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9115 revision A

Background
Background

- Reminder: AS9115 supercedes AS9006, which was published in March, 2003 as an Americas only standard
- Later Internationally adopted as 9115
- AS9115 - Software Supplement to AS9100
  - Adds specificity and granularity for compliance with the objectives of AS9100 requirements for Deliverable Software

- Deliverable Software
  - Developed or modified, airborne, shipborne, space borne or ground software
  - Can be a stand alone deliverable software by contract line item or embedded in deliverable product
  - Unmodified COTS components excluded
AS9115 SUPPLEMENTS
AS9100

- Clarifies 9100 requirements relative to software
Example of standard AS9115 verbiage when AS9100 text applies with NO clarification needed for deliverable software

7.1.5.2 Measurement Traceability

When measurement traceability is a requirement, or is considered by the organization to be an essential part of providing confidence in the validity of measurement results, measuring equipment shall be:

a. calibrated or verified, or both, at specified intervals, or prior to use, against measurement standards traceable to international or national measurement standards; when no such standards exist, the basis used for calibration or verification shall be retained as documented information;

b. identified in order to determine their status;

c. safeguarded from adjustments, damage, or deterioration that would invalidate the calibration status and subsequent measurement results.

The organization shall establish, implement, and maintain a process for the recall of monitoring and measuring equipment requiring calibration or verification.

The organization shall maintain a register of the monitoring and measuring equipment. The register shall include the equipment type, unique identification, location, and the calibration or verification method, frequency, acceptance criteria.

NOTE: Monitoring and automated test equipment owned and custom

Calibration or verification environmental condition

The organization shall conduct calibration or verification of measuring equipment is

7.1.5.2 Measurement Traceability

The requirements of 9100 apply. No clarification required for software.

AS9100

AS9115
Example of standard AS9115 verbiage when AS9100 text applies WITH additional clarification needed for deliverable software

7.2 Competence

The organization shall:

a. determine the necessary competence of person(s) doing work under its control that affects the performance and effectiveness of the quality management system;

b. ensure that these persons are competent on the basis of appropriate education, training, or experience;

c. where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken;

d. retain appropriate documented information as evidence of competence.

**NOTE:** Consideration should be given for the periodic review of the necessary competence.

**NOTE:** Applicable actions can include, for example, the provision of training to, or the re-assignment of, currently employed persons; or the hiring or contracting of competent persons.

7.2 Competence

The requirements of 9100 apply with the following clarification for software:

Software practitioners (e.g., Engineering, Quality, Testers) shall be qualified by education, experience, and training appropriate for the criticality, complexity, customer and regulatory requirements, and other relevant attributes (e.g., IA) of the associated software product and activities.
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Reasons for revision
ISO 9001 / 9100 core reasons for change

- Adapt to a changing world
- Enhance an organization's ability to satisfy its customers
- Provide a consistent foundation for the future
- Reflect the increasingly complex environments in which organizations operate
- Ensure the new standard reflects the needs of all interested parties
- Integrate with other management systems
The “9100” needs to change, to:

- Incorporate changes made by ISO TC176 to the ISO 9001:2015 requirements *(ISO liaison organized to collaborate with the IAQG 9100 team and to obtain consideration for IAQG requirements)*

- Consider Aviation, Space and Defense stakeholders’ needs identified since the last revision *(web survey performed in 2013)*

- Consider clarifications to 9100 series requests issued by IAQG since the last revision *(requirements clarified or notes added)*
Why “9115” needed to change:

- AS9100 changed to align with ISO 9001:2015
-Respond to changes in software development methods
-Consider threat profiles to Aviation, Space and Defense software systems – adds themes of cybersecurity
-Advances in tools, simulations and testing capabilities
-Recognize the expanded scales of software impact such as cloud based services, mobile apps, small embedded web based servers and networked appliances
-Ensure mitigation of potential quality concerns are met for software
-Disposition the collection of feedback related to 9115 since 2010
9100 revision D / 9115 revision A

High Level Structure
High Level Structure

- ISO is going from 8 clauses to 10 clauses

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Rationale

- Better alignment to business strategic direction
- With PDCA approach
- More compatible with other management system standards

Implementation Considerations

- Review your current QMS structure (preferable to adapt the QMS structure to the Business Processes)
9115 revision A
Key Changes
New content – Recognition of Mobile Apps & Cloud Based Services

Organization infrastructure includes, as applicable:

a. software development tools and utilities, including host computer and support software;

b. software verification tools and utilities, including test equipment and test software;

c. equipment, tools, software and utilities for archiving and storage (e.g., network, web or cloud based storage), backup, disaster recovery, protection, replication, software loading, transmittal, and documented information retention;

This standard supplements the 9100 standard requirements for deliverable software and contains quality management system requirements for organizations that design, develop, and/or produce deliverable software and services for the aviation, space, and defense industry. This includes, as required, support software that is used in the development and maintenance of deliverable software and services. The deliverable software may be stand-alone, embedded, mobile application, or loadable into a target computer.

This deliverable software may also be part of services (e.g., cloud environment, web hosted solutions or platforms).
High quality software is not enough.

✓ In the past, software had to meet functional and safety requirements

✓ This alone is no longer adequate

✓ Now, software and it’s environment must also be SECURE – Information Assurance
Understanding: Information Assurance, Information Security and Cybersecurity

Information Assurance as defined in AS9115: “The set of activities needed to protect information and information systems by ensuring availability, integrity, authentication, confidentiality, and non-repudiation including protection, detection, and reaction capabilities.

INFORMATION ASSURANCE

– QMS /Policy/Infrastructure level –

“Protecting information and information systems by ensuring availability, integrity, authentication, confidentiality, and non-repudiation. Includes protection, detection, and reaction capabilities.” (1). NIST, IC

INFORMATION SECURITY

– Security of all media –

“Protecting information and information systems from unauthorized access, use, disclosure, disruption, modification, or destruction in order to provide confidentiality, integrity, and availability.” (1). NIST, IC, ISO

CYBERSECURITY

– Security in the cyber realm –

“Protecting cyberspace [networks, computers, processors and communication systems] from cyber attacks.” (1). NIST IC, DOD
9115 revision A

Significant addition to 9115 standard: Enhanced cybersecurity requirements
Cybersecurity derived themes

✓ Culture of Security
✓ Technical Security
✓ Software Life Cycle Security
✓ Supply Chain Security
✓ Internal Audit of Cyber Security
✓ Notification, Response, and Recovery

NIST Cybersecurity Framework (NIST 800-53)
Introduction, Scope & References provide inclusion of mobile applications, and services (e.g. cloud environment, web hosted solutions or platforms)

3.0 - Definitions

- Information Assurance – new definition
- Interested Parties – replaces Stakeholder
- Non-developmental Software – added Government off-the Shelf (GOTS) software to definition
- Software Life Cycle – slight definition revision to provide clarity
- Support Software – slight definition revision to provide clarity
- Validation – slight definition revision to provide clarity
- Verification – slight definition revision to provide clarity
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✓ Verification – slight definition revision to provide clarity
4. – Context of the Organization

4.3 “When determining the scope of the quality management system, the organization shall include the elements of IA (e.g., culture of security, including personal identifiable information security; technical security; software development life-cycle security elements; supply chain security; internal security audits; notification; response; recovery), appropriate to the size, criticality, complexity, or consequence of exploitation of the organization’s processes, products, or services.”

“NOTE: For further information, see the IAQG Supply Chain Management Handbook (SCMH).”

5. – Leadership

No clarification from 9100 for Software
6. – Planning

✓ 6.1 “The organization shall consider deliverable software products, processes, and services when determining risk and opportunities.”

✓ This should include consideration of external providers, when appropriate.

7. – Support

✓ Focus on infrastructure in 7.1.3

• Tools, utilities, cyber protected environment, code analysis capabilities
• Security for software environments against threats

✓ 7.1.4 “The organization shall ensure that the operational environment appropriately protects the software against unauthorized access and tampering.”

✓ Competence (7.2) appropriate for the criticality and complexity to support customer and system requirements

✓ Resources available to retain legacy data (7.5.3)
8. – Operation

- Software planning addresses software related activities from project planning through product delivery and maintenance
- Quality objectives and requirements expressed in measurable terms, including critical items and key characteristics
- Defined rules, practices, conventions, techniques, and methodologies for development and test
- Strong software configuration management guidance
- Focus on product integrity and safety
- Prevention of counterfeit software (8.1.4)

9. – Performance Evaluation

- Software organizations analyze and evaluate industry data on emerging threats and vulnerabilities
- Internal audits include software aspects of the QMS
10. – Improvement
   ✓ No clarification from 9100 for Software

11. – Notes
   ✓ No clarification from 9100 for Software

Support materials on 9115 and software QMS:
   - IAQG Supply Chain Management Handbook
Supply Chain Management Handbook (SCMH)

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IAQG/AAQG
Raymond Wright – IDR
raymond_wright@raytheon.com

APAOQG
Satoshi Kikuchi – APAOQG SDR
s-kikuchi@hirec.co.jp

EAQG
Hartwig Flory – EAQG SDR
hartwig.flory@airbus.com