

MRO

Aerospace Magazine



MRO Outlook 2024

Challenges but light at
the end of the tunnel

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Can AI help managing
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Engine removed from aircraft
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MRO – the challenging outlook for 2024

By David Dundas

As the commercial aviation industry gears itself up for another challenging year, the MRO sector is far from shielded from ongoing problems. Having seen the industry as a whole recover well but not fully from the myriad problems created by the COVID-19 pandemic, globally, the MRO sector is not expecting to return to full capacity until 2024, while other hurdles remain which have the potential to have a major effect on the MRO sector. First there is global unrest with two major conflicts occupying much of the news space, both of which are having an impact on the commercial aviation industry. Second, there is what is becoming an almost perennial problem – the supply chain for aircraft, materials and for parts, not just for aircraft manufacturing, but the latter particularly having a direct effect on MRO services.

Just looking into the engine MRO market, it has been forecast that 2024 MRO shop visit numbers could well exceed 8,800, which in itself will present its own challenges. In an environment where aircraft demand is constantly outpacing production, both the average age of aircraft in service and retirement age of these aircraft has reached approximately 12 and 22 years, respectively. The more sobering thought is that this burgeoning demand for MRO services will see this sector of the market likely reach a value of approximately 45% of the commercial aftermarket.

The knock-on effect of the increased life of an aircraft means that MRO providers will have little option but to increase operational efficiencies, a challenge in itself when dealing with global supply chain problems. At the heart of this challenge, you will most likely find

agile asset management,

The leveraging of advanced technologies and a global supply network, combined with optimised inventory management, cutting-edge data analytics and minimising an aircraft's downtime, should help to result in extending the life of an aircraft, cutting operational costs and enabling an MRO supplier to be competitive and win capacity.

The International Air Transport Association (IATA) released in December this year its outlook for the airline industry with an optimistic trajectory and an anticipated US\$964 billion in total revenue – an unprecedented figure. However, IATA's Director General, Willie Walsh, was keen to point out that ongoing challenges such as regulatory burdens, fragmentation, high infrastructure costs, and oligopolies within the supply chain will remain.



Louis Mallette, SVP Operations, AJW Technique

However, there is the forecast of strong fleet growth over the next ten years from 31,000 to 42,700 aircraft, driven primarily by demand in North America and Europe. Narrow body jets should take a larger share of the fleet as the midsize aircraft market transitions. For the MRO sector, over the next ten years demand will be sustained around the US\$112bn to US\$139bn mark. This will be driven primarily through the need to keep older aircraft in service, additional maintenance required for new-generation engines, and cabin modifications (connectivity, etc.).

One of the greatest problems facing the MRO industry is staffing and IATA predicts that as human capital is one of the most important resources within the MRO sector of the industry, the pursuance of digital strategies, whilst paramount, should be done in such a way that it is complementary to any workforce.

Getting a clearer picture of what key trends lie ahead in 2024

To help us get a better understanding of the MRO landscape for 2024, we decided to approach some of the key MRO industry players to get their perspectives on a number of critical MRO issues. In particular, we wanted to know what key trends and developments they foresaw that would shape the aircraft maintenance industry in 2024.

Louis Mallette, SVP Operations at AJW Technique was keen to point out that: "Industry analysts are predicting a full recovery for the aviation sector in 2024 and the latest air travel outlook released by Airports Council International (ACI) predicts passenger traffic will reach 9.4 billion passengers globally next year. While this will increase flight schedules and no doubt fleet expansion for operators, the continued impact of labour shortages is still a factor to consider and will continue to affect the MRO sector. Recruitment and training of skilled Technicians to support the expected volumes will therefore be one of the key priorities."

He also identifies OEM supply chain problems as a major pain point for MROs: "...the continued flying of older aircraft due to the required downtime of the newer fleets related to the P&W GTF required engine inspections will support a higher volume of repair activity with the component MROs, and indirectly reduce the availability of used serviceable material due to resulting delays in aircraft retirements.

Adam Brammer, Divisional Vice President – Business Manager at AMERON AMETEK MRO sees the introduction of new technology in aircraft safety and sustainability and a continued improvement in parts availability,

growth in automation usage inclusive of artificial intelligence (AI), immersive technologies in repair, and new technologies in flight use will require new maintenance capabilities, and new eco-friendly systems. He has noted at AMETEK MRO that: "...the overall lead time for parts has improved as either repair operations have been able to plan for the longer lead times, or the parts manufacturers have been able to ramp up demand. But critical supply chain problems still exist for most repair operations. Additionally, some repair stations are making use of AI in their support processes to optimise what needs to be repaired or taken off aircraft and when, as well as increase availability of the parts needed for repair. Since this technology is new, the effects are still not fully incorporated in most operations, but this will grow."



Adam Brammer, Divisional Vice President - Business Manager at AMERON AMETEK MRO

Justin Daugherty, Sr Director, Sales & Marketing at TRAX sees embracing AI as a critical move. "For example, TRAX eMRO software utilizes Machine Learning to take maintenance planning to the next level by offering predictive insights. Analyzing historical data and external factors, Machine Learning algorithms foresee trends and outcomes, providing a foundation for informed decisions, which empowers our users to respond promptly

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Louis Mallette, SVP Operations at AJW Technique



Justin Daugherty, Senior Director,
Sales & Marketing, TRAX

to shifting conditions, adapt strategies, and allocate resources optimally. Our solutions incorporate predictive analytics to anticipate maintenance and materials requirements. By analysing historical maintenance data and usage patterns, we can help our clients foresee maintenance needs before they arise, allowing for proactive planning and reduced downtime. This predictive capability ensures that maintenance customers

experience minimal disruption and a higher level of service." He adds that: "The use of mobile apps continues to be a key industry trend. For years operators lagged behind in leveraging the potential of mobile solutions for their maintenance operations, mainly from lack of budget and resources, and not from lack of foresight. Often it was due to the airlines' technology funding being funnelled more toward IFE and operational software than toward their aircraft maintenance departments. The TRAX' slogans over the past few years are "Mobilizing Maintenance" and "Work Anywhere, Work Paperless", which strongly resonates with our clients. They recognize the benefits of having real-time information and real-time transactions."

Mansoor Janahi, Managing Director and Group CEO, Sanad sees that to meet the projected fleet growth MRO service providers are having to embrace digitalization for data-driven decision-making, fostering an interconnected ecosystem for increased efficiency, sustainability, and competitiveness. He also sees that in tandem with technological advancements, the rise of electric and hybrid aircraft is expected to reshape the MRO landscape, necessitating



Richard Marston, Chief Commercial Officer,
MAAS Aviation

adaptability in skillsets and infrastructure. Janahi says to: "expect increased collaboration within the industry, promoting exploration of new markets, broadening capabilities, and facilitating knowledge exchange across the aviation supply chain. These collective efforts underscore the industry's commitment to adapting and thriving in the dynamic aviation landscape. The aviation MRO industry in 2024 will navigate persistent supply chain challenges, embrace technological evolution, invest significantly in talent, and foster collaborative initiatives. These transformative forces signal a revolution, reshaping critical operational aspects and setting a new standard for excellence in customer experience worldwide."

Richard Marston, Chief Commercial Officer at MAAS Aviation sees AI as likely to have the biggest impact on the overall MRO sector. He also sees that: "automation of certain parts of the painting process is likely to be the next big jump forward. Possibilities for 3-D printing and aircraft wrapping are being explored by all the OEMs as they look at how the process can be enhanced. But this is still a long way off in my opinion as there are many challenges ahead, not to mention huge investment needed, before these advances become economically viable and a reality in the mainstream."



Mansoor Janahi, Managing Director & Group CEO, Sanad



Oscar Torres, President and CEO,
Kellstrom Aerospace Group

Oscar Torres, President & CEO, Kellstrom Aerospace Group points out that during the early part of the recovery of the industry from the pandemic, operators managed to use serviceable aircraft and engines that had been placed into temporary storage to meet demand and to defer costly maintenance events. However, the inventory of serviceable aircraft and engines then decreased significantly and therefore owners and operators dramatically increased their demand for maintenance events. However, it is the supply chain that causes him considerable concern. "... the supply chain continues to be a challenge for maintenance providers. These supply chain issues include reduced availability of technical labour, reduced availability of used serviceable material, and longer lead times from parts manufacturers. The combination of these factors is likely to result in maintenance organizations continuing to operate at or near capacity, with long lead times and significant backlogs. As a company that is solely focused on supporting MROs and Operators with parts and services that are essential for completing maintenance events in an efficient and cost-effective manner, Kellstrom Aerospace is very well positioned to support the maintenance industry as it manages through an

environment of significant demand offset by lead time and supply chain issues."

How the aircraft maintenance industry intends to address environmental concerns and make aviation more environmentally friendly

Currently, the airline industry is responsible for 3% of global carbon dioxide emissions. Reducing carbon footprints and carbon emissions, ideally to a carbon-neutral level is the objective of the industry. IATA has set 2050 as the target date for airlines to achieve net zero carbon emissions. For carriers, some of the changes needed to be made are easy to identify, such as the introduction of SAFs. However, that will only reduce CO2 emissions by 80%, necessitating the use of carbon offsetting to mitigate the remaining 20%. Interestingly, United Airlines is taking a different approach to the situation by concentrating on an alternative to carbon offsetting, in particular, direct air capture (DAC) capture. Currently United has invested in 1PointFive Inc, a Texas-based project which has a capacity to remove 1 million tonnes of CO2 from the air. Hydrogen technology is yet another area being explored as a means to fuel aircraft in a more environmentally friendly way. However, for MROs, the road to carbon neutrality is less straightforward, bearing in mind the complex nature of MRO operations. However, as an example, operational-optimising software is making huge inroads into achieving such a target.

Amada Martinez Jaco, VP of Sales, SkySelect makes it clear that: "By leveraging new technologies and better understanding data, airlines will become more efficient and less wasteful all the

way from operations and maintenance to commercial functions and airside tasks. Specifically looking at aircraft maintenance, airlines and MROs can optimize their parts procurement process to be more efficient. For example, by having a better understanding of the market and knowing what parts are available and where they are located, components can be sourced from suppliers closer to the location of where the part is needed, and purchase orders can be optimized to reduce the number of orders (i.e. being from one supplier instead of three). Or by better understanding their operations, MROs and airlines can carry less unused parts and cut down on the need to expedite shipping, which will lead to a significant reduction in waste.

Louis Mallette, SVP Operations at AJW Technique happily points out that AJW is dedication to the environment and sustainable business practices forms one of the cornerstones of Group business practices and reinforces its commitment to the UN Global Compact. "Our eco-friendly headquarters exemplifies responsible resource management with rainwater harvesting systems and solar panels. Our Facilities and Operation teams are expanding our solar panel initiative, which has resulted in an annual reduction of 425 tonnes of CO2 emissions to date." When it comes specifically to MRO activities, he states that: "For component MROs, the majority of our efforts are at a local level through energy reduction programs for our facilities, and through our commitment to aircraft teardown activities to ensure as many components as possible can be economically repaired and returned to service. We ensure the parts that cannot be returned to service are correctly recycled and reprocessed to minimise the

“ ... the supply chain continues to be a challenge for maintenance providers.

Oscar Torres, President & CEO, Kellstrom Aerospace Group

environmental impact, which also ensures we maximise their value.”

Justin Daugherty, Sr Director, Sales & Marketing at TRAX sees going paperless as a major contribution to reducing carbon footprints. “One of the biggest contributions mobile and paperless maintenance software such as TRAX eMRO and eMobility can do for sustainability and environmental concerns is to create a paperless environment. Technical compliance record keeping requires massive amounts of paper with associated printing costs and required equipment. In addition, document storage takes up tremendous amounts of physical space. One of our customers reported a 60% reduction in offsite physical



Amada Martinez Jaco, VP of Sales, SkySelect

storage after implementing our eMobility eContent Control app which provides a centralized platform for storing and organizing task completion records. Once the tasks are finished, they are signed off electronically, and the work record is archived into the eMRO software and made accessible through the eContent Control web-based application.”

Where Sanad is concerned, the Group’s

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Amada Martinez Jaco, VP of Sales, SkySelect

CEO Mansoor Janahi pointed out that such a robust recovery, coupled with a growing need to address next-generation engine maintenance requirements and increasing pressure to reactive parked fleets, has led to an escalating demand for world-class aviation MRO services. He added that: “Sanad has strategically leveraged the industry’s rebound, consistently servicing engines in our workshop during and after the pandemic. This increase in demand for our services has earned us over 30 global customers, including prominent airlines like Etihad Airways, Emirates Airline, Ethiopian Airlines and Wizz Air Abu Dhabi, along with partnerships with all major global Original Equipment Manufacturers (OEMs). In 2022 alone, Sanad serviced 120 engines, and following our recent inauguration of the first LEAP Engine MRO Center in the South Asia, Middle East and North Africa (SAMENA) region, the number of units to be serviced by the end of 2023 is expected to reach an impressive 140 engines.”

Oscar Torres, the Kellstrom Aerospace Group CEO remarks that ESG initiatives will continue to be a vital component to the long-term success and viability of any organization, irrespective of the industry or geographic location. He sees sustainability and environmental concerns at the forefront of any initiatives. He points out that: “of any organization. Sustainability and environmental concerns

are at the forefront of those initiatives. Aircraft maintenance organizations, including Kellstrom and Vortex Aviation, continue to look at every opportunity to improve their sustainability and environmental impact through the use of: 1) increased training and awareness of employees, customers and suppliers to eliminate processes that adversely impact the environment, 2) increased use of technologies that improve operational efficiencies and reduce consumption of power and carbon fuels, 3) increased use of Used Serviceable Material, 4) re-assessing lighting, HVAC and high power consumption machinery and equipment with a goal of moving towards more energy efficient alternatives, and 5) evaluating carbon offsetting arrangements. Over both the short and long term, sustainability and environmental concerns will continue to be an area where the aircraft maintenance industry will work together to identify opportunities for improvement.”

Most commercial carriers are coming close to operating at pre-COVID-19 capacity, but does this automatically mean the MRO sector has recovered to the same degree?

In October this year Bloomberg reported that global airline capacity was poised to surpass 2019 (pre-pandemic) levels. This has had an immediate knock-on effect on the MRO sector, but that does not automatically mean it has fully recovered too. One of the biggest challenges facing the sector is the supply chain, and it is felt that it could be two or three more years before supply-chain problems are resolved. When added to

staff shortages and a rise in prices of approaching 7% expected over the next year or two, this is also proving to be a challenge for MRO operators who are looking to reduce costs to become more competitive.

Adam Brammer at AMERON AMETEK MRO feels that the industry has most definitely not recovered, but that it is getting closer. As he points out: Total flights in the US are still down ~6% from 2019 and ~5% worldwide. Additionally, parts availability continues to be a problem. The ramp up in demand, together with a lack of technicians to manufacture the parts, and the increase in raw material lead time has caused situations whereby some parts are not available for many months longer than pre-Covid standards. The team at AMETEK MRO predict that this will last well into 2024.

Amada Martinez Jaco at SkySelect feels this is not a simple question to answer as there is much to be taken into consideration, such as geographical location, the type of air travel the MRO operation is geared towards, the aircraft type, or even the parts required. However, she still feels positive about the situation. "More people flying on more aircraft leads to more aircraft which need to be served for maintenance and more aircraft being ordered. For example, at the Paris Air Show, leading manufacturers Airbus and Boeing had 1000 aircraft ordered combined only in the first two days of the event. The Airbus order set a new record for the manufacturer. According to Visiongain Reports Ltd, the global top 20 commercial aircraft maintenance, repair & overhaul (MRO) market was valued at US\$83.0 billion in 2022 and is projected to grow at a CAGR of 4.3% during the forecast period 2023-2033. We're certainly heading in the right direction as an industry with our brightest days still ahead.

Louis Mallette at AJW Technique was quick to identify the biggest concern for the MRO industry and as a whole – the supply chain. "We are seeing growth in active fleets and a general increase in flying hours across all regions. Barring



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any geopolitical effects, which could upset air travel, we expect the component repair shops such as AJW Technique to be operating at close to maximum capacity. In terms of demand, most MROs are back to pre-covid levels and expect to be above that level in 2024. However, the OEMs continue to struggle with their post-covid production ramp up and as a result, the industry continues to experience stress due to supply chain capacity."

Mansoor Janahi, Sanad's CEO notes that in relation to the global recovery from the pandemic, the Middle East has now seen both international and domestic capacity exceeding pre-COVID levels. As far as Sanad is concerned, Janahi points out that the Group "has strategically leveraged the industry's rebound, consistently servicing engines in our workshop during and after the pandemic. This increase in demand for our services has earned us over 30 global customers, including prominent airlines like Etihad Airways, Emirates Airline, Ethiopian Airlines and Wizz Air Abu Dhabi, along with partnerships with all major global Original Equipment Manufacturers (OEMs). In 2022 alone, Sanad serviced 120 engines, and following our recent inauguration of the first LEAP Engine MRO Center in the South Asia, Middle East and North Africa (SAMENA) region, the number of units to be serviced by the end

of 2023 is expected to reach an impressive 140 engines."

MAAS' CCO Richard Marston notes that "whilst there has been strong recovery in the market, there are still many difficulties to face post-pandemic. Escalating operating costs, supply chain and production issues as well as recruitment and workforce challenges, are all putting pressure on the sector." He adds that these problems are not exclusive to the MRO industry, or even the broader aviation industry, but they are far-reaching business issues that everyone must all adapt to.

In Conclusion

While multiple challenges still remain in the MRO sector, the overall outlook for 2024 is positive, without question. With carriers now operating at near-to pre-pandemic levels and demand for MRO services correspondingly being ramped-up, the worst would appear to be behind both. However, there still remains the legacy of supply-chain problems and this, above anything else, is likely to have the greatest short-term impact.

To end on an optimistic note, one only has to look, and you will see that order books for MROs and parts manufacturers are full, and the demand for used serviceable material is high.