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Configuration Management Requirements for Subcontractors/Vendors

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CONFIGURATION MANAGEMENT REQUIREMENTS
FOR
SUBCONTRACTORS/VENDORS

SEPTEMBER 1986

Engineering Department

ELECTRONIC INDUSTRIES ASSOCIATION



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FOREWARD

This Bulletin is written as a guide for the contractors (hereinafter referred to as the BUYER) when imposing Configuration Management Requirements on their Subcontractors/Vendors (hereinafter referred to as the SUPPLIER) in the following five major categories of procurement.

1. Development Item
2. Off-the-Shelf (OTS) Item
3. Modified Off-the-Shelf (MOTS) Item
4. Build-to-Print (BTP) Item
5. Piece Part

This Bulletin is written in three parts; the first part establishes the outline of those CM requirements which should be addressed in reference to suppliers. The second part presents a matrix, found in Appendix I, which may be used as a guide to the Buyer when considering applying CM requirements on the Supplier. The third part presents a questionnaire, found in Appendix II, which may be used by the Buyer to evaluate and determine the Configuration Management (CM) capability of a Supplier.

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1.0 INTRODUCTION

Configuration Management (CM) disciplines provide a means for the management of technical engineering documentation, determining any differences between the documentation and the product as built, and controlling changes affecting both. In applying CM disciplines, government and industry have concentrated at the prime contract level. Equal attention must be given to the products and services produced by the Suppliers.

Experience has shown that by clearly stating minimum CM requirements in requests for proposal/bid/quote to prospective suppliers it is possible to obtain more realistic cost and schedule estimates. Then the CM requirements contained in the work statements for the Suppliers can be tailored, if necessary, to fit the budget for these items and become a part of the originally funded design effort.

1.1 PURPOSE

The purpose of this Bulletin is to provide a guide for the Buyer in levying tailored CM requirements on his Suppliers; and as a guide for the Suppliers to assist in establishing a management system necessary to satisfy those requirements. Through general use of this Bulletin, it is anticipated that:

- a. All Buyers, at any level, can impose more consistent CM requirements on the Suppliers.
- b. Suppliers, because of consistent requirements imposed upon them by the Buyers, will be able to use the same internal systems for all supply activity.
- c. Because of consistency of requirements and systems, the overall system costs should be reduced.

1.2 SCOPE

The role of CM, within any one company's organization, on the development and production of a product has been established by internal company needs or imposed by customer dictum. (As used hereinafter, in order to reduce any confusion, computer programs, components, software, hardware, firmware, etc., are included in the designation "PRODUCT".)

The primary focus of this Bulletin is directed toward the Buyer and Supplier personnel who will be managing hardware products in the production phase and software products in the full-scale development phase. The trend in DoD is toward expanded use of standardized components and subassemblies, using competitive repurchase. The DoD needs to know the full span of CM requirements which should be included in the production contract and the management tasks that will have to be accomplished. Buyers, bidding on the competitive production contracts, need to understand the full impact of the management tasks required by the work statement prior to submitting any proposal. In order to estimate the full impact, the Buyer must pass the CM disciplines onto the Supplier to the extent necessary to fulfill the contract requirements and obtain an estimate of the cost from the Supplier.

While extensive reference is made to DoD Military Specifications and Standards such as; DoD-STD-100/-480/-2167 and MIL-STD-483/490/1521, this does not preclude the applications of standards imposed by other government agencies such as FAA, NASA, NSA, etc. Nor does it preclude a Buyer's own standards or requirements prepared specifically for subcontracting which are based on these established federal/military/agency standards.

The tasks identified in this Bulletin are those that can be easily translated by a Buyer into a contract work statement, and by the Supplier into recognized functional organizations and responsibilities.

2.0 APPLICABLE SPECIFICATIONS AND STANDARDS

2.1 GOVERNMENT

Those Governmental Specifications and Standards referenced in the contract shall be imposed on the Supplier only to the extent necessary for the Buyer to fulfill the contractual CM requirements.

a. Specifications:

DoD-D-1000	Drawings, Engineering, and Associated Lists.
MIL-S-83490	Specifications, Types and Forms.
MIL-Q-9858	Quality Program Requirements.

b. Standards:

DoD-STD-100	Engineering Drawing Practice.
MIL-STD-130	Marking Requirements Identification.
MIL-STD-196	Joint Electronics Type Designation System.
DoD-STD-480	Configuration Control-Engineering Changes, Deviations and Waivers.
DoD-STD-481	Configuration Control-Engineering Changes, Deviation and Waivers (Short Form).
DoD-STD-483	Configuration Management Practices for Systems, Equipments, Munitions and Computer Programs.
DOD-STD-490	Specification Practices (Section 3.3 pertaining to SCNs)
DOD-STD-1456	Contractor CM Plans.
MIL-STD-1521	Technical reviews and audits for systems, equipments, and computer programs.
MIL-STD-2167	Defense Systems Software Development.
MIL-STD-2168	Software Quality Program.



2.2 INDUSTRY

The industry specifications and standards referenced in the Buyer's contract shall also be imposed on the Supplier only to the extent necessary for the Buyer to fulfill the contractual CM Requirements. The following document is an example:

- a. ANSI Y32.16-1975 Reference Designations for Electrical and Electronic Parts and Equipment.

2.3 OTHER PUBLICATIONS

The Supplier's Operational Procedures could also be used; however, such documentation is normally reviewed at PCA and is not a deliverable document.

3.0 DEFINITIONS

3.1 AS-BUILT CONFIGURATION

This term means the verified description of a product (hardware or software) represented by the specifications, engineering drawings, software media and associated changes to which the product has been produced; and their incorporated effectivity.

3.2 AS-DESIGNED CONFIGURATION

This term means the engineering description of the product (hardware or software) represented by approved and released specifications, engineering drawings, software media and associated changes; and their specified effectivity.

3.3 BUILD-TO-PRINT (BTP) ITEMS

Are those items to be procured from Suppliers wherein the Buyer controls the detailed design and all of the related design/test documentation.

3.4 BUYER/CONTRACTOR

The activity responsible for the delivery of the product, as defined in the design specification, to the customer (often the Government).

3.5 COMMERCIAL/ITEM

A product in regular production sold in substantial quantities to the general public, wherein no design activity is involved.

3.6 DEVELOPMENT ITEM

A product which includes the requirement for design, development and testing.

3.7 MODIFIED-OFF-THE-SHELF (MOTS) ITEM

Commercially available OTS or DoD inventory items which are altered to a unique design for a specific application and required identification.

3.8 OFF-THE-SHELF (OTS) ITEM

An item of a class or kind which is regularly used for other than Government purposes and is sold in the course of conducting normal business operations.

3.9 PIECE PART

A nonrepairable item which may or may not be part of an assembly.

3.10 PRODUCT

As used in this Bulletin the term product will include such terms as; computer programs, computer program components, software, firmware, hardware, etc.

3.11 SUPPLIER (SUBCONTRACTOR/VENDOR)

Distributor, vendor, manufacturer, or firm that furnishes a product to the Buyer.

4.0 GENERAL CM REQUIREMENTS

4.1 CM FLOWDOWN REQUIREMENTS

A Supplier's Configuration Management Program must provide a systematic approach to the identification, control, and accounting of the configuration of the Supplier's delivered configuration items and piece parts, from the point of their initial definition and continuing throughout the life of the contract. To the extent that the Supplier is procuring items from outside sources (for incorporation into items to be delivered under the Supplier's contract with the Buyer) the configuration requirements as specified will be imposed on those second-tier Suppliers as required to facilitate his compliance with the Buyer's requirements.

The Supplier should also maintain surveillance over a second-tier Supplier's efforts to comply with the requirements specified. The methods and procedures employed by the Supplier to impose configuration requirements on a lower source and to accomplish surveillance over the Supplier's compliance with these requirements should be subject to the Buyer's review. It should be incumbent upon the Supplier to satisfy the Buyer that such methods and procedures are adequate.

4.2 SUPPLIER ITEM CATEGORIES VS CM REQUIREMENTS

The six basic CM functions required to achieve a systematic approach to Configuration Management are:

1. CM Organization/Administration
2. Configuration Identification
3. Configuration Control
4. Configuration Verification/Audits
5. Configuration Status Accounting Reports (CSAR)
6. Subcontractor/Vendor CM Requirements

The CM matrix found in Appendix "I" is a guide for the Buyers to use as they invoke CM requirements for the five categories of procurement described in the Foreward, i.e., Development Item, Off-The-Shelf Item, Modified Off-the-Shelf Item, Build-to-Print Item, and Piece Part.

4.3 CM REQUIREMENTS STATEMENT

The Supplier shall establish and maintain an internal CM system to assure strict control of the product baseline documentation and/or the product drawings/media, engineering change data, inspection and test data, etc., to provide a chronological history for each delivered CI or Product. Completed document masters/media shall be protected from unauthorized changes. Authorized changes made to completed documents/media shall be subject to audit by the Buyer. Changes classified as Class I shall have traceability starting with the Buyer approved Engineering Change Proposals (ECPs) per DoD-STD-480/481 to the Supplier's design documentation/media and ending with the Product and data change incorporations. The CM system shall prevent the use of obsolete and unauthorized documents/media and shall include a method for maintaining a complete record (current and history) of all engineering documentation/media status created and/or used on the Buyers Purchase Order. As required by the Buyer the Supplier shall submit for Buyer approval a Configuration Management Plan in accordance with the Supplier/Subcontractor Data Requirements Lists (SDRL). The Supplier shall provide a proposed As-Built-List (ABL) format in accordance with the SDRL. The Buyer reserves the right to perform audits of the Supplier's CM system and ABL throughout the life of the Purchase Order.

4.4 PROPOSAL/AWARD ACTIVITY

During the pre-award phase, prospective Suppliers should be evaluated for CM competency. This evaluation should cover the conditions which can be expected to be encountered in implementing a Supplier CM program. This evaluation will be accomplished for all prospective Built-to-Print Suppliers and for other prospective Suppliers with partial or total design/development responsibility for the Product(s).

The Buyer's personnel should utilize the Supplier's internal information system for surveillance of Supplier changes to the Product and any engineering documentation. The Supplier data shall be made available for review and/or audit when requested by the Buyer.

The evaluation should utilize a CM questionnaire (See Appendix II as a sample). The evaluation of a Built-to-Print Supplier will address, primarily, the in-house change control process, whereas the evaluation of a Supplier with design/development responsibility will include the total CM process.

4.5 IMPACT OF LOGISTICS REQUIREMENTS ON SUPPLIER CM

The Buyer should consider the logistic requirements for the Product(s) to be procured from a Supplier (e.g., cost, frequency of maintenance, MTBF, reliability factors, warranties, repairability, non-repairability, return-to-vendor, potted/encapsulation, recommended spare parts lists, etc.). The CM matrix (see Appendix I) will be the tool used in applying CM requirements on the five categories of procurement. Such items as adequate documentation, control and specific reports required to ensure supportability of the CI/Product to the level of Buyer maintenance should be considered.

5.0 SPECIFIC CM REQUIREMENTS

5.1 CM ORGANIZATION/ADMINISTRATION

The Supplier should recognize the importance of a sound internal and external interface to apply configuration control to a given program. The CM function/program should be organized in such a way that the tools that it uses and the information that guides it are commonly used by all contributing areas within the Supplier's organization. This internal interface is supplemented by comparable external interface with the Buyer, as well as carrying out the prescribed contractual CM obligations. A configuration manager should be identified and be responsible to the Project/Program Manager in all areas of Configuration Management activities.

5.1.1 RESPONSIBILITY FOR CM

The responsibility of a configuration manager for a given product as described in this Bulletin is as follows:

- a. Have the authority to speak on all matters relating to configuration management.
- b. Provide Buyer interface concerning CM requirements, implementation, audits and review of engineering changes.
- c. Define and implement CM programs which are compatible with customer/program requirements for product integrity.
- d. Verify documentation releases and changes for completeness, proper authorization and classification via the administration of a release system and a configuration control board (CCB).
- e. Assure that all releases and changes are considered by all disciplines represented on the CCB.
- f. Assure that changes which affect parts interchangeability result in part number reidentification to assure the integrity of interchangeable items. (See DoD-STD-100 for part number change criteria).