AEROSPACE QUALITY MANAGEMENT SYSTEM - 9100

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April 11th, 2003 Edinburgh General Assembly – 1 of 24
Aerospace Quality Standards Numbering System

- **International Standards - 91xx**
  - Are planned for harmonization across all 3 aerospace sectors and are recognized globally

- **Americas Standards - 90xx**
  - Are published for use by AAQG, may become an 91XX standard at a later date

- **“AS” Standards - Americas**
  - Published by Society of Automotive Engineers

- **“EN” Standards - Europe**
  - published in Europe by AECMA

- **“JIS Q”or “SJAC” is the Japan / Asia Equivalent**
Aerospace Quality System Standards

- INTERNATIONAL STANDARDS
  - 9100 - Quality System for Aerospace Manufacturers
  - 9101 - Checksheet for 9100
  - 9102 - First Article Inspection
  - 9103 - Management of Key Characteristics
  - 9110 - Quality System for Aerospace Repair Stations
  - 9111 - Checksheet for 9110
  - 9120 - Quality System for “Pass-Through” Distributors
  - 9121 - Checksheet for 9120
ISO TC20 - WG11

ISO Technical Committee 20 - Aircraft & Space Vehicles
– Established Working Group 11 (April 1997)

• Chartered to develop and publish an international quality system standard based upon ISO 9001 for the aerospace industry

• United States (Gene Barker) Convener

• Members:
  - Brazil
  - China
  - France
  - Germany
  - Japan
  - Mexico
  - United Kingdom
  - United States
International Quality System
Standard Creation 1998

Americas Standard
AS9000

World Aerospace Quality Standard; AS/EN/JIS Q 9100

ISO 9001 1994

Europe Standard
prEN 9000-1

ISO TC 20 WG11

AS9100

EN 9100

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Aerospace Quality System Model

Quality System Requirements - International Standard ISO 9001

Common Aerospace Quality System Requirements - International Requirements 9100

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Internationally Agreed Implementation Processes

AS/EN/JIS Q 9100

Int’l Reqmnts & Company Reqmnts
Why 9100?

- To standardize Aerospace quality expectations on a global level
- To achieve improvements in quality and reduce costs throughout the value stream
- ISO 9000 model for quality does not capture regulatory requirements or importance of safety, reliability or maintainability
- Captures aerospace supplements agreed to at an international level
ISO9001 versus AS9100

• AS 9100 version is formatted to match ISO 9001:2000 and added “requirements” that provide for -
  • Regulatory organizations interfaces
  • Configuration Management
  • Design and Development V& V., & V&V testing
  • Control of changes in Production Process
  • Control of production equipment, tools, NC machines
  • Control of work in outside facilities
  • Control of service operations
  • First Article Inspection
  • Inspection documentation

• These added requirements enables a standardized approach to supplier flow down requirements
A moving target . . .

Note: AS9000 / AS9100 section 2 phase out December 15, 2003
Certificates are expected to expire in line with ISO 9001 requirements
Does NOT mean that “approvals” are invalid


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“The Aircraft Certification Service still believes that the effective implementation of AS9100 - Rev A will continue to enhance an organization’s overall performance. The statement found in Section 1.1 General: states “It is emphasized that the quality management system requirements specified in the standard are complementary (not alternative) to the contractual and applicable law and regulatory requirements.” is still a requirement that must be adhered to.
Proposed Department of Defense (DoD) Adoption of the AS9100:2001 Quality Management Systems - Aerospace Requirements (Nov. 2001)

- prepared ... DoD adoption notice for the AS 9100:2001 to provide information for document visibility and facilitate document availability to DoD personnel.

Current NASA Position on 9100

- NASA issued Adoption notice on April 8th, 2002, signed by Dr. Michael Greenfield, Associate Administrator for Mission and Safety Assurance.

- This notice makes AS9100A available for use by NASA for procurements for all programs.
SPACE CONSIDERATIONS

- ISO TC20 / SC14 and IAQG have on-going project to supplement 9100 w/ special considerations for Space needs
  - Includes Risk Management & Safety and Mission Assurance emphasis
  - Use as supplement to 9100
  - Consideration for full inclusion at next revision of 9100
- Other industries / applications are considering using 9100 - Weapon systems and Nuclear energy industry
• IAQG developed 9101 Common Checklist to be used by industry to cover all ISO 9001 & 9100 elements - allows industry to share audit information

• Must be used by Certification Bodies when performing 9100 audits

• Scoring feature is currently used by many organizations
9110 Repair Station Quality System

• Status of 9110
  – New version was developed with Manufacturers-MRO, DoD, FAA and Airline inputs
    • Takes latest version of FAA Part 145 into account
  – Will replace EN 9110 in Europe that is already in use since 1999
    • 3 Airlines and most European Manufacturers already use it to specify requirements to MRO suppliers

Registration / Certification plans being put in place
Why 9110?

- Manufacturers want a Quality System flow-down requirement for their repair activity
- Manufacturers want reputable suppliers that have repair station approvals and a defined quality system
- There is a need to put all of the expectations in one document for Repair and Maintenance organizations
- Military is very interested in having defined Quality System requirements for MRO
9120 Distributor Quality System

- EN 9120 developed and implemented in Europe for “pass through” stockists / distributors that handle parts and supplies that are used in aerospace products.
  - Checklist 9121 is also available
  - Based on 9100, but only applies necessary system requirements.
  - 9120 is available
  - Registration plan to be available 1/2003
• Projects are Designed to reduce requirements variation
• Projects are designed to provide support and compliance enhancement to areas that Aerospace has identified for Risk Reduction (resource limitation)
• Projects are designed to increase process capabilities
• Projects are designed to improve products or processes
Aerospace Quality Standards (cont.)

International Standards

- First Article Inspection (9102)
- Management of Key Characteristics (9103)
- Record Retention (9130)
- Nonconformance Documentation (9131)
- 2D Bar Coding (9132)
- Part Qualification Process (9133)

Other Projects

- “Less than” 9100 (AS9003)
- Operator Self Verification (ARP)
- Deliverable Software Quality
- Non-Deliverable Software
- Direct Shipments (ARP 9004)
- Sampling Plans
- 3D Digital Data Storage (ARP)
- Contract Clauses (ARP)
Industry Leaders are Listening

- Agreed to improve the overall approach to quality
- Major Aerospace Companies have agreed upon Quality Management System approval approaches
- A key objective is to reduce the number of audits
- There are significant benefits to the Aerospace Industry
- Working to develop our International processes to incorporate the new approach
- International approach is based on a single agreed standard, harmonization of system application and shared information
The IAQG implementation metrics show that:

- 75+% of members have implemented 9100 internally and to their suppliers.
- 25+% of members have implemented 9102, FAI, internally and to their suppliers.
- 10% of companies have implemented the recently published 9103, Component Proving, internally and to their suppliers.

- Implementation is gaining momentum and this will increase, particularly when the new Boeing Quality System is reissued.
- The sector implementation approaches are also making good progress but the benefits from global mutual recognition of Quality System audits is still not quite there yet - working the global database.