Aerospace Standard for Maintenance, Repair, and Overhaul Services Improves Safety

By: Sidney Vianna

IAQG 9110 Makes Sense for the MRO Sector

Aviation safety is a very critical issue. For millions of people to fly safely every day around the world, a very large and complex network of business and regulatory agencies have to operate flawlessly, delivering defect-free, on-time parts and hardware to all corners of the globe.

During the last few years, the International Aerospace Quality Group (IAQG) [1], which is comprised of some of the most prominent original equipment manufacturers (OEMs) in the aviation, space, and defense industries, has developed a set of comprehensive international standards supported by an assessment and certification program designed to improve confidence at all levels of the global supply chain. Although numerous standards have been developed, the best known by far is the AS/EN/SJAC 9100[2], which provides a comprehensive set of requirements for organizations that design, develop, and/or produce aviation, space, and defense products. More than 10,000 organizations have implemented the AS9100 standard and attained certification through the IAQG Industry Controlled Other Party (ICOP) scheme; a program where industry stakeholders engage with accreditation and certification bodies to enhance the credibility, trustworthiness, and confidence of certificates issued in the sector.

A much less known, but no less critical standard is the AS9110 document, the subject of this article, which prescribes requirements for a quality management system for organizations whose primary business is providing maintenance, repair, and overhaul services (MRO) for commercial and military aviation products. It can also be utilized by OEMs with MRO services operated autonomously or that are substantially different from their manufacturing or production operations.

Airlines rely on a vast, global, and ever-growing network of repair stations to keep their fleets operating safely and cost-effectively. Surprisingly to some, neither the civil nor the military aviation maintenance industry have awakened yet to the potential benefits of embracing and deploying the AS9110 standard through its supply chain, including reliance on the associated ICOP certification scheme. While in the OEM world more than 10,000 organizations have been certified to the AS9100 standard, less than 250 organizations have attained certification to the AS9110 model, at the time of this writing. This asymmetrical development caught the attention of the IAQG, which recently launched the Maintenance, Repair, and Overhaul Relationship Growth Strategy Team to address this disparity.

The aviation maintenance industry is filled with many challenges and one of our biggest concerns is

figuring out how to demonstrate proper controls to build customer and regulatory confidence that we have robust quality systems in place, ensuring the airworthiness, integrity, and safety of the products we bring back into service. Many people familiar with the IAQG would like to see this answered by a multifaceted approach, such as that taken by the IAQG OEMs and their supply chain:

• The adoption of an industry recognized standard, which is robust enough for all stakeholders to coalesce around

• The adoption of a credible assessment and certification process, which not only provides confirmation that organizations are in compliance with the standard, but that their systems are effective in achieving planned results

• The willingness by all stakeholders, including national aviation authorities and customers, to rely on the results of such audits and certificates—recognizing them as an important component of their supplier oversight process

• Any additional audit activities performed by customers should not duplicate the assessment activities covered in the audits performed by certification bodies operating under the ICOP scheme.

While industrywide adoption of AS9110 is a potential answer to the challenge posed above, it is critical to realize that the aviation maintenance industry is marked by a co-existence of certificated and noncertificated repair stations. Certificated, in this context, means that the repair station has been assessed by a national aviation authority, such as the Federal Aviation Administration (FAA) of the U.S. Department of Transportation, and issued a certificate to operate. Noncertificated repair stations fall outside the regulatory oversight of the aviation authorities and are subject to monitoring only by their customers, e.g., airlines. We should note, that the monitoring of noncertificated repair stations is not as vigorous as many stakeholders would like to see.

On the other extreme, some MRO organizations suffer from excessive scrutiny. A classical example was presented during the International Aviation Safety Conference in 2007: a major MRO organization in Asia reported undergoing 120 external audits during 2006. These were conducted by national aviation authorities and their customers without any significant nonconformity being found or reported. When we recognize that each of these 120 audits was probably a multiday, multi-auditor activity, one can easily estimate the resources and cost this organization incurred to support these audits.

For those already experiencing an excessive number of oversight audits, there may be apprehension in proposing another quality management system audit. Ironically, the ICOP-based 9110 certificates may help reduce the number of external audits and help to focus customer audits only to product and process assessments. In the aviation, space, and defense industries, more and more organizations are relying on certification to the AS9100 standard as an important component of their supplier monitoring process. Although some organizations still conduct supplier audits, second-party auditors are moving away from broad, quality management system audits, and paying closer attention to process effectiveness and product integrity, adding more value from the customer's and supplier's perspectives.

On the other side of the spectrum, a growing number of noncertificated repair stations are subject to no regulatory oversight and questionable scrutiny and monitoring by their aviation maintenance customers. In a 2005 report[1], "Air Carriers' Use of Non-Certificated Repair Facilities," the U.S. Department of Transportation concluded that the audit systems used by air carriers to evaluate noncertificated facilities did not focus on key areas established by the FAA. A prime example, the procedure used by one air carrier consisted of a two-page list of questions that only required a yes or no response; one of the questions was "Does the vendor have a fax machine?"

Certification of this industry segment to AS9110 would be a welcome layer of control and risk mitigation. A solid quality management system, such as AS9110, would definitely boost the performance of noncertificated repair stations. Issues such as personnel competence, process validation, effective corrective and preventive actions, and product safety and integrity would have to be integrated into these organization's quality management systems. Many of these noncertificated repair stations have, at best, old fashioned quality control systems focusing on inspection and test. Such an archaic approach to quality (reacting to nonconformities instead of preventing them) needs to be phased out of the aviation maintenance industry. Collectively, we must instill modern quality methodologies into this industry segment where quality management is an integral part of the business strategy, and AS9110 can facilitate this cultural transition.

For national aviation authorities, airlines, and customers of aviation maintenance services, all struggling with supplier oversight resources, the benefit of encouraging suppliers to attain AS9110 certification is clear: It provides an additional layer of control and confidence that enhances the supplier's quality system and is funded by the suppliers themselves. In other words, without spending a dollar, a customer that demands their MRO suppliers to attain AS9110 certification would have a team of qualified auditors scrutinizing that supplier, according to industry-developed standards such as the AS9104 series. It would follow an industry-developed protocol and provide customers and regulatory agencies with confidence about the supplier's capabilities. If properly executed, AS9110 certification would help reduce risks to the aviation maintenance supply chain.

For those not familiar with the AS9110 standard, be informed that the document is based on the world-acclaimed ISO 9001 and supplemented by applicable AS9100 aviation, space, and defense industry requirements. Specific aviation maintenance industry requirements were added to address the demanding regulatory requirements associated with aviation safety and product airworthiness, as well as other expectations inherent to the aviation maintenance world.

Some of the enhancements, new requirements, and areas of emphasis in the revised AS9110 standard include:

Counterfeit and suspect unapproved parts—The AS9110 standard addresses the need for systems to detect and prevent the introduction of counterfeit parts and components that might not have been or are suspected of not having been produced in accordance with applicable laws and regulations. As we all know, "unapproved" or "bogus" parts are extremely dangerous to aviation safety. It is critical that aviation maintenance organizations have robust controls in place to prevent the introduction of substandard flight hardware into aviation products.

Human factors—Recognizing that workers are affected by physical fitness, physiological characteristics, personality, stress, fatigue, distraction, communication, and attitudes, AS9110 includes requirements associated with human factors. These requirements are intended to ensure a safe interface between workers, procedures, data, equipment, facilities, and other external influences.

Safety management systems—The International Civil Aviation Organization is developing a proposal for the harmonization of provisions relating to the implementation of safety management systems across all safety-related disciplines in signatory states. Aviation maintenance organizations will be required to introduce safety management system within their business practices. The AS9110 standard introduces some initial components required for a safety management system (i.e., establishment and maintenance of a safety policy and safety objectives), with the primary concern being product safety.

Technical data—The availability of technical data necessary to ensure that the aircraft or component can be maintained for serviceability and airworthiness, and related operational and emergency equipment is assured. This data includes maintenance programs, airworthiness directives, service bulletins, major repairs or modifications, operator maintenance manuals, drawings, engineering orders, component maintenance manuals, and technical orders.

Project management—The revisions to AS9110 contain new requirements for planning and managing product overhaul, repair, and maintenance in a structured and controlled manner. Maintenance, repair, and modification of aircraft and aircraft components can be a large and often complex project, which needs to be adequately managed.

Risk management—The way aviation maintenance organization's address risk management is critical. Therefore, it only seems appropriate to introduce a new requirement for the development, implementation, and maintenance of a risk management process applicable to the organization's products and services provided, with well-defined process responsibilities, criteria, mitigation, and acceptance.

Summary

The IAQG believes that a well-coordinated promotion of the AS9110 standard and the intelligent and responsible use of the ICOP certification scheme can assist with risk mitigation and performance improvements in the aviation maintenance sector. A concerted effort is under way to engage with industry stakeholders for a larger scale embrace of the standard in the aviation MRO community.

Notes:

[1] Air carrier's use of non-certificated repair stations; FAA report number AV-2006-031, date issued December 15, 2005.

[2] Known as AS in North America, EN in Europe, and SJAC (or JIS Q) in Japan and Asia.

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