

# Quality Clause Q6R

## Software & Firmware - Deliverable & Non-Deliverable

*The latest issue of this document is the version on the Lockheed Martin website:*

<https://www.lockheedmartin.com/en-us/suppliers/business-area-procurement/aeronautics/quality-requirements/clauses.html>.

### **APPLICABILITY**

This quality clause excludes Commercial Off-the-Shelf (COTS) Software, as defined by AS9115A.

### **NOTES**

1. The terms “Software,” “Firmware” and “Deliverable” are defined in AS9115A, and “Non-Deliverable” is defined in AS9125.

### **REFERENCE DOCUMENTS**

1. SAE AS9115A, Quality Management Systems – Requirements for Aviation, Space & Defense Organizations - Deliverable Software (Supplement to 9100:2016)
2. SAE AS9125, Aerospace Series - Non-Deliverable Software Requirements

### **REQUIREMENTS**

#### **1. Software Quality Management System (SQMS)**

- A. Seller shall define, implement and maintain a Software Quality Management System (SQMS) acceptable to Buyer and documented as part of Seller’s Quality Management System, regardless of whether or not the Software Quality Plan (SQP) is contractually defined as a Supplier Data Requirements List (SDRL).
  - i. As part of its SQMS, seller shall establish and maintain processes for evaluation of each non-deliverable software item used, whether in the automated manufacturing of deliverable hardware or in the qualification or acceptance of deliverable software or hardware. Seller shall ensure these processes provide for the following:
    - a. Required functions of the non-deliverable software are defined, in writing, and objective evidence exists prior to the intended use of such software, that such software performs the required functions.
    - b. The non-deliverable software is placed under internal configuration control prior to its use, and such internal configuration control is maintained throughout its use.

#### **2. Software Development Plan (SDP)**

- A. For Deliverable Software, the organization shall develop and maintain a software development plan in accordance with AS9115A. The plan must be acceptable to Buyer.
  - i. Seller shall produce a software development and testing schedule commensurate with the complexity of the software development.

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ii. Metrics shall be made available upon Buyer's request.

**B.** For Non-Deliverable Software, the organization shall develop and maintain a software development plan in accordance with AS9125. The plan must be acceptable to Buyer.

i. Seller shall produce a software development and testing schedule commensurate with the complexity of the software development.

ii. Metrics shall be made available upon Buyer's request.

### **3. Software Quality Plan (SQP)**

**A.** The SQP shall include software quality activities to be performed for standalone or embedded deliverable, non-deliverable, & support software associated with this Purchase Order (PO), in relation to the software development tasks that include:

- software requirements
- software design
- software coding
- software unit and integration testing
- verification testing
- product and documentation reviews
- metrics and trending
- safety
- security
- records archival and retrieval
- change management,
- requirements traceability
- release processes

**B.** The Seller's SQP shall include specifics regarding the Seller's management support of SQMS and the resources provided to the software quality employees involved, including their training, tools, security clearances, if needed, and program access.

**C.** Seller shall include in its SQP definitions of all internal and independent reviews and audits to be performed, the metrics to be captured, and the resulting records to be archived, in order to ensure Seller compliance with contractual requirements and applicable standards.

**NOTE:** A separate document(s) is not required for the SDP or SQP unless contractually required (e.g., Supplier Data Requirements List) as long as the requirements are sufficiently documented elsewhere (i.e., in the seller's command media).

**4.** Seller shall review and meet SAE standards AS9115A and AS9125, as appropriate to their software quality processes.

**5.** Seller's infrastructure shall include the elements and processes identified below in subsections i – vii. Each element shall be defined and visible, with artifacts of compliance that are readily verifiable:

- i. Software development tools and utilities, including host computer and support software;
- ii. Software verification tools and utilities, including test equipment, test software, vulnerability scanners, code scanners, and fuzzers;

- iii. Equipment, tools and utilities for product and documentation archival and storage, replication, change management, configuration management, software loading and verification, transmittal, disaster recovery protection, and software quality;
  - iv. Equipment, tools, and software programs used to automate, control, monitor, or measure production processes, validated prior to final release and maintained.
  - v. Integrity verification tools and utilities (e.g., virus protection/checking, digital signatures, security hash algorithms, and checksums or cyclic redundancy checks);
  - vi. Equipment and software needed to meet retention requirements; and
  - vii. Security for software environments against attacks (e.g., malicious code, enumeration, fingerprints, worms, viruses, backdoors, and spyware).
6. The Seller shall flow down these Q6R requirements or their equivalent to its Sub-Tiers and require that Sub-Tiers flow the same to their Sub-Tiers to ensure the degree of management discipline and documentation required of the Seller is maintained at each subsequent sub-tier level.
  7. Buyer and Buyer's customer shall have access to Seller's and Seller's Sub-Tiers' personnel, facilities, procedures, metrics, and objective evidence involved in the project in order to conduct in-process assessments, inspections, and surveillances of the software development and testing processes, internal procedures, supporting functions (e.g., Software Quality, Software Configuration Management/Configuration Management, Safety, Security) and applicable documentation.
  8. Buyer's assessments and/or inspections shall be permitted of any and all Ground-Based and Airborne Systems, regardless whether the development is defined as a software development process or a hardware development process or whether the Programmable Logic Device is considered to be software, hardware, firmware, Complex Electronic Hardware, Field Programmable Gate Arrays, Application Specific Integrated Circuits, a subsystem, or other.