aftermarket installation of antiskid braking for the King Air, we are constantly looking at new enhancements that provide value to our customers. Our service team is also very involved in the development of new products, integrating aircraft maintenance with aircraft design. We have a team that is charged with ensuring that we extend maintenance intervals on new products, giving our products the longest maintenance intervals in the industry.

## STATE OF THE INDUSTRY Q&A continued

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This is good for customers and GE. The investment in GE Digital's Predix, a cloud-based, open-source platform, provides an enabling infrastructure to effectively harness the rapidly-growing volume of data across the industry.

**How does your company encourage innovation?** Innovation is a big piece of our DNA. It is centered in our investment in technology to deliver products and services aligned with our customers toughest challenges. We work hard to foster a collaborative, learning culture and to leverage the best ideas from across our business. I believe our focus on digital and on simplification will help us do this faster and more efficiently.

▶ Franck Terner continued from page 25

installed in the aircraft. For large quantities, traditional production methods can remain cheaper.

**How does your company encourage innovation?** In 2015, AFI KLM E&M has launched "The MRO Lab". This is an ambitious innovation program which encourages the dynamics of innovation at all levels: employee participative innovation programs, partnership with start-up incubators, universities etc. In February 2016, we opened a co-innovation center in Singapore together with Ramco.

The MRO Lab is already providing new tools and knowledge to propose simpler, easier and faster maintenance solutions for our clients.

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we always find ways transfer innovative technologies from our OEM side to our MRO business.

**How does your company encourage innovation?** Frederick Rentschler, founder of Pratt & Whitney, created the WASP engine, a lighter, air-cooled engine that revolutionized the aircraft industry. The Geared Turbofan engine is another example of challenging the status quo to create an innovative technology. We continue that tradition today by encouraging innovation across all aspects of our business, including MRO. We regularly collaborate with our engineering team to incorporate innovative repair technologies into our maintenance and repair network. Innovation is the life blood of Pratt & Whitney.



# STATE OF THE INDUSTRY Q&A continued

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we prevented from happening. Perfect example: the “new” 8130 requirement in MAG Change 5. It was a potential debacle that could’ve cost industry millions and grounded the international business of FAA certificate holders. We led an industry-wide effort to “smooth” implementation by realigning its effective date with regards to parts documentation. It’s not over yet; we’re working constantly to help the FAA reasonably implement the new 14 CFR § 21.137(o) allowing production approval holders to issue authorized release certificates.

I invite everyone to review ARSA’s work on that issue at [arsa.org/mag-change-5](http://arsa.org/mag-change-5). The entire maintenance community continues to get a return on that investment. It’s a microcosm of the association’s continuing efforts as the industry’s voice: preventing disasters by enforcing commonsense application of the rules and helping manage the intersection of business and government.

Of course, we accomplished much more than that last year and it’s all chronicled in one way or another at [arsa.org](http://arsa.org). **What regulatory initiatives should MROs be concerned about right now?** All eyes on Washington. Air traffic control privatization has taken all the ink in the reauthorization debate so far, but once a bad idea is introduced in Congress – and repair stations has seen a lot of them – it never goes away. The few maintenance-related provisions in the both the House and Senate versions of the FAA bill are all bad.

The thing about congressional meddling is that small businesses are most vulnerable. Being the “weakest actors,” especially with disproportionate attention given to much larger manufacturers and operators who can afford to deploy lobbying teams 24/7, the companies that are the backbone of the MRO sector stand to suffer the most from unnecessary, duplicative mandates.

What starts on Capitol Hill this year will end up on Independence Avenue (at the FAA), so our biggest regulatory concerns this year might actually emerge from Congress.

**What will ARSA be focusing on for 2016?** The focus of the association hasn’t changed in decades: Keep a steady course on long term issues (e.g., major/minor determinations, ICA, airworthiness directive compliance, audits), address items that matter and be ready for the crisis of the day. As Winston Churchill would say, we’re going to “Keep bugging on.”

Of course, we’ll put our time in on Capitol Hill. We don’t want dozens of FAA extensions because it doesn’t give industry or the FAA much-needed certainty; however, we don’t want a bad law either. At the same time, we’ll be ready to support our members when we need it. Small businesses, like ARSA, are agile; we can address concerns as they shift and be steady when they don’t. The longevity and experience of the association’s people will be our strength – 100 plus years practicing in legislative and regulatory affairs that affect our members, clients, customers and the flying public.

We share it in a lot of different ways, but the message is simple, and we’re going to keep spreading the word: You can’t fly without us.

Dany Kleiman continued from page 28

companywide called Ideas Matter whereby our employees are encouraged to submit their ideas for ways we can improve service, quality and processes – and be compensated for it. In addition, we are always constantly working to enhance our IT tools and communications to improve mobility, transparency and accountability. We also use innovative IT systems to improve the cost-effectiveness of our customers’ engineering and technical resources in fulfilling component power-by-the-hour agreements and making long-term preventative maintenance recommendations.

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alternative. We’ll need to wait and see. In any case, we have the right products in place to serve either side of the demand.

**How will Big Data impact MRO? Is Big Data being used by your company and, if so, how is that improving your business?** Big data helps us to better evaluate the behavior of certain fleets by being able to identify specific patterns which can only be detected due to the larger amount of data that are being gathered on newer engine types. To put it simple: big data allows us to make far more detailed analysis and take the appropriate corrective actions, if necessary – so we are eager to follow that trend.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in MRO, if applicable)?** MTU Aero Engines has started with additive manufacturing processes to produce boroscope bosses for the PW1100G-JM engine powering the A320neo. Another example is a new seal carrier that was designed for a demonstrator engine based on Pratt & Whitney’s PW1500G. It is supposed to be used for the next generation of geared turbofan engines.

In the maintenance section, we are closely following this development as it has a major potential for parts repair, for example to restore the blade tips.

**How does your company encourage innovation?** We are constantly looking at new ways to reduce cost in order to stay ahead of the competition. This not only means improving our production processes and developing new technologies, but also creating innovative services that bring value to our customers – as explained before. Our engineering expertise as the primary driver for innovation: as a group, in 2015 we invested €210 million in R&D projects. Further, we actively ask our employees to come up with new ideas as part of our company-wide suggestion scheme.

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aircraft equipment. This allows us to become very efficient on this platform. We use our Lean program to spur innovation. Lean is a long journey and there is no final destination. I am truly encouraged from what I am seeing at PEMCO. Some of our teammates have taken initiative and implemented small 6S programs in their areas. I believe the message is being heard, and we are getting the buy-in we need to succeed. We have a great team of technicians that are hungry for knowledge and truly want to do the best they can for our customers. I am really excited about the opportunities we have at PEMCO.

Christopher Whiteside continued from page 32

prevalent it will be possible for a seamless demand and replenishment cycle to be put into place where the MRO provider is alerted to a need while the aircraft is still in flight. Just as happens in the rotary industry with the likes of HUMS.

**How does your company encourage innovation?** Innovation has been at the heart of AJW group, it is part of our ethos across all divisions. We are never satisfied, to improve we must innovate. We have seen several innovative ideas from the very simple to the very complex come from all corners of the workforce over the past months. We are seeing people with 25 years of aviation experience coming up with new, better ways to complete their task. We also use other industries to benchmark ourselves against, using non-aviation innovative ideas within our organization and leverage information technology.

▶ Jeremy Remacha continued from page 33

this data with advanced analytics software enables us to optimize investment and tactically deploy our inventory within our global network.

ARMAC, an SR Technics subsidiary, has developed specific inventory optimization software that utilizes Big Data in the decision-making process enhancing asset utilization while improving delivery performance. This can be further developed to support customers to optimize their internal supply chains.

### **How does your company encourage innovation?**

Implementing innovation requires a positive culture and a commitment to change. The constant pressure of managing costs while serving our clients better is driving us to find new and innovative ways of doing business. We are continuously reviewing our processes and encouraging our people to seek new and innovative ways to make us more efficient and competitive on the global market, while maintaining our high quality and safety standards.

With an increasing trend of using tablets and mobile devices, we are looking to implement new applications as part of our supply chain giving technicians and customers a real time access to data.

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Another growing trend in our industry is the transition to an integrated paperless hangar. Moving from paper to electronic recordkeeping leads to process efficiencies and cost savings. And, finally, we've seen growth in the use of specially equipped vehicles to assist operators vs. having technicians tied to a facility. At Gulfstream, our Field and Airborne Support Teams — FAST — include several large customized trucks, a van and even a NASCAR-style tractor-trailer that brings technicians, tooling and parts plane-side to assist an operator. This significantly enhances our ability to support operators without having to establish a facility in the region. For example, we have a FAST truck based in Seattle that can rapidly respond to operators at airports there and in metro Portland, Oregon, which is less than three hours away.

**Is Big Data being used by your company and, if so, how is that improving your business?** Yes, we are using Big Data. The Gulfstream G650 business jet, which entered service in December 2012, is a prime example of how more data can help our customers and improve the services we offer them.

The aircraft features an Aircraft Health and Trend Monitoring System (AHTMS) — known as PlaneConnect HTM. Previously, system failure events/data were only communicated from the aircraft at the top of descent. With PlaneConnect HTM, failures are reported on occurrence, giving support personnel and decision-makers additional time to initiate troubleshooting and resource placement. With the long legs of the G650 and Gulfstream's worldwide support presence, we have created the ability to have field service personnel, parts or equipment in place at the aircraft destination, significantly reducing the time it takes to return the aircraft to service.

**How will additive manufacturing impact MRO (give examples of how your company is using additive manufacturing in service and support, if applicable)?** We have used additive manufacturing to create on-demand tools and fixtures for components and ground support equipment repair, and will continue to look at how we can incorporate more of this 3-D printing into our business.

For example, this form of manufacturing may be a way to replace

▶ Zilvinas Lapinskas continued from page 35

all maintenance works in real time. This helps us to detect any potential delay and process flows (e.g. works stopped due to unsupplied spare parts or a need for customer's authorization) before it starts affecting TAT. Moreover, as approx. 80% of delays come due to poor and lengthy communication between the MRO and its customer, we've also introduced an online communication system which allows our engineers to receive direct authorizations on additional parts or works from customer's technical manager. This allows avoiding intermediates in the communication as well as speed up the confirmation process and thus minimizing the downtime of an aircraft if an unscheduled work is required.

In addition, we have developed an app for in-house spare parts supply that allowed mechanics to promptly upload a request for required parts and get instant notification when the part arrives supplemented with information where the part is exactly stocked. Also, we are to integrate wearable technologies and other smart devices which should ease internal communication, data exchange and access to technical documentation for our technical staff.

However, any MRO can achieve much more noticeable time and human resource savings if all MRO chain players — from OEMs and suppliers to airlines — would engage in automated data exchange and synchronization, document digitalization and other related processes. In order for the MRO industry to benefit from Big Data/Internet of Things technologies, all stakeholders must have a more pro-active engagement. The industry also needs more exemplary case studies.

older components, allowing us to produce exact substitutes without production tooling. Replacement components can be printed on-site in less time than it takes to order and receive the part.

**How does your company encourage innovation in the service and support sector?** Continuous improvement is part of Gulfstream's culture. We have a program known as Your Ideas at Work that offers Gulfstream employees the opportunity to suggest improvements to their work processes. We've received and implemented thousands of ideas through this program. Throughout our company, we look at ways to make existing processes as well as new products and services more efficient.

A good example of innovation specific to our Product Support organization relates to our next aircraft, the G500. As part of the preparations for the aircraft's 2018 entry into service, we integrated a team of maintenance technicians with Flight Test to follow the aircraft through manufacturing and flight testing.

The integrated team performed all the modifications and testing required to prepare the aircraft for first flight on Feb. 20 of this year, and will continue to lead it through testing in support of Federal Aviation Administration type certification in 2017. The goal is the smoothest entry-into-service possible for our customers.

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Todd Duncan continued from page 37

**How is additive manufacturing impacting MRO (give examples of how your company is using additive manufacturing in service and support, if applicable)?** Our in-house Research & Development team uses additive manufacturing in the design and production of our in-house test equipment. This allows us to build our test equipment much faster and at less cost. In the last few years, we have utilized FDM (fused deposition modeling) in hundreds of in-house products and applications, ranging from prototypes of antenna mounts to tail stand alarms. Recently, we also used this manufacturing process in a Duncan Aviation-designed modification to an IFR RD-301 radar generator.

Additive manufacturing is an emerging technology, with new materials being added every day. It is not the right answer for every application, but when it is, we certainly utilize it.

**How does your company encourage innovation?** Innovation is certainly something we pride ourselves on and, quite honestly, is something that is part of our culture. We are celebrating our 60th anniversary in 2016 and I truly believe that we wouldn't be where we are today without the innovative, entrepreneurial spirit of my grandfather and father. It is my goal to make sure we continue that tradition by maintaining a culture that has an openness to listen to the ideas and desires of team members, customers, industry partners and even competitors and, when it makes sense, to look for solutions and/or new ways to perform our work.

To capture team member ideas, we have a formal Continuous Improvement Program that allows team members to submit ideas and then be part of the team that collaborates with other departments to evaluate the impact and coordinates idea implementation, when applicable. Some of these ideas are as simple as creating a storage area for tools that increases team efficiency to as complex as constructing a humidity controlled storage area for leather to ensure ideal moisture content, which makes the material easier to work with. In 2015, we implemented 546 ideas, 60 percent of those involved several teams and collaboration across department and facility lines.

We listen to customers in several ways. We host weekly lunches and dinners with customers on-site at our Lincoln, Nebraska, and Battle Creek, Michigan, facilities. We ask them about their experience and how we could improve. On a more formal level, we have three Customer Advisory Boards, one in the U.S., one in Europe and one in Latin America. These Boards have one-day meetings where we listen to their challenges and experiences and ask them for their thoughts on some of our business plans and changes.

We also listen to industry partners and even competitors by participating in alphabet boards throughout the industry as well as OEM advisory and technical boards.

Charles Picasso continued from page 39

change. ATP has been around for over 40 years and gone through many iterations of technology to keep pace with the changing needs of the industry – launching the first digital publications in the late 1980s and early '90s and now helping MROs learn how Cloud-based information can take them up another step.

And, you have to make a financial commitment to the technology and resources you need to be successful – it is a continuous innovation process, not something you start for a year or two and then stop. We encourage this innovation within our company by constantly engaging our people with our customers in their place of business. Through these visits we have tough discussions on what they like and don't like about ATP, but also we gain understanding of where there are new opportunities for us to help them with their business.

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Neil W. Book continued from page 38

**How does your company encourage innovation in the service and support sector?** At JSSI, we compete directly with the PBH programs of the OEM. For us to effectively compete, we need to provide innovative products and services to our customers to be successful. As a result, innovation is in our DNA. Recently, we began creating the next generation of JSSI services by going above and beyond the Engine, Airframe, APU or Tip-to-Tail® Programs that we have delivered for more than 27 years. We have introduced JSSI Parts, the ultimate JSSI all-inclusive service and our new Asset Monitoring Platform (AMP) for the aircraft finance community. All three of these new programs are unlike anything we have offered before, and each provides a service to a segment of the market that will expand our footprint in the industry. These innovative ideas for new JSSI services were conceived through customer dialogue and collaboration with our extended family of vendors and suppliers. And I assure you there is more of this to come from JSwSI in the near future.

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# Maintenance Software: More Real-Time, More Mobile

by Charlotte Adams

**A**utomation is everywhere you look — in the hangar and repair shop as well as the cockpit. For the repair shops, line maintenance operations, MROs, and airline support departments that make the best use of it, computer technology gives a competitive edge in this tight-margin business. Benefits include lower costs, higher efficiencies, and greater capacity.

But automation isn't static. In aviation maintenance as in other industries automation continues driving towards higher-speed, lower-cost processing and to deeper levels of integration both within individual software systems and between enterprise maintenance software and complementary aftermarket applications.

Perhaps the highest-profile trend in the aviation maintenance software market is the integration of mobile devices with core software and the proliferation of Web apps that can allow maintenance technicians to log their hours and sign off on work more quickly yet be trackable by managers in near real time. As a result, traditionally paper-intensive maintenance operations promise to become less costly and more efficient.

## Ultramain

Ultramain offers a suite of integrated, but user-selectable, applications oriented around an "ePaper" strategy, according to Mark McCausland, company president. The latest release, ULTRAMAIN v9, was designed for paperless use, he says.

The company provides a series of mobile products – Mobile Mechanic, efbTechLogs, eCabin, Mobile Inventory, and Mobile Executive – that work together with ULTRAMAIN's M&E/MRO suite as well as with other maintenance systems, he says. Headquartered in Albuquerque, N.M., the company has units in Ireland, India, and Hong Kong. It is mainly focused on the commercial aviation sector.

Ultramain notes three recent go-lives, two of which involved a line maintenance MRO in Mexico, serving 70 airlines with 23 destinations in that country. The latest involved a large international carrier that initiated efbTechLogs for its 777 fleet.

Ultramain software also incorporates optimization into functions such as fleet planning, maintenance scheduling, labor resourcing, and hangar bay usage. It includes cost accounting functions throughout its maintenance and supply applications, McCausland says, and "comes with off-the-shelf integration capabilities ... with financial systems such as Oracle and SAP."

## TRAX

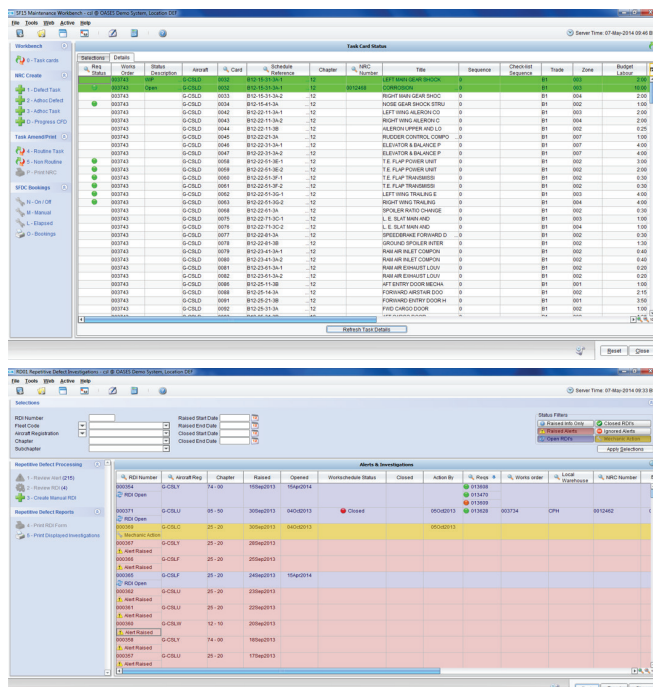
Miami-based TRAX has introduced a new Web product called eMRO, a mobile MRO solution usable on any platform, it says. The software is "totally mobile" in that "all functions can be used on mobiles." And since eMRO is "pure Web," there is no installed client," it says.

Most of TRAX's customers are passenger and cargo airlines although "pure" MROs like Lufthansa Technik Philippines and Turkish Technic also use the software. The company regards Swiss Aviation, SAP, Mxi Technologies, and IFS as competitors.

Both eMRO and the company's legacy platform, TRAX Maintenance, provide materials management, resource management, technical publications, fleet management, component management, and EDI functions.

## Commsoft

Commsoft, a UK-based software developer with a wide-ranging, global customer base, also stresses Web alignment and mobile



Last year Commsoft launched the first in a series of mobile apps designed to work with OASES. Commsoft images.





# CAMP's Market Moves



CAMP recently acquired two software providers, Continuum Applied Technology (CORRIDOR) and Component Control (Quantum Control and StockMarket.aero). CAMP image.

A major development in the bizjet sector is CAMP Systems' expansion into the enterprise aviation maintenance software market. It recently acquired two software providers, Continuum Applied Technology (CORRIDOR) and Component Control (Quantum Control and StockMarket.aero).

"We're putting together a family of products to help solve aviation problems," says Rob Hillas, CAMP's director of sales and business development. The company's "guiding vision" is to move maintenance information around more easily, he says.

CAMP sees synergies between the new acquisitions and its aircraft health management business. The two newly acquired software companies complement each other, with slightly different emphases and customer sets, Hillas says. But since many CAMP customers – owners or operators – take their aircraft to maintenance facilities using CORRIDOR or Quantum Control, the three companies together can add value to the market.

CAMP, for example, is pursuing deep integration between the acquired software systems and the CAMP system. That way, CAMP subscribers can pull up everything they need to know about their airplanes from within their native software environments.

package.) Rusada is headquartered in Switzerland with offices in the UK, North America, Dubai, India, and Singapore.

Envision focuses "purely on aviation engineering and maintenance." The software covers airframe, engine, and component maintenance as well as manufacturing and all associated MRO activities. The company notes Mxi, AMOS, TRAX, and Ramco among its competitors. Among Envision's differentiators, Rusada lists its integrated flight operations module, end user-based workflow, integration with enterprise resource planning and finance systems, and relatively rapid implementations – "weeks rather than months and years."

## CAMP Systems

CAMP Systems has extended the reach of its core maintenance tracking and engine health monitoring systems and added complementary software systems from Continuum Applied Technology and Component Control (see sidebar). While the company still supports its CAMP MTX aircraft maintenance tracking service, in the last few years it has been bringing together its maintenance tracking and engine health monitoring lines into an "aircraft health management" service, something that's been "a huge change," says Rob Hillas, CAMP's director of sales and business development. A single interface is available now via the CAMP AC home page, which gives customers an overview of aircraft health, including aircraft and engine status.

The company tracks maintenance for more than 16,000 aircraft and monitors the health of more than 30,000 engines. CAMP customers' platforms are primarily business aircraft, but with some regional aircraft, as well.



CAMP says it tracks maintenance for more than 16,000 aircraft. CAMP image.

CAMP owner/operator subscribers and their delegated maintenance providers access CAMP's services via a Web interface, assisted by hundreds of company maintenance analysts, a service element which CAMP considers a major differentiator. Customer data is cloud-hosted.

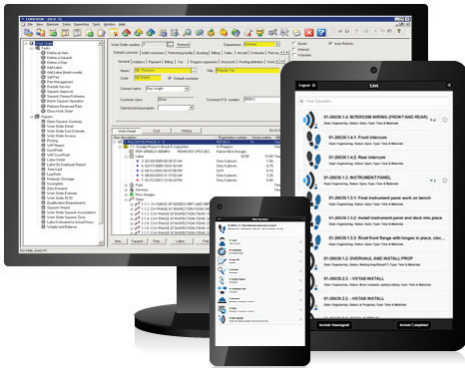
Meanwhile the company is adding more helicopter functionality to its core product this year, following an agreement with Bell



Helicopter last year. Bell chose CAMP as the “sole recommended maintenance tracking provider for all Bell helicopters,” according to a CAMP release. Current Bell Skybooks maintenance tracking customers will have the opportunity to move to CAMP and Skybooks will be phased out.

### Continuum Applied Technology

The most recent release, Version 11, of Continuum Applied Technology’s CORRIDOR aviation service software added Tool Crib, Time & Attendance, and Planning & Scheduling modules. Also new is the Austin, Texas, company’s Mobile Mechanic multi-platform app as well as an integration with Alltite Calibration Services, according to Chris Kubinski, business development manager. CORRIDOR is aimed at aftermarket service providers such as MRO shops, FBOs, component shops, operators, and refurbishment centers.



CORRIDOR is aimed at MRO shops, FBOs, component shops, operators, and refurbishment centers. Corridor image.

Released in 2015, CORRIDOR Mobile Mechanic enables technicians and supervisors to remotely add, request, or view labor, parts, and services, as well as to perform inspections and signoffs in real time, Kubinski says.





He also emphasizes integration among software providers. The CORRIDOR SDK (software developer’s kit) “exposes key areas of CORRIDOR business logic to allow virtually seamless integration, automation, and extension” of the software, Kubinski says. SDK’s application program interfaces “facilitate integration of CORRIDOR into an expanded IT environment,” opening up opportunities, such as customer access integration, internal data sharing, and data mining. He also notes CORRIDOR’s Maintenance Records Integration module, which allows electronic transfer of “due list” and “completed work items” between CORRIDOR and third-party tracking software like CAMP Systems.

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## E-Commerce

Aerexchange, a major player in e-commerce and supply chain solutions in the commercial aviation aftermarket, provides “full end-to-end EDI electronic messaging from buyer to seller and back,” explains Albert Koszarek, CEO and president.

For businesses without EDI or XML infrastructures, connectivity to the Aerexchange platform requires only a Web browser. Aerexchange works in the background, carrying the data payload between trade partners in the supply chain, he says. “We work hard to be invisible to the user and [to be] a seamless part of the MRO application.”

<b>AeroBuy®</b>  <ul style="list-style-type: none"> <li>• Complete technical procurement system</li> <li>• Provides one-stop access to all sources of supply</li> <li>• Seamless integration to buyer system (requisition through invoice/remittance)</li> <li>• Configurable alerting and KPI reporting</li> </ul>	<b>AeroRepair®</b>  <ul style="list-style-type: none"> <li>• Full featured repair management collaboration system</li> <li>• Seamless integration to buyer/system</li> <li>• Complex repair manages life cycle of repair process with invoicing</li> <li>• Fast enablement of complete seller network with two-way B2B</li> <li>• Configurable alerting and KPI reporting</li> </ul>	<b>AeroAOG®</b>  <ul style="list-style-type: none"> <li>• Inventory sharing systems to facilitate rapid spare part acquisition supporting AOG recovery</li> <li>• Loan and borrow transaction portal with tracking capability</li> <li>• Invoice management</li> <li>• Loan and related document management and data capture</li> </ul>	<b>AeroComponent®</b>  <ul style="list-style-type: none"> <li>• Component support and exchange pool management system</li> <li>• Real time tracking of exchange unit and the unexchangeable return unit</li> <li>• Web portal and two-way B2B for both pool provider and operators</li> <li>• Configurable alerting and KPI reporting</li> </ul>	<b>SmartSource Cloud</b>  <ul style="list-style-type: none"> <li>• Cloud-based eTendering Suite</li> <li>• RFQ/Auction/Surveys Project Management</li> <li>• Custom reports</li> <li>• Flexible and configurable</li> <li>• Contract repository and authorizing capabilities</li> <li>• Supplier Management</li> <li>• Performance Graphs and supplier comparisons</li> </ul>	<b>Procurexchange®</b>  <ul style="list-style-type: none"> <li>• Facilitates indirect procurement including Expendables, Chemicals, Uniforms, etc.</li> <li>• Complete application that includes web-based shopping, experience and full-service order management capabilities</li> <li>• Can be integrated into ERP systems to facilitate adhering to procurement business rules</li> <li>• Provides full reporting capabilities</li> </ul>
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Aerexchange recently announced a partnership with Pentagon 2000 Software, another example of increasing integration in the aftermarket space. Thanks to the alignment, airline suppliers using PENTAGON 2000SQL will be able to employ the Aerexchange network to respond to RFQs, acknowledge purchase and repair orders, send and receive shipment notifications, provide status updates, and submit invoices to 40 airlines from within the Pentagon 2000 environment, according to Aerexchange. The system-to-system connection – through automated, direct interfaces – enables efficient and error free collaboration on purchase-to-pay and repair management processes, Aerexchange says.

In February of 2016 Ramco also announced plans with Aerexchange to support and develop a standardized connection between the two software systems. Aerexchange’s latest launch is Procurexchange, a “complete procure-to-pay solution for non-technical, aviation-specific procurement,” such as uniforms, chemicals, tools, and ground vehicle support, Koszarek says. Features of this Web-based platform include: guided buying, simplification of complex purchases, and seamless integration into enterprise resource planning or procurement systems. In addition, it provides the ability to maintain consistent business rules internally and with suppliers, he says.


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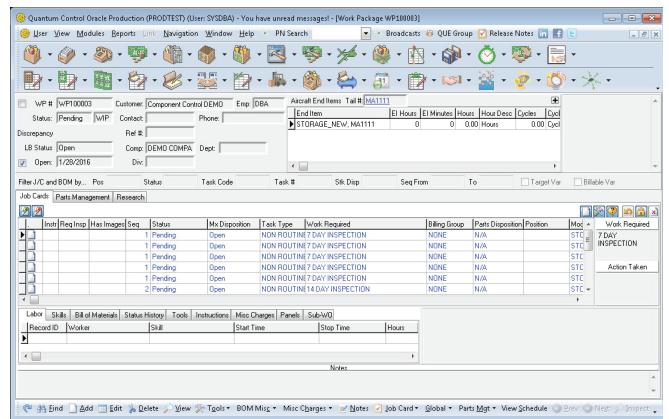
Continuum distinguishes between “foundation” modules, which support standard business processes, and “process” modules that are used to tailor a solution with real-time process transitions and seamless interdepartmental communications. (Mobile Mechanic is part of the foundation suite.)

### Component Control

Component Control boasts a varied customer base and installations in almost 60 countries. Headquartered in San Diego, Component Control serves more than 1,100 companies, the majority of which are third-party repair providers, says Andrew Valley, senior vice president of sales. Also among its customers are parts traders and distributors, as well as FBOs and companies that combine some of these functions. Recent additions include Air Atlanta Avia Services and CRS Jet Spares. Other users include AJW Technique. One differentiator, Valley notes, is relatively high revenue per capita



Andrew Valley, senior vice president, Sales at Component Control. Component Control image.



Component Control’s Quantum Control customers get a broad set of core modules and a choice of options. Component Control image.

search the data, list your inventory, and send requests for quotes, Valley says. “If you want to show up first or second or in the top five, you can sponsor a group of part numbers—it’s like a Google ad.”

### Pentagon 2000 Software

Pentagon 2000 Software supports operators, MRO firms, component MROs, repair management, defense contractors, and brokers/distributors, according to Kirk Baugher, executive vice president of business development. Headquartered in New York City, the company has offices in North America, Europe/Middle East, and Asia Pacific. Among customers listed on its Web site are Fokker, Boeing, Sikorsky, Bell Helicopter, Airbus Military, EADS, HEICO Aerospace, and UPS. The company has released Version 9 of its PENTAGON 2000SQL product.

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There is an extensive core system along with numerous additional modules. The system “incorporates the broadest set of functionality in the industry to support fleet management, flight operations, aircraft recordkeeping, maintenance, repairs, exchanges, materials, and mobile apps,” Baugher says. Key differentiators are the software’s interfaces to service providers such as ILS, Aviall, IIHS Haystack, partslogistics.com, Locatory, Fipart, CTA-FOS, SPEC2000, and Aeroexchange, he says.

## TracWare

Headquartered in the UK, TracWare recently opened an office in Australia to support its 11 customers there and those in China. Among its 2015 implementations are two sites in China for joint ventures between two large OEMs – one based in China and the other in the U.S. The company’s AeroTrac software is primarily aimed at small to medium-sized aircraft operators, maintenance facilities, and engine/component MROs.



TracWare’s AeroTrac software is aimed at small to medium-sized aircraft operators, maintenance facilities, and engine/component MROs. TracWare image.

The latest version of AeroTrac – AeroTrac Platinum v2.50 – was released in Q4 of 2015, and 15 customers already have upgraded. TracWare describes its product as MRO process control software that is designed to control specific commercial, technical, logistical, and financial MRO processes. Among its competitors are Rusada, Ramco, Commsoft, Component Control, and Pentagon 2000.

The new release features a front-end refresh and the integration of an increasing variety of Web-based apps that can be used on tablet devices to augment the functionality of the main application. TracWare, for example, has launched AeroSector– an Electronic Flight Tech Log app which is independent of (but fully integrates with) AeroTrac v2.50.

The evolution of AeroTrac reflects the ever-growing demands of the small to medium-sized OEMs, the MROs, and the airworthiness authorities, according to TracWare. “Customers have emphasized the benefits of having an embedded, fully integrated Quality Management module and a Planning Manager tool for improved use of resources.”

## Swiss AviationSoftware

Swiss AviationSoftware, developer of the AMOS maintenance application, is part of the Lufthansa Group. Customers include airlines, such as Etihad Airways, and MROs, such as Taiwan’s EGAT.

AMOS 10 includes a front-end refresh with the addition of widget functions like customer-tailored dashboards and a cleaner structure of the menu and status bar, according to the company. The company also has launched features related to the

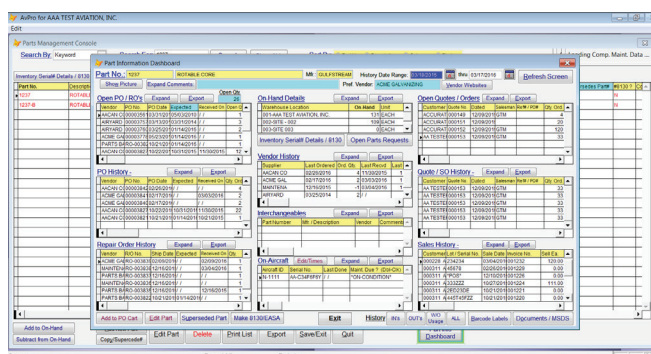
management of new generation aircraft, multi-entity functions, multi-operator support and special control dimensions.

## AvPro

Unlike many aviation maintenance software companies, Florida-based Decision Software Systems (DSS), provider of AvPro software, also serves markets such as medical/surgical, wholesale distribution, manufacturing, and retail. AvPro’s primary aviation focus is business fleets, government fleet maintenance, small charter airlines, and MRO and repair stations.

Modules can be purchased stand-alone or integrated with DSS’s accounting software. An AvPro software license also can be purchased outright “for use in perpetuity.” AvPro can run in a client/server environment or be cloud-hosted as a software service.

Recent updates include the ability to run as a hosted Web application, the handling of multiple foreign currencies in purchasing and receiving inventory parts, and support for partial billings on large in-process work orders. **AM**



Decision Software’s AvPro can run in a client/server environment or be cloud-hosted as a software service. Decision Software image.



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# Coatings Application Training Gets an Update

by Dale Smith





# T

Whether you are shaking up a rattle can or yielding a high-end airless spray gun, there's a lot more to achieving a great paint finish than picking the right color.

The aircraft coatings industry has undergone a revolution of sorts. The old chromate-heavy primers and topcoat-type paints have all but been replaced with the new basecoat/clearcoat formulas.

These new paint formulations are not only much, much more environmentally friendly, the fact that they dry faster and hold their colors years longer on the aircraft, have freed airlines up to use their fleet as airborne billboards touting everything from elaborate liveries to some really creative, co-branding messaging.

"For these purposes, the paint performs a very special role," stated Stefan Jaschinski, head of Technical Services for Mankiewicz Coatings. "The applications of complex liveries and the usage of micas have increased over the past years. The quickness (drying times) of the basecoat applications plays an important role here."

"For instance, if one were to paint the WestJet Disney livery using topcoats, the aircraft would sit in the hangar for weeks without being able to carry passengers," he said. "That is inconceivable."



Whether it's a simple white fuselage with red and blue stripes or WestJet's elaborate Disney Frozen themed livery, successful painting processes require training. WestJet image.





This Canadian Airline WestJet Disney Magic themed 737 required 36 color shades and was partially achieved by using Mankiewicz's wild spraying technique. WestJet image top; Sherwin-Williams image right.

According to Mankiewicz, the Disney Magic themed 737 the company painted for Canadian Airline WestJet required 36 color shades partially achieved by the company's "wild spraying technique" which is based on the blending and shading of various colors.

"The wild spraying technique is one of the many process improvements that accompany the basecoat/clearcoat technology," Jaschinski said. "Instead of the most frequent color (base color) being applied first, you can apply the lowest (background) color first. Amongst time and material, this procedure results in weight and cost savings for the operator."

"The overwhelming perception is that the basecoat/clearcoat technology potentially adds two to three years to the life of an aircraft's finish," explained Richard Giles, Global Technical Service



**"The wild spraying technique is one of the many process improvements that accompany the basecoat/clearcoat technology," Jaschinski said. "Instead of the most frequent color (base color) being applied first, you can apply the lowest (background) color first. Amongst time and material, this procedure results in weight and cost savings for the operator."**





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## Chromates Training is Required by Law



AkzoNobel, Mankiewicz, PPG and Sherwin-Williams all offer both classroom-style and on-site training programs for their current and prospective customers around the world. Sherwin-Williams says paint preparation and mixing are two big challenges. Top image Sherwin-Williams; bottom image Mankiewicz.

While getting trained to remove and apply any aerospace coatings is a good idea, if you work with any chromates your initial and ongoing training may be required by law. "I believe it was in 2008 that the final ruling for the National Emission Standards for Hazardous Air Pollutants (NESHAP) (<https://www3.epa.gov/airtoxics/6h/6hpg.html#RULE>) was created for the automotive and aviation industries for people who spray heavy metals," explained Steve Stalker, chief instructor and owner of FocusPoint LLC. "One of the heavy metals that is found a lot in aviation is chromates."

"According to the ruling, people who spray these chromates are now required by law to get training within six months of hiring on and again every five years on the job," he said. "If a company doesn't comply with the rule, the EPA can go back and fine the operator a penalty that's retroactive for up to five years. That would put most shops out of business."

"I don't think that too many aircraft maintenance providers are even aware of the law," Stalker said. "They need to be. I've had students come to my training class that had never heard of the requirement. It was a real eye-opener for them."

and Training Manager, Sherwin-Williams Aerospace Coatings. "That's many more years on the strip cycle and that adds up to significant savings, which airlines are using to invest in more aesthetically pleasing livery." Of course, whether you're painting a simple white fuselage with red and blue stripes or WestJet's elaborate Disney Frozen themed livery, the successful application of basecoat/clearcoat paints requires a fundamental rethink of your painting processes. And that requires training. For example, Désiree Oldenburger, AkzoNobel Aerospace Coatings, segment manager, explained that the company not only offers training for aircraft coatings technicians, they also offer training for livery designers.

"Designers often use different color standards (PMS color std.) as used within the aerospace industry. AkzoNobel set up a dedicated color design studio to assist the artist in developing the new color livery for the aircraft," she said. "Specially trained people can guide the designer on the realistic options and systems for the exterior application on an aircraft. This initiative is taken to speed up the process from the designer's drawing board to the aircraft on the runway."

### Learning Basecoat Basics

AkzoNobel, Mankiewicz, PPG and Sherwin-Williams all offer both classroom-style and on-site training programs for their current and prospective customers around the world. "New opportunities have opened in emerging regions, increasing the demand to train painters in today's sophisticated application techniques, while providing product and equipment education," stated Mark Cancilla, PPG's global director, Aerospace Coatings. "PPG sees practical hands-on spray training being more beneficial to paint shop people than theoretical teaching for these advanced technologies." Cancilla said that along with their current U.S. based coatings school, to better meet the rapid growth of both OEM and MRO paint work around the world, the company's European coatings team established the PPG Aerospace Coatings Academy in 2015.

"(The Academy) offers a schedule of hands-on training and classroom sessions focused on basecoat/clearcoat and chrome-free technologies, as well as general aerospace coatings information," he said. "These classes are designed for painters, buyers and engineers in Europe, the Middle East and Africa. There are already four sessions scheduled for this year." While paint application is foremost, understandably these training classes have to cover more than just spraying color.

**"The quality of paint application is related not only to the characteristics of the paint, but also the skill of the painter and application conditions."**



A photograph showing two male technicians working on the engine compartment of a white aircraft. The technician on the left is wearing a blue polo shirt and safety glasses, and is using a wrench. The technician on the right is wearing a dark green polo shirt and safety glasses, and is also using a wrench. The engine is complex, with various hoses and components visible. The aircraft's fuselage is white with blue and white stripes.

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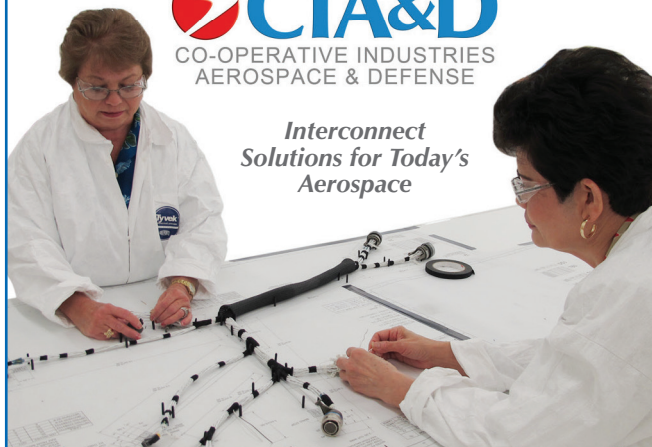
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"We start by focusing on why they (students) are here," Giles said. "We discuss health and safety, surface preparation, application and clean up. We also spend a good amount of time covering the proper steps to paint mixing and preparation."

"Paint preparation and mixing is always a big challenge for technicians," he said. "Both in our training course and when we do on-site training, because paint will only magnify what the level and standard of the preparation is: good or bad. Full gloss paint will not conceal anything."

"We've visited maintenance facilities and found hardener cans with no lids on them. That attracts dirt and moisture into the materials. We also see out-of-date containers," Giles said. "We educate that if you have the right materials, handle them properly and prepare the surfaces correctly, you are two-thirds the way to the best result." Giles explained that the goal of the Sherwin-Williams applications "school" is to give painters a better understanding of what it really means to achieve the desired outcome.

"So many painters have basic skills but not a complete understanding of how everything comes together to achieve the desired finish," he said. "What they all come away with is a better understanding of application; the importance of following the manufacturer's data sheet. Many new as well as seasoned painters mix paint by experience or mix by eye – whatever that means. Now they have to relearn how to do it correctly. A back-to-basics class has corrected many of these problems."

### Regs play a big role in aircraft painting industry

"Another service AkzoNobel offers customers is assisting in engineering and HSE (Health, Safety and Environment) issues. We can advise customers on products to use, what products will be banned in future, and what alternatives are available," Ms. Oldenburger said. "We also provide companies with specific training on how to deal with HSE issues like personal protection, safe paint handling, interpretation of MSDS' (Material Safety Data Sheets), and other HSE related topics."

### Rework is a Four-Letter Word

"The quality of paint application is related not only to the characteristics of the paint, but also the skill of the painter and application conditions," Cancilla said. "In general, PPG's classroom sessions focus on product handling, mixing equipment and (various) coatings application techniques. Our hands-on part of the training involves actual product spraying with feedback and guidance from members of the PPG technical team."

"The new basecoat/clearcoat materials are wonderful, but you have to be trained in the right ways to use them to achieve the desired effects," Giles said. "These effect coatings can be sensitive to aesthetic disruptions like tiger striping or mottling. The equipment, surface preparation and conditions have to be compatible with the scale and type of effect they are trying to achieve."

"The goal is to make sure you get consistency and that rework is minimized," he said. "As a painter you have to remember that you only get paid to paint the surface one time – if you have to do it again it's costing you. Rework is the number one killer of MRO painting profits."

### Aircraft Coatings Application 101

While the scheduled and customer-site training programs the major paint manufacturers offer are all excellent, it may well be a bit too advanced for someone who has recently gotten into aircraft painting.





Sherwin-Williams says the goal of a good basic training class is to come away with a better understanding of application, the importance of following the manufacturer's data sheet and understanding health, safety and environment issues. Mankiewicz image.

One option for technicians looking to learn painting from the ground up is to attend a program like the one offered by Finishing Brands and coordinated through Owens Community College in Toledo, Ohio.

"This is a class for all kinds of people – sales people, painters, suppliers, manufacturers, operators, supervisors – anyone who has anything to do with painting airplanes," explained the program's chief instructor and owner of FocusPoint, Steve Stalker. "My class runs for two and a half days. The first half-day is noting but understanding coatings and their formulations. You have to know how what goes in affects what's coming out of the gun."

Stalker said that a major area of misunderstanding is the importance of using paints at the right temperatures. Yes, temperatures.

"Everything is high solids now. Lacquers are long gone. So coating temperatures are very important to achieve consistency in finish quality. If it's too cold, the paint won't flow correctly so you have to add more air pressure and that leads to more overspray and waste," he said. "The coating companies use 77 F as their

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Basecoat/clearcoat technology potentially adds two to three years to the life of an aircraft's finish says Richard Giles, Global Technical Service and Training Manager, Sherwin-Williams Aerospace Coatings. Sherwin-Williams images.





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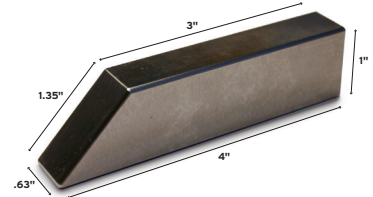
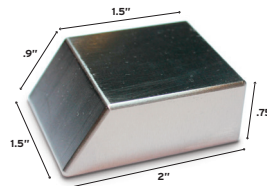


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standard. When you start changing temperatures you change everything." Along with the finite details of the coating's handling and chemistry, Stalker said he spends a lot of time covering the hardware – spray guns, hoses and the air source.

"I'd say in all the paint shops I've visited over the years, that more than half of them don't have the right equipment for the job at hand," he said. "I was at a major aircraft manufacturer in Wichita recently. They were having trouble achieving consistent finishes. The fix was easy – they were trying to use touch-up style spray guns to paint large areas. That just won't work. It's too hard to get a consistent coating using high solids materials with low CFM air caps."

Stalker said that having the right hardware will go a long way towards improving the finish quality of every painter's work. To that end, he strongly suggests everyone who ever does any painting download a copy of the ABC's of Spray Finishings handbook from Binks. <http://www.binks.com/resources/literature-library>"<http://www.binks.com/resources/literature-library>

### Process. Prepare. Paint. Repeat.

Stalker, as well as the other experts contacted for this story all stressed the growing need to make painting a repeatable process. You just can't achieve a second time, what you can't recall doing the first time.

"What I believe very strongly in is developing some kind of standardization process," Stalker said. "My belief is if it worked yesterday and doesn't work today, what is different? And if you don't have a set process to follow then you can't answer that. So documentation is key."

"Repetition of good practices ensures good results," Giles said. "That's why we try to instill in these good people the need to

"Painting is literally liquid engineering," he said. "Change one thing and the end result could well be different. That's the value of good training. We help build the foundation of a solid process throughout."

follow set guidelines. Once you establish that a particular process works, then repeat it every time."

"Painting is literally liquid engineering," he said. "Change one thing and the end result could well be different. That's the value of good training. We help build the foundation of a solid process throughout."

"By training our customers, and by working closely together with our customers, we are also able to identify the customer requirements for the future. It is possible to assist the customer in optimizing their coating process, to help OEMs in the design of new product requirements, to provide the different types of customers with solutions for their coating problems," Ms. Oldenburger said. "Effective global training concepts in aerospace coatings are of mutual interest for OEMs, airlines, MROs and the coating supplier, in the past, present and for the future." **AM**

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# You've Got to Fight for Your Right to PMA-ty

**O**ver the years, I have heard a lot of debate about the use of PMA parts on leased aircraft. Challenges may arise from restrictive clauses in lease agreements that prevent the use of PMA on the asset. This can cause particular headaches when the lessor is an air carrier that is looking to reduce maintenance costs, but whose largely (or exclusively) leased fleet means that restrictive clauses (either perceived or actual) restrict use of PMA.

The good news for the aviation industry is that lessors' position with respect to use of PMA appears to be loosening as:

- lessees demand the right to use PMA,
- lessors become more familiar with PMA, and
- the industry continues its shift toward ever greater PMA acceptance.

The first, and most important, step in greater PMA acceptance on leased aircraft is demand by the operators. If PMA is not useful to the operators then it is not useful at all. We have already heard at least two air carriers—Delta Air Lines and Copa Airlines—state unequivocally that they will not sign leases with “no PMA” clauses in them. Many – MANY – others have asked how they can start using PMAs on their leased aircraft. At several industry trade shows over the past year, we have heard multiple parties—both air carriers and lessors—state that the use of PMA on leased aircraft was a common occurrence; the lessee (the air carrier) just has to ASK.

Lessors typically enter a lease negotiation with a set of boilerplate terms. Those terms, however, are subject to change to suit the lessee's business model and to satisfy the needs of both parties. At MRO Asia last year, Ananta Widjaja from Sriwijaya Air pointed out that a lessor will never give a lessee anything outside of the boilerplate unless the carrier asks for it. This point was echoed by a number of lessors over the course of that conference, who recognize that use of PMA is a reality in virtually every air carrier's operation.

This is an important point for air carrier maintenance departments to discuss with their

leasing departments. Remind the leasing department that most lessors will permit PMA to be used on leased aircraft (with a few exceptions); the carrier just has to demand the right. As lessors continue to grow more familiar with PMA, and recognize that use of PMA does not in any way devalue their asset, they grow more willing to waive the “no PMA” clauses in their lease agreements. This is beneficial for the lessee and lessor, as the lessee can continue to realize the savings and reliability improvements provided by PMA, and the lessor opens up more potential customers by allowing the use of PMA.

A number of the air carrier representatives I have met at recent trade shows have pointed out to me that they are quite likely to use PMA during the middle of the lease. For lessors, the most important part of any lease is the return conditions, because these are the terms that dictate the condition of the aircraft for the next lessee. When permitted by the lease, lessees can take advantage of this fact by using PMA throughout the term of the lease (as allowed by the lease terms) and as necessary return, remove PMA parts during the heavy check prior to the return of the aircraft.

I would have expected leasing companies affiliated with OEMs to be the last folks to embrace PMA, but I recently encountered an executive from one such leasing company who admitted that there are PMAs on his company's products, and acknowledged that it is something they are managing.

Lessors are becoming more accepting of PMA for a couple reasons. The first is demand by their customers. Lessors need to have their aircraft leased in order to realize a return on investment, so it makes sense to permit the customer to use PMA if that is what it takes to get the lease signed.

Second, lessors have expressed concerns about an effect on residual 'end-of-life' value of the aircraft. Because most PMA parts are expendables that have no part-out value, this is not a concern that applies to the vast majority of PMA parts. For those very few rotatable PMA parts, at least one manufacturer has reported that their overhaul recovery rates are actually higher than those of the corollary OEM parts.



Third, lessors have begun to realize that it is simply not possible for many carriers to operate without any PMA. PMAs, especially on interiors and air frames, are a reality for a significant number of carriers. Some carriers simply cannot operate without the use of PMA to control costs and reliability. Air carriers want to control costs and improve reliability to the greatest extent possible, and this drives use of PMA.

Lessors recognize this. Lessors have even started to realize that this is the case with respect to engines. And though most lessors remain squeamish about PMA in the gas path or life-limited engine PMA, the simple fact is there are very very few PMA that meet this description – which means that nearly all PMAs are fair game.

Finally, lessors are becoming more flexible in allowing PMA because it is impractical not to. When leasing older aircraft, lessors recognize that it is simply not possible to get “OEM” spares. They also recognize the significant lead times for OEM parts, when PMA parts are available off the shelf. This makes a big difference in turn time when delivering a leased aircraft to the next customer. Finally, lessors are beginning to understand that many new aircraft are, in fact, built new using PMA parts(!) It simply makes no logical (or legal) sense to demand no PMA be used when the aircraft are delivered new with PMA throughout.

There are still some hurdles for PMA in leased aircraft. Lessors remain nervous about PMAs in engine gas paths, LLP PMAs and rotatable PMAs. But these are not the traditional roles of third-party PMA parts, so they are not a concern for 99% of the PMA parts out there. The best way to address PMA concerns is through education. Explaining that PMA meets the exact same airworthiness and quality assurance regulations as TC/PC parts,

and must meet or exceed the safety performance of the OEM part is an important point that is often echoed by the FAA.

Ultimately, lessors are becoming more and more accepting of PMA in leased aircraft. Air carriers must remember that everything is negotiable, and that if PMA plays an important part of their maintenance and cost saving strategy, they need to demand use of PMA be allowed by the aircraft lease. PMA manufacturers should make it a point to remind their customers that lessors will allow (or at least negotiate) the use of PMA. But they won't allow anything if the carrier doesn't ask. **AVM**

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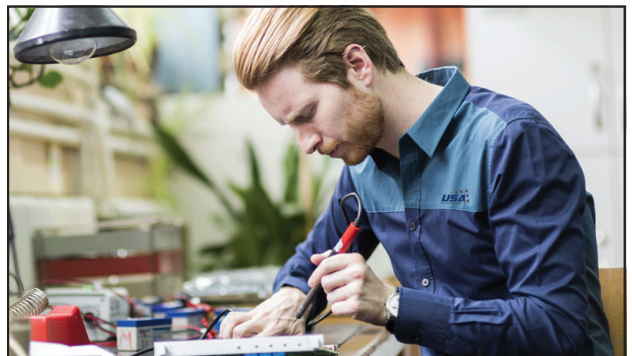
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