AVIATION MAINTENANCE

www.avm-mag.com

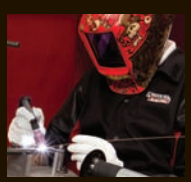
MRO, UPGRADES AND REFURBISHMENT ON COMMERCIAL, BUSINESS/GA AND MILITARY AIRCRAFT GLOBALLY

The GIANTS

Dr. Ismail Demir, CEO, Turkish Technic, is setting his sights on becoming one of the top global players in MRO.

December 2013 / January 2014

WELDING
CHECK IN ON THE LATEST TECHNOLOGY IN WELDING INCLUDING ADVANCED NEW TECHNIQUES



CABIN REFURBS
TIPS FROM THE PROS ON EVERYTHING FROM A REFRESH TO A FULL MAKEOVER

INNOVATION DOESN'T STOP WITH THE ENGINE.

Modern aircraft engines are bigger, faster and hotter than ever before. So we engineer Mobil Jet™ turbine engine oils for reliable performance and protection in the world's most extreme engines, flying millions of miles under virtually all conditions.

Mobil Jet™

Learn more at exxonmobil.com/aviation

THIS IS AVIATION AUTHORITY

STANDING BEHIND YOUR JET

Highest dispatch rate.*

Best customer experience.*

Largest company-owned global service center network.

Unsurpassed service speed.

Best spare-parts availability.

*JetNet IQ 2013

Find us online at cessna.com/citation-service

Cessna

CONTENTS

DECEMBER 2013, JANUARY 2014 VOL 33 ISSUE 1

DEPARTMENTS

COVER STORY

On the cover: Dr. Ismail Demir, CEO of Turkish Technic. *Turkish Technic Image.*

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

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

AVIATION MAINTENANCE
www.avm-mag.com

EDITORIAL
Editor-in-Chief
Joy Finnegan
jfinnegan@avmain-mag.com

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

ADVERTISING/ BUSINESS
Publisher/Owner Adrian Broadbent,
+1 321 800 5817
abroadbent@aerospace-media.com
Global Sales Director Daniel Brindley,
+ 1 414 847 6305
dbrindley@avmain-mag.com
International Key Account Director
Jina Lawrence,
+44 (0) 20 8669 0838
jinalawrence@avmain-mag.com

DESIGN/PRODUCTION
Cavich Creative, LLC.
mail@cavich.com
703-992-7086
www.cavich.com

SUBSCRIPTIONS
subscriptions@avm-mag.com

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

LIST RENTAL
Statistics Jen Felling,
(203) 778 8700, j.felling@statlistics.com

REPRINT PARTNER
The YGS Group
717-505 9701 x100

US Publisher
Daniel Brindley
ASI Publications Ltd

US Publishing Office Address:
500 W Silver Spring Drive
K-200
Glendale, WI 53217 7

AEROSPACE & SECURITY MEDIA
www.aerospace-media.com

ASI publications ltd
www.aerospace-media.com

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

ASI Publications Ltd
77a Freshfield Road,
Formby, Liverpool, L377BG, UK

+1 321 800 5817 (US)
+44 (0) 20 3289 2577 (EU)

abroadbent@aerospace-media.com

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

UK Company registration no 5999781
UK VAT no GB919525796

Here's to You

BY JOY FINNEGAN
EDITOR-IN-CHIEF

"Cultivate the habit of being grateful for every good thing that comes to you, and to give thanks continuously. And because all things have contributed to your advancement, you should include all things in your gratitude."

— Ralph Waldo Emerson

As one year comes to an end and another begins, I want to take a moment to express gratitude to aviation maintenance professionals all around the world. To those of you who dedicate you life to learning the inner workings of the aircraft that carry us, our families and loved ones, our precious cargo, our pets and more to destinations across the globe, you have our unending appreciation. Whether you are in maintenance planning, supply chain, maintenance software, avionics, airframes, engines, sheet metal, the tool crib, wiring, parts, back shops, training or manage some or all of the above, please know that your efforts and dedication are gratefully acknowledged and appreciated.

A cold wave has descended across much of North America as I write this note. It reminds me that regardless of the weather, the professionals entrusted with the care of aircraft must continue on in spite of weather conditions. More often today there is a hangar that is environmentally controlled to work in. But sometimes aircraft break in the most inconvenient of places and require work to be completed on a freezing ramp in precipitation of many kinds. My hands hurt just thinking about trying to manipulate tools and parts in the kind of weather we are experiencing in much of the U. S. right now.

On the flip side, I remember the hottest days of last summer. Thinking about working on an aircraft in an un-air-conditioned hangar with sweat dripping and clouding eyesight, becoming dehydrated and being under the pressure of departure time while the passengers wait comfortably in air-conditioned terminals is enough to make me thirsty.

To those aircraft maintainers who saw something wrong on someone else's aircraft, perhaps it was even a rival airline's aircraft, and stopped to point it out, we salute you.

To those aircraft maintainers who took the time to take a new mechanic under your wing and help them learn the ropes, do things the right way and pass along your knowledge and passion, we salute you.

To those who go above and beyond the call of duty, working beyond your set schedule, missing time with family or sacrificing your free time so the aircraft you are working on can depart on schedule, we salute you.

To those who work strange hours, graveyard shifts, long hours, holidays and weekends we salute you.

The work done to maintain aircraft, whether a small, single-engine pleasure craft or a massive military transport or a trans-continental jetliner, is complex and never-ending. Although newer aircraft coming off the line are becoming more reliable and requiring less unscheduled maintenance, the fact remains, without you, the knowledge you possess and your dedication to solving mysterious anomalies, aircraft would never get off the ground because airplanes break.

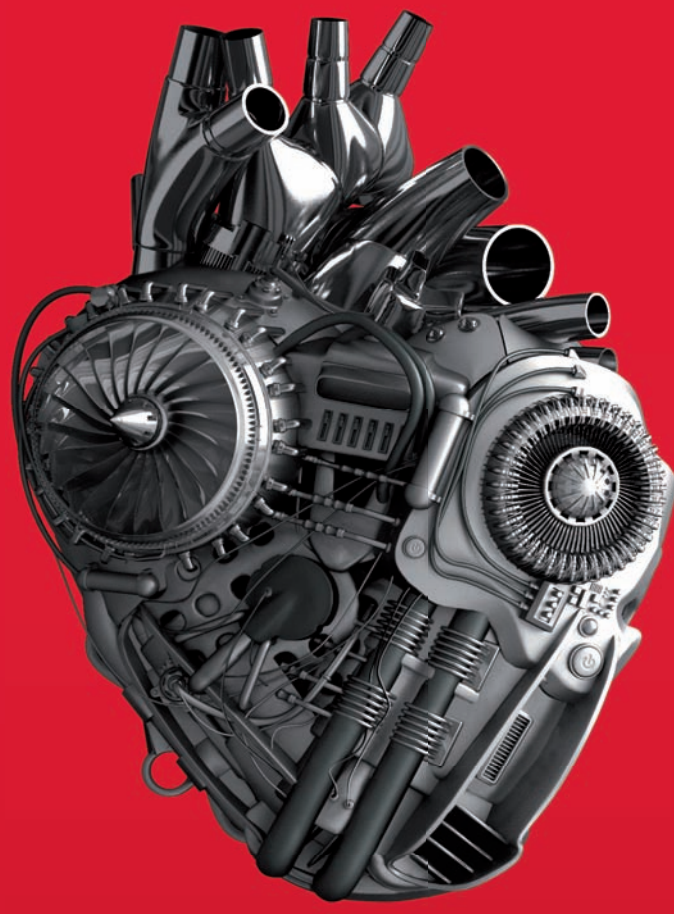
I am reminded of a couple of great quotes from some maintenance leaders at a conference earlier this year. From Joe Ferreira, vice president of line maintenance at United: "There is no such thing as a self-healing airplane." And this from Jim Sokol, vice president, maintenance operations at Southwest Airlines: "It's the most responsible, highly regulated, complex part of our business and technology is lagging 30 years behind." And finally this: "Line maintenance is the hardest job in the airline business," Richard Anderson, Delta CEO.

The accident rate in aviation continues to decline and fatalities due to accidents are also declining. Thank you to all maintenance professionals for your dedication to safety, for taking personal responsibility, for holding yourselves to the highest standards, for following procedures even when they are poorly written and for all you do to keep us flying! AM

"We must find time to stop and thank the people who make a difference inou r lives."

— John F. Kennedy

OUR EXPERIENCE DRIVES YOUR EXCELLENCE.



When what matters is finely tuned, everything works.

Iberia's merger with British Airways has made us stronger. Our technicians have more than 85 years of experience and are experts in their field. With our extended product range and joint resources we can offer you the high quality service that you demand.

STRONGER TOGETHER.

Iberia Maintenance. Commercial and Business Development Direction
Madrid-Barajas Airport. Z.I. La Muñoza. Motores Building, 28042 Madrid.
Spain tel: + 34 91 587 51 32/ Fax: +34 587 58 84
maintenance@iberia.es / www.iberiamaintenance.com
British Airways Maintenance: baeng@ba.com / www.ba-mro.com

BRITISH AIRWAYS ENGINEERING | MAINTENANCE IBERIA

Members of IAG

Textron to Acquire Beechcraft

On the day after Christmas Textron announced that it has reached agreement to purchase all outstanding equity interests in Beech Holdings, the parent of Beechcraft Corporation, for approximately $1.4 billion in cash. Beechcraft has estimated 2013 revenues of $1.8 billion and supports more than 36,000 aircraft with a global network of company-owned and authorized service centers.

"The acquisition of Beechcraft is a tremendous opportunity to extend our general aviation business," said Textron chairman and CEO Scott C. Donnelly. "From our customers' perspective, this creates a broader selection of aircraft and a larger service footprint—all sharing the same high standards of quality and innovation. The iconic King Air product line perfectly complements our Caravan and Citation jet line-up and our combined global service network will deliver the superior level of services expected by our Cessna, Beechcraft and Hawker customers."

Bill Boisture, CEO of Beechcraft, shown at left, said, "This transaction represents an important step forward in the evolution of Beechcraft's business. The team at Beechcraft has worked tirelessly to strengthen our core business and to maintain our position as a leader in a highly competitive environment. Textron's experience in the industry and its willingness to invest in and maintain the iconic Beechcraft brand make it an ideal parent company, one that will help us continue to satisfy our customers and meet our business objectives at a faster pace."

Textron plans to finance the purchase of the equity as well as cash required for the repayment of Beechcraft's working capital debt through a combination of available cash and up to $1.1 billion in new debt. Holders representing equity interests in Beech Holdings sufficient to approve the transaction have delivered proxies authorizing written consents in favor of the transaction. The transaction is expected to close during the first half of 2014, subject to customary closing conditions, including regulatory approvals.

Monarch Unveils New Facility at Birmingham Airport

Monarch Aircraft Engineering Limited (MAEL) officially opened a brand new multi-million pound maintenance hangar at Birmingham Airport, UK. Sir Roy McNulty, non-executive director, Monarch Holdings Limited, officiated at the ceremony. The facility, which is immediately creating 150 new jobs, also has the potential to add a further 150 posts.

Monarch says the 110,000 sq ft state-of-the-art facility will complement the company's existing engineering operations at London Gatwick, London Luton and Manchester Airports and supports the continuing growth of MAEL's aircraft engineering activities.

The new facility can accommodate almost every aircraft type in its two bays, incorporates industry-leading design and build standards, and is one of the first to have the capacity for Boeing 787 Dreamliner maintenance, with sufficient capacity for other wide body aircraft, such as the Boeing 777, 747 and Airbus A350. It is large enough to accommodate two Boeing 777-300ER aircraft or 10 narrow-body aircraft and will contain a number of component-repair and back shops. The building is big enough to house four full size football (soccer) pitches, 2400 Minis or 450 double decker buses.

In its first month of operation, seven different aircraft types are scheduled for maintenance in the facility, including Airbus A300, A320 and A321, Boeing 757 and 767, Embraer 195 and Bombardier Q400.

"Today is a real milestone in the growth and development of MAEL as we officially open our tremendous new state-of-the-art engineering hangar at Birmingham Airport. The hard work and dedication of the whole team involved in this project has been outstanding and has allowed us to ensure it has opened on time and most importantly, within budget," Mick Adams, managing director of MAEL, said.

"We are very proud to be opening this innovative new facility, just one year after we announced its creation," Iain Rawlinson, executive chairman of The Monarch Group, said. "It has been a huge achievement. This multi-million pound investment at Birmingham Airport, a key and growing part of The Monarch Group's operation, clearly demonstrates our commitment to the region and is not

FL Technics Appoints New CEO

Lapinskas

Butautis

FL Technics announced the appointment of Zilvinas Lapinskas to the position of CEO. Lapinskas will replace Jonas Butautis who will act as the Deputy CEO for the rest of the transition period. Zilvinas Lapinskas boasts an experience of over ten years spent leading international enterprises and teams of 4000 employees. The 37-year-old executive has joined FL Technics after managing City Service, a NASDAQ OMX Vilnius Stock Exchange-listed company, engaged in facility management services in Eastern and Central Europe.

On the 6th of December, 2013 Zilvinas Lapinskas was appointed the CEO of FL Technics as the person responsible for the company's global operations and its further development in Europe, Asia, the CIS and other regions. "I am delighted to be joining FL Technics at such an incredibly exciting time for the MRO industry. I am determined to bring all my knowledge and skills to contribute to the efforts of the entire team in securing FL Technics' goals and aspirations," said Lapinskas.

"For the past several years FL Technics has been successfully developing its activity in terms of both services and geography. We have significantly increased our market presence. In the nearest future we will focus on implementing our exceptionally ambitious goals. We are determined that Zilvinas, with his deep international business expertise as well as an extensive experience in managing international teams, will continue boosting FL Technics success worldwide. Also, I would like to take this opportunity to thank Jonas Butautis for [the]...pivotal role he has played in creating a truly global MRO provider," said Gediminas Ziemelis, the chairman of the Board of Avia Solutions Group, the parent company of FL Technics. "I have been incredibly privileged to lead FL Technics for the last four years along its successful growth. I am certain that with a new leader to stand at the wheel of FL Technics the company will firmly continue with its confident goal-driven strategy worldwide," commented Butautis.

only generating jobs, but will also attract more international and domestic customers, benefitting both the region and the UK economy as a whole."

Additionally, Monarch Aircraft Engineering Limited (MAEL) has been granted UK Civil Aviation Authority (CAA) Part 147 approval to deliver aircraft type training on the Boeing 787 Dreamliner.

The Boeing 787 Dreamliner B1 and B2 type training will be delivered by the Monarch Aircraft Engineering Training Academy (MAETA) at its training facility at London Luton Airport. The first full B1/B2 course commenced in November 2013. MAEL says it has made a considerable investment in training and through the use of technology including tablet devices is now delivering the best in class technical training for both internal and external customers.

about people

Winkler to Helm MTU Aero Engines

Winkler

MTU Aero Engines AG's Supervisory Board extended the contract of CFO Reiner Winkler. The new, five-year contract will run from October 1, 2014 through September 30, 2019. On January 1, 2014, Winkler will take over the helm of MTU Aero Engines AG as its new Chief Executive Officer, in addition to his duties as CFO. Winkler has been a member of MTU Aero Engines' Board of Management since May 2005 and has been responsible for finances, human resources and IT. Winkler joined MTU in 2001.

Huston Joins Banyan as COO

Banyan Air Service announced that Craig D. Huston will be the company's new chief operating officer (COO). "The company is excited to add Craig to the leadership team as Banyan continues to grow and explore many opportunities," Don Campion, President of Banyan said. As COO, Huston will be responsible for overseeing all of Banyan's operations, including FBO Services, Avionics, Maintenance, Parts Solutions and Banyan Pilot Shop.

Huston

Ladnier

FlightSafety Promotes Ladnier

FlightSafety Int'l announces that Ron Ladnier has been promoted to vice president, FlightSafety Services Corporation. He replaces Mike Sangster who will be retiring from his full time position at the end of 2013. Mike will continue to serve as a consultant. Ladnier joined FlightSafety as director, Military Business Development in 2011. His responsibilities included working with government and military agencies around the world to identify and provide training and simulation equipment solutions. He previously served in the United States Air Force obtaining the rank of Major General.

ERAU Welcomes New Safety Director

Jeremy Mammen, an alumnus of Embry-Riddle Aeronautical University, has joined the school's Daytona Beach, Fla., campus as the Flight Department's director of Aviation Safety. Most recently Mammen was the manager of Flight Safety at Aerosim Flight Academy in Sanford, Fla. In previous positions at Aerosim he was a Certified Flight/Check Instructor and a Courseware Developer. He was also a member of the Runway Safety Action Group and Noise Abatement Committee for Sanford International Airport.

about people

ERAU Worldwide Names Witcher Dean

Kenneth L. Witcher has been named dean of the College of Aeronautics at Embry-Riddle Aeronautical University – Worldwide. In his nine years with the university, Witcher has served in several roles including adjunct faculty member, director of academics and program chair. As dean of the College of Aeronautics, he will lead nearly 50 full-time faculty and more than 900 active adjunct faculty who instruct courses online and at more than 150 Worldwide locations in the U.S. and abroad. Witcher earned his master's degree from Embry-Riddle and doctorate from Northcentral University in Arizona.

Blackhawk Names Kromer SVP

Blackhawk Modifications added Robert A. "Bob" Kromer in the role of senior vice president of Sales and Marketing. Kromer is a 30-year industry veteran with experience and expertise in Sales, Marketing, and Management.

"Bob's technical experience and global market knowledge will further strengthen and expand our depth and capability in these two extremely critical areas of the company," said Jim Allmon, Blackhawk president and CEO. Kromer holds a Bachelor of Science in Aerospace Engineering from Texas A&M University.

NORDAM Taps Whitten to Lead Sales

NORDAM CEO Meredith Siegfried announced Dave Whitten has been appointed senior vice president, sales, marketing and strategy. "NORDAM has domestic and international divisions supplying aircraft manufacturers, airlines, and military customers around the globe," Siegfried said. "We needed a single sales leader to leverage the information and lessons learned from one part of the business across all of our divisions." Previously, Whitten served as senior vice president, strategy and marketing. Whitten has a master of business administration from Carnegie-Mellon University and a bachelor of science in mechanical engineering from Georgia Institute of Technology.

Allianz Names Park Head of Claims

Allianz Group's specialist corporate insurer, Allianz Global Corporate & Specialty (AGCS) appointed of Rocie Park to head of Aviation Claims North America, effective January 1, 2014. In this position, Park will be responsible for developing and executing the aviation claims operations

ST Aerospace Signs JV with Wings Capital

ST Aerospace's wholly owned subsidiary, ST Aerospace Resources (STA Resources) has signed a joint venture agreement with Wings Capital Partners Holdings, to set up WingStar Pte. Ltd. (WingStar).

Based in Singapore and equally owned (50:50) by the two shareholders, WingStar will build on opportunities created by global fleet expansion and renewal to acquire aircraft for lease, conversion or part out. Under the joint venture agreement, the shareholders plan to build up a portfolio of mid-life and end-of-life aircraft assets which will initially include Airbus A320 and Boeing 737NG families of aircraft.

The two say WingStar will leverage Wings Capital Partners' experience in deal sourcing, financing, leasing and marketing, alongside ST Aerospace's technical expertise in airframe, engine and component maintenance repair and overhaul, aircraft tear-down, parts trading, passenger-to-freighter conversion, as well as aircraft inspection and technical asset management, to bring value added services to the aircraft operators globally. WingStar is expected to commence operations by early 2014.

"This joint venture extends ST Aerospace's total aviation support offering, adding a new dimension to how we can support airline customers on mid to end-of-life aircraft. We look forward to working with Wings Capital Partners to build up aircraft solutions for the global market," says Chang Cheow Teck, president, ST Aerospace.

Gama Aviation Inaugurates Facility at Glasgow Airport

Gama Aviation recently inaugurated a brand new 2,480m², £3.8 million ($6.23 million) maintenance hangar, offices and executive aircraft handling facility in Glasgow, Scotland. The new facility provide a modern and convenient aircraft charter base for Gama Aviation's Scottish based customers and the Gama Aviation Executive Terminal (FBO) will be ready for the Ryder Cup Golf Tournament and the Commonwealth Games, when the city expects to handle a large volume of business and VIP visitors.

Gama Aviation will provide full base and line maintenance in the new hangar, to support the Beechcraft King Air 200s operating an essential service for the Scottish Air Ambulance. In addition Gama Aviation anticipates significant third party aircraft maintenance activity coming to Glasgow.

Gama's long association with the Scottish Ambulance Service and NHS Scotland commenced in 1993. The air ambulance service is an essential component of the provision of healthcare in Scotland. These specially equipped aircraft together with the highly trained medical and flight crews provide round-the-clock cover for routine and urgent patient transfer.

"We are delighted to complete the first phase of this significant investment project, which is a great showcase for our wide ranging aviation capabilities—all under one roof," Gama Aviation CEO Marwan Khalek said. "We are extremely proud to have been here in Scotland for over two decades and this new facility underlines our long term commitment to this region. We are also delighted to announce the creation of new jobs here in Glasgow as we look towards Phase 2 of our investment program, when we will double the hangarage and handling capacity of our new facility in 2014."

Amanda McMillan, managing director of Glasgow Airport, said: "This new facility is a fantastic vote of confidence in the city of Glasgow and the airport. Gama Aviation is making a considerable investment, creating jobs and new business, and the announcement of a second phase of investment underlines this commitment."

CARE²AIRFRAME CARE²ENGINES CARE²COMPONENTS CARE²ENGINEERING

ADDING CARE²AIRFRAME

TAP M&E is all about care. From daily checks to heavy maintenance, care meets quality in each single tailored service. This approach to Customer needs, along with near 70 years supporting TAP Portugal fleet, enable us to offer a full set of reliable solutions to you. We add care to quality. We care more.

C²Q *Care to Quality*

CARE²MEET US?

PHONE: +351 707 200 800 care2me@tap.pt

TAP MAINTENANCE & ENGINEERING

A Business Unit of TAP Portugal

www.tap-mro.com

about people

in North America, leading a team of 18 highly specialized aviation claims experts across the spectrum of Airlines, Aerospace and General Aviation. She will replace Tim McSwain who will retire at the end of December 2013. She is a member of both the New Jersey and Colorado Bar Associations and is a licensed pilot.

Goudou to Advise President of Apave

Goudou

Apave has chosen Patrick Goudou to act as technical advisor to Christian Mainet, president. Goudou officially joined Apave in October, with the mission of consolidating the aeronautical division of the Group. After spending 28 years at the heart of the DGA (General Directorate for Armament), Goudou was named director of the European Agency of Air Security (AESA), upon its creation in 2003. Goudou (63) is an alumnus of the Ecole Polytechnique and Sup'Aéro (Ecole nationale supérieure de l'aéronautique et de l'espace) and a general armament engineer. "We are proud to welcome Patrick Goudou who joins us to reinforce the development of Apave's strategically crucial aeronautical division. His contribution will ensure that objectives as well as clients' expectations are met," states Christian Mainet, president of the Apave Group.

Branson's Wood in "Top 40 Under 40"

Wood

In the latest issue of Airport Business Magazine, Rachel Wood, deputy director of Marketing and Air Service Development at the Branson Airport, was named as one of the magazine's "Best and Brightest Top 40 Under 40." "It is truly an honor to be recognized by Airport Business magazine, especially when it's among all of these other amazing leaders in the aviation industry," said Wood. "It is great to see Rachel recognized as an industry leader among our peers" said Jeff Bourk, executive director for the Branson Airport. "Receiving this award is an honor few in our industry get to experience; she has worked very hard to elevate the airport, grow tourism to our area and she greatly deserves this recognition."

PJS Hires VP of Operations

Private Jet Services Group (PJS) recently announced the hiring of Craig Hutchison as vice president of Operations. Hutchison,

Middle East Propulsion Company Expands with MTU's Help

Saudi Arabian engine maintenance company, Middle East Propulsion Company, has strengthened its position as a provider of military engine maintenance, repair and overhaul (MRO) services for the whole of the Middle East region. Four years after MTU's acquisition of a 19-percent share in 2009, MEPC's product portfolio has been continuously extended. The Middle East Propulsion Company has expanded its module maintenance work by winning contracts for the RB199, the engine powering the RSAF Tornado fleet. Furthermore the MRO capability for the PT6 engine installed on the RSAF's Pilatus PC-9 and PC-21 training aircraft has recently been established and the company is awaiting certification approval for maintenance work on the T56 engine that powers the RSAF fleet of C-130 Hercules. This approval is expected by the first quarter of 2014. As a result the company will be in a position to offer full overhaul services for two additional turboprop engines. In addition to this expansion, MEPC has been awarded with a follow-on contract of the Pratt & Whitney F100-PW220 engines for the Boeing F15 beginning November 2013. This contract was put on tender for the first time and was won by MEPC against strong international competition. The F15 has been the backbone of the company in past years.

"MEPC has a dedicated as well as well-qualified and certified workforce and a highly committed management team, the perfect basis for becoming the leading provider of military maintenance services across the whole of the Middle East," says Klaus Guenther, senior vice president Defense Programs, MTU Aero Engines. "The acquisition of additional programs at MEPC in less than four years represents a tremendous achievement."

MEPC has ambitious goals for the future and plans to add more programs to its existing portfolio. This includes obtaining a maintenance contract from Eurojet and its partners for the EJ200 engines installed on the RSAF Eurofighter Typhoon fleet. Saudi Arabia has ordered 72 Eurofighter Typhoons, 32 of which have already been delivered, and prospects are good for a follow-on order. MTU contributes the low-pressure and high-pressure compressors and the digital engine control unit (FADEC) to the EJ200 program. Other engines targeted include the General Electric F110-229 for the F15 Fighter, T700 for the UH-60 Black Hawk and AH-64 Apache helicopters operated by the RSAF, and the AGT1500 tank engine built by Honeywell.

Middle East Propulsion Company is based in Riyadh the capital of the Kingdom of Saudi Arabia and is the major military engine MRO company in the Middle East. By the end of 2013, it will have a workforce of 89 employees and an annual sales volume of more than 60 million U.S. dollars. MEPC is a joint-venture partnership of Pratt & Whitney a United Technologies Corporation (UTC) company, Saudi Arabian Airlines, Saudi Aerospace Company (SAC), WAMAR and MTU Aero Engines. MEPC's prime customer at the moment is the Royal Saudi Air Force (RSAF), which operates its Pratt & Whitney F100-PW220 engines as well as its PT6 and T56 engines and the RB199s powering its Tornado jets to MEPC.

Stopping Power Across The Globe

Our work is certified by the FAA, EASA and CAAC, which means that regardless of where our customers are located, they can experience our quick turn-times, personalized customer service and high quality work performed by technicians with over 60 years of combined experience.

- Miami, FL
- Oklahoma City, OK
- Indianapolis, IN
- Kuala Lumpur, Malaysia

Contact us today to learn more about lower costs and faster turnaround times from AAR.

AAR®
Wheel & Brake Services

AAR Wheel & Brake Services — 9270 N.W. 100th Street — Medley, FL 33178 — USA — Tel: 305.883.1511 — www.aarcorp.com/wheel&brake

about people

an aviation industry veteran, will be responsible for managing all PJS operations, including flight services, vendor contracting, quality assurance, safety management programs, service delivery and Concierge training. Hutchison comes to PJS with significant aviation experience. He served as a pilot in the charter business and as vice president of Sierra West Airlines, district operations manager for ARAMARK Aviation Services and VP of Business Development for Evergreen International Airlines. Hutchison earned a degree in communications from California State University, Hayward and served as a Black Hawk Pilot and operations officer in the US Army.

FlightSafety Promotes MacLellan

MacLellan

FlightSafety International announces that Daniel MacLellan has been promoted to Vice President, Operations. He will assume responsibility for operations at FlightSafety's worldwide network of Learning Centers from Greg McGowan, senior VP, Operations, when he retires at the end of 2013. "We congratulate Dan on his well-deserved promotion," said Bruce Whitman, president/CEO. "FlightSafety's Customers and Teammates will benefit from Dan's leadership, experience, and commitment to provide the highest quality training and service. We greatly appreciate and value Greg McGowan's outstanding contributions to FlightSafety for more than 30 years, and his commitment to enhance aviation safety worldwide. All FlightSafety Teammates wish him the very best in his upcoming retirement."

Timken Names Wilson Field Service/ Sales Engineer

Wilson

The Timken Company has appointed William I. Wilson as field service/sales engineer for the Timken aerospace maintenance, repair and overhaul business. Wilson joins Timken with more than 20 years of experience in aerospace technical and customer service support. He has served as a field service representative and manager of fleet specialist and engine programs, and has held management positions with several aerospace repair organizations. He holds an airframe and power plant (A&P) license as well as an Aircraft Mechanics Diploma.

Locatory.com Integrates with Pentagon 2000SQL

Locatory.com has selected Pentagon 2000SQL for integration with its own trading platform catered specifically to the aircraft spare parts aftermarket. Responding to the rapid growth and the most recent trends in the aviation industry, Locatory.com has started its business process integration and added Pentagon 2000 Software as its initial ERP partner.

Gabriel Mofaz, president at Pentagon 2000 Software commented that "the Locatory.com inventory and services locator has a very comprehensive set of data that is required throughout the industry, and they are making significant investments to expand their offerings and maintain leading technology for their platform. With over two billion inventory items listed and more than 700,000 repair capabilities included, it is no wonder that many of our key customers connect to the service on a daily basis."

Zilvinas Sadauskas, the CEO of Locatory.com added, "Pentagon 2000 Software has been in business for over 27 years and serves leading OEM's, global operators, a broad set of repair stations, and distributors in all regions of the world. We have a core set of common customers today, and this new integration will allow quick and seamless expansion of our service capabilities to hundreds of other businesses that utilize the Pentagon 2000SQL platform."

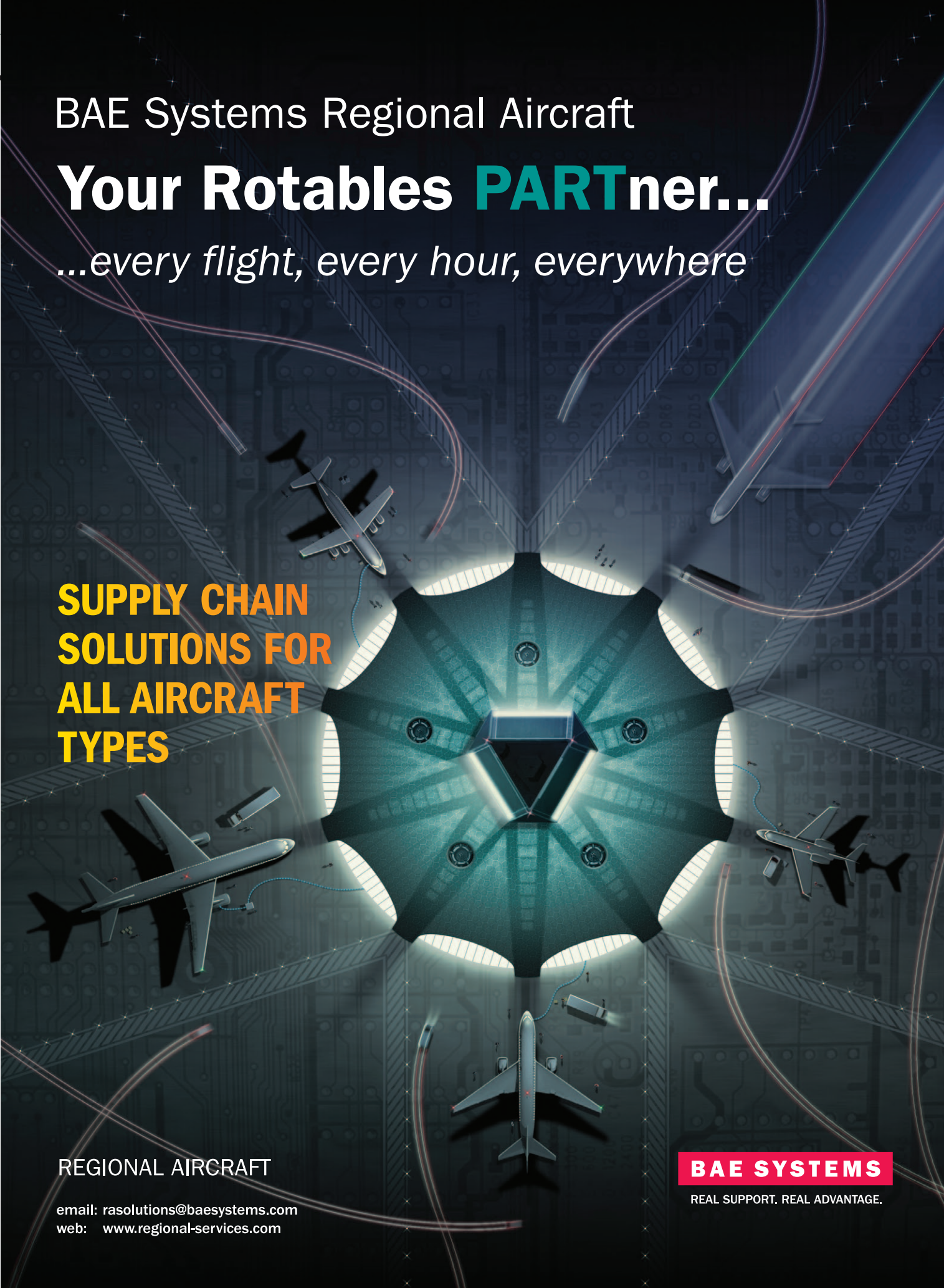
Jet Aviation Basel Refurbs Maintenance Shops

To improve operational efficiency and production capabilities, Jet Aviation Basel has expanded, restructured and refurbished its Engine, Wheel and Non-Destructive-Testing (NDT) shops. All three shops were doubled in size, reorganized and outfitted with new materials and equipment. The expansion and refurbishment further includes large new storage rooms, a meeting room, office space and a library. A new in-house water purification system has also been installed to recycle water from wheel and NDT activities.

"Along with the restructuring of the shops, we developed and introduced new work processes," said Arjen Boone, senior director of MRO Supply Chain Management and Support Operations at Jet Aviation Basel. "The shops are now better coordinated to help improve efficiency, meet our strategic business objectives and ultimately enhance customer focus and service quality. This is one of many initiatives that has been undertaken to ensure we continue providing our clients the best support possible."

"These changes have directly improved our production capacity to enable us to respond to increasing demand and better meet the needs of our valued customers," added Johannes Turzer, vice president and general manager of the Maintenance Center at Jet Aviation Basel. "This investment demonstrates our commitment to the highest quality standards and the ongoing improvement of our services."

The company plans to further expand its Engine repair capabilities in the near future. Its engine shop currently supports Honeywell TFE 731, CFE 738, HTF7000 and Honeywell APU GTCP engines.


BAE Systems Regional Aircraft
Your Rotables PARTner...
...every flight, every hour, everywhere
SUPPLY CHAIN SOLUTIONS FOR ALL AIRCRAFT TYPES
REGIONAL AIRCRAFT
email: rasolutions@baesystems.com
web: www.regional-services.com
BAE SYSTEMS
REAL SUPPORT. REAL ADVANTAGE.

about people

Aguiari

Aguiari Joins GlobalAir.com

GlobalAir.com announced Moreno Aguiari has joined their sales and marketing team, undertaking the promotion of clients on both the west coast of the U.S. and internationally. Aguiari received his Bachelor's Degree in Political Science from Universita' Statale in Milan, Italy, and an Aeronautical Technician diploma from National Avio School in Milan, Italy. He moved to the United States in 1999 to become a commercial pilot, and became a U.S. citizen in 2007. After flying professionally for several years, he started his own online company. In the last ten years, he has developed extensive experience in sales, marketing and business development from working on personal projects as well as consulting for internet companies.

Hayes

Hayes Joins Superior

Superior Air Parts, Inc., President and CEO Tim Archer, announced L. Scott Hayes has joined the company as vice president of Sales and Marketing.

"In today's highly competitive market, it's not enough just to have the best products and pricing, you need to have a truly professional and dedicated sales effort to ensure you are meeting all of your present and potential customers' expectations," Archer stated."His aviation experience and sales expertise gives him a combination of skills that will »

AAR Reaches Key Milestones at its Lake Charles Facility

AAR recently completed the first heavy maintenance check on a commercial aircraft at its maintenance, repair and overhaul (MRO) facility located at Chennault International Airport in Lake Charles, Louisiana. The work was performed on an Airbus A330. In addition, the Lake Charles MRO, which commenced operations using a short-term approval granted under its Miami facility's operating certificate, has now received its own operating certificate bringing the total number of FAA-certified AAR repair stations to 14.

AAR announced that it would occupy the facility in August and commenced operations in September. The Lake Charles MRO is the company's sixth major heavy aircraft maintenance facility in North America, where AAR provides a wide range of services, from scheduled maintenance and structural repairs to re-engineering aircraft interiors.

"We were able to assemble a great team and perform the work in a relatively short time by leveraging the strength and talent of our nationwide network of MRO facilities," said Chris Jessup, senior vice president, Airframe and Engineering for AAR's Aviation Services segment. "These are significant milestones in the ramp up at Lake Charles as we establish the new operation and position the business for growth."

Virgin Galactic Goes Live with Ultramain M&E

Ultramain Systems announced the go-live of ULTRAMAIN v9 software at the world's first spaceline company, Virgin Galactic. Virgin Galactic went live on the entire ULTRAMAIN M&E/MRO product suite.

According to Mark McCausland, president of Ultramain Systems, "Virgin Galactic is on the cutting edge of aerospace technology and achievement. Working with them has been an incredible experience. We are of like mind in our desire to expand the envelope of paperless operations through the use of well thought-out software. The software in use by Virgin Galactic is the most sophisticated collection of ULTRAMAIN applications produced to date and will be an integral part of the space tourism operations."

In addition to being the first to offer commercial space tourism, Virgin Galactic is the first spaceline to implement commercial grade Maintenance and Engineering software. "We are honored that our software is a part of that distinction," McCausland added. The Virgin Galactic go-live constitutes several other firsts including the first operational use of an electronic logbook (ELB) on a mobile device and the first operational mobile ELB integrated with an M&E system. Virgin Galactic is also the first user of the paperless Mobile Mechanic and Mobile Inventory software.

Turkish Airlines CEO to Head AEA

Association of European Airlines convened in November for the inaugural Aviation Leadership Summit in Brussels. As of 1 January 2014, Dr. Temel Kotil, CEO of Turkish Airlines will take over the chairmanship from Bernard Gustin, CEO of Brussels Airlines who was chairing the association for the last two years. Under the new governance structure, Dr. Kotil will be the first president of the Association.

Perfect landing

With over 80 years of experience and powerful technological infrastructure,
we are the team of choice for some of the world's most prominent airlines.
Join us for perfect success.

www.turkishtechnic.com

Technically Yours TURKISH TECHNIC

about people

be an invaluable benefit to our ongoing efforts." Before joining Superior Air Parts, Hayes was with Interstate Battery and Valassis-ADVO. Hayes holds a BS degree in Professional Aviation from Louisiana Tech.

PAS Technologies Selects Theis to Lead Sales

PAS Technologies announced the appointment of David W. Theis to the newly expanded role of senior vice president Sales. In this capacity Dave will provide global leadership to the entire company, for all products and services, including Aerospace and Energy. Since joining PAS in early 2012, his responsibilities have grown, having started with sales responsibility for Industrial Gas Turbine offerings. In addition to IGT, for the past 12 months, Dave has also led sales for their high growth Oil and Gas portfolio. Today's new appointment adds responsibility for aerospace products and services.

"Dave's high energy and passion in working with our IGT and Oil & Gas customers has demonstrated to me that he is the right person to lead all of the company's sales initiatives, including Aerospace," said Tom Hutton, CEO of PAS.

Sewell

Ken Sewell Joins IBA

Ken Sewell has joined the International Bureau of Aviation as head of Aircraft Transactions. He will be responsible for aircraft remarketing and associated transaction management across IBA's growing managed portfolio as well as seeking new business opportunities worldwide. Ken brings thirty five years' experience in the aviation industry in both a technical and commercial environment. He started his career with British Airways in the mid-seventies as an avionics technician and later became manager of the component overhaul workshops and the material management and supply chain operations. In 1999 Ken joined their aircraft trading team, as a technical program manager and subsequently as aircraft trading manager. Phil Seymour IBA's president and COO says, "Ken brings with him a vast range of experience in aircraft transaction management and remarketing. His skill-set complements and enhances the services we offer to our asset management clients, where both the commercial aspects and the technical considerations of the aircraft are very important."

ExxonMobil Aviation Celebrates 50th Anniversary of Mobil Jet Oil II

ExxonMobil Aviation recently celebrated the 50th anniversary of its Mobil Jet Oil II at its production plant in New Jersey.

Introduced in 1963, Mobil JetTM Oil II is a high-performance, synthetic aircraft-type gas-turbine lubricant that is formulated to handle extreme speeds and temperatures, as well as other stresses placed on airplane engines.

ExxonMobil says Mobil Jet Oil II remains one of the aviation industry's most widely selected lubricant formulations. "We are proud to celebrate this milestone and believe the aviation market's continued reliance on Mobil Jet Oil II—more than 50 years after its introduction—serves as a great example of how ExxonMobil Aviation continues to deliver the highest level of technology leadership and application expertise to help its customers achieve their business goals," said Frans Horjus, global aviation lubricants sales manager, ExxonMobil Fuels & Lubricants.

Along with celebrating the 50th anniversary of Mobil Jet Oil II, ExxonMobil Aviation recently celebrated another milestone with the ground breaking ceremony of its advanced blending and packaging center for synthetic aviation lubricants in Port Allen, La.

ExxonMobil says the new facility demonstrates continued commitment to the aviation lubricants business and was designed to meet long term customer needs. Set to be operational by early 2015, this new facility will feature advanced manufacturing capabilities to help support the production of future jet engine oil technologies, including the newest addition to the Mobil Jet family, Mobil Jet Oil 387.

Inventory Locator Service,® LLC (ILS)

ILS offers supply chain solutions that increase sales and save time and money.

Inventory Locator Service,® LLC (ILS) is a global leader in providing supply chain solutions to the aviation and defense industries. Over the last 30 years, ILS has built the world's largest and most active aviation and defense parts marketplace, ILSmart. This marketplace offers an array of services that allow companies to promote their business to key players in their industries, make and receive bids on merchandise, search thousands of supplier inventories around the world in seconds, and get information on prospective buyers/sellers.

The ILS MRO database lets buyers search a worldwide community of aviation suppliers and see the average cost to overhaul, repair, bench check and exchange items. Repair shops can market the services they provide to ILS customers who search the MRO database for over 81,000 items a month. Competitively-priced services can be found with the click of a button, and MRO service providers can be visible to a much larger market – allowing more local repair stations to serve a world-wide clientele. You can also contact suppliers directly using our easy-to-use online RFQ system.

But the marketplace is only part of the story. ILS offers a rich set of solutions that enable clients to manage their internal inventory and repair processes, auction off surplus inventory, company profiles, send message broadcasts, retrieve supply and demand information report, research defense logistics data, create personalized electronic catalogs or websites, and seamlessly integrate internal business processes with the ILS marketplace.

ILS also offers market intelligence reports that provide in-depth supply and demand statistics, and pricing information for individual parts all the way up to the complete component level. Six different types of standard reports are available, or a company can choose to receive a custom report, and the information in all reports is fully exportable for greater ease of use.

Visit www.ILSmart.com, or call 1-901-794-5000 for more information on ILS.

Contact details
Inventory Locator Service,® LLC
8001 Centerview Parkway, Suite 400
Memphis, TN 38018 – U.S.A.
1-901-794-5000
marketing@ILSmart.com

Image courtesy of Turkish

MRO Titans

Facing Increased Competition from OEMs, Each Other

By James Careless

The global MRO market is volatile but growing. Competition from OEMs and other MROs is putting pressures on the biggest MROs—the titans—and just because a company is big today is no guarantee of its survival in years to come.

Depending on who you talk to, the global MRO market (engine and airframes combined) is currently worth anywhere from $50.0 billion (Frost & Sullivan) to upwards of $55 billion-$60 billion (FL Technics). What these experts agree on is that the market is definitely growing. For instance, Frost & Sullivan's Wayne Plucker (the company's industry manager, Aerospace & Defense) sees the global MRO market as "being worth $62 billion in five years time," up more than $10 billion from his current $50.0 billion estimate.

Of course, some areas are growing faster than others. Specifically, "The North American and European markets are showing slow growth rates while the growth in Asia and the Middle East are accelerating," said Marcel Versteeg. He is owner and managing director of VZM Management Services, an aviation consultancy based in Sassenheim, The Netherlands.

Later, we will look more closely at what is driving these various regions. But before we do, consider who the titans of MRO are.

In general, the titans' ranks remain unchanged from the previous year. In fact, "we have not really seen a change of the MRO titans in the last five years," Versteeg said. In the Top Five, it is engine OEMs such as GE, Pratt & Whitney, and Rolls-Royce who lead the pack, based on their turnover. Following them are Lufthansa Technik (LHT) and Air France Industries-KLM Engineering & Maintenance (AFIKLM) remain on top, said Versteeg. "Of the last two, we have seen AFIKLM more and more focussing itself on the components and engines business as they have missed the battle for airframe maintenance. Both of their divisions hardly perform any C-checks for customers, and have no worldwide network like LHT to perform base/heavy maintenance in lower labor cost countries," he said.

Up-and-coming to the titan's ranks is the UAE's Mubadala Aerospace, which has acquired Abu Dhabi Aircraft Technologies (ADAT) and SR Technics (SRT) in a bid to gain market share. Still, this newly consolidated company has a turnover that is only a third of the smallest of the Top Five MROs. As a result, "they are now about same size as ST Aerospace, another worldwide player," noted Versteeg. Other MRO titans include Delta TechOps and Iberia, said Wayne Plucker. This notwithstanding, "the engine MROs have done a really good job of capturing much of the MRO market," he observed.

Meanwhile, the China/Hong Kong MRO, Haeco, has staked its flag in the North American region by acquiring Timco. "This Asian MRO has been a prominent player in airframe maintenance two decades ago, but lost their position to ST Aerospace," said Marcel Verteeg. "It will be interesting to see where this will end as in the past not all foreign initiatives in North America have been a success."

Overall, "The names of the titans are quite well-known to the market," said Paulius Kavaliauskas, FL Technics head of Business Development. FL Technics is an MRO based in Vilnius, Lithuania, with offices in Europe and Asia. "But whether it is ST Aerospace, Haeco, or any other, what we see today is that it is not the size that matters," he said. "Flexibility to adapt to new market trends is much more valuable today."

Engine OEMs GE, Pratt & Whitney, and Rolls-Royce lead the pack of MRO titans followed by Lufthansa Technik (LHT) and Air France Industries-KLM Engineering & Maintenance (AFIKLM). Shown above is the AFIKLM E&M 787 hangar.

The Global Market in Detail

Now that the ranks of the MRO titans have been reviewed, it is time to look at their regional playing fields in detail.

As Versteeg mentioned, Asia and the Middle East are the fastest-growing regions in the global MRO market. In particular, "the market is continuing its shift towards Asia Pacific," said Kavaliauskas. Part of this shift is being driven by the region's booming economy, which is resulting in increased aircraft sales there and more demand for MRO support. In turn "the high demand for qualified MRO services in the region has led to the emergence of large maintenance facilities in cooperation with leading MROs and OEMs," he added. "Thus a lot of maintenance work is currently outsourced to Asia."

As the Chinese-built COMAC C919 and ARJ21 passenger liners come into service, there will be even more incentive for MRO work to be done in Asia. "After all, these aircraft's OEMs will be in China, rather than Asia or North America," said Plucker. "It will only make sense to service them close to where they were made, since that will now be possible."

MRO titans such as Lufthansa Technik have been responding to changes in the world marketplace, by moving into Asia and other growing regions through direct expansion and joint ventures with local companies. One such joint venture is Ameco Beijing (Aircraft Maintenance and Engineering Corporation). Now the largest MRO in China with a staff of 5,600, Ameco is a joint venture between LHT (40 percent) and Air China (60 percent). The fact that Ameco Beijing was founded in 1989 signals just how far-sighted LHT is, when it comes to spotting marketing trends.

"The focus of the business is slowly shifting to the booming markets, where we see strong business opportunities in the future, although the North American market is still the most important one worldwide and Europe remains our home market," said Walter Heerdt, LHT's senior vice president of Marketing and Sales. "New MRO facilities with new players have been established over the past years and this development will surely continue. This means stronger competition, but also a stronger production of MRO services in these regions."

Vector Aerospace has also jumped into the Asian market, with its soon-to-be-opened PW150A turboprop servicing center in Singapore's Seletar Aerospace Park. When ready in 2014, this 5,200 square meter facility will include full engine overhaul and test bed capabilities, allowing Vector to support the PW150A throughout the region.

"The South East Asian market is extremely important to us due to its geographic location, strong projected growth and our customer base," said Vector Aerospace President and CEO Declan O'Shea. "We recognize the immense importance of this market and are taking these steps to expand our presence here with close proximity to our customers."

The Middle East demand for aviation is also growing, thanks to this region's oil-driven economy. In response, "MRO capabilities in the Middle East are growing rapidly in the last couple of years and improving in quality and performance," said Versteeg. The downside: Such growth "creates a challenge for them to find and keep sufficient qualified technicians."

On the flip side, North American fleet reductions, plus the retirement of older aircraft, have hit the MRO market hard. Marcel Versteeg credits these trends for the closures of Aveos and Pemco, and American Airline's decision to close one of its MRO bases. Meanwhile, "European MROs have suffered from the economic stagnation in that area," he noted. "However, we have seen the market picking up slowly again. We see that the base/heavy maintenance shops for narrow body aircraft are filling up quickly this winter, making it tougher for airlines to find a slot for their maintenance."

OEMs Knocking on the Door

For years, airlines have been replacing their fleets with new, fuel-sipping aircraft. Being young these aircraft haven't required the kind of heavy maintenance that older aircraft do. Meanwhile, airlines have deferred maintenance on their remaining

Continued on page 24

BAE SYSTEMS REGIONAL AIRCRAFT - MOVING INTO NEW MARKETS

BAE SYSTEMS

BAE Systems Regional Aircraft's transition from an OEM provider of support and engineering services to its in-service fleet to becoming an integrated solutions provider for different aircraft types is gathering momentum and building on its extensive support experience and industry-leading expertise of supply chain and engineering programmes.

The most significant recent development is the expansion of the company's EASA Part 21 G and J approvals in May 2013 to allow it to work on any aircraft type for both design and manufacturing work (DoA and PoA).

Graham Smith, Head of Business Development for the business says: "This means that Regional Aircraft can support minor changes/modifications through its own Service Bulletins, while for major changes/modifications, such as mandatory avionics upgrades, this can be provided through a Supplemental Type Certificate. We can cover both design work and arranging the manufacture of parts.

"We have already won our first contracts on a range of different aircraft types. These cover the design for the installation of new water boilers and ovens and provision of installation kits, to TCAS 7.1 upgrades and SATCOM systems".

Dialogue is underway with various parties on a broad range of programme possibilities covering further equipment upgrades, interior upgrades, replacement parts, minor and major changes/major modifications and supply chain solutions. There are two target markets. The first is principally mid-life aircraft such as the Boeing 737 Classic, the A320 family, the Bombardier CRJ700/900 Series and the earlier Embraer E-Series, and the second is around newer technologies such as SATCOM WiFi broadband, which, through the company's capabilities, extend to any aircraft.

BAE Systems can also identify the need for replacement parts for different aircraft types, design them or source them, arrange their manufacture, obtain certification and then support them through its well-established programmes honed over years of top-level support for its in-service fleet of BAE Systems-manufactured aircraft.

Years of experience

The business is a leading provider of support and engineering services to customers throughout the world, supporting some 500 aircraft with over 200 customers in 70 countries.

Its aircraft, including the Jetstream family, ATP, BAe 146 and Avro RJ remain important players in today's regional airline market. The continued success of these aircraft in demanding and wide-ranging

geographical locations is a tribute to their original design and the integrated support provided by Regional Aircraft today.

Regional Aircraft's customer base continues to grow with current customers extending their support contracts and new customers signing long-term support packages. Major fleet operators of its aircraft are counted among its customers. This continued business growth results from the successful drive to reduce costs and Regional Aircraft's ability to meet the demanding service levels today's customers have come to expect.

Over this time, the business has amassed considerable experience in a wide range of support solutions and products, many of which are now applicable to other aircraft types. It has developed a Total Support package, available in a modular format that allows operators to take the elements that return best value to them. These four elements are Rate-per-flying-hour programmes (JetSpares and MACRO), Spares, Modifications and Technical Services.

It has been a pioneer in the development of rate-per-flight-hour spares support programmes and has 190 aircraft enrolled with operators around the world. It is continually assessing these programmes to widen their appeal and increase the range of products covered by these programmes. It has also developed new products to stimulate continuing spares sales and has experience in supporting aircraft across the globe with tailored programmes to suit local requirements.

Regional Aircraft's headquarters and centre of Engineering and Support is located in Prestwick, Scotland, with its spares logistics facility located at Weybridge, Surrey, close to London Heathrow and Gatwick Airports. Some 325 people are employed by the business.

Vector Aerospace Engine Services - Atlantic

Vector Aerospace Engine Services - Atlantic (ES-A) is a fully-authorized Pratt & Whitney Canada (PWC) Distributor & Designated Overhaul Facility (DDOF) for the PT6A & JT15D engine series, as well as a PWC Designated Overhaul Facility (DOF) for the PW100 and PW150A engine series.

More than twenty years of specialization in the repair & overhaul of PWC products has earned ES-A industry leader status. This has been accomplished by providing high quality engine repairs, excellent customer service, and superior warranty coverage. Above all of that, ES-A boasts the fastest turn-around times in the industry, and excellent service at a competitive price.

Headquartered in Slemon Park, Prince Edward Island, Canada; ES-A operates a 140,000-square-foot facility, complemented by fly-in capabilities and hangar space.

In addition to its headquarters in Prince Edward Island, ES-A also has a service center in Calgary, Alberta, Canada; as well as facilities in the United States, South Africa, Kenya, the UK, France, Australia and - in 2014 - Singapore.

Contact:
Colin MacDonald
Manager, Marketing & Communications
Vector Aerospace Engine Services - Atlantic
Tel: 902-888-1828
colin.macdonald@vectoraerospace.com

For more information, visit www.vectoraerospace.com

Quality, reliability, competitiveness and fast turn-times are the cornerstones of our service.

VECTOR AEROSPACE
ENGINE SERVICES - ATLANTIC

Kelowna Flightcraft

Kelowna Flightcraft is a one-stop shop servicing corporate, commercial and military aviation worldwide. Kelowna Flightcraft operates two full service facilities in Kelowna, BC and Hamilton, ON. These bases have over 300,000 sq. ft. of hangar and shop space with the capacity to accommodate aircraft as large as a DC10-30. We are ISO 9001-2008 certified, TC approved AM 16-82 and EASA Approval 145-7040. KFL is a DAO under TC, and ADO under DND.

Customers from around the world come to Kelowna Flightcraft for quality maintenance and modification work. We pride ourselves on reliable on-time service. We provide expertise in B727, B737 and B757 models, Convair and DH-8, Avionics and Structural Repairs and Modifications.

Kelowna Flightcraft can perform complete landing gear repair or overhaul. Our shop capabilities allow us to disassemble, strip, inspect, NDT, machine, plate, paint and re-assemble on site. We use the latest plating technologies including: Hard Chrome, Dull and Bright Cadmium Plate, Anodize, Alodine and Nickel Plating, complete with all the necessary etching and sealing. Our large machine shop is capable of OD and ID grinding and parts fabrication on our CNC equipment.

Our Engineering programs include: damage tolerance assessments and repair instructions; avionics upgrades; as well as extensive structural modifications. (CV5800 stretch program; CV580, B727 and B737 cargo door conversions; and CV Fire Tanker conversions).

Flightcraft is a designated dealer for Cobham Avionics, Honeywell, Rockwell Collins and Universal radios.

KFL Manufacturing Group produces parts for out-of-production aircraft, KFL is a recognized Parts Manufacturing authority under OEM authority.

Kelowna Flightcraft is the OEM and STC holder for the Convair Twin Engine aircraft. As the design authority we support all Convair operators worldwide. We are willing and able to supply parts and technical services 24/7 with totally integrated customer support and project engineering services. Our extensive expertise includes manufacture of the CV580, CV5800 and the CV Air Tanker.

KELOWNA **Flightcraft**

Contact:
Kelowna Flightcraft Group of Companies
mro@flightcraft.ca
P: (250) 491-5500

Barry Lapointe	CEO/ Owner
Tracy Medve	President
Mike Udala	Director of Maintenance
Bryan Akerstream	Manager, Business Development

Continued from page 20

flying older aircraft, by using parts taken from those older craft they've parked in the desert.

But now time is catching up, said Frost & Sullivan's Plucker. "These aircraft are coming to the end of their cycles, which means it's time for them to go the MROs for heavy maintenance," he explained. "That's good news for the MRO industry." Meanwhile, the ongoing fleet renewal is resulting in still-flying older aircraft being sent to the desert, to park beside their parted-out fleet mates.

Unfortunately, the airframe OEMs have woken up to the reviving MRO market, and are now chasing this maintenance and overhaul work for themselves. "For years, the OEMs seemed to regard MRO work as being beneath them," Plucker said. "But times have changed: Airbus, Boeing and Bombardier can see the very real advantages of providing such after-market support; not just for the money it brings, but the chance it offers to keep customers buying their aircraft when fleet renewal time comes."

Even today, "OEMs are using the opportunity of fleet replacement to continue their expansion in the MRO market, which represents an additional source to recoup their investment in developing the new technologies," said FL Technics' Kavaliauskas. That's not all. "Component MRO, same as engine MRO, is being increasingly controlled by OEMs," he said. "Meanwhile, OEMs are continuing to oppose the utilisation of non-OEM parts and DER-repairs."

Even shops that are OEM-Designated Overhaul Facilities (DOFs), as Vector Aerospace is for Pratt and Whitney, are dealing with a combination of OEM and customer-generated pressures. "In order to compete against lower aircraft values when engine overhauls come due, Vector has been offering a 20 percent labour reduction for JT15D Series engine overhaul inputs within 2013," explained Jeff Holdridge, director of Sales and Marketing for Vector's Atlantic Division.

"The availability of lower-priced PMA parts for the PT6A Series engine has also become a new form of competition for DOFs. In response, PWC is offering lower prices on OEM parts, allowing us to retain our customers," he said.

Theoretically, the OEMs can slash their own margins to drive down maintenance/overhaul prices and put standalone MROs in trouble. The big question is whether this will be enough to woo airlines away from trusted in-house or third-party MROs, at the risk of giving the OEMs even more control over the airlines' fates?

On this point, the experts' opinions are mixed. "At least in the engine category, the airlines have thrown up their hands and said to the OEMs, 'whatever you want to do is fine with us'," said Wayne Plucker. But Paulius Kavaliauskas isn't so sure: "Airlines stand for their own interest," he said. "That is the only thing that could be stated for certain. In some cases airlines support OEM-proposed 'total care' packages, as they allow to decrease not only the cost of maintenance, but also the price of aircraft as. However, we are noticing that more and more airlines are shifting from the all-in-one solutions, as they wish to mitigate their dependence on a single MRO provider."

Looking Ahead

As 2014 gets underway, it seems unlikely that the MRO titans will be displaced any time soon. This said, the advantages that size has traditionally offered for keeping prices down and keeping clients may be diminishing, as standalone MROs struggle to stay current with composite airframes, maintain a skilled workforce as the Baby Boomers retire, and fend off aggressive attacks by OEMs on the MROs' turf.

Under these conditions, "it is difficult to establish the obvious leaders," Kavaliauskas said. "The dynamics of the industry is a lot different than it was just a while ago."

In an attempt to hold their own, some MROs are fighting back. A case in point: "The still not finalized A350 order by Air France-KLM is an example of this," said Versteeg, "as AF-KLM insists on obtaining the right to maintain the A350 Rolls-Royce engine in their own shop and offering it to third parties—which is very important for AF-KLM to keep their shop running in the future. Not surprisingly, Rolls-Royce is resisting this."

Will the MROs—titans and mom-and-pop shops alike—hold their own against the OEMs? Much depends on the airlines and the importance they put on keeping OEMs and MROs apart.

Unfortunately, this importance will likely be determined by money, and the OEMs' willingness to lose profits in order to undercut MROs on a consistent basis. Should this become a serious threat, the ranks of the titans may thin as they merge to form bigger, more competitive units with deeper pockets and more staying power.

"We expect that this fight for new generation aircraft maintenance and overhaul to lead to consolidation and partnerships in the MRO market," Marcel Versteeg predicted. But it won't happen overnight, "We expect it to be a gradual process over the next five to ten years." AM

Turkish Technics and the Stress of Success

Based at Atatürk International Airport in Istanbul, Turkey, Turkish Technics is enjoying a run of unprecedented growth—and the stresses that accompany such success. Its parent company, Turkish Airlines, has been expanding its fleet of Airbus and Boeing aircraft aggressively, in response to the region's healthy economy, growing ticket sales, and the extension of its destinations into North America, Europe, and Asia. This alone is keeping Turkish technics' hangars very, very busy.

However, "other airlines in Turkey are also growing, and also using our facilities," said Dr. Ismail Demir, Turkish Technics' CEO. Then there is Turkish Technics' increasing role as a third-party MRO, serving international carriers such as Ethiopian Airlines, India's SpiceJet, Russia's Nordwind Airlines, Italy's Meridiana, Greece's Astra Airlines, and a long list of new clients.

If this isn't enough, Turkish Technics is moving away from being a low cost, labor intensive airframe MRO to a diversified MRO that offers a complete range of airframe, component and engine services, plus manufactures items such as aircraft seats, and even services industrial gas turbines. "We have five joint ventures currently underway, both with domestic companies and OEMs such as Pratt & Whitney and UTC Aerospace Systems," Dr. Demir said. "So there is quite a lot going on here."

To cope, Turkish Technics has built a new widebody hangar, and added an extension to its existing narrowbody hangar. At least, the company had planned to have these done by now, but construction delays have resulted in the narrowbody extension just passing inspection, and the widebody hangar not being ready until 2014. "As a result, we have been quite constrained for space," Dr. Demir said. "2013 was a good year, but it would have been even better if we had a been able to access this extra space."

Turkish Technics can trace its history back to 1933, when Turkish Airlines was formed as the country's flag carrier. That initial fleet consisted of a five-seat Curtiss Kingbird, two four-seat Junkers F-13s and one ten-seat Tupolev ANT-9. As the new airline's maintenance department, it was Turkish Technics' job to keep them flying.

In 2006, Turkish Technics was spun off from Turkish Airlines as a separate entity. The MRO began an intensive modernization process at that time, which continues to this very day. The facility holds EASA 145, JAA 145, FAA and Turkish DGCA certifications, and offers airframe heavy maintenance, APU and engine overhauls, and full landing gear support among its many services.

An aerial view of Turkish HABOM. They invested heavily in creating a cutting-edge facility. Their new widebody hangar will be ready in 2014 and will relieve space constraints for this up-and-coming player in

Dr. Ismail Demir, CEO

"We have grown to become a one-stop-shop for Airbus and Boeing commercial aircraft operators, and business aircraft as well," said Dr. Demir. "Our location at the crossroads of Europe and Asia also makes us highly convenient for carriers on these continents, plus Africa, the Pacific Rim, and the Indian subcontinent."

Dr. Demir has a very clear goal for Turkish Technics. He wants the company to become a true global player, and to join the ranks of the Top 5 MRO Titans. Achieving this goal means convincing more carriers to choose Turkish Technics. So what does this MRO have to offer, besides a full range of services and an excellent fly-in location?

"The answer is a combination of reasonably-priced labor, plus substantial value and quality service," Dr. Demir replied. "We know that location and good labor costs aren't enough: Although our labor rates are below that of North America and Europe, we can be undercut by China and other emerging nations. This is why Turkish Technics has invested heavily in creating a cutting-edge world-class facility, improving turnaround times for our customers, and providing a level of service that, based on price, delivers incredible value."

Mindful that good help is hard to find—especially in today's global MRO market—Turkish Technics has established its own comprehensive training program for new mechanics. "We give our new recruits months of classroom training, followed by hands-on education in the shop," said Dr. Demir. "But only the very best become Turkish Technics' employees; those who meet the high standards of our own managers, and of the customers we serve."

With any luck, 2014 will be an easier year for Dr. Ismail Demir; at least as soon as Turkish Technics' new hangars are operating at full capacity. Still, the easing of this MRO's space issues may only be short-lived, should Turkish Technics maintain the 15-20 percent annual growth rate that it has enjoyed for the past few years. That's just one of the stresses that goes with success; a stress that this MRO will likely be faced with for years, if not decades, to come. AM

AAR CORP.

At AAR, broad and growing aerospace capabilities coupled with deep experience drive our ability to improve efficiency and reducing costs for aviation, government and defense customers worldwide.

With more than 6,000 employees in 17 countries, AAR has the strength and agility to rapidly respond to the dynamic needs of commercial and regional airlines, cargo carriers, original equipment manufacturers, maintenance providers and governments, all while helping them maintain high levels of quality, safety and service.

Backed by a 50-plus-year legacy of excellence and trust, today's AAR has been structured around a diverse and balanced portfolio of Aviation Services and Technology Products and ranks among the world's top parts suppliers, independent MROs and defense contractors.

Aviation Services
AAR combines its diverse supply chain, maintenance, engineering and technical capabilities to provide customized, integrated solutions that lower costs, increase asset availability and ensure the highest levels of quality.

Key capabilities include:
Supply Chain & Logistics
Aircraft & Engine Parts
Aircraft Maintenance & Modifications
Landing Gear, Wheels & Brakes
Component Repair & Management
Engineering Services
Aircraft & Engine Sales & Leasing
Expeditionary Airlift

From its roots as a leading commercial aviation aftermarket supplier, AAR is the largest provider of MRO services in the Americas. The company provides streamlined supply chain and customized inventory management solutions, aircraft overhaul and modifications, landing gear services, wheel and brake services and component repair for the world's major regional and cargo airlines. Additionally, AAR maintains one of the industry's largest and most complete inventories of airframe parts — stocking new and serviceable components for virtually every commercial aircraft type.

AAR Airlift provides expeditionary airlift service to government and defense customers around the world with its fleet of more than 60 aircraft. AAR is currently the largest airlift provider to the U.S. Department of Defense in Afghanistan and has assisted missions around the world, including in Africa and the Western Pacific.

Technology Products
AAR designs and manufactures products, services and structural components in support of commercial aviation and defense industries. These include the manufacturing of complex machined and composite aerostructures and command and control systems that merge data from multiple sources into actionable information and can be integrated into vehicles, shelters or hard-fixed facilities.

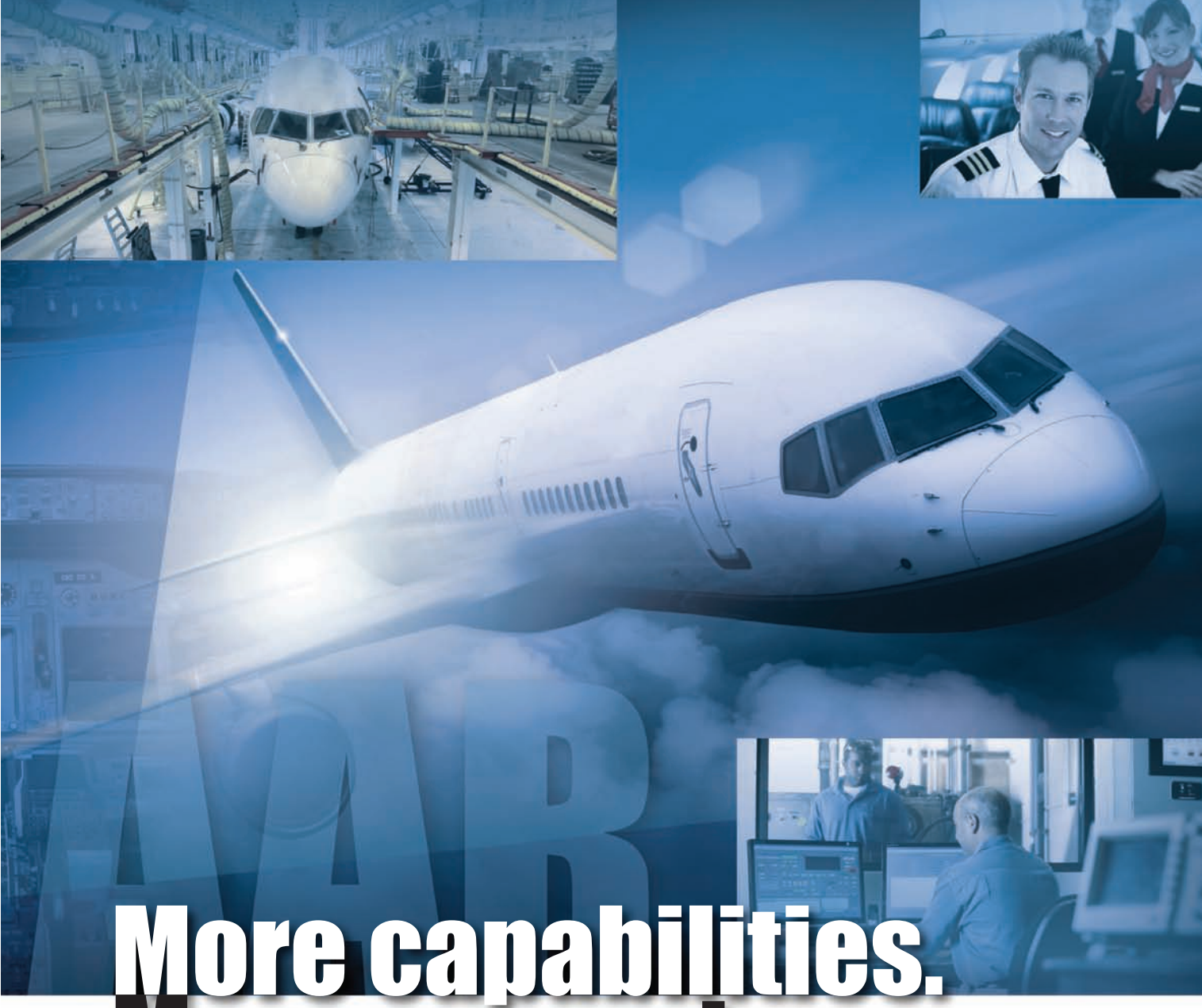
Key capabilities include:
Cargo Products & Systems
Specialized Mobility Products
Integrated Communications Technologies
Precision Machining
Composites Fabrication

As aircraft operators, manufacturers and government customers continually find it necessary to do more with less, AAR is by their side — delivering customer value, with efficient and effective services and technologies – from a strong, proven and trusted partner.

Contact:

Jack Arehart
Vice President and Co-Chief Commericial Officer
sales@aarcorp.com

AAR CORP.
1100 North Wood Dale Road
Wood Dale, IL 60191
United States
T: +1 630 227 2000
F: +1 630 227 2039
www.aarcorp.com



More capabilities. More support.

Operating in today's challenging business environment, commercial airlines and OEMs need a partner that can provide cost-effective support and solutions that contribute to their success. With enhanced safety, improved reliability, increased productivity – and satisfied customers who keep coming back.

For many of the biggest names in commercial aerospace, AAR is the answer – for complete MRO, parts, engineering, logistics and fabrication services. And, especially, for a partner they can trust.

AVIATION SERVICES

Supply Chain Programs
Aircraft & Engine Parts
Aircraft Maintenance & Modifications
Aircraft Sales & Leasing
Expeditionary Airlift

TECHNOLOGY PRODUCTS

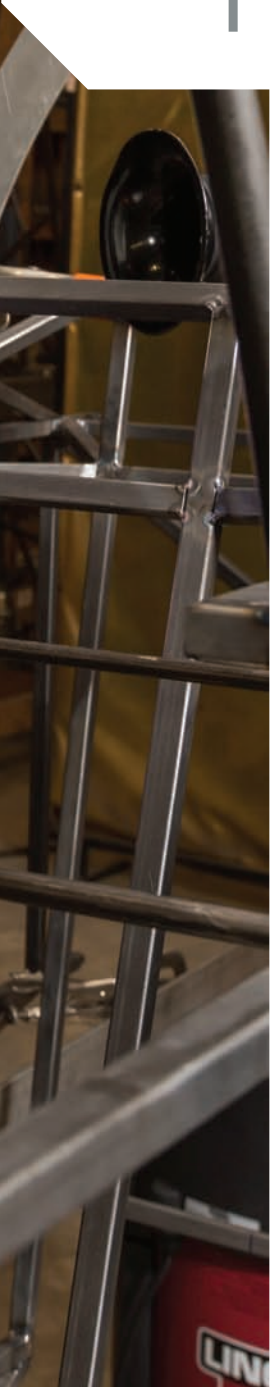
Specialized Mobility Products
Cargo & Transport Products
Precision Machining
Composites Fabrication
Communication Systems

AAR®
aarcorp.com

WELDING TECHNOLOGY:

Aircraft welders are using manual TIG, metal inert gas (MIG) or oxy acetylene torches, all of which have been available for many years. Lincoln Electric Photo.

Slow but Steady Improvements



By Charlotte Adams

Welding hasn't changed in decades or welding hasn't changed at all. That's what you hear from veteran practitioners. Many of them have been using the same oxy acetylene or tungsten inert gas (TIG) equipment for decades, and have seen no need to change. But the industry has not been static: there has been a steady stream of innovations and new products.

Change probably occurs at a faster pace in more high-volume, production scenarios. Automated welding, once properly set up, can all but guarantee the quality and the repeatability of welds on a job. Military contractors are using friction stir welding, which doesn't require any kind of torch. It generates heat by the high-speed spinning of a cylindrically shaped tool.

For lower-volume applications like aircraft maintenance, automated welding probably would be the exception to the rule. Welders use manual TIG, metal inert gas (MIG) or oxy acetylene torches, all of which have been available for many years.

Although oxy acetylene is the process that is tested for in the Federal Aviation Administration (FAA) exam for candidate airframe and powerplant (A&P) mechanics, the TIG process is generally viewed as relatively more advanced. For one thing, TIG is more controllable in real time. As an electrical process, TIG has benefited from advances in the manipulation of electrical current—such as wave shaping and high-frequency switching—that help to fine-tune characteristics of the arc such as the heat output, cleaning vs. penetration, arc stability and directional control for difficult-to-weld materials such as aluminum, titanium and magnesium.

The technologies are very different. TIG uses an electrical arc to create heat and shields the weld puddle with inert argon gas. With oxy acetylene, the welder ignites acetylene gas with a handheld striker and feeds the acetylene with oxygen to create a high-temperature flame. The acetylene flame melts the metal with the intense heat of the inner cone, approximately 5,600 degrees F, and then shields the molten puddle with the flame's outer envelope until cooled. Oxy acetylene is also a dirtier process, as the burning acetylene creates carbon soot if the right mixture is not achieved, says Dave Duhon, a recently retired welder with a major airline.

Oxy acetylene is better for cutting and brazing than for welding, says Ray Bacon, an instructor at the A&P school within Tarrant County College in Fort Worth, Texas. "It takes a lot of heat for a gas flame to

Multiplaz uses a mixture of tap water and rubbing alcohol, considered more environmentally friendly than gas-shielded arc welding. See sidebar below for more info. (Mulitplaz Photo)

make steel molten, and the heat spreads too far, so you wind up really heating up your work and could punch a hole in it or distort it." More modern techniques concentrate heat in a tiny area, he says, so that even though the temperatures are higher, the material cools quickly without a lot of distortion.

With oxy acetylene or other processes, the welder can control the heat by turning the torch aside from the project and then turning it back to the metal again. Or, before starting the weld, the oxy acetylene user can adjust the flow of oxygen from the gas canister or simply choose a smaller tip. TIG, however, offers more fine-grained, real-time control.

The oxy acetylene process, which is taught at A&P schools, is more difficult than gas-shielded arc processes to become expert at. But since oxy acetylene has fewer variables than TIG and is much less expensive than the electrical processes, oxy acetylene may be more appropriate for inexperienced welders to start with in order to pick up the basics. TIG, on the other hand, is regarded as the most difficult manual welding process to learn because it requires considerable dexterity to manipulate the torch, apply the filler rod and control the heat output via a foot pedal or a button on the torch that adjusts the amperage.

Multiplaz

For something really different, readers need look no further than Multiplaz, a Russian-headquartered company with branches located worldwide. The Multiplaz 3500, invented in 2008, is an all-in-one welder, cutter, solderer and brazer, the company says. But what's really different is its fuel—a mixture of tap water and rubbing alcohol, so the company considers it much more environmentally friendly than gas-shielded arc welding. The equipment weighs about 30 pounds and is priced at about $2,000.

The company is reluctant to describe the inner workings of its technology, but the process is not—as some welders have speculated on Internet forums—electrolysis, says Patricia Lewis-Hansen, CEO of Multiplaz North America. She says that the company demonstrated the technology at a Los Angeles area chapter of the Experimental Aircraft Association and that the technology generated a lot of interest there.

The equipment runs on DC current and operates in two modes. In Mode 1, it's more like an oxy acetylene torch and in Mode 2, it's more like a tungsten inert gas (TIG) torch, says Angel Villanueva, the company's senior welding tech.

Mode 1, which offers lower current settings, would probably be used for welding aluminum, depending on the thickness of the metal. In Mode 1 an arc is created inside of the torch in order to ignite the alcohol/water mixture and create a plasma, some 14,400 degrees F, which melts the metal. (The temperature can be reduced by turning the starter button/dial on the torch.) For welding aluminum, a 50/50 alcohol/water solution is recommended.

In Mode 2, intended for heavier metals and thicker metals, the arc is projected from the nozzle of the welder and melts the metal. The plasma vapor protects the weld area, Lewis-Hansen explains. The plasma also "pushes away and disintegrates much of the micro particulum users [would otherwise often] breathe into their lungs, which is why it is a great tool for low ventilation areas," she says.

THE HEIGHT OF EXCELLENCE

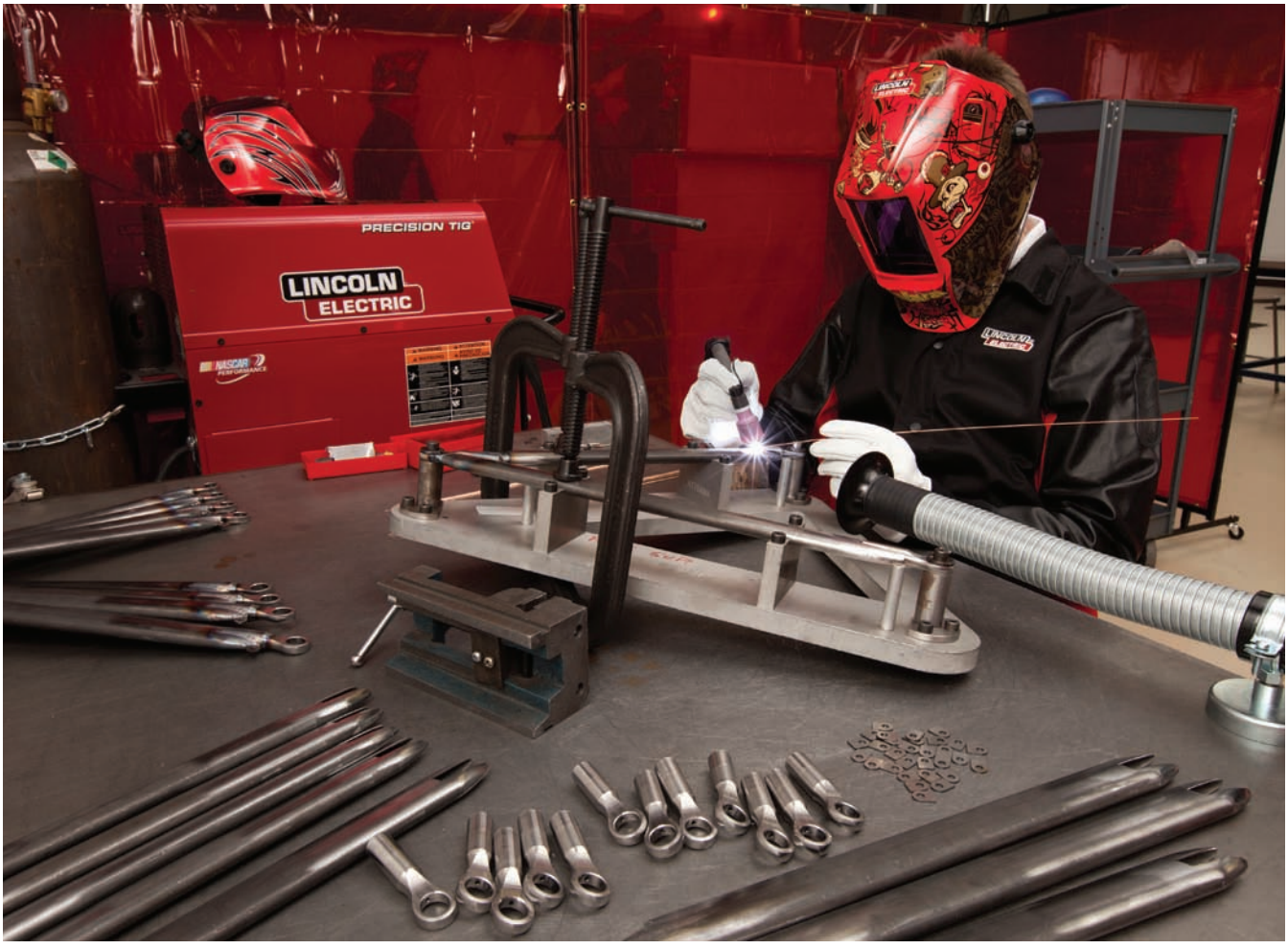
Since 1967 Monarch Aircraft Engineering has gone about its business providing first class service to major airlines around the world. Today, we continue to provide valued solutions to the aviation industry.

WE AIM FOR THE TOP

- Base Maintenance
- Line Maintenance
- Engine Maintenance
- Component Maintenance
- Spares Trading
- 24/7 AOG Support
- Technical Training – Part 147
- Design Services – Part 21 J
- Engineering Services – Part M
- Technical & Safety Consultancy

Monarch
AIRCRAFT ENGINEERING

Please contact us @ engineering@monarch.co.uk monarchaircraftengineering.com ☎ +44 (0)1582 398644



During welding training students are taught the theory of welding, welding equipment, safety procedures and techniques, and enough of the manual skill to perform basic operations but not how to repair an aircraft via welding so that it can be returned to service (see sidebar). Lincoln Electric.

TIG Evolution

The TIG process was invented in the late 19th century and was matured in the 1930s and 1940s, explains Andrew Pfaller, product manager for Miller Electric, one of the major TIG welding equipment makers in the U.S. A driver behind TIG's development was the aviation industry's need in World War II to weld magnesium parts, he says. Miller Electric and Lincoln Electric are the two largest TIG welding equipment manufacturers in the U.S.

TIG technology has improved over time. Manufacturers now offer "square wave" systems, for example, which literally make the AC sine wave into more of a square shape, preventing the "migration" of tungsten from the electrode to the work piece. The artificial square wave form also enables very fast transitions from positive to negative polarities—less time at or near "zero," producing a more stable arc. The square wave's rapid zero crossings also maximize the energy in each cycle, allowing fast travel speeds, adds Ivan Gracic, Lincoln Electric's TIG product manager.

Teaching Welding

Airframe and powerplant (A&P) schools are required by the Federal Aviation Administration (FAA) to teach the subject of welding, and the agency closely controls the curriculum, down to the what's and even the how's of the job.

Instructors are required to teach the subject to "Level 2," which means that students learn the subject well enough to explain it thoroughly to another person, says Ray Bacon, an instructor in the A&P school at Tarrant County College in Fort Worth, Texas. Students, for example, learn about the theory of welding, welding equipment, safety procedures and techniques, and enough of the manual skill to perform basic operations. The exact number of hours spent on the subject is negotiable between the schools and the FAA when the school is originally certified to teach, Bacon says. At Tarrant County College 48 hours are devoted to the subject. Students spend 16 hours in lectures and 32 hours practicing welding pieces of metal in a lab. They are not building a "project" or a part for an airplane. They are just learning the do's and don'ts, the rudiments of welding, by hands-on experience. They use oxy acetylene equipment because that is the technology the FAA asks about in the A&P exam.

Students essentially are taught what welding is and how to visually evaluate the integrity of a weld, but not how to repair an aircraft via welding so that it can be returned to service, Bacon says. The student, for example, should be able to recognize the proper dimensions and the proper finish of the weld bead.

The Global Leader in OEM and Aftermarket

HARCO is an FAA approved repair facility with over 60 years of OEM experience. Our products range from air data computers to cable harness assemblies and temperature sensors. We have design teams developing cost effective repair solutions, while we also manufacture quality new replacement hardware when the original hardware is BER and cannot be repaired. Whether you are looking for new hardware or a solution for repairing existing equipment within airframe, engine or aircraft systems **HARCO** will provide you with the best in service, quality and cost.

Comprehensive Aftermarket Support services:

- Temperature Sensors
- Interconnect Cable-Harness Assemblies
- Calibration & Re-certification of our Air Data Computers and Probes
- Replacement Hardware
- Repair Exchange Programs
- Warranty Support
- Field Support

Our success is a reflection of both our philosophy and our process. We recognize that every job is custom. Our structure establishes dedicated project teams with a flexible and creative approach leading to innovative solutions to meet your needs. If we don't have a repair solution, our team will work with yours to develop cost effective, durable solutions while maintaining OEM quality and reliability.

The most recent advance in TIG welding is the wireless foot pedal, which allows the welder to work at some distance from the power source.
Lincoln Electric Photo.

Another improvement was the development of AC balancing, which adjusts the time spent at the positive and negative polarities of the AC wave. A high percentage of electrode negative (EN) results in greater penetration, while a high percentage at electrode positive (EP) results in greater oxide removal or "cleaning." Cleaning is important in the welding of aluminum, for example, because aluminum oxide—which can impair the weld—melts at a much higher temperature than the base metal itself. Nevertheless, excessive oxide removal is undesirable, so the balance is typically set to relatively higher EN percentages. This also reduces the heat on the tungsten, Pfaller says. Tungsten will slowly erode with the arc heat and contaminate the weld, Bacon adds.

But probably the biggest advancement in TIG welding to date was the invention of inverter-based power sources. Inverter technology allows AC frequency switching at much higher speeds than the 60 Hz one gets from outlet power in North America. Frequency control improves the quality of the arc and helps adjust the heat output to the material being welded. The arc can be more narrowly focused with better directional control. Both Miller and Lincoln see customers switching from transformer-based to inverter-based products. Inverter-based equipment is also more power-efficient, smaller and more portable. Although the newer technology is more expensive up front, it may be cheaper in the long run through power savings.

The most recent advance in TIG welding is the wireless foot pedal, which allows the welder to work at some distance from the power source. This could be helpful to aviation welders, for example, who might be working up the fuselage, away from the power source. There is also a trend toward more user-friendly interfaces to the equipment.

Products

Lincoln Electric and Miller Electric, between them, offer a wide range of welding technologies. They offer six families of established products—both transformer- and inverter-based—and are introducing new features and lines.

In the older, transformer-based technology, Lincoln Electric offers its Precision TIG and Square Wave lines and Miller Electric offers the Syncrowave line. In the newer, inverter-based technology, Lincoln offers the Invertec line and Miller offers the Dynasty and Maxstar lines. Miller is thought to have invented the square wave technique back in the 1970s, but the approach is now widely used in the industry.

Lincoln's Precision TIG products "offer the widest amperage range," according to Gracic. The Precision TIG 375, for example, provides an output range of 2 to 375 amps, he says.

Both companies have their own brands of arc-starting technologies. Miller's Blue Lightning arc starter—available with its Dynasty and Maxstar inverter products—allows a more consistent arc start and more precise control of heat output, the company says. Lincoln's Micro-Start II technology, on the other hand, delivers stable, low-amperage starts for both AC and DC welding, Gracic says. These "soft starts" are beneficial in welding thin material because amperage builds up and is tightly controlled, minimizing material distortion in the weld, he adds.

Both companies also offer wireless foot pedals. Miller's was introduced several years ago and has a 90-foot range. Lincoln's is expected soon. The Lincoln product will work with both the Precision TIG and Invertec lines, as well as with the company's new Aspect 375. The product will have a range of 100 feet and will include a battery life indicator and an attachment that allows for height adjustment.

Miller's newest product is the Dynasty 280, which will meet the needs of customers using the older Syncrowave 250, Pfaller says. It offers a range of 1 to 280 amps, filling the gap between the Dynasty 200 and the Dynasty 350, he says. The Dynasty 280 is also significantly lighter than the older machines, making it much more portable and versatile for maintenance applications, he says. The user interface of the new product is also easier to understand and the machine is faster to set up, he adds.

Lincoln Electric plans to introduce a new product next year, the Aspect 375, which will be the flagship of a new TIG welding inverter line. This machine will have a wide amperage range—2 to 375 amps—and faster switching speeds than the company's current lineup to provide the welder with more precise arc control. This machine is also designed for ease of use with a simplified interface. AM

INDUSTRY LEADERS

AAR Wheel & Brake Services

AAR WBS® offers commercial, military and regional aviation customers a complete program of aircraft wheel and brake services including repair, rebuilding and inspection for all major aircraft types. Our high-tech testing and certification process ensures that hairline fractures and other nonvisible stress defects are detected and repaired before they cause damage or affect safety. AAR provides fast turnaround from our modern 10,000 square foot facility, with an extensive inventory of long-lasting, original OEM parts. AAR's volume-buying capability allows us to offer the highest quality products at competitive prices.

AAR®
Wheel & Brake Services

Customer Benefits:

- AAR maintains a complete inventory of OEM parts on-hand for fast turnarounds.
- High-quality work delivered on time means improved safety and more landings for your aircraft.
- Exterior parts are cleaned and painted with durable coatings. Professional priming and painting extends part life by protecting metal parts from debris and wear.
- Backed by AAR's global presence, our diverse product offering and professional services enable us to meet all your program needs.

Competitive Differentiators:

- **Experience** — AAR is experienced in all aspects of wheel and brake overhaul, rebuild and repairs.
- **Quality** — AAR maintains a complete inventory of OEM parts on-hand for faster turnaround. Quality OEM parts last longer and are manufactured to meet the highest standards.
- **Capabilities** — AAR performs critical testing and certification on all models in accordance with FAA, EASA and CAAC.
- **Value** — AAR's pricing is competitive because of our lean practices and extensive inventory. The highest quality parts and services result in longer lasting and more reliable wheel and brake systems.

TAP MAINTENANCE & ENGINEERING
A Business Unit of TAP Portugal

TAP M&E is all about **Care²MRO solutions** for Airbus, Boeing and Embraer fleets. Our commitment is to add care to quality worldwide, side-by-side with a full scope of tailored services aligned with Customers' needs.

Years of experience on TAP Airline fleet maintenance, combined with a Customer minded strategy, geographical flexibility and process agility, made us a trusted solution when it comes to the following services:

CARE²AIRFRAME

Maintenance services for:

- **AIRBUS** (A300-B4, A300-600, A310, A320 Family, A330, A340)
- **BOEING** (B727, B737 CL/NG, BBJ, B747-200/300, B757, B767, B777, DC10, MD11)
- **EMBRAER FLEETS** (EMB 120, ERJ 135/145, E-JET 170/175/190/195, Legacy)

CARE²ENGINES

Engine overhaul for models:

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

CARE²COMPONENTS

Wide range of repair capability maintenance on Avionics, Pneumatics / Hydraulics, Fuel / Oil and Mechanical Components.
Landing gear repair and overhaul for:

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

CARE²ENGINEERING

Full Continuing Airworthiness Management services, Airframe and Engine repairs and modifications – DOA (Part 21J), Engineering and Technical Services, Training, Logistics solutions and Technical Labs (NDT, Physical & Chemical, Calibrations).

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

C²Q *Care to Quality*

CARE²MEET US?

PHONE: (+351) 707 200 800 care2me@tap.pt

EUROPE SALES OFFICE
PHONE: (+351) 218 416 034

SOUTH AMERICA SALES OFFICE
PHONE: (+55) 21 3383 2782

NORTH AMERICA SALES OFFICE
PHONE: (+1) 337 499 3126

www.tap-mro.com

IBERIA MAINTENANCE & ENGINEERING AND BRITISH AIRWAYS ENGINEERING

The merger of the Iberia and British Airways businesses under the IAG banner in April 2011 will have a great impact on the MRO market. With the progressive integration of services, the world class engineering capabilities, facilities and expertise of British Airways Engineering and Iberia Maintenance & Engineering have come together to provide global carriers with compelling, premium MRO services.
The combined capabilities of the two companies provide airlines with high-quality services that deliver real value for money. With worldwide reputations for engineering excellence, Iberia Maintenance & Engineering and British Airways Engineering provide customers with a flexible approach that keeps their fleets in the air for longer. Combined, the two MROs can provide customers with:

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

The merger of the two MROs has significantly widen the capabilities and extended the scope of each business, ensuring airworthiness, increasing the efficiency and substantially reducing aircraft downtime for more carriers in more locations.

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

Iberia Maintenance & Engineering offers engine process on a wide range of products such as CFM56-5A1/-5B/-5C4, CFM56-7B; RB211-535E4/-C, CF34-3A/-3B, RR Pegasus MK 154 and JT8D-217A/-C. The company leading edge technology and innovative repair procedures developed in-house.
With customers at the heart of everything they do, every day Iberia Maintenance & Engineering and British Airways Engineering oversee:

- More than 480 aircraft under their care
- More than 1,750 departures
- Eight lines of base maintenance
- 13 lines of heavy maintenance
- Three modification lines
- 130 worldwide line maintenance bases
- Three paint lines
- Engine shop with 200 shop visits per year

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

When what matters is finely tuned, everything works.

STRONGER TOGETHER.

For further information please contact:

British Airways Engineering
24/7 AOG aircraft: +44 208 513 0880
24/7 AOG parts: +44 208 562 3007
Email: bae@ba.com
Website: www.ba-mro.com

Iberia Maintenance and Engineering
24/7 AOG Desk: +34 91 587 3719/ +34 91 329 2952
aogdesk@iberia.es
24/7 AOG Engine: +34 609 246 801
24/7 AOG Aircraft Team: +34 91 587 5045
dmccie@iberia.es
Commercial & Development Direction: +34 91 587 5132
Email: maintenance@iberia.es
Website: www.iberiamaintenance.com

BRITISH AIRWAYS ENGINEERING | MAINTENANCE IBERIA

Members of IAG

Monarch Aircraft Engineering

Established in 1967, Monarch Aircraft Engineering (MAEL) is one of Europe's leading award winning independent MRO's. MAEL operates globally, supporting clients located in east and west Europe, Middle East, Australia and North America. MAEL has superior knowledge in maintaining legacy fleets and is also a leading MRO for new technology aircraft, including the Boeing 787 Dreamliner and is also a Boeing approved GoldCare provider. With its headquarters based at London Luton Airport in the UK, MAEL is ideally placed to provide high quality and cost-effective aircraft maintenance and engineering solutions and offers the following services:-

Heavy Maintenance

Checks from 'A' to 'D' are carried out at MAEL's hangar facilities at Birmingham, London Luton and Manchester Airport on Boeing B737NG, 757, 767, 787, Airbus A300B2/B4, A310, A320 Family, A330, Embraer 175/195 and Bombardier A400 aircraft. Monarch has carried out many thousands of heavy maintenance checks, including major SB- / AD- modification campaigns and complex structural repairs for clients located throughout the globe.

Line Maintenance

With permanent line maintenance stations established at London Gatwick, London Luton, Birmingham, Manchester, East Midlands, Leeds Bradford, Edinburgh, Glasgow, Malaga, Alicante, Canary Islands, Warsaw, Kiev, Goa and the Maldives, where technical handling is carried out on Boeing 737, 757, 767, 777, 787 Dreamliner, Airbus A300-600, A300B2/B4, A310, A320 family, A330, Embraer 175/195 and Bombardier Q400 aircraft.

Down Route AOG Support and Rescue

With a large number of line maintenance clients, Monarch Aircraft Engineering is acutely aware of the significant damage to airline operations and revenue when AOG events are not responded to immediately. In order to ensure that the necessary action is taken to manage the operational limitations, Monarch has created a Specialised Monarch AOG Response Team (SMART). Available 24/7, this service is managed through Monarch's Integrated Operations Centre (IOC).

Airline Component Support

With a $100 million spares inventory, Monarch Aircraft Engineering is able to provide full spares support programmes on a flight-hour basis as well as offering components on a loan and exchange basis. Consignment stocks are available, and Monarch's team of experts can also advise on initial provisioning packages and stocking policies. The spares inventory owned by Monarch is dual-released with both EASA and FAA certification.

Component Maintenance Centre

Situated at its London Luton facilities, with additional operations at Manchester, Monarch has established a state-of-the-art component maintenance centre. The facilities have an excellent range of tools and test equipment, and several workshops, including avionics and battery services, calibration, composites, safety equipment, and aircraft engine and mechanical services.

Engineering Services (Part-M and Part-21 J)

Monarch has a large engineering and technical management team and they are well set up to provide all aspects of continuing airworthiness management, planning, technical records, SB reviews and recommendations. With the added advantage of EASA and GCAA Part-21 Subpart J Design Organisation approval, it means that they can offer a comprehensive suite of services.

Monarch Aircraft Engineering Training Academy (MAETA)

MAETA, based at London Luton Airport, has gained a worldwide reputation for its continuing high standards providing full EASA Part 147 B1 and B2 type courses and Part 66 category A basic training. This well equipped learning centre, which has several theatre style classrooms, also houses the apprenticeship training scheme. MAETA has been involved with apprentice training for over 40 years and continues to uphold its reputation for producing high calibre engineers for the industry.

Our highly skilled and professional instructors are approved under Part 147 by the UK Civil Aviation Authority and are able to complete training at London Luton Airport or Manchester Airport. If preferred, training courses can be offered at the client's own facilities worldwide.

TEAMS Consulting

Through its Consulting Division, branded TEAMS (Technical & Expert Aircraft Maintenance Support) Monarch Aircraft Engineering can provide tailored management, technical and safety management systems (SMS) consulting services to Airlines, MRO's as well as Supply Chain organisations. These services can be offered on a short, medium or long term basis and tailored to specific client requirements.

Monarch
AIRCRAFT ENGINEERING

Contact details
For all your MRO requirements please get in touch with us by email: engineering@monarch.co.uk or call: +44 1582 398644.

BAE Systems

Customers around the world depend on BAE Systems for flight-critical aircraft electronic products and services. Using world class design and manufacturing centers, the company develops and manufactures innovative products and backs them with a global network of support for current and anticipated needs.

The company provides spares and asset management as well as maintenance, repair, and overhaul for a wide variety of aircraft electronics, including:

- Engine controls
- Flight controls
- Electrical distribution systems
- Flight-deck systems
- Airframe systems controls and monitoring
- Cabin systems
- Detection and alerting systems
- Data distribution
- Test equipment and technical services

BAE Systems' strategically located service centers deliver vital and timely aftermarket support to more than 500 commercial aircraft customers around the world.

BAE Systems provides capabilities and products that improve operational safety and performance. It offers worldwide product support for commercial, regional, and business aircraft systems. Services include:

- Original and upgrade equipment
- Modifications, repairs, and overhaul
- Prognostics and fleet health management
- Life-extension programs
- FAA, EASA, and CAAC approvals available
- Assured quality

Commercial aircraft flying with the company's products include Boeing and Airbus airliners, regional and business aircraft by Bombardier and Embraer, and Sikorsky helicopters.

KEEPING YOU FLYING IS OUR BUSINESS.

Wheels Up to Wheels Down Maintenance
- Engine Controls
- Flight Controls
- Aircraft Electronics
- Cabin Systems and Modifications

www.baesystems.com/commercialsupport

BAE SYSTEMS

Fly with confidence

Sabena technics is by your side.

As a leading independent provider of maintenance services to civil and military operators, we provide tailor-made cost-effective solutions through dedicated product lines.

Airframe services
VIP completion
Component services
Integrated services
Military services
Training services

TAT GROUP

sabena technics

www.sabenatechnics.com

One group, one vision, your satisfaction

Air France Industries KLM Engineering & Maintenance: a world-leading multi-product MRO.

AIRFRANCE INDUSTRIES

KLM Engineering & Maintenance

About AFI KLM E&M

AFI KLM E&M offers a comprehensive portfolio of Components & Logistics support for Airbus, Boeing and regional aircraft, GE and CFM engine overhaul, and airframe & modifications services. AFI KLM E&M provides expertise and scale effects based on its support for close to 1300 aircraft worldwide.

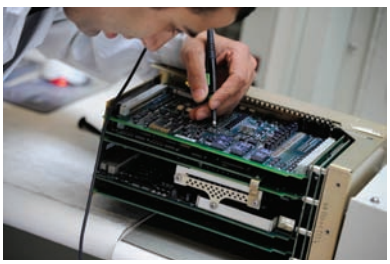
Its 14,000 highly-skilled personnel working in world-class facilities leverage more than 80 years of hands-on experience. From one-off repairs to all-in fleet support, AFI KLM E&M meets and surpasses the requirements of today's highly-competitive civil aviation market.

Adaptiveness ® lies at the heart of AFI KLM E&M's successful offer. The airlines that prefer to outsource all their maintenance activities can access a one-stop-shop approach. AFI KLM E&M can also customize services and maintenance contracts to their very specific requirements.

The AFI KLM E&M Network

AFI KLM E&M is consolidating a strong network of subsidiaries and joint ventures, both for the development of new products and the extension of its geographical presence. These include the Florida-based Aero Maintenance Group (component support, repair and services), EPCOR in Amsterdam (APU and APU component maintenance), KLM UK Engineering in Norwich (full maintenance of Boeing 737, regional fleets and A320 Family), CRMA in Paris (engine repairs), AMES in Dubai (Aerostructure services), Aerotechnic Industries in Casablanca (A320 Family and 737NG Airframe services), Spairliners in Hamburg (A380 component services) and Max MRO Services in India (component services).

A single point of contact and local support is provided by sales offices all over the world. Ultimately, the strength of AFI KLM E&M lies in the extent of its knowledge, flexibility and experience, combined with its worldwide network support.



Approvals and certification

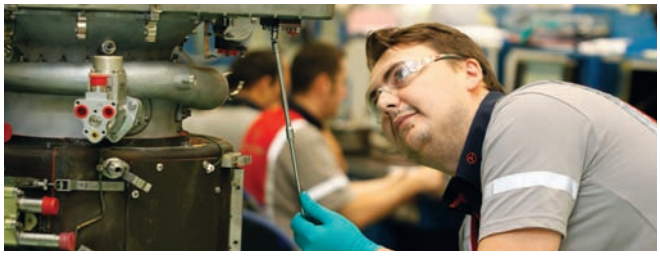
- **European approvals (EASA and DGAC)**
  EASA Part 145, Part M subpart G, Part 21J, Part 21G, Part 147
- **US approvals**
  FAR 145: FAA approved Repair Station: CNFY912C
- **Other international approvals**
  Over 30 approvals have been granted to AFI KLM E&M by a number of international authorities (and notably CAAC), enabling the Group to work on aircraft registered in the countries concerned.
- **Certification**

AFI is the world's only MRO to have obtained Global and Unique Certification covering nine international standards for all of its facilities: ISO14 001 (Environment), ISO 9001 (Quality Management), EN 9100 (Aircraft Design), EN 9110 (Aircraft Maintenance), EN 9120 (Logistics and Storage), ISO 22 000 (Food Safety), OHSAS 18 001 (Occupational Health & Safety), ISO 15 489 (Records Management) and ISO 26000 (Sustainable Development). In the Netherlands, KLM E&M's avionics unit is also ISO 14 001 certified.

More information at www.afiklmem.com and mobile.afiklmem.com

Follow us on Twitter @afiklmem

TURKISH TECHNIC



Based at Istanbul Atatürk International Airport, Turkish Technic Inc is the leading aircraft maintenance, repair and overhaul organisation in the region that is certified through Turkish DGCA, EASA-145, JAR 14 and the FAA for the performance of maintenance services. Being the only one-stop shop in the region, Turkish Technic, with its wide range of back shops certified for over 4,000 Boeing and 4,000 Airbus components, offers comprehensive maintenance services. These include airframe heavy maintenance, engine, APU overhaul, landing gear overhaul, and more, that take place in its four hangars. Three are located at Atatürk International Airport, including one for business jets, and one at Esenboga Hangar in the capital city of Ankara. The company serves more than 100 airlines in Turkey, Europe, the CIS countries, Africa, the Middle East and southern and central Asia with a highly qualified workforce of more than 3,000 personnel.

Subsidiaries:

- Turkish Engine Center (TEC), a joint venture (JV) with Pratt & Whitney at Istanbul Sabiha Gokcen International Airport. Capabilities: CFM56 series and IAE V2500 Engines
- Goodrich Turkish Technic Service Center (GTTSC), a JV with Goodrich Corporation in the Gebze Industrial Zone, located close to Sabiha Gokcen International Airport. Capabilities: MRO services for nacelle, thrust reverser and rotable support
- Turkish Cabin Interior (TCI), with Turkish Airlines and TAI. Capabilities: Manufactures all types of cabin interior equipments such as galleys, trolleys, business class bar units, pilot and crew rest, doghouse, cabin floor panels, and divider and wind screen
- Turkbine Technic, a JV with ZORLU Energy O&M. Capabilities: maintenance and repair of General Electric CF6-80C2 Engine and GE LM6000 industrial gas turbines
- Turkish Seats Industries (TSI), with Turkish Airlines and Assan Hanil Automotive Industry and Trade Co. Capabilities: Manufactures aircraft seats; economy, business and convertible

TURKISH HABOM MRO Center

The HABOM MRO Center is located at Sabiha Gokcen International Airport and is only 70km away from Atatürk Airport. When the centre becomes fully operational with a total area of 372,000m2, Turkish Technic will have the capacity to provide services for three widebody and 11 narrowbody aircraft simultaneously.

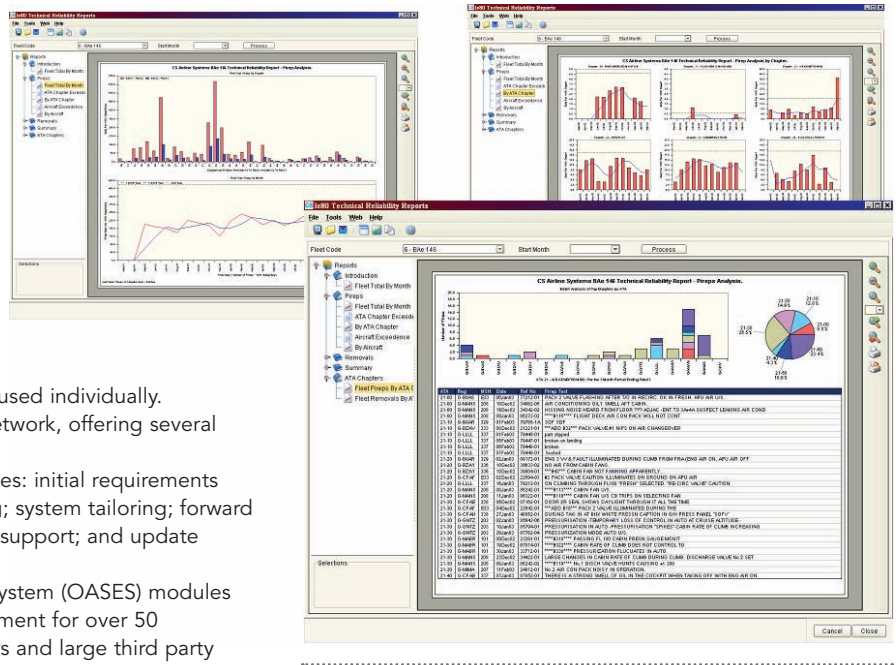
Capabilities:

- Base maintenance up to and including D checks, six to 12 years checks, CPCP, SSID, structural checks and modifications for Airbus A300, A310, A320 Family, A330, A340, Boeing 737 Classic and NG, 777-200/300
- Line maintenance at stations in Turkey and worldwide for A300, A310, A320 Family, A330, A340, 737 Classic and NG, 757, 767, 777, Gulfstream and Embraer ERJ-170/190
- Painting with full aircraft stripping in a dedicated climate-controlled area
- Engine repair and overhaul capability (performed by Turkish Engine Center) with a 100,000lb thrust test cell and dedicated part repair shops for CFM56-3 series, -5C and -7B, IAE V2500-A5. Spare engines are also available
- APU repair and overhaul with a dedicated test cell. Authorised Hamilton Sundstrand Repair Station for APS2000 and APS3200, plus GTCP 131-9B, GTCP 85 series and GTCP-331-250H. Spare APUs are also available
- Landing gear overhaul for 737 Classic and NG, A300-B4, A310, A320 Family, A330, A340. Spare gears are also available
- Honeywell-authorised repair station for CFM56-7B HMUs

TURKISH TECHNIC

Contact details
Atatürk International Airport
Gate B, 34149 – Yesilkoy
Istanbul
Turkey
t: +90 212 463 6363, Ext. 29246
f: +90 212 465 2547
e: techmarketing@turkishtechnic.com
www.turkishtechnic.com
Key personnel
Altug Sokeli Marketing & Sales Manager
Ferhat Yenibiertiz Media, Advertising & Public Relations Manager

Communications Software



For over 35 years, Communications Software has supported aircraft maintenance organisations with high-quality computer systems with easy-to-use but functionally sophisticated systems that increase efficiency and reduce costs in many key areas.

Proven worldwide in a variety of live maintenance environments under approvals from the CAA, FAA and JAA, the system modules are fully integrated, but can also be used individually.

The system can be run on any PC or any network, offering several database options including Oracle.

The company offers a full package of services: initial requirements studies; implementation support; user training; system tailoring; forward planning; day-to-day help desk; maintenance support; and update release services.

The Open Aviation Strategic Engineering System (OASES) modules cover all key aspects of maintenance management for over 50 users worldwide, ranging from national carriers and large third party maintainers to regional, charter and small independent operators.

Closed-loop maintenance

OASES's 'closed-loop' maintenance philosophy ensures full feedback between all aspects of the system. Starting with resource information relating to staffing, aircraft type and tooling, this feeds into planning modules producing a workpack, also generating work-in-progress reports and raising non-routine cards that are actionable immediately or fed into schedule changes – updating records continuously and informing the re-planning process. Simultaneously, a second closed loop is running for the provision of spares.

Demands that come from the planning department and engineers on the line or in the hangar are electronically requisitioned with a 'time required'. If the part is in stock the necessary electronic notification is routed to the appropriate store, or, if not in stock, notification is routed to the purchasing department. All such requirements will be automatically re-shortaged should the situation change and the part becomes unavailable.

OASES covers all aspects of technical records, line maintenance, MSG-3, reliability, inventory control, purchasing, rotable tracking, workcard production, shop floor data collection, time and attendance, digital documentation, AD/SB/EO evaluation, advanced scheduling, line maintenance control, DR, graphical planning and defect control.

OASES can be easily implemented either as standalone modules or as a fully integrated system.

Contact details

8 The Centre	+44 1621 817425
Tiptree	+44 1621 817262
Essex CO5 0HF	info@commsoft.aero
United Kingdom	www.commsoft.aero

BAKER-AVIATION.COM

FLY WITH Confidence!

More than 100 years of Experience with Capabilities that include:

Airframe, Engine, Avionics, Interiors,
Parts Sales, Field Servicing

Airframes
Challenger, Learjet, Citation, Gulfstream, King Air, Hawker Beechcraft, Falcon 10, 20, 50, 900 and 2000.

Engines
Honeywell, GE, Pratt & Whitney Canada, Hamilton Sundstrand

HOT-STOP® 'L'
LITHIUM ION FIRE CONTAINMENT BAG

The HOT-STOP® 'L' Fire Containment Bag safely contains fires, explosions and smoke emissions from Lithium Ion-powered devices as well as any combustible item aboard an aircraft, without the aid of a water supply.

Inquire on your upcoming maintenance event and learn how you can qualify for a complementary fire containment bag(s)!

BAKER AVIATION

BAKER AVIATION MAINTENANCE & PARTS SALES
4700 Glenn Curtiss Dr. | Addison, TX 75001
972-248-0457 | 972-248-7215 FAX | Ask for Ray Goyco, *Ray@baker-aviation.com*

FAA PART 145 REPAIR STATION CERTIFICATE # 5BVR011C

Insider's Guide to

MANAGING AN AIRCRAFT REFURB PROJECT

By Dale Smith

The aircrat refurb and repurpose sector is predicted to grow from $3.04 billion to over $4.2 billion in the next five years. Shown here is a bedroom option in the Timeless Visionary cabin for widebody aircraft by Jet Aviation. Jet Aviation image.

In today's active business aircraft cabin refurb market there's a lot more to ensuring a successful (and profitable) project than picking the right color of carpet.

The longer you're involved with the business aircraft industry the easier it is to see that it's like a giant pendulum – new aircraft sales go up and refurbs go down. New aircraft sales go down, as they are today, and the business of refurbishing older aircraft gets a boost.

In fact, the folks at marketsandmarkets.com recently put out a study that says that the aircraft refurbishing and repurposing market will grow from "$3.04 billion in 2012 to over $4.2 billion by 2017." While not all of that gain will be in cabin refurbs on corporate and VIP aircraft, that segment will no doubt account for a good portion of it.

Talking to some leading refurb MROs that all stressed that between the combination of increased activity and the pressures of a combination of increased competition and tight schedules, there are traps out there it's not all good news.

If all the customer really wants is a good cleaning and a scuff-and-buff on the woodwork, well, that's a far cry from a complete start-from-scratch cockpit or cabin refurb.

And one of the biggest areas of concern is entering into a new project without a clear vision of what the customer is really trying to accomplish.

"A lot of times they (customers) don't have a really good idea of what actually what can be done in their airplane," explained Aaron Kreissler, sales director for Jet Aviation, St. Louis. "That's why it's important to get engineering involved with the sales department early on. Customers need to get involved with the shop's technical people up front."

Kreissler said that the goal is to not only understand what can, and more importantly, cannot be done in the airplane but to also to create pretty firm package which can be submitted to all the shops the customer wants to bid on the project.

"Everyone needs to be working from the same plan to create their proposals," he said. "It all needs to be apples-to-apples to give the customer a good point of comparison."

So what kinds of information should be in this plan you ask? "The first thing we want to know the work scope. Is it just a cockpit or cabin, or does it include things like paintwork? Do you want to change the leather on the seats? Do you want to install a new CMS (cabin management system)?" stated George Bajo, completions sales representative, Duncan Aviation. "Usually when you ask the customer these questions it leads to other information on other parts of the project."

Another very important piece of "other information" is whether there is any major airframe maintenance or inspections coming due on the aircraft in the next 12- to 18-months. "It's always a very good idea to couple that type of maintenance with the interior refurb," he said. "That kind of work requires removing the interior so it's just best to do it all at the same time. It will save money and time and eliminate any possibility of damaging the new interior."

Also a clear understanding up front of the need for airframe inspection or maintenance can also help the owner/

Setting Your Shop Apart

While there's been lots of valuable information shared, the simple fact is you can take steps long before a customer flies in to helping put your shop in position to cash in on the cabin retrofit and refurbishing boom. Here are a few valuable tips to help you make the most what opportunities come your way:

1. Prepare a list of recent customers to use as referrals. If they don't want to be contacted, just ask them for a short testimonial letter. It's also a great idea to have photos of the before, during and after of each project.

2. Ask the prospective customer detailed questions about how the aircraft is used now and how it may be used in the future. Also ask what systems they may want to add in a year or so. It can save money and time to pre-wire for anticipated equipment additions.

3. Prepare a complete list of items to help prospective customers plan each step of their project. And the more detailed you make it the better.

4. Create a calendar of project milestones that spells out who will be responsible for what decision and when. Again, because you will be working with a number of people in the owner's company, this needs to be very detailed.

5. Do a highly detailed pre-disassembly inspection of the interior and exterior of the aircraft including the avionics and antennas. Note anything that needs repaired and the condition when the aircraft arrived. If it's not on your 'to-do' list then tell the owner. Every owner thinks their airplane is "perfect" when they dropped it off. (Digital photos are great.)

6. Once you get started communicate, communicate and communicate some more. Provide consistent updates to your customer on every detail on the project. Even small changes can make big differences in the final product.

7. The project plan should also specify which person in your shop is responsible for making all the logbook entries as the project goes along. DO NOT leave this important task until the end. The lack of current paperwork is a leading cause of delivery delays.

8. Speaking of delivery delays, don't wait until you're passed the promised date to have a contingency plan in place that states who will pay how much if the aircraft's owner has to charter another airplane? And if you're going to own-up for missing the date, why not put in a bonus clause as an incentive to beat the deadline? It's worth asking…

9. Create a contract that clearly states the goals and commitments for both parties. You'll be amazed at how much smoother a project goes when people have to put their signature on a piece of paper.

When you sit back and look at it, these steps really aren't anything new. The biggest key to being successful in this facet of the business is remembering that doing a cabin retrofit or refurbishing project is the most personal kind of work you can do on someone's aircraft. "You have to look at a refurbishing project like you're working on decorating someone's home," a shop owner said. "They are trusting you with their most personal space. And once they give you that trust, you must do everything in your power to show them that they were right. If you fail, you can be sure that everyone will hear about it."

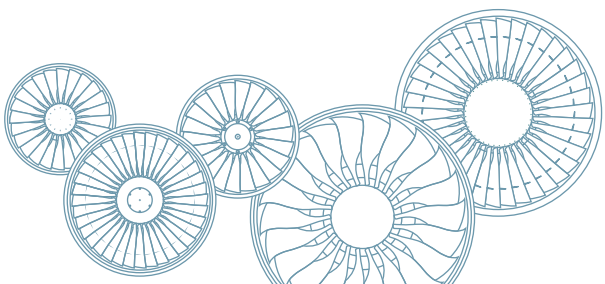
MTU Maintenance

Full repair capability for the GE90 Growth

MTU – Maintaining your power

At MTU Maintenance, we believe in streamlined, cost-effective results. We are the world's largest independent engine service provider, combining the benefits of state-of-the-art technologies, decades of expertise, customized maintenance solutions and process excellence. MTU's extensive MRO portfolio now also includes the GE90 Growth. Dedicated to support you.

www.mtu.de



Unique to Duncan Aviation's completions center is their customer one-piece PSU panel for the Falcon 900. The design not only adds value, but it also updates the look and functionality of an older aircraft. Wood trim is a new feature integrated into the design.
Duncan Aviation photo.

operator decide which shop they should be working with on the project.

"Not every shop is approved or certified to do major work on every airframe type," explained Nate Darlington, another member of Duncan Aviation's completions sales team. "Not every shop has in-house engineering capabilities. That can make a big difference in the selection."

And it's not only maintenance issues. Sometimes engineering is a critical part of what seems like a basic cabin refurb.

"Say you are doing an interior upgrade on a Global Express. You can't just replace a 9G divan with a 16G divan," Kreissler said. "You have to structurally beef-up the floor beams. You really need someone who is familiar with that airframe."

"You also need to ask if the shop has done the particular type of upgrade before?" he added. "If it's required, do they have an STC for the work or is it a new STC? If that's the case it can add a lot of time and money to the project. You need to know that going in."

A Good Refurb is the Sum of its Parts

Another thing shops need to determine up front is whether or not the aircraft is, or may soon, be operated on a Part 135 certificate?

"That has a bearing on what types of materials we can use and how the cabin is set up," Bajo said. "For example, with Part 91 aircraft you are not required to fire block the 9G seats. With Part 135 aircraft you have to fire block the seats."

(For those of you not up to speed on flammability testing, according to Jarod Triplett, VP, Skandia, a provider of flammability, toxicity, smoke and flotation certification testing for the aviation industry, the term fire blocking refers to FAA 25.853(c) testing, which is also known as the "oil burn" test.)

"We always recommend doing fire blocking on all seats just to add value to the aircraft," Darlington added. "If you are Part 91 and sell the aircraft to a Part 135 operator, it just makes the airplane that much more valuable."

But, even if you don't operate Part 135 or plan on selling to someone who does, beyond the obvious, a shop's ability to do flammability testing in-house like Duncan Aviation, or their familiarity of a third-party provider like Skandia, will be extremely valuable. And it'd doubly so if the owner/operator wants to use his or her favorite interior designer on the project.

"We often work with freelance interior designers. Part of our job is to educate them on the specific challenges that exist when designing within the world of aviation," stated Kristen Cotugno, designer, Duncan Aviation. "If the client has anything unique they want to do, the earlier we can start that discussion the better. Many of them don't realize the extent that the FAA and EASA require us to go through for certification."

"We are working with a customer like that right now," Kreissler said. "The designer just finished the owner's boat and was not familiar at all with the materials we can use on the airplane. So early on we had the designer come in and sit with our in-house designers to go through the material selection with the owner."

"We often work with freelance interior designers. Part of our job is to educate them on the specific challenges that exist when designing within the world of aviation."

- Kristen Cotugno, designer, Duncan Aviation

Flammability is a Hot Topic

No one can argue the value of cabin flammability testing today. Especially not after witnessing the recent Asiana 214 accident in San Francisco where the tight regulations no doubt saved hundreds of lives. But those tight regulations do put tight reigns on cabin materials selection.

"The stringent requirements do significantly limit the options for cabin materials. Ultimately the refurb shop is responsible for the compliance with the regulations." Triplett explained. "Understanding the regulatory environment up front will ensure compliance and make the whole refurbishing process more efficient for the shops and the owners."

"The quick and easy is that they know that if any cabin materials are being changed or modified, it will require some form of flammability testing," he said. "They can always contact their FSDO for guidance, but it may be easier to contact a flammability DER (designated engineering representative) to help guide them in the right direction."

Triplett added that while most international regulatory groups have followed the FAA and EASA flammability testing guidelines, if the aircraft is registered internationally, it's good practice to get specific guidance from a particular country's governing civil aviation authority.

If your selected refurb shop doesn't have the information, Triplett said that Skandia would provide guidance.

Steer Hide and Shagreen

Of course half the fun of being in the refurb business is trying to fulfill the wildest dreams of even the most demanding clientele.

"We do get a lot of unusual requests but nothing really outlandish," Darlington said. "One of the most recent was an owner who wanted to use cow hide on the floor and sidewalls."

"It was actually steer hide. They leave the hair on the hide so has some excellent texture," Ms. Cotugno said. "It was pretty neat looking actually, but it did take quite a long time to get is right. The owner wanted to use a specific vendor who had never dealt with aviation before."

"We had to do a lot of burn tests. Our on-site burn lab worked closely with the vendor to create the final product," she said. "It was quite a process to get from the initial state to where we could install it."

"Another project included using Shagreen (Stingray hides) on the interior of a GIV," Ms. Cotugno added. "After many attempts using standard shop equipment, the team discovered that using a hydro cutting machine was the best way to ensure a flawless installation."

"That's the magic of this place," she said. "All the teams finding the workable solutions to the crazy stuff we designers give them. It's amazing."

Of course it's not only the obviously ostentatious that can cause issues for the design and engineering teams. Sometimes it's as simple as installing an Espresso machine.

"A lot of our international customers want Espresso machines installed," Bajo said. "The problem is you just can't run out to Best Buy and get one to plug into the airplane. It's sometimes difficult for clients to understand that."

"It's not certified for aircraft use so we essentially have to beef up the cabinetry and build a fire-proof box for it on the airplane," he explained. "Everything has to comply with the FARs."

Darlington said that another COTS (commercial off-the-shelf) product that keeps becoming an installation issue is the common microwave.

"You just can't go buy one at the store for a hundred dollars. An aviation-approved unit is around $15,000 and that's not including installation. People are shocked by that," he said.

Good Communication is Key

Like with any level of maintenance or refurbishing project, good communications from the program's onset are critical to success at the end.

"We encourage our customer or their representative to be here as much as they can," Kreissler said. "We have a private office they can use and they get a security badge that gets them anywhere on our facility they need to go."

"There are a lot of things that look good on paper, but when you start putting it in the airplane you find that it needs to change," he added. "If the rep is here it's easy to show them and get an answer on the spot. If it's something that the owner needs to see, we can send digital photos."

Also, to help keep things moving and on schedule—which, according to the experts we've talked to is the most important part of the whole project – all the big shops use an active status system so everyone knows exactly what's due where and when.

"When we do an original proposal we give them (customer) a chart spelling out when everything is due," Kreissler said. "We try and spell out the responsibilities for the owner up front and we keep it updated for them. If you don't give them a timeline at the beginning, you can't really fault them for missing key dates."

"Many of the materials the owners select have very long lead times," Darlington said. "Carpeting alone can be six- to 16-weeks out. That's where pre-planning comes in. If they make what seems to be a simple change to the carpet color it has a domino affect on everything else."

"Ideally, we like to have all this settled on and have everything here in the shop waiting when the customer's aircraft arrives," Bajo said. "That's the easiest and most efficient way to do any refurb project. Any other way and you are at the mercy of all the variables. But sometimes it's just out of our hands. "

"Downtime is the key driver," Darlington added. "Once the schedule is set it's really hard to ask for more time. Clients don't like that." AM

AVM SUMMIT USA RECAP

On November 20 and 21, 2013, Aviation Maintenance held its first ever U. S. event, the AVS Summit USA in Orlando, Fla. Our keynote speaker lineup included two top leaders in the aviation maintenance world. Dr. Chris Markou, deputy director engineering, the International Air Transport Association(IATA) and Marshall Filler, managing directory and general counsel for the Aeronautical Repair Station Association (ARSA).

Some umbrella themes of the event were improving operational efficiency, getting leaner, innovating, managing costs and saving money. Dr. Markou talked about IATA's efforts to simplify maintenance operations by incorporating paperless technologies, thereby facilitating regulatory compliance and enabling new processes to reduce costs. He offered thoughts on how to do this via digital aircraft records, e-parts tracking, RFID and real-time data communications via the cloud. He also said that IATA sees some resistance to the use of some forms of digital documentation such as the digital signature and suggested that if we can trust our banks to digitally secure our money, we should be able to do the same with aircraft records and signatures.

ARSA's managing director, Marshall Filler, offered thought leadership on the global aviation regulatory environment. He talked about the economic and political realities ofregulations from a maintenance organization's view point and he offered recommendations on working smarter with that environment. Filler offered in depth explanations of how to work with the "state of registry" airworthiness standards for design approval, continuing airworthiness and personnel certification. He offered ways to work smarter via bilateral agreements, CAMOs and SMS.

After the keynote addresses, the conference split into two tracks: commercial MRO and business jet MRO. Top MRO professionals from around the world shared real world examples of improving their operations. Luis Gustavo Silva, executive director from LATAM showed how he lead change at his company via a well-planned process and top-down buy-in. Pedro Costa, GM of continuous improvement at TAP E&M in Portugal presesnted a case study on continuous improvement by showing how TAP made strides in the A-check on the A340. These were just two samples of the amazing information and expertise shared in Orlando. Join us in London for more!

Sabena technics, your solutions provider

Sabena technics is a leading independent provider of maintenance services to civil and military aircraft operators. The group operates under the brands Sabena technics, Sabena technics training and Barfield in the USA. Sabena technics employs over 3,000 persons across its 18 sites worldwide. Its services are organized into product lines: Airframe services, VIP completion, Component services, Integrated services, Military services and Training services.

Airframe services

Across six of its sites, Sabena technics offers airframe maintenance services on a large range of aircraft, from pre-flight inspections to D-checks.

Thanks to the support of its many backshops, Sabena technics is able to test, repair and maintain a wide range of components. The engineering department, the EASA PART 21J Design Office and the EASA PART 21G Product Office allow the company to perform the most complex modifications. With an expertise in civil, military and corporate aircraft, Sabena technics also provides stripping and painting services. Sabena technics also develops special solutions for lessors.

VIP completion

Sabena technics offers outstanding refurbishment and completion services for the following aircraft families: Airbus, ATR, Boeing, Bombardier, Embraer and Fokker. Working with the best designers, Sabena technics develops and installs aircraft cabin projects for airlines, governments and business aviation operators.

Component services

With three sites in Europe and four sites in the United States, Sabena technics certifies over 100,000 components in-house every year, benefiting from logistics platforms including Paris CDG.

In order to provide the right component services, the following technologies are offered on a flat rate and time and material base: avionics, integrated drive generator, electromechanics, pneumatics, fuel, hydraulics, oxygen, aircraft structure and wheels and brakes.

Sabena technics also offers landing gear services: its facilities, as well as its Dinard-based Hydrep joint-venture with Messier Services, are fully equipped to carry out all kinds of repairs and surface treatments under the same roof.

Integrated services

Integrated services is an "à la carte" support. To meet its customers' needs, Sabena technics builds customized and cost-effective maintenance support, combining key services: airframe solutions, component solutions, logistic solutions, fleet solutions, asset solutions and support solutions.

More than 730 aircraft already benefit from these solutions. 24 hours a day, 7 days a week, Sabena technics guarantees its customers the support they need in AOG situations, wherever they are.

Its trading division provides spare parts solutions in managing the purchasing, short or long term lease, loans and exchanges of a wide range of components.

Military services

Sabena technics offers global support and maintenance services to military operators, from line to heavy maintenance, including airworthiness monitoring. The company also provides aircraft modifications, new systems integration and aircraft interiors. Sabena technics has been an authorized Lockheed Hercules service center since 1977 and is renown worldwide for its C-130 expertise. Sabena technics has also won numerous Maintaining in Operational Condition (MOC) contracts.

Training services

Sabena technics training shares its know-how with you through EASA PART 147 accredited training programs, based on more than 80 years of experience in aircraft maintenance. Tailored to clients' needs, its programs can be set up at its training centers in Brussels and Bordeaux or at customers' premises.
Sabena technics training is a founding member of the Airbus Maintenance Training Network.

Contact details
Sabena technics Group
visit our web site at http://www.sabenatechnics.com/

Maintaining their current fleet while preparing for incoming aircraft is the major challenge facing Emirates Engineering, the maintenance branch within the Emirates Group.

Emirates photo.

FACING DOWN GROWTH

By Douglas Nelms

In October 1985, Emirates Airline began service with a leased Boeing 737 and Airbus 300-B4, basically serving Middle Eastern and Southeast Asian destinations. Fifteen years later, in 2000, it had grown to 28 aircraft. Today it has more than 200 aircraft, and took delivery of its 44th A380 last December for a total of 12 delivered in 2013 and a fleet total of 212. It is the world's largest operator of the world's largest commercial jetliner, and will be taking delivery of another 13 in 2014.

Last November Emirates entered the aviation record book by placing the largest aircraft order by dollar value in civil aviation. During the biennial Dubai Air Show, it placed an order for 150 Boeing 777s, consisting of 35 777-8Xs and 115 777-9Xs, plus options on an additional 50, along with an order for an additional 50 A380s, for an estimated list price of $99 billion.

"We don't turn down people that need help. We are also the Middle East agent for aircraft recovery, with all the recovery equipment necessary to an aircraft having difficulty. We have the recovery jacks and the trained personnel, and we work with the IATA supplier for the region. We have invested heavily in that."

- Iain Lachlan, Divisional Senior Vice President, Aircraft Maintenance Engineering (above)

This gives the Dubai, UAE-based carrier a total firm order book of 385 aircraft consisting of 214 Boeing 777s, 101 Airbus A380s, and 70 Airbus A350s.

It thus becomes clear why maintaining the current fleet while preparing for incoming aircraft is a major challenge facing Emirates Engineering, the maintenance branch within the Emirates Group.

The airline is expecting to take 25 of its new A380s just within the next four years, so a major part of that challenge is physically preparing to take delivery of the new aircraft while maintaining the current fleet plus preparing its older fleet of leased A330s and 340s to be returned.

To do that, it is in a major facility expansion mode, building four new hangars to add to the seven hangars currently available at Dubai International Airport (DXB), according to Iain Lachlan, Divisional Senior Vice President, Aircraft Maintenance Engineering. All of the current hangars are A380 compatible, as will be the four new ones, with each having floor space of approximately 100 square meters, Lachlan said. The seven hangars, plus a paint hangar, is considered the largest free-spanned structures in the Middle East, with roofs support by 110-meter long single spans.

The new hangars are expected to be ready during the first quarter 2014. Emirates also has an engine test cell capable of producing about 150,000 lbs of thrust. Both of these are located about 40 km from the airport. Lachlan said the engine test cell will focus primarily on GE 90 engines used to power the 777 and the GP7200 engines used on the A380.

Preparing for the introduction of the new aircraft is not cheap. Unlike maintenance operations such as Lufthansa Technik and British Airways Engineering, Emirates Engineering does not sell its services to third-party operators, particularly at the C check level. The maintenance facility is simply too busy with the introduction of new wide body aircraft to take on additional heavy maintenance for other carriers, Lachlan said. The facility already has five lanes for C checks, with a sixth coming on line in 2014 and a seventh in 2016 just for its own aircraft.

"So with the fleet growth, I need additional hangars just to manage the existing fleet. With a fleet of 180 aircraft, all wide body, and growing with another 200 aircraft (coming in), we just don't have the capacity."

However, it does support other airlines at the line maintenance level, Lachlan said. It currently provides support for six airlines at its Dubai hub—Virgin Atlantic, British Airways, Singapore, Singapore Cargo, Korean and Air France.

It will also assist other carriers at other destination airports if needed. "We don't turn down people that need help. We are also the Middle East agent for aircraft recovery, with all the recovery equipment necessary to an aircraft having difficulty. We have the recovery jacks and the trained personnel, and we work with the IATA supplier for the region. We have invested heavily in that."

Emirates Engineering also is not considered a profit center and does not sell its service to the airline.

"Emirates Engineering is part of the Emirates Group. They have invested heavily in us and have the confidence in us to be able to support them to the level of their expectations," even though the airline has the option of using other maintenance facilities, he said.

While not part of the revenue column, Emirates Engineering is part of the expenditure column. In fiscal year 2013 (April 1, 2012 to March 31, 2013) Emirates reported total expenditures of $19.1 billion, up 16.2% over FY12, on revenues of $19.9 billion, a 17% increase. Expenditures for aircraft maintenance showed a 43.9% increase, from $352.76 million to $507.635 million, reflecting the increased need for scheduled maintenance on the airline's expanding fleet and cost of phasing out older aircraft. Maintenance accounted for 2.7% of the airline's expenditures during FY12.

By the end of the fiscal year, Emirates had 31 A380s in its fleet, making it the largest operator of that aircraft in the world, serving 21 destinations across its network. During its fiscal year it took delivery of 34 wide-body aircraft, including 10 A380s, 20 777-300ERs and four 777-200LRFs for a total of 126 777. Its current order book as of March 31, not counting options, was 193 aircraft, to include 59 additional A380s.

Along with having to prepare for new super wide bodies coming in, Emirates Engineering also simultaneously has to prepare for wide bodies going out. This is the program aimed at handing back aircraft that have been flown on lease over about the past 12 years.

The "hand back" program "is quite a challenge because you have to return the aircraft in excellent shape," Lachlan said. "It's a very intense program; and the demands are very high. People expect a brand new aircraft back even though it has been in service for 12 years. Over

the next five to six years, we will have 40 plus aircraft that we have to return. So that requires very demanding, high tech efforts. We have established a separate department that deals purely with returns. We work as far as 12 months ahead to maintain all the records and other documentation. We normally hand back an aircraft with a full "C" check done."

Another challenge within the primary challenge is protecting the Dubai hub, Lachlan said. "This means that we have to make sure we maintain technical dispatch reliability, making sure we are delivering to the time scales, using the abilities that we have to do it in a very congested area."

Dubai International Airport (DXB) is one of the world's busiest airport for international passenger traffic, reporting 50.977 million passengers in 2011, lastest figures available from Airports Council International. With over 100 airlines serving DXB, dispatch reliability is a major factor in meeting the competition.

One of the problems facing the maintenance center is simply lack of space. "Because as Dubai (International) Airport is developing and growing, and the fleets are growing, obviously real estate is a very important factor. We try to minimize the amount of stand parking that we have, but that is not possible because of the growth." The airport currently has three terminals and added a new Concourse A in Terminal 3 in January 2013. The new concourse is served exclusively by Emirates and was purpose built for the A380.

A second airport, Al Maktoum International, has now partially opened near the Jebal Ali Free Trade Zone,. Once fully open, the airport will be able to handle 160 million passengers per year, while DXB will be able to handle 90 million once an ongoing expansion program is completed…giving the two airports a total capacity of 250 million passengers.

However, with the new hangars schedule to open at DXB, maintenance for Emirates Airline is expected to remain at that airport, Lachlan said.

Another challenge Emirates faces is working with its suppliers on new aircraft. The aircraft manufacturers focus on their choices of suppliers, working with single source suppliers, Lachlan said.

"On the one hand, it is extremely good to have one source that makes that particular system on an aircraft or any other particular part. That is okay provided (the source) can maintain its reliability and the ability to ship it. Unfortunately, that doesn't always happen. From an operator's perspective, there is nowhere else to go.

Emirates Engineering is headed by Adel Ahmad Al Redha, Executive Vice President Engineering and Operations. Emirates photo.

So we have to work very, very closely with both the aircraft and engine manufacturers, as well as the suppliers of the parts."

Lachlan said that the airline hosts annual meetings with both Airbus and Boeing, as well as the suppliers to ensure that their requirements are met. "And we don't apologize for being demanding. The industry is a demanding business and we

Emirates Engineering is currently construction a 225,000 sq. ft. GE Engine Overhaul Maintenance facility to handle the growth of its growing 777 and A380 fleet. When completed later this year, it will be able to perform up to 300 engine overhauls a year on GE90 engines powering the Bowing 777 and the GP7000 engines on the Airbus A380s. Emirates Photos.

want to work in partnership (with suppliers) to make sure that we meet the customers' expectations."

Needless-to-say, both Boeing and Airbus provide technical support for the aircraft flown by Emirates. Part of that support is provided by Boeing's Lifecycle Solution Airplane Health Management (AHM) and Airbus's AIRMAN (AIRcraft Maintanance Analysis) programs. These are software programs designed to monitor each aircraft's "health" in flight and advise the maintenance section if any fault or warning message is recorded by the on-board monitoring system. That information is then transmitted to the maintenance facility so that repair crews can be waiting when the aircraft lands.

These programs not only alert maintenance that there is a problem, but also provide the necessary information, including maintenance required and the relevant documents, to resolve the problem quickly.

Also facing any airline introducing new models of aircraft, such as the A380, is the maturing process. "Any new aircraft that go into the industry always have challenges. You can see what happened on the 787, on the 380, on the 350. I am not aware of any aircraft that has an extremely smooth introduction," Lachlan said.

He noted that for an aircraft to "mature," it has to go through a range of modifications. The challenge is the speed at which those modifications can be made.

"So that is a high focus of attention. We have to work with the manufacturers to make the changes as the aircraft matures."

To do that, Emirates hosts technical review meeting with both the airframe and engine manufacturers twice a year. "We review what has happened, what is going to happen, and how they are dealing with current issues."

Along with its standard maintenance practices designed to meet the needs of new aircraft, Emirates is introducing new technology such as thermography, more detailed X-ray capabilities and phased ultrasonics for working with the growing use of composites. It is also working with Rolls-Royce to develop C-scanning for fan blade inspections.

"We're continually looking at how we can improve our capabilities, and will look at anything that gives us an advantage," Lachlan said. One rather mundane, yet highly cost effective example is computerized carpet cutting. "We just roll the carpet through the machine and it cuts the carpet just the way we want. We make it more of a jigsaw to minimize wastage. And we work with carpet manufacturers to find pre-shrunk carpet because we were finding that when we cleaned the carpet that was cut exactly to fit, it would shrink."

Along with building additional facilities to handle the growth, Emirates is also on a hiring binge. Lachlan said that he currently has a staff of 4,070. This is expected to grow to around 4,300 by the end of the fiscal year. A large percentage of the current maintenance personnel are expatriates, although the airline is moving more and more toward hiring native Emiratis. He noted that there are a lot of young Emiratis who want to train to be aircraft mechanics "and one of the company objectives is for national development overall. Because of the growth of young people coming through Emirates our apprentice program is focused on the nationals."

Most of the applicants are coming right out of high school, and what the airline is looking for most is a competency in English and mathematics. "A lot of people apply, but we only have a limited number of places."

Lachlan noted that they have "quite an extensive training section," with 26 classrooms, and that they also train mechanics for other airlines as well as writing A380 courses for third parties. "This brings in quite a bit of contribution to us, so that is another area we have," Lachlan said.

Another challenge that is going to be facing Emirates Engineering is wing repair on its A380s. In 2011 Type 1 and 2 cracks were detected in the A380 wings. Preliminary repairs keep the aircraft flying, but must be repeated roughly every 500 hours. The airline will start permanent wing repairs in March, pulling four aircraft off the line at a time for the eight-week repair cycle. Once repaired, the wings have a 90,000 hour full life cycle.

A total of 44 A380s will need the repair. The 45th A380 was planned to be delivered from Airbus with a newly designed wing that resolves the problem. AM

MULTIPLE AVIATION INDUSTRY SEGMENTS. ONE MESSAGE: SAFETY.

If the entire aviation industry should collaborate on one thing, it is safety. At a time of constrained resources, increased regulation and unprecedented scrutiny, the Flight Safety Foundation continues to be the leading advocate for safety and prevention of accidents, thereby saving lives.

Show your commitment to the aviation community's core value – a strong, effective global safety culture. Join the Flight Safety Foundation.

Flight Safety Foundation Headquarters:
801 N. Fairfax Street, #400
Alexandria, VA 22314
Tel: +1.703.739.6700

flightsafety.org

Member Enrollment:
Ahlam Wahdan
Membership Services Coordinator
Tel: +1.703.739.6700 ext. 102
membership@flightsafety.org

Membership/Donations/ Endowments:
Susan M. Lausch
Senior Director, Membership and Business Development
Tel: +1.703.739.6700 ext. 112
lausch@flightsafety.org

BARS Standard Program Office:
Level 6|278 Collins Street
Melbourne VIC 3000 Australia
GPO Box 3026
Melbourne VIC 3001 Australia
Tel: +61 1300.557.162
bars@flightsafety.org

Aviation Maintenance Magazine is proud to present the following Products & Services to its readers

Landing Gear Strut Service Cart

The Malabar Model 8844B Landing Gear Strut Service Cart provides hydraulic fluid and nitrogen to service both single chamber and dual chamber struts for all narrow and wide body aircraft landing gear. Servicing of aircraft struts is accomplished without jacking the aircraft. For over 78 years, Malabar has been a world leader in designing and manufacturing maintenance equipment for commercial and military aircraft.

Malabar International
http://www.malabar.com/N2/8932.php

Larson Electronics EPL-16C-1MLED

The EPL-16C-1MLED explosion proof portable tank light from Larson Electronics has a removable 16-inch light head that uses LEDs to produce 10,000 lumens of light while drawing only 150 watts, which provides 8,000 square feet of work area coverage. This unit is 120/277VAC capable and can be passed through an 18-inch or 24-inch man-way. Included with this LED light cart is 250 feet of SOOW cord ending in an explosion proof straight blade plug.

Larson Electronics
http://www.larsonelectronics.com

MRO, aftermarket, and services for commercial, regional, and business aircraft platforms

BAE Systems offers the largest breadth of MRO, aftermarket, and services spanning commercial, regional, and business aircraft platforms.
We're proud to be a preferred OEM in the service and support of:

- Engine Controls
- Flight Controls
- Aircraft Electronics
- Cabin Systems and Modifications

BAE Systems
http://www.baesystems-ps.com/cas/

AVM Summit Europe

Jan 21-22, 2014
London, UK
http://www.avm-summit.com

BY JASON DICKSTEIN

Continued Operational Safety: What Should You Be Looking For?

Continued Operational Safety, or COS, is a term that is used by many in the industry, yet I find a lot of people asking me for a definition of the term. This is especially true of personnel from maintenance organizations and air carriers who want to know how COS benefits them.

For manufacturers, COS is all about ensuring that the product will work as expected, every time. If it is an aircraft, it keeps flying; if it is an engine, it keeps providing power; if it is a part then it performs as expected. Historically, COS has been grounded in proper manufacturing techniques: the product or article is properly designed and it is properly produced.

Once, proper production really meant having quality control mechanisms to ensure that only products and articles that were satisfactory left the quality system, and unsatisfactory products and articles are prevented from leaving the quality system. If an unsatisfactory product or article were to leave the quality system, then this would be considered an "escape." Typically, a pure quality control model would check the part at the end of the process, to ensure that it met design expectations.

As the doctrine of quality assurance took hold in aviation, proper production came to include quality assurance mechanisms/systems. This meant system-based controls that helped to check that parts were being properly fabricated throughout manufacturing before they reached the end of the fabrication process. Quality assurance elements could include supplier audits to ensure that suppliers are acting in a manner calculated to provide adequate supplied materials, receiving inspections for raw materials and other supplied materials to ensure they meet expected specifications, in-process inspections to ensure that manufacturing processes are being carried-out correctly, and internal audits to ensure that the system is working properly.

Modern production quality management systems (QMS) include management elements like metrics (measuring the elements of the system to test their effectiveness) and continuous process improvement (improving the system and then examining the metrics to ensure that the system improvement was successful, and did not undermine aviation safety nor unexpectedly affect any other business goal).

They also include closed-loop issue response systems in order to ensure that root cause of any problem is identified, and that the root cause is corrected to prevent recurrence of identified problems. This process not only corrects present non-conformities and prevents future non-conformities; it also serves as one of the mechanisms that helps to drive a company's continuous improvement efforts.

Another feature of modern production quality management systems is using the system itself as a tool to ensure continued compliance with the aviation regulations. For example, US (FAA) manufacturing regulations require each design approval holder to report failures, malfunctions and defects to the FAA. This helps the FAA track problems and find solutions (or ensure that the private sector finds them) as necessary. It is a required function under the regulations. But even without the regulatory requirement, communications are an important element of a modern COS system. So a manufacturer with a robust COS will have procedures for communications (including reporting) that fulfill the practical requirements of communications (making sure that the right people know the information that they need to know in order to preserve safety) as well as the regulatory obligations (reporting to the FAA in accordance with the regulatory requirements of 14 C.F.R. § 21.3).

All of these quality systems represent efforts by manufacturers to ensure that their customers experience the highest levels of continuous operational safety in operating their aircraft. This is the essence of COS.

What about the system of tomorrow? In recent years, there has been a movement towards the proactive collection of data in order to identify potential future safety problems before they become problems. This data is analyzed to identify potential future hazards, and a risk analysis is applied in order to prioritize hazard remediation resources s so that the most important hazards are mitigated first. This sort of risk analysis also identifies whether hazard's risk fall below the manufacturer's risk threshold and if it does not then the manufacturer can test any hazard mitigation against the risk threshold to ensure that the hazard mitigation was successful in reducing the risk.

Using analytical tools similar to those used for resolving actual (realized) problems, root cause(s) for each potential future hazard can be identified, and the manufacturer can develop and implement corrective action. Using the risk analysis discussed in the last paragraph, the manufacturer has a mechanism for testing whether the risk mitigation was sufficient or whether further risk mitigation is necessary.

This modern trend in continued operation safety was adopted by the Modification And Replacement Parts Association (MARPA) when they published their COS guidance over eight years ago (first released to MARPA members Nov 2005). This MARPA COS guidance has since been updated to reflect changes in the industry and in the state of the art for safety management. The MARPA COS guidance explains in its opening section what its own COS guidance is all about with the following definition:

Continued Operational Safety is a closed-loop technical and logistical support system that ensures lifetime part safety and addresses applicable fleet requirements. This support system includes the following three fundamental elements addressed both before and after FAA part approval:

1. Problem Prevention
2. Part Monitoring
3. Problem Response

The MARPA COS guidance is in its second revision and the third revision is in the process of being developed by MARPA's COS Committee and members. Each revision is being driven by new processes and new paradigms that are influencing the way that the industry achieves the highest level of safety.

The modern trends in COS have been leading to a Safety Management Systems (SMS) model. ICAO has defined four components of an aviation SMS system: 1) a safety policy and set of safety objectives, (2) safety risk management, (3) safety assurance and (4) safety promotion. Each of these components has between two and five elements. ICAO has suggested that SMS differs from traditional quality management systems in that SMS is focused more on the safety, human and organizational aspects of an organization, rather than on the end product. Under the ICAO model, the objective of SMS is to identify the safety hazards the organization must confront during delivery of services, and to bring the safety risks of the consequences of these hazards under organizational control.

MARPA COS Guidance Reflects Many of the Elements of SMS

So what is Continued Operational Safety for manufacturer? Really, it is the process of using the latest proven system of processes and procedures to help support the safety of the aerospace product or article being produced by the manufacturer.

COS benefits aircraft operators and the maintenance community by providing immediate safety benefits (a safe and compliant product or article) as well as by ensuring that the manufacture has committed resources to the continued support of the product or article. Many people who buy aircraft parts from manufacturers are asking the manufacturers about their COS programs to make sure that the programs meet the safety needs of the industry.

Looking for more details? The MARPA COS guidance is available for free on MARPA's website at http://pmaparts.org/gvt/COSGuidance.pdf. It provides an in-depth look at the elements of a modern COS program.

Want to learn more? Then please register for the MARPA Conference, which will take place in October at the Las Vegas Renaissance Hotel (next door to the Convention Center). AM

BY RUS SUTARIA

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

Delayed Re-Delivery of Leased Aircraft Can Maintenance Managers Do More?

The general and positive mood of the air-transport economy with spectacular numbers of aircraft orders exceeding the 500 barrier at the Dubai Air Show this fall is indeed good news. A large proportion of these new aircraft will undoubtedly fall under leasing contracts.

It is a common fact that more than 80 percent of aircraft re-deliveries following the end of an operating lease are delayed by seven days or more. The over-arching causes of these delays invariably fall within the remit of aircraft minimum return conditions, and the more mundane duties surrounding continuing airworthiness and their associated practicalities. It is not often appreciated by aircraft maintenance managers that the issues surrounding aircraft re-delivery should be considered even before the new aircraft is specified and much less delivered.

The key problematic areas include redelivery conditions, MRO management, paint, materials and the biggest issue involving the passenger cabin. However, further delays have also been caused by incomplete, inaccurate or plain-missing technical records, specifically these are technical records that are associated with component changes, borescope inspections and subsequent failure rectification, structural repairs, landing gear, engine/APU and other knock-on issues caused by the outsourcing of aircraft maintenance.

The fundamental issue is one of how to address the operational, logistical, administrative and technical care of an aircraft at the beginning, during and towards the end of its operating lease. To this effect, maintenance managers must consider both contractual obligations to the lease as well as regulatory obligations to Continuing Airworthiness. If operators are leasing aircraft for first time...Sorry guys and girls...your lives just got more complicated!!

The specification of the aircraft must be correctly balanced between commercially utopian needs, and financial as well as technical requirements. Maintenance managers and lessors generally share the same technical and compliance interest, and can act as the operators' conscience and either question or distinguish on-board features that are need-to-haves from those which are nice-to-haves. To emphasize the point, aircraft standardization and transferability is of principally the interest to the lessor when considering subsequent aircraft leases over the 25-year life of the aircraft.

It is understandable that the lessor will want to see certain features in terms of the presence or absence of critical items, in terms of minimum return conditions, as this either has a positive or negative effect on the aircraft's commercial value, and on-going leasability.

However, there is a more important point that the maintenance manager must consider from the outset of identifying and ultimately leasing an aircraft. The simple rule that an aircraft with a standard and transferrable specification will mean low lifetime costs, optimized asset value for the lessor and ultimately the lowest possible lease cost for the operator.

Potentially, the main source of delay to any aircraft re-delivery invariably involves the aircraft's technical records. "Aircraft records are a frequent source of conflict and disagreement between airlines & lessors at redelivery," Brian Dowling of SMBC Aviation Capital (formerly RBS Aviation Capital) once stated.

This sort of conflict always costs a significant amount of time and ultimately money for the airline re-delivering the aircraft. On average, re-delivery delay can be as much as 7 to fourteen days, and is a painful sting in the tail for the airline trying to give the aircraft back to the lessor. Any lessor will tell you, that the true value of their aircraft mainly lies within its accompanying paperwork, so where missing records relating to continuing airworthiness are concerned, these guys get very nervous, on the basis that they may have an unsellable or unleasable aircraft on their books.

Maintenance managers sometimes miss the contractual criticality of this point, and should be continuously involved with the validity of the aircraft's technical records whilst taking lessor considerations into account. With any complex airline operation, there is an unfortunate tendency for aircraft and component technical records to end up in a number of different locations that are both official and unofficial.

Where planning and maintaining technical record storage is concerned, the maintenance manager together with his or her technical records colleagues must bear in mind, the temporary nature of the aircraft as a part of the operators' fleet.

In the ideal world, technical records should be warehoused either physically or electronically in one place, and under individual aircraft types. There should be no excuses in this day and age with complex tech records management systems that facilitate easy access to aircraft technical data in multiple locations. Perhaps lessors should take the lead on this point, and consider the introduction of their own data warehousing facilities.

This allows the technical records to remain electronically centralized and completely removes the issue of lost hard documentation. To this effect, the complexities of aircraft redelivery planning from both the operator's and the lessor's perspective are immediately reduced, where the technical records audit is concerned.

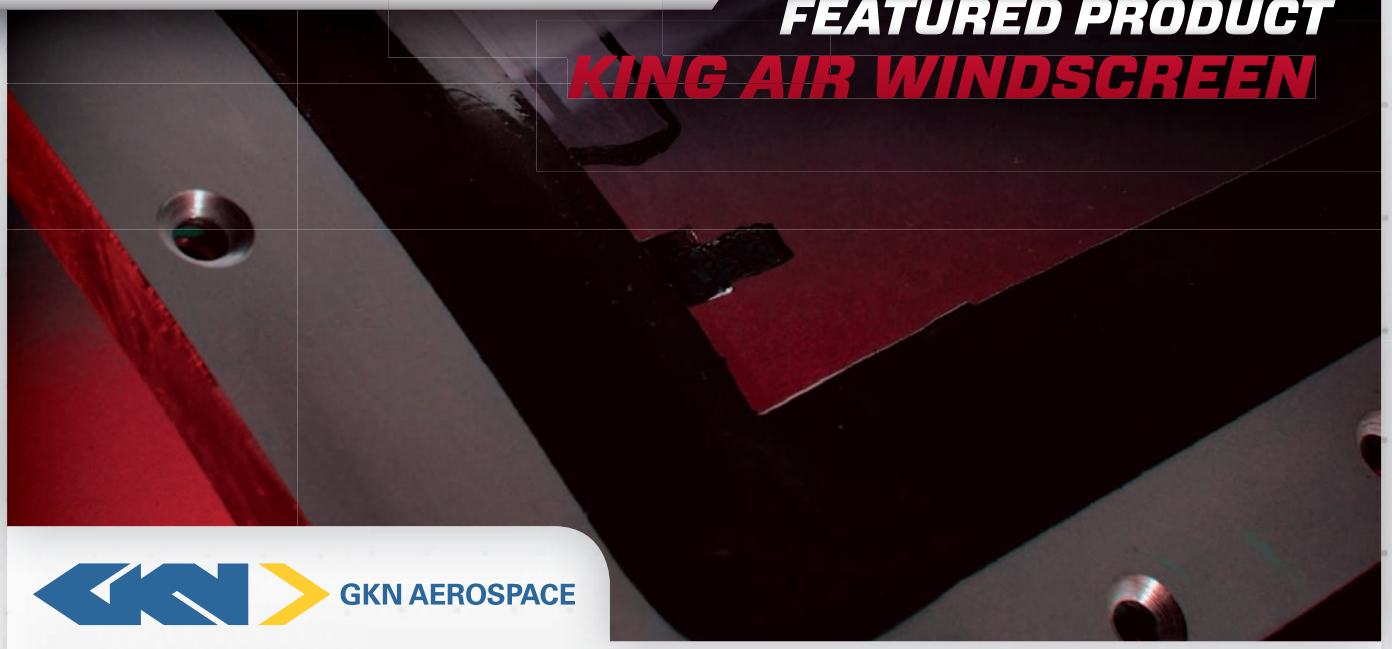
The maintenance manager must now consider incorporating complex cloud-based maintenance software solutions into the overall CAMO strategy, whilst simultaneously ensuring that their suppliers utilize similar or compatible systems for the recording, transmission and storage of technical records data.

Aircraft maintenance managers must increase their involvement with the aircraft lease before, during and after the fact. They must be an integral part of the development of the aircraft's specification, and assume the balancing role with regard to need-to-haves and nice-to-haves. Finally, assume a centralized role, ensuring smooth operation and ultimately redelivery on-time, when he physically hands the keys back to the lessor. AM

GLOBALPARTS.aero

EXCLUSIVE DISTRIBUTOR FOR GKN KING AIR WINDSCREEN

FEATURED PRODUCT
KING AIR WINDSCREEN



GKN AEROSPACE

The GKN King Air windscreen is produced using only new parts that include a number of proprietary improvements in sensor performance and heater uniformity. Through process improvements, use of superior materials and design upgrades, GKN King Air windscreens are able to provide greater reliability.

Key Capabilities Include:

- *Superior wire grid for improved powered optics & service life*
- *Spare sensor for increased redundancy (fail/safe operation)*
- *Static tab design to eliminate static discharge heater burnout*
- *Over 15 years of in-service performance history*

CONTACT US

WWW.GLOBALPARTS.AERO

+1.316.733.9240 ➤ RFQ@GLOBALPARTS.AERO

24-HOUR AOG LINE: +1.316.351.5511

Your *ONE SOURCE* Aviation Parts Solution ISO/ASA Accredited

AIRFRAME | AVIONICS & INSTRUMENTS | BRAKES | LANDING GEAR

ROTABLES | WHEELS | WINDOWS | ACCESSORIES

DPHM | DIAGNOSTICS, PROGNOSTICS & HEALTH MANAGEMENT

YOUR ENGINES ARE TALKING
YOU COULD BE LISTENING

Pratt & Whitney Canada's Flight Acquisition Storage & Transmission (FAST™) system allows you to synchronize maintenance events with your schedule and keep downtime to an absolute minimum. As a one-stop application for managing all aircraft performance data, FAST™ offers more than improved dispatch reliability, aircraft availability and reduced operating costs. It offers the peace of mind that comes with optimized maintenance.

Think FAST™.

DEPENDABLE ENGINES

Pratt & Whitney Canada
A United Technologies Company

WWW.PWC.CA/DPHM