

MRO MANAGEMENT

mromanagement.com

VOLUME 21 • ISSUE 4 • DECEMBER 2019

Steady progress

**Etihad Engineering is
developing new capabilities**

Gender *balance*

**The MRO industry
needs more women**

Big twin

**777-300 FREIGHTER
LAUNCHED**

In transit

Joramco continues
to evolve & expand

Building blocks

Hangars are in demand
for MRO & paint

Family values

The PW100 turboprop
market is growing

Aircraft Technical Support Services

CAE offers the following services:

- Borescope Services
- Part 21 Design Services
- Materials Procurement & Logistics Support
- CAMO Services
- Engine Leasing Support Services
- Structure & Composite Repair Review
- Technical Consultants & Engineers
- Mid-Lease & Annual Audit Inspections
- Remote Records Review Services

E: tssinfo@cae.com

T: +353 1 816 1777

cae.com/tss



EDITOR'S LETTER

Older aircraft are driving maintenance demand

Judging by the mood at MRO Europe in London in October, the industry is in pretty good shape right now. This is partly due to technical problems at Airbus and Boeing and their associated powerplant partners, which has seen older aircraft staying in service longer than expected in some cases, so generating additional maintenance work.

This increased demand has resulted in more hangars projects being planned around the world, both for maintenance and for paint. The latter market has been stimulated by airlines closing their own paint shops, forcing them into the third party market.

Of course, those older aircraft are the feedstock for the freighter conversion market and it seems there have been fewer announcements this year than before. However, GECAS and IAI have teamed to develop a freighter version of the 777-300ER and we take a detailed look at the programme. This has been dubbed 'The Big Twin' by the partners, as it will be the largest twin engine freighter aircraft. It is interesting that Boeing already has a freighter version of its yet to fly 777-X under consideration. One cloud is that air cargo volumes have decreased this year as a result of political tensions and trade wars, but the inevitable growth of e-commerce is likely to remain a strong driver of demand.

Sustainability in aviation is here to stay and one of the biggest trends is eVTOL. However, it is all a bit smoke and mirrors at the moment. There are lots of projects around but very few will ever enter service. While EASA produced certification



Above: The Network for Electric Aviation concept (photo: SAS)

standards in July, big questions hang over just how autonomous vehicles will fit into the current air traffic environment and how the public will react to them and their associated helipads. In this issue, we look at some electric alternatives for remote areas that can use existing aircraft and infrastructure and maybe have a chance to get to market faster.

Finally, as this is the last issue of the year, the MRO Management team wishes all our readers and advertisers very best wishes for a peaceful and prosperous 2020.

EDITOR

Ian Harbison

CONNECT ONLINE WITH MRO MANAGEMENT

@MROMANAGEMENT MROMANAGEMENT.COM

06



Contents

ISSUE 4 • DECEMBER 2019

58



55



03 Editor's Letter

06 Hangar talk

News across the industry

10 Training

There is a huge demand for staff in the aviation industry. Why are so few women stepping up?

16 Hangars

Capacity constraints are generating demand for more hangar space. Ian Harbison looks at some new projects and some new technology

48



22 Maintenance

Etihad Engineering continues to expand and grow its capabilities

30 Maintenance

Joramco is continuing its transformation and picking up new contracts on the way.



- 34 Components**
AAR has expanded its component repair services at its Amsterdam facility and won a repair support contract with BAE Systems
- 38 Freighter Conversions**
GECAS and Israel Aerospace Industries (IAI) have announced 'The Big Twin', a Boeing 777-300ERSF passenger to freighter conversion
- 40 Wheels & brakes**
Increased flying means increased wear and tear on wheels, brakes and tyres, which is good business for the MRO specialists

- 44 Personnel**
Computerised aircraft systems mean maintainers now need more troubleshooting skills rather than manual skills
- 48 Engines**
The Pratt & Whitney Canada PW100 turboprop engine has millions of flight hours behind it, aided by maintenance programmes designed with cost-effectiveness in mind
- 55 Sustainability**
Much is being made of eVTOL and autonomous air vehicles but the reality is very different and other electric solutions may offer better opportunities
- 58 Engines**
There is a shortage of engine MRO capacity, which requires ambition and innovation to make it through the challenges
- 63 Information technology**
AMOS MRO software has now been adopted by the main players in the Lufthansa Group
- 64 Events/People**
- 66 Subscription form/Advertising index**



EDITORIAL TEAM

EDITOR
Ian Harbison
ian.harbison@realresponsemedia.com

EDITORIAL & PRODUCTION ASSISTANT
Melina Zachariou

ART DIRECTOR
Phil Couzens

GRAPHIC DESIGNER
Denis Pobric

GROUP PRODUCTION MANAGER
Barnaby Moore
barnaby.moore@realresponsemedia.com

COMMERCIAL DIRECTOR
Josephine Bellanca
josephine.bellanca@realresponsemedia.com

SENIOR SALES MANAGER
Helga Schweissguth
helga.schweissguth@realresponsemedia.com

SALES MANAGER
Roohi Bali
roohi.bali@realresponsemedia.com

CEO
Chris Pitchford
chris.pitchford@realresponsemedia.com

For subscriptions & enquiries:

Laura Andrews
laura.andrews@realresponsemedia.com

All enquiries
+44 (0) 20 8444 2554

Printed in the United Kingdom by Micropress.
Reproduction is not permitted without the express written consent of the editor.
All efforts are made to ensure that factual accuracy is correct at time of publication.

All rights reserved. No part of this publication may be reproduced, duplicated, stored in any retrieval system or transmitted in any form by any means without prior written permission of the publishers.

MRO MANAGEMENT

Published by

Real.
RESPONSE MEDIA

St Marks Studios,
14 Chillingworth Road,
Islington, London N7 8QJ
ISSN 2059-9986

ENGINES

Trent problems continue for Rolls-Royce

While Rolls-Royce is making progress in resolving technical problems with the Trent 1000, it will still take some time before the situation is fully cleared.

There have been three significant technical issues which have affected each of the three variants of the Trent 1000 (Package B, Package C and TEN). Of the nine fixes required, eight have been designed and seven have been certified and are now being incorporated into the fleet.

A new HPT blade for the Trent 1000 TEN variant is the final modification required. However, a detailed technical evaluation of the proposed has identified that it will not deliver a sufficient level of enhanced durability. The original plan was to start incorporating the new blade in early 2020 but it will now not be ready before the first half of 2021. Even then, the new blade has a more conservative durability estimate that is lower than the initial

target but sufficient to meet the needs of customers and to update forecasts of future shop visits and maintenance costs. The company is looking to reduce the number of AOGs to single digit levels by the end of 2Q20 and will invest significantly to increase the stock of spare engines.

There are also implications for the Trent 7000, which shares much of the same core design as the Trent 1000 TEN and is intended to receive the new HPT blade as well. However, it has a younger and smaller and a less arduous usage profile in-service. While there will be a delay in receiving the modifications, Rolls-Royce has been able to plan maintenance capacity and spare engine provision appropriately to safeguard against customer disruption.

The company is also accelerating plans to grow its MRO network, with several major projects underway to deliver a near term increase in



capacity for the Trent 1000. These include part of existing sites in Dahlewitz and Montreal that will become service hubs handling Trent 1000 engine overhauls; use of an additional test bed at Dallas Fort Worth; expansion of overhaul capacity in Derby and a doubling of capacity at Heathrow.

INDUSTRY

Czech finish Finnish check

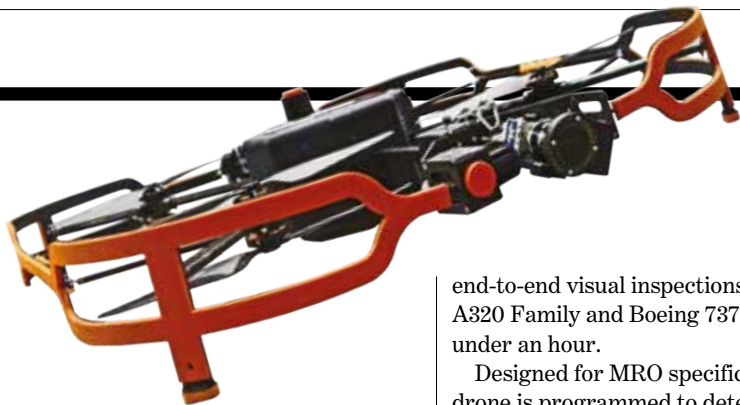
Czech Airlines Technics (CSAT) has successfully completed a two-year cabin modification and wifi network installation project for Finnair, one of CSAT's long-term Base Maintenance division clients. A total of 24 Airbus A320 Family aircraft were modified at CSAT's facility at Václav Havel Airport Prague.

The cabin work involved installation of the Safran SpaceFlex V2 galley/lavatories modification at the rear of the aircraft, allowing six to 13 extra seats to be fitted, depending on aircraft model. At the same time, CSAT workers had to reinforce the



fuselage to install the satellite antenna and radome on top of the fuselage (the service provider is Viasat using the Eutelsat network), install several Wifi Access Points and distribute cables throughout the aircraft, including the cockpit and passenger cabin.

Preparatory work took six months, involving CSAT, Finnair and Airbus, as well as suppliers. At times, two aircraft were in work simultaneously. Alongside the cabin modifications and wifi installations, regular base maintenance work was performed to make most efficient use of the aircraft downtime.



TECHNOLOGY

AAR uses drones in Miami

AAR has announced the integration of Donecle drone technology into its MRO operations. AAR's Miami facility is the first in its global network to use the fully automated drone technology to drive operational and cost efficiencies, where the pilot phase has yielded increases in speed and precision. With laser positioning, the drone can safely perform

end-to-end visual inspections of Airbus A320 Family and Boeing 737 aircraft in under an hour.

Designed for MRO specifications, the drone is programmed to detect any aircraft structural damage, as well as assess paint quality, markings and signs of lightning strike. One complete scan by a drone covers the equivalent of several maintenance tasks and personnel, conserving significant time and resources in the inspection and overall maintenance turnaround time.

AAR and Donecle have partnered on an initial 12-month technology agreement, and upon further assessment and results, will expand the platform to other MRO facilities. In compliance with Federal Aviation Administration (FAA) requirements, AAR performs manual aircraft inspections in addition to the drone inspections.

HANGARS

New life for Birmingham

STS Aviation Group has finalised the purchase of the former Monarch Aircraft Engineering (MAEL) aircraft maintenance facility in Birmingham, UK. The facility was put up for sale in March 2019. Terms of the purchase were not disclosed. It features 18,580m² of space, including ramp area, and can house two widebody aircraft or 10 narrowbody aircraft at the same time. In addition, it has several on-site component repair and back shops, vertical lift storage devices, a global reporting room and dozens of laptop mobility hubs.

In September, STS acquired Apple Aviation, based in Newquay, UK. Mark Smith, President of STS Aviation Group, said: "Thanks to the recent acquisition of Apple Aviation, we have the resources



and the manpower in place to have the facility up, running and fully operational by January of 2020 subject to the lease transfer being agreed to."

P J Anson, CEO of STS, added "The widebody aircraft maintenance facility in Birmingham is a game-changer for our company. This purchase allows us to create a central European hub, one that will stand as a true focal point for multiple STS divisions already operating in the region."

ENGINES



MTU expands into Serbia

MTU Aero Engines and the government of the Republic of Serbia have signed a Memorandum of Cooperation (MoC) establishing their close cooperation in the field of training of skilled labour. The aim is to effectively address the specific needs of the aviation industry in the curricula of vocational and trade schools. The move clears the way for an adoption of a training scheme based on the proven dual system of classroom and work-place learning for teaching people the ropes of the aviation industry.

The decision to step up cooperation comes against the backdrop of MTU's plan to open a dedicated engine parts repair facility in Serbia. MTU's new shop will be located in Nova Pazova near Belgrade and is scheduled to be up and running in the course of 2022. In support of the project, a Serbian subsidiary, dubbed MTU Maintenance Serbia, has been set up, and the first employees have already been hired. Their focus over the next few months will be on developing a workforce to meet the company's needs. While the construction of the new facility is under way, MTU will be training people for the skilled positions to be filled. This training will take place at local vocational and trade schools in Serbia and on site at MTU's facilities in Germany along the lines of the MoC now signed.

SUSTAINABILITY



ANA flies green

A

ll Nippon Airways (ANA), Japan's largest 5-Star airline for seven consecutive years,

received its latest passenger aircraft from the United States via a delivery flight that was conducted using a blend of jet fuel and sustainable aviation fuel on 30 October 2019. The brand new Boeing 777-300ER was flown from Boeing's facility in Everett, Washington to Japan, utilising sustainable aviation fuel made from waste gas-derived ethanol for the trans-Pacific flight.

ANA worked closely with LanzaTech, the producer of the ethanol-derived sustainable aviation fuel, to inspect the fuel's quality, ensure transport, and to blend the fuel for loading onto the aircraft. The success of this delivery flight is a major step toward the full-scale use of sustainable aviation in the future.

This is not the first time that ANA has utilised sustainable aviation fuel. Earlier this year, ANA purchased 70,000 US gallons of sustainable aviation fuel. ANA used this advanced fuel on commercial flights from San Francisco to Tokyo, leading to a reduction of its carbon footprint. ANA also signed an offtake agreement with LanzaTech, allowing ANA to purchase sustainable aviation fuel.



Airbus and Delta are working on their risk management scheme

TECHNOLOGY

Airbus/Delta digital alliance

Airbus and Delta Air Lines are going to form a digital alliance to develop new predictive maintenance and health-monitoring solutions for airline customers worldwide from 2020. To be accessed via a unified portal through the Skywise platform, the cross-fleet solutions will harness each member's expertise in airframes, systems and engines. Delta Air Lines will be the first user of the enriched predictive maintenance solution.

This partnership builds on an already successful platform of technical collaboration between Airbus and Delta: In 2015, Delta TechOps began working

with Airbus to develop its initial predictive program, Prognostic Risk Management (PRM), by co-designing, testing and making improvement recommendations about some of its key features. In October 2018, Delta entered into a multi-year contract with Airbus to apply Skywise Predictive Maintenance to its A320 and A330 fleets – covering around 400 aircraft. Moreover, in June this year, Airbus and Delta joined forces to offer A220 component repair and material services for Airbus' A220 Flight Hour Services (FHS) programme.

Today, Delta has an internal team of over 20 employees who assure accuracy of the predictions through the bench testing of parts and components for the predicted fault, with a success rate of over 95% for pending failure predictions. In 2010, Delta had more than 5,600 cancellations due to maintenance versus 2018, when they logged only 55 maintenance-related cancellations.

“In 2010, Delta had more than 5,600 cancellations due to maintenance versus 2018”



TRUEngine.TM Protect your asset. Think outside the box

Optimum performance isn't just about individual parts. It's about the entire engine system. TRUEngine qualification is available for CFM engines maintained to our precise standards. This assures expedited technical support, unmatched product knowledge and peace of mind. With as much as 50% higher residual value*, it's easy to see how our TRUEngine program helps to protect your overall investment.

Take part now at cfmaeroengines.com/services

*Based on CFM, GE and independent third-party research.

CFM International is a 50/50 joint company between GE and Safran Aircraft Engines





WOMEN *at work*

There is a huge demand for pilots, engineers and air staff for the future of the aviation industry. With so much room for application, why are so few women stepping up? **Melina Zachariou** reports

There are only 5% of active civil pilots worldwide who are women. This statement was brought forward by Frederica Luca, Head of communications, European Business Aviation Association (EBAA) who was amongst those who spoke at the Aviation centres of excellence event in October 2019.

The percentage of female maintenance technicians is even lower, while demands are set to rise by 769,000 according to Boeing's Commercial Market Outlook 2019 – 2038.

There is room for women. The problem is getting the message across to them, especially to younger girls.

Hosted by the British Business and General Aviation Association (BBGA) and the EBAA, the event took place with the hopes of developing tomorrow's workforce for a global community. The aim of the event was to bring together politicians and educators within the UK aviation industry to discuss a rapidly growing, critical issue: the shortage of skills within the UK aviation community. There were many important topics for discussion. There was however, one important question that stood out amongst the others: why aren't there enough women in aviation?



GO BEYOND

PW100 AND PW150

SETTING INDUSTRY BENCHMARKS

Pratt & Whitney's commitment to performance and innovation has set the standard in regional aviation. Thoughtfully engineered to consume up to 40% less fuel and generate up to 50% fewer CO₂ emissions, our turboprop engine family has the lightest impact on the environment. With industry-leading dispatch reliability and a comprehensive suite of engine services, we keep your costs low and help to propel your business forward.

EQUIP YOUR FLEET AT WWW.PWC.CA/PW100-150

A UNITED TECHNOLOGIES COMPANY



12%

Lufthansa Technik:
the percentage of this year's
new female trainees has
risen by 2% to 12%

Frederica pointed out that 30% of trained aviation professionals end up accepting offers in these different job sectors. The lack of interest in younger talent pools is down to the lack of influence and exposure in schools, and the fact that aviation is seen as a less attractive industry to work in compared to other industries.

Alongside Luca were other individuals at the event including Sandra Kelly, UK Directory of skills and policy, Lisa Almond, BAE Systems Military and Civil Training – Part 147/66 Regulatory Approval Manager and Rachel Gardner-Pool, CAA – Head of general aviation. All experts in their respective fields, and all women.

Rosalind Azouzi, Head of Skills and Careers, Royal Aeronautical Society (RAeS) was also present. During her presentation, she highlighted the fact that by becoming the middleman between employers and young people, there is

a chance to highlight the attraction and retention of younger members after education and training. Opportunities for partnerships, trailblazer groups, and STEM jobs will become more easily available through their intervention.

According to the RAeS website, the Women in Aerospace & Aviation Committee (launched in 2009) was created to encourage more young women to consider aviation and aerospace as a worthwhile and exciting career. The committee is chaired by Sarah Minett, managing director of Collins Aerospace and features a range of events from networking to seminars and the participation in the Alta mentoring programme for women.

Alta recognises that women are under-represented at the highest levels of the aviation industry. With

Top: Stansted Airport College aims to train more women as engineers
Below: Engineering has been seen as a male-dominated profession (photos: SAC)



the help of RAeS, they can reach out to provide one-to-one mentoring from successful women, and a network that's dedicated to ensuring that talented women reach their full career potential.

Karen Spencer, Principal and CEO of Harlow College and Stansted Airport College also provides future talent with the opportunity to reach full career potential. She described the key to gaining an interest in aviation was in pre-training training. "From the ages of five and eight, youngsters develop a knowledge of limitations," says Spencer. Between that time, she says it is essential to "create at least seven meaningful engagements with employers." Through Stansted Airport college, both young men and women can explore the range of opportunities available to them beyond the typical cabin crew/pilot courses.

The Go on Girl campaign (organised as a part of Stansted Airport College) is a vital organisation bringing females forward into engineering – a profession once seen as strictly male dominated. Women can access the "pre-apprenticeship in engineering operations" course which includes a certification in aviation operations at level 2. They can then progress onto level 3 and eventually land a career that could be earning them £40,000 a year by the time they are 21.

The course is championed online by employers who praise the concept. Colin Hothersall, Training Manager at Tui said: "Females are under-represented in the engineering sector, so we're keen to show this is an inclusive profession and that as an employer we welcome female talent into the business."

Mary Cooksey, Area Manager at Ryanair also added: "There are various benefits to having more females in engineering. Women tend to have the ability and the flexibility



“Females are under-represented in the engineering sector, so we’re keen to show this is an inclusive profession and that as an employer we welcome female talent into the business”

to look at things from a different viewpoint; they have strong analytical skills and a real ‘can do’ attitude, particularly in the area of avionics.”

In Europe, Iberia have also gone down the educational route by encouraging girls to join their Quiero Ser (I Want To Be) two-day event. The programme, a part of their Diversity and Inclusion Plan, gives 35 high-school students the opportunity to meet female aviation professionals in the year they start making career choices. They get to experience flight simulators used at the CAE pilot training school, visit the Iberia headquarters and meet with females in the company who have successful careers as pilots and technicians.

Of the 35 students, many are part of the Technovation Girls Movement – an online platform of entrepreneurs, mentors and educators who teach girls the skills they need to change the world with technology.

Elsewhere, at Lufthansa Technik the

percentage of this year’s new female trainees has risen by 2% to 12%. That is a percentage they still consider as too low, but they have some clever plans to boost numbers.

This year, the company decided to participate in Germany’s annual girls’ day. The event, which takes place throughout the country, provides an insight into the possibilities of working in technical professions and inspires young girls to study in those fields through an apprenticeship or university.

“On that day, we invite around 140 female pupils, aged between 12-16, so they can figure out and get excited about possible apprenticeships in aeronautical engineering fields,” explains Astrid Neben, Head of Human Resources. “Existing apprentices provide them with a first-hand look at day-to-day working life during the training.”

Lufthansa have special incentives like MINT PINK, a program where female pupils with an interest in a career in technology spend one week at their base. They have also been in collaboration with selected universities for engineering disciplines in Germany for some time.

A place on these highly sought-after programmes (available for Bachelor, Master students and graduates) is only available under one strict condition: “Our target is to achieve a female share of

between 20-30% in each traineeship programme,” says Neben.

This clever yet controversial application process nudges educators to expand more on the topic. This is done by teaching the importance and significance of engineering and maintenance careers to young girls in class. The 30% condition could also lead potential male candidates to reach out and encourage females to join up, securing their own place in the process.

On the extra mentoring programmes, the mentors are leading men in the field. By reassuring women that they have a place in what is more widely known as a “man’s profession” more job applications are likely to come through: “I place value on having men mentor women, because it provides a win-win situation for both parties – the women come to understand the perspective, approach, and strategies of the men, and the men come to understand those of the women. This enhances reflection and a leadership attitude,” says Neben.

There is still a while to go until companies discover a way to make the aviation world more appealing to women. The steps taken by the likes of Stansted college, Lufthansa and the RAeS is a steady upwards climb. The challenge is reaching the top by 2038 so that hopefully, more than 30% of the 500,000 strong demand for pilots will be women. **W**

Training the future

Corporate Affairs Director at Stansted Airport Jonathan Oates says there are 300-400 job vacancies available at the airport alone. The issue is the shortage of applicants. More than 50% of European airports are afflicted by the lack of staff that come equipped with necessary skills. There is also very little interest in the younger talent pools. It is estimated that 30% of trained

aviation professionals end up in other more attractive sounding careers.

According to the Airbus Global Market Forecast 2019-2038: “New technologies, such as augmented and mixed reality solutions, are also being tested as a way to improve student engagement, quality of instruction, and knowledge retention.”

The best way to find skilled staff is to train up younger audiences. At Stansted Airport College, students can select from a selection of pre-apprenticeship pathways providing the essential skills that set up students for entry level jobs such as hand skills and self-presentation. It also offers

30 hours of work placement during the chosen course and hands-on experience on a Bombardier Challenger 600 jet aircraft donated by The Inflight Jet Centre. With only 500 spaces available at the College each year, Principal Karen Spencer has received 450 applications already for 2020.

KLM UK have recently sponsored the Norwich Science Festival and engaged with both boys and girls about careers in aviation. They soon realised the need to work with them at a primary school level to reach them early. They also held an Apprenticeship & Careers event in November to try and recruit.

A man with short brown hair and a light beard, wearing a white button-down shirt, stands in the foreground of a large aircraft hangar. In the background, a large aircraft engine is being worked on, and the hangar's structure with blue beams and lights is visible.

EXCELLENCE

IS CONSTANT ACTION, NOT A POSITION.

At Lufthansa Technik, excellence is part of our corporate DNA. For more than six decades we have been providing the technology that keeps fleets flying and turns a good aircraft into a great one. Today, we are proud that our company's name is synonymous with high quality and in-depth knowledge. And we continue to shape the aviation industry – by embracing new challenges and exceeding our customers' expectations.

CSABA MÉDER • MAINTENANCE PROJECT LEADER

Excellence in Motion



Lufthansa Technik



Building BLOCKS

Capacity constraints are generating demand for more hangar space. **Ian Harbison** looks at some new projects as well as some new technology

Left: A series of 7.5m diameter tubes inflate to form the hangar (photo: Buildair)

With a booming airline industry, increased maintenance requirements have led to a shortage of hangar slots. In addition, the number of aircraft being rebranded to changing operators is putting further pressure on available spaces.

Buildair

Buildair Engineering & Architecture recently completed the largest inflatable structure in the world – the 6,000m² Hangar H75 is located at the Saudia Aerospace Engineering Industries (SAEI) facility at King Abdul Aziz International Airport (KAIA) in Jeddah, Saudi Arabia.

The company forms its structures using 7.5m diameter tubes made from fire-retardant PVC-covered fabric, which are kept inflated at a relatively low pressure of 20-22mb by blower motors (the number depends on hangar size). Hangar H75 has external dimensions of 90m x 95m x 34m, and internal dimensions of 75m x 80m x 26.5m, big enough to hold an Airbus A330 or Boeing 777-200 on jacks. The structure has been anchored to an area of specially

constructed apron, with no foundations required. Initial inflation and quality checks were carried out in Spain in June 2018, says Felipe Cano, Commercial Director. A year later, on site in Jeddah, after three weeks of preparation, inflation took about two hours, with a couple of pauses to check progress.

Given the harsh climatic conditions in Saudi Arabia, including sand storms, there are four high-capacity air conditioning units in the hangar, capable of producing 300,000m³/hour of cool air, so when the twin doors are opened to pull in an aircraft (they are parked nose in) or to remove it, the temperature quickly returns to a comfortable level after they are closed.

As further protection, operational parameters (such as wind speed, inflation motors rpm, internal pressure of tubes) are automatically monitored 24/7 by the Telematic Control System, which relays any discrepancies to a control centre and advise the hangar operator in case any action has to be taken.

An infra-red fire detection system is backed up by six mobile firefighting vehicles that produce compressed-air foam, a more effective suppressant than water-based foams. Two lateral emergency exits allow quick staff evacuation in case of emergency.

Fahad Gadhei, VP Commercial Services at SAEI says the hangar received General Authority of Civil Aviation of Saudi Arabia approval on 24 October, with the first aircraft, an Airbus A330-343 of Saudi Arabian Airlines, arriving six days later.

The hangar was originally intended for the maintenance of Lockheed Martin C-130 Hercules transport aircraft, but a contract award from Saudi Arabian Airlines for C checks on A330 and Boeing 777 aircraft led to a change of role. As this is a temporary building, no docking has been installed. Instead, it is equipped with steps and electrically powered ground support equipment.



Buildair Engineering & Architecture's Hangar H75 in Jeddah – the largest inflatable structure in the world – takes just two hours to reach its full capacity of 6,000m², with no foundations required

ALL PHOTOS: BUILDAIR

Buildair is also working an R&D project at Lleida-Alguaire Airport, about 140km north of Barcelona. This will see the erection of a building with tubes that are completely sealed. Solar panels will be fitted to power the back-up motors if a significant pressure drop is detected. An aviation application would probably be for deployment of a temporary hangar to a remote airfield where an aircraft may have suffered damage or diverted with an engine failure, although it could also be by other industries, such as construction or mining.

The background of the advertisement is a photograph of an aircraft's landing gear assembly, specifically the main wheels and struts, with a green color overlay. In the upper left, the text 'TP Aerospace' is written in a white, italicized sans-serif font. The central focus is the large, bold, white text 'WHEELS AND BRAKES'. Below this, the phrase 'IT'S THAT SIMPLE' is written in a smaller, white, italicized sans-serif font. At the bottom, there is a decorative horizontal band of white diagonal lines. To the right of this band, the website 'TPAEROSPACE.COM' is printed in a small, white, sans-serif font. In the bottom right corner, there is a white line-art illustration of a wheel hub with multiple bolt patterns.

TP Aerospace

WHEELS AND BRAKES

IT'S THAT SIMPLE

TPAEROSPACE.COM



“The primary benefit of this design compared to conventional cross or down draft designs is significantly reduced energy costs”

Jewers Doors

Jonathan Jewers, Director, says business is good, although the commercial aviation sector is currently a bit depressed, with business and military projects generating the greatest demand.

One military project that is nearing completion is of interest through the use of horizontal air flow (cross draft), unlike many paint facilities that use vertically descending air (down draft).

George Bristol, President of Morehead Industrial Services, which is responsible for the design of the system, explains that cross draft has been shown to produce fewer defects than down draft, which can suffer from eddy currents that distort the spray pattern, particularly over the wings. Several aerospace manufacturers and most military paint shops have moved in this direction, given the operating cost and technical advantages.

This particular facility is a recirculating cross draft design that is often referred to as an 80/20 booth, indicating that approximately 20% of the total air volume moving through the working space is constantly being exchanged with fresh tempered air from outside, while 80% of the total air volume is being recirculated.

The primary benefit of this design compared to conventional cross or down draft designs, which exhaust 100% of the process air, is significantly reduced energy costs, especially when the booth requires air conditioning as well as heat and humidification control. The actual fresh-air-to-recirculated ratio may vary, says Bristol, based on environmental calculations that are run to verify booth space conditions meet environmental regulations for personal exposure levels.

The hangar doors are insulated with external cladding to ensure minimal heat or cold from outside is transmitted. 20% of the air mix is drawn in from outside, filtered, conditioned and heated or cooled as necessary – ideal conditions in a paint hangar are a temperature of 24°C and a relative humidity of 50%, allowing the paint to be used without any additives to compensate for atmospheric changes. The recirculation fans push the booth air mix into a distribution plenum running over the top of the door.

The air entering the plenum doors moves into the booth through dispersion filters installed in the face of the doors. These filters create enough additional static within the door plenum to help equalise the flow into the booth

to yield laminar flow throughout the facility cross-section. The recirculated air mix can be sculptured to match the silhouette of aircraft being processed to further reduce energy demands or to match airflow characteristics over the aircraft. This can be achieved by simply blanking off filter racks as required to reduce the number of filters utilised.

The exhaust plenum is situated on the opposite end of the booth and utilises three-stage NESHAP rated filters generally required for the aerospace industry. These filters are a key element of this design as they are rated to filter out 98% of all paint particulate over 2.5 microns in size.

The exhaust fans are ducted to pull the majority of the booth exhaust air (20% of the total booth air volume) from the lower areas of the exhaust plenum, as Volatile Organic Compounds (VOC) being emitted from the painting process are heavier than air and thus sink as they approach the plenum.

Hence, 20% of the booth air entering the exhaust plenum is extracted directly to atmosphere after moving through NESHAP filters, with the remaining 80% pulled through the recirculation fans. The fresh tempered 20% replacement air is mixed with the booth air being recirculated as it moves into the hangar door supply air plenum.

The facility is designed to meet breathing air standards set by the US Occupational Safety and

Above: With eight plenum door leaves, the hangar can hold an Airbus A330
Below: Paint curtains divide the space to tailor outside bays for smaller aircraft
(all photos: Jewers)





Health Administration, which calls for the booth air to be clean enough for workers not to wear masks (although they always do).

Both companies have worked on plenum door designs in the past, says Jewers, but this has typically been for fighter aircraft or higher end corporate jets. The significance of this facility is its size – the hangar is 70m x 73m x 21m with eight plenum door leaves. It can handle aircraft up to the size of an Airbus A330, with two paint curtains dividing the space into three bays, the outside bays being tailored to smaller aircraft. That means it has potential for commercial MRO applications.

KF Aerospace

KF Aerospace opened its first widebody aircraft hangar in November at Hamilton International Airport, Ontario. The 6,970m² hangar can hold six concurrent lines of narrowbody aircraft maintenance, or up to three widebody aircraft.

The building was completed in less than eight months and is the centrepiece of a \$40-million investment that includes new workshops and a campus for the Mohawk College Aerospace Training Hub. The hangar is 87m wide by 80m deep with a 20m high ceiling. KF began hiring earlier this year in preparation for the hangar opening, and has already welcomed an additional 60 staff. With 200 currently at the base, KF is planning to grow to over 400 staff in Hamilton by 2022.

“With airlines closing their own paint facilities and major carriers undergoing rebrands, fleet repainting is a necessity”

IAC

Another paint hangar will open at Shannon Airport in Ireland at the end of 2019. International Aerospace Coatings (IAC) is building a new 7,000m² aircraft painting facility measuring 90m x 80m x 30m, able to accommodate widebody types up to and including the Airbus A380 and Boeing 777X. The new facility is being built next to the company’s existing two-bay narrowbody hangar.

Patrick Donnellan, VP Sales, explains there is increasing demand for these aircraft to be painted. Part of this comes from airlines closing their own paint facilities and the number of heavy maintenance checks that require a full strip of an aircraft are set to increase. In addition, some major carriers are going through livery changes and rebrands which mean a fleet repainting is a necessity.

Along with airline fleet repaints, many other aircraft flying are transitioning between customers at the end of a lease, so the aircraft must be painted into the livery of the onward customer. Ireland is a global leader in aircraft leasing, so many of the world’s aircraft are transitioned through Ireland at MROs and painted there.

The hangar will operate 24/7 and the likely throughput will be between 60-80 aircraft depending on the hangar configuration. It will also have a central paint curtain that means it can be used simultaneously for two narrowbody aircraft. Donnellan explains IAC often has nose-to-tail contracts covering a number of aircraft, so flexible capacity is essential. At the same time, they can contract other single input events such as regional aircraft or VIP repaints. He notes demand for painting is strongly driven by the winter peak season for maintenance, and 90% of work at this time of year in terms of volume can be A320/737 aircraft.

MAAS

MAAS Aviation is due to start construction this winter of a dedicated multi-bay aircraft paint facility at Kaunas Airport, Lithuania. The company has rented an area in the northern part of the airport following an auction. The multi-million euro investment will see a 12,000m² hangar start operations at the end of 2020. The paint bays will cater for single aisle aircraft up to Airbus A321/Boeing 737 size. The project is a further development phase of aircraft MRO activities at the second largest airport in Lithuania.

Tim Macdougald, CEO MAAS Aviation: “Kaunas is an excellent location for aircraft painting and the presence of FL Technics and other base maintenance operators [Kaunas Aircraft Maintenance Services and DOT] at the airport combined with a skilled labour pool and supportive governmental agencies were key in our decision to commit. I would like to thank the Lithuanian Airport Authority and Invest Lithuania for their contributions in making this venture possible.”

Above: A Boeing 737-800 and an Airbus A321 of Air Transat in the new KF Aerospace hangar in Hamilton (photo: KF Aerospace)



LEASES

Guaranteed.

As the world's largest CFM56 engine lessor,
we have what it takes to cover your fleet.

The CFM56 and LEAP engine specialists.
Go to www.ses.ie

SES is a wholly owned subsidiary of CFM International

SES
Power to Fly Now



STEADY
PROGRESS



Etihad Engineering continues to expand and grow its capabilities. Ian Harbison reports

With 2019 looking like a record year, Frederic Dupont, Vice President - Technical Sales & Customer Service at Etihad Engineering says the company (recently rebranded from Etihad Airways Engineering) is facing a capacity challenge at the moment, as work continues to roll in. It has managed to add additional apron space, with parking for up to 10 widebody aircraft, and the space currently occupied by AMMROC next door will become available when the military MRO moves about 100km south east to Al Ain. However, Etihad is planning a new facility rather than taking over those facilities, so there will be a construction lead time. He suggests

there are two alternatives – erection of a temporary structure in Abu Dhabi or acquisition of an MRO facility elsewhere.

Part of the demand comes from being part of the Airbus MRO Alliance and a centre of excellence for the Airbus A380. As the aircraft entered service in October 2007, there will be an increasing number of complex 12-year (12Y) checks coming up. Experience has been gained on aircraft from Etihad Airways and third-party customers in the Middle East, Asia, Europe and Australia and next year will see three aircraft from one of these carriers arrive with the work to be carried out alongside a major cabin configuration.

Earlier this year, it received UAE General Civil Aviation Authority (GCAA) for the A350. The first aircraft for maintenance came from long-term client LATAM Airlines group. This was for a C check and modifications, followed by full stripping and painting of the aircraft in LATAM's livery. The airline deliberately runs a nose-to-tail programme to minimise ferry flights, with aircraft arriving in Abu Dhabi having carried out a flight from South America to Europe, then departing after maintenance in time to operate the return flight.

However, this check was carried out in January at Tarbes in France. The company had signed an MoU with TARMAC Aerosave (an industrial group specialising in aircraft maintenance, storage and recycling, owned jointly by Airbus, Safran and Suez). An Etihad Engineering team flew from Abu Dhabi to carry out and support the check, receiving hands-on Part 147 training in the process, ahead of the first local check in March. The MoU also covers the provision of Part 145 maintenance services and products to customers around the world. The next step, he says, is to achieve A320neo Family approval.

An international development earlier this year was a collaboration agreement with Argentina's main aircraft manufacturer, Fabrica Argentina de Aviones (FAdeA), to provide narrowbody aircraft maintenance services at FAdeA's facility in Córdoba. This is a logical step, he explains, as Etihad Engineering has a

Etihad Engineering is a centre of excellence for the Airbus A380 (all photos: Etihad)



After 12 years in service, Airbus A380s face complex checks. The market is about to emerge

“The ‘Etihad Greenliner’, to be introduced early next year, will be used by both companies to explore and assess environmental sustainability initiatives”



Dupont says Etihad has a focus on efficiencies driven by technology, but is also expanding its component repair

strong customer base in Latin America, having carried out heavy maintenance work on Airbus A330, Boeing 767, 777 and 787 for customers in Argentina, Brazil, Chile and Colombia. In addition, Etihad Engineering will be FAdA's preferred partner for Part 21J Engineering and Part 21G Production.

The first maintenance contract was with LAN Argentina for cabin reconfiguration on seven Airbus A320 aircraft. To date, there have been more than 20 inputs, including 6Y checks.

He says the company has a focus on efficiencies driven by technology, and it has set up an innovation steering committee to identify opportunities and to build a development roadmap. It also has a Design, Engineering and Innovation department.

Another area for development is component repair, where the company is expanding its portfolio. An example is a 15-year agreement signed at the end of 2018 with Moog, which sees the OEM provide global access to its component pool as well as complete repair support

on a range of part numbers fitted to the Etihad fleet. The agreement also provides for support to expand the MRO's component capability onsite, which will improve its offering for third-party work.

Going Green

Etihad Airways and Boeing have announced an 'eco partnership', in which a specially themed Boeing 787 Dreamliner will be used to test products, procedures and initiatives designed to reduce aircraft carbon emissions.

The 'Etihad Greenliner', to be introduced early next year, will be used by both companies to explore and assess environmental sustainability initiatives while the aircraft operates scheduled services across the airline's network. Other stakeholders, from equipment suppliers to airspace regulators, will be invited to join the companies in advancing and testing efficiency measures on or with the 'Greenliner'.

Tony Douglas, Group CEO of the Etihad Aviation Group, said the blended green-blue design for the aircraft represents the importance of water in Arabic life and culture and symbolises the 'blue sky' thinking needed to deliver practical, incremental initiatives to progressively lower fuel consumption and carbon emissions.

Working groups will be formed between the flight operations and engineering arms of both companies, with senior pilots and engineers from Boeing's 787 Division leading sessions at Etihad's Abu Dhabi headquarters to identify and explore more emission-reducing measures, from changed operating practices to weight-saving initiatives.

**WE ARE ENGINEERS
OF EXCELLENCE.**

Climbing higher. Together.

For more than 60 years, we have been representing excellence in aviation. Our developments shape the industry. The quality of our products enjoys the highest recognition worldwide - from cabins to systems. It is this multifacetedness that makes our company so strong. And we use it to work side by side with our customers. For mutual success.

www.diehl.com/aviation



BEYOND MRO

CUSTOMIZED MRO SOLUTIONS
TO KEEP YOU FLYING

For over a century, customers have relied on StandardAero as the industry experts for operational efficiency, innovation and custom MRO solutions. Today, our company is **Bigger, Better and Bolder** – committed to providing engine support for our airline, governmental and business & general aviation customers!

Our Airlines & Fleets team proudly supports your engine needs:

• **AE 3007** • **APS2300** • **CF34-3/-8** • **CFM56-7B** • **GTCP36**
• **JT15D** • **PT6A** • **PW100** • **PW150A** • **RB211-535** • **RE220**

Come visit us at:

MRO Latin America (Cartagena, Colombia, January 22-23)

Singapore Air Show 2020 (Singapore, February 11-16)

www.standardaero.com



StandardAero



The new partnership between Etihad and Boeing builds upon their existing membership of Abu Dhabi's Sustainable Bioenergy Research Consortium (SBRC), an academic and industrial cooperative whose members also include Khalifa University, Abu Dhabi National Oil Company (ADNOC), and the specialist technology groups Safran and Bauer Resources.

The SBRC is working to develop commercial quantities of biofuel from saltwater-tolerant plants, and the first commercial service to use this fuel was an Etihad Boeing 787 flight from Abu Dhabi to

Above: Earlier this year, Etihad Engineering received UAE GCAA approval for the A350
Below: The 'Etihad Greenliner' with its distinctive new colours



Amsterdam in January this year.

A second Boeing 787 'eco flight' from Abu Dhabi to Brussels will take place during Abu Dhabi Sustainability Week in January 2020, incorporating a wide range of environment-focused initiatives.

Etihad Engineering is also involved with the Boeing ecoDemonstrator, a 777 flying testbed, which was in Frankfurt recently for a two-day visit as part of its flight test programme.

This was an opportunity to test and present its intelligent and smart cabin, i+sCabin, for the first time. The i+sCabin has been developed by an international consortium initiated by Etihad Engineering. It enables the exchange of cabin health and significant operation data through a new intelligent communication standard. This leads to faster dispatch times, higher reliability of cabin functions and enhances operations for crew and maintenance teams.

The key goal of this project is to facilitate the collection and exchange of information in order to generate a real-time overview of the status of all aircraft cabin areas. This information will then be used to create correlations and

algorithms to predict potential faults by individual functions and the corresponding maintenance works that would be required – a revolutionary concept considering the fixed maintenance cycles that the industry currently has to contend with.

A major pillar of this research was the creation of a new standard protocol for cabin communications, in which cabins can be equipped with new and improved functions. Innovative products and applications will be integrated more quickly and additional maintenance and operation predictions will be available. New software applications are envisaged for the different user groups such as maintenance teams, cabin crew, network operators, maintenance planners and more.

The research project is in line with the industry's focus on the future role of the cabin in the aerospace industry. The consortium partners in addition to Etihad Engineering include Boeing, Bühler Motor, Diehl Aviation, Jeppesen, KID-Systeme Safran company and university partners Baden Württemberg Cooperative State University and Hamburg University of Technology.

The project was funded by the German Ministry of Economy and nominated as a cornerstone for further cabin developments.

The i+sCabin is progressing on schedule since its launch in 2018, with the main milestone of implementation and testing of the first version of the cabin communication standard at the end of this year, and project finalisation planned for 2021.

3D PRINTING

With faster production times and reduced weight parts, 3D printing is integral to developments in aviation

Etihad Engineering has made a major investment in 3D printing. It first received Part 21G Production Organisation Approval (POA) and Part 21 J Design Organisation Approval to 3D print with filament technology in 2017 and was the first airline MRO in the world to certify, print and fly 3D printed cabin parts. This started in January 2017 with a partnership agreement with Strata and Siemens. Strata has a local manufacturing plant in Abu Dhabi and a cooperation agreement with Siemens that could lead to the development of a strategic three-year joint roadmap for the further industrialisation of additive manufacturing in the UAE. This comes under the country's Vision 2030 national development plan, in which the airline and MRO are also involved. It also worked with Diehl Aerosystems to successfully develop an IFE control unit cover plate, which has been installed in economy seats on several aircraft of a Middle Eastern third party customer.

A development late last year was the signing of a strategic partnership with German company Electro Optical Systemas (EOS), a leading technology supplier in the field of industrial 3D printing. The initial phase of the collaboration included the qualification of machine, process and materials to aviation regulatory requirements. After certification of the additive manufacturing process, further developments include working with EOS to develop, test and qualify new polymer materials.

This has already resulted in a new product for a third party customer, which is a blow out panel in the lower cabin sidewall. Conventional injection moulded components are flexible and so susceptible to damage by passengers. With additive manufacturing, the panel is extremely rigid and robust, giving greater durability.

The latest step was the opening in November of the region's first additive manufacturing facility at the Etihad Engineering facility. This has been developed in collaboration with EOS and BigRep, another 3D printing technology provider.

The primary machine is an EOS P 396 powder bed fusion technology system. This uses a laser to create a 3D part one layer at a time by sintering a fine thermoplastic powder such as EOS's PA 2241 FR. The system enables the tool-free manufacture of serial components, spare parts, functional prototypes and models directly from CAD data. These can be up to a total build volume of 340mm x 340mm x 600mm. In contrast to traditional manufacturing processes, it enables faster production and reduced weight of parts. EASA approval for powder bed fusion 3D printing technology was received in October 2019.

The second machine is the BigRep ONE, one of the largest, serial-built industrial thermoplastic extrusion 3D printers. It is designed for the manufacture of large parts, jigs and fixtures as well as moulds. It uses fused filament fabrication (FFF), in which a single filament of material is deposited via a moveable print head to build the component. The BigRep ONE has a build volume of 1.05m x 1.05m x 1.05m. In the next phase a BigRep PRO, the most advanced large-format FFF 3D printer, will be installed, which has a build volume of 1500mm x 800mm x 600mm.

The newest system installed by EOS produces serial parts from polymer materials and enables the manufacture of cabin parts for an aircraft during a C check. Cabin defects can also be rectified within a short turnaround time which allows for the production of the required cabin parts during line maintenance. **M**

“Etihad was the first airline MRO in the world to certify, print and fly 3D printed cabin parts”



Right:
An additive manufacturing 3D printing lab

JORAMCO

Committed to
Excellence

A **QEP** COMPANY

YOUR TRUSTED MRO PARTNER



EASA Part 145
+ 25 Additional National Approvals

15 Lines of Maintenance

Aircraft Capabilities



- B737 (Classic, NG and MAX)
- B787-800/900
- B777-200/300



EMBRAER

- E170
- E190
- E175
- E195



AIRBUS

- A300-600
- A330
- A310-200/300
- A340-200/300
- A320 Family
- A320neo



IN TRANSIT

Joramco is continuing its transformation and picking up new contracts on the way. **Ian Harbison** reports



Since being taken over in 2016 by Dubai Aerospace Enterprise, Joramco has been on an upwards trajectory, winning contracts from major airlines like the Lufthansa Group, Gulf Air and South African Airways (see MRO Management, December 2018).

This has come from a combination of increased investment and an influx of experienced senior management. The company is now engaged in the second stage of its transformation programme.

In 2019, it has been expanding its aircraft capabilities. EASA approval for Airbus A320neo (LEAP) came in February, along with Boeing 737 MAX, followed by FAA approval for the A320neo in March. That month also saw approval by Airbus as an MRO station for

A300/310/320/330/340 – an important step, says Fraser Currie, Chief Commercial Officer, as it means the OEM can allocate work to Joramco on behalf of its customers, such as mandatory modifications. Projects so far have included an A320 lateral windshield frame replacement and installation of an improved bushing on an A330 main landing gear Rib 6 lug bore. The windshield frame replacement was particularly complex, involving skin panel removal for access to the basic aircraft structure.

In April, the first Boeing 787 C check was carried out for Royal Jordanian Airlines. This was followed by out of phase work on five 787s for Kenya Airways, including the upgrade of IFE wiring systems and PSU oxygen modules, and C checks on two 737-800s, which led to a heavy maintenance agreement for seven 787 heavy checks and modifications between January and September 2020.

The next significant project was a complete cabin reconfiguration for five A330 aircraft of Brussels Airlines. This included new seats, galleys, IFE system and LED mood lighting. In addition, modifications included improved cargo bay ventilation and ADS-B Out. The first ADS-B Out installation was carried out earlier in the year on a Boeing 737 Classic VIP aircraft.

In September, EASA A320neo approval was expanded to include the PW1100G-powered variant. The company also received EASA Boeing 777 approval – with a large number of aircraft in the region, says Currie, this is seen as a strategic move, with very good potential from a wide geographical region.

A recent success has been a new base maintenance agreement with low cost carrier Ryanair, which will see two parallel lines of Boeing 737 NG work running between November this year and the end of March 2020. The work includes 8Y and 14Y checks. In preparation, the company sent a team of engineers to Ryanair's maintenance facility at Prestwick in Scotland for two weeks of training.

Top: Ryanair and Kenya Airways have been two recent successes (all photos: Joramco)



Another low cost, and long-term, customer is flydubai, which is currently using the Amman facility to install Split Scimitar Winglets from Aviation Partners Boeing on most of its Boeing 737-800 aircraft. The first installation was completed in late September and the programme is expected to finish by October 2020. Some of the flydubai work will be under a heavy maintenance agreement that Joramco anticipate being up to 45 C checks and Entry Into Service checks from January 2019, including avionics and cabin modifications, and installation of connectivity from Global Eagle.

The amount of structural work has led to a partnership with US-based GDC Engineering for Part 21J Design modifications. In the hangar, there are plans to introduce a new cabin maintenance station with a docking system for L1/L2 door access on narrowbody and widebody aircraft linked to a mezzanine area with an industrial lift to move components and a racking system.

The latest heavy maintenance contract is with Corendon Airlines, the Turkish leisure carrier, for four 737NG during winter 2019/20. With this work, there will be a total of six 737 lines in Amman. Slotting in alongside will be three C checks

“Some of the flydubai work will be under a heavy maintenance agreement that Joramco anticipates being up to 45 C checks and Entry Into Service checks from January 2019”

between December and February on two Airbus A300 and one A330 freighter aircraft of MNG Airlines of Turkey.

As well as aircraft types, the company is investing in equipment, processes and people. EASA approvals now include TIG and spot-welding, while an MoU has been signed with Testia, an Airbus company, to explore the use of smart inspection tools such as the SmartUE1 ultrasonic & eddy current instrument and ThicknessTool for the measurement of the remaining thickness in large blended out areas.

It has recently received BS EN9110:2018 - Quality Management Systems certification, the first independent MRO in the region to do so. He describes this as a ‘holistic health check’ on the business. As part of this, all departments are now using

Q-Pulse from Ideagen for core quality and safety functions. This is also available to key customers. Q-Pulse Risk assesses the data to provide management with detailed visibility of risks throughout the business. Procedures manuals have been completely redesigned, using flow charts that are easier to interpret, helping employees to be more aware of quality issues. Another software acquisition has been FleetCycle MRO from EmpowerMX. Now the core system, it assists the business in becoming paperless throughout the facility, which should help to reduce turnaround times while improving efficiency and forecasting.

Lean has not been forgotten, with Green Belt Lean Six Sigma training for several management staff; a reorganisation of the supply chain department for greater efficiency; and the establishment of a handling team solely responsible for delivering tooling and equipment to the hangars, instead of being part of the ground servicing equipment department. That department has seen delivery of new widebody maintenance access steps.

Finally, to enhance the MRO's ability to meet its objectives, they have invested in 150 leaders within the business by providing an in-depth training program. The training was delivered by Cyprus-based Kratis Training and Consulting and focused on Safety, Quality, Compliance Process, Productivity, Customer Service, TAT and capacity utilisation. **Q**

Top: Jordan is good location for airlines from Europe and the Middle East



THE ENGINE MRO COMPONENT SUPPLIER OF CHOICE

- Supply chain and logistics solutions provider
- Distributor and stockist for the global Aerospace industry
- Competitive pricing and excellent customer care





Close Air S U P P O R T

AAR has expanded its component repair services at its Amsterdam facility. **Keith Mwanalushi** speaks to Director of Commercial Operations Andre op't Hof about AAR's repair capabilities for BAE Systems

Left: The BAe 146/Avro RJ fleet is gradually disappearing from airline fleets (photo: BAE Systems)

Right: New operators are in specialised roles, such as firefighting (photo: Jeff Zimmerman)

In September 1981, the first BAe 146 regional jetliner took to the skies from the British Aerospace airfield at Hatfield, Hertfordshire in the UK. The aircraft – and its later-build successor, the Avro RJ – was destined to become Britain's most successful jet airliner. The final new-build aircraft was delivered from the Woodford, Cheshire production line 22 years later in November 2003.

The Avro RJ/BAe 146 is widely considered the most successful British civil jet airliner programme, and the last remaining in service aircraft operate in a wide variety of roles, supported by

BAE Systems Regional Aircraft.

AAR began executing a component repair contract with BAE in January 2019, and by October it was announced the deal would include a wider range of components for BAE's regional jet support programmes.

The scope of services focuses on BAE Systems' out-of-production regional aircraft, utilising AAR's expertise in legacy platform component repair at its Amsterdam facility. Speaking at the MRO Europe 2019 event in London, Andre op't Hof, Director of Commercial Operations at AAR tells this publication that BAE had been a customer in the facility for quite some time. "Obviously, BAE Systems on the regional fleet is out of production, but they still have a sizeable fleet flying around the world," he says.

The AAR facility in Amsterdam provides component repair, overhaul, exchange and replacement solutions and op't Hof says it's been operational for over 50 years. It's one of the first fully owned businesses for AAR. In Amsterdam, the facility employs around 130 people, working solely on components.

"We are one of those component MROs that has a great reputation for being able to do a lot for their customers. We have very wide capabilities and we are able to address a lot of different things."

Clearly, BAE – like other OEMs – have their own support systems in place with their respective cost-per-hour programmes that support the existing fleets. With regards to out-of-production types, op't Hof emphasises the need to offer cost-effective solutions when it



"AAR utilises its expertise in legacy platform component repair on BAE's out-of-production regional aircraft"

comes to ageing fleets. "What we provide BAE with is a solution that is as cost-effective as possible and uses their inventories – they still support aircraft around the world. We want to work together with BAE to keep repairing components and still support them in providing solutions. That's why we are teaming up and forming a partnership with them."

He stresses that OEMs in general are not ignoring the old platforms, as they have a responsibility to keep supporting them. "It's not that OEMs are not necessarily providing that support, but a lot of systems OEMs on the aircraft have a lot of other projects out there."

Speaking on direct customer interaction between the aircraft operators and BAE, op't Hof says AAR will "do a little bit of both" saying while BAE still had its own customers



enrolled in its cost-per-hour support programme, other niche customers such as firefighting operators in California provided some additional opportunities: “These operators are not flying regular passenger services, they don’t rack up a lot of flight hours so we are in direct business with them,” he states.

AAR sees all types of components coming into the facility, as op’t Hof attests. “It’s a mixed bag of units that come through. There are a lot of inventories out there and we are having conversations with BAE all the time as to what else can be done.”

He reiterates that AAR didn’t build these capabilities specifically for BAE and this project. The facility had BAE 146 and RJ repair capabilities already for some time.

BAE have reported that since entering the contract in January, AAR has consistently delivered cost savings and a high-quality final product. However, Graham Smith, Head of Procurement for BAE Systems Regional Aircraft notes that although the agreement did add some additional parts to the agreement that BAE already had with AAR, it is not an exclusive agreement, provides no guarantees on quantities and with both South African Airlink and Braathens moving their Avro RJ fleets on, they will only have ISSAC - Ministry of Defence (MOD) support contact for the four BAe 146s contracted

for rotatables after March 2020.

Back in September last year, BAE Systems said it was awarded a four-year £42 million contract from the UK MOD for the support of the Command Support Air Transport (CSAT) fleet of four BAe 146 jetliners operated by 32 (The Royal) Squadron from RAF Northolt in West London.

The contract commenced on March 1, 2018 and runs until 2022. There are options in the contract for extensions of one or two years. If the two-year extension is taken up, the contract value will increase to £60 million.

Importantly, op’t Hof stresses that AAR’s capabilities go way beyond out-of-production aircraft, but there is an emphasis on taking them away from the OEMs [AAR still performs some work on Boeing 707 military platforms].



“We are one of those component MROs that has a great reputation for being able to do a lot for their customers”

“We don’t want to leave the impression that we are a platform for the old generation. We have moved forward in innovation from aircraft capabilities to test equipment. Our capabilities are very wide from a technology perspective from instruments, radios, avionics and gearboxes.

“From the 737s to the Neos, the OEMs are not making life easy for the independent MRO, but I would say the scale of difficulty progresses if you go from a classic 737 component to something on an Airbus A350.”

Reaping the rewards

Last year AAR scooped Jet2.com’s supplier of the year award – AAR’s ongoing relationship was recognised for exceeding customer metric targets in real-time operations. AAR performs component repair services for its long-standing customer Jet2.com at the Amsterdam repair facility, and recently signed a five-year agreement for component repair.

“They invited all their suppliers from across their business and we were the only one from a technical field that won a supplier of the year award from Jet.com. It shows that we are doing a great job for them. We have worked for the airline for several years,” op’t Hof indicates.

The scope of work that AAR provides is across the board, with about 350 parts a month that are repaired, and op’t Hof says this is huge from a customer perspective.

Jet2 has a very comprehensive scorecard to measure their suppliers in terms of time delivery, quality and cost and op’t Hof is particularly pleased with that award: “Over the past few years we have consistently been a stretch above the average among the top-tier suppliers. You are only as good as your last component, so you have to be constantly making sure that your last component is as good as the others and that’s where our day-to-day focus is at.”

Above: Another niche market is supporting extractive industries in remote areas (photo: BAE Systems)
Below: AAR has making large investments in its Amsterdam repair shop (photo: AAR)

WE KEEP OUR HEADS IN THE CLOUDS

TO KEEP YOUR FLEET OFF THE GROUND



AVTRADE

www.avtrade.com    



Bigger FURTHER

GECAS and Israel Aerospace Industries (IAI) have announced the establishment of a passenger to freighter conversion programme that they are calling 'The Big Twin' with the launch of the Boeing 777-300ERSF

The Boeing 777-300ER entered service in 2004, so residual values for early models are now reaching that point where a freighter conversion can extend their useful life. The first converted aircraft is expected to enter into service in 2022, after a three-year development and prototype conversion process that will culminate in joint FAA/Civil Aviation Authority of Israel STC Approval. Subsequent aircraft will average four to five months to convert.

GECAS and IAI, which are jointly funding the project, signed agreements in July 2019 to launch the STC Development Program. As launch customer, GECAS has committed to 15 firm orders and 15 additional options from aircraft in its own portfolio. It is also providing the prototype aircraft. The conversion of initial aircraft is expected



to take place in Tel Aviv, but further conversion lines could be established in other locations outside of Israel from 2023 – IAI will be able to enter into conversion agreements for the 777-300ERSF directly with airlines as well as other lessors around the world.

The Big Twin will offer operators 25% more capacity (18 tonnes) than the 777-200ERF and 15% more (9 tonnes) than the Boeing 747-400BCF on every single sector. Having a 4,650nm range means that it can directly replace aging 747-400BCF and McDonnell Douglas MD-11 freighters.

The aircraft is being proposed in four configurations:

- Eleven 96in x 238.5in ULDs; four 96in x 125in ULDs; one 88in x 108in ULD, placed laterally
- Thirteen 96in x 238.5in ULDs; four 96in x 125in ULDs; one 96in x 125in ULD, placed laterally
- Twenty-one 96in x 196in ULDs, placed laterally
- Thirty-six side-by-side 88in x 108in ULDs; one 88in x 108in ULD, placed laterally (this is a US military Civil Reserve Air Fleet configuration. The government makes peacetime business available to civilian airlines that offer aircraft for emergency airlift requirements that cannot be



25%

The Big Twin will offer operators
25% more capacity (18 tonnes)
than the 777-200ERF

met by the military transport fleet).

In addition, belly capacity is maintained, offering a payload of 72,500kg. According to ANA, this could be 24 LD3s – or eight LD7s and eight 88in pallets – in the forward hold, and 20 LD3s in the aft hold.

The crew compartment includes a double bunk crew rest, wet galley with chiller and a lavatory with a vacuum toilet. Two double business class or nine economy class supernumerary seats can be installed.

The conversion includes removal of all passenger equipment, replaced by a robust cabin liner and window plugs; installation of new floor structure that can use a powered or non-powered loading system; deactivation of all passenger doors except the first pair; installation of a 9g rigid cargo barrier; 1-minute smoke detection system; main deck temperature

control; and modified ECS ducting. As the fuselage cross section is identical to the 777-200ER, the main deck door in the port rear fuselage has been retained, measuring 146.5in wide x 120in high.

It is anticipated that it will achieve up to 21% lower fuel burn per tonne than the 747-400BCF. Over a weekly round-the-world trip, it will burn 191 less tonnes of fuel (and carry 99 tonnes more payload). Some sample sectors show a saving of 34 tonnes between Frankfurt and Hong Kong; 28 tonnes between Hong Kong and Anchorage; and 23 tonnes between Cincinnati and Frankfurt.

For operators with mixed 777-300ER/200LR/-200LRF passenger/freighter fleets, no extra pilot training will be required; the GE90 engine will have 100% commonality; while maintenance procedures and spares holdings will have 90% commonality. Of course, pallets and containers will be common, as will 95% of ground handling equipment.

The aircraft is powered by the GE90-115B engine, and sister company GE Aviation will offer tailored support packages to maximise engine life, especially as the aircraft will have much lower annual utilisation than in passenger service. The partnership say cost efficiency can be maintained even below 2,500 flight hours per year. 

Above Left: The Big Twin comes with a comprehensive support package to keep flying and maintenance at reasonable cost
Above Right: In addition to fixed configurations, the aircraft can carry a variety of mixed payloads (all photos: GECAS/IAI)

Rolling Along

Increased flying means increased wear and tear on wheels, brakes and tyres. **Ian Harbison** reviews the business progress of some of the leading MRO specialists

W

heels, brakes and tyres have relatively short times on wing compared to other aircraft equipment. That means there is a constant flow of material to the maintenance facilities that specialise in looking after them.

TP Aerospace

It has been a year since TP Aerospace launched its Green Sunrise growth strategy and the company is making good progress. The growth strategy has two main parts – moving closer to its customers and to improve processes for greater efficiency and customer service. It also has a

focus on Asia, as this is the fastest growing market.

In January 2019, the first new Green Sunrise facility opened in the MRO Centre at Subang Airport, Malaysia. This followed a three-month renovation programme and installation of equipment workshop, followed by Civil Aviation Authority of Malaysia (CAAM) approval. Initial capability, with six certified staff, is up to 10 units per day. Previously, all work was carried out in Singapore, and the new facility represents another example of locating closer to customers.

During April 2019, TP Aerospace opened its first UK-based wheels and brakes MRO facility. Three connected 369m² units are located in Castle Donington, close to East Midlands Airport. The company already had a strong UK customer base before opening its UK operations, but the impetus to set up a new facility came with a seven-year contract with cargo carrier West Atlantic for an all-inclusive wheels and brakes programme to support 46 Boeing 737, 767, Bombardier CRJ and BAe Systems ATP freighters. A \$1 million investment in machinery and equipment and 22 production,

Above: TP Aerospace has opened new facilities in Malaysia, the East Midlands and Thailand (photo: TP Aerospace)



support and management staff means it is capable of handling over 10,000 units per year.

In the same month, another Asian facility was opened, this time in Thailand. The new MRO workshop is located 10 minutes from Suvarnabhumi International Airport and only 45 minutes from Don Mueang and U-Tapao International Airport. The facility is currently operated by a small team of five certified staff, initially expected to produce up to five units per day.

Asian progress continued in July 2019, this time with the opening of a new representative office in Shenzhen, China. Matthew Pun,



Director of Sales and Business Development, says the Chinese market is forecast to more than double in the next 10 years, and looking at the global fleet during the same period, China is expected to account for more than 30% of the global growth. It is important to have a local point of contact between TP Aerospace and key players in the market.

As well as investment in modern machinery in each facility (see MRO Management, September 2018), the company also developed a paperless system throughout the worldwide network (headquarters in Copenhagen, Bangkok, Dubai, East Midlands, Hamburg, Kuala Lumpur, Las Vegas, Melbourne, Orlando, Shenzhen and Singapore).

“The Chinese market is forecast to more than double in the next 10 years”

TP Aerospace has managed to use its current Quantum Control ERP system, developed by Component Control, to customise the paperless system to the company's specific needs. It is a direct data entry method that can process work orders from the introduction of a unit, through the maintenance procedures, to the end of the final inspection where the airworthiness review certificate can be

signed off electronically. It replaces an old scanning system, where barcoding was needed on all tools and hardcopy work orders. With the new system, the number of procedures to be completed are linked to digital protocols. This provides a stronger quality control and reduces the risk of mistakes.

The new system has already been approved by several aviation authorities around the world - EASA, CASA, CAAM, and CAAT - along with other local authorities expected to approve it later this year. TP Aerospace's Melbourne facility was the first to apply the new system, followed by Subang, Bangkok and Castle Donington. By 2020, all TP Aerospace facilities are planned to be paperless.



World Aero

Phil Randell, CEO, says business is steady but World Aero is seeing increased interest from the regional market, especially for the Embraer E-Jet and ATR 72. It recently signed a five-year Cost Per Landing agreement with a European airline for wheels, brakes and tyres on its E195 fleet, while ATR business is coming from operators who feel there is some OEM domination in the overhaul market. World Aero, he says, is completely independent and this is attractive to operators who are concerned that other MROs might be working in the best interests of the OEM, not the airline.

*Above: World Aero is seeing increased interest from the regional market. (photo: World Aero)
Below: DAES Group's turnkey wheel and brake facility for FCAS in Riyadh (photo: DAES)*

Additionally, World Aero is focused on its MRO business and not spares trading and this has boosted business from brokers and distributors who do not expect to compete with the MROs they use when it comes to inventory sales. A further attraction for brokers and distributors is that World Aero can advise them on which wheels and brakes to prioritise in processing aircraft teardowns, thanks to its understanding of market trends.

As well as scarce components with higher values, there are often items that have flooded the market with a resultant drop in price. In between, and possibly the most difficult to define, is the trade-off between the cost of repair and overhaul versus the likely return when the item is sold.

This focus helps World Aero with smoothing out the workload across the year; many traditional airline contracts are based on consumption, meaning peak workload is in summer when aircraft utilisation is highest. Further assistance with balancing workload comes from contracts for freighter aircraft and the company also uses the quieter winter period to overhaul its own pool of inventory to support its contracted customers ahead of the next busy season.

Technology can also affect the business, he says. The increased service life of carbon brakes versus

steel brakes means that there are now fewer replacements per aircraft and therefore the manhour value of repairs is less. The same applies to radial tyres versus bias tyres on wheels.

Nevertheless, expansion plans are in place at World Aero, with most of the workshop area to be covered by a mezzanine level with multiple goods lifts to move work around. The experience of workshop staff to optimise the layout and internal processes, rather than boast about expensive floor area, is key to sustaining maximum efficiency and a competitive edge says Randell.

DAES Group

DAES Group just completed a turnkey wheel and brake facility for First Class Aviation Services (FCAS), an MRO company headquartered in Riyadh, Saudi Arabia. It has a gross area of 1,300m² and was due to start operating by the end of November. The shop is expected to employ approximately ten people and handle an average of at least 1,000 wheels per year. This project is part of a regional growth plan by FCAS that will be followed by a facility in Jeddah airport.

The shop layout design, the equipment selection, the installation, and the commissioning were entirely project managed by DAES Group. A smart floor plan contributes to workflow and efficiency optimisation, reducing manual labour with increased automation using equipment from manufacturers such as Bauer, Odlings and ATG.

The facility has been approved by the General Authority of Civil Aviation (GACA) of the Kingdom of Saudi Arabia, with FAA and EASA approvals to follow to serve clients with foreign registered aircraft. 





BEYOND **AIRCRAFT**

Beyond Aircraft optimises customers' operating revenue streams through the purchasing, trading and short-term leasing of all major commercial aircraft. With our technical and commercial expertise supported by our capital resource, AerFin provide a professional and efficient solution to aviation aftermarket operations.

For further information visit www.aerfin.com

Engine | Airframe | Programs | Lease | Trade | Manage

Call us on +44 (0) 2920 109 890 or email sales@aerfin.com | aog@aerfin.com





MOVING TO MANUAL

As several aircraft systems are now computerised it is becoming more common for the professional development of maintainers to revolve more around computerised troubleshooting rather than manual skills. **Mario Pierobon** reports

Left: Lufthansa Technik Sofia says hands-on skills are still crucial, despite increased digitalisation (photo: Lufthansa Technik)

Brett Levanto, vice president of operations at the Aeronautical Repair Station Association (ARSA) believes that industry entities must keep abreast of technology and properly utilise new tools and associated methods, techniques and practices in order to perform work.

“As a result, the use of computers and other assessment tools are often needed in maintenance organisation training programmes. Of course, the repair station/approved maintenance organisation community is very ‘bottom heavy’, meaning many small businesses adopt new technologies with careful planning whilst bigger companies, with more capital resources, can be more exploratory,” he says. “As a result, the kinds of training and skill required will vary by organisation, size and type of work, but there will always be skill requirements related to the hands-on performance of work and to report and assess the system status.”

Digital vs hands-on work

Air France Industries KLM Engineering & Maintenance (AFI KLM E&M) believes the traditional line between mechanical engineers and avionics engineers is becoming more vague. Vincent Metz, Head of Strategy, Marketing & Communication for the organisation says, “This trend has, for a certain part, already been incorporated in the regulatory framework when introducing EASA Part 66, whereby the mechanical B1 engineer also deals with more avionics type of problems. Then all traditional mechanical items are having computers and software linked to them. In our training programmes, we have shifted to incorporate these new skills.

“We are helped, of course, by the fact that all our existing personnel as well as the new generations of people we hire are more and more exposed to digital tools in their daily life, so we do not face major challenges based upon this trend,” he continues. “These new requirements create a sort of hands-on competence that is of a different nature to the old one, but the basis is the same, so experience in troubleshooting and solving problems will provide the experience one can use for future needs”.

For a long time, at a cultural level there has been a trend away from hands-on, technical work. “In the US, skills training, shop classes and other skills-based learning opportunities are nowhere near as prevalent as they were 30 years ago. We have lost that foundational level of skill that every potential job applicant used to have”, says Levanto. “That is not because of new technology or computer assessment, it is because of how we culturally approach learning pathways and career development. Perhaps there is a positive in the increase of new technology in aviation maintenance as it may attract applicants who would have thought the work to be too ‘blue collar’ otherwise.”

According to Iavor Konarov, Head of Production at Lufthansa Technik Sofia, despite the significant digitalisation in the MRO business, and the growing automation of aircraft systems, a skilled mechanic with a wide understanding of the aircraft systems is irreplaceable.

“The maintenance tasks are getting more complex and, in certain cases, require more reading, understanding and analysing of the results and measurements. However, the skilled hands and years of experience are more crucial. In addition, the aging of the aircraft and system components is always revealing new challenges that are not that easy to catch with automated systems,” he says. “Nowadays, training development is even more crucial to maintain a stable bridge between the new complex aircraft systems and human perception and comprehension. We constantly need to find new ways to

“For a long time at a cultural level there has been a trend away from hands-on, technical work”



“Lufthansa Technik is looking at educating team members in their personal development”

with no fear to ask for help or speak out on mistakes,” says Metz.

It is the International Civil Aviation Organization (ICAO) that encourages national aviation authorities to include human factors training in their regulatory requirements. “EASA and Transport Canada both have explicit requirements, including suggested topics, for human factors training. These requirements are included in the special conditions of the US-EU MAG, so American repair stations performing work under the bilateral must have training. The FAA does not have explicit regulatory requirements but strongly encourages its inclusion, even using the word ‘must’ in its guidance related to repair station training programmes,” says Levanto.

Maintainability developments

There have been several developments with regard to aircraft maintainability and certainly the digitisation of the elements onboard has had an important impact. “At AFI KLM E&M we are very active in the development of predictive maintenance techniques. Our Prognos suite is one of the industry leading tools. Prognos radically changes the way of working. We can monitor the aircraft status and the tool is predicting much earlier – around 30 cycles – that certain problems will arise. This window allows us to really plan the maintenance activities, drastically improving aircraft availability, and reducing delays and cancellations for technical reasons. Further digitisation is having a sizeable impact on troubleshooting processes around the aircraft,” says Metz.

There is more potential for the OEMs to provide better access not only to maintainers but also to other parts of the maintenance organisations, such as better direct possibility for planning purposes, according to Konarov. “The possibility to use the maintenance data for easy transfer into customised job cards as well as quick links to the proper

provide training content that is easy to understand in the environment of increasing complexity of aircraft systems and management system requirements.”

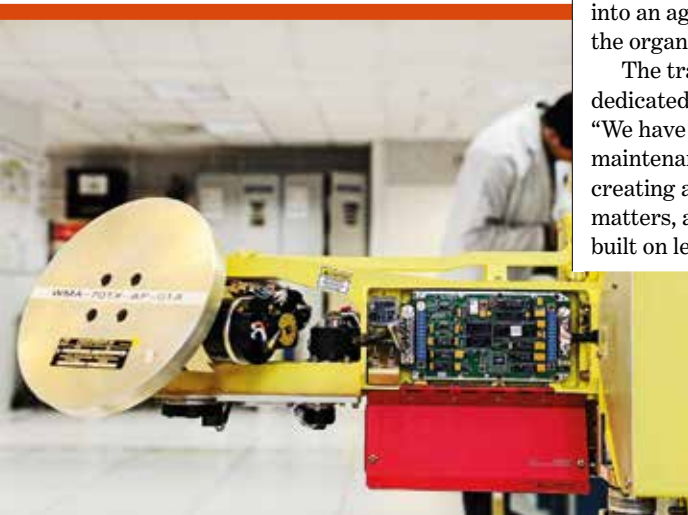
Levanto points out that in the US aviation maintenance training schools operate under a rule that has not been substantively updated since the early 1970s. “The curriculum requirements are very prescriptive, so schools have extremely limited leeway to introduce new technologies that are not directly related to aircraft systems,” he says. “In aviation, our focus is and should always be on necessary competency to perform work. Tools and technologies have been changing since the day the Wright Brothers first flew in Kill Devil Hills. Competency focus, procedural awareness and system safety should be the guiding principles of performing work no matter what resources are in use. From that perspective, it is not worth panicking about impacts on proficiency.”

Human factors training

Human factors training is an integral part of the professional development of maintenance personnel. Maintenance organisations are becoming more focused on this training aspect. “Human factors awareness, like competency, will always be fundamental. In aviation, just about every failure tracks back to the human element in some form. Since we are in a period of unprecedented public fervour about aviation safety, managing the ‘human element’ is incredibly important,” says Levanto.

“The perception that human factors is a familiarisation in the Dirty Dozen principles and a simple explanation of human physics and psychology is long gone”, says Konarov. “We are constantly searching for new ways to reach and work on the level of personal mindset and affect daily behaviours which directly correspond to the organisational culture. There is a need that the core of the safety management system, leadership training and practices and training systems get into an aggregated flow clearly shaping the organisational culture”.

The training at AFI KLM E&M has a dedicated segment on human factors. “We have safety programmes in our maintenance organisation focused on creating awareness of all safety-related matters, and creating a safety culture built on learning and improving openness



Top: Lufthansa Technik aims to empower future employees (photo: Lufthansa Technik)
Left: AFI KLM E&M is active in the development of digital diagnostics (photo: AFI KLM E&M)

corresponding manuals would be a great step forward,” he says. “In the development phases of the latest aircraft generations, the large aircraft manufacturers have established mixed working groups in which MRO experts have been involved for support. For example, Lufthansa Technik’s engineers participated in the so-called A350 customer focus group and aided with the design and development phase of the aircraft with respect to maintainability and maturation”.

Specific initiatives at MRO companies

AFI KLM E&M’s training programmes are linked to achieving all required training and to enable the personnel to fulfil their technical duties. “More and more we use new techniques to bring our training material to life. One example is the augmented reality (AR) technology we use in our technical training that we developed in conjunction with NLR, the Dutch Aerospace laboratory,” says Metz. “We also try to familiarise our personnel with the latest technologies.

“An interesting development is the Fablab factory we started at Paris

Charles De Gaulle airport where we have new technologies like 3D printing. These tools can be used by our personnel to develop work-related items, but also for private use. We want to expose our personnel to them so they get the feeling for them. Once they understand how they work and what they can bring, they will link that to their day-to-day working problems and it will stimulate innovation.”

To support continuous professional development for personnel, ARSA is pressing for a focus on career path development that is less concerned with airman certification and more concerned with having the right body of knowledge to perform work. “For too long, the industry has over-focused on certificated mechanics (who will always be important and are required under the rules) at the expense of flexibility. As systems become more and more advanced – both in terms of necessary flight operations and ‘amenities’ like passenger entertainment and connectivity – we need the biggest possible net for collecting potential technicians, engineers and support staff,” says Levanto.

“The most successful examples are organisations that have stopped hiring

A&P mechanics and instead hire non-certificated personnel that enter ‘helper’ training programmes through which they gain the necessary experience for their certificate. By doing so, companies can tailor the experience exactly to the work being performed, hire for ‘character’ and willingness to work and learn rather than credential, and make a much bigger impact on the lives of the people they employ.”

Lufthansa Technik is increasingly looking at educating team members not only on technical topics but also in their personal development, such as interacting with colleagues, customers and peers. “Risk assessment and management in daily life is not only an upcoming requirement but already part of our maintainers’ daily operations around the aircraft in a much more structured way and through understanding. Parts of the classical leadership training and development are increasingly provided not only to leaders and potentials but also to team members. Empowerment and self-managed teams are more common and not just HR buzz words anymore,” says Konarov. 



MAGELLAN
AVIATION GROUP

EXTENDING
THE LIFE CYCLE

BUY | SELL | LEASE

For more than a decade, Magellan Aviation Group has been dedicated to keeping your aircraft in flight by ensuring our warehouses are stocked and ready to satisfy your requirements. More than solely a parts supplier, we are active purchasers of both regional and commercial aircraft engines. For a full range of our expertise, please visit our website: www.magellangroup.net

US +1.704.504.9204
salesusa@magellangroup.net

EU +353.61.474800
sales@magellangroup.net

APAC +65.6220.7877
asiafqqs@magellangroup.net

AIRBUS | ATR | BOEING | BOMBARDIER | CFM | EMBRAER | GE | IAE | PW/PWC



FAMILY Values

The Pratt & Whitney Canada PW100 turboprop engine has millions of flight hours behind it, aided by maintenance programmes designed with cost-effectiveness in mind. **Bernie Baldwin** reports

Left: Silver Airways have enlisted StandardAero to support their growing fleet of ATR 42/72-600 aircraft (photo: ATR)



StandardAero is one such company, carrying out work at a range of facilities across the US, Canada, Europe and the Asia-Pacific. Moreover, the company is one of only two DOFs for the bigger PW150 engine used on De Havilland Dash 8-400.

Nathan Key is the customer service manager at the company P&WC's Designed Overhaul Facility (DOF) in Summerside, PE, Canada. He sets out an evaluation of the key areas of concern when a PW100 family engine comes in for a scheduled overhaul, and how much that might differ depending on the geographical region where the engine is operating.

"A scheduled overhaul – whether undertaken on a 'hard time' basis as 8,000 hours, or more commonly 'on-condition' at longer interval – will usually see full replacement of life-limited parts (LLP), especially in the engine's hot section," he begins. "The key areas of interest will include detailed inspection for any unusual areas of engine wear, plus identification of any opportunities for 'repair rather than replace,' thus helping to minimise costs for the operator.

"The operating environments can have a direct impact on engine life, with obvious examples including salt-laden environments (for example, coastal areas), sandy environments (such as deserts), and even environments contaminated with volcanic ash (as was the case in Iceland after the 2010 Eyjafjallajökull eruptions). Corrosive harsh environments may affect critical housings which may have otherwise been deemed repairable," adds Key.

As noted, the OEM itself has its own maintenance facilities in its global service

Across all airline operations, the Airbus A320 and Boeing 737 families are often referred to as the workhorses of the industry – and rightly so. Move into the turboprop sector and although the numbers don't match those of the single-aisle narrowbodies, two aircraft families have dominated – from ATR and Bombardier (now De Havilland of Canada) – and the workhorse behind them has been the Pratt & Whitney Canada PW100 family of engines.

In addition to maintaining the engines on those aircraft still in production, there are many out-of-production types which have PW100 family engines still in operations. Among these types are the Dornier 328, Embraer EMB120 Brasília, Fokker 50, Ilyushin IL-114-100 and Xian Aircraft MA-60.

In addition to its own MRO facilities around the world, Pratt & Whitney Canada, like many other OEMs, has a network of third-party MRO providers which have been granted Designed Overhaul Facilities (DOF) status.



network. Those specialising in PW100 support are in the USA, Canada, Brazil, Singapore and the UK. The company also has its take on the key areas involved in a scheduled overhaul and the effect of geographical regions.

“As is typical in the industry, engines operate in all kinds of environments. We’re always learning, making design changes, issuing software updates and adjusting maintenance plans and practices accordingly,” says a company spokesperson. “As operators have deployed increasing numbers of regional aircraft in more severe environments, we have increased the capability of the PW100 engine family accordingly. For example, we have increased maximum take-off power for our PW127 series engines from 32°C to 44°C (approximately 90°F to 111°F).”

For many years PW&C has offered its regional airline customers a Fleet Management Program (FMP) to manage – and budget for – the maintenance of their PW100 family engines. “We help customers lock-in lower operating costs and simplify fleet operations management. For example, roughly seven out of every ten of our PW150 family engines are enrolled in an FMP,” the spokesperson adds.



“We have developed a suite of event-based, transactional offers known as P&WCSMART services, designed to address the needs of mature PW100 engines”

“As another example, we have developed a suite of event-based, transactional offers known as P&WCSMART services, designed to address the needs of mature PW100 engines. Our P&WCSMART portfolio for PW100 family engines includes an overhaul parts capped cost programme, a hot section inspection (HSI) capped cost programme and more.”

Preventive maintenance has grown considerably, including the ability to track the health of the engine and thus provide some predictability for when parts need to be replaced.

“We offer several digital engine services maximising engine performance, efficiency, dispatch reliability and time on wing. These include our FAST (Full flight data Acquisition, Storage and Transmission) solution, which delivers full-flight engine data, as well as our oil analysis technology,” remarks P&WC’s spokesperson.

“The FAST solution captures, analyses and wirelessly sends full-flight data intelligence to customers within minutes of engine shutdown so we can maximise engine and aircraft availability, optimise maintenance planning and reduce operating costs. With FAST, we’re able to analyse hundreds of distinct engine and aircraft parameters – enabling on-condition predictive

maintenance, extended time on wing and maintenance cost guarantees.

“Our oil analysis technology is up to 100 times more sensitive than traditional methods. It detects deterioration of oil-wetted parts like bearings, gears and seals, at times hundreds of hours before a potential issue. This helps convert unplanned events into scheduled maintenance,” the company states.

StandardAero also has a preventive maintenance offering. “We’re uniquely positioned as a PW100 Designated Overhaul Facility which is also appointed as a CAMP Systems Designated Analysis Center (DAC),” says Key. “This allows us to support the engine condition trend monitoring (ECTM) services offered for the full range of Pratt & Whitney Canada products, including the PW100. By capturing and analysing engine data recorded in flight, engine health monitoring is able to identify small problems before they become big problems. The key parameters tracked include engine interstage turbine temperature (ITT), high pressure spool

*Top: Savings from serviceable or rotatable/exchange parts can be substantial (photo: StandardAero)
Left: Silver Airways will have access to all of StandardAero’s North American network of service centres (photo: ATR)*

COMPOSITE SERVICES, USA

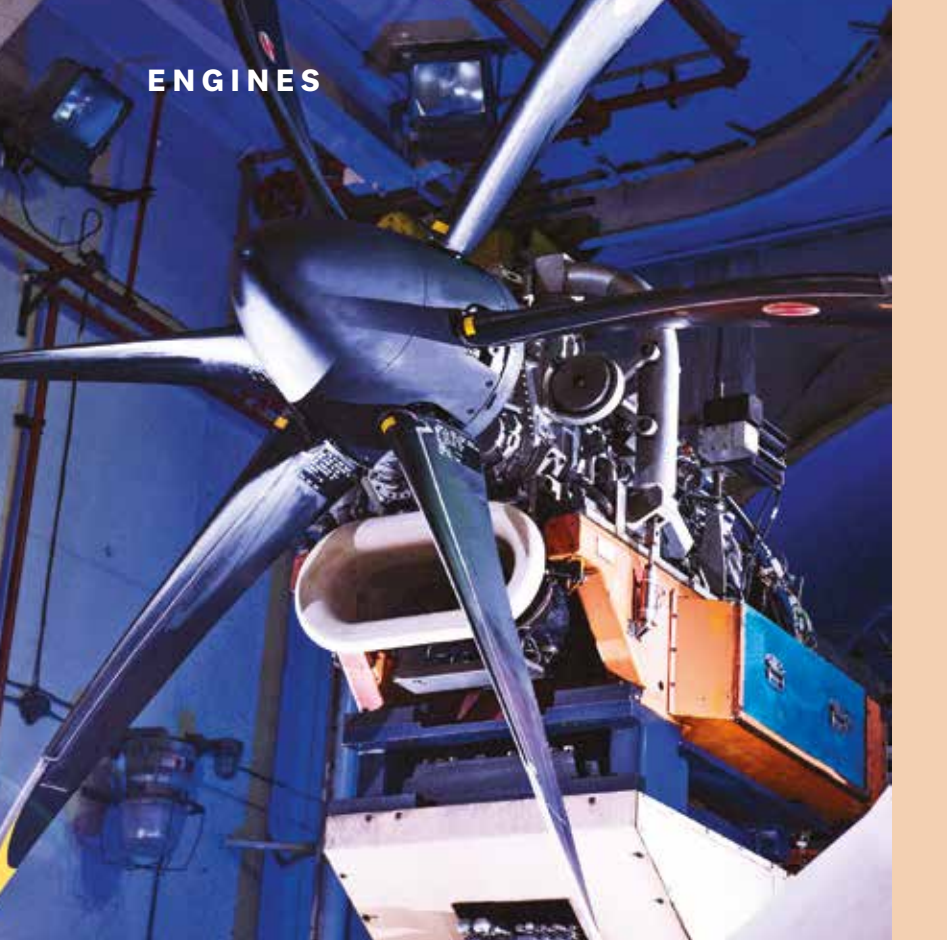


As the use of advanced composites increase, HAECO Americas continues to invest in its support of next generation aircraft and aero-structures. Built upon decades of experience, its new standalone FAA Repair Station (M52R952N) in Greensboro, NC facilitates restoration and maintenance of these complex structures.

Capabilities include:

Nacelle Systems | Fan Reversers | Airframe Components | Radomes

compositeservices@haeco.aero | www.haeco.com



Above: Pratt & Whitney Canada puts a PW127M engine through its paces in a test cell (photo: P&WC)

speed (NH), low pressure spool speed (NL), and fuel flow (WF)."

"Repairing rather than replacing" is a goal of MRO companies, to keep costs down for customers. These providers also ensure operators can reduce their capital outlay on components by providing a pool of parts from which a replacement can be swapped for a part going into the repair process. The pool parts can be either repaired or new.

According to Nathan Key, StandardAero has a dedicated in-house engine trading team to assist operators with their parts, module and engine material requirements, including both new and used serviceable material. "We have a large pool of PW100 rental engines available to support operators on a short- or long-term basis, and also offer parts pools for certain critical components," he confirms.

"Savings offered by serviceable or rotatable/exchange parts can be substantial when compared to new replacement. StandardAero has developed in-house repairs where applicable to further minimise customers' overhaul event costs. We make every effort to explore these avenues and thus maximise the options open to our customers," Key declares.

One customer keen to make use of

these StandardAero services is Silver Airways, which recently signed a long-term contract for support of the P&WC PW127M engines on its growing fleet of ATR 42/72-600 aircraft. StandardAero will provide the carrier with "comprehensive engine services" including responsive overhaul-level support and engine condition trend monitoring (ECTM).

The support will be led by the Summerside facility where customer service manager Key is based, but Silver Airways will also have access to all of StandardAero's North American network of service centres and mobile repair teams (MRTs).

As would be expected, Pratt & Whitney Canada also has extensive services in parts pooling but, as is the case with OEMs in the MRO field, the range of support on offer is continuing to grow. "We have one of the largest global service networks, with more than 40 owned and designated facilities for the MRO of turboprop, turboshaft and small turbofan engines, as well as auxiliary power units (APUs)," the company spokesperson comments.

"Within this network we have eight MRO facilities across three continents for the PW100 family of engines, including

7

Roughly seven out of every 10 PW150 family engines are enrolled in an FMP

PW127 series engines for the ATR 42, ATR 72 and Airbus C295, as well as PW150 series engines for the Dash 8-400 and soon the AVIC MA700 [which will use the PW150C model]. Our Customer First (CFirst) Centres in Montreal and Singapore support customers 24 hours a day, every day of the year, by phone and email," the company emphasises.

"We also have seven parts distribution centres around the world with around-the-clock support, with more than 40,000 new and used parts, which we can typically deliver within 24-48 hours. In addition, we have more than 100 field support representatives (FSRs) and mobile repair teams (MRTs) around the world, backed by an organisation of more than 2,000 service professionals.

"We offer a range of tailored engine and parts availability solutions for regional airlines. We continually enhance our offerings through flexible financial and delivery models, such as subscription programmes, shared pooling options and rental options for greater operator accessibility," the P&WC spokesperson continues. "Our line replaceable unit (LRU) initiatives, for example, position onsite LRUs to optimise engine availability and support a rapid return to service.

"Through our growing portfolio of spare engine solutions, such as long-term leasing and our new in-region engine availability subscription programme – which we're launching for PW150 and PT6A engines – we offer alternatives that ensure guaranteed access to a spare engine at all times, all of which reduces the cost of ownership and risk while maximising the return on investment (ROI)," the P&WC executive highlights.

For operators, those financial criteria are just as valid in the choice of MRO provider as the quality of repair or support. The two are interdependent. Thankfully for operators, there are plenty of choices in the market to fit their requirements. **Q**

MRO. COVERED

CUSTOM DESIGNED MRO HANGARS



AIRCRAFT HANGARS. READY FOR ACTION

With 50 years' experience, Rubb is a global provider of tailor-made aircraft maintenance, repair and overhaul hangars. We work closely with end users, airlines, airports and contractors on all large scale hangar projects to provide a custom-designed, high quality solution. Hangars can be used for line maintenance, base maintenance, airframe maintenance, heavy maintenance and many other operational projects. To learn more about Rubb's alternative hangar solutions visit our website or contact the team today.

Email: info@rubb.com | Tel: +44 (0)191 482 2211 | www.rubb.com



excellence in engineering



@afiklmem

Augmented
Reality



BEST4LEAP*

100%
Innovation

100%
Global network

100%
Airline MRO

100%
Adaptiveness



SnapPress

- 1 Download the **SnapPress** App for free.
- 2 "Snap" this page.
- 3 Explore the page's exclusive hidden content.



"I've been an engine module technician on CFM56 and CF6 engines for 10 years. Thanks to this experience I have joined the LEAP team. I'm determined to provide the best quality and TAT to meet our customers' expectations, while always looking for ways to improve our processes."

Leandro Rodrigues Oliveira, Engine Module Technician

AFI KLM E&M has extended its capability list to include maintenance for the LEAP* engine, with an MRO service offering that covers both On Wing/On Site support and shop visits. AFI KLM E&M, which has provided support when new engines go into service on a number of occasions in the past, is capitalizing on the know-how of its teams to support early-stage operations on the LEAP worldwide. We are ready to meet the needs of the airlines with services that are always the **Best4You**.

* LEAP engines are products of CFM International, a 50/50 joint company between GE and Safran Aircraft Engines.

AIRFRANCE
INDUSTRIES

KLM
Engineering & Maintenance

A D A P T I V E N E S S ®

Right: A Britten-Norman Islander is at the heart of a project that aims to electrify an existing aircraft (photo: Britten-Norman)



Flights Electric

Much is being made of eVTOL and autonomous air vehicles but the reality is very different, says **Ian Harbison**, and other electric solutions may offer better opportunities

The reality of eVTOL is that progress will take a long time and few of the current projects will ever enter service, as the costs involved in making the jump from a prototype to certification and to setting up a production line will be prohibitive for many initial investors – think back to the days of the Very Light Jet.

For those that do succeed, the air traffic management challenge is immense – free flying, small aircraft operating over urban areas, often on the edges of controlled airspace around airports. The introduction

of fully autonomous aircraft will take even longer, only after a lengthy period of manned operations to ensure the concept is safe, followed by another period with a pilot monitoring the automatic operation. Add to that resistance to the construction of those local helipads from the neighbours and it can be seen that eVTOL is an idea whose time is yet to come.

A more practical approach is to design a manned aircraft which is capable of operating in controlled airspace. Inevitably, electric aircraft are short range, so an ideal application is the linking of smaller airports in remote areas.

Eviation

A start was made this year with an announcement at the Paris Air Show that US-based Cape Air had taken a 'double-digit' purchase option for the Alice electric aircraft from Eviation Aircraft. It is claimed that Alice is capable of flying on a single charge with nine passengers at 240kts to a range of just over 1,000km.

Cape Air currently operates a large fleet of nine-seat Cessna 402s and has started replacing them with the 11-seat Tecnam P2012 Traveller, with 100 on order. The airline's network stretches across the US, from its local operations in Massachusetts, including Nantucket and Martha's Vineyard, linking smaller cities with Boston, to the Caribbean and the Midwest, many services being government subsidised Essential Air Services.

Eviation says regional travel in the US is on the rise, with an increase in consumers flying short distances between 50 to 650 miles. This growing segment offers the ideal scenario for Eviation's all-electric Alice, which aims to undercut the cost of

PHOTO: EVIATION



travel by making middle mile trips cheaper, faster and cleaner. The shift to electric will reduce operating costs, eliminate greenhouse gas emissions, make air travel more affordable and connect communities like never before.

The all-composite aircraft will be powered by three magni 250 electric motors from magniX, each producing 375hp and driving a 165cm five-blade carbon fibre propeller from Hartzell. The rearward facing engines are mounted on the wingtips and in the aft fuselage, driven by batteries that produce 920kwh of usable power and take up 60% of the aircraft's MTOW.

However, Eviation still faces all the eVTOL challenges in terms of financing. It has yet to fly and there is an optimistic three-year flight test programme to achieve certification in 2022.

Project Fresson

A simpler step is to electrify an existing aircraft, and the UK government has just awarded a £9 million grant to Cranfield Aerospace Solutions (CAeS, part of Cranfield University) to design, manufacture and integrate a hybrid-electric propulsion system into a nine-seat Britten-Norman Islander aircraft. Again, this aircraft is often utilised in remote areas.

Called Project Fresson, the grant is provided through the ATI Programme: a partnership of the Aerospace Technology Institute (ATI), the Department for Business, Energy & Industry Strategy, and Innovate UK. Other partners in the 30-month project include:

- **Britten-Norman:** baseline aircraft and aircraft data/design support
- **Delta Motorsport:** battery packs
- **Rolls-Royce:** providing power management system

- **Denis Ferranti Group:** electric motors
- **WMG (University of Warwick):** battery testing and characterisation

Following the demonstrator project, CAeS will go on to certify the modification through EASA to obtain a Supplemental Type Certificate. This will then be immediately available in the global market, allowing the current operators of more than 400 Islanders to convert their aircraft to reduce operating costs and their carbon footprint.

In follow-on phases, the intention is to design and implement a similar modification, this time to a larger existing 19-seat sub-regional aircraft type, continuing with partners to design and build a new 19-seat aircraft. The design of the new aircraft will be optimised for emission-free propulsion, making use of the certified propulsion systems architecture from the earlier phases. **M**

Above: The Alice electric aircraft from Eviation Aircraft is being prepared for a first flight in the near future (photo: Eviation)

Nordic flying

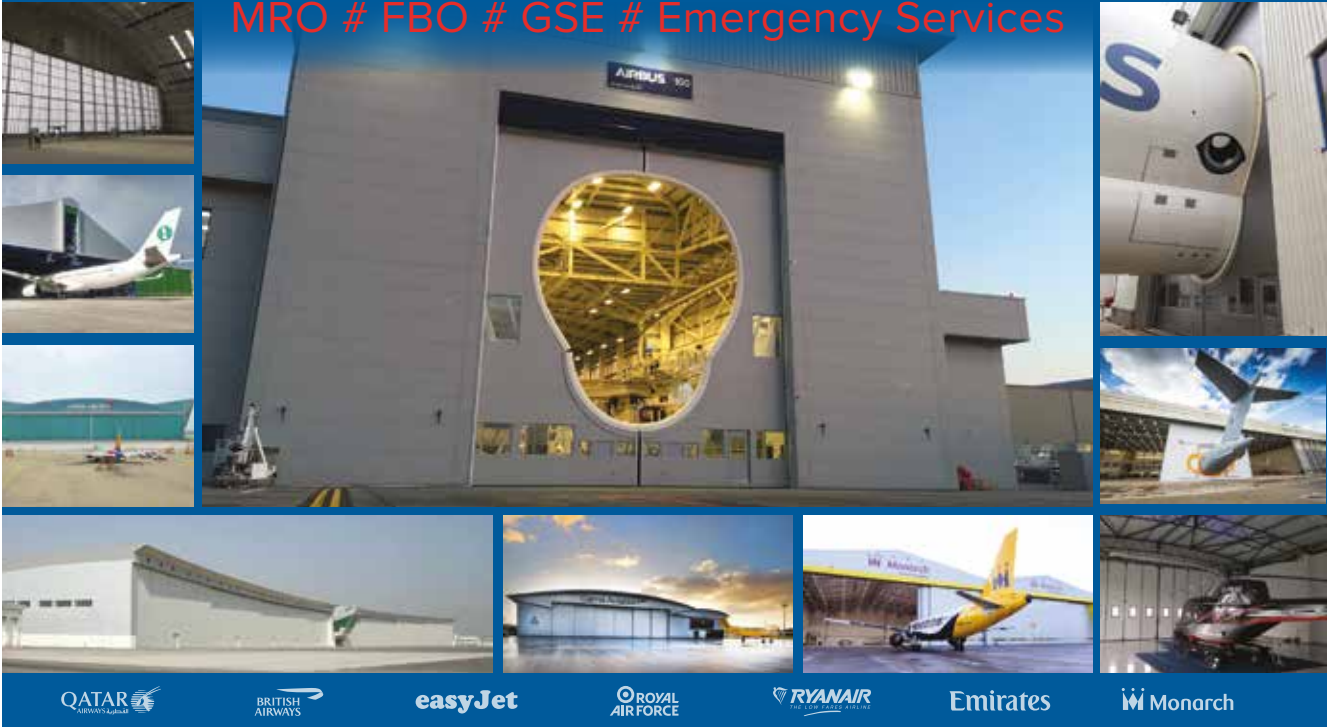
Another project that has attracted some big names is the Nordic Network for Electric Aviation (NEA). Many domestic services in these counties operate into very short, remote airstrips and so are suitable for this technology. This has been funded by Nordic

Innovation (an organisation under the Nordic Council of Ministers). The NEA network will organise workshops and other events to build knowledge and cooperation in the Nordic countries. At present, the network has eleven members (Air Greenland, Avinor, Braathens Regional Airlines, El-fly, Finnair, Heart Aerospace, Icelandair, Nordic Innovation Sustainable Aviation (NISA), RISE, SAS and Swedavia).

There are four focus areas with clear objectives for driving the growth of electric aircraft: to standardise electric air infrastructure in the Nordic countries; to develop business models for regional point-to-point connectivity between Nordic countries; to develop aircraft technology for Nordic weather conditions; and to create a platform for European and global collaborations.

World renowned door solutions for all your airside requirements.

MRO # FBO # GSE # Emergency Services



Based in Luxembourg, CTI Systems achieved solid reputation as an integrated one-stop solution provider for industrial automation and surface treatment installations.

In aviation, notable projects have been realised for any global commercial aircraft manufacturer, tailored to meet customer's specific requirements.



Beyond this, CTI Systems is highly recognised for its outstanding solutions for MRO access & handling systems as well as paint installations:

- Teleplatforms for aircraft painting & maintenance
- Maintenance Dockings
- Hangar Cranes
- Engine Handling for maintenance centres and test cells
- Aerial Jib Platforms (AJP)

Being a Member of the Paul Wurth Group, CTI Systems has globally located service centres that are ready to serve your company's needs.



THE PERFECT **STORM**

There is a shortage of engine MRO capacity at present, says Katia Diebold-Widmer, Head of Marketing at MTU Maintenance Hannover, which requires ambition and innovation to make it through

**There will be strong
overhaul demand
until the mid-2020s
before the retirement
wave arrives**

The capacity shortage affects engines of all ages. For older technology engines, which represent 21% of the current MRO market, low fuel prices are keeping aircraft in service longer, generating more maintenance demand. The e-commerce boom has seen an increase in freighter conversions, which tend to be older aircraft with low residual values. While lease and exchange engines can offer an alternative to MRO, they are in short supply. Equally, with fewer aircraft coming out of service and being parted, there is less teardown and used material available. This sector is generally independent of the OEMs, who are more interested in current production models, but some MROs are moving from these older engines and exiting this market.

Current technology engines represent 66% of the market, with a balance of OEM and independent MRO companies. Demand is at peak levels, especially the CFM56-5B/7 and V2500 fleets, reflecting delivery rates from the big two aircraft OEMs. They are also being flown at high levels of utilisation, reflecting their popularity with low cost carriers. Delivery

patterns also mean that a large number of engines are coming up for their first scheduled shop visits. There will be strong overhaul demand until the mid-2020s before the retirement wave arrives.

New technology engines represent 13% of the market, which is dominated by the OEMs. These powerplants have been hit by early technical removals thanks to an unexpected magnitude of technical issues caused by their complex technology. New MRO procedures and repairs need to be developed and so there is limited network capacity at present, with few slots available. The OEMs have been equally affected and are having to juggle production and MRO simultaneously.

Overall, limited slots and restricted new material availability mean longer turnaround times and higher spare engine demand.

Newer technology engines will require less shop visits over a shorter lifecycle. Comparing the Pratt & Whitney JT8D from the 1960s to that company's latest PW1100G GTF engine, the number of shop visits decreases by a third. Their complexity requires much higher levels of investment in training and tooling, meaning that fewer independent MROs will be able to enter the market.

That is one of the biggest challenges for MTU Maintenance Hannover. However, it does have a strategy to deal with this. The first step is to secure access to the market and secure a baseload. This can be achieved through different types of partnerships. Risk and Revenue Sharing Partnerships provide opportunities to cooperate with OEMs on newer engines from the early stages of development,



Left: The V2500 engine has attracted strong demand

helping to shape and be part of the future MRO requirements. Other options include joining forces with airlines for whole fleet-based contracts to provide economies of scale and similar arrangements with lessors and banks, taking on entire portfolios. Recent examples of airline deals include a 13-year agreement to 2033 with JetBlue Airways for V2500 engines and a 12-year agreement with United Airlines for GE90-115B engines, plus MTU proprietary repairs as well as engine trend monitoring.

The second step is to increase capacity. The company has planned a 50% increase in the next five years, with new shops for engine/parts repair and the expansion of all existing shops.

In 2019, there has been a shop extension at MTU Maintenance Berlin-Brandenburg, while December sees the opening of EME Aero in Jasionka,

Poland, a joint venture between MTU Aero Engines and Lufthansa Technik for the overhaul of GTF engines. It has a planned annual capacity of more than 450 shop visits. A shop extension at Airfoil Services in Malaysia (another 50/50 joint venture with Lufthansa Technik) will increase current repair capacity from 650,000 to 900,000 parts per year by 2020.

Next year will see MTU Maintenance Zhuhai expand by 50%, taking it to a capacity of 450 shop visits by 2021, including CFM LEAP engines, for which it recently signed a General Support License Agreement (GSLA) with China Southern (a 50/50 joint venture partner alongside MTU Aero Engines) and CFM International. MTU Maintenance Canada will be moving into a new facility in Vancouver that will expand capacity by 60% and consolidate all repair activities currently spread across three locations.

Hand in hand with this goes increased efficiency through digitalisation and automation, increasing employee cross-qualification across engine models to adapt to workflow fluctuations and more on-site logistics capacity.

The final step is to broaden the portfolio beyond MRO to value-added products for customers. These include on-site and 'near wing' services, engine leasing and exchange and engine fleet management software.

Earlier this year, it launched MTUPlus Intelligent Solutions, aimed at operators who increasingly require tailor-made solutions across the lifecycle in order to control and optimise cost, as well as those of asset owners and lessors, where residual value and cost of ownership is key. The portfolio has been divided into four highly tailored solutions:

- **PERFORMPlus** for newer engines, with optimised fleet management, engine trend monitoring, on-site services and lease support.
- **SAVEPlus** for more mature engines, using smart strategies to minimise end of life cost
- **MOVEPlus** for lessors and asset owners
- **VALUEPlus** end-of-life asset management
- **SERVICEPlus** for single and ad-hoc requests.

The strategy appears to be working. The company reported 10% increased revenue in the first nine months of 2019, from €1,037.0 million to €1,137.8 million. The main sources were the V2500, PW1100G-JM and GENx engine. 



Hangar Doors

Weathertight and insulated. The most reliable hangar door choice from Arctic areas to scorching hot climates.

CHAMPIONDOOR®

www.championdoor.com

HEAD OFFICE / FACTORY
Tel. +358 445 8800
info@championdoor.com

FRANCE
Tél. +33 147 202 314
france@championdoor.com

USA
Tel. (713)-352-0403
us@championdoor.com

UAE
Tel. +971 488 103 31
uae@championdoor.com

AMOS. AGAIN.



"AMOS, which is already used as a standard tool by many LH group airlines, will also help us at Lufthansa to make our Technical Fleet Management processes even more transparent and, above all, even more efficient. Among other things, we are relying on the already very broad AMOS know-how of our sister companies. We chose AMOS because of its 30 years of success in the industry, but also because of its continuous product innovations, which help us to establish state-of-the-art processes in Technical Fleet Management at Lufthansa as well."

says CEO Lufthansa German Airlines
Hub Frankfurt

Lufthansa and Lufthansa Cargo take off with AMOS, the world-class M&E software solution.

Both carriers will implement AMOS including AMOSmobile, enabling paperless maintenance operations from the beginning.

The close cooperation of the Lufthansa group members will be further promoted by AMOScentral, which enables the exchange of data between AMOS instances while nevertheless allowing each group member to keep control over their individual AMOS environments.



Build *air*
Inflatable Structural Solutions

We provide your MRO Hangar:
portable, safe, fast and cost efficient.
Contact us: sales@buildair.com






Airframe Maintenance & Training

- EASA Part 145 & 147 Technical Training Facility
- Boeing 737 All Series including MAX
- Embraer 170/190
- Airbus A320 Family
- Fokker 70/100
- BAE146/Avro RJ

Contact us now to book your maintenance and training slots

See website for full product information

Follow us: [@klmukecareers](#) [@klmuke](#)
   
www.klmukengineering.com

KLM UK Engineering

AIRFRANCE INDUSTRIES 

All join in

AMOS MRO software has now been adopted by the main players in the Lufthansa Group

Swiss-AviationSoftware (Swiss-AS) has been in business for 30 years, starting as the IT department of regional carrier Crossair. Through various ownership changes it became a 100% subsidiary of Swiss International Air Lines and, in turn, part of the Lufthansa Group. Ironically, other Lufthansa Group airlines such as Austrian Airlines, Brussels Airlines, Eurowings and Lufthansa CityLine all became AMOS customers, but never the main airline. That has just changed with the announcement in November that Lufthansa German Airlines and Lufthansa Cargo are now joining the party.

Lufthansa Executive Board approval for the start of the project's Implementation Phase followed an in-depth Definition Phase, including AMOS business process/interface workshops and the specification of comprehensive business requirements. This phase will be carried out by a dedicated team of Lufthansa German Airlines and Lufthansa Cargo aviation experts supported by Swiss-AS consultants and project managers. Both carriers will implement AMOS, including AMOSmobile for its Line Maintenance and CAMO Operations, based on the best practice processes already implemented within the group.

The Lufthansa Group already runs Technical Fleet Management (TFM), which is aimed at the

"We chose AMOS because of its 30 years of success, and because of its continuous product innovations which help us to establish state-of-the-art processes"

standardisation and harmonisation of processes to boost the performance of the individual technical operations departments and to allow an easy exchange of aircraft and other assets within the group. The AMOS processes have all been modelled, aligned and verified against the TFM standards.

Klaus Froese, CEO Lufthansa German Airlines Hub Frankfurt, says: "AMOS, which is already used as a standard tool by many Lufthansa Group airlines, will also help us at Lufthansa to make our TFM processes even more transparent and, above all, even more efficient. Among other things, we are relying on the already very broad AMOS know-how of our sister companies. We chose AMOS because of its 30 years of success in the industry, but also because of its continuous product innovations, which help us

to establish state-of-the-art processes in Technical Fleet Management at Lufthansa as well."

From the moment of cut-over, the line maintenance operations will be fully paperless by using AMOSmobile, which is being interfaced with Lufthansa's Electronic Techlog Solution, ensuring the status of the entire passenger fleet is live and fully accessible throughout AMOS at all times.

For the future, the close cooperation of the group members will be further promoted by AMOScentral, a cloud-based message broker that enables the exchange of data between AMOS groups while allowing each group member to keep control over their individual AMOS environments. By adopting AMOScentral, the individual airlines, with their diverse needs, complexities and corporate cultures, are not obliged to work in a single environment. Instead, they are seamlessly connected via AMOScentral.

AMOScentral allows group members to harmonise and synchronise data, to send requests of an individual airline to several group members (such as part requests) and to forward technical data sets (such as Engineering Orders) to other member airlines. 

Top: Lufthansa will synchronise with other AMOS users



People

Who's moving in the industry?

Martin Broadhurst has been appointed as a non-executive director of **AJW Group**.

Sajedah Rustom has been appointed as CEO of **AJW Technique**, while **Robert Gogo** becomes Director of Customer Experience.

Robert Ymker has been appointed as Repair Manager at **APOC Aviation**, while **Sing Lo** becomes Warehouse Manager.

Ian Hilton is now Director of Business Development for Europe/Africa at **C&L Aerospace**, specialising in Embraer ERJ 135/145 and ATR 42/72 aircraft, while **Warrick Hood** has been employed to oversee its ATR spares programme and **im Katopodis** has joined as design engineer at **C&L Engineering**.

Andreas Meisel is the new CEO of **China Aircraft Services Limited**.

Jim Sturgis is the new COO of **EmpowerMX**.

Kandarp Joshi has been appointed as Associate Director of Software at **FLYdocs**.

Frank Walschot has been appointed as CEO of **HAECO**.

Matt Stewart has been appointed as Director Transformation Management Office at **Joramco**.

Graham Casbourne has been appointed as Business Development & Sales Director at **KLM UK Engineering**.

Benoit Rollier is the new Managing Director and CFO of **Spairliners**.

Jean-Marc Lenz is now CEO at **SR Technics**.

Mick Adams has been appointed by **STS Aviation** to oversee its European operations, including **Apple Aviation** in Birmingham.

Beau Hawkins has been promoted to Avionics Sales Manager at **Western Aircraft**.

If you have any personnel changes, email
ian.harbison@realresponsemedia.com



Events

Where the industry meets

MRO Latin America

22-23 January

CARTAGENA, COLOMBIA

mrolatinamerica.aviationweek.com

Aero-Engines Americas

4-5 February

MIAMI, FL

aeroenginesusa.com

Singapore Airshow

11-16 February

CHANGI EXHIBITION CENTRE, SINGAPORE

singaporeairshow.com

MRO Middle East Summit & Expo

24-26 February

DUBAI, UAE

mromiddleeast.aviationweek.com

MRO Australasia

11-12 March

BRISBANE, AUSTRALIA

mroaustralasia.aviationweek.com

Aerospace Tech Week

18-19 March

TOULOUSE, FRANCE

aerospacetechweek.com

MRO Americas

28-30 April

DALLAS, TX

mroamericas.aviationweek.com

ILA Berlin

13-17 May

ExpoCenter Airport, Germany

ila-berlin.de

If you have an upcoming event please contact Ian Harbison at
ian.harbison@realresponsemedia.com

Hangar doors for efficient operations

Offering exceptional functionality, durability and availability for your hangar door. With 35 years' experience of innovative construction with over 850 worldwide installations.

BUTZBACH - THE DOOR COMPANY.®

Butzbach GmbH Industrietore
Industrieweg 4-8
89299 Unterroth

Tel. +49 7343 81-130
hangar.doors@butzbach.com
www.butzbach.com

BUTZBACH
THE DOOR COMPANY.

**Rotable
Repairs**

REPAIR AND OVERHAUL
SPECIALISTS FOR AIRCRAFT

WHEELS AND BRAKES

www.rotablerepairs.com

COVERING ALL
AIRCRAFT TYPES

EASA / FAA PART
145 WORKSHOPS

FULL RANGE OF
NDT SERVICES

POOL AND CONSIGNMENT
STOCK AVAILABLE

CPAL, FIXED COST AND
ADVANCED EXCHANGE

www.rotablerepairs.com

**REGISTER
TODAY**



MRO MANAGEMENT

FREE SUBSCRIPTION APPLICATION

MRO Management is available free to senior management within airlines, aircraft operators, MRO contractors, OEMs, leasing companies, industry consultants, regulatory bodies and suppliers of services, systems and products to the MRO industry.

To register for a free subscription, visit realresponsemedia.co.uk/mro-management-registration. Alternatively, please complete all sections on the form below, scan the page and email it to us at laura.andrews@realresponsemedia.com

I wish to receive a free subscription: ☐ print ☐ digital ☐ newsletter

Name: _____

Job title/position: _____

Organisation: _____

Business address: _____

Country: _____

Tel no: _____

Email: _____

Signature: _____

Date: _____

0313

Please tick one box only that best describes your job function:

- ☐ Corporate managementA1
- ☐ Corporate operations.....B1
- ☐ Finance.....C1
- ☐ Legal.....C2
- ☐ Banking.....C3
- ☐ Leasing.....C4
- ☐ Engineering.....D1
- ☐ Maintenance.....D2
- ☐ Technical.....D3
- ☐ Safety.....E1
- ☐ Quality assurance.....F1
- ☐ Inspection.....F2
- ☐ Purchasing/procurement.....G1
- ☐ Planning/strategy.....H1
- ☐ Sales/marketing.....J1
- ☐ Public relations/communications.....J2
- ☐ Customer service.....J3
- ☐ Regulatory/government.....K1
- ☐ Training.....L2
- ☐ Recruitment.....L3
- ☐ Consultant.....M1
- ☐ IT.....Q1
- ☐ Other (please state).....ZZ

Please tick one box only that best describes your organisation:

- ☐ Airline1
- ☐ Aircraft operator3
- ☐ Maintenance/overhaul/modification service provider...11
- ☐ Aircraft freighter conversion/modification company...12
- ☐ Civil aviation authority43
- ☐ MRO equipment/system/service provider.....54
- ☐ Trade body/organisation.....41
- ☐ Government.....42
- ☐ Aircraft/engine/component manufacturer.....51
- ☐ Component manufacturer/supplier.....60
- ☐ Leasing/financial/legal institution.....52
- ☐ Industry consultancy.....53
- ☐ Training organisation.....55
- ☐ GSE supplier/manufacture.....59
- ☐ Recruitment consultancy.....62
- ☐ Other (please state).....99

We work on your success three MRO's at the time.



With the addition of JAT Tehnika, Avia Prime capabilities
grow even further

- 34 maintenance lines with 3 wide - body slots
- Advanced back shops including Engine Shop and Test Cell
- Competitive TAT
- EASA PART147 training

www.aviaprime.eu
sales@aviaprime.eu
trainings@aviaprime.eu

AOG

+48 723 010 101 | +386 41 692 738
+381 (11) 2675 578

/AVIAPRIME


Jat Tehnika

ADRIATEHNIKA


LINE TECH

One-stop shop for comprehensive MRO solutions



You can rely on us for all your aircraft maintenance requirements from base maintenance to major modifications, connectivity and more, for most commercial aircraft including the A380, the A350 and B787 Dreamliner.

We are the first Middle Eastern MRO service provider to receive the EASA Part 21J Design Organisation Approval for major cabin design and modifications and have extensive cabin and back-shop capability as well as EASA Part 21G Production Organisation Approval.

Our dedicated Customer Focus Teams are committed to add value to your business with customised solutions, ensuring complete customer satisfaction from the start of every project to timely delivery and beyond.

Follow us on LinkedIn: <http://bit.ly/EYEngLinkedIn>
Visit our website: www.etihadengineering.com



Flammability lab
and cabin interior
facilities



Inhouse
3D printing
facility



Extensive
back shop
capability



Complex
modification
expertise



All major
Airbus & Boeing
aircraft



World class
painting
facilities

