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WROCI
Configuration Management Plan (CMP)

Western Range Operations Communications and Information (WROCI)
Contract No. F04684-03-C-0050
CDRL A009 – Configuration Management

Prepared for

Department of the Air Force
30th Space Wing
Vandenberg Air Force Base, California 93437

Prepared by
Western Range Operations Communications and Information (WROCI)
Configuration Management (CM)
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Document History

This document, dated 16 January 2004, is the original issue. The pages in this document are listed below:

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Title Page	0
ii	0
iii	0
1 through 25	0

*A zero in the Revision column indicates the original issue of the document.

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1. INTRODUCTION

1.1 Purpose

This plan defines the approach for, and implementation of, Western Range Operations Communications and Information (WROCI) Configuration Management (CM) program and support of the 30th Space Wing. WROCI CM will be utilized for engineering, logistics, maintenance, test & integration, and operations. WROCI CM will support operations and maintenance of Launch Communications, Communications and Information (C&I) Operations, Vandenberg Electronic Security System (VESS), Spacelift Range System Contract (SLRSC), and Range Standardization and Automation, Phase IIA (RSA IIA). Throughout this document, there will be times when SLRSC and RSA IIA will be addressed together, and therefore, will be referred to as Sustainment and Recapitalization Contractors (SRC).

1.2 Scope

This plan, which is the controlling document for management of Configuration Items (CI), is directive on all WROCI elements and establishes the policy to be utilized in meeting WROCI CM requirements. It addresses the organization established to accomplish configuration identification, configuration control, status accounting, review and audits. This plan defines WROCI CM interfaces internal and external to WROCI for the systems engineering, sustaining engineering support, and new tasking support for data processing systems, communications, data transfer systems, instrumentation, and necessary facility systems. This plan identifies the interface with WROCI Quality Assurance (QA) organization. It further describes how WROCI CM change control activity will interface with 30th Space Wing (30 SW) in proposing changes. WROCI CM will utilize systems engineering methodology processes and procedures in executing engineering efforts, to include; technical management and control of engineering activities and design reviews as defined in WROCI's Standard Operating Procedures (SOPs).

1.3 Management Integration of Configuration Management

WROCI CM is an integral part of the effort applied to tasking, sustaining engineering, developmental support engineering, and SRC hardware (HW), software (SW), and facilities changes. Work scheduled to be accomplished through sustaining engineering or systems engineering and interaction will be evaluated prior to installation to determine impact to established configuration baseline. An Engineering Change Proposal (ECP) and an Authorization for Configuration Change (ACC) (as applicable) will precede installation when affecting WROCI or SRC system's baselines.

The response from WROCI CM to improvement engineering and new tasking will include schedule reflecting events, major milestones, and documentation

proposed to accomplish and document the work. The response will show the relationship between events critical to accomplishment of the work and the relationship of appropriate configuration management tasks. The sequencing of events necessary to create and document the life cycle or to revise an existing baseline(s) will be included. Major events in the modification or development of HW, SW, testing, reviews, audits, documentation, and drawings will be included. Other items, Government Furnished Equipment (GFE), and facilities implications will be included in the schedules.

1.4 Plan Update

WROCI's CM plan will be updated as required to incorporate changes agreed to by the Government and WROCI and resubmitted for approval in accordance with Contract Data Requirements List (CDRL) item A009, Configuration Management Plan.

1.5 Configuration Implementation Plan

WROCI CM will generate a Configuration Implementation Plan (CIP), WROCI 3042-1002 that will identify what Standard Operating Procedures (SOPs) will be generated and estimated release dates.

2. REFERENCE DOCUMENTS

WROCI CM is conducted in accordance with the following guidance and reference documents.

Number	Title	Date
	Guidance	
ANSI/EIA 649	National Consensus Standard for Configuration Management	13 Jan 95
MIL-HDBK-61	Configuration Management Guidance	30 Sep 97
	Reference	
CMU/SEI-93-TR-25	SEI Key Practices of the CMM, V1.1	
MIL-STD-100	Engineering Drawing Practices	9 Jun 97
MIL-DTL-31000	Detail Specification for Technical Data Packages	15 Oct 98
MIL-STD-498	Software Development and Documentation	5 Dec 94
MIL-STD-961	Defense Specifications	22 Mar 95
ISO 9001	Standard Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing	15 Dec 00

3. ORGANIZATION

This section describes the organization and CM functions that WROCI will implement to support the Launch Communications, C&I Operations, VESS, and SRC systems. This plan also defines the management approach WROCI will use to accomplish the required CM functions.

3.1 Structure

WROCI CM provides support for engineering elements when affecting changes to the Launch Communications, C&I Operations, VESS, and SRC systems. Figure 3-1 outlines WROCI's Configuration Management Organization and Functions.

3.2 Configuration Management Program Control

WROCI CM Program Control is maintained through the organizational structure of the WROCI CM Plan. In addition, compliance with WROCI CM policies and practices are reinforced through training programs from management and supervisory personnel, and the more detailed training from WROCI CM personnel. WROCI CM is assisted in the training effort by other WROCI management organizations. Internal Review Boards (IRB) and daily application of procedures ensures compliance. Monitoring and controlling of WROCI CM is accomplished continuously and processes are updated reflecting current procedures. Periodic audits of the programs by elements of QA are accomplished to verify compliance with WROCI CM's policies and procedures.

3.3 Configuration Management

WROCI CM is responsible for the development of CM policies, which are approved by the Government, and provides overall technical services for the conduct of WROCI CM activities. WROCI CM is responsible for updating the WROCI CM Plan, developing detailed procedures for its execution and ensuring compliance with overall CM requirements. The functions of configuration identification, configuration control, configuration status accounting, and configuration audits for Launch Communications, C&I Operations, and VESS systems is WROCI CM's responsibility. Assistance for technical reviews will be provided to other organizations when required for tasking support. WROCI CM supports Launch Communications, C&I Operations, VESS and SRC systems in maintaining the "as-built" configuration baseline. This baseline consists of the documentation that exists at the start of this contract and any changes to this documentation produced by WROCI during performance of the contract. In addition, changes as a result of GFE and those changes resulting from contractor/vendor activities will also be incorporated into their respective baselines.

3.4 Interfaces with Configuration Management

Preparation of the technical presentation materials to be used for reviews and audits in support of engineering efforts is the responsibility of all applicable departments, and are assisted in these efforts by all support activities. Preparation for and the conduct of design reviews is the responsibility of WROCI organizations. Additional information pertaining to design reviews and application is contained in WROCI SOPs. Conduct of configuration audits is the responsibility of WROCI CM. Scheduling of audits and reviews will be a coordinated effort with the participating departments and WROCI CM.

3.5 Interfaces with Systems Program Office (SPO), RSA IIA, and SLRSC

The primary and the major interfaces for CM within WROCI are depicted in figure 3-2. The primary 30 SW interface for CM will be between the Systems Program Office (SPO) (SMC/RNV), SLRSC CM, and RSA IIA CM. It is recognized that WROCI will interface with and execute technical interchanges with other Western Range (WR) contractors. Specific procedures will be developed to ensure that an effective working relationship is established and maintained between each WROCI activity, performing engineering functions and other WR contractors. The definition and control of these interfaces are discussed in the SOPs.

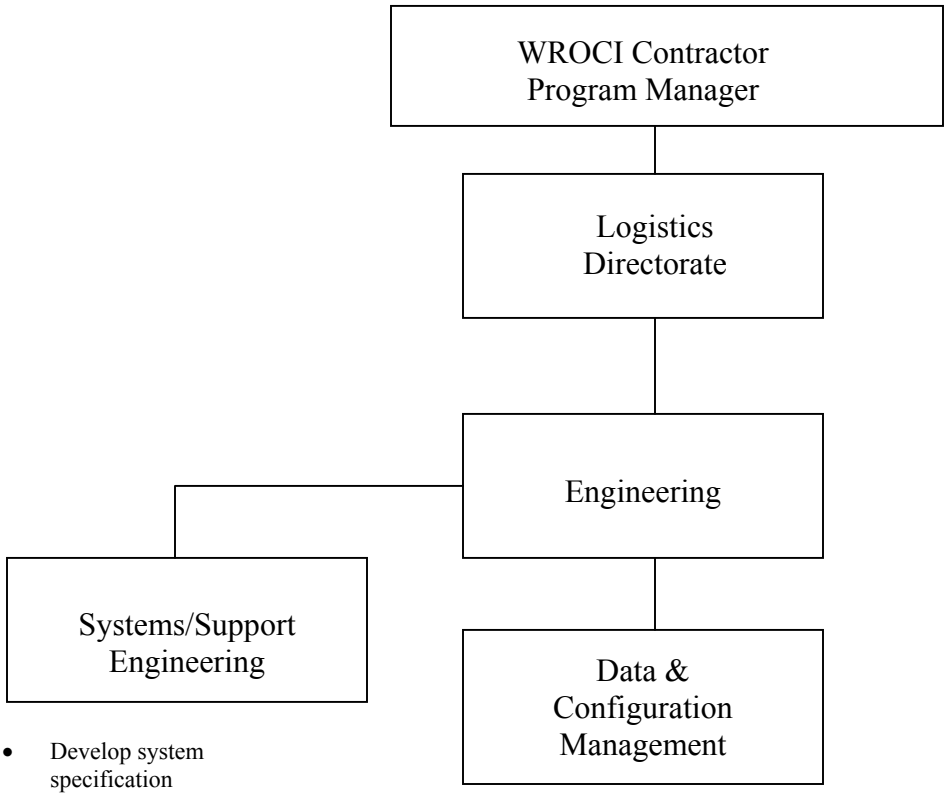

Figure 3-1 Configuration Management Organization and Functions

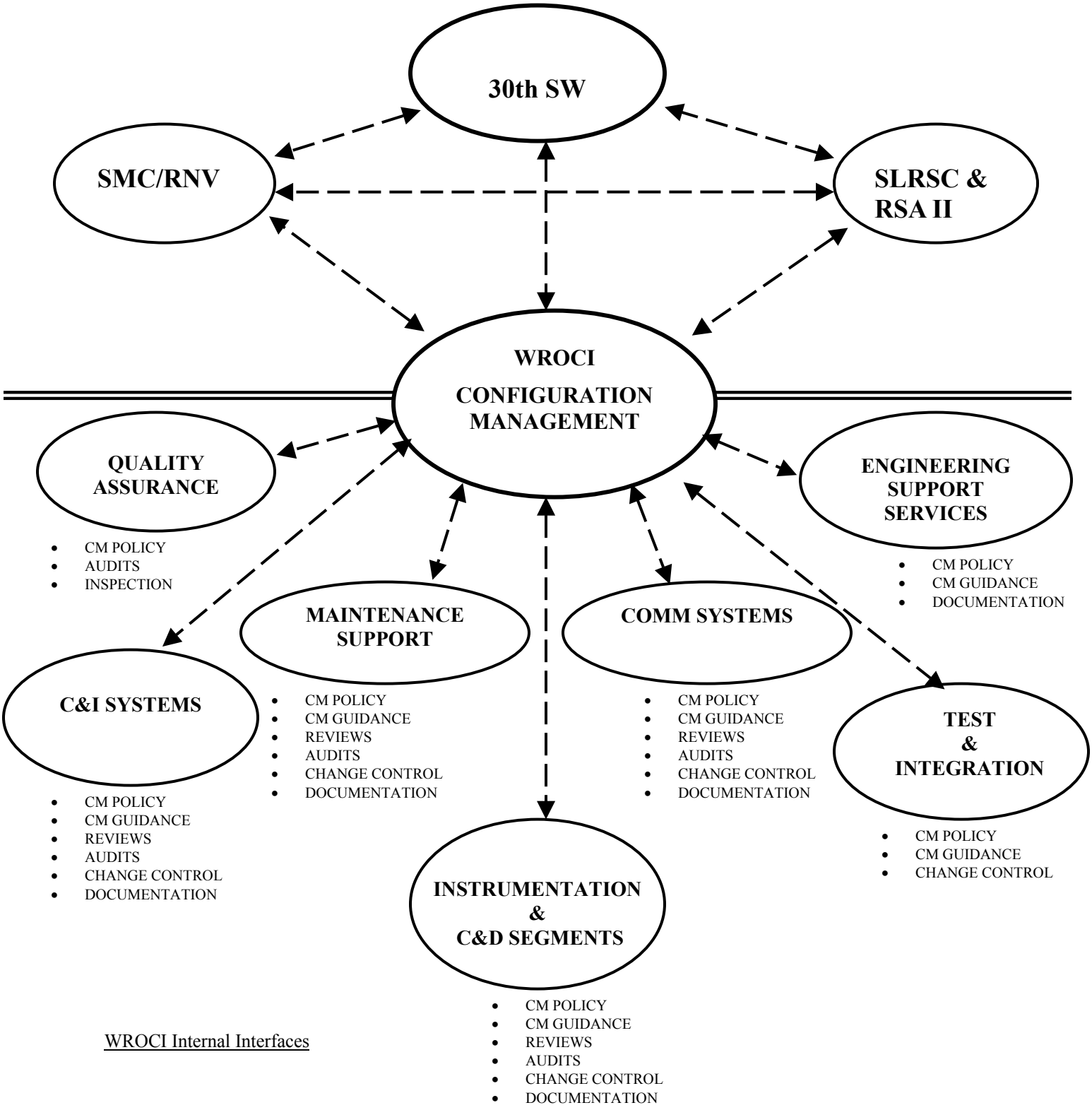

Figure 3-2 Configuration Management Interfaces

4. CONFIGURATION MANAGEMENT PHASING AND MILESTONES

4.1 Baselines

Baselines will be employed throughout the life cycle of a Configuration Item (CI) and Computer Software Configuration Item (CSCI) to ensure an orderly transition from one major commitment point to the next in the system engineering process. WROCI CM will use three baselines: functional, allocated, and product, as shown in Figure 4-1. This figure reflects the relationship of the life cycle phases of conceptual, validation, development, production and operation to the three baselines.

The description of a specific baseline will be provided through technical documentation (specifications, drawings, parts lists, computer listings, and other documentation), which will define technical performance, functional requirements, and physical characteristics of the CI/CSCI. This technical documentation will provide the necessary degree of visibility to ensure the orderly development of CI/CSCI in compliance with stated requirements. Baselines and approved changes to baselines will constitute the current "as-built" configuration identification.

WROCI CM will provide necessary documentation required to update SRC's baselines prior to changing configuration.

4.1.1 Functional Baseline

The functional baseline is the initial approved functional configuration identification.

WROCI will use the functional configuration identification to prescribe:

a. All necessary functional characteristics.

b. Test data reviewed and verified as required and demonstrates development of specified functional characteristics have been completed satisfactorily.

c. Identification of necessary interface characteristics that are associated with applicable CIs/CSCIs.

d. CI's/CSCI's key functional characteristics and key lower level CIs/CSCIs are identified and documented.

e. Design constraints, product specification, and interface specifications are identified and documented, (such as envelope dimensions, component standardization), for future use of inventory items and integrated logistics support policies.

This baseline, when required, will be documented by performance-oriented system, system/segment specifications and will serve throughout CI's/CSCI's life cycle as a description of its required functional characteristics.

4.1.2 Allocated Baseline

The allocated baseline is the initial approved allocated configuration identification.

WROCI CM will provide the allocated configuration identification, in performance-oriented specifications governing the development of configuration items that are part of a higher-level CI/CSCI, in which each specification:

a. Defines the functional characteristics that are allocated from those of the higher level CI/CSCIs.

b. Establishes testing requirements to demonstrate achievement of their allocated functional characteristics.

c. Delineates necessary interface requirements with other associated configuration items.

d. Establishes design constraints, if any, such as component standardization, use of inventory items, and integrated logistics support requirement.

This baseline will be documented by performance-oriented configuration item development, software requirement and interface requirement specifications. Commercial-Off-the-Shelf (COTS), HW and SW, will be described and baselined with commercial documentation.

4.1.3 Product Baseline

The product baseline is the initial approved or conditionally approved product configuration identification.

WROCI CM will use the product configuration identification to define the configuration of a CI/CSCI during the production, operation, maintenance, and logistics support phases of its life cycle, and to prescribe:

a. All necessary physical or form, fit, and function characteristics of a CI/CSCI.

b. Select functional characteristics designed for production acceptance testing.

c. Production acceptance tests.

This baseline will be documented in the as-built configuration for form, fit, and function; and acceptance tests contained in drawings and product specifications.

4.2 Engineering Drawings, Specifications, and Associated Lists

WROCI CM will use engineering drawings and associated lists, technical drawings, installation specifications, and interface control drawings to develop baselines. CM will use applicable standards in the development of the baselines.

4.3 Specification Tree

WROCI CM will develop/maintain the Configuration Item Tree for identification of CIs and CSCIs on Launch Communications, C&I Operations, and VESS. This documentation and new documentation, including baseline identification changes, will be used for site audits to validate the existing configuration. WROCI will provide assistance to SRC in maintenance of their specification tree.

4.4 Documentation for Existing Systems

Baseline documentation does not exist for some CIs/CSCIs systems (Launch Communications, C&I Operations, and VESS) at the Western Range. Such documentation will be developed when necessary and requested by the Government. The documentation that does exist, such as the following, will be used as the baseline identification for applicable systems.

a. Specifications

b. Engineering drawings

c. Circuit layout records

d. Acceptance test procedures

e. Programming, users, and positional handbooks/manuals

f. Operating, maintenance, and parts manuals

g. Commercial documents

It is understood that some items listed would not normally be used as baseline documentation; however, they will be used when documentation does not exist.

4.5 Documentation for New Systems

Baseline documentation for new systems, (Launch Communications, C&I Operations and VESS), developed by WROCI CM, will be provided as specified in the engineering tasks. Authentication of the system level and allocated requirements specifications will establish the applicable baseline. Product

baseline will normally be established upon successful completion of Physical Configuration Audit (PCA) or when a PCA is not required, the authentication of the Product Specification (PS).

New documentation from contractors will be used to establish baselines when such documentation is turned over to WROCI CM. The quality or adequacy of the baseline identification (functional, allocated, product) will be determined by the documentation delivered.

4.6 Changes to Baseline Identification

Engineering changes proposed by WROCI CM and the resulting changes to approved baseline identifications will be submitted to 30 SW or SMC/RNV. CM will utilize ECPs, specification change notices (SCNs), notice of revision (NOR), drawings, and existing engineering documentation, to establish baseline identifications.

4.7 Documentation and Drawings

Requirements of MIL-STDs and WROCI CM procedures for document numbers are identified in CM's SOPs.

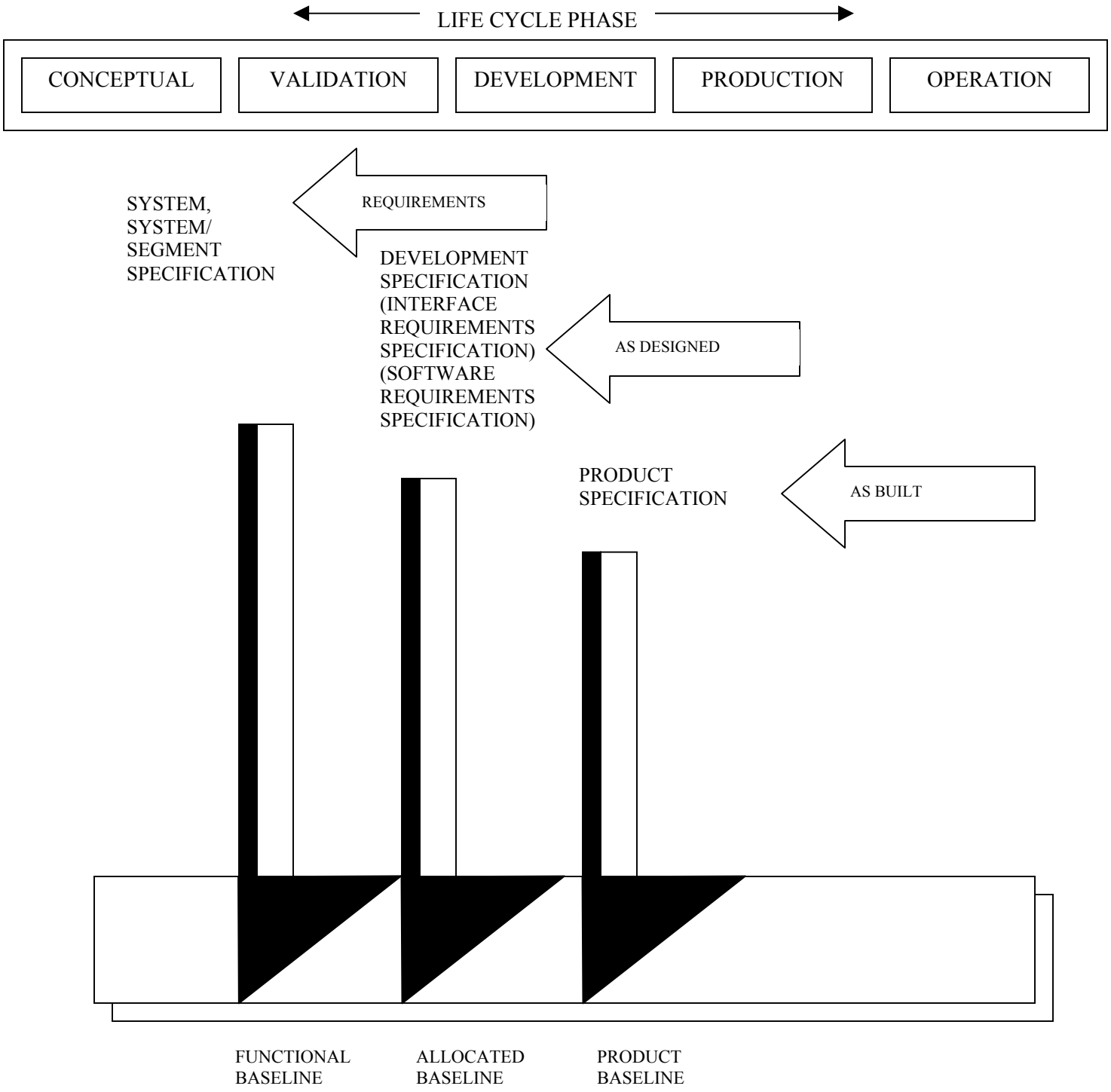

Figure 4-1 Baselines for System Development

5. CONFIGURATION IDENTIFICATION

Configuration identification is used to establish and describe a configuration baseline, and to document performance, qualification, fabrication, and compliance requirements for a CI or a CSCI under development. Configuration identification will be used as the basis for the preparation of technical, administrative, and management documents such as work breakdown structure, technical reports, and provisioning documents. This function will ensure that technical and administrative documents are current, approved, and available for use at the time needed. Configuration identification will be used as the basis for configuration control and status accounting throughout the CI's/CSCI's life cycle.

5.1 Central Documentation Repository

WROCI CM will develop a documentation repository that will support Launch Communications, C&I Operations, VESS and other contractors as needed.

5.2 Configuration Control Board (CCB) Responsibilities

5.2.1 WROCI

The 30 SW will chair the WROCI CCB responsible for Launch Communications, C&I Operations, and VESS. The WROCI CM will act as technical advisory and secretariat in the operation of the CCB and provide agendas, minutes and develop a database to track and report status of ECPs, deviations and action items for the CCB. The SRC will provide information to the CCB as necessary to avoid possible conflicts or impacts to WROCI's baseline. The WROCI CM will track ECPs that are boarded.

5.2.2 SLRSC

SMC/RN will chair the SLRSC CCB. WROCI CM will be a technical advisory member in attendance and in support of 30 SW. CM will provide information to the CCB as necessary and avoid possible conflicts or impacts. SLRSC CM will provide a viewable tracking database of all applicable ECPs effecting WROCI's systems.

5.3 CCB Minutes

The ECP is presented to CCB for Government approval and the decision by the CCB chairperson is recorded in the minutes. WROCI CM is responsible for compilation and distribution of the CCB meeting minutes and assigned actions carried out as a result thereof. The minutes will contain non-concurrence of any member and their official position on the proposed change, should that be in disagreement with the chairperson's decision.

5.4 Life Cycle Requirements

Configuration management supports the development and modifications of life cycle requirements for Launch Communications, C&I Operations, and VESS using specifications, test plan/procedures, test reports and manuals/handbooks. Any other configuration identification documentation required will be provided and/or maintained as needed.

6. CONTRACTOR INTERFACE

In support of the 30 SW, WROCI CM contractor will support and interface with SRC with documentation identification of all major component interfaces of each CI/CSCI.

7. CONFIGURATION CONTROL

Control will be exercised on baselines currently established for Launch Communications, C&I Operations, VESS, SRC, new systems development and baselines. New systems developed by other contractors that effects WROCI baselines will be reviewed to determine what documents are affected and require updating. All affected activities such as engineering, QA, security, environmental, safety and operations will participate in reviewing the proposed changes prior to submission to the Government.

7.1 Changes

Engineering Change Orders (ECO), waivers or deviations affecting the configuration of a CI/CSCI will be limited to those that are necessary or are of significance to the Launch Communications, C&I Operations and VESS. ECPs and Notice of Revisions (NORs) will be processed when affecting SRC baselines. Necessary or significant changes include those that:

a. Correct deficiencies.

b. Satisfy changes in operational or maintenance support requirements.

c. Affect substantial life cycle cost savings.

7.2 Engineering Change Proposal

An ECP will be prepared to propose changes to existing systems or to propose technical changes during work request efforts. All Class I ECPs are to be approved by the Government prior to implementation. The ECP will be a complete analysis of the impact of the changes on existing configurations and contractual obligations. The ECP will provide technical information in detail concerning changes required in the functional/allocated/product baselines.

7.3 Deviations and Waivers

Deviations and waivers for a CI or CSCI will be prepared and submitted to the Government for approval. Deviations and waivers will be treated as basic inadequacies to specification requirements.

Deviations will be used to depart from a particular performance or design requirement of a specification, drawing, or other document prior to production of an item.

7.4 Internal Review Board

WROCI CM will provide a centralized Internal Review Board (IRB) control group, to support the various engineering elements responsible for recommending and implementing changes to Launch Communications, C&I Operations, and VESS. This will provide the discipline that the system requires while permitting the efficiency of decentralized execution. The IRB will provide not only for policy and procedural review but also the internal CM evaluation of proposed changes prior to submission to the Government. The IRB will be responsible for the control of technical changes and interfaces, assignment of classification and priority to the ECP prior to submission to the Government for approval.

7.4.1 IRB Membership

The IRB membership will include representatives from all WROCI segments, (Launch Communications, C&I Operations and VESS). Also included in IRB membership are representatives from contracts, security, environmental, safety and QA. Members will represent their respective organizations and present their official position on agenda items. Management of WROCI CM will act as the chairperson of the IRB.

7.5 Change Evaluation

Every proposed configuration change affecting the as-built of a CI/CSCI will be critically evaluated. The evaluation of each proposed change will take into consideration all aspects of the changes on a CI/CSCI and the associated CIs/CSCIs with which it interfaces. Such aspects may include design, performance, reliability, maintainability, cost, schedule, operational effectiveness, safety, human factors, operational and maintenance support, transportability, and training. For a multi-application CI/CSCI, change proposal evaluation will consider the impact on all applications.

7.6 Change Implementation

Technical documentation requiring change or update will be issued in accordance with the approved schedule associated with the ECP. All documents will be kept current, either by changes on a regular basis or by timely revisions when appropriate. Positive control, effective distribution, and efficient utilization of change packages, technical data, and material are essential to support the approved changes.

Specification Change Notices (SCNs) will be included with ECPs. The guidelines for SCN will be as follows:

a. Configuration Item (CI) – SCNs will be completed and submitted with the ECP approval. This will be application to the system segment specification, development, software requirements, interface requirements specification and the product specification, once the product baseline has been established.

b. Computer Software Configuration Item (CSCI).

1. CSCI system/development software requirements, interface requirement specifications. SCNs will be completed and submitted with the ECP for approval by Government.

2. CSCI product specifications. Since the content of the product specification depends on completion of prerequisite design and development efforts, the exact content of the SCN cannot be determined when the ECP is submitted for approval. However, an SCN number for the product specification will be referenced in the ECP with descriptive information of what the SCN will entail. Subsequent to approval of the ECP and completion of the design and development effort, the SCN to the product specification will be completed and submitted for approval by Government.

8. CONFIGURATION STATUS ACCOUNTING (CSA)

All changes will be processed electronically and available to authorized users.

8.1 Configuration Item Development Record

The CI development record will provide status information (scheduled and completion dates) on the development progress of the CI as reflected by specification, review and audits, and qualification accomplishments. It will include a listing of ECPs/SCNs showing impact of the changes on related configuration items. WROCI will support Launch Communications, C&I Operations and VESS with change status documentation.

9. AUDITS

9.1 Configuration Audits

Configuration audits will be used to verify compliance with specifications and other system requirements. The WROCI CM audit function will validate that development requirements are met and that the design documentation is accurate and complete. Configuration audits may consist of a Functional Configuration Audit (FCA) and/or Physical Configuration Audit (PCA). These audits will vary in type, quantity, and depth in accordance with complexity of CI/CSCI development/modification. The tailoring concepts described in EIA-649 will be applied.

WROCI CM will be responsible for preparing for and conducting configuration audits and the Formal Qualification Review (FQR), which is usually completed with the FCA. CM will receive technical assistance from the CI/CSCI engineering element in preparation and presentation of the audits.

The necessity of audits will be determined on the merits of each CI/CSCI and the audits tailored accordingly. Depending on the need, only a PCA may be conducted, the FCA and PCA conducted jointly, or the audits may be done in detail and held separately. For minor tasks, it may be determined that a configuration audit is not required. The audits recommended by the configuration team will be included in project proposals and schedules and forwarded to the Government for approval. WROCI CM will participate in CM audits performed by SRC. See Figures 9-1 and 9-2, Audit flow diagrams

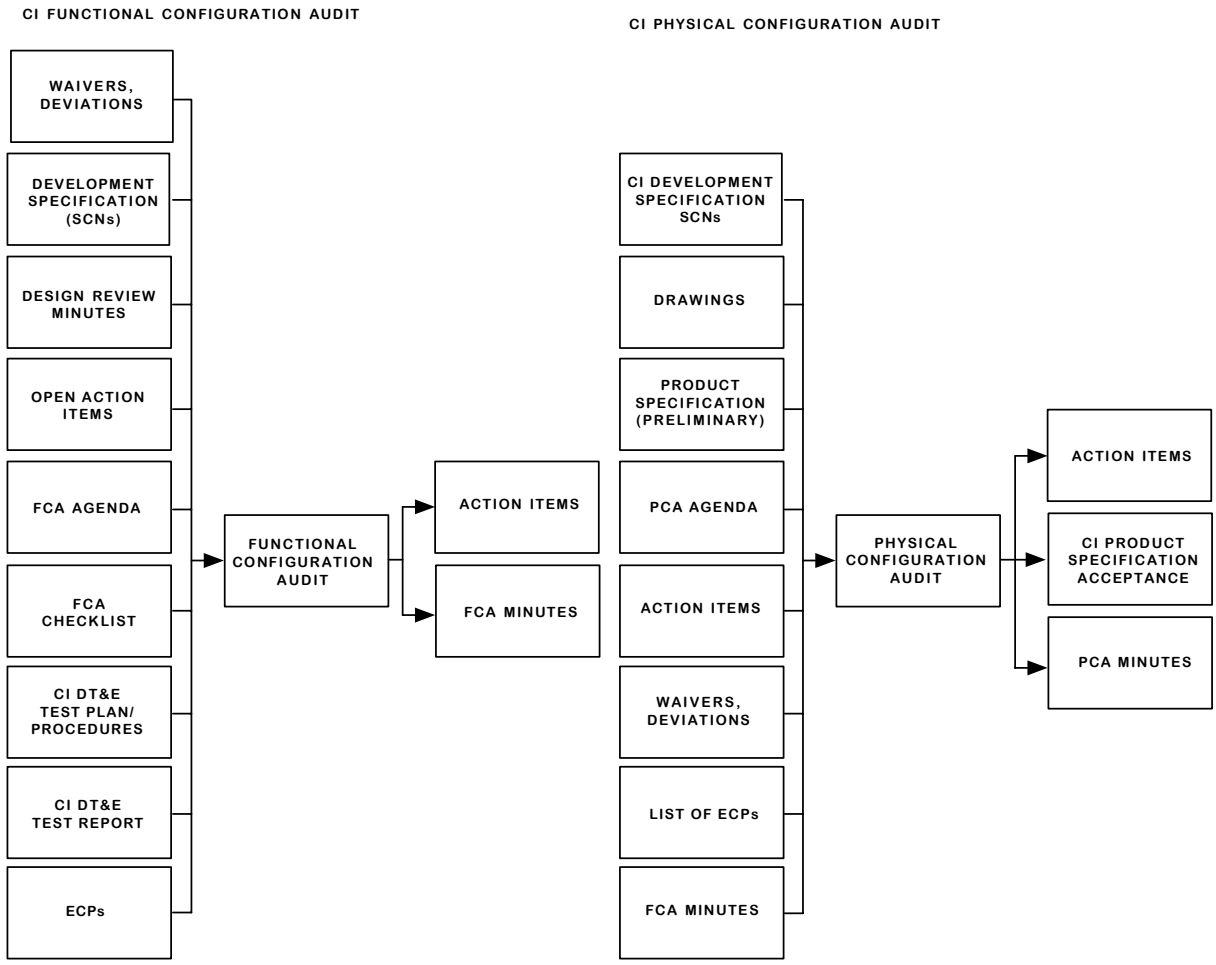

Figure 9-1 Hardware Items Typically Audited

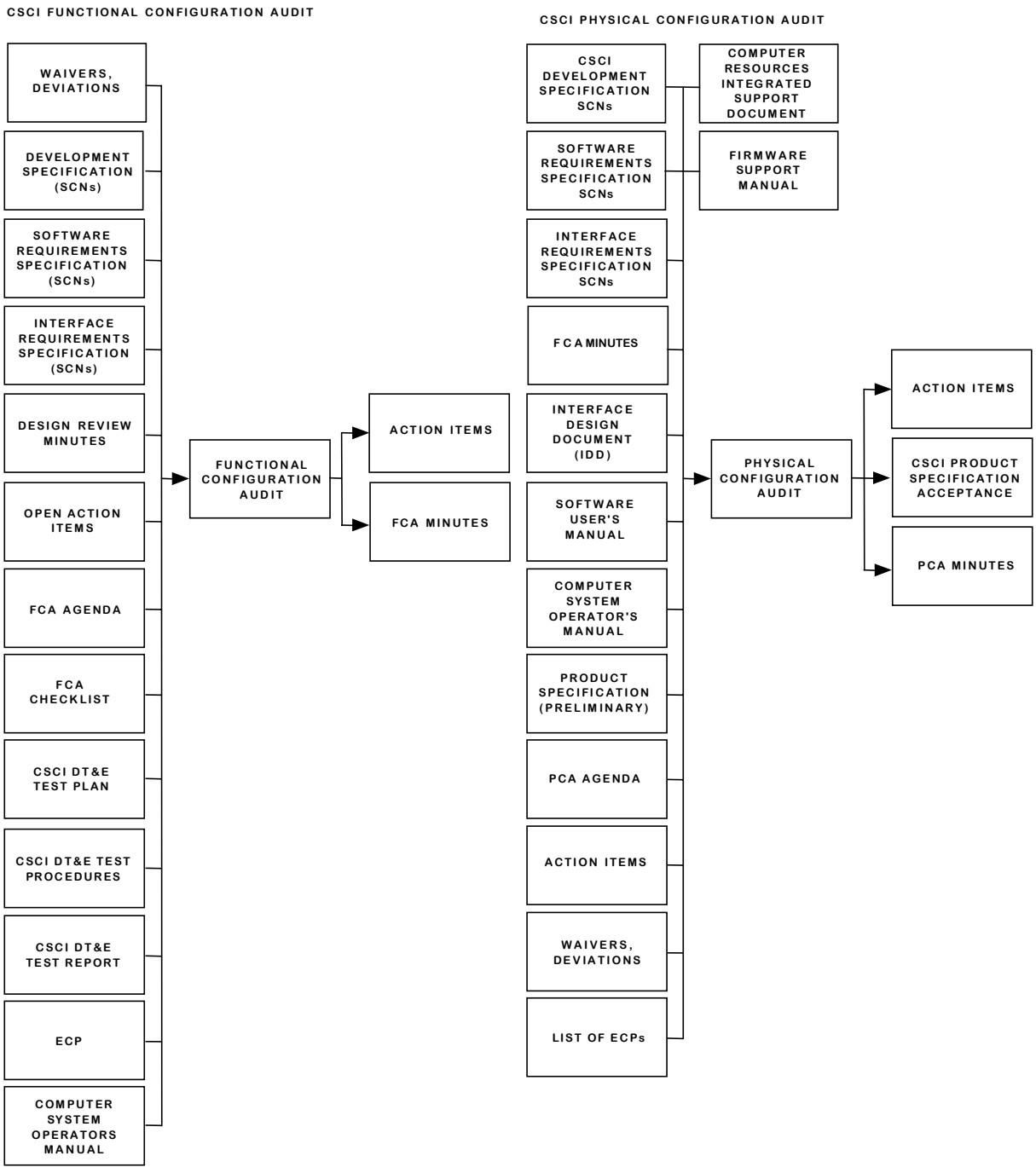

Figure 9-2 Software Items Typically Audited

10. SUBCONTRACTOR/VENDOR CONTROL

WROCI CM will include configuration management requirements in contracts with subcontractors and vendors to a level consistent with CM requirements in the basic contract.

Requirements for configuration management in a subcontract for items to be manufactured will include; specification drawings, test plan/procedures, manuals/handbooks and warranties. The complexity of each document will be tailored to impose only the requirements that are needed to ensure that the hardware/computer program will meet the established baseline configuration.

WROCI CM will support Launch Communications, C& I Operations, VESS and any other contractors with COTS, HW/SW documentation and any changes thereof.

Appendix A

List of Abbreviations and Acronyms

Term	Meaning
30 SW	30th Space Wing
ACC	Authorization for Configuration Change
C&I	Communications and Information
CCB	Configuration Control Board
CDRL	Contract Data Requirements List
CI	Configuration Item
CIP	Configuration Implementation Plan
CM	Configuration Management
CMP	Configuration Management Plan
COTS	Commercial Off-The-Shelf
CSA	Configuration Status Accounting
CSCI	Computer Software Configuration Item
ECO	Engineering Change Order
ECP	Engineering Change Proposal
FCA	Functional Configuration Audit
FQR	Formal Qualification Review
GFE	Government Furnished Equipment
HW	Hardware
IDD	Interface Design Document
IRB	Internal Review Board
MIL-STD	Military Standard
NOR	Notice Of Revision
PCA	Physical Configuration Audit
PS	Product Specification
QA	Quality Assurance
RSA IIA	Range Standardization and Automation, Phase IIA
SCN	Specification Change Notice
SDD	Software Design Document
SLRSC	Spacelift Range System Contract
SMC/RNV	Space and Missile Systems Center / Range Network Vandenberg
SOP	Standard Operating Procedure
SPO	Systems Program Office
SRC	Sustainment and Recapitalization Contractors
SW	Software

VESS	Vandenberg Electronic Security System
WR	Western Range
WROCI	Western Range Operations Communications and Information