SYSTEMS MANAGEMENT STANDARD

EIA-649-1™	REV. A
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(R) Configuration Management Requirements for Defense Contracts

RATIONALE

This is a defense unique companion to the non-government standard, EIA-649 “Configuration Management Standard," that is generated, managed, and controlled by the non-government standard body with defense membership, to provide requirements specific for defense contracts. Defense programs often include requirements for configuration management beyond those outlined in EIA-649. Additional guidance is needed for configuration management requirements for defense applications and for placing these requirements on contracts. This standard is for placing tailored Configuration Management requirements on defense contracts. Tailoring CM requirements is essential for program success and mitigating impacts to cost, schedule, and resources. Therefore, it is not recommended to put this entire standard on contract.

FOREWORD

This document defines requirements for a Defense enterprise implementation of the EIA-649 in an Acquirer/Supplier contractual relationship. The requirements are intended to be tailored by the Acquirer and cited in contracts or similar agreements with Suppliers to establish requirements for Configuration Management tasks consistent with EIA-649 and each of its functions and principles. Unless otherwise indicated, the requirements described herein apply to both hardware and software systems. It is the responsibility of the Acquirer to determine the specific needs for their respective programs and ensure that their contracts or agreements sufficiently communicate those requirements. This document also applies when other types of agreements exist, such as agreements between government organizations who play the roles of Acquirer and Supplier.

Finally, this document, once tailored, is intended to be used as a stand-alone reference, invoked on a contract where it intends to be consistent with EIA-649 principles, and can be used for Defense programs in all phases of the acquisition life cycle.

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For more information on this standard, visit
https://www.sae.org/standards/content/EIA649_1A/

TABLE OF CONTENTS

INTRODUCTION

The planning and execution of Configuration Management (CM) is an essential part of the product development and life cycle management. It provides control of all configuration documentation, physical parts and software representing or comprising the product. CM's overarching goal is to establish and maintain consistency of a product's functional and physical attributes with its requirements, design, and operational information throughout its life cycle. To achieve this purpose, CM provides:

a. Management and planning of CM tasks;

b. Identification of the functional requirements, operational requirements, and physical attributes of each product;

c. Documentation of these attributes;

d. Management and control of changes to each product and its documentation; and

e. Verification that the configuration of the product design meets its requirements and matches its documentation.

1. SCOPE

This document applies to hardware and software and provides CM requirements to be placed on contracts after being tailored by the Acquirer. The requirements have been organized by the following five CM functions:

a. Configuration Planning and Management

b. Configuration Identification

c. Configuration Change Management

d. Configuration Status Accounting

e. Configuration Verification and Audit

1.1 Responsibility of Acquiring and Supplying Activities

1.1.1 Responsibility of Acquirer

The Acquirer establishes and controls the product's functional requirements, performance requirements and has oversight and contract compliance responsibility during product development, production, fielding/deployment, operation, upgrade/modification, maintenance, and disposal. The Acquirer defines the contractual CM terms and conditions for the contract(s) it issues through tailoring of this document.

1.1.2 Responsibility of Supplier

The Supplier is responsible for complying with the requirements cited in this document, as tailored by the Acquirer. In addition, the Supplier is responsible for ensuring that their Sub-suppliers also conduct CM in such a manner that these requirements are achieved.

1.1.3 Applicability

This document applies to Acquirers and their Suppliers covered by the contract and/or statement of work can be considered, whether the Supplier is a commercial enterprise or another government entity, tasked with CM responsibilities. CM is implemented on programs throughout the product life cycle or as specified in the contract.

1.2 Tailoring Requirements

This document is applicable only to the extent specified in the tasking directive or contract. The Acquirer tailors the requirements from this CM document to make them applicable to a specific program. Factors that influence the tailoring include; the program's life cycle phase, contract type/structure, acquisition or procurement method, complexity, size, intended use, mission criticality, and logistics support requirements of the affected Configuration Item. The EIA-649 principles listed in this document are copyright-protected by SAE. Except as permitted under the applicable laws of the user's country, neither the EIA-649 principles nor any extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, photocopying, recording or otherwise, without prior written permission being secured; they are intended to be for reference only. However, the requirements in this document, which are listed in Annex A, may be used and quoted in contracts. Annex A is provided as a tool to aid the Acquirer in tailoring these requirements for use on specific contracts. For additional guidance, refer to GEIA-HB-649A.

2. REFERENCES

2.1 Normative References

NOTE: Basic document numbers are referenced here. Unless otherwise specified, the issue in effect at the date of request for bids applies.

ASME Y14.35	Revision of Engineering Drawings and Associated Documents
ASME Y14.100	Engineering Drawing Practices
DAG	Defense Acquisition Guidebook
DoDI 5230.24	Distribution Statements on Technical Documents
GEIA-HB-649	Configuration Management Standard Implementation Guide
FAR	Federal Acquistion Regulation
IEEE 15288.2	Technical Reviews and Audits on Defense Programs
IEEE 24765	Systems and software engineering - Vocabulary
ISO/IEC/IEEE 15288	Systems and software engineering — System life cycle processes
ISO 9000	Quality management systems – Fundamentals and vocabulary
MIL-HDBK-505	Definitions of Item Levels, Item Exchangeability, Models, and Related Terms
MIL-DTL-15024	Plates, Tags, and Bands for Identification of Equipment, General Specification for
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-196	Joint Electronics Type Designation System
MIL-STD-961	Defense and Program-Unique Specifications Format and Content
MIL-STD-1285	Department of Defense Standard Practice: Marking of Electrical and Electronic Parts
MIL-STD-13231	Department of Defense Standard Practice: Marking of Electronic Items
MIL-STD-1464	Army Nomenclature System
MIL-STD-1661	Mark and Mod Nomenclature System
MIL-STD-31000	Technical Data Packages

EIA-649	Configuration Management Standard
Title 10 United States Code	Section 2302, Definitions

2.2 Informative References

ACMP 2009 (STANAG 4427)	Guidance on Configuration Management
ANSI/EIA-836	Configuration Management - Data Exchange and Interoperability
ASME Y14.24	Types and Application of Engineering Drawings
ASME Y14.41	Digital Product Definition Data Practices
Defense Standardization	DoD Acquisitions: Buying Commercial Items and Nondevelopmental Program Office SD-2 Items
DoDD 5000.01	The Defense Acquisition System
DoDD 8320.04	Item Unique Identification (IUID) Standards for Tangible Personal Property
DoDI 5000.02	Operation of the Defense Acquisition System
DoDI 5000.75	Business Systems Requirements and Acquisition
IEEE 828	IEEE Standard for Configuration Management in Systems and Software Engineering
ISO 10007	Quality management systems - Guidelines for configuration management
IEEE 12207	Systems and software engineering - Software life cycle processes
IEEE 15288.1	Application of Systems Engineering on Defense Programs
MIL-HDBK-61	Configuration Management Guidance
MIL-HDBK-502	DoD Handbook Product Support Analysis
MIL-STD-881	Work Breakdown Structures for Defense Materiel Items
MIL-STD-882	System Safety
MIL-STD-962	Defense Standards Format and Content
SAE GEIA-STD-0007	Logistics Product Data
SAE TA-STD-0017	Product Support Analysis
SRD-2009-49	NATO-US Configuration Management Contract Scoping Tool

2.3 Definitions

ADMINISTRATIVE CHANGE: An Administrative change which does not meet the definition of a Major (Class I) or Minor (Class II). Administrative change affects the configuration documentation only, not the configuration of the item, and therefore does not affect, or have the potential to affect, end item use, form, fit or function, interface or any other performance characteristics. Administrative changes are generally a correction of typographical errors, addition of information for clarification, changes to title block information or distribution legends, changes to Model Based Definitions (MBD) datasets, which do not affect the design, minor format changes, changes to reference documents, etc.

ACQUIRER: An individual or enterprise that (1) commissions the engineering, design, manufacturing, production, or maintenance of a product; (2) is a prospective purchaser of the end products of a system or a portion thereof; (3) is a procurer of the product; (4) is a user or consumer of the product; or (5) is an obtainer of output service or product.

ALLOCATED BASELINE (ABL): The approved requirements for a product, subsystem, or component, describing the functional, performance, interoperability, and interface requirements, that are allocated from higher-level requirements, and the verifications required to demonstrate achievement of those requirements, as established at a specific point in time and documented in the allocated configuration documentation. The allocated baseline for each lower-level system element (hardware and software) is usually established and put under configuration control at the system element Preliminary Design Review (PDR) (adopted from Defense Acquisition Guidebook (DAG)).

ALLOCATED CONFIGURATION DOCUMENTATION (ACD): The documentation describing a Configuration Item functional, performance, and interoperability requirements that are allocated from those of a system or higher-level configuration items; interface requirements with interfacing configuration items; and the verifications required to confirm the achievement of those specified requirements.

APPROVED CONFIGURATION: The baseline plus any approved changes.

AS-DESIGNED CONFIGURATION: The configuration of an item as documented by the design activity.

AS-BUILT CONFIGURATION: The configuration of an item as actually produced. The as-built configuration consists of the as-designed configuration at the time of production as modified with approved engineering changes and variances. In addition, if the as-designed configuration consists of design alternatives, the as-built configuration reflects the actual produced item.

NOTE: The as-built configuration may be referred to as the as-delivered configuration in some cases. In other cases, the as-delivered and as-maintained configurations may be further modification of the as-built configuration. When this distinction exists, the exact definition of each is described in the Configuration Management Plan (CMP).

AS-MAINTAINED CONFIGURATION: The configuration of an item as currently in-service. The as-maintained configuration consists of the as-built configuration, plus any approved changes, retrofits, or modifications implemented after the item is put into service; also referred to as the as-supported, as-installed, or in-service configuration.

AUDIT: A systematic, independent, and documented process for obtaining evidence and evaluating it objectively to determine the extent to which pre-defined criteria are fulfilled. Conducted by authorized individuals for the purpose of assessing compliance with established design/ performance requirements, commercial and appropriate military standards, and functional, allocated, and product baselines as appropriate (adopted from ISO 9000).

BASELINE: A formally controlled and maintained set of data that serves as the basis for defining change. When used as a verb, baseline is the act of initially establishing and approving a set of data at a given point in time.

CHANGE REQUEST: Information describing the justification to request a change submitted to a Configuration Approval Authority for disposition (i.e., approval/disapproval/deferral). Information, by which a change is proposed, described, justified, and submitted to the approver.

COMMERCIAL AND GOVERNMENT ENTITY (CAGE) CODE: A five position alphanumeric code that provides a unique activity identifier to commercial and government activities that manufacture or develop items or provide services or supplies for the government or the Design Activity Identification (adopted from ASME Y14.100).

COMMERCIAL-OFF-THE-SHELF (COTS): Any item or supply (including construction material) that is (1) a commercial item (as defined in FAR Subpart 2.101 – Definitions); (2) sold in substantial quantities in the commercial marketplace; and (3) offered to the Government, under a contract or subcontract at any tier, without modification, in the same form in which it is sold in the commercial marketplace; and does not include bulk cargo.

COMPONENT: A part, subassembly, or assembly that comprises a composite part of a higher level Configuration Item. Components are identified in the product hierarchy, assigned nomenclature and identifiers, and are defined via drawings, detailed specifications, performance specifications, commercial item definitions, or other means.

COMPUTER SOFTWARE CONFIGURATION ITEM (CSCI): An aggregate of software that satisfies an end use function and is designated by the Acquirer for purposes of specification, interfacing, qualification testing, CM, or other purposes. A Computer Software Configuration Item is composed of one or more software units which may consist of: (1) source code, object code, control code, control data or a collection of these items; (2) an aggregation of software, such as a computer program or database, that satisfies an end use function and is designated for specification, qualification testing, interfacing, CM or other purposes; or (3) an identifiable part of a software product. A Computer Software Configuration Item may also be interchangeably termed as a Software Configuration Item (SWCI) (adopted from ISO/IEC/IEEE 24765).

COMPUTER SOFTWARE UNIT: The lowest separately compilable piece of code element within the software product structure, corresponding to a separately compilable piece of code (adopted from EIA-649).

CONFIGURATION: (1) The product attributes of an existing or planned product, or a combination of products, i.e., product requirements, the product, and associated product configuration information; (2) one of a series of sequentially created variations of a product.

CONFIGURATION APPROVAL AUTHORITY: The organization or person authorized to approve: (1) a baseline, (2) a configuration change to a product, (3) changes to product definition information and other related documents, (4) release or cancellation of documents for use in a specific program, and (5) results of audits.

CONFIGURATION AUDIT: Review of processes, product definition information, documented verification of compliance with requirements and an inspection of products to confirm that products have achieved their required attributes and conform to released product configuration definition information. See also “Functional Configuration Audit” and “Physical Configuration Audit” (adopted from EIA-649).

CONFIGURATION BASELINE: Configuration of a product, at a specific point in time, which serves as a basis for defining change, for conducting verifications and for other management activities. For a software product, the build baseline includes the actual product (adopted from EIA-649).

CONFIGURATION CONTROL: The systematic proposal, justification, evaluation, coordination, disposition of proposed changes or requested variances and the implementation of all approved changes, or variances in the configuration of a configuration item after establishment of the configuration baseline.

CONFIGURATION CONTROL BOARD (CCB): A chartered board composed of technical and administrative representatives who recommend approval, defer with comments to be adjudicated, or disapproval of proposed engineering changes and variances to a configuration item’s current approved and baselined configuration documentation.

CONFIGURATION DOCUMENTATION: The technical documentation that identifies and defines the item’s functional performance and physical characteristics. The configuration documentation is developed, approved, and maintained through three distinct evolutionary, increasing levels of detail. The three levels of configuration documentation are the functional configuration documentation, the allocated configuration documentation, and the product configuration documentation.

CONFIGURATION IDENTIFICATION: The configuration management function that encompasses the selection of configuration items which are to be separately configuration managed, organization of system into a hierarchical structure of all its components, the determination of the types of configuration documentation required for the system and its components; the issuance of identifiers to be affixed to the system and its components; and to the technical documentation that defines their configuration; the release of Configuration Items and their associated configuration documentation; and the establishment of configuration baselines for Configuration Items.

CONFIGURATION ITEM (CI): A product or an aggregation of products (hardware, software, firmware, or documentation) that accomplishes an end-use function, is under separate configuration control and is designated for configuration management control. It is the primary identifier for referencing a product and/or allocated components that satisfies an end-use function. An item is designated as a Configuration Item for purposes of additional configuration management focus due to its complexity, logistic support requirements, acquisition strategy, or because it is intended to undergo configuration status accounting or verification and audit separately from other items. Configuration items are end items or major components of end items, which typically have performance requirements allocated to them and documented in their own specification. The term Configuration Item will be used to mean hardware and software items unless there is a specific need to distinguish between them in which case the term Hardware Configuration Item (HWCI) and Software Configuration Item (SWCI) will be used.

CONFIGURATION MANAGEMENT (CM): CM is a technical and management process, which establishes and maintains consistency between the product requirements, the product configuration information, and the product itself. Configuration management process will identify, control, record, and verify the product requirements are met, the product configuration information is clear, complete, and accurate, and that the product itself is consistent with the product configuration information.

a. In this document, CM refers to the five functions described in the Introduction of this document and applies to hardware, firmware, software, and services.

b. As applied to Configuration Items, a discipline applying technical and administrative direction and surveillance over the life cycle of items to:

    1. Manage and plan.

    2. Identify and document the functional and physical characteristics of Configuration Items.

    3. Control changes and variances to Configuration Items and their related documentation.

    4. Record and report information needed to manage Configuration Items effectively, including the status of proposed changes and implementation status of approved changes.

    5. Audit Configuration Items to verify conformance to specifications, drawings, interface control documents, and other contract requirements.

c. As applied to digital data files, CM pertains to the application of selected configuration identification and configuration status accounting principles to:

    1. Uniquely identify the digital data files, including versions of the files and their status (e.g., working, released, submitted, approved).

    2. Record and report information needed to manage, protect, and maintain the data files effectively, including the status of updated versions of files.

CONFIGURATION MANAGEMENT PLAN (CMP): The description, definition, and processes of how CM is accomplished and how consistency between the product definition, the product's configuration and the CM records is achieved and maintained throughout the applicable phases of the product's life cycle or the duration of the contract (adopted from EIA-649).

CONFIGURATION STATUS ACCOUNTING (CSA): The CM function that formalizes the recording and reporting of the established product configuration information (including historical information), the status of proposed changes, and the implementation of approved changes and changes occurring to product units due to operation and maintenance. CSA implementation includes assurances that the information is current, accurate, and retrievable.

DESIGN ACTIVITY: An organization that has, or has had, responsibility for the design of an item (adopted from ASME Y14.100).

DESIGN ACTIVITY IDENTIFICATION (DAI): The application of a unique identifier that distinguishes design activities from each other. Design activity identifiers use Enterprise Identifiers – see definition (adapted from ASME Y14.100).

DETAIL SPECIFICATION: A specification that states design requirements, such as materials to be used, how a requirement is to be achieved, or how an item is to be fabricated or constructed. A specification that contains both performance and detail requirements is still considered a detail specification. Both defense specifications and program-unique specifications may be designated as a detail specification (adopted from MIL-STD-961).

EFFECTIVITY: A designation, defining the product range e.g., serial numbers, block numbers, batch numbers, lot numbers, model, dates or event, at which a specific product configuration applies, a change is to be or has been affected, or to which a variance applies (adopted from EIA-649).

ENGINEERING CHANGE: A change to the current approved configuration of a Configuration Item at any point in the item's life cycle. Also known as configuration change.

ENGINEERING CHANGE PRIORITY: The priority (emergency, urgent, routine) assigned to an Engineering Change Proposal (ECP) to indicate the urgency with which the ECP is to be reviewed, evaluated and, if approved, ordered, and implemented.

ENGINEERING CHANGE PROPOSAL (ECP): A proposed engineering change to the product and/or its configuration documentation, by which the change is described, justified, and submitted to a Configuration Approval Authority for approval/disapproval or deferral.

ENGINEERING RELEASE: An action whereby configuration documentation or an item is officially made available for its intended use.

ENGINEERING RELEASE RECORD (ERR): Information (in a document or database) that indicates or authorizes an engineering release. These records provide:

a. An audit trail of Configuration Item documentation status and history.

b. Verification that engineering documentation has been changed to reflect the incorporation of approved changes and to satisfy the requirements for traceability of variances and engineering changes.

FIRMWARE: The combination of a hardware device and computer instructions and/or computer data (i.e., firmware code) that reside on the hardware device. The firmware code and data contained in these devices provides the control program for the device. Firmware code and data are held in non-volatile memory devices such as Read Only Memory (ROM), Erasable Programmable Read Only Memory (EPROM) or flash memory (i.e., a combination of persistent memory, program code, and data that performs a specific set of functions on a specific hardware device). Firmware is software designated for a very specific hardware device. It is subject to all of the software CM requirements defined in this document.

FIT: The ability of an item to interface or interconnect with or become an integral part of another item.

FORM: The shape, size, dimension, mass, weight, cleanliness, recertification/expiration date, and other measurable parameters, which characterize an item. For software, form denotes operating systems, compilers, input/output schemas, and formats.

FUNCTION: (1) The action or actions which a system or system component is designed to perform. (2) The actions or actions which the user, operator, or maintainer is expecting to perform, or which a system or system component is designed to perform.

FUNCTIONAL BASELINE (FBL): Describes the system's performance (functional, interoperability, and interface characteristics) and the verification required to demonstrate the achievement of those specified characteristics. It is directly traceable to the operational requirements contained in the Initial Capabilities Document (ICD) or equivalent document (adopted from Defense Acquisition Guidebook as of June 2013).

FUNCTIONAL CONFIGURATION AUDIT (FCA): The formal examination of functional characteristics of a Configuration Item to verity that it met the requirements specified in its functional and allocated configuration documentation.

FUNCTIONAL CONFIGURATION DOCUMENTATION (FCD): The information describing the system's functional, performance, interoperability, and interface requirements as well as the verifications required to demonstrate the achievement of those specified requirements.

HARDWARE: An item that is made from materials or has components that are made from materials.

IDENTIFIER: A unique numeric or alphanumeric code applied to documents and products for the purpose of identification, change control, status accounting, verification, and audits. Identifier types include the following:

a. Enterprise Identifier: A string of characters that uniquely identifies the enterprise. This identifier is assigned by an issuing organization within a scheme and is unique to that scheme. Example: CAGE CODE, Data Universal Numbering System (DUNS) Number. See also Design Activity Identification. Note: For DoD and NATO, CAGE, and NCAGE, codes are mandatory for use.

b. Group Identifier: Uniquely identifies a group of like units of the same product manufactured under uniform conditions. Examples: lot number/batch number.

c. Product Identifier: Unique to the issuing organization, used to designate products of the same configuration and to differentiate them from other products. Examples: Part or Identifying Number (PIN), Universal Product Code (UPC), Stock-Keeping Unit (SKU).

d. Document Identifier: Unique to the issuing organization, used to identify configuration documentation. Examples: drawing number, specification number, document control number.

e. Type (Model) Identifier: An alphanumeric identifier, unique within the issuing organization that is used to designate a line of products, usually established by the Acquirer. Examples: M16 Rifle, MK48 Torpedo, F119 Engine.

f. Unit Identifier: A sequentially issued identifier used to designate a specific instance of a product among like products. Examples: Item Unique Identification (IUID), serial number, Vehicle Identification Number (VIN).

g. Revision Identifier: A sequentially issued identifier that distinguishes a change to a document or other data artifact in order to differentiate between two closely related documentation iteration from one another.

INTERCHANGEABLE ITEM: An item which (1) possesses comparable functional and physical characteristics as to be equivalent in performance, reliability and maintainability to another item of similar or identical purposes; and (2) is capable of being exchanged for the other item without selection for fit or performance, alteration of the items themselves, or adjoining items, except for adjustments (also known as an Alternate Item) (adopted from MIL-HDBK-505).

INTEGRATED DATA ENVIRONMENT (IDE): Associated tools for implementing digital data operations in an acquisition program. May also be referred to as “Integrated Digital Environment.”

INTERFACE: The functional and physical characteristics at a common boundary.

INTERFACE CONTROL: The process of identifying, recording, and managing product attributes’ interface information at the common boundary of two or more products.

INTERFACE CONTROL DOCUMENTATION (ICD): Interface control drawings, requirements, or other descriptive products, which define, describe, and/or depict physical, functional, and test interface of related or co-functioning Configuration Items.

INTERFACE CONTROL WORKING GROUP (ICWG): For programs, which encompass a system, Configuration Item or a Computer software Configuration item (CSCI) design cycle, an ICWG is established to control interface activity among the Acquirer, Supplier(s), or other agencies including documentation of interface agreements and resolution of interface problems.

INTEROPERABILITY: The ability of the defense services and lower level commands to exchange information with each other (joint operations) or with an allied system (combined operations) to enable them to operate effectively together. This also refers to the ability of their systems, equipment, and software to communicate and interoperate.

ITEM: A term used to denote any product, including systems, materials, parts, subassemblies, sets accessories, software items, etc. (adopted from MIL-HDBK-505).

ITEM UNIQUE IDENTIFICATION (IUID): A system of establishing Unique Item Identifiers (UII) within the Department of Defense by assigning a machine-readable character string or number to a discrete item, which serves to distinguish it from other like and unlike items (adopted from MIL-STD-130).

MATERIEL: A generic term for complete systems, equipment, stores, supplies, and spares, including related documentation, manuals, computer hardware, firmware, and software.

MATERIAL REVIEW BOARD: A Supplier's multi-disciplined board, composed of personnel representing, at a minimum, quality (lead), engineering, and manufacturing/production representatives, identified by position, who determine and recommend approval or disapproval of proposed dispositions for nonconforming material or services (when such authority has been delegated to them), or who recommend submittal or ECPs or RFVs for Acquiring Activity disposition.

NON-DEVELOPMENTAL ITEM (NDI): An item available with little or no development effort required by the Acquirer. NDIs may include Items obtained from a commercial marketplace, items already developed and in use by other services and Government agencies, items developed by a commercial entity or Items already developed by foreign governments that can be supplied in accordance with mutual defense cooperation agreements and Federal and DoD acquisition regulations (adopted from SD-2).

NOTICE OF REVISION (NOR): Documentation, submitted as part of an ECP, used to describe changes to drawings, associated lists, specifications, Model Base Definitions (MBD) datasets, or other referenced documents.

PERFORMANCE SPECIFICATION: A specification that states requirements in terms of the required results with criteria for verifying compliance but without stating the methods for achieving the required results. A performance specification defines the functional requirements for the item, the environment in which it must operate, and interface and interchangeability characteristics. Both defense specifications and program-unique specifications may be designated as performance specification (adopted from MIL-STD-961).

PHYSICAL CONFIGURATION AUDIT (PCA): A formal examination of the actual (as-built) configuration of an item compared to its product configuration documentation. The PCA verifies the product configuration documentation is a clear, complete, and accurate representation of the configuration item and is necessary to establish the product baseline. The objective of the PCA is to resolve any discrepancies between the production-representative item that has successfully passed Operational Test and Evaluation (OT&E) and the associated documentation currently under configuration control. At the conclusion of the PCA, the final product baseline is established and all subsequent changes are processed by formal engineering change action.

PRELIMINARY ENGINEERING CHANGE PROPOSAL: Preliminary ECPs are used to address the impact of proposed changes in general terms sufficient enough for the government to determine if final ECPs are warranted (adopted from MIL-HDBK-61).

PRODUCT: The result of a process. The following seven generic product categories (and their combination into systems) are addressed within this document:

a. Hardware; e.g., engine mechanical part, system;

b. Software; e.g., computer program, dictionary;

c. Firmware; e.g., embedded software or data that is delivered to a specific hardware device;

d. Processed materials; e.g., lubricant;

e. Documentation; e.g., specifications, drawings, test procedures, publications, version description documents; in digital and non-digital format;

f. Services; e.g., transport services, transport;

g. Facility; e.g., laboratory, machine shop.

PRODUCT BASELINE (PBL): Describes the detailed design at a specific point in time, for production, fielding/deployment, and operations and support. The PBL prescribes all necessary physical (form, fit, or function) characteristics and selected functional characteristics designated for production acceptance testing and production test requirements. The initial PBL includes "build-to" specifications for hardware (product, process, material specifications, engineering drawings, 3D Computer Aided Design (CAD) models, and other related data) and software (software module design - "code-to" specifications). The As-Delivered and subsequent PBLs add product operational information needed to operate and maintain the product (adopted from Defense Acquisition Guidebook). The approved detailed design requirements for a product or system established at a specific point in time and documented in the product configuration documentation. The Product Baseline is generally established as a result of a successfully completed FCA/PCA, a verification of the baseline, and validation of the right product delivered.

PRODUCT CONFIGURATION DOCUMENTATION (PCD): A CI's detailed design documentation including those verifications necessary for accepting product deliveries (first article and acceptance inspections). Based on program production/procurement strategies, the design information contained in the PCD can be as simple as identifying a specific part number or as complex as full design disclosure.

PRODUCT CONFIGURATION INFORMATION: Includes product definition information (information that defines the product's requirements, documents the product attributes, and is the authoritative source for CM of the product) and/or product operational information (information developed from product definition information used to test, operate, maintain and dispose of a product).

PRODUCT DEFINITION INFORMATION: Information that defines the product's requirements, documents the product attributes, including the process information and is the authoritative source for configuration management of the product.

PRODUCT OPERATIONAL INFORMATION: Information developed from product definition information used to test, operate, maintain, and dispose of a product.

PRODUCT STRUCTURE: Product structuring is the hierarchical decomposition of a product. Product structures show component relationships, enable visualization of a product in relation to its higher, and lower level components, from any level. When effectively done, product structuring facilitates the "where used" requirement needed for both traceability and impact analysis.

PROGRAM PARTS SELECTION LIST (PPSL): A listing of the components and Configuration Items, which are a composite part a Configuration Item. PPSL will typically include Manufacturer's Part Number, Manufacturer's CAGE, and Quantity per Assembly, Where Used/Next Higher Assembly, Drawing Number, Drawing Revision number, and effectivity for each item in the CI's product structure.

RELEASE: The designation that the configuration documentation is complete and suitable for use. To authorize for dissemination, a particular version of product and/or product information that is made available for a specific purpose. Release means that the product has transferred from developmental configuration to the product baseline configuration and is subject to configuration control procedures.

REPAIR: A procedure which reduces but does not completely eliminate a nonconformance from a Configuration Item and which has been reviewed, concurred, and approved for use by the Acquirer. The purpose of repair is to reduce the effect of the nonconformance. Repair is distinguished from rework in that the characteristic after repair still does not completely conform to the applicable drawings, specifications, or contract requirements.

RETROFIT: The incorporation of new design parts, software, or firmware resulting from an approved engineering change to an item's current approved configuration documentation into already Acquirer accepted (Material Inspection and Receiving Report, DD Form 250) and/or operational items.

REVISION: An attribute that distinguishes a change to a design or document in order to differentiate one closely related design or document iterations from another. A revision represents a change to a document's contents or a modification to a part such that it remains interchangeable with its previous iterations. See also version (adopted from ASME Y14.35).

REWORK: A procedure applied to a nonconformance that will completely eliminate it and result in a product that conforms completely to the drawings, specifications, or contract requirements. The Supplier must disclose that the rework occurred when outside the normal process to manufacture the part.

SERIAL NUMBER: A unique number identifying individual units within a series of like items. The serial number does not establish the PN or PIN but tracks the number of items that were produced under the PN or PIN. Serial numbers should be assigned to all items requiring tracking.

SOFTWARE: (1) All or part of the programs, procedures, rules, and associated documentation of an information processing system, or (2) computer programs, procedures, and associated documentation and data pertaining to the operation of a computer system (ISO/IEC/IEEE 24765). The definition of software is independent of the media on which the software is stored or the device in which the software executes.

SOFTWARE CONFIGURATION DOCUMENTATION: Technical data or information, regardless of media, which documents the requirements, design, or details of computer software; explains the capabilities and limitations of the software; or provides operating instructions for using or supporting computer software during the software's operational life cycle.

SOURCE CONTROL DRAWING: A drawing that provides an engineering description, qualification requirements and acceptance criteria for commercial items or vendor-developed items procurable from a specialized segment of industry that provide the performance, installation, interchangeability, or other characteristics required for critical applications. The drawing provides a list of approved sources of supply and the Sub-vendor's item identification for the item(s) that have been qualified and approved for use in the critical application(s). The source control drawing establishes the source control item identification (adopted from ASME Y14.24).

SPECIFICATION: The essential technical requirements for purchasing materiel. Procedures necessary to determine that the requirements for the specified materiel covered by the specification have been met are also included (adopted from MIL-STD-961).

SPECIFICATION CHANGE NOTICE (SCN): A request to propose, transmit, and record changes to a specification.

SUB-SUPPLIER: An entity, at any level, under contract to Supplier (also known as Sub-contractor, Sub-tier supplier, Sub-vendor).

SUBSTITUTE ITEM: An item, which possesses such functional and physical characteristics as to be capable of being exchanged for another only under specified conditions or in particular applications and without alteration of the items themselves or of adjoining items (adopted from MIL-HDBK-505).

SUPPLIER: An individual, partnership, company, corporation, association or other entity tasked under the terms of an Acquirer contract or an agreement to provide the Acquirer with the design, development, manufacture, maintenance, modification, or supply of items may also be referred to in certain binding agreements as a Contractor or Vendor.

SYSTEM: An aggregation of system elements and enabling system elements to achieve a given purpose or to provide a capability (adopted from DAG).

SYSTEM ELEMENTS: Members of a set of elements that constitute a system. Also referred to as Configuration Items, subsystems, segments, components, assemblies, or parts (adopted from IEEE 15288 and Defense Acquisition Guidebook).

TAILORING REQUIREMENTS: The process by which decisions are made to exclude or modify individual requirements (sections, paragraphs, or sentences) in a standard or contract.

TECHNICAL DATA: Product configuration information recorded (regardless of the form or method of recording) of a scientific or technical nature (including software configuration documentation) relating to supplies procured by an agency. The term does not include computer software or data incidental to contract administration, such as financial or management information (adopted from ITAR Section 120.10, EAR Section 772, and DFAR clause 252.227-7013).

a. Technical data is required to define and document an engineering design or product configuration and is used to support production, engineering, and logistics activities. This aspect of technical data is called product definition information.

b. Technical data, which provides instructions for the installation, operation, maintenance, training, and support of a system or equipment. This aspect of technical data is called product operational information.

NOTE: A technical manual normally includes operation and maintenance instructions, parts lists or parts breakdown, and related technical information or procedures exclusive of administrative procedures. This data may be presented in any form (e.g., hard copy, audio and visual displays, magnetic tape disks, or other electronic devices). Technical orders that meet the criteria of this definition may also be classified as technical manuals (Title 10, United States Code, Section 2302,"Definitions").

TECHNICAL DATA PACKAGE (TDP): The authoritative technical description of an item. This technical description supports the acquisition, production, inspection, engineering, and logistics support of the item. The description defines the required design configuration and/or performance requirements, and procedures required to confirm adequacy of item performance. It consists of applicable technical data such as models, engineering design data, associated lists, specifications, standards, performance requirements, quality assurance provisions, software documentation and packaging details (adopted from MIL-STD-31000).

TYPE DESIGNATION: A combination of letters and numbers arranged in a specific sequence to provide a short significant method of identification (adopted from MIL-STD-196).

UNIT: An assembly or any combination of parts, subassemblies and assemblies mounted together, normally capable of independent operation in a variety of situations. (Examples: Hydraulic jack, electric motor, electronic power supply, internal combustion engine, electric generator, radio receiver). A unit should not be confused with a Computer Software Unit (adopted from MIL-HDBK-505).

UNIQUE IDENTIFICATION: A system of establishing globally unique and unambiguous identifiers within a Defense enterprise, which serves to distinguish a discrete entity or relationship from other entities or relationships.

UNIQUE ITEM IDENTIFIER (UII): A globally unique and unambiguous identifier that distinguishes an item from all other like and unlike items. The UII is a concatenated value that is derived from a UII data set of one or more data elements (adopted from MIL-STD-130).

VALUE ENGINEERING CHANGE PROPOSAL (VECP): A proposal submitted by the Supplier to propose a change, which, if accepted and implemented, provides an eventual, overall cost savings to the Acquirer. A subcategory of ECP which proposes to reduce cost to manufacture, test, inspect, maintain, or operate the item. The purpose of the VECP is to provide an incentive to propose engineering changes that reduce cost without reducing product performance. Savings resulting from approved VECPs are shared between the supplying and acquiring activities as stipulated by the contract.

VARIANCE: An authorized temporary departure from the approved configuration documentation information for a specific number of units under the contract or contracts identified and that does not require revision of approved product configuration documentation. A variance is also known as a Deviation/Pre-Production (Authorization prior to procurement/fabrication of an item) or a Wavier/Post-Production (Authorization acceptance of an Item). A variance authorizes departure from the configuration, but cannot be used to modify the configuration documentation information. Note: An approved variance may also restrict the usage of items affected to a specific end use. (Formerly known as Waiver or Deviation.) (Departure From Specification (DFS) is another term used for a Variance within the Navy.)

VENDOR: Any organization providing services or goods to the Acquirer, including other government organizations or the Supplier.

VERSION: A specific configuration of a product or document. Modifications to a version of software (resulting in a new version) which require CM actions by the Supplier, by the Acquirer, or both.

2.4 Acronyms/Abbreviations

The acronyms used more than once in this document are defined as follows:

ABL Allocated Baseline

ACD Allocated Configuration Documentation

ACL Allowance Component List

ACMP Allied Configuration Management Publications

AEL	Allowance Equipage List
ANSI	American National Standards Institute
APL	Allowance Parts List
ASR	Alternative Systems Review
ASSIST	Acquisition Streamlining and Standardization Information System
CAD	Computer Aided Design
CAGE	Commercial and Government Entity
CAM	Computer Aided Manufacturing
CCB	Configuration Control Board
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CFA	Code of Federal Regulations
CI	Configuration Item
CM	Configuration Management
CMP	Configuration Management Plan
COTS	Commercial-off-the-Shelf
CSA	Configuration Status Accounting
CSCI	Computer Software Configuration Item
DAG	Defense Acquisition Guidebook
DFAR	Defense Acquisition Regulation Supplement
DAI	Design Activity Identification
DID	Data Item Description
DoD	Department of Defense
ECP	Engineering Change Proposal
EIA	Electronics Industry Association
EPROM	Erasable Programmable Read Only Memory
ERR	Engineering Release Record
FAA	Federal Aviation Administration
FAR	Federal Acquisition Regulation
FBL	Functional Baseline

FCA	Functional Configuration Audit
FCD	Functional Configuration Documentation
HWCI	Hardware Configuration Item
ICD	Interface Control Document
ICWG	Interface Control Working Group
IDD	Interface Design Document
IDE	Integrated Data or Integrated Digital Environment
IMS	Integrated Master Schedule
INFOSEC	Information Security
IUID	Item Unique Identification
ITAR	International Traffic in Arms Regulation
LPD	Logistics Product Data
MBD	Model Based Definitions
MIP	Maintenance Index Pages
MRC	Maintenance Requirement Cards
NCM	Nonconforming Material
NDI	Non-Developmental Item
NOR	Notice of Revision
NSN	National Stock Number
OEM	Original Equipment Manufacturer
OPSEC	Operations Security
OT&E	Operational Test and Evaluation
PBL	Product Baseline
PBLI	Product Baseline Index
PCA	Physical Configuration Audit
PCD	Product Configuration Documentation
PDR	Preliminary Design Review
PIN	Part or Identifying Number
PMS	Planned Maintenance System
PN	Part Number

PPSL	Program Parts Selection List
PRR	Production Readiness Review
RFV	Request for Variance
ROM	Read Only Memory
SCN	Specification Change Notice
SEMP	Systems Engineering Management Plan
SFR	System Functional Review
SKU	Stock-Keeping Unit
SOW	Statement of Work
SPS	Software Product Specification
SRR	System Requirements Review
STANAG	NATO Standardization Agreement
SVR	System Verification Review
SVD	Software Version Description
SWCI	Software Configuration Item
TDP	Technical Data Package
TRR	Test Readiness Review
UII	Unique Item Identifiers
UPC	Universal Product Code
VECP	Value Engineering Change Proposal
VIN	Vehicle Identification Number

3. CONFIGURATION MANAGEMENT REQUIREMENTS

Principle CM-1: Configuration Management implementation requires a balanced and continuous application of CM functions and their underlying principles throughout the product life cycle.

(1) The Supplier shall comply with CM requirements in this document as tailored in the contract.

NOTE: This requirement must be included as part of the contract.

(2) The Supplier shall require its Sub-suppliers to comply with or suitably tailor the same CM requirements that are being imposed upon the Supplier.

(3) The Supplier shall establish and execute a CM process to control all configuration documentation representing or comprising the configuration item.

(4) The Supplier shall support the Acquirer's requests to audit and verify Supplier and Sub-supplier CM process requirements.

3.1 Planning and Management

Principle CMP-1: The foundation for CM planning, which delineates the specific CM application methods and their levels of emphasis, is an understanding of the context and environment of the product to which the CM process is to be applied.
Principle CMP-2: CM Planning documents how the organization will implement CM throughout the applicable phases of the product life cycle to provide consistency between product configuration information and the product.
Principle CMP-3: To implement planned CM functions, resources are identified and applied and responsibilities to perform CM activities are assigned.
Principle CMP-5: CM Procedures document how each CM function is implemented to accomplish the intent of the CM planning.
Principle CMP-6: Provide CM training to assure that individuals understand their responsibility, authority, accountability, and the procedures for performing CM.
Principle CMP-7: Periodic assessment of the effectiveness of CM procedures and tools and of compliance with the Configuration Management plan maintains the health of the CM process.

(1) Supplier shall perform CM planning to define the following factors:

a. Objectives of the CM program and of each applicable CM element.

b. Appropriate level of CM activity for each CM function throughout the product's life cycle.

c. CM organization and organizational relationships.

d. Responsibilities and authority of CM professionals.

e. CM resources to be used (tools, techniques, training, and methodologies).

f. Coordination activities to be used with internal and external agencies (e.g., Acquirer, other Suppliers, other Government agencies, foreign governments).

g. Functions, responsibility, and authority of CCBs.

h. A release process for product configuration documentation.

i. Methods used to determine the effectiveness of Sub-supplier/Sub-vendor CM processes, to include actions when determination of CM processes are ineffective.

j. CSA activities for creating, editing, reviewing, approving, releasing, publishing, and distributing product configuration documentation and configuration change documentation.

k. Identification and labeling structure for Configuration Items.

NOTE: The Acquiring Activity may cite DI-SESS-80858 Supplier's Configuration Management Plan and DI-MISC-80508 Technical Report–Study/Services, for specifying the delivery of the data product that emanates from meeting this requirement.

3.1.1 Monitoring Configuration Management Performance

Principle CMP-4: The establishment and maintenance of CM performance and status measurements are necessary for all products where compliance with the Configuration Management planning and continuous improvement are critical.

The purpose of monitoring an organization's CM performance is to assess, appraise, and evaluate the value of its CM processes in order to provide continuous improvements of the processes. Assessments can be conducted with Acquirer oversight and agreed upon by both parties during the project's life cycle.

(1) The Supplier shall include in their Configuration Management Plan (CMP) a methodology for generating, measuring, and reporting CM performance data.

(2) The Supplier shall make CM performance data available to the Acquirer.

Suggested performance metrics may include but are not limited to:

a. Number of open changes and variances awaiting Acquirer disposition

b. Number of closed Supplier changes and variances

c. Number of minor changes/variances

d. Number of major changes/variances

e. Change processing cycle time

f. Average amount of time (days) changes or variances remain open

g. Percentage of requests for change/variance by category, nomenclature, Configuration Item identifier number, etc.

h. Change request rejection rate and reason for rejection

3.1.2 Supplier's Configuration Management Plan

Principle CMP-8: Performing configuration management includes responsibility for the configuration management performance of the supply chain.

(1) Supplier shall submit to the Acquirer for review and approval the CM Plan describing the processes, methods and procedures used to manage the functional and physical characteristics of the assigned CI(s) for the life of the contract and shall include the CM performance of Sub-tier suppliers.

NOTE: The Acquiring Activity may cite DI-SESS-80858 Supplier's Configuration Management Plan, for specifying the delivery of the data product that emanates from meeting this requirement.

3.1.3 Technical Reviews

(1) The Supplier shall provide configuration documentation to support each Technical Review.

These reviews may include the following:

a. Alternative Systems Review (ASR)

b. System Requirements Review (SRR)

c. System Functional Review (SFR) (establishing the Functional Baseline)

d. Preliminary Design Review (PDR) (establishing Allocated Baseline)

e. Critical Design Review (CDR) (establishing the Product Baseline (initial))

f. Test Readiness Review (TRR)

g. System Verification Review (SVR)

h. Production Readiness Review (PRR)

i. Other technical reviews, whether periodic or ad hoc, as prescribed by the contract

NOTE: Refer to reference IEEE 15288.2 Technical Reviews and Audits on Defense Programs for how the reviews are to be conducted.

3.1.4 Product Configuration Documentation Processes

Principle CMP-9: Information processes, including collection and processing, controlling status, providing interoperability and exchange, and long term preservation, are essential elements of effective CM planning and management.

(1) The Supplier shall address contractually specified product configuration documentation requirements in its CMP, especially data handling, processing, storage, retention, integrity, transfer, releasability/disclosure, security, and maintenance documentation requirements.

(2) The Supplier shall inform the Acquirer of any requirements that will be imposed on the Acquirer to maintain the security and integrity of shared data.

3.2 Configuration Identification

Principle CI-1: Configuration identification is the basis from which the configuration of products is defined and verified; products and their product configuration information are labeled; changes are managed; and traceability is maintained throughout the product's life cycle.
Principle CI-2: Product configuration information serves as the basis for development, production, operation, and maintenance/support of the product.
Principle CI-3: Enterprise identifiers designating the responsible designer, manufacturer, or preparer provide uniqueness to the identifiers of products and product configuration information.
Principle CI-4: Product identifiers are assigned so that one product can be distinguished from other products; one configuration of a product can be distinguished from another and the correct corresponding product information can be retrieved.
Principle CI-5: Individual units of a product are assigned a unique product unit identifier when there is a need to distinguish one unit of the product from another.

Principle CI-6: When a product is modified, it retains its original product unit identifier, even though its part identifying number is altered to reflect a new configuration.
Principle CI-7: A series of like units of a product is assigned a unique product group identifier when it is unnecessary or impractical to identify individual units, but necessary to correlate units to a process, date, event, or test.
Principle CI-8: Product configuration information is uniquely identified so it can be referred to precisely and is made accessible.
Principle CI-9: Establishing product structure to organize product configuration information provides efficient application of the information over its lifecycle.

The purpose of Configuration Identification is to establish and maintain a definitive basis for control and status accounting for a product and associated configuration documentation as it evolves throughout its life cycle. The responsibility for configuration documentation information is passed between design engineering and CM as it is developed, analyzed at design reviews, and then officially managed by CM to become part of formal baselines.

(1) The Supplier shall use a documented process for configuration identification.

(2) The Supplier shall accomplish the following for hardware, software, and services:

a. Apply the criteria identified in 3.2.1 to select Configuration Items.

b. Establish a Configuration Item structure and hierarchy.

c. Select configuration documentation to be used to define configuration baselines for each CI.

d. Identify and control interfaces.

e. Assign identifiers (i.e., enterprise, product, unit, group, and document) to Configuration Items and their component parts and associated configuration documentation. This will include DAI and PIN including prefixes and suffixes, and serial, lot, or batch numbers will remain the same, with a specific Acquirer type designation, as appropriate.

f. Whenever an item is modified to a new configuration that is not interchangeable with the existing configuration, the part or identifying number (PIN) must change. Although the PIN is changing, the part must retain its original unit identifier (batch, lot, or serial number) to provide traceability to the original configuration.

g. Include the CAGE Code of the design activity for hardware and software and affix those CAGE codes to all Configuration Items, their subordinate parts and assemblies, configuration documentation, software media, and products.

h. Place each item of configuration documentation (e.g., item, material, or process specifications) and software specification, Software Version Description (SVD), etc. under configuration control.

i. Establish and manage the functional, allocated and product baselines at the appropriate points in the system/Configuration Item life cycle.

j. Mark or label items and documentation with their applicable identifiers that correlates to the item, configuration documentation and other associated data.

k. Obtain Acquirer approval of the type designation and nomenclature for each Configuration Item that is designated by the Acquirer for control, tracking and logistics purposes.

NOTE: Refer to MIL-STD-196 Joint Electronics Type Designation System, MIL-STD-1464 Army Nomenclature System, MIL-STD-1661 Mark and Mod Nomenclature System, ASME Y 14.100 Engineering Drawing and Related Documentation Practices.

NOTE: Refer to DODI 5230.24 Distribution Statements on Technical Documents.

NOTE: The Acquiring Activity may cite DI-SESS-81254 Request for Nomenclature, DI-SESS-81121 Baseline Description Document, for specifying the delivery of the data product that emanates from meeting this requirement.

(3) In addition to the list above, the Supplier shall accomplish the following for software:

a. Assign system product-unique identifiers to elements of the software development environment such as Commercial-Off-the-Shelf (COTS) development products like compilers, linkers, loaders, binary developmental libraries, configuration settings, automation scripts, and other elements that are part of the system and will conform to the format specified in the CMP.

b. Provide a part number representing the device with the embedded code (in cases where both the hardware device and the embedded code are controlled via a single engineering Altered Item Drawing).

c. Part number and the software medium is labeled with the Supplier's code/name identification and marked separately on the device.

d. Designate computer software as Configuration Items.

NOTE: The Acquiring Activity may cite DI-SESS-81011 Drawing/Model Number Assignment Report, for specifying the delivery of the data product that emanates from meeting this requirement.

3.2.1 Configuration Item Selection

(1) The Supplier shall select and submit potential CIs for Acquirer review and selection concurrence.

(2) The Supplier shall identify as a Configuration Item any item that satisfies a system end use function and designates it for separate CM because the item meets or impacts one or more of the following:

a. An item critical to the functioning of the system.

b. An item whose failure might result in serious injury, loss of life or loss of primary system capability.

c. An item whose technology is complex, not well known, and critical to meeting acquisition, operational or supportability goals of the program.

d. Is under control as designated by the Acquirer.

e. Requires separate type designation, versions, or nomenclatures.

f. Is critical or high risk and failure would have significant financial impact.

g. Requires any one or more of the following logistics elements:

1. Supply support Allowance Parts List (APL)

2. Supply support Allowance Equipage List (AEL)

3. Supply support Allowance Component List (ACL)

4. Test equipment (e.g., General Purpose, Special Purpose, or Built-in)

5. Technical manuals

6. Planned Maintenance System (PMS) Maintenance Index Pages (MIP) and Maintenance Requirement Cards (MRC)

7. Danger or Caution Tag Out requirements

NOTE: The Acquiring Activity may cite DI-SESS-81254 Request for Nomenclature and DI-SESS-82007 Configuration Item Documentation Recommendation, for specifying the delivery of the data products that emanates from meeting this requirement.

3.2.2 Engineering Release System

Principle CI-10: Product release provides the appropriate process(es) and evidence necessary to validate the integrity of the product for its intended use.

(1) The Supplier shall use an Engineering Release process, which employs formal release records to authorize the use of new or revised configuration documentation.

(2) The Supplier shall use an engineering release system to issue initial and subsequent approved, including minor changes to the product configuration documentation.

(3) The Supplier shall use an engineering release process to authorize the use of configuration documentation associated with an approved configuration.

(4) The Supplier shall incorporate approved configuration documentation and Engineering Release Record into their CSA system.

NOTE: The Acquiring Activity may cite DI-SESS-80463 Engineering Release Record for specifying the delivery of the data product that emanates from meeting this requirement.

3.2.3 Configuration Baselines Types

Principle CI-11: A configuration baseline is established by agreeing to the definition of the attributes of a product at a point in time and identifies a known configuration to which changes are addressed.

Principle CI-12: A baseline for any product, or any document, plus the approved changes, is the current approved configuration.

There are three major configuration baseline types established during the life cycle of a product: Functional (FBL), Allocated (ABL) and Product (PBL). The FBL and ABL are part of the design requirements development process and used as inputs to the detailed design realization process. The PBL constitutes the final output of the design realization process. Each of these baselines must be maintained and configuration controlled by the acquiring activity or supplying activity as required by the contract.

3.2.3.1 Configuration Baselines and Their Configuration Documentation

(1) The Supplier shall generate the configuration documentation required for the configuration baselines being established by the Acquirer, as tailored in the contract.

NOTE: The Acquiring Activity may use MIL-STD-31000 Technical Data Packages and its associated Data Item Descriptions (DIDs) for specifying the delivery of the data product that emanates from meeting this requirement.

(2) The Supplier shall trace each succeeding baseline to its predecessor(s) including a detailed extension.

3.2.3.2 Functional Configuration Documentation (FCD)

(1) The supplier shall document the FBL of a system by:

a. Describing its functional, performance, interoperability, and interface requirements.

b. Describing the verifications required to demonstrate achievement of those requirements.

c. Identifying any specialized software and documenting the operating environment used to author the above requirements.

NOTE: The FBL is made up of the contract and the A-level specification, End Item, or System level specification.

3.2.3.2.1 Allocated Configuration Documentation (ACD)

(1) The Supplier shall document the ABL of a Configuration Item by:

a. Describing its functional, performance, and interoperability requirements that are allocated from those of a system or higher-level Configuration Item, and interface requirements with interfacing Configuration Items.

b. Describing the verifications required to demonstrate achievement of those requirements.

c. Identifying any specialized software and documenting the operating environment used to author the above requirements.

3.2.3.2.2 Product Configuration Documentation (PCD)

(1) The Supplier shall document the PBL of a Configuration Item by:

a. Describing its detailed design including necessary physical (form, fit, and function) characteristics and selected functional/performance requirements selected for production test, qualification, and acceptance test.

b. Identifying the verifications necessary for accepting product deliveries (first article and acceptance instructions).

c. Identifying and documenting the design of any special tooling, software, equipment, and facilities required to manufacture, operate, maintain, calibrate, or inspect items contained in the design.

d. Identifying and documenting the design of any special packaging parts required to package the CI.

e. Including any form, fit, function and quality assurance provisions required to accept deliveries of the Configuration Item (first article or acceptance inspection).

f. Including any unique process specifications required to manufacture, operate, maintain, or calibrate items contained in the design.

g. Identifying any specialized software and documenting the operating environment used to author the detailed design.

h. If required by contract, may include technical data, which provides instructions for the installation, operation, maintenance, training, and support of a system or equipment.

i. Identifying and documenting any COTS hardware or software used in the detailed design.

(2) The Supplier shall document the PBL of a privately developed Configuration Item by including any verification provisions required to accept deliveries of the Configuration Item (first article or acceptance inspection).

3.2.3.3 Maintenance of Configuration Documentation

(1) The Supplier shall maintain the current approved configuration documentation by creating a new revision to configuration documentation after the change approval, unless it applies to only TDPs controlled by the Supplier, or unless otherwise stated in the contract or agreement. The new revision to the configuration document shall provide traceability by detailing conditions before and after the change is incorporated and by identifying the change as the revision authority.

3.2.4 Configuration Identifiers

(1) The Supplier shall uniquely identify each CI. Each Configuration Item and component shall be assigned a unique product identifier (e.g., PN/PIN).

(2) The Supplier shall determine the types of configuration documentation required for each Configuration Item and component.

(3) The Supplier shall assign unique identifier and other identifiers for the Configuration Item and to the technical documentation that comprises the Configuration Item configuration documentation.

(4) The design document identifier (i.e., CAD model, engineering drawing) shall be the same as, or traceable to, the PN/PIN.

3.2.4.1 Product Identification/Marking

(1) The Supplier shall identify all Configuration Items including their sets, groups, units, assemblies, subassemblies, parts, or other items by marking in accordance with MIL-STD-130, MIL-STD-1285, or MIL-STD-13231, as applicable.

(2) The Supplier shall adhere to DoD Item Unique Identification (IUID) directives, instructions, and standards as tailored in the contract.

NOTE: For DoD IUID directives, instructions and standards for each applicable Unique Identification and Unique Item Identifier CI, refer to MIL-STD-130.

(3) When required in acquisition documents, IUID marking shall be in accordance with MIL-STD-130. Identification marking may be applied direct to an item or by separate means in accordance with MIL-DTL-15024.

(4) For Configuration Items marked with Unique Item Identifier (UII), the Supplier shall check DoD IUID Registry to determine that the UII has not been previously assigned to an item.

3.2.4.2 Software Marking and Labeling

(1) The Supplier shall mark and label software as follows:

a. Embed software identifier and version in the source and executable code header including technical and administrative.

b. Mark each software medium (e.g., disks, hard drives) with a label to include distribution statement, ITAR statement and classification and that all identifiers shall be repeated on the media, as applicable.

c. Each label shall contain, or provide cross-reference to, a list of the applicable software identifiers of the entities it contains.

d. The label shall also indicate the status of the software maturity on the medium (i.e., whether this software is a release candidate or if the software has been tested and verified).

e. Mark with a label all Computer Software Configuration Items deliverable media. Label shall contain:

1. Acquirer Contract number.

2. Computer Software Configuration Items Number (include a designator indicating whether source or executable code).

3. Design activity CAGE Code.

4. Media Number (e.g., 1 of 2, 2 of 2) if there are multiple units per set. Each time a new version of software is issued, new copy numbers, starting from one, must be assigned.

3.2.5 Interface Management

Principle CI-13: Interfaces between products are managed by mutually agreeing to defined common product attributes, making them part of the product configuration baselines for each product, and applying a process to maintain interface integrity.

Principle: CI-14: Configuration items are designated where distinct control is appropriate.

3.2.5.1 Interface Identification and Documentation

(1) The Supplier shall identify the internal and external interface requirements for the system and its Configuration Items.

(2) The Supplier shall incorporate into the FCD, ACD, and PCD all interface information.

(3) The Supplier shall maintain configuration control of interface requirements defined in baseline specifications.

NOTE: The Acquiring Activity may cite DI-SESS-81248 Interface Control Document, for specifying the delivery of the data product that emanates from meeting this requirement.

3.2.5.2 Interface Control Working Group (ICWG) Membership

(1) Each interfacing Supplier shall support and provide a representative to the Acquirer's ICWG.

(2) The ICWG Supplier representative shall be empowered to:

a. Commit the interfacing Sub-supplier to specific interface actions and agreements.

b. Provide assigned and agreed-to draft interface control documentation at a specified period prior to the Acquirer's ICWG meeting where it will be discussed.

c. Update, release, control, and re-release interface control documentation reflecting the ICWG decisions.

d. Distribute copies of such released interface control documentation to other ICWG participants.

3.3 Configuration Change Management

Principle CCM-1: Changes to an approved configuration are accomplished using a systematic, measurable change process.

(1) The Supplier shall apply configuration control to each Configuration Item and its components and configuration documentation.

(2) The Supplier shall confirm that:

a. Configuration baselines are maintained and controlled.

b. Configuration identification control of all Configuration Items and their associated configuration documentation is maintained.

c. Product configuration changes and variances are documented, coordinated, evaluated, dispositioned, and recorded in a configuration status accounting system and reported to the Acquirer.

d. Requested configuration changes and variances address all areas of impact, to include cost, operational, sustainment, implementation actions (e.g., ordering material, designing tooling, manufacturing planning, and interface design, support equipment, software code, producing parts, retrofit).

e. Released/approved configuration changes are incorporated into all product configuration information including the CM/status accounting system, and implemented into each product/CI/component impacted in a timely manner.

f. Released/approved configuration changes are verified as being incorporated in product configuration information to maintain control and consistency, as well as, prepare release authorization documentation.

g. Released/approved variance corrective actions are implemented and verified.

(3) Supplier shall support a joint Acquirer/Supplier Configuration Control Board(s).

3.3.1 Engineering Change Proposal (ECP)

(1) The Supplier shall use an ECP to document changes to the approved baseline(s) via their configuration documentation and submit to the Acquirer or Acquirer's designated change authority.

3.3.1.1 Engineering Change Process

Principle CCM-2: Justifying the need for a change provides the rationale to commit resources required to document, process, and if approved, implement the change.
Principle CCM-3: A unique change identifier enables tracking of the request for change and the status of implementation and verification of the approved change.

(1) When an engineering change affects documentation previously approved by the Acquirer, the Supplier shall perform the following actions:

a. Define the need for the change.

b. Review product model and other technical data to determine what specific changes will need to be made.

c. Prepare an ECP, Notice of Revision (NOR) and technical data supporting the change.

d. Prepare a separate ECP for each engineering change, which has its own distinct objective.

e. Incorporate the approved ECP into the configuration documentation in a timely manner (unless otherwise stated in the contract, approved ECPs will be incorporated into the configuration documentation upon ECP approval.)

f. Implement and update configuration documentation with approved changes described in the ECP, using a documented engineering release system.

g. Record all changes in the CSA system database.

h. Verify that the approved change was implemented correctly.

i. Identify superseding revisions to ECPs. An ECP must be revised when alterations or changes to the initial ECP are necessary.

j. Provide an implementation timeline schedule for each ECP.

k. State in ECP any effects on the program in case the ECP is not approved.

l. Notify the Acquirer when there are changes to Commercial off the Shelf (COTS) hardware or software via an ECP that may affect interface or interoperability characteristics.

3.3.1.2 Classification and Authority of ECP

Principle CCM-4: Classification of a requested change determines the appropriate level of review and the applicable change approval authority.

(1) The Supplier shall use content in “DD Form 1692” or equivalent for assigning a Major (Class I) or Minor (Class II) classification to an ECP.

(2) An ECP shall be classified as a Major (Class I) change, after the establishment of the product baseline, when it has one or more combination of the following criteria:

a. A change to approved configuration documentation for which the Acquirer is the Current Document Change Authority or that has been included in the contract or statement of work by the tasking activity.

b. A change, which affects any physical or functional requirement in approved functional or allocated configuration documentation.

c. A change which affects or changes any approved acquisition baseline (FBL, ABL, and PBL) that is owned by the Acquirer.

d. A change which affects compatibility with interfacing products (including such products as test equipment, support equipment, software, and products furnished by an Acquirer) or that affects one or more of the following:

1. Delivered operation or servicing instructions of products, assemblies, or components.

2. Required calibration to the extent that product identification should be changed.

e. A change, which affects or changes the current system requirements or any specification type. This may include but not be limited to the following:

1. A change or correction to an approved program or project specification or equivalent;

2. The software requirements specification;

3. Any interface characteristics and documents for those requirements or specifications;

4. Any imposed qualification and acceptance requirements;

5. Any other imposed technical requirements definition documents;

6. A change which affects or changes specified and approved requirements including:

a) Safety;

b) Reliability;

c) Maintainability;

d) Durability;

e) Survivability;

f) Supportability; and

g) Quantitative requirements that result in product attributes that would be outside specified limits or specified tolerances.

f. A change which affects required interchangeability (form, fit, function (F3I)), substitutability and replaceability of products, assemblies, or components at the end item or non-repairable subassembly level;

g. A change which affects sources defined by a Source Control Drawing;

h. A change which affects any software build, version or release of the operational, test and checkout or maintenance software;

i. A change which affects software or hardware interface compatibility;

j. A change which affects operational, test, or maintenance computer programs;

k. A change which affects the required hardware's form, fit, or function, its interface, or the software version of the embedded code;

l. A change which affects operator and maintenance manuals (when the change is material);

m. A change which affects or changes the hardware or software of maintenance and operating training systems;

n. A change which affects Security such as: Informational (INFOSEC), Operations (OPSEC) and or Cyber (CYBER SECURITY);

o. A change which has significant environmental Impact;

p. A change which affects or changes the contractual Life cycle costs and savings associated with the current system or an existing ECP;

q. A change which affects or changes user skills or user physical attributes;

r. A change which affects contractual work performance and schedules;

s. A change which requires retrofit of delivered products (e.g., by product recall, modification kit installation, attrition, replacement during maintenance using modified spares);

t. A change which affects or changes weight, balance, moment of inertia (when a factor);

u. A change which affects or changes electromagnetic characteristics (when a factor);

v. A change which affects, changes, or has a significant impact to logistical support requirements such as training, technical or operational manuals, spares, maintenance procedures, or equipment, etc.;

w. A change which requires or mandates that a re-qualification of the item undergoing the change must occur;

x. A change which requires a new or updated Domain certification (e.g., airworthiness, sea worthiness, etc.) to occur;

y. A change which affects or changes Biomedical factors;

z. A change which affects or changes personnel manning;

aa. A change which corrects deficiencies;

ab. A change, which affects or changes interoperability requirements;

ac. A change, which changes the operational capabilities or logistics supportability of the system or item, and the change is significant and measurably changes the system effectiveness;

ad. A change which prevents slippage in an approved production schedule, (if contractually affected);

ae. A change to approved configuration documentation that incorporates or integrates COTS hardware or software;

af. A change which changes or impacts non-technical issues such as fees, incentives, costs, cost schedules, price, and delivery to customer(s), including incentives and fees, guarantees, warranties, contracted deliveries, schedule milestones, or contract milestones.

1. Minor (Class II) ECPs do not impact the criteria above for Major (Class I) changes.

2. For military derivatives of commercial products regulated by the Federal Aviation Administration (FAA) under Code of Federal Regulations (CFA), Title 14, Chapter I, Subchapter C, Part 21, Subpart D – Changes to Type Certificates; Major/minor classification may have a different meaning and criteria with regard to FAA certification.

3.3.1.3 ECP Format

Principle CCM-5: As the primary vehicle for referencing and managing a change, the request for change must be clear and comprehensive from technical, cost, and scheduling perspectives.

(1) The Supplier shall use appropriate form/text, such as "DD Form 1692," or equivalent for referencing and managing a change. Unless otherwise negotiated between Acquirer and Supplier, the Supplier shall prepare ECPs on DD Form 1692-series of forms or its own forms provided that the information requirements of DD Form 1692-series are satisfied.

(2) The Supplier shall obtain approval from the Acquirer if the Supplier wants to use its own ECP format for Major (Class I) and Minor (Class II) ECPs.

NOTE: The Acquiring Activity may cite DI-SESS-80639 Engineering Change Proposal, for specifying the delivery of the data product that emanates from meeting this requirement.

3.3.1.4 Supporting Data

Principle CCM-6: Prior to approval, a requested change is evaluated for all impacts and risk considerations including technical, operational, support, schedule, and cost, as well as the consequences of not approving the request.

(1) The Supplier shall support ECPs with drawings and other data (e.g., Logistics Product Data (LPD), detailed cost proposal data, test data and analyses, quality, packaging, interchangeability factors) to better understand and evaluate the change and its impacts upon the system, its operation and support.

(2) The Supplier shall include in the ECP implementation production and retrofit costs, when the contract references life cycle cost and/or operation and support cost model, the following costs:

a. All future production and spare items projected to be procured for the program.

b. All projected operation and support costs for operation of the total inventory of items by the Acquirer.

(3) The Supplier shall include in the ECP, as supporting data, a summary of any testing done by the Supplier to validate concepts or new technology to be employed in the proposed change and details of such test data vital to the decision regarding acceptance of the change.

3.3.1.5 ECP Decisions

Principle CCM-7: After considering all impacts and risk factors, change approval decisions are made by an appropriate authority who can commit resources to implement the change.

NOTE: Usually proposed ECPs (regardless of class) are not implemented until an approval has been obtained by the designated Configuration Approval Authority. If the Supplier chooses to proceed with implementation prior to that approval then they do so at their own risk with the possibility that any such implementation work will have to be undone or scrapped, at their own cost, if the proposed change is disapproved.

Principle CCM-8: An approved change is implemented in accordance with documented direction approved by the appropriate level of authority**.**

The Acquirer is configuration approval authority for all Major (Class I) engineering changes for the Configuration Item once the Acquirer has configuration control of the baseline.

3.3.1.6 Engineering Change Priorities

The Acquirer uses the engineering change priority recommendation of emergency (48 hours), urgent (30 days), or routine (90 calendar days) to determine the time frame in which the ECP is to be reviewed, evaluated, ordered, and implemented.

(1) The Supplier shall assign an Emergency or Urgent Engineering Change Priority to a Major (Class I) ECP with prior Acquirer approval.

3.3.1.7 Related Engineering Changes

A related engineering change occurs when the desired engineering change in one item (the basic or original engineering change) requires related engineering changes in other items to retain (or attain) either an interface match or compatibility and interoperability of the associated items.

3.3.1.7.1 Related Engineering Changes - Single Prime, Single Procuring Activity

(1) The single prime/procuring Supplier shall include all support data and interface items in one basic/original uniquely numbered engineering change.

3.3.1.7.2 Related Engineering Changes - Single Prime Multiple Procuring Activities

(1) The Supplier shall assign a number to the basic ECP.

(2) The Supplier shall use the basic ECP number, plus a separate dash number, for related ECPs submitted to other procuring activities.

3.3.1.7.3 Related Engineering Changes - Separate Primes

(1) The Supplier shall submit a coordinated basic ECP when a desired engineering change in one product (the basic ECP) requires related engineering changes in other products that are the responsibility of other prime Suppliers who are participating in a specific item development or production program.

(2) The Supplier's coordinated basic ECP shall include data showing the extent of the coordination and its results to the related ECPs of the other prime Suppliers.

(3) The Supplier shall include in the basic ECP the impact on the other items.

(4) The Supplier shall cross-reference basic and other related ECPs.

3.3.1.8 Minor (Class II) ECP

(1) The Supplier shall assign an ECP classification of Minor (Class II) to an ECP whose engineering change does not meet the criteria for a Major (Class I) change. Minor (Class II) ECPs are limited to administrative, documentation clarifications, corrections, or configuration changes, which do not affect interchangeability.

3.3.1.8.1 Concurrence in Classification

(1) The Supplier shall obtain Acquirer classification concurrence of any Minor (Class II) ECP. The Acquirer may delegate authority to an Acquirer's designated representative, Supplier or retain within the government, for the concurrence of classification for Minor (Class II) ECPs as tailored in the contract.

(2) The Supplier shall cancel a Minor (Class II) ECP if the Acquirer disagrees with the classification of the ECP. The Supplier may revise and resubmit the proposed change as a Major (Class I) ECP.

(3) The Supplier shall submit to the Acquirer for final decision, any classification disagreements between the Supplier and the Acquirer's designated representatives when retained within the government.

3.3.1.8.2 Concurrence of Minor (Class II) Changes

(1) The Supplier shall submit the Minor (Class II) change to the Configuration Approval Authority for concurrence, approval, or disapproval after the classification review and prior to delivery of the product.

3.3.2 Requests for Variance (RFV)

Principle CCM-9: If it is necessary to temporarily depart from approved product configuration information, a request for variance is identified, classified, documented, coordinated, evaluated, and dispositioned.

(1) The Supplier shall obtain the Acquirer's or its designated representative approval on any Configuration Item or component, including COTS hardware or software, which is non-conforming to its requirements by preparation and submittal of an RFV.

NOTE: RFVs may be submitted by an Engineering Variance (i.e., before the item is produced and the Supplier is aware in advance of a need to deviate from the items requirements), or Production/Procurement Variance (i.e., a non-conformance is discovered after an item is produced).

(2) If the Acquirer determines that the Engineering Variance would be permanently acceptable, then the Supplier shall submit an ECP to accomplish the change and results in closure or removal from the CSA information.

(3) The Supplier shall provide for:

a. Production/Procurement Variance (aka Post Production RFV) – the quantity of items affected by the nonconformance and the extent the affected items do not meet the Acquirer's contractual requirements. The Supplier shall provide per unit and total cost impact and will be calculated based on estimates to complete repairs or replace the affected item(s). When supplies or services are accepted with minor nonconformances, the identified amount shall be used to determine if the savings to the Supplier exceed the cost to the Acquirer to modify the contract. When supplies or services are accepted with critical or major nonconformances, the Acquirer's contracting officer must modify the contract to provide for an equitable price reduction or other consideration as per FAR 46.407 -- Nonconforming Supplies or Services.

b. Engineering Variance (aka Pre-Production RFV) – the quantity of items affected and the extent of the proposed departure from an approved product definition information. In case of self-inflicted need for departure from design and/or requirements, the Supplier shall provide per unit and total savings when submitting the request for Engineering Variance. When supplies or services are accepted with critical or major nonconformances, the Acquirer's contracting officer must modify the contract to provide for an equitable price reduction or other consideration as per FAR 46.407 -- Nonconforming Supplies or Services.

(4) The Supplier shall document the following elements of the dispositioned RFV in the CSA system:

Type of Variance (non-conformance)

a. Description; Impact of the variance (pre-production or post production) inclusive of any impact to any additional product/part;

b. Criteria used in establishing the need for corrective action appropriate to the effects of the variance and when applicable;

c. Action taken/accomplished by the Supplier to prevent reoccurrence of the non-conformance.

NOTE: The Acquiring Activity may cite DI-SESS-80640 Request for Variance, for specifying the delivery of the data product that emanates from meeting this requirement.

3.3.2.1 Recurring Variances

(1) The Supplier shall obtain the Acquirer's approval before submitting a reoccurring RFV with the same nonconformance. Corrective action plans included in a RFV should reduce the need for recurring Variances.

(2) The Supplier shall evaluate recurring engineering variances for possible submittal of an ECP. RFVs are limited to their documented effectivity, which must be less than or equal to the remaining contract period for all produced items/units. RFVs can only apply to the contract under which it is submitted. The RFV cannot apply to future contracts.

3.3.2.2 Classification of Variances

(1) The Supplier shall use content in "DD Form 1694" for assigning a Critical/Major or Minor classification to an RFV. Classification based on the impact of the variance:

a. Critical. Use this classification when it is a departure from requirements affecting one or more of the following:

i. Safety

ii. Human health

iii. Environment

iv. Security (local program or national)

b. Major. Use this classification when it is a departure from requirements affecting one or more of the following:

i. Performance or operational limits

ii. Interchangeability, reliability, survivability, maintainability or durability of the item or its repair parts

iii. Structural strength

iv. Effective use or operation

v. Weight, moment of inertia, center of gravity

vi. Appearance

vii. Limits on product use or operation

viii. Temporary use of alternate items

ix. When the configuration documentation defining the requirements for the item classifies the departure from the requirement as major

c. Minor. Use this classification when it consists of a departure that does not involve any of the factors listed for critical or major, or when the configuration documentation defining the requirements for the item classifies the departure from the requirement as minor.

NOTE: Departures from the requirements that do not meet the definition of critical or major and are not classified in any configuration documentation (i.e., unlisted characteristic) are treated as minor.

(2) The Supplier shall submit to the Acquirer for final decision, any classification disagreements between the Supplier and the Acquirer's designated representatives.

(3) Suppliers shall provide an implementation timeline for Critical and Major classified RFVs.

3.3.2.3 RFV Decisions

The Acquirer is configuration approval authority for all Critical and Major RFVs. The Configuration Approval Authority for all Critical, Major or Minor RFVs is the Acquirer or Acquirer's designated representative.

(1) The Supplier shall submit all proposed Critical and Major RFVs to the Acquirer with data from the Acquirer's designated representative, if available.

(2) The Supplier shall submit all requested Minor RFVs to the Acquirer or Acquirer's designated representative.

3.3.2.4 Minor RFVs

(1) The Supplier shall assign an RFV classification of Minor to an RFV that does not meet the criteria for a Critical or Major.

3.3.3 Specification Change Notice (SCN)

(1) The Supplier (design activity for, or the current change authority of a specification not generated by word processing) shall prepare a separate proposed SCN for each contractual specification that would require revision.

(2) The Supplier shall submit SCNs in conjunction with any ECP that affects a specification. Program/project organizations not being in possession of interactive digital files shall prepare a proposed change on specifications in NOR format.

NOTE: The Acquiring Activity may cite DI-SESS-80643 Specification Change Notice, for specifying the delivery of the data product that emanates from meeting this requirement.

3.3.4 Notices of Revision (NORs)

(1) The Supplier shall submit a NOR or contractor format if so allowed for each document affected by an ECP.

(2) The Supplier shall prepare and submit with each NOR all information required to disposition the NOR and its associated ECP.

NOTE: The Acquiring Activity may cite DI-SESS-80642 Notice of Revision, for specifying the delivery of the data product that emanates from meeting this requirement.

3.4 Configuration Status Accounting (CSA)

Principle CSA-1: Configuration Status Accounting (CSA) provides an accurate, timely information base concerning a product and its product configuration information throughout the product life cycle.
Principle CSA-2: Information about the product and the product configuration information are captured as CM tasks are performed; reporting is accessible to support program/project activities as needed.

CSA formalizes the recording and reporting of the accurate and timely established product configuration information. CSA provides status of proposed changes, the implementation of approved changes and changes occurring to product units due to operation and maintenance.

(1) The Supplier shall maintain the legitimacy of the CSA by storing valid data in the CSA system.

(2) The Supplier shall perform CSA analysis to detect and identify trends and report problems.

3.4.1 Supplier CSA System

The Supplier may utilize any information technology tools or systems desired to meet CSA functional process requirements described herein.

(1) The Supplier's CSA system shall be closely linked to the data repository used to store and manage the product configuration and product operational information.

This close linkage may be accomplished via use of an all-encompassing product data management system (with CM, data repository, requirements management, and traceability functionality all in the same product) or by integration of separate stand-alone IT tools/systems.

(2) The Supplier shall use a CSA system to capture, store, and maintain product configuration information about the product that is either provided by the Acquirer or created by the Supplier during the duration of the contract.

(3) The Supplier shall establish and maintain a CSA system for support of the CDRL Data Items that has the following capabilities:

a. Capture and maintain the currently approved product configuration information by the identification number assigned to each Configuration Item and component.

b. Capture and maintain all historical product configuration information with traceability detailing product configuration from contract award to the present.

c. Store and manage all product configuration information.

d. Identify dependencies among Configuration Items.

e. Report the status of both proposed and approved configuration changes and variances to all Configuration Items.

f. Record, track and report implementation status and engineering release of configuration documentation for approved configuration changes.

g. Record, track and report the status of corrective actions (repairs, "use as is") for nonconforming materiel addressed by the RFVs, which affects the configuration of any Configuration Items.

h. Record and report the planning and results of configuration audits to include the status and final disposition of identified discrepancies.

i. Provide performance metrics that measure the execution of the Supplier's CM process and functions.

j. Record and report all product data inherited from Sub-tier suppliers, to include vendor part numbers and serial numbers, and provide clear traceability from these components to their respective next higher assemblies.

(4) The Supplier shall:

a. Make CSA system and product configuration information readily available to the Acquirer or Acquirer's designated representative, via on-site inspection, remote access, or regular submissions of CSA information and updates in accordance with the contract.

b. Comply with Cyber Security requirements for the purpose of interoperating with the Acquirer's system as in an integrated digital environment.

c. Adequately secure, safeguard and retrieve, after extended storage, recorded product configuration information.

(5) The Supplier shall provide a digital delivery to the Acquirer upon the completion of the contract, CSA information and configuration baseline documentation created, collected, and managed during the contract. The form, format and delivery date for this data delivery shall be in accordance Contract Data Requirements List (CDRL) specified within the contract.

NOTE: The Acquiring Activity may cite DI-SESS-81253 Configuration Status Accounting Information, for specifying the delivery of the data product that emanates from meeting this requirement.

(6) The Supplier shall document the incorporation of all retrofit changes to those units identified for retrofit when so tasked by contract provisions.

NOTE: The Acquiring Activity may cite DI-SESS-81245 Installation Completion Notification, for specifying the delivery of the data product that emanates from meeting this requirement.

3.4.2 CSA Analysis Requirements

Principle CSA-3: Metrics derived from configuration status accounting information are used to evaluate and improve CM process effectiveness.

(1) The Supplier shall evaluate CSA corrective actions to verify that problems have been resolved, metrics of adverse trends have been reversed and changes have been correctly implemented in the appropriate processes and products; and determine whether additional problems have been introduced.

Suggested performance metrics may include but are not limited to those that are listed in 3.1.1.

3.5 Configuration Verification and Audits

Principle CVA-1: Verify CM processes to ensure appropriate consistency is established and maintained in their execution.
Principle CVA-2: Verifying a product's compliance with the physical, functional, and interface requirements in approved product configuration information confirms the basis for managing product configuration.
Principle CVA-3: Verify the implementation of each change to ensure consistency is maintained between the product, its configuration information, and related support assets.
Principle CVA-4: Configuration audits are a summation of the configuration verification process, where necessary to establish approved configurations at key points in the product life cycle.

The audit verifies that the product during development or modification has achieved specified requirements and the design is accurately and completely documented in configuration baseline information. Verifying the documentation determines that it is adequate for its intended purposes and accurately reflects a design compliant with the product's functional and physical requirements. DoD utilizes Functional and Physical Configuration Audits (FCA/PCA) to achieve these goals.

3.5.1 Common Supplier Audit Responsibilities

(1) The Supplier shall:

a. Conduct the FCAs and PCAs for designated Configuration Items to verify the system allocated and product configuration baselines including the prime supplier's designated Sub-tier level.

b. Support and participate in the FCAs and PCAs for related Configuration Items, as identified by the Acquirer.

c. Conduct incremental, lower-level Configuration Item audits leading up to the system level audits.

d. Establish the schedule for audits to be conducted at Supplier or Sub-supplier facilities including the agenda for each configuration audit in consonance with the Integrated Master Schedule (IMS) and obtain Acquirer's approval.

e. Confirm that each configuration audit schedule is compatible with the availability of the necessary information and contract articles (e.g., system engineering data, released engineering documentation, trade study results, producibility analysis results, risk analysis results, product specifications, quality control records, manuals, drawings, reports, hardware, Interface Design Document (IDD), and SVD for software).

f. Sub-suppliers participate in planning and conducting configuration audits and prepare an audit plan to identify their requirements and responsibilities.

g. Designate a representative for the audit.

h. Provide a current listing of all RFVs, SCNs, NORs, and ECPs against the Configuration Item either requested or approved.

i. Participating Supplier and Sub-supplier personnel are prepared to discuss the technical detail of the presented materiel.

j. Participate in the resolution of discrepancies identified during the FCA/PCA.

k. Summarize conclusions and add appropriate comments summarizing the side meetings and the main meeting into the official minutes.

l. Document significant questions and answers, action items, conclusions, and recommended courses of action resulting from each audit.

m. Record all discrepancies identified during the audit and process each one until it is closed out or a suitable residual task, including identification of responsible activities and suspenses, have been established and which will lead to the close out of the discrepancy/action item.

n. Verify the implementation of engineering changes and variance corrective actions to confirm consistency is maintained between the product and its product configuration information.

(2) When audits are conducted in increments, the Supplier shall support a final audit to verify that all requirements of the FBL, ABL, and PBL have been satisfied.

(3) Supplier shall complete all audit entry and exit criteria prior to completion or closeout of the audit.

NOTE: The Acquirer should consult IEEE 15288.2 Technical Reviews and Audits and all associated Addenda and Amplifications for tailoring PCA Entry and Exit Criteria, which are determined through acceptance of the Supplier's Systems Engineering Management Plan (SEMP).

NOTE: The Acquiring Activity may cite DI-SESS-81646 Configuration Audit Plan, DI-ADMN-81249 Conference Agenda, and DI-ADMN-81250 Conference Minutes, for specifying the delivery of the data product that emanates from meeting this requirement.

3.5.2 Functional Configuration Audit (FCA)

The objective of the FCA is to verify the CI's and system's performance against its approved functional and allocated configuration documentation, to ensure the Configuration Item's and system's specifications and interfaces are accurately and adequately defined, and to ensure the Supplier's change control system is adequate to control the processing and release of configuration documentation. The Computer Software Configuration Item (or CSCI) FCA ensures that all requirements have a related test step, and the test, as performed by test engineers, passes successfully.

(1) When FCAs are conducted in increments, the Supplier shall conduct a final system-level FCA to confirm that the system has been satisfied.

(2) The Supplier shall conduct the FCA to verify that the Configuration Item meets its performance requirements as documented in the approved FCD, ACD and is consistent with the up-to-date PCD.

(3) Each FCA non-compliance shall be documented and provided to the Acquirer for appropriate action.

(4) The Supplier shall use test data from the verification of the Configuration Item for the FCA.

(5) The Supplier shall audit the Configuration Item with prior Acquirer approval of the FBL and ABL of the Configuration Item or system involved.

3.5.2.1 Supplier FCA Responsibilities

(1) The Supplier shall provide the following information to the Acquirer prior to the audit date:

a. List of items to be audited to include documents.

b. List of tasks to be accomplished at the FCA for the Configuration Item.

c. Matrix that identifies and provides traceability for all requirements; includes a cross reference to the test plans, test procedures, test programs with automatic/automated test equipment (when applicable), test reports (results of demonstrations, inspections and analyses for each requirement), and any known deficiencies supported by applicable deficiency report numbers.

(2) The Supplier shall provide the following information and data necessary to support the FCA.

a. The configuration documentation for the Configuration Item being audited.

b. All approved ECPs.

c. An account of the ECPs incorporated and tested as well as proposed.

d. Test plans, specifications, descriptions, procedures, recorded results, and analyses for the Configuration Item.

e. A general discussion of the entire Configuration Item test effort delineating problem area accomplishments.

f. Configuration Item requirements that were not met, including a proposed remedy for each item.

g. Complete list of test requirements not yet performed and a plan for accomplishing each requirement.

h. Analyses or simulations for those requirements, which cannot be completely verified through the use of testing.

i. Provide the following for Computer Software Configuration Items:

1. Database characteristics, storage allocation data, and timing and sequencing characteristics for compliance with specified requirements.

2. Documents that comprise or describe the contents or the use of the software product for format and completeness (e.g., Software Product specification (SPS), User's Manual, SVD))

3. Records that reflect the changes made to the developmental configuration for the Computer Software Configuration Items.

4. Listing of all versions of the developmental and non-developmental software for the Computer Software Configuration Items that are in the software library.

5. Findings of all internal CM and software QA audits of the Computer Software Configuration Items.

j. Preliminary Design Review (PDR) and Critical Design Review (CDR) minutes. The Acquirer examines to ensure that all findings have been incorporated and completed and that all action items are closed.

(3) The Supplier shall provide the FCA minutes to include the requirements traceability and test matrix.

3.5.3 Physical Configuration Audit (PCA)

The purpose of the PCA is to provide assurance to the Acquirer that the product configuration documentation (including CAD models, drawings and software source code) accurately reflects the validated product and the documentation is a clear, complete and accurate representation of the intended design and to establish the final product baseline. The Supplier and Acquirer conducts a PCA to examine the as-built configuration of a validated CI, comparing results against its design documentation plus any approved changes after a successful CDR. The software PCA is conducted after producing a software build, the build has to be produced and checked that it can be installed on the device or computer during a PCA and verified against the SVD, and is witnessed by QA or any other entity established by the Acquiring activity. This would include verifying all software updates have been applied, as listed on the problem reports for this build. Each PCA non-compliance identified during the audit is documented by CM and evaluated by the project lead for appropriate action.

(1) The Supplier shall conduct the PCA to verify that the PCD is consistent with the validated Configuration Item.

(2) The Supplier shall confirm compatibility between the Configuration Item with the Program Parts Selection List (PPSL) and examine the Configuration Item to ensure that the proper parts are actually installed.

(3) When PCAs are conducted in increments, the Supplier shall conduct a final system-level PCA to confirm the system PBL is correct.

(4) The Supplier shall document each PCA non-compliance and provided to the Acquirer for appropriate action.

(5) If any portions of the inspections, tests, or audits need to be re-accomplished, the Supplier shall invite the Acquirer or Acquirers designated representative to witness the required inspections, tests, and audits.

3.5.3.1 Supplier PCA Responsibilities

(1) The Supplier shall provide the following information to the Acquirer prior to the audit date:

a. Data describing the item configuration, to include:

1. Configuration Item specifications.

2. A list delineating both approved and outstanding changes against the CI.

3. Complete shortage list.

4. Acceptance test procedures and associated test data from those procedures from the successful FCA.

5. Engineering drawing index including revision letters.

6. Operating and support manuals; including operator's manuals, maintenance manuals, illustrated part breakdown, programmer's manuals, diagnostic manuals, etc.

7. Proposed Material Inspection and Receiving Report, DD Form 250.

8. Approved nomenclature and nameplates.

9. SVDs for software.

10. FCA official minutes for each Configuration Item unless being performed incrementally.

11. Status of the current Original Equipment Manufacturer (OEM)/Supplier Quality Assurance Programs.

12. Parts Selection List.

13. Interface Design Document for software.

14. Current approved issue of hardware development and software and interface requirements specifications to include approved SCNs and approved variances.

15. Operational test plans, specifications, descriptions, procedures, recorded results, and analyses for the CI.

16. Configuration Item requirements that were not met, including a proposed remedy for each CI.

17. Complete list of operational test requirements not yet performed and a plan for accomplishing each requirement.

18. Analyses or simulations for those requirements, which cannot be completely validated through the use of testing.

19. Identification of all changes made during test.

20. Identification of any required changes not completed.

21. All configuration documentation, or electronic representations of the same, required to identify the CI.

b. Identification of any difference between the physical configurations of the selected production CI(s) and the development CI(s) used for the FCA, including certifications or demonstrations that these differences do not degrade the functional characteristics of the selected CI(s).

c. Form, fit, and function of the product model data as well as interface or integration data as proof that the product model and derived output products are current. First Article Tests/product verification could be used to provide information in support of PCA after CDR.

(2) The Supplier shall provide the following information and data necessary to support the PCA and provide within the minutes:

a. Complete product drawings/associated lists package (3D model type, cut-away drawings, and/or Model Based Definitions) and associated manufacturing instruction sheets (and/or Computer Aided Manufacturing (CAM) data) for each item of hardware or software identified.

b. Completed inspection reports for selected drawings (3D model type or cut-away drawings and/or Model Based Definitions) and associated manufacturing instructions (and/or CAM data).

c. Records of the configuration baselines to compare with the Supplier's engineering change control procedures and release system, including interim releases of spares/repair parts provisioned prior to PCA to confirm delivery of currently configured spares/repair parts.

d. Confirmation on the completion of the inspection and test of Sub-supplier equipment end items at point of manufacture.

e. PPSL to support examination of the Configuration Item to verify that the proper parts are actually installed.

3.5.4 Post-Audit Action

(1) The Supplier shall complete post-audit actions as assigned/directed.

3.5.5 Configuration Audit Summary

(1) The Supplier shall:

a. Prepare Configuration Audit Summary Report consisting of the applicable audit action items and discrepancy information that was derived from the applicable audit checklist package.

b. Prepare a detailed configuration audit summary report after successful verification of the completed action items has been conducted.

c. Provide the completed configuration audit summary report.

NOTE: The Acquiring Activity may cite DI-SESS-81022 Configuration Audit Summary Report, for specifying the delivery of the data product that emanates from meeting this requirement.

Table 1 - Cross reference for principles from EIA-649

CM Functions and Principles (CM)		**Reference**
Principle CM-1	CM implementation requires a balanced and continuous application of CM functions and their underlying principles throughout the product life cycle.	3. Configuration Management Requirements
Configuration Management Planning and Management (CMP)		**Reference**
Principle CMP-1	The foundation for CM planning, which delineates the specific CM application methods and their levels of emphasis, is an understanding of the context and environment of the product to which the CM process is to be applied.	3.1 Planning and Management
Principle CMP-2	CM Planning documents how the organization will implement CM throughout the applicable phases of the product life cycle to provide consistency between product configuration information and the product.	3.1 Planning and Management
Principle CMP-3	To implement planned CM functions, resources are identified and applied and responsibilities to perform CM activities are assigned.	3.1 Planning and Management
Principle CMP-4	The establishment and maintenance of CM performance and status measurements are necessary for all products where compliance with the Configuration Management planning and continuous improvement are critical.	3.1 Planning and Management 3.1.1 Monitoring Configuration Management Performance
Principle CMP-5	CM Procedures document how each CM function is implemented to accomplish the intent of the CM planning.	3.1 Planning and Management
Principle CMP-6	Provide CM training to assure that individuals understand their responsibility, authority, accountability, and the procedures for performing CM.	3.1 Planning and Management
Principle CMP-7	Periodic assessment of the effectiveness of CM procedures and tools and of compliance with the CM plan maintains the health of the CM process.	3.1 Planning and Management
Principle CMP-8	Performing CM includes responsibility for the CM performance of the supply chain.	3.1.2 Supplier's Configuration Management Plan
Principle CMP-9	Information processes, including collection and processing, controlling status, providing interoperability and exchange, and long term preservation, are essential elements of effective CM planning and management.	3.1.4 Product Configuration Documentation Processes
Configuration Identification (CI)		**Reference**
Principle CI-1	Configuration identification is the basis from which the configuration of products is defined and verified; products and their product configuration information are labeled; changes are managed; and traceability is maintained throughout the product's life cycle.	3.2 Configuration Identification
Principle CI-2	Product configuration information serves as the basis for development, production, operation, and maintenance/support of the product.	3.2 Configuration Identification

Table 1 - Cross reference for principles from EIA-649 (continued)

CM Functions and Principles (CM)		Reference
Principle CI-3	Enterprise identifiers designating the responsible designer, manufacturer or preparer provide uniqueness to the identifiers of products and product configuration information.	3.2 Configuration Identification.
Principle CI-4	Product identifiers are assigned so that one product can be distinguished from other products; one configuration of a product can be distinguished from another and the correct corresponding product information can be retrieved.	3.2 Configuration Identification
Principle CI-5	Individual units of a product are assigned a unique product unit identifier when there is a need to distinguish one unit of the product from another.	3.2 Configuration Identification
Principle CI-6	When a product is modified, it retains its original product unit identifier, even though its part identifying number is altered to reflect a new configuration.	3.2 Configuration Identification
Principle CI-7	A series of like units of a product is assigned a unique product group identifier when it is unnecessary or impractical to identify individual units, but necessary to correlate units to a process, date, event, or test.	3.2 Configuration Identification
Principle CI-8	Product configuration information is uniquely identified so it can be referred to precisely and is made accessible.	3.2 Configuration Identification
Principle CI-9	Establishing product structure to organize product configuration information provides efficient application of the information over its lifecycle.	3.2 Configuration Identification
Principle CI-10	Product release provides the appropriate process (es) and evidence necessary to validate the integrity of the product for its intended use.	3.2.1 Configuration Item Selection 3.2.2 Engineering Release System
Principle CI-11	A configuration baseline is established by agreeing to the definition of the attributes of a product at a point in time and identifies a known configuration to which changes are addressed.	3.2.2 Engineering Release System 3.2.3 Configuration Baselines Types
Principle CI-12	A baseline for any product, or any document, plus the approved changes, is the current approved configuration.	3.2.2 Engineering Release System 3.2.3 Configuration Baselines Types
Principle CI-13	Interfaces between products are managed by mutually agreeing to defined common product attributes, making them part of the product configuration baselines for each product, and applying a process to maintain interface integrity.	3.2.5 Interface Management
Principle CI-14	Configuration items are designated where distinct control is appropriate.	3.2.5 Interface Management

Table 1 - Cross reference for principles from EIA-649 (continued)

Configuration Change Management (CCM)		**Reference**
Principle CCM-1	Changes to an approved configuration are accomplished using a systematic, measurable change process.	3.3 Configuration Change Management
Principle CCM-2	Justifying the need for a change provides the rationale to commit resources required to document, process, and if approved, implement the change.	3.3.1.1 Engineering Change Process
Principle CCM-3	A unique change identifier enables tracking of the request for change and the status of implementation and verification of the approved change.	3.3.1.1 Engineering Change Process
Principle CCM-4	Classification of a requested change determines the appropriate level of review and the applicable change approval authority.	3.3.1.2 Classification and Authority of ECP
Principle CCM-5	As the primary vehicle for referencing and managing a change, the request for change must be clear and comprehensive from technical, cost, and scheduling perspectives.	3.3.1.3 ECP Format
Principle CCM-6	Prior to approval, a requested change is evaluated for all impacts and risk considerations including technical, operational, support, schedule, and cost, as well as the consequences of not approving the request.	3.3.1.4 Supporting data
Principle CCM-7	After considering all impacts and risk factors, change approval decisions are made by an appropriate authority who can commit resources to implement the change.	3.3.1.5 ECP Decisions
Principle CCM-8	An approved change is implemented in accordance with documented direction approved by the appropriate level of authority.	3.3.1.5 ECP Decisions
Principle CCM-9	If it is necessary to temporarily depart from approved product configuration information, a request for variance is identified, classified, documented, coordinated, evaluated, and dispositioned.	3.3.2 Request for Variance (RFV)
Configuration Status Accounting (CSA)		**Reference**
Principle CSA-1	Configuration Status Accounting (CSA) provides an accurate, timely information base concerning a product and its product configuration information throughout the product life cycle.	3.4 Configuration Status Accounting (CSA)
Principle CSA-2	Information about the product and the product configuration information are captured as CM tasks are performed; reporting is accessible to support program/project activities as needed.	3.4 Configuration Status Accounting (CSA)
Principle CSA-3	Metrics derived from configuration status accounting information are used to evaluate and improve CM process effectiveness.	3.4.2 CSA Analysis Requirements