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EirTrade Aviation's Key Milestones

2010/2011

- EirTrade was founded in November 2010
- Warehouse opened by the Irish Aviation Authority
- 16 CFM56-3 engines

2012/2013

- Knock disassembly facility established
- First A320-200 disassembled at Knock

2014/2018

- Negotiated and managed the disassembly of two A380 aircraft
- Increased warehousing capacity to 42,000 square feet
- Completed world's first teardown of two A380s

2019

- Patrick Jordan invests and becomes a shareholder
- Asset Management division created
- Repositioned as a complete end-of-life solution provider

2020

- Aircraft disassembly capacity at Knock increased
- Increased warehouse and office capacity to 160,000 square feet
- Engine hospital shop set up in Dublin for Lufthansa's Irish operations

2021/2023

- Increased headcount to more than 80
- Established US facility in Dallas
- 29 aircraft and 51 engines acquired in 2021/2022 period
- Warehouse and office capacity increased to 220,000 square feet
- Opened the engine dismantling shop for CFM56-5A/5B/7B/3B
- Obtained AFRA accreditation at Knock

EirTrade Aviation's Areas of Expertise

End of life asset management • Engine and airframe parts sales • Engine and aircraft leasing
 Engine and aircraft disassembly services • Consignment programmes • Technical services
 Aircraft parking and preservation • Engine storage



Keeping the world's fleets flying

MRO

Management

Back in business

Widebody MRO specialists are gearing up for future growth

P44

DATA TRACKING

Wiser on driving accuracy and reliability in the MRO sector

P16

AIRCRAFT AFTERLIFE

Opportunities and challenges for recycling, reusing and repurposing

P30

ROLLS ROYCE REBOUND

Engine supplier expects return to pre-Covid flying hours

P38

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Editor's Letter

The aircraft teardown process plays a vital role in the aviation sector's efforts to improve its record on recycling, reusing, and repurposing aircraft parts. As the aviation industry continues to grow and modernise, the need for more sustainable practices becomes increasingly important.

No longer seen as an activity to end an aircraft's operating life, teardowns are becoming an essential, value-driven procedure offering numerous opportunities for the industry to reduce waste, conserve resources, and enhance its environmental performance.

Aircraft comprise various components which can all be recycled and repurposed. Furthermore, metals can be melted down and reused in new aircraft production and valuable parts like engines and avionics can be refurbished and sold as spare parts, extending their lifespan and reducing the demand for new replacements.

Several specialist companies are developing new technology to make the approach to aircraft end-of-life more efficient. For example, EirTrade Aviation's specialist fuselage support cradle allows it to remove landing gear at the beginning of the disassembly process, enabling the aircraft owner to monetise or utilise the landing gear sooner.

The recycling of aircraft parts of course requires specialised facilities, equipment, and skilled workforces. The dismantling process needs to be carried out meticulously to maximise the recovery of reusable parts and minimise waste. Coordinating these operations efficiently can be a logistical challenge, but as we learn more about aircraft in the afterlife in our feature on page 30, it is clear the industry is on a journey to fully understand the potential of aircraft recycling.



▲ EirTrade's unique jack allows landing gear to be dismantled first

In other exciting news, our Predictive Aircraft Maintenance (PAM) Conference is back this year on 27-28 November in London. Now a two-day event for 2023, it will bring together industry thought leaders for an agenda that will cover a broad range of issues related to predictive aircraft maintenance. You can find more event details on page 14, and we hope to see you there.

Regular readers of *MRO Management* will notice that I am the magazine's new editor; I'm thrilled to be joining an exciting sector and to continue to bring you the latest insights and trends shaping the MRO industry. Please do get in touch to share comments, but in the meantime, I hope you enjoy reading this issue.

Craig Waters

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MRO
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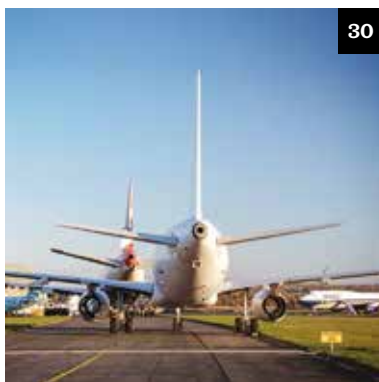
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Contents

JUNE 2023



6 Hangar talk

The latest industry news

12 Trend watch

New partnerships, solutions and initiatives are driving innovation

14 PAM 2023 preview

The Predicative Aircraft Maintenance conference is back, bigger and better

16 Industry voices

Wiser Systems' Cris Masselle on UWB RTLS intelligent tracking and positioning systems

18 Legal matters

A beginners' guide to Parts Manufacturer Approval

22 Q&A

Etihad Airways Engineering's David Doherty talks about growth and future opportunities for the business

24 Industry voices

EirTrade's Ken Fitzgibbon explains why predictability in the aviation industry is vitally important

26 Interview

Trade association AFRA tells us about its work on aircraft end-of-life standards and sustainability

30 Aircraft recycling

The opportunities and challenges for component recycling

38 Rolls-Royce Engine Maintenance

How UK manufacturer Rolls-Royce is determined to reach a return to near pre-pandemic flying hours

44 Widebody MRO markets

MRO specialists are gearing up to deal with the demands of returning aircraft and growing fleets

50 Green sky

AIRA's Tony Seville discusses why the industry must embrace aircraft interior recycling

Hangar Talk



ACMI

Avia Solutions Group takes “strategically important” step in development with move to Ireland

➤ Avia Solutions Group has become the second-largest Irish-registered aviation business behind Ryanair after moving its headquarters to Dublin.

The Lithuanian leasing, crew, maintenance and insurance [ACMI] provider said the move was “strategically important” for the business.

The new headquarters in Central Park, Leopardstown, is expected to have up to 50 specialists from various fields working at the site.

Jonas Janukenas, chief executive of Avia Solutions Group, said: “Moving the company’s controlling headquarters to Ireland is a strategically important step for us in terms of our further development plans.

“Ireland is known as a global aviation hub. A large number of aviation companies are here so, being closer to the aviation community, we will be able to implement the group’s development plans faster and maintain market leadership.

“The group previously financed expansion in 2019 on the Dublin Stock Exchange with a \$300 bonds issue, bought by the world’s largest institutional investors from the US and Europe; this was also a reason for choosing Ireland.”

Avia agreed a €300 million investment in 2021 from Certares, a US-based investment management company focusing on travel, tourism and hospitality sectors.

Janukenas added: “Ireland is at the centre of this growth, having developed

a world-renowned expertise in global aviation finance. It was the first European country to ratify the Cape Town Convention in 2005, and it has 14 of the world’s top 15 lessors based here, with approximately 50 per cent of the world’s leased aircraft managed or leased from Ireland.”

The latest issued financial results for Avia Solutions Group for the financial year ending December 31 showed a year-on-year doubling of revenue to €1.9 billion, EBITDA at €288 million, and adjusted profit totalling €85 million.

In 2022, 96 per cent of Avia Solutions Group’s revenue was generated by operations in Western Europe (81 per cent), Asia (10 per cent), and North America (5 per cent).



ENGINES

Rolls-Royce breakthrough with new UltraFan technology aircraft engine

➤ Rolls-Royce completed the first tests of a new type of aircraft engine using UltraFan technology that could be fitted to Trent engines to make them more efficient.

The engine manufacturer conducted the tests using 100 per cent sustainable aviation fuel (SAF) at its Testbed 80 demonstrator facility in Derby, the world's largest.

Rolls Royce declared the test a "historic moment" due it being the first time in 54 years that it has tested a new engine architecture.

The firm said the breakthrough is "proof of what can be achieved when industry and governments work together".

Tufan Erginbilgic, chief executive of Rolls-Royce, said: "The UltraFan demonstrator is a game changer – the technologies we are testing as part of this programme have the capability to improve the engines of today as well as the engines of tomorrow.

"That is why this announcement is so important – we are witnessing history in the making; a step-change in engine efficiency improvement."

MRO

Farsound celebrates milestone with new "state-of-the-art" facility in Texas

➤ Supply chain and logistics solutions specialist Farsound will open a new facility in San Antonio in Texas this summer.

Described as "state-of-the-art", the facility will become the base for all Farsound's activities in the Americas, from bespoke MRO supply chain services to aero engine parts logistics.

Farsound said it will enhance the services it offers to its customers across the US. The initial facility will occupy approximately 28,000 sq ft of specialist warehousing and office facilities.

New Farsound president US, Matt Berkebile (pictured), said: "Opening this exciting new facility in San Antonio is an enormous milestone for Farsound. It supports



our ambitious plans to strengthen our presence in the US market and grow our reputation for excellence, customer service and innovation in the global aviation industry."

BRIEFS



- UK-based aviation engineering specialist Nasmyth completed a financial restructuring that saved the business from collapse. In a statement released after the board completed the restructure of the holding company, the firm said it "will provide both the financial security and capital base it needs to continue to prosper into the future".

- MRO specialist provider VSE Corporation has agreed a deal to acquire the parent of rival Desser Aerospace for \$124 million. The deal, which was announced on May 4, was expected to close within 90 days of being made public, subject to regulatory approvals.

- Global aviation supply chain solutions firm FDH Aero has completed the acquisition of BJB Electronics Group. FDH said that the acquisition "broadens and deepens" its role in the aviation supply chains, and will enable it to offer a more expansive range of products and services.

- Pratt & Whitney is to expand its engine component repair facility at Wichita Falls in Texas thanks to a \$10 million investment. The Canadian business unit of the engine manufacturer announced that the expansion of capabilities at the facility will create 30 new jobs.

- Lufthansa Technik is expanding its presence in South America through a new partnership with Chilean carrier JetSMART. The five-year deal covers extensive CAMO (Continuing Airworthiness Management Organisation) support and aircraft engineering services.

\$89.6

million

Net income reported by aviation MRO specialist Triumph in its financial year to March 31

300

The number of aviation mechanic students a new FEAM Aero training facility in Cincinnati will be able to house

€1.5

billion

Revenue in the first quarter of 2023 Lufthansa Technik said it expected to hit



MRO

SF Airlines and STE form Chinese joint-venture



Singapore Technologies Engineering (STE) has formed a new joint venture company with SF Airlines in the Chinese city of Ezhou.

The venture is a partnership between STE's commercial aerospace business and the Chinese cargo airline owned by SF Express. It was set up with registered capital of around S \$19m. ST Engineering has a 60 per cent stake in the venture with the remaining 40 per cent held by SF Airlines.

The venture will operate a greenfield airframe facility at the Ezhou Huahu Airport to provide airframe MRO

services to cargo and passenger airlines operating in the Asia region, including SF Airlines. The first hangar facility is expected to be ready in 2025.

Jeffrey Lam, president of commercial aerospace at ST Engineering, said: "China will be a strong growth driver for Asia's commercial aerospace sector over the next decade.

"A presence in Hubei, China will enhance our MRO network in Asia to better meet and capture the rising regional demand, while our strategic collaboration with an airline partner will enable us to start up a greenfield operation quickly."



FACILITIES

JETMS facility opens in Lithuania



JETMS has opened new hangar space in Kaunas in Lithuania as it continues its business expansion.

The global maintenance and interior solutions provider's subsidiary JetMS Regional will increase maintenance capabilities offering more services to clients from November.

Vytis Zalimas, chief executive of JetMS Regional, said: "Our expansion is a testament to our unwavering commitment to providing high-quality maintenance services.

"This strategic move will double our capacity from the current JETMS VNO hangar, allowing us to sell approximately 100,000 MHRS per year.

"By doing so, we can serve a larger client base and offer more comprehensive maintenance solutions. These efforts further strengthen our position as a leading player in the aviation industry."

"This move will double our capacity, allowing us to sell approximately 100k MHRS per year"



MAINTENANCE

Lufthansa Technik signs support deal with SmartLynx Airlines

➤ Lufthansa Technik is to provide component support for SmartLynx Airlines having signed a seven-year deal with the ACMI, cargo and charter services provider.

The deal covers maintenance for over 60 aircraft, including 53 Airbus A320s, ten A330s and four Boeing 737 MAXs.

Latvia-based SmartLynx Airlines has experienced rapid growth in recent years, and says it is now focused on “excellence and reliability for its customers”.

The partnership aims to optimise its service and achieve better performance. The total component support (TCS) agreement includes services such as spare parts pooling and MRO for the required components.

SmartLynx Airlines will see short and fast transport paths within Lufthansa Technik’s global supply chain, including Aircraft On Ground (AOG) support for time-critical components.

Lufthansa Technik’s support is expected to be especially critical during the upcoming peak season.

Zygmantas Surintas, chief executive of SmartLynx Airlines, said: “As we gear up for the busy summer season, the safety and comfort of our customers continues to be our top priority.

“Last year we faced a number of challenges due to the lingering effects of the Covid-19 pandemic on spare part availability, and we are fully committed to avoiding any repeat of those difficulties this year.

“Our new contract with Lufthansa Technik is critical to reaching our goal of optimising our performance and becoming the world’s leading and trusted ACMI airline.”

Kai-Stefan Roepke, vice president corporate sales EMEA at Lufthansa Technik, added: “We are very proud to be the new component provider for SmartLynx Airlines.

“I would like to thank them for their trust in Lufthansa Technik and our state-of-the-art TCS services which promise excellent quality and assistance for the highest performance.”



ACMI

TrueNoord completes Helvetic Airways Embraer lease deal

➤ TrueNoord has put open to paper on the three-year leases of two Embraer E190 aircraft to regional carrier Helvetic Airways, despite ongoing supply chain and MRO challenges.

The aircraft will be based in Zurich operating flights across Europe and will be made available for ACMI to airlines and tour operators as well as Helvetic’s scheduled operations.

They take the Helvetic Airways’ fleet to 18 aircraft. Chief executive Tobias Pogorevc said: “TrueNoord specialises in regional aircraft and is therefore an ideal partner for Helvetic Airways. The two modern Embraer E190s are the perfect addition to our fleet.”

Ahmed Ali, sales manager – Europe at TrueNoord commented: “Despite the supply chain and MRO challenges, TrueNoord is able to make these regional aircraft available to Helvetic Airways just in time for the peak summer travel period.”

TrueNoord chief executive Anne-Bart Tieleman said the long-standing partnership with Helvetic “is a testament to its value proposition and we are proud to be their lessor partner”.

“The two modern Embraer E190s are the perfect addition to our fleet”

A large industrial jet engine is the central focus on the right side of the image, mounted on a complex assembly line. In the background, two workers in dark blue shirts are visible; one is seated at a workstation with multiple computer monitors, and the other is standing nearby. The factory environment is filled with yellow overhead cranes, various mechanical components, and structural beams. The lighting is bright and industrial.

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TREND WATCH

New partnerships, solutions and initiatives are driving innovation in the MRO industry



01

MRO capacity

● A lack of MRO capacity was among the big 10 challenges for the aviation sector set out by Avia Solutions Group chairman Gediminas Ziemel.

Among the issues the sector is expected to have to deal with Ziemel listed delays in LEAP engine maintenance and MRO booking slot scarcity.

He also cited additional debt airlines have taken on to finance spare parts and maintenance, repair and overhaul.



05

One-stop cooperation

● Spirit AeroSystems signed an exclusive cooperation agreement with ST Engineering's Commercial Aerospace business to support customers in the Middle East.

The deal covers Qatar, the UAE, Jordan, Saudi Arabia, Kuwait and Oman. The firms will combine their expertise across various aircraft platforms.

Kailash Krishnaswamy, senior vice president of Spirit Aftermarket Services, said: "The cooperation will allow two strong MRO players to offer one-stop, comprehensive MRO solutions for our Middle Eastern customers."

"The cooperation will allow two strong MRO players to offer one-stop, comprehensive MRO solutions for our Middle Eastern customers."

02

Cloud certification

● Aircraft maintenance software provider Rusada has been granted cloud integration certification for its ENVISION solution with aviation technology specialist SAP.

The SAP certification allows organisations using SAP S/4HANA to access the ENVISION software and pass data between the two systems using tested integrations.

ENVISION Integrator allows customers to create input and output interfaces for SAP systems without additional programming, using standard APIs available on the SAP Business Technology Platform.



03

Lease deal

● OEMServices and AerCap Materials have agreed a new multi-year component lease agreement to provide inventory services for pool access support.

AerCap Materials is a leading global distributor of airframe material for Airbus, Boeing, Bombardier, and Embraer, as well as components for CFM and Pratt & Whitney engines.

The new agreement will see OEMServices Original Integrated Services continue to provide pool access services from Dubai for its key A380 customers.

04

TRIUMPH profits

● Aviation and defence industries MRO specialist TRIUMPH reported healthy profits for the financial year to March.

The company reported net sales of \$1.38 billion and net income of \$89.6 million. Operating income was \$238.1 million. Adjusted operating income stood at \$158.7 million.

Adjusted EBITDAP, a measure of profitability, came in at \$195.7.



Trending stats

36

According to the Airbus AMM, an A350-900 requires a C-check every 36 months (from Widebody MRO Markets feature, p44)

£143

MILLION

Last year's bounce back profit of Rolls-Royce's civil aerospace division (from Rolls-Royce Engine Maintenance feature, p38)

95

The percentage of components that can be recycled from an Airbus A320 (from Aircraft Recycling feature, p30)

550,000

Number of square metres of Abu Dhabi International Airport's expanded MRO facility (from Etihad Airways Engineering Q&A, p22)

06

Skills gap

● A study has warned the sector faces a 'perfect storm' of dwindling workers while demand for flying from travellers accelerates.

The Risk to Aviation's Future by recruitment consultancy AeroProfessional claims 27% of the aircraft engineering workforce are due to retire in the next decade.

It claims a further 45% are considering switching to another industry and forecasts 680,000 engineers will be required to meet growing demand.



08

Expanding reach

● AJW Group has appointed Geoff Shearer as its new representative for the Australasia region.

Shearer's responsibilities will be to nurture relationships with key customers, maximise opportunities arising from the company's presence in the region, and expanding its business reach.

He brings a wealth of experience and expertise to his new role, with a distinguished career spanning several decades in the aviation industry.

07

Component repair

● AMETEK MRO AEM has expanded heat exchanger capabilities at its Ramsgate facility in the UK, following increased customer demand from A320, B737 and B757 aircraft fleet operators.

The firm said that there is limited support in Europe for heat transfer outside of the OEM providers, so investment in AEM will "provide a solution" for customers to obtain local support for repairs with a broad capability covering a variety of aircraft types.





PAM RETURNS *bigger and better*

Aviation Business News' annual Predictive Aircraft Maintenance Conference proved to be a huge success last year, so this year it has been expanded and found a new home

The Predictive Aircraft Maintenance (PAM) Conference has been expanded to a two-day event this year following demand from delegates.

The event, which was relaunched following the Covid pandemic last year

by MRO Management parent brand *Aviation Business News*, will take place on November 27-28.

The prestigious Ham Yard Hotel has been chosen to host PAM 2023 due to its excellent conference facilities, as well as its location close to Piccadilly Circus in the heart of London.

More than 150 delegates who have pre-registered have been contacted to secure their places with an early bird rate for suppliers and free places available for airline employees.

Delegate fees include an invitation to a welcome drinks reception on November 26 and entry to a networking event featuring ten pin bowling and karaoke at the Ham Yard.

The expanded event will offer the opportunity for the agenda to cover a broader range of topics, in particular the legal, regulatory and sustainability issues that relate to predictive aircraft maintenance.

Sessions on the first day will include panel discussions from the perspectives of all key stakeholders in the MRO sector including airlines, aircraft and engine manufacturers, OEMs and technology developers.

There will also be opportunities for case studies showcasing successful predictive aircraft maintenance solutions in action and keynote presentations from thought leaders in the sector.

Last year PAM featured expert speakers from the likes of Airbus, Air France, Lufthansa Technik, Rusada, GE Aviation and StandardAero, among others.

Lee Hayhurst, editorial director of *Aviation Business News*, said: "The feedback from last year's event was spectacular with every single one of the delegates we asked saying they intended to come back for PAM 2023.

"And we were extremely proud when the event was nominated in the Best New Business Initiative category in the ALF Awards which honours the achievements in the sales and marketing industry.

"That gave us the confidence that making the event a two-day conference and bringing it to a premium venue was the right thing to do.

"We're lining up another fantastic roster of speakers and sponsors for the conference to whom we are extremely grateful for their support."



2022 key takeaways:**120+**

Delegate attendees onsite at the event

40+

Airline attendees representing airlines from five continents

97%

of attendees rated the conference very good or better

100%

of attendees plan to attend PAM 2023.

More than half rated the networking as excellent.

Testimonials:

“ Predictive Aircraft Maintenance 2022 was an excellent conference; very well managed with thought-provoking sessions including industry leaders and expert speakers on this subject. The mixture of networking opportunities and conference topics encouraged interaction between all participants, which was vindicated by the quality of questions that came from the floor, and which were expertly answered.”

Jim Berryman, aerospace and defence director, Bolloré Logistics

“ We were pleased to sponsor the inaugural Predictive Aircraft Maintenance Conference in 2022. This proved to be an extremely worthwhile event for EirTrade with networking opportunities generating worthwhile discussions and fostering new relationships. The structure of the day created a professional environment for discussion and the conference delivered powerful insights with expert speakers and knowledgeable industry participation.

EirTrade is pleased to work closely with the organisers on an enhanced event for 2023 which will integrate the exploration of new topics covering recycling, teardown and sustainable practices. We are excited to be part of the team to bring this industry-leading forum to reality and proud to be Platinum Sponsor. We look forward to welcoming everyone to participate in a fantastic agenda and a great event.”

Ken Fitzgibbon, chief executive, EirTrade Aviation

“ It was great to represent easyJet at the Predictive Aircraft Maintenance Conference 2022. Events like this are invaluable to connect like-minded visionaries to share experiences and ideas. Each member of the organisation team was incredibly efficient, professional and enthusiastic.”

Craig Lynch, head of predictive maintenance, easyJet

Clockwise from top left: Last year's PAM 2022 highlights included sessions on software, analytics and digital offerings; an academic perspective from Dr Ip-Shing Fan; Lufthansa Technik's Mia Witzig on Aviator; the event offers ample opportunities to foster new relationships and share ideas; the prestigious Ham Yard Hotel will be the venue this year

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THE PROMISE OF DATA-DRIVEN INTELLIGENCE

Cris Masselle, Wiser Systems' chief marketing officer, says only UWB RTLS intelligent tracking and positioning systems are capable of providing the accuracy and reliability needed in today's hi-tech MRO sector



“Continuous data collection by UWB RTLS systems ensures there are no gaps in the data, even if a product goes off the production line or there are pauses in the process”



Cris Masselle
is chief marketing officer
of Wiser Systems



For more information on real-time location and tracking systems, visit wisersystems.com

Ultrawide-band (UWB) Real-Time Location Systems (RTLS) provide accurate and timely positioning and tracking data continuously, unlike last-known-scan solutions.

With UWB RTLS, even industries with cluttered, metal-filled environments can more accurately and reliably monitor assets and manage inventory and workflows with 100 per cent visibility.

The reliability and accuracy of the data generated is essential if the MRO industry is to benefit from the data-driven intelligence analytics and valuable insights promised by Industry 4.0. For this reason, identifying which RTLS system can best meet the accuracy and reliability data requirements for a facility or operation is of critical importance.

There are many kinds of RTLS systems on the market today, including Bluetooth, WiFi, BLE, and RFID that operate well enough in settings like homes, offices, retail stores and health care facilities, but only UWB RTLS can deliver the data that consistently locates accurately and reliably in heavy industrial environments like MRO, even where there is often no direct line-of-sight to thousands of assets.

The significance of high-quality data in UWB RTLS extends to several areas, including process optimisation and data-driven decision-making. Process optimisation involves critical aspects such as production planning, capacity

planning, identification of production bottlenecks, workforce optimisation and efficiency improvements.

On the other hand, data-driven decision-making relies on reliable data to assess rework history, determine total production costs, access real-time insights, drive production processes and ensure accurate parts location and assembly. These factors underscore the importance of good data quality in maximising operational performance and informed decision-making within the context of RTLS.

The combination of UWB RTLS and data analytics empowers MRO organisations to make informed decisions regarding resource allocation, equipment investments, maintenance planning and other critical areas. For instance, UWB RTLS data provides visibility into rework processes by tracking the number of times each lot must be reworked and the time taken for each process. This information aids in identifying areas for quality improvement, reducing rework and optimising production processes.

Additionally, having a comprehensive view of the time taken for each step, product type or lot allows organisations to calculate production costs. This facilitates better planning, pricing and investment decisions, optimising labour and capital costs. Continuous data collection by UWB RTLS systems also ensures there are no gaps in the data, even if a product goes off the production line or there are pauses in the process.



“Uninterrupted data collection gives a holistic view of the production process, so organisations can make accurate and reliable decisions”

This uninterrupted data collection provides a holistic view of the production process, enabling organisations to make accurate and reliable decisions.

UWB RTLS data can be used to drive production transactions, such as delivering items to the production line or initiating inventory orders. Access to precise location information of parts minimises the chances of assembling the wrong components. It also aids in locating missing parts, catching errors in real-time and speeding up production.

Impact on Predictive Analytics and Machine Learning

Accurate and reliable data from UWB RTLS, combined with sensors and IoT (Internet of Things) devices enables real-time monitoring of equipment conditions, even in motion. By collecting data on variables such as vibration, temperature and performance metrics, organisations can benefit from proactive equipment failure prediction, optimise maintenance scheduling and process optimisation, enabling cost reduction, downtime optimisation and implementation of tailored maintenance strategies.

It is crucial to consider the implications of inaccurate location data in organisations. Erroneous real-time

positioning and tracking data can lead to misleading analysis, resulting in flawed decision-making processes. This can have far-reaching impacts on productivity, profitability and customer satisfaction. Inaccuracy in location data can exacerbate errors and inefficiencies in operational processes, leading to reduced productivity and increased costs.

For example, one customer used UWB to prevent the waste associated with mis-channelled materials. Materials that were incorrectly channelled and processed in the wrong order were typically thrown away. Catching a part before it could be processed in the wrong order not only saved it but saved the cost of making its replacement as well as reducing material waste.

In addition, digital twin scenarios powered by RTLS data can seamlessly integrate location data information, sensor readings and operational data, giving operators the ability to visualise the facility and its assets and model alternative optimised workflow scenarios.

Obtaining precise UWB RTLS data for process improvements can be challenging due to variations in RTLS technologies and their performance under different conditions. It is essential for managers to thoroughly evaluate and test the accuracy

and reliability of any RTLS system before making a purchasing decision.

For instance, consider the case of a customer who used active RFID to track machinery throughout the manufacturing process. Once the equipment left the production floor and was parked outdoors awaiting shipment, it could no longer be tracked. Consequently, it became lost among a multitude of other pieces of equipment in that area. Had the customer installed a seamless indoor-outdoor UWB mesh solution, they could have achieved 100 per cent coverage even in areas with too-high ceilings or no ceiling at all.

In another example, a customer who implemented a UWB system that required line-of-sight found that even the slightest reorganisation of the floorplan (moving a potted plant, for example) was detrimental to the point where the system was no longer reliable enough.

In summary, UWB RTLS offers high-quality real-time location data that serves as a crucial first step in enabling valuable insights, actionable intelligence and data-driven decision-making in industries such as MRO. ^M

▲ UWB RTLS data, combined with sensors, allows operators to monitor real-time equipment conditions, even in motion



Joshua Krotec

MARPA board member
and senior vice president of
First Aviation Services

A handy cut out and keep guide to Parts Manufacturer Approval

MARPA board member **Joshua Krotec** answers common questions people new to aviation ask about standards



Visit pmaparts.org for more information on the non-profit trade association that represents parts manufacturers

It is important to understand the regulatory basis for aircraft parts manufacturing. So much else evolves out of that seed, from documentation standards to international acceptance criteria.

In this article I will summarise some of the basic standards that apply to manufacturing and identifying Parts Manufacturer Approval (PMA) components for aircraft.

Additionally, I will provide answers to the basic questions that I often hear asked by people who are new to the aviation industry.

To manufacture an aircraft, or parts for an aircraft, you will need government approval. Typically, this takes the form of (a) design approval and (b) production approval.

To issue a design approval, the government assesses the design against

the safety and airworthiness standards published by the government. These standards are usually published in the regulations, although they can be published in other resources (such as Technical Standard Orders).

The data being assessed can include drawings, tests, inspections and any other information calculated to demonstrate that the design meets one or more safety and/or airworthiness standards.

If the government determines that the design meets the applicable standards, then it can issue a design approval. In the case of an aircraft engine or propeller, this design approval takes the form of a type certificate.

To obtain a production approval, the applicant must show the FAA that the applicant's production quality assurance system is sufficient to ensure that each part released from the system will meet the standards of the approved design.

In the case of an aircraft engine or propeller, this design approval takes the form of a production certificate (PC).

The FAA issues two types of approvals that are both design and production approvals: Parts Manufacturer Approvals (PMAs) and Technical Standard Order Authorisations (TSOAs).

In each case, the government has to make all of the findings supporting both design and production approval before it can issue the PMA or TSOA.



Because the approved production system ensures that parts meet the approved design, and the design approval ensures that the design meets FAA safety and airworthiness standards, the result of the two approvals together is that they yield parts that meet FAA's published safety standards.

In the 1990s, many companies considered themselves to be Original Equipment Manufacturers (OEMs) who did not need production approval.

The FAA put a stop to this through the Enhanced Enforcement Program (EEP). When EEP was published, the FAA made it clear that all aircraft parts must be produced in accordance with the FAA's manufacturing regulations.

Aircraft parts must conform to an acceptable FAA method of compliance; for most parts, that means that they are produced under FAA production approval (PC, PMA or TSOA).

Unless the aircraft part fits into a special exception (such as standard parts, maintenance-produced parts, etc) this rule applies to practically all aircraft

“To issue a design approval, the government assesses the design against its safety and airworthiness standards”

parts. It even applies to so-called Original Equipment Manufacturer (OEM) parts.

A company that made the parts that went on the original aircraft is not allowed to sell replacement parts to the installation industry unless those parts meet one of the FAA's categories of acceptable parts.

This can mean selling the parts through a PC holder (so they are inspected/assessed according to the production certificate holder's quality assurance system) or it can mean the so-called OEM getting a PMA to sell their own parts to the repair station and air carrier community.

Yes, many companies that we think of as OEMs produce their parts under PMA. So how do you identify PMA parts? The FAA requires PMA parts to be marked with the following:

- A mark identifying the PMA holder (a name, trademark, symbol, or other FAA-approved identification);
- The part number;
- The letters 'FAA-PMA'.

If you obtain a PMA part, the markings should leave no question that it is a PMA part.

It is fairly normal in the aviation industry for a manufacturing company to include some sort of manufacturer identification as a prefix or suffix to the part number.

The root part number (aside from the manufacturer's identification) is often identical to the part number that it will replace. This makes it easier for the person selecting the part to coordinate the replacement part.

For example, Hamilton Sundstrand made packing for a heat exchanger that



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WHY SHOULD YOU BE INTERESTED IN PMA PARTS?

MARPA Member airlines worldwide already take advantage of PMA parts on their fleets in order to achieve benefits like safety, reliability, reduced lead times, and savings in order to remain competitive. Other operators could be enjoying these same benefits. The global leasing community should look to PMA as a way to protect the value of their assets.

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“You can look up PMA part numbers on the FAA’s Dynamic Regulatory System to verify whether the FAA has approved the part ”

is part-numbered 69494J354. Jet Avion then made a PMA replacement part which has the part number JA69494J354 (notice the ‘JA’ prefix for ‘Jet Avion’).

Wencor made a PMA replacement part with the part number 69494J354WE (notice the ‘WE’ suffix for ‘Wencor’).

It is normal in the industry for these prefixes and suffixes to be at least two letters long so that they cannot be confused with a revision-level indication.

An independent PMA part number may not be listed in the illustrated parts catalog. This is not a problem as long as the FAA-PMA supplement identifies the part.

You can look up PMA part numbers on the FAA’s Dynamic Regulatory System

(DRS.FAA.gov) to verify whether the FAA has approved the part.

Those usually in charge of ordering aircraft parts know that slight variances in part numbers can be important, so airlines typically review PMA parts and then intentionally place them into their parts databases after their engineering department has confirmed that the PMA part is definitely a bona-fide replacement.

The process for approving the PMA parts for use by the airline often includes both an engineering component (such as an engineering configuration control) and a commercial component (such as identifying a contract price at which the part will be purchased).

However, once the airline has decided that it can use the PMA part, that part is fully FAA-approved and eligible for installation.

Thus, an airline typically orders the PMA version of the part after the PMA part has been intentionally inserted into the air carrier’s computer system.

This article was intended to answer some of the questions that I hear asked by people who are new to the aviation industry. Please feel free to cut this out of the magazine and tape it to the wall for your younger colleagues. 

▲ Once an airline has decided it can use the PMA part, it is fully FAA-approved and is eligible for installation



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David Doherty, vice president commercial (acting), Etihad Airways Engineering

‘It’s all about commitment’

Following a visit by *MRO Management* to Etihad Airways Engineering’s facilities in Dubai, acting commercial vice president David Doherty talks about expanding and partnering globally and its approach to driving development this year and into the future

Q. The recently announced expansion of the Etihad Airways Engineering maintenance facility adjacent to Abu Dhabi International Airport feels like a big moment. What led to the decision to expand, and what are your goals and ambitions?

It has always been a long-term goal to expand the facilities to meet our strategic objectives, supporting the consistent growth of our extensive capabilities and customer footprint across the globe, and to cater to the rising global demand for industry-leading MRO services.

We are investing in the expansion of our facility at Abu Dhabi International Airport to a total site area of 550,000 square metres. Our MRO facility is currently the largest of its kind in the Middle East and can accommodate around 40 widebody and narrowbody aircraft on its busiest days.

In addition to our existing hangars, we are now building two new widebody hangars. A new widebody bay (6D), large enough to take an A380, will be added to Hangar 6 which can induct three A380s simultaneously at present. Another new hangar (Hangar 7) will be built with two B777 capable bays.

The demand for our comprehensive aircraft engineering maintenance solutions from customers across the globe is at an all-time high and our facility and capacity expansion is a part of initiatives to meet that demand.

Q. Will this lead to an increase in man hours, and why is this important?

Having a greater capacity and more hangars will help us take on additional strategic partnership projects and serve a larger number of customers.

One of the hangars we are building is customised to our specific business requirements and will be dedicated to passenger-to-freighter conversions.

It is our expectation that the additional hangar capacity will allow us to reach our two million man hours per annum target.

Q. How significant are the A380 12-year checks to the business?

Etihad Airways Engineering carried out the world’s first 12-year check on an A380. It added to our robust experience and expertise of extensive structural modifications, cabin reconfigurations and refurbishment on A380s for customers across the world.

Even though A380 heavy maintenance may wane over the long term, our proficiency in possibly the world’s most

exhaustive aircraft checks demonstrates our ability to plan, manage and execute complex aircraft maintenance projects on time and to the satisfaction of a range of global customers.

Our MRO expertise covers most major commercial Airbus and Boeing platforms, including the A380, the A350 and the B787.

Q. Many MRO companies describe themselves as ‘one-stop-shops’. What are some of the latest innovations and capabilities that have been added?

We deliver hundreds of aircraft every year to customers all over the world, and our work ranges from routine heavy maintenance to cabin reconfiguration, from complex structural repair to component repair and overhaul, from livery paint to parking and preservation.

We are constantly adding new capabilities to our service portfolio and continue to build our experience and expertise across the entire spectrum of aircraft MRO solutions.

Manufacturing 3D printed cabin parts inhouse and flammability testing are some of the recent capability upgrades we have been investing in and delivering innovative solutions to our customers under one roof as we move towards being a Digital MRO.

Q. The company’s 3D printing capabilities seem to be becoming more important. How has this grown in importance and what are the next steps?

Etihad Airways Engineering was one of the first commercial MROs in the world to have an inhouse 3D printed lab for manufacturing certified aircraft parts.





2

“It is our expectation that the additional hangar capacity will allow us to reach our two million man hours per annum target”

We launched our 3D printing facility with a humanitarian project, manufacturing and distributing 3D printed face shields to frontline health workers during the pandemic.

Over the years, we have manufactured and delivered a wide range of aircraft cabin parts to customers in the Middle East, Europe and Latin America and the demand continues to grow consistently.

Our 3D printed parts are EASA-certified, light and durable, and come with significantly shorter lead times for cabin parts that are not readily available off-the-shelf from OEMs.

These can easily be shipped around the world to our customer locations. Our 3D printing business is currently making a six figure contribution to our bottom-line; this is expected to increase further as we have recently added another 3D printing machine to our facility.

This more than doubled our capacity and enabled us to not just fulfil existing orders but also meet any on-demand requirements of our MRO customers whose aircraft are undergoing maintenance at our facility.

Q. How important is company culture and what are Etihad Airways Engineering's main philosophies?

We are a truly multinational company with professionals from more 50 nations working as one team at Etihad Airways Engineering. What has kept us all together for decades is our commitment to deliver the best possible solutions to our customers as a team and always have a can-do attitude.

Therefore we have many world firsts to our credit, from the world's first stripping and painting of a B787 by a commercial MRO to the very first 12-year heavy maintenance check on an A380.

Our office tagline is 'It's all about commitment' as that embodies our attitude to our customers as well as our colleagues, as we support each other in success.

Q7 This year's MRO Middle East show saw many announcements and seemed to be a big success for the company. What is your strategy and main areas of focus for the rest of 2023 and beyond?

As we navigate the changing challenges that the aviation market presents, our

focus on the short term is supporting our customers as they complete their Covid recovery journeys and return to full operation.

We will continue to look to address the skills gap, utilising the new training academy operated on site by the technical training team. In the medium term, we want to secure more multi-year contracts with our key customers as we tailor our capability to meet their changing fleet demands.

We have big plans going forward, including some very significant partnerships to enhance our capabilities as we work with OEMs to deliver aftermarket support.

Despite the new hangar build, we also recognise the need to expand our MRO network, through partnership, as we have done in South America.

It is not feasible to fully support our global customers through a single base, so this will be an area that we are looking at developing. ^M

1. An A380-800 in for maintenance

2. The Etihad Airways Engineering facility

THE IMPORTANCE OF PREDICTABILITY IN THE AVIATION INDUSTRY

Ken Fitzgibbon, chief executive of Dublin-based aircraft recycling specialist EirTrade, observes that in a sector facing many and varied challenges which cannot be anticipated, it is vital that it predicts what it can - from end-of-life asset values to workforce challenges

Predictability in all walks of business is highly desirable, but anyone who works in aviation knows all too well a lot can happen that simply can't be anticipated.

Volcanic eruptions, weather events, bird strikes and industrial action can all upset best-laid plans - and who could have predicted a two-year grounding due to a global pandemic?

This is why it's vital that we predict what we can in the aviation sector, particularly as it's faced with supply chain issues and workforce challenges.

This is no more evident than in MRO, and that is why Predictive Aircraft Maintenance is a topic of growing importance as airlines look to operate more efficiently and sustainably.

Modern data analytics allow operators a much more detailed understanding of their operations, enabling them to anticipate future needs. We'll hear

plenty about this at this year's Predictive Aircraft Maintenance Conference organised by *MRO Management* and *Aviation Business News*.

In EirTrade's world, predictability is all about how we realise the value in an asset at end-of-life. That aircraft is not going to operate again, but what is the residual value?

We break the asset down and look at the value of everything we can sell so customers have a fair idea what they can expect before they go to market.

We've got a production line for dismantling, just as Boeing has for building aircraft, and what makes us different is that we have a process whereby we can tear down a narrowbody in just 15 days.

We have developed jacks that allow us to take off the landing gear and get to the most valuable parts first, so customers can get a predictable return on their asset sooner.



"In EirTrade's world, predictability is all about how we realise the value in an asset at end-of-life"



Ken Fitzgibbon is chief executive of EirTrade Aviation

What's harder to predict in terms of aircraft at end of life is the materials OEMs will use during manufacturing and whether or not these can be recycled, such as carbon fibre.

Why is an OEM permitted to manufacture an aircraft without a proper procedure for recycling? If they know what's in the aircraft, why are they not looking for the correct solution?

They're primarily focused on making the aircraft more fuel-efficient but, by using those lightweight materials like carbon fibre, they solved one issue and created another, pushing the problem down the line.

Something that is predictable in aviation, I'm afraid, is the lack of qualified engineers in the sector, which is not going to be solved any time soon.

B1 and B2 mechanics are extremely hard to find, and they are demanding higher and higher wages, so you have to ask what are the cost implications from a maintenance point of view.

Do we have enough people coming through from college that want to become B1 and B2 mechanics? How do we attract talent to the industry?

This cost and efficiency squeeze in MRO is going to make it even more important for airlines to predict as much as then can when and what maintenance services they are going to require. **M**

◀ EirTrade was the first firm to tear down a Boeing 787





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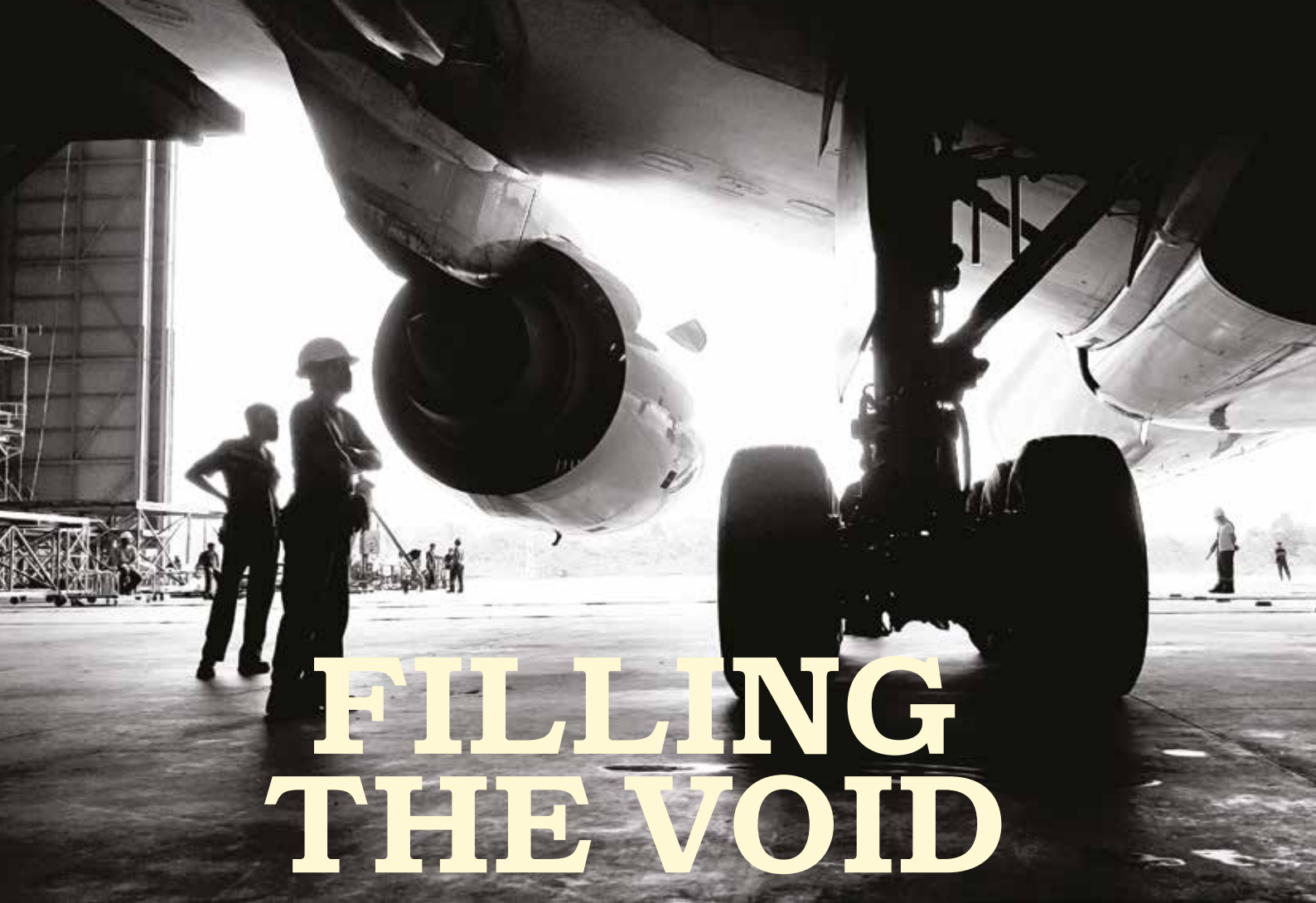


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FILLING THE VOID

1

Lee Hayhurst spoke to trade association AFRA about the important work it does on standards in the aircraft end-of-life sector and pushing the sustainability agenda

Since it was established in 2006, the Aircraft Fleet Recycling Association (AFRA) has championed self-regulation as better and more effective than government intervention.

As increasing numbers of aircraft reached end-of-life, it was clear there needed to be industry standards for their dismantling and the Used Serviceable Materials (USM) market. The group was established so that regulators did not feel the need to intervene, and it developed Best Management Practices (BMPs) covering disassembly and recycling.

Brent Webb is an AFRA board member who also sits on the board of the Aviation Suppliers Association (ASA) which provides AFRA with management services and government affairs support. He is also chief executive of Aircraft

Inventory Management and Services. He explains: "The original idea for AFRA was to come up with an end-of-service avenue for dismantling aircraft and engines because there was nobody that watched over that.

"What we found with the ASA is that if there's no governing body, the government is quick to fill that void, so the best opportunity is self-governance. It also allows for expedience in that you don't have to go through the bureaucracy of governmental bodies lobbying for what's best for the environment.

"AFRA created BMPs back in 2006, looking at the best ways of dismantling aircraft in environmentally friendly ways and still being commercially viable. It's no good being a big environmental steward if all it does is drive you into bankruptcy. The goal is to make you a steward over and over again, not just once or twice."

Webb says that, as well as a lack of regulation, AFRA was established to counter concerns about negative perceptions related to how the sector dealt with decommissioned aircraft. "There was a lot of stuff coming out in the news about abandoned aircraft," he says. "They'd be parked at an airport and sit and, for the lack of a better term, rot.

"The impetus was to put together an organisation that would make sure we weren't seeing aircraft becoming skeletons of themselves because if passengers are sitting on an airport runway looking out of the window at aircraft falling apart that erodes confidence.

"The truth is they were not falling apart, it was just they were serving the used serviceable marketplace, parts were being recycled, but it was not a good image for passengers."

1. As increasing numbers of aircraft reach end-of-life, industry dismantling standards are essential
2. Rather than just selling aircraft off, some airlines are now aiming to dismantle them and consume the parts internally
3. AFRA interim executive director Walter O'Connor

Walter O'Connor, AFRA interim executive director, says: "We created the BMPs to ensure organisations had a methodology to qualify their processes as they performed disassembly.

"What we did not want to do was erode the faith and trust that the public had in aircraft that had reached end of service. People, generally, don't understand USM. They know a car is worth more in pieces than whole, but that's also true of aircraft. Just because the asset has been retired does not mean there are not valuable items that can be retrieved off it.

"However, you don't want someone who has just set up a pop-up shop, who has no clue how to disassemble an aircraft, then trying to get that material back into the market. There's always a concern if you don't have any oversight in an industry you can't guarantee it isn't being managed to a certain level by every single player.

"AFRA felt it prudent to define our own destiny as opposed to leaving it up to a government to regulate, because then it becomes much more difficult."

O'Connor says that from the outset AFRA has had good global reach, and that could soon become even more true if Chinese regulators agree to accept its BMP accredited organisations. Asia is already a growth area for members, but the CAAC appears poised to endorse its standards on tear down and disassembly so it can access the USM market for parts.

"The Asian China market is a huge market of potential growth over the next decade, but they have their own specific requirements," says O'Connor. "We are in negotiations with the CAAC to accept our BMP disassembly accredited organisations to potentially be granted a CAAC145 certification limited to disassembly only. The Chinese really want access to USM but want to make sure they're not receiving fraudulent parts. That would be a major step forward for AFRA and for the industry."

AFRA will release latest figures on the number of aircraft that are recycled at end of life at its annual conference that will be held in Orlando in June. It's estimated there are around 11,000-15,000 aircraft globally reaching the end of their serviceable life.

Pre-Covid, Webb says a "bow wave" of 3,500 aircraft were expected to be recycled in a single year. However, the pandemic delayed aircraft deliveries and decreased demand so carriers' focus switched to revenue and keeping aircraft flying longer by recycling their own parts.

He explains: "I know a couple of airlines looking to dismantle their own aircraft so they can consume the parts internally. They also want to limit the amount they distribute externally.

"Before, carriers would turn the leases back in or sell aircraft off, now they look at them as having potential to extend the



3

"One of the key issues facing aircraft recyclers is how to deal with new composite material like carbon fibre used on more recent aircraft"

life of some of their sunseting aircraft. You're starting to see that across the industry, not just with the low cost carriers but some of the majors."

One of the key issues facing aircraft recyclers is how to deal with new composite material like carbon fibre used on more recent aircraft to reduce weight and increase efficiency. AFRA has a Research and Development committee currently working with recyclers EirTrade and ecube in Europe and the National Manufacturing Institute of Scotland to find a solution.

EirTrade received the first two 787s for tear down and, through negotiations with Boeing and the owners, AFRA has taken possession of some of the composite parts. These have been moved to the National Manufacturing Institute of Scotland where the wings are stored as part of a project on how best to recycle them. At the end of May, AFRA was due to take the fuselage of one of the 787s, to be stored at ecube's facility in Wales.

O'Connor recalls how he and Webb spoke to aircraft manufacturing giant Boeing's ESG (Environmental, Social and Governance) group about composite materials two years ago. He says: "This industry is great at making aircraft, but what about once they leave



2



A decommissioned aircraft can provide up to 2,500 parts for future use

“Manufacturers realise we have to identify how to disassemble and reuse or recycle and repurpose new and existing material”

service, disassembly and recycling, and controlling items going to landfill? The manufacturers realise we have to identify how to disassemble and reuse or recycle and repurpose new and existing material.

“We are really concerned about the impact on the environment and we really need to understand at the design phase what impact that material is going to have. We can’t just think about that when that aircraft is decommissioned because by then it’s too late.

O’Connor continues: “We know of one airline that has gone back to all its suppliers requiring them to supply the breakdown of everything that goes into their aircraft. From an ESG and environment standpoint, they want an aircraft that’s green, they want to be able to tell people ‘We understand what’s going on and this is the part we are playing.’ Both Boeing and Airbus are taking part, and I think this is something you are going to see more and more airlines recognising and pushing forward with their own initiatives.”

For Webb, this focus on sustainability is nothing new in aviation and, although the sector gets a lot of attention from climate activists, it is everyone else who is playing catch-up. He says, “There’s always been a

huge push to be more green. The industry makes up 2 per cent of the world’s carbon pollution but is under the most scrutiny when it comes to its carbon footprint.

“Before ESG was a term, aviation was constantly focused on making itself a leader in being environmentally sound. The world’s catching up with where aviation has been for years.”

O’Connor adds: “We’re stewards by de facto in this. We realise we have only one planet and that we have to ensure that the sustaining of this planet goes on as long as possible.”

At the core of this ethos is a push to be more transparent about aircraft recycling and for AFRA to provide more data and insights into what’s really going on in the industry. A decommissioned aircraft can provide up to 2,500 parts for future use but accurately assessing how much of any aircraft material is recycled is fraught with complexity.

The association says it does not endorse impressive-sounding claims of percentages in the high 90s of material that is recycled or the amount saved from going to landfill. Alongside its BMPs, voluntary Key Performance Indicators (KPIs) give organisations something to aim for and AFRA is collecting

data to develop reliable industry performance metrics.

Webb says: “It’s not about competing with each other because the benefit is for the whole world. For each aircraft, you are looking to keep as much out of landfill as possible. Transparency is important. It really is about self-improvement. If we look internally about how we self-improve we really do make the world better for everybody. Showing we have the ability to improve is one of the biggest things in our legacy over the last five years.”

Meanwhile, AFRA continues to fly the flag for self-regulation. It is awaiting the final outcome of a European Union Aviation Safety Agency (EASA) review of the sector. AFRA was invited to be involved, and a year ago raised concerns about some of the commentary in an initial report commissioned for EASA, says O’Connor.

“They had concerns that the industry is something that’s not being regulated. We wanted to make sure that the information they had was factual. We were very concerned EASA was potentially considering ways to regulate end of service. That’s why we spoke up for the industry, to say we do already have something in place.” 



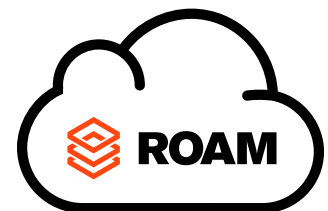
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Aircraft in the afterlife

Emma Kelly speaks to aircraft tear down specialists about the opportunities and challenges for aviation as it targets improving its record on recycling, reusing and repurposing



◀ Ecube uses a three-step reuse, repurpose and recycle process to minimise the environmental impact of retired aircraft

The industry has made significant progress in reusing and recycling parts and materials from retired and dismantled aircraft over the past couple of decades in the push towards sustainability.

Specialist companies have developed new technology and processes to make the industry's approach to aircraft end-of-life more efficient as they strive to improve the rate of recycling.

Work is also under way to address the looming carbon fibre composite recycling issue involving the latest generation of commercial airliners.

"Many factors determine how much of the aircraft is fully recycled – the aircraft type and its construction, the customer's particular needs from the disassembly process and of course local regulations that outline how we process the materials," explains Steven Taylor, chief commercial officer of service provider ecube, which has facilities in the UK, Spain and North America.

Ecube uses a three-step reuse, repurpose and recycle process to minimise the environmental impact of each aircraft retired and disassembled, he says, with key data sets supplied to each stakeholder to support their own sustainability objectives.

"With something like an Airbus A320 you are probably looking at 95 per cent that can be recycled," says Mark Gregory, managing director of Air Salvage International (ASI), based at Cotswold

80%

An aircraft like an A319, A320 or 737NG will generally take about six weeks, with 80 per cent of the high value parts removed in the first two weeks

"ASI has dismantled more than 1,000 aircraft at home and as far as South Africa, the US and Asia"

Airport in the UK, which has been in the business for 27 years.

During that time, ASI has dismantled more than 1,000 aircraft at its home base and via its mobile service stretching as far as South Africa, the US and Asia.

"Nothing will go to landfill. The unwanted material or the non-metallic material is incinerated in the turbines and generators that power the machines that fragment the metal," explains Gregory.

Airbus says that typically around 90 per cent of its aircraft can be recycled. "Significant progress has been made over the years to reuse and recycle," the company explains, adding it is "continuing to seek new solutions, including rethinking materials right from the design phase".

The time it takes to disassemble an aircraft depends on its age and the number of parts being recycled.

According to ASI's Gregory, "If it's a very old 747 and the parts company we are working on behalf of is shrewd, they will only want 400-500 parts and they are very specific. That can take us up to four weeks.

"With something newer, a next generation 737 for example, we would be removing between 800 and 1,200 parts; something a bit newer again could be up to 2,000 parts."

If the work is on behalf of an operator using the parts within their own fleet, it could involve up to 2,500-3,000 parts. An aircraft like an A319, A320 or 737NG will generally take about six weeks, with 80 per cent of the high value parts removed in the first two weeks.

The average age of aircraft is generally around 18-20 years, with the oldest being Boeing 747s, which are around 23-26 years old, and the youngest being high cycle aircraft, which usually last 11-12 years.

ASI primarily works on A320 family, A330s and A340s, with 747 numbers dwindling and some 777s and 737s. During Covid, ASI had 65-plus aircraft on its ramps, 15 of which returned to service with the remainder being dismantled, says Gregory.

ASI averages around 40-50 disassembles per annum, although this year is proving slower than usual as delays at the original equipment manufacturers (OEM) force operators to hold onto ageing aircraft. "I think

this year will be slow and next year will probably ramp up to what we saw before the pandemic,” predicts Gregory.

Ecube is also seeing changes, with the average age of aircraft retirement steadily increasing. “With the ongoing OEM delays, we are seeing the market average age trend line increase close to 23 years old,” says Taylor.

From its formation in 2011 through to the end of 2022, ecube had disassembled 337 aircraft, including many A320 family and 737NG aircraft. It handled most of British Airways’ 747 retirements and is now in discussions with airlines on similar fleet roll-over programmes. In Europe, ecube has recently seen increased demand for regional aircraft disassembly.

“We have a strong pipeline across all locations for the remainder of 2023 and are confident in being ready to support the market demands in 2024 and beyond with our current capacity of eight aircraft per month increasing to 10 per month by 2024,” Taylor explains.

Expertise has been channelled back into the industry via the Aircraft Fleet Recycling Association (AFRA), which was formed in 2006. AFRA is a global membership-based collaborative association



1

“EirTrade has a specialist fuselage support cradle which allows it to remove the landing gear at the beginning of disassembly”

which aims to elevate industry performance and increase commercial value for end-of-service aircraft. Its Best Management Practice recommendations have significantly improved management of end-of-life aircraft in terms of environmental and sustainable performance.

“All of our processes on the disassembly side we share with the association,” says ASI’s Gregory, adding that AFRA has brought credibility and best practice to aircraft disassembly. ASI was one of AFRA’s founding members.

Innovation continues. EirTrade Aviation, for example, has developed a tailor-made process and a specialist fuselage support cradle which allows it to remove the landing gear at the beginning of the disassembly process. This enables the aircraft owner to monetise or utilise the landing gear sooner, explains Lee Carey, vice president asset management.

Dublin-based EirTrade can disassemble any aircraft type, ranging from a regional aircraft through to widebodies, says Carey, with aircraft ranging from 10-30 years and the average of around 20 years. The company operates two disassembly lines, with a narrowbody disassembled in as little as 15 days, as well as projects off site.

Carey said: “EirTrade harvests all components for which there is demand and a realisable value. This material is then repaired so that we can make

the material available for sale to our customers in serviceable condition.”

Most recently, EirTrade secured a contract to disassemble offsite two 10-year-old Boeing 787-8s – the first of the type to be retired from commercial service – with the disassembly expected to take three months.

“As no 787s have been retired from commercial service to date, there is almost no used serviceable material [USM] market for this platform at the moment,” says Ken Fitzgibbon, chief executive.

“We are entering into a specialist area and hope to become a market leader in the provision of USM for the platform.” EirTrade is no stranger to such firsts, having also worked on the inaugural A380 disassembly.

Ecube provides a specialist zonal disassembly service across its facilities, aimed at delivering “quality at pace”, but is constantly looking at improvements, says Taylor.

The firm can fully disassemble a narrowbody aircraft in three weeks, while its additional services, including third-party logistics, allows a customer to have access to their material immediately or store it. Taylor says

1. Ecube can fully disassemble a narrowbody aircraft in three weeks

2. Repurposing aircraft parts is one of Ecube’s key aims in its dismantling process



2

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1

“Tarmac recycles 92 per cent of an aircraft’s total weight and more than 99 per cent of the engine parts, and is working to increase this”

ecube is focused on “developing new methods, utilising technology, to provide shorter lead times”.

Tarmac Aerosave claims its processes and tools are “unique in the world”. Tarmac, owned by Airbus, Safran and French waste management and utility company SUEZ, has dismantled 347 aircraft and 190 engines during its 15 years of operations from three sites in Tarbes and Toulouse, France, and Teruel, Spain.

It is currently recycling 92 per cent of an aircraft’s total weight and more than 99 per cent of the engine parts, and is working to increase this. Tarmac says it is working to “optimise the recycling activity” with a new French government-supported project under way.

Covid and accompanying supply chain issues have had an impact on the market for parts, with demand continuing to increase, according to Dutch company AELS, which has dismantled 17 aircraft.

AELS, which processes both narrowbodies and widebodies at its Twente Airport base, says it aims to get as many aircraft parts back into the

industry as possible to contribute to the circular industry.

The whole process must be carefully managed, however, with large numbers of one aircraft type being disassembled at the same time negatively impacting the value of the spare parts, warns ASI’s Gregory.

Global expansion by several companies is under way. EirTrade has fast-tracked US expansion to include a team on the ground in Atlanta and ecube recently added its third facility in Coolidge, Arizona.

Its first US disassembly – an A319 – has already been conducted, and ecube anticipates the US facility will be its second largest base by volume, after the UK, by 2024. Its current focus is on establishing ecube US, but Taylor says it continues to evaluate market demand in Asia.

Ecube has also established a remote offering. “Many parked aircraft will remain in-situ and the requirement for the disassembly service to come to the aircraft, rather than the aircraft coming to the service provider, will be a continued trend,” Taylor believes.



2

Asia is already on Airbus and Tarmac Aerosave’s radar, having partnered with the Chinese city of Chengdu to establish the country’s first aircraft lifecycle services centre. The facility will provide maintenance, upgrades and conversions through to dismantling and recycling, with a capacity for 125 aircraft. Construction is expected to be completed by the end of the third quarter, with operations commencing at the end of the year.

Airbus subsidiary Satair will acquire ageing aircraft and trade the used parts. The manufacturer estimates that 75 per cent of the aircraft stored in the centre will be transitioned into a second lifecycle, while the rest will be dismantled, recovering approximately 90 per cent of the aircraft weight.

“Aircraft disassembly and dismantling will be the main services offered, with the aim of recycling a maximum number of components for re-use in in-service aircraft. One of the objectives of the centre is to reduce the ultimate amount of aircraft waste,” explains Airbus.

As well as returning to industry, recycled parts find homes in diverse places. EirTrade’s Carey says it receives bespoke requirements from aircraft furniture companies and aviation training facilities for aircraft sections, while ecube’s own repurposing brand, Plane Reclaimers, has upcycled surplus materials into office chairs, clocks, coasters made from aircraft skin and a boardroom table made from 737NG winglets.

The recycling path for the latest generation aircraft with their high carbon composite content – more than

1. Upcycled aircraft parts find homes in increasingly diverse places

2. Ecube also offers a remote dismantling option for service providers

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50 per cent on an A350 – is less clear, but work is under way to find solutions.

Composites including carbon fibre reinforced polymer (CFRP), with low-weight and strength, have brought weight and efficiency benefits, reducing the aircraft's environmental impact, but also problems concerning recycling. Today's solutions are not adequate or cost-effective for CFRP recycling, with industry concerns that 30 per cent of carbon is not properly recovered.

"We are on a journey to fully understand how we can deal with the growing levels of advanced composites in modern aircraft," says ecube's Taylor. "The direction of travel is good, with many new entrants into the market working with disassemblers like ecube to find a way of reusing these carbon strands for potential re-use into the aviation supply chain," he adds.

The task is not an easy one, however, says ASI's Gregory. "Despite what the industry may be proclaiming, carbon composites are extremely difficult to recycle because it is so time consuming to remove the non-carbon fibre items, such as screws, bolts and rivets.

"You can only recycle [within the aerospace industry] clean carbon fibre," he says. As a result, carbon fibre is currently often incinerated or crushed down for road surfaces.



2



1

"We are on a journey to fully understand how we can deal with the growing levels of advanced composites in modern aircraft"

"Manufacturers would like to see carbon fibre recycled and reused within the industry, but we are not at that stage yet. It can't be done, not with unclean carbon composite material. They are exploring this, but they are coming up against a problem of extracting the other material," he says. Gregory has doubts we will ever reach that stage due to the cost and time involved compared with value.

He also questions why we are in this situation. "It's a great material, it has great properties, but in this day and age I believe we should not be manufacturing something that cannot be recycled now," he says. The industry shouldn't assume "we'll have a way in the future because we might not," he adds.

OEMs are working to find solutions. "One of the challenges ahead is to anticipate the recycling of tomorrow's waste, such as carbon composites," concedes Airbus. The quest has prompted the company to be involved in research projects, including the European Commission Clean Sky project HELACS – Holistic processes for the cost-effective and sustainable management of End of Life of Aircraft Composite Structures.

The project includes the development of innovative technologies and systems, including a flexible and portable robotic platform with machine learning capabilities and dedicated tools for

CFRP cutting and debonding, as well as recycling technologies involving optimised pyrolysis processes for improving carbon fibre yield.

The project aims to improve the recyclability of CFRP components by 40 per cent, increase the value retention of recycled carbon fibres by 85 per cent, reduce CO₂ emissions by 50 per cent and increase profitability by 30 per cent.

The OEM is also collaborating with specialised companies involved in carbon fibre recycling, including a materials recovery research project.

Tarmac is working with SUEZ and industrial composites solution provider Fairmat on recycling carbon composites projects. Fairmat has developed a new material produced from waste carbon fibre and can be used in consumer products including sports equipment.

Ecube is working closely with Boeing on recycling initiatives to support newer generation aircraft.

Taylor says: "Every stakeholder in the aviation industry is responsible for maximising sustainability within their area of expertise, where the sum of the parts will be greater than the whole." 

1. EirTrade's unique jack allows valuable landing gear to be dismantled first

2. Ecube aims to increase its capacity to 10 aircraft per month by 2024

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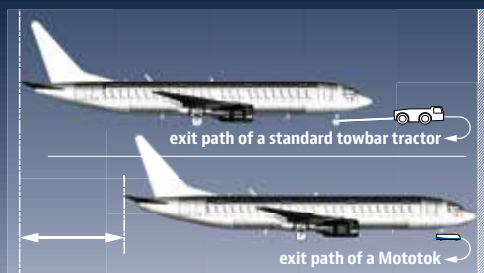
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A BRAVE NEW WORLD OF MRO OPPORTUNITIES

UK manufacturer Rolls-Royce expects a return to near pre-pandemic flying hours by the end of this year. *Kevin Rozario* reports



1. The Trent XWB is on track to become the company's primary widebody engine
2. David Williams of StandardAero, which works with Rolls-Royce engines in North America

70%



With 70 per cent of its business in large engines, the civil aerospace division bounced back from an operating loss of £172 million in 2021 to a profit of £143 million last year

Other engine families from Rolls-Royce also power aircraft of all types operated by hundreds of airlines around the world.

Rigorous MRO procedures ensure that their downtime is minimised to extend time on-wing and ensure that airline profitability is maximised.

Speaking to shareholders in early May at the company's AGM, chief executive Tufan Erginbilgic said long-term service agreement large engine flying hours (EFH) had reached 83 per cent of 2019 levels in the four months to April 30, and were on track for up to 90 per cent for the full year.

For UK-headquartered Rolls-Royce, the EFH recovery is essential to its wellbeing. The aviation industry was battered by the Covid-19 pandemic and Rolls-Royce's civil aerospace revenue was negatively affected because sales and maintenance contracts – central to profitability – are tied to flying hours.

The more airlines use the engines, the more they pay Rolls-Royce (a set-up described by former chief executive Warren East as “selling the airlines an insurance policy against the maintenance”) so with aircraft grounded it was a lean time.

Rolls-Royce's share price collapsed to just below 40 pence at the end of September 2020, but it has revived to the 150 pence mark as the aviation business continues to revive. From an operating loss of £172 million in 2021, the civil aerospace division (where 70 per cent of the business is in large engines) bounced back to a profit of £143 million last year.

Rebound and expansion

The MRO business is also turning around. At N3 Engine Overhaul Services (N3), the joint venture between Lufthansa Technik and Rolls-Royce, expansion is on the cards after a tough time.

The company has been maintaining Trent engines since 2007 when it received the operating licence for Trent 500s. Since then, N3 has overhauled more than 1,400 engines, with the latest operating licence granted for the Trent 1000 TEN in 2022.

The two parent groups are intensifying their cooperation in Thuringia in Germany with plans to grow. They include the expansion of the factory and the construction of a logistics centre on company premises, with work expected to start in the second half of 2023.

This is an about-turn from Covid days. A spokesperson at N3 recalled: “Before the pandemic in 2019, we were on a growth path to build more capacity, particularly for the Trent 900 and Trent XWB engine types.

“By 2021 and 2022, the company faced a one-third drop in orders and it was the Trent 700 and Trent XWB

Rolls-Royce engines have become mainstays in civil aviation. The Trent XWB is said to be the fastest-selling widebody engine ever, surpassing 11 million flying hours.

It was developed as the exclusive power solution to the Airbus A350, enabling longer flights, and more efficient fuel usage; delivering 25 per cent lower fuel burn and CO₂ emissions.

After the Trent 700, the Trent XWB is the largest member of the Trent fleet; today, there are more than 1,000 XWBs in service – with over 900 on order. This means that eventually it will become the company's primary widebody engine.



2

“Rolls-Royce's share price has revived from below 40 pence in 2020 to the 150 pence mark as the aviation business continues to revive”



The famously reliable RB211-535 engine's modular design supports maintainability

“For the RB211-535, we expect to see demand stabilise around the cargo market with operators such as FedEx and UPS”

that carried N3 through the pandemic. Thanks to good crisis management, and government support for short-time work, we were able to retain the workforce.”

That was just as well because, by spring 2022, N3 had to move from crisis to growth mode as the Rolls-Royce Trent 1000 TEN engine was set to be added to the portfolio in autumn 2022. The engine is used by Boeing 787 Dreamliners, a new market for the company which had, until then, only looked after Trent models powering Airbus aircraft.

N3's current product portfolio now consists of five engines: the Rolls-Royce Trent 700, Trent 900, Trent XWB, Trent 1000 TEN and Trent 500 (for serviceability checks and tests on demand). Capacity utilisation is expected to double over the next five years from the current 120 engines per year to 250.

“These expansion plans and the increasing workload are, of course, accompanied by increased demand for skilled workers and the workforce at N3

is expected to grow to more than 1,000 employees in the coming years,” said the N3 spokesperson.

With that growth comes the issue of finding enough skilled staff to ensure a smooth scale-up, another hangover effect of the pandemic.

Referencing the operating licence for the Trent 1000 TEN engine, N3 managing director Carsten Behrens (representing Rolls-Royce) commented: “We are securing our future by expanding and increasing our capacities. As a result, we will be able to react with greater flexibility to future maintenance and repair demand.”

Light repairs to full overhauls

In North America, MRO provider StandardAero also works with Rolls-Royce engines. The most prevalent are the AE 3007 (powering the Embraer ERJ145 family and Cessna Citation X), and the RB211-535 (powering the

Boeing 757), plus the AE 2100 and T56 turboprops, and the AE 1107, M250 and RR300 turboshafts.

David Williams, director of Global RB211 Sales for StandardAero's Airlines and Fleets team, told *MRO Management*:

“For the AE 3007, we continue to support the majority of engines serviced through the OEM's TotalCare and CorporateCare programmes, in addition to transactional customers. We continue to see demand for a wide range of MRO services, from light repairs to full overhauls.”

He added: “Where feasible, we assist customers wanting to create a single, airworthy engine from multiple high-time cores, though high-time engines proposed for such projects can be beyond economical repair. For the RB211-535, we offer a range of MRO requirements from L1 light worksopes to full L4 heavy events.”

StandardAero says the AE 3007 is a relatively trouble-free engine to support. “This is thanks both to its modular design and commonality with the AE 2100



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250

Capacity utilisation is expected to double over the next five years from the current 120 engines per year to 250

“IntelligentEngine will enable Rolls-Royce to design, test and maintain engines in the digital realm”

turboprop and AE 1107 turboshaft.

This helps to ensure a reliable supply of parts even though the ERJ145 and Citation X platforms are now both out of production,” said Williams.

As a result, StandardAero’s Maryville facility in Tennessee reports sub-45-day turnaround times for the AE 3007, which is impressive given the industry’s current supply chain issues.

Williams commented: “The RB211-535 is a famously reliable engine and, like the AE 3007, benefits from its modular design which supports maintainability.”

However, the RB211-535 does present some parts sourcing issues, given that the last engine was delivered by Rolls-Royce in 2009.

“We therefore rely on our in-house StandardAero Component Services (SACS) team – including PAS Technologies – to help ensure a reliable supply,” noted Williams.

Looking ahead at this end of the Rolls-Royce MRO market, Williams said: “For the AE 3007, we expect to see a continued trend away from large airline operators towards semi-private airlines such as JSX and new regional airlines in Africa and elsewhere, while continuing to support the needs of Citation X and Legacy 600 corporate operators.

“For the RB211-535, we expect to see demand stabilise around the dedicated cargo market, including major operators such as FedEx, SF Airlines, and UPS.”

This makes sense as the Boeing 757 continues to be valued for its large cargo volume, good fuel economy, range, reliability and performance.

The narrowbody was a passenger-to-cargo conversion favourite during the pandemic.

Intelligent engines

Rolls-Royce engines will benefit from MRO developments being introduced in the coming years, including AI-enabled inspection techniques and 3D parts printing. The company believes that robotics could revolutionise the future of engine maintenance by bringing its IntelligentEngine (IE) vision to life.

IE will enable Rolls-Royce to design, test, and maintain engines in the digital realm, but also make them better connected, contextually aware and smart enough to do their own fault finding, for example, which should eventually drive greater reliability and efficiency.

Thanks to such technology – and the way contracts are determined – the lines between products and services are blurring, allowing Rolls-Royce to improve its offer to customers.

Together with academics from Harvard and Nottingham universities, the company has demonstrated a range of potential future technologies, from ‘snake’ robots that work their way through the engine like an endoscope, to collaborative ‘swarm’ robots that crawl inside to diagnose issues.

The company said: “These robotic technologies represent an opportunity to improve the way engine maintenance is delivered, for example by speeding up inspection processes or by removing the need to take an engine off an aircraft in order to perform maintenance work.”

This could lead to more rapid repairs, significantly reduce the cost, and increase an engine’s availability. Snake robots, for example, can collaborate to carry out patch repairs to damaged thermal barrier coatings.

This research project is still ongoing through a partnership between Rolls-Royce, Nottingham University and metal spray expert Metallisation. More broadly it opens the door to a brave new world of MRO opportunities for the future. 

◀ The AE 3007 is prevalent in North America, powering the Embraer ERJ145 family and Cessna Citation X



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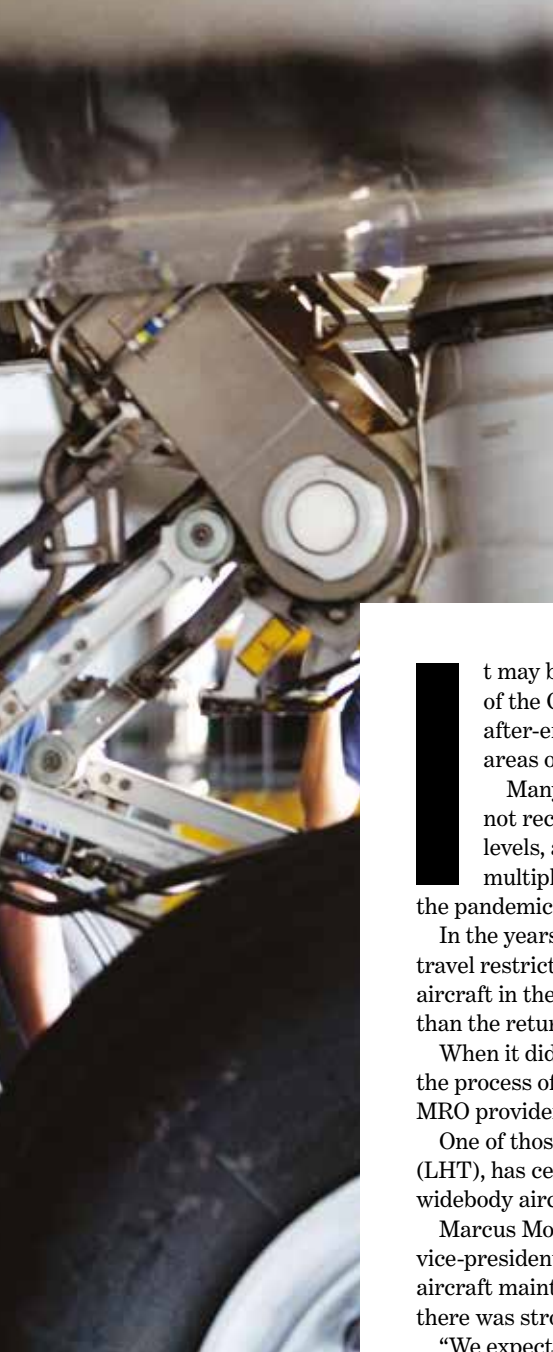


1

Taking the wide(body) angle

After suffering during the pandemic, widebody aircraft are back in business in a big way. *Bernie Baldwin* reports on how the MRO providers have supported the bounce back and assesses future prospects for this buoyant sector of the market

1. Lufthansa Technik has been in demand to quickly get widebody aircraft back in service
2. AAR's Landing Gear Systems (LGS) has played a critical role converting gears from passenger to freighter configurations



It may be three years since the height of the Covid-19 pandemic, but its after-effects are still being felt in certain areas of the aviation industry.

Many supply chains, for example, have not recovered to their pre-pandemic levels, although of course there are multiple reasons behind that as well as the pandemic.

In the years following all the lockdowns and travel restrictions, the presence of widebody aircraft in the air recovered much less rapidly than the return of narrowbody types.

When it did begin though, it was rapid, with the process often meaning extra work for MRO providers.

One of those providers, Lufthansa Technik (LHT), has certainly been in demand to get widebody aircraft back into service.

Marcus Motschenbacher, the company's vice-president and chief commercial officer, aircraft maintenance services, confirms that there was strong upturn in widebody demand.

"We expected the recovery of air traffic to have a significant influence on the comeback of widebodies, but the extreme pace at which it happened indeed came as a surprise," he says. "There are a number of factors that contributed to this development.

"On one hand, we have foreseeable factors such as the fact that significant numbers of previously stored long-haul aircraft returned with deferred base maintenance requirements.

"On the other hand, there are rather unforeseeable factors such as the recent delays in the delivery schedules of various new-build widebody types that prompt airlines to operate older types for much longer than expected," Motschenbacher adds.

"This even goes as far as that various four-engined aircraft types, which had been 'pronounced dead' by many airlines before the crisis, are now making a comeback.

"One such example is Lufthansa's Airbus A340-600s that have been returned to service

because their First Class cabins are urgently needed to cope with the strong demand from high-yielding customers.

"The biggest surprise in this regard, and I am sure I'm not the only one to say this, is the resurrection of the Airbus A380. As Lufthansa and several other airlines almost simultaneously decided to reactivate their superjumbo fleets to provide short- and medium-term capacity relief, the demand for A380 MRO is currently going through the roof."

Motschenbacher adds: "To aid the industry's currently huge need for added capacity, we have decided to expand our existing base maintenance offerings for this type with a third overhaul line at our subsidiary, Lufthansa Technik Philippines in Manila. The third line will become operational in the coming months.

"A dominant driver for this expansion is the general shortage of A380 MRO capacity around the world. As an example, our extended capacity will aid major A380 operators such as Emirates – who have previously done all their A380 MRO in-house – in sourcing additional capacity that ensures a timely return to service for their huge A380 fleet.





12

Another driving force for increased MRO demand is the fact that many A380s are now reaching an age that requires 12-year checks

“Another driving force for increased MRO demand is the fact that many A380s are now reaching an age that requires 12-year checks, which is by far the most extensive check item in its entire maintenance schedule.

“In addition, a service bulletin released by Airbus currently mandates additional crack inspections on the wing spar. Depending on aircraft age or storage time, this requires a good bit of extra attention for MRO providers. I expect all these factors to remain important and to drive widebody MRO demand during the coming years.”

One of the key systems needing care and attention on widebody types during their re-entry into service has been landing gear. Pablo Bunge, director programs, Landing Gear Services (LGS) at AAR, explains the effect that period had on MRO in his specialist area.

“During the pandemic there was a decrease in passenger travel and an increase in demand for cargo. As a result, several airlines have converted their gears from passenger to freighter

“An Airbus service bulletin currently mandates additional crack inspections on the wing spar”

configurations. This is where LGS has played a critical role, performing these conversions in the field and in our facility,” Bunge says.

“In the forthcoming years, we believe that demand for travel will increase and the demand for cargo will stay steady or slightly increase,” he forecasts, “so we expect an overall surge in demand for widebody aircraft” – and the associated MRO work to accompany that growth.

Furthermore, widebody aircraft are fewer in number than narrowbody and perform fewer takeoffs and landings. As a result, the MRO tasks for the landing gear on these aircraft differ from the demand on smaller types.

“There are fewer MRO requirements for widebody aircraft than narrowbodies

as we typically see the widebody gears coming to our facility for overhaul at the 10-year mark, whereas the narrowbody gears mostly come before 10 years as they reach their cycles limits first,” Bunge tells *MRO Management*.

“However, the main driver for the work required is mostly dependent on the number of cycles a gear has. The more cycles, the more maintenance a gear will require, regardless of the aircraft type and the years in service.”

While Motschenbacher agrees about widebody types having fewer takeoffs and landings, he believes it is difficult to generalise the MRO requirements for the airframe structure. “For example, we have to keep in mind there are a number of operators who sometimes also operate widebodies on short haul routes if passenger demand justifies it,” he explains.

“Thus, the number of takeoff/landing cycles is not the only important factor here. For example, we regularly have structural findings in the cabin floor area (not related to the number of takeoffs and landings), especially when these aircraft

1. Lufthansa Technik say a number of operators operate widebodies on short haul routes, leading to unpredictable MRO requirements

2. For AAR, landing gear is a key system in need of care on widebody types re-entering service



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1

“There is still a learning curve about how damages on the newer, mainly composite airframes need to be addressed”

have surpassed the first six-year cycle. Here, we often experience corrosion on the floor beams, which is caused during operation of the aircraft (leakages, liquid spills and so on).

“Also, we often come across a number of findings related to ground operation incidents such as dents and other damage caused by ground support equipment (food trucks, luggage loaders), which are also not related to the number of cycles.”

When it comes to MRO, it is of course more likely that older aircraft will need more work on them, with the intervals on newer types being longer.

“Looking at the book level figures from the Aircraft Maintenance Manuals (AMMs), it is indeed the case that for the latest generation aircraft models, the maintenance cycles have been extended compared to legacy aircraft types,” says Motschenbacher.

“According to the Airbus AMM, an A350-900, for example, requires a C-check every 36 months, where on the A330-300 it was due every 24 months.

“However, how well these [newer] airframes perform in the longer term is still hard to tell, mainly because the majority of latest-generation widebodies – A350s or 787s, which are largely made out of composites – are still comparatively young,” he points out.

“Thus, they are mostly undergoing three-year checks at the moment, where the numbers of findings are still expectedly low, shifting a good bit of the focus of these layovers to modification work or cabin refurbishments.

“It is also worth noting that there is still a learning curve concerning how damages on the newer, mainly composite airframes need to be addressed. Thus, it is still quite often the case that we have to closely consult the aircraft OEMs before conducting repairs.

“The Structural Repairs Manuals (SRMs) for the new types are still limited and are constantly being developed by the manufacturers as more and more aircraft reach the respective milestones.”

What AAR's Bunge has seen with newer aircraft types has been a challenge in supplying parts for them. “This is due to fewer parts being available in the aftermarket,” he explains. “Typically, the OEM is the only path to procuring material.”

New technologies, processes or procedures continue to make the maintenance of widebody aircraft more efficient, speeding up turnaround times while not affecting the quality of the work. In this regard, AAR is like other MRO providers in pushing such developments.

1. Lufthansa Technik is reducing manual tasks for mechanics with new technology
2. AAR have found fresh challenges in the supply of parts for newer aircraft types

Bunge provides a key example: “The use of thermal spray as an alternative to chrome plating has proven to be more efficient as the process time is much faster. Additionally, the quality is superior, and this helps minimise future re-work.”

According to Motschenbacher, Lufthansa Technik too has been investing to make its widebody MRO better, and he highlights one area in particular.

“In my opinion, the biggest technological development making maintenance of aircraft in general, but also the maintenance of widebody aircraft, more efficient is digital transformation.

“It enables us to react much faster to unforeseen events, for example defects, by combining end-to-end data flows through our digital customer interface Aviator MRO Management.

“Aviator is a digitalised production system including aspects such as a transparent work process and additional work approval interface with the customer, digital job cards or connected tools and automated sourcing processes.

“In addition to this, we regularly test new technologies and tools reducing the overall effort for data input and manual tasks for our mechanics.”

Widebody aircraft utilisation rates are moving towards being back to pre-pandemic levels.

The MRO specialists are clearly showing they are well prepared to deal with the demand caused not just by returning aircraft, but also those of growing fleets in the coming years. M



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Tony Seville, director, Aircraft Interior Recycling Association – AIRA

SECOND LIFE

AIRA's **Tony Seville** discusses why the industry must embrace aircraft interior recycling

At AIRA (Aircraft Interior Recycling Association), we are long-term researchers of recycling and sustainability of aircraft interiors and its materials.

We all really need to take the responsible approach to this and deal with them properly.

Over the years we have worked out a number of different ways that really stand out to find the highest material recovery rate. We continue to look at getting as much recyclable material out of the interiors as possible. This is really important for our clients to know what materials we can take out of the aircraft interiors that can be recycled, getting the maximum use out of AIRA as a specialised dedicated company to recycle aircraft interiors from the manufacturing process through its lifecycle and through to the end of life.

Here are some startling facts and figures for you to think about, and how we are helping aircraft interior manufacturing and airlines reduce their carbon footprint.

In the past 18 months, AIRA has recycled over 130,000kg and saved almost 300,000kg CO₂ from the manufacturing process in the UK. One company, one sort of material, and this is low due to just coming out of the pandemic and supply chain problems. It would normally be double that figure. The CO₂ saved is a benefit to the manufacturing company in various ways which will be included in their ESG reports.

After many years of our research and the introduction of our new software system, Q Intelligent Systems, we can now very accurately identify and calculate an airline's carbon footprint reduction per aircraft, which can amount to many thousands of kilogrammes of materials recycled and also millions of tonnes of CO₂ to be offset from their own

“It became clear our industry is possibly unaware of the negative impact it has”

emissions should the airline implement a simple strategy with us. And it's not only the airline and its passengers that benefit – it's the OEM that supplies the interior components and the whole supply chain behind it, if done correctly.

Material analysis

We recently carried out a material analysis for an airline customer that wanted to look at the waste they were producing and landfilling from different cabin interior components over a period of seven years and then multiply that by the number of aircraft in their fleet.

After going through the analysis and imputing all the data, it became very clear that our industry is possibly unaware of the negative impact they have with the materials currently used but also how quickly we can turn this into a positive for airline clients and their passengers without them having to be sustainability specialists and trying to re-invent the wheel with materials that have a higher carbon footprint than the materials we already have, and that cannot be recycled from either the manufacturing process or end of life.

An airline with 100 narrowbodied aircraft could recycle over 475,888kg of materials over the life span of the aircraft, saving in the region of 2,518,600kg CO₂ which is the equivalent of 5,672,522.52 passenger airmiles. It's also the equivalent of 533,881kWh which would power 62,882 homes for a whole day, and the equivalent of planting 119,928 trees. Again, the CO₂ saved is a benefit to the airline in various ways which will be included in their ESG reports.

It has become a more significant issue since the world's aircraft fleet size is expected to increase from 25,900 to 49,405 aircraft between 2019 and 2039. While the more established markets of Europe and North America are predicted to increase by around 76 and 42 per cent respectively, the Asia Pacific fleet is expected to increase by about 139 per cent to 18,770 aircraft in 2040. 



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says Group Head of Information Technology SriLankan Airlines

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