# Overcoming Technical challenges in Aerospace MRO Industry with Augmented Reality Technology

In the dynamic realm of technology, where each and every circuit, wire, bolt counts for a safe flight to the sky full of innovation and new horizons, the industry of **Aerospace MRO (Maintenance, Repair, and Overhaul)** navigates through complex technological difficulties and regulatory demands that require efficiency and utmost precision for ensuring each aircraft's story to continue with safety and security.

From commercial airlines to military warfighters jets, as the aircraft continues to evolve into complex machines of mission critical systems and precision, challenges faced by maintenance professionals, aircraft operators, original equipment manufacturers have grown a lot. The world of MRO is a complex ecosystem where aerospace professionals face a constant struggle to maintain the operational efficiency of aircraft. From ensuring high precision in repairs and maintenance to overcoming the pressure of cost and time constraints, ensuring high safety standards and reliability takes the center stage of the industry.

However, the implementation of technologies such as Generative AI, Augmented Reality, Digital Twins & Data Analytics are emerging as a transformative tool to tackle the hurdles the Aerospace MRO industry goes through in maintaining the efficiency and precision of complex civil and military aircraft machines and equipment. With the rapid advancements in technology and global shifts, the MRO industry is paving

its way for a new transformation adapting the latest trends and technologies. In this article, we will explore the challenges that the MRO industry faces in the maintenance, repair and overhaul of the aircraft and how Augmented Reality Technology and its **remote technical support solutions** and **apps** play an important role in mitigating or overcoming those challenges, making the MRO process smooth and seamless.

**Complexity & Challenges of Aerospace MRO Industry:**

- **Shortage of skilled aviation technicians & knowledge transfer:**

  Going through old methods and being stuck in troubleshooting newer and complex machinery when the technicians are not skilled enough to solve the complex aircraft system is a growing challenge faced by the MRO industry. Seasoned professionals retire and the unavailability of highly skilled aviation technicians demands a lot of training and development programs to tackle the complexities of modern aircraft maintenance. Traditional training methodologies and paper manual processes to solve any aviation machinery are very time consuming and need lots of resources which hinders efficient transfer of knowledge and creates a gap between the capabilities of future and current workforce.

- **Technical Complexity of modern aircrafts:**

  Modern aircrafts or advanced avionics systems are designed and built with intricate engine designs and complex systems. Solving any technical faults or issues on such aircrafts requires specialized knowledge of the subject and advanced tools for proper repair and maintenance. Shortage of skilled qualified technicians and real time troubleshooting errors under expert guidance when not present on the field and geographical barriers of experts being remote unable to provide timely assistance is  a big challenge.

- **Timely Remote Collaboration & Expertise Guidance:**

  MRO activities require collaboration with specialists who are at geographical distance or far apart when on-site technicians or aircraft on-field operators get stuck in solving the technical complexities of the system. Traditional methods such as video conferencing, mobile phone calling limit the ability to share timely visual rich information required for enhanced communication and faster troubleshooting.

- **Downtime & Cost Management:**

  Downtime or grounded aircrafts cause disruptions to operational flight schedules and generate no revenue, causing financial losses for the airlines. Delays in the maintenance, unavailability of required parts on time, lack of timely assistance by the specialized expert teams, accessing critical data in remote and challenging environments, logistical challenges all lead to higher operational costs and are time consuming processes, hindering the operational activities. Therefore, minimizing downtime, optimizing workflows and efficient cost management is necessary to maintain profitability of the sector.

## How Augmented Reality Technology is a boon to the Aerospace MRO Industry

Augmented reality provides real time contextual information offering many solutions for overcoming technical challenges prevalent in the aerospace Maintenance, Repair, and Overhaul Industry with advanced remote tech support solutions. **Augmented Reality Apps and Software's** address those challenges in the most effective way and streamline the MRO process with enhanced productivity.

- **Real-time Experts Collaboration:**

  MRO tasks often require expertise guidance beyond the immediate team, particularly when the on-site technician encounters challenges with complex aircraft jet engines or machinery. Bringing specialists for consultation from afar can be time consuming & expensive. AR bridges this gap by facilitating real-time remote expert video communication with on-site aircraft operators, technicians or maintenance personnel. Technicians can share their screen with experts via live back camera video streaming and remote experts view their field of view, enabling them to guide through complex procedures via AR annotations, markers, and overlays.

- **Enhanced Safety & Real Time access to information:**

  MRO technicians often work in confined and hard to reach areas within aircraft, which makes accessing reference materials and physical manuals difficult. Augmented Reality overlays display AR manuals and relevant instructional information directly onto their field of view, eliminating the need of carrying bulky paper manuals for accessing critical data at the time of need and mitigating the safety risk by highlighting safety protocols and potential hazards, promoting a safe working environment.

- **Enhanced Trainings of the workforce:**

  Augmented Reality powered training programs provide aerospace workers or trainees engaging and interactive learning experiences. With AR support they can explore 3D models of aircraft components and visualize service procedures, checklists and AR manuals while receiving real-time guidance and feedback, leading to improved knowledge retention and faster skill acquisition with few clicks.

- **Minimized Downtime & improved workflows:** Paper based documents and manuals, emails or spreadsheets used by airlines to schedule or plan aircraft maintenance, leads to delayed services. AR powered work instructions and step-by-step digital guidance provide technicians and trainees capabilities to perform tasks faster with efficiency. When equipped with AR Glasses, the process becomes way more smoother with hands free access to information, minimizing risk of errors and rework. Troubleshooting issues with digital workflows and smart glasses leads to faster aircraft turnaround, reduced downtime with improved workflows.

Augmented reality is an emerging technology opening doors of new heights and horizons for every sector in the tech space. With evolving advancements and growing tech, integration of new technologies and software solutions are minimizing the challenges and difficulties faced by the industrial and tech sector. Above are a few examples of how AR is changing the scenario of MRO and as the technology matures and evolves further, there is much more to expect, the way MRO activities are conducted. By embracing this technology, organizations can unlock a future of the next generation of predictive maintenance, operational excellence and safety for a smooth flight of continued efficiency to limitless skies.

Source reference: AR Genie Inc.