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**ALLIED
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NATO INTERNATIONAL STAFF - DEFENCE SUPPORT DIVISION

**NATO
SOFTWARE QUALITY
CONTROL SYSTEM
REQUIREMENTS**

August 1981

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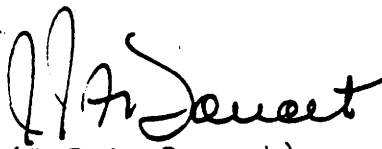


NORTH ATLANTIC TREATY ORGANIZATION
MILITARY AGENCY FOR STANDARDIZATION (MAS)
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August 1981

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FOR THE MILITARY AGENCY FOR STANDARDIZATION


(J.J.A. Doucet)
Major-General (CAAR)
Chairman, MAS

AQAP-13

II

RECORD OF CHANGES AND AMENDMENTS

Identification of Change or Amendment and Reg. No. (if any) & date	Date Entered	NATO Effective Date	By Whom Entered (Signature, Rank, Grade or Rate, Name of Command)

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CHAPTER 1

GENERAL

101 INTRODUCTION

- (a) The development and acquisition of computerized equipment may be characterized by a recognized combination of two major components; hardware and software. The successful integration of these two major components is essential for compliance with overall user requirements. Essential to this successful integration is the application of a disciplined approach to management provided by a quality control system.
- (b) This document may be used as a supplement to AQAP-1 in stipulating a Software Quality Control (SQC) sub-system which will be considered a part of the quality control system prescribed by AQAP-1 or may be used as support to the application of AQAP-1 in the procurement of software.
- (c) Where AQAP-1 is not applied, this document may be invoked as a stand-alone document which stipulates a SQC system.

102 SCOPE

This document establishes SQC requirements for contractors.

103 APPLICABILITY

When referenced in a contract this AQAP shall apply to the design and development of software whether the contract is for software alone or for software as a portion of a system. This AQAP shall also apply to non-deliverable software developed under the contract, which affects the quality of the deliverable product unless specifically exempted. If an inconsistency exists between the contract requirements and this document the contract requirements shall prevail.

104 REFERENCED DOCUMENT

AQAP-1 "NATO Quality Control System Requirements for Industry".

105 DEFINITIONS

For the purpose of this document the following definitions shall apply:

Software: Covers all instructions and data which are input to a computer to cause it to function in any mode; it includes operating systems, supervisory systems, compilers and test routines, as well as application

programs. The words embrace the documents used to define and describe the programs (including flow charts, network diagrams and program listings), and also cover specifications, test plans, test data, test results and user instructions.

Firmware: Computer logic that is either hardwired or in a state that cannot be readily modified.

Quality Assurance Representative (QAR):

The authorized representative of the national QA authority designated in the contract.

Test Plan:

A management document which addresses all aspects related to the test. It should include the test schedule and define the necessary support tools.

Test Specification:

Describes the test criteria and the methods to be used in a specific test to assure that the performance and design specifications have been specified. The test specification identifies the capabilities or program functions to be tested and identifies the test environment.

Test Procedure:

A test procedure is a document that delineates each step necessary to conduct a test. The steps shall be in sequence with all inputs and outputs defined.

CHAPTER 2

REQUIREMENTS

201 GENERAL

The contractor's activities shall be planned, developed, implemented, documented and maintained in conjunction with other contractor functions necessary to satisfy contract requirements. The contractor shall establish management policy, standards of design, programming practices, and SQC procedures. Provision shall be made to permit the Quality Assurance Representative (QAR) to verify and validate that the SQC requirements are being met. This applies to all phases of the contract performance. Software problem reporting procedures shall be provided for the early detection of actual or potential deficiency trends or conditions which could result in unsatisfactory quality, and for timely and effective corrective action. Objective evidence of the contractor's SQC activities, reports and decisions shall be available to the QAR for his evaluation of the contractor's system.

202 ORGANIZATION

Effective management for software quality shall be clearly prescribed in writing by the contractor. The contractor shall delegate to those personnel performing software quality functions both the responsibility and the authority to identify and evaluate software quality problems and to initiate, recommend, or provide solutions during all phases of the contract.

The contractor shall appoint in writing a management representative with the necessary authority to resolve matters pertaining to software quality to the satisfaction of the QAR.

203 SYSTEM REVIEW

Provisions shall be made for the periodic and systematic review of the SQC system by the contractor to ensure its effectiveness. Provision shall also be made for evaluation by the QAR who may disapprove the SQC system.

204 PLANNING

During the earliest possible phase of the contract, the contractor shall plan for the development and implementation of a system which includes practices and procedures to ensure conformance with all software requirements of the contract.

The contractor shall prepare a SQC Plan (hereafter referred to as the Plan) which meets all requirements of this AQAP. The Plan shall identify and describe the organization, responsibilities, and authorities for its execution and all key

functions as described in succeeding paragraphs. The Plan shall also identify and make timely provisions for special needs (controls, tools, facilities, skills, etc.) required for its execution. The Plan shall also identify the methods to be used for the detection, reporting, analysis, and correction of software problems and deficiencies.

205 DOCUMENTATION

(a) Procedures

The contractor shall reference the documentation standards, coding conventions and practices to be used for deliverable software and identify the procedures to ensure their application.

(b) Work Instructions

The contractor shall identify procedures to be used in preparing and issuing work instructions for all software tasks to be accomplished.

206 CORRECTIVE ACTION

The contractor shall reference and document SQC procedures which shall include:

- (1) Adoption of a system to report problems and deficiencies to the appropriate management level.
- (2) Analysis of data and examination of problem and deficiency reports to determine the causes and to propose corrective measures.
- (3) Analysis of deficiency trends to prevent the development of non-conforming software.
- (4) Review of corrective measures to determine their effectiveness.
- (5) Provision for defining all necessary retesting to validate modifications to any item of software.
- (6) Provision for ensuring that timely corrective action is taken by reviewing deficiencies and tracking their clearance.
- (7) Provision for controlling and accepting non-conforming software.

207 REVIEWS

The contractor shall reference or document the procedures to be used for reviews to ensure that the software meets the

contract requirements. The Design shall be subject to review prior to release for coding. These reviews shall be carried out independently of the designer of the particular part under review. The procedures shall include:

- (1) Descriptions of the objectives of each review.
- (2) Identification of key milestones in the software life cycle for reviews.
- (3) Methods for specifying non-scheduled reviews.
- (4) Identification of the function of the personnel involved.
- (5) Provision for the recording of analyses and recommendations of reviews.
- (6) Methods to ensure that the recommendations arising from reviews are monitored to ensure that timely corrective action is taken.

208 CONFIGURATION MANAGEMENT (CM)

The contractor shall identify the CM procedures to be applied to software development.

Specifically the contractor shall ensure that procedures exist to identify, document and control all software. The procedures shall include a method for:

- (1) Program and/or module version identification.
- (2) Obtaining approval to implement a modification.
- (3) Ensuring that modifications are properly integrated.
- (4) Keeping secure masters.
- (5) The provision of validated copies.
- (6) The proper marking, storage and handling of software media.
- (7) The control of the identification inspection status.
- (8) The control of support software.
- (9) Issuing computer program and/or module versions.
- (10) Ensuring that non-conforming software is identified and segregated.

209 Paragraph not allotted.

210 SUB-CONTRACTOR CONTROL

The contractor is responsible for ensuring that all software procured from his sub-contractors conforms to the requirements of the main contract. The main contractor shall identify the methods and procedures for ensuring that the sub-contractors conform to these requirements.

211 SOFTWARE SUPPORT - TOOLS, TECHNIQUES AND METHODOLOGIES

The contractor shall make provisions for identifying, documenting and validating applicable software support tools, techniques and methodologies to be used to support the development or maintenance of software. The extent and depth of testing for support software shall also be defined.

212 PURCHASER SUPPLIED MATERIEL

The contractor shall establish and maintain procedures for the acceptance, storage, and maintenance of all supplied materiel provided for accomplishment of the contract requirement.

213 TESTING

The contractor shall identify all SQC measures related to software integration and testing. In order to control satisfactorily the quality of testing, it is essential that test documentation, e.g. test plans, specifications and procedures, shall be produced and implemented. SQC measures shall include:

- (1) Analysis of software requirements and design to determine testability.
- (2) Review of test requirements and criteria for adequacy, feasibility and traceability.
- (3) Review of test documentation, e.g. test plans, specifications and procedures, for compliance with contractual requirements and for confirmation that only authorized changes are incorporated.
- (4) Verification that tests are conducted in accordance with approved test plans and procedures and that the software is the correct version.
- (5) Provision to witness tests and/or certification that test results are actual and valid.
- (6) Provision for review and certification of test reports.
- (7) Maintenance of test-related documentation to allow test repeatability.

- (8) Identification and verification of any software, test data test files and hardware used as a tool for software testing.
- (9) Provision for the specification of the host development environment.

214 Paragraph not allotted.

215 Paragraph not allotted.

216 Paragraph not allotted.

217 PREPARATION FOR DELIVERY OF SOFTWARE

The contractor shall identify the procedures for marking, handling, storing, preserving, packing and shipping to protect the integrity of the software products to be delivered. The contractor shall also identify a procedure for certification of the conformity of the software to the contract requirements.

218 ACCOMMODATION AND ASSISTANCE

The contractor shall provide the Quality Assurance Representative with the accommodation and facilities required for the proper accomplishment of his work, and shall provide any assistance required by the Quality Assurance Representative for verification, documentation, or release of materiel. The Quality Assurance Representative shall have the right of access to any area of the contractor's or his sub-contractor's premises where any part of the work is being performed. The Quality Assurance Representative shall be afforded unrestricted opportunity to verify conformance of the supplies with contract requirements. The contractor shall make his support tools available for reasonable use by the Quality Assurance Representative for verification purposes. The contractor's personnel shall be made available for operation of such support tools as required.

