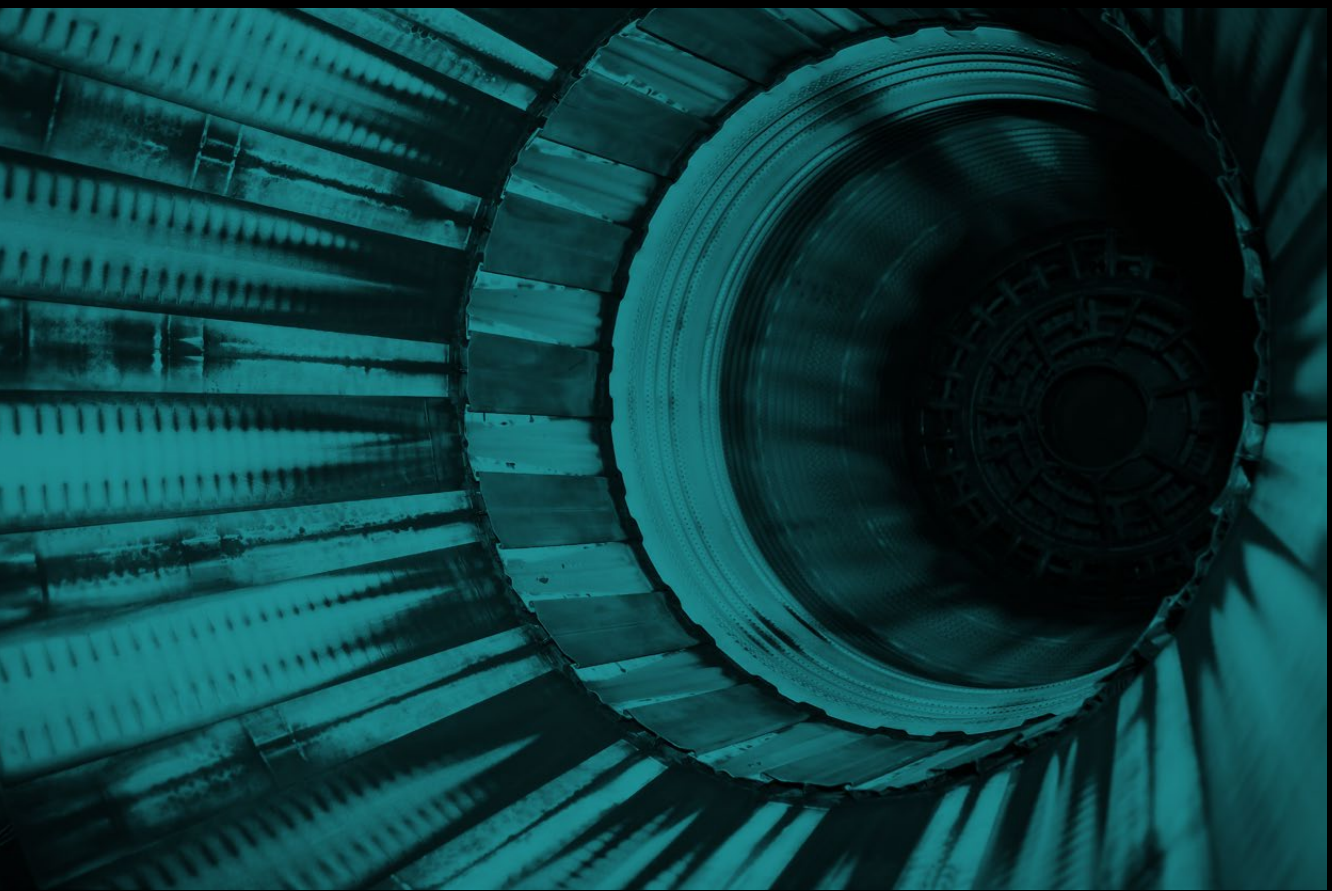




Think Ahead.

Military Airworthiness and Air Safety in the GCC: Establishing a Common Framework





Overview

To ensure safety standards for flight crew and personnel on the ground, a holistic regulatory framework for airworthiness and air safety incorporating aircraft design, its physical condition as it is continuously operated, and the organizations and personnel responsible for maintenance is imperative. Unlike the civil sector, most militaries develop their own airworthiness and safety requirements. Still, GCC nations have primarily relied on original equipment manufacturers (OEMs) to work with local maintenance, repair, and overhaul (MRO) contractors and operators to furnish such requirements for military aircraft programs.

As GCC nations move towards establishing military aviation authorities, which promise multi-faceted long-term benefits, establishing a harmonized framework at the GCC level will lay the basis for multinational collaboration that can increase aircraft availability, reduce program durations and, importantly, drive down costs. Creating a coordination mechanism to develop standard requirements and a shared roadmap will also accelerate the longer-term effort toward acquiring a comprehensive military certification capability. GCC nations can adopt a quick-start approach for MAAs by focusing initially on continuing airworthiness aspects where performance criteria, professional standards, and standard operating procedures (SOPs) are instituted, and the cultivation of the required ecosystem is set in motion.

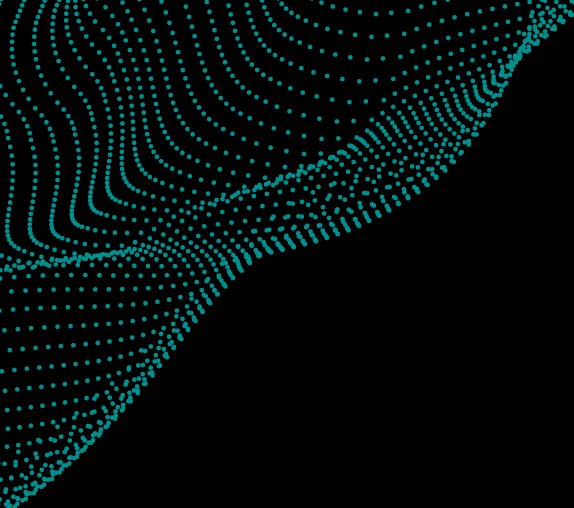


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Airworthiness and Air Safety in the Military Context: A Snapshot

Airworthiness is necessary to ensure safety standards for flight crew and personnel on the ground. A holistic approach ensures that all aspects of an aircraft can be certified as airworthy and safe – from aircraft design to the physical condition of the aircraft as it is continuously operated, as well as the organizations and personnel responsible for maintaining them. In the civil sector, the International Civil Aviation Organization (ICAO) sets airworthiness and air safety guidelines for national civil aviation authorities (CAAs) that maintain regulatory frameworks for all civil aircraft in their respective nations. Military aircraft are, however, exempted from ICAO guidelines. In defense, nations are individually responsible for setting regulations to ensure military aircraft are airworthy and can be flown safely.

Similar to a national CAA, a military airworthiness authority (MAA), typically mandated within the defense ministry, is assigned responsibility for military airworthiness and regulates the operational and technical aspects of ensuring compliance with the safety standards it lays out.

With no equivalent global guidelines such as ICAO for military aviation, nations regulate military airworthiness and air safety independently at their discretion. As most militaries develop their own respective military airworthiness regime, a lack of commonality inevitably emerges that creates obstacles in the way of emerging opportunities for multinational pooling and resource-sharing. Military allies and partners are increasingly seeking commonality and standardization in military airworthiness and air safety regulations through multinational harmonization to

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exploit the potential benefits of transnational facilities and engineering staff applying best practices and sharing common spare parts. Such multinational collaboration promises to increase the operational availability of military aircraft, reduce program durations and, importantly, drive down costs related to military airworthiness and air safety issues. The positive effects of this trend stand to benefit private sector maintenance organizations typically responsible for military aircraft maintenance as well as military operators searching for more effective support.

Outsourcing Airworthiness to OEMs in the GCC

GCC militaries have undertaken major aircraft acquisition programs over the past decade, which, combined with historically strong partnerships with OEMs, presented a logical case for reliance on original equipment manufacturers (OEMs) to ensure airworthiness and air safety for military aircraft. This was a relatively straightforward endeavor, given that most of these programs related to high-end military airframes came with proven design reliability that tended to be under-utilized operationally. However, as GCC militaries have become more active



in continuous operations, owing to global dynamics and a greater emphasis on burden-sharing commitments with coalition allies and partners, ranging from warfighting missions to military operations other than war (MOOTW), the case for relooking at how airworthiness and air safety requirements are fulfilled has become more robust.

OEMs are likely to be less cost-conscious without necessary cost-control mechanisms. In contrast, their responsiveness to changing operational requirements is likely based on factors other than simply complying with instructions from operational command. Moreover, given the absence of national guidelines and regulations, the unavoidable ambiguity around ultimate responsibility and signing off authority suggests that the outsourcing model for airworthiness and air safety to OEMs needs to be revised. Therefore, to better manage military aircraft fleets, control and reduce costs, meet changing operational requirements more responsively, and make independent

determinations of when aircraft are airworthy and safe to fly, GCC nations increasingly need MAAs of their own. From the broader perspective, MAAs will also be helpful to efforts in the GCC towards cultivating new expertise and knowledge bases, given their potential to contribute to developing local defense industries and employment opportunities related to aerospace engineering.

Moving Towards MAAs in the GCC and International Baseline

MAAs typically perform a more comprehensive range of functions that enable and complement the core function of ensuring military aircraft are airworthy and safe to operate, such as certification of design types, approvals for design, production, and maintenance training organizations, permits to fly test flights, registering aircraft on national registers, ensuring new products

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or modifications comply with aircraft-type designs and the licensing of maintenance personnel. The move towards establishing MAAs and developing holistic approaches for military airworthiness and air safety, therefore, involves much more than simply localizing the work OEMs have been relied on to do for airworthiness in the past and demands a multi-faceted technical capacity-building program. With wide-ranging expertise and experience available with their own national civil aviation authorities, through allies and partners with established MAAs, and with OEMs, GCC nations do not need to start from scratch in developing operating models for MAAs or the regulatory frameworks and guidelines relating to military airworthiness and air safety.

Taking advantage of aircraft fleet commonality, key definitions, acronyms, and supporting documents such as operational manuals and syllabi for training maintenance personnel, which are relatively accessible, for example, new MAAs in the GCC can adapt and adopt various existing frameworks, mechanisms, and SOPs relatively quickly. GCC nations should be able to move at speed in creating national MAAs and, considering the benefits of early coordination to build-in commonality from the beginning, establishing a GCC-level forum along the lines of the European Defence Agency's (EDA) Military

Airworthiness Authorities (MAWA) Forum. The MAWA Forum, established in 2008 to harmonize European military airworthiness regulations, brings representatives from member MAAs and industry representatives to codevelop European Military Airworthiness Requirements (EMARs). The MAWA Forum maintains a broad area of interest that may not be necessary for GCC nations to emulate for the time being but provides a valuable baseline model to evolve toward. EMARs have progressed over the years to cover initial aircraft certification, aircraft maintenance, maintenance training organizations, maintenance personnel licensing, and continuing airworthiness management.

Working Towards the End Goal

GCC MAAs must ultimately work towards establishing an independent capability for military certification, which promises long-term national benefits extending much further beyond. At this level, work for MAAs will begin early in the aircraft acquisition or development programs process once users have determined capability requirements. Then, GCC MAAs will work closely with design and manufacturing organizations to determine the airworthiness requirements for the aircraft program based upon civil standards, defense standards, or a combination of both, resulting in a certification basis being agreed upon, according to which the design and production of the aircraft will be evaluated.

Suppose the national MAA is satisfied through progress reviews during the design and development phase that the approved design organization is meeting requirements agreed upon for the certification basis. In that case, a permit to fly within limits determined by the MAA will be issued. Supporting evidence from test flights submitted to the MAA will need to

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substantiate if or when a development aircraft is meeting conformance for certification. It can then be issued a military-type certificate permitting full-scale production. Once in production, the MAA must inspect and certify that each aircraft conforms to the approved design before being registered in the national military aircraft register.

To undertake such activities, GCC MAAs must develop various enabling technical competencies and institutional capacities related to research, engineering, and development of aeronautics. It will take time and concerted effort for MAAs in the GCC to develop to such a capability level. At that point, they will become national resource centers that can assist in developing better military aircraft design, maintenance and support, testing and evaluation, and even operational performance. Essentially being conduits to new knowledge and production methods that, through facilitating the development of better systems, devices, materials, and procedures, MAAs will make it possible for greater output to be produced from lower levels of input. MAAs may be a boon for budding defense industries in the GCC because, in addition to the obligation for local defense industries to meet regulatory standards and certification, MAAs will foster international competitiveness, exportability, and unlock market access,

making it possible to achieve higher returns on investment.

Developing a Holistic Capability: Imperatives for MAAs

As GCC nations establish MAAs to develop a capability for military certification pertaining to airworthiness and air safety standards, the first step relates to creating the appropriate legal frameworks. Clearly defined rules and responsibilities stretching across all aspects of airworthiness, including certification, licensing, and registration, together with mechanisms to facilitate effective collaboration, information-sharing, and coordination with national civil aviation authorities and between MAAs on a regional level, are necessary. As GCC nations establish MAAs, it is imperative that these are individually mandated and empowered to:

- Create a national military aircraft register;
- Develop a syllabus, training standards, and licensing system for maintenance personnel
- Develop approval and continued certification processes for design, production, and maintenance training organizations which certify that each organization has the audited processes, procedures, and systems in place to undertake those respective activities;
- Approve and hold accountable an authority within operator-embedded Continuing Airworthiness Management Organizations (CAMOs) to monitor compliance with regulations
- Establish the processes and capacity to negotiate and codevelop a certification or recertification basis with the approved design and production organizations;

- Determine conditions or limits of permitted test flights and issue permits to fly;
- Undertake reviews of and independently validate evidence of aircraft conforming to airworthiness requirements and;
- Issue military certification for each aircraft

Comprising unique attributes, each of these elements is individually distinct yet interlinked, forming a system for military airworthiness and air safety that any MAA in the GCC will need to function effectively. Each element also poses unique technical capacities: An approved design organization, for example, will need to be investigated by the MAA to ensure it has the processes, procedures, and systems in place to design and maintain aircraft design and sub-systems. On the other hand, an approved maintenance training organization will need to verifiably demonstrate that it has the processes, procedures, and systems to train aircraft maintenance personnel in line with the professional standards and approved syllabus articulated by the MAA. On the other hand, maintenance personnel will need to be licensed through a process verifying that each technician possesses the qualifications, experience, and skills necessary to maintain military aircraft. Invariably, the work of an MAA is tedious. While relationship- and partnership-building are vital to successful outcomes, an MAA must be able to constantly scratch beneath the surface, work in grey areas and enforce decisions that may not be popular with stakeholders.

A Quick-Start Approach for MAAs in the GCC

To enable a quick-start operation, GCC nations can limit the initial focus of MAAs on continuing airworthiness aspects related to sustaining the airworthiness of military aircraft already in service throughout their service life. To ensure the continuing airworthiness of military aircraft, MAAs require a regulatory capacity that will allow them to:

Approve maintenance training organizations through appropriate auditing and checks to certify they have the correct processes, procedures, and systems in place to undertake such activities;

License aircraft maintenance personnel according to an approved syllabus and training standards to ensure that only qualified personnel are permitted to carry out military aircraft maintenance, and;

Approve a designated authority under the CAMO residing within the organizational structure of the operator to ensure the processes related to airworthiness and air safety are correctly managed, required data is collected, and report logs of unexpected faults or occurrences are adequately maintained.

The overarching theme at the start-up stage for GCC MAAs is to set in place performance criteria, professional standards, and ways of working with SOPs at the management and maintenance operations levels across the stakeholder chain. By ensuring that only personnel with the appropriate qualifications, training, and experience are permitted to carry out maintenance on military aircraft or assigned responsibility within the approved CAMO, MAAs can begin to cultivate the ecosystem necessary for delivering military airworthiness and air safety. Setting these foundations in place and building up from this

basic structure, it becomes possible to expand the work of MAAs toward the long-term goal of attaining a comprehensive capability for military certification. Once a preliminary regulatory capacity and baseline standards for delivering continuing airworthiness can be established, GCC MAAs should be able to rapidly expand to aspects of continued airworthiness, which relate to ensuring airworthiness through sustaining aircraft design through life.

Continued airworthiness requires a capacity within MAAs to monitor unexpected problems, faults, and occurrences across the service life of military aircraft that potentially require structural repair or modification, as well as mechanisms to manage upgrades and modifications necessary to meet capability requirements that change over time for military users. MAAs, therefore, need to be able to work closely with organizations that designed and manufactured military aircraft already in-service to find solutions to airworthiness issues that arise or potentially enforce usage limitations until airworthiness is restored. MAAs must also be able to work closely with the organizations that designed and produced aircraft and, if not the same organizations responsible for upgrades or modifications, following appropriate approvals, to determine airworthiness requirements in any new configuration. The MAA must then be able to define a recertification basis against which an updated military certificate can be issued once an upgrade or modification is successfully implemented or be able to enforce limitations until airworthiness is restored.

MAAs and Change Management: Painstaking Work Ahead

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The establishment of MAAs around the GCC aligned to build coordination and regulatory commonality from the beginning will allow GCC militaries to improve operational performance through a higher availability of assets, more effective support to operators, and reduced overall lifecycle costs. The preliminary challenge of instituting MAAs is defining the legal framework and standing up the organizational structures and operating models with the necessary staff, skills, and technology. As is often the case, however, the biggest challenge is the human element. The work of MAAs will be incredibly challenging because it will demand an entirely new way of working for the military aviation stakeholder community. Hence, resistance to change needs to be anticipated and appropriately managed. Therefore, it will be essential for GCC MAAs to be led from the top by individuals highly skilled in stakeholder management and able to engineer a cultural shift, particularly with operators, so that airworthiness and air safety standards can be sustainably ingrained across the stakeholder community.

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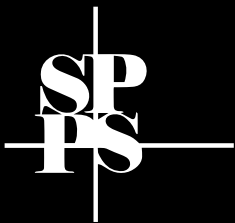
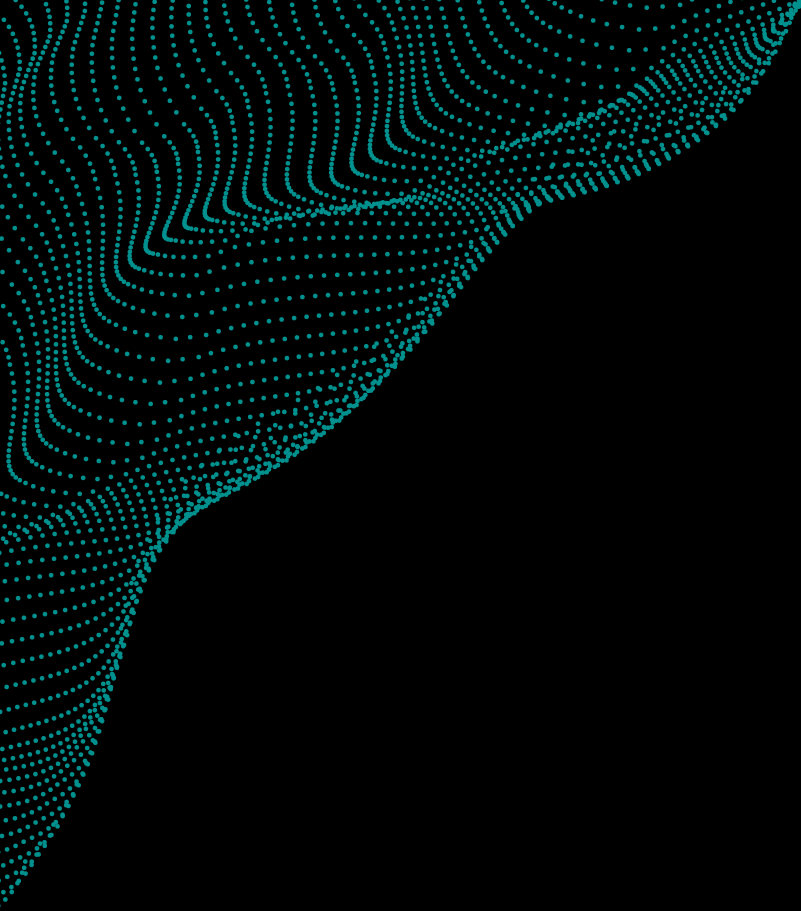
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