

**JSP 886**  
**THE DEFENCE LOGISTICS SUPPORT CHAIN MANUAL**

**VOLUME 7**  
**INTEGRATED LOGISTICS SUPPORT**

**PART 8.12**  
**CONFIGURATION MANAGEMENT**



MINISTRY OF DEFENCE

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## CHAPTER 1 - INTRODUCTION

### CONTEXT

1. This part provides key points of policy and guidance in the Configuration Management of systems and equipment for through life support.
2. Configuration Management is the process of managing Products, facilities and processes by managing the information about them, including changes, ensuring they are to specification for their intended purpose.

### POLICY

3. It is MoD policy that Configuration Management will be carried out to the appropriate level, decided on a project, Product, system or equipment basis.
  - a. The CMP is to be coherent with the requirements set out in the AOF and SSE, and the guidance given by DES-SE DQA-POL-NAT2
  - b. Project decisions to deviate from MoD policy will be promulgated in the CMP.
  - c. All Projects shall carry out CM in co-operation with the stakeholders.
  - d. The needs of the users, maintainers and managers must be considered alongside the capabilities of the current and planned future support infrastructure.

### PRECEDENCE AND AUTHORITY

4. The authority to carry out Configuration Management is promulgated from Standing Instruction 07 – Support Solutions Management.

### MANDATED REQUIREMENTS

5. To meet the MoD's legal duty of care obligations, it is a requirement that accurate, accessible, relevant Product information is provided with all Products, systems and equipments.

### ENSURANCE AND ASSURANCE

#### Ensurance and Assurance

6. The details for ensurance on the configuration management Governing Policy are provided on the Acquisition Operating Framework (AOF), within the Support Solutions Envelope (SSE), Governing Policy 2.5.

Ensurance: is internal validation carried out by the project team as an assessment of the development of the support solution.

7. Configuration management is an element of the ILS process which is independently assured against Governing Policy 2.1. Guidance for Assurance can be found in JSP 886 Volume 1 Part 3 Support Solutions Envelope.

Assurance: Governing Policies are externally assessed by the Support Improvement Team, independently identifying risks to delivery and assisting in the provision of a coherent support solution.

#### Process

8. Guidance on configuration management is in the following chapters.

## KEY PRINCIPLES

9. The Five Key Principles of CM are: -
- a. Configuration Management and Planning.
  - b. Configuration Identification
  - c. Configuration Change Management.
  - d. Configuration Status Accounting.
  - e. Configuration Audits.

Note: These principles are defined later in this guidance document.

## ASSOCIATED STANDARDS AND GUIDANCE

Defence Standard (DEFSTAN) 05-57 Configuration of Defence Materiel.

Allied Configuration Management Publications (ACMP) 1-7

STANAG 4159 NATO Materiel Configuration Management Policy and Procedure for Multinational Joint Projects

STANAG 4427 Mutual Agreement to use the Allied Configuration Management Publication (ACMP) series.

ISO 10007:2003 Quality Management Systems – Guidelines for Configuration Management

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## CHAPTER 2 - CONFIGURATION MANAGEMENT (CM)

### PURPOSE

1. Configuration management, applied over the complete life cycle of a project, provides control and visibility of its performance, functional and physical attributes. Configuration management verifies that Product performs as intended and is identified in sufficient detail to support its projected life cycle (throughout CADMID), see Figure 1. For the purpose of these guidance notes, Product is defined as the result of a process; services; software; hardware; or processed materials (this is consistent with the definition of Product in ISO 9000 series).
2. The UK MOD policy on Configuration Management is to carry CM in accordance with DEF STAN 05-57 and further information on can be found in ISO 10007 (Quality management systems – Guidelines for configuration management), STANAG 4427 & 4159 for NATO applications and the Support Solutions Envelope (SSE) on the AOF website, Key Support Area 2, Guiding Principle 2.5.
3. The purpose and benefits of using a configuration management system are:
  - a. Defined requirements are controlled.
  - b. Product configuration information is documented and visible throughout the life cycle of the Product / project and a baseline for making changes is established.
  - c. To enable the configuration status and history to be continuously recorded and available.
  - d. Control the selection of Configured Items (CIs) that collectively define the Product.
  - e. To identify and record the physical and functional characteristics of the CIs.
  - f. Changes to requirements, Product, support publications, facilities and/or procedures are evaluated for their likely impact.
  - g. Changes are evaluated, recorded, authorised, verified and implemented by a controlled procedure.
  - h. Actual Product configuration is verifiable against the recorded physical baselines.
  - i. Product performance and functionality can be measured against the requirements.
  - j. It establishes records and controls Product CI interfaces, both internally and externally.
  - k. Configuration Management shall be maintained throughout the life of the project, Product, system or equipment.
  - l. The IPT leader is ultimately responsible for the implementation of CM policy for the duration of the project lifecycle and shall appoint a Focal Point to ensure effective application of CM principle.

4. Although mainly engineering derived, CM must be used throughout an entire organisation to ensure that all information available and Product used is current, verified and validated.

5. Five Key Principles of CM are (which are defined later):

- a. Configuration Management and Planning.
- b. Configuration Identification
- c. Configuration Change Management.
- d. Configuration Status Accounting.
- e. Configuration Audits.

## CONFIGURATION MANAGEMENT AND THE CADMID MILESTONES

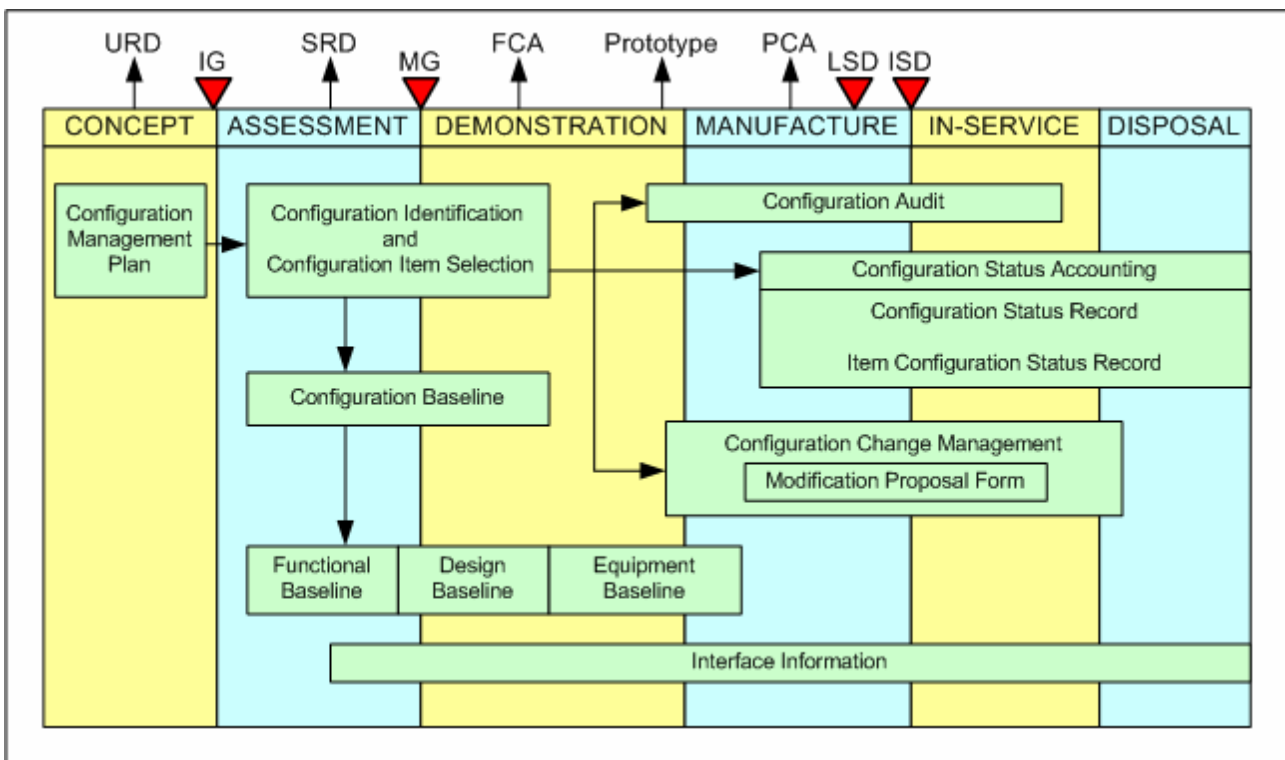


Figure 1: Configuration Management in the CADMID Cycle

6. The following milestones in the CADMID cycle shall have these CM documents or processes in-place.

- a. **User Requirements Document (URD).** The configuration of the URD shall be managed throughout the life of the Product / project.
- b. **Initial Gate (IG).** A configuration management plan shall be written.
- c. **System Requirements Document (SRD).** The configuration of the SRD shall be managed throughout the life of the Product / project.
- d. **Main Gate (MG).**

- (1) The configuration management plan shall be implemented and updated.
- (2) An Product structure shall be implemented.
- (3) A method of identification of configuration items shall be established.
- (4) Configuration items (CIs) shall be selected.
- (5) The initial design baseline shall be established.
- (6) Test parameters for acceptance of the Product shall be defined.
- (7) Interfaces with other Products, equipment or platforms shall be considered.
- (8) Requirements for Functional Configuration Audits shall be detailed.

**e. Logistic Support Date (LSD) and In-Service Date (ISD).**

- (1) Functional Configuration Audits (FCAs) shall be carried out; ensuring design baseline meets requirements.
- (2) Configuration status account system operational.
- (3) Configuration change management procedures shall be incorporated.
- (4) The Product baseline shall be established.
- (5) Physical Configuration Audits (PCAs) shall be carried out.



## **CHAPTER 3 - ROLES & RESPONSIBILITIES**

### **THE INTEGRATED PROJECT TEAM (IPT) – GENERAL**

1. The IPT shall ensure the effective application of the CM principles and practices are defined and accepted by all stakeholders throughout all phases of the acquisition cycle.

### **THE IPT LEADER (IPTL)**

2. The IPTL is ultimately responsible for the implementation of CM policy for the duration of the project lifecycle. The IPTL shall operate within the personal letter of delegation for managing Product quality, configuration and logistics. Where there is further delegation of these responsibilities the IPTL shall ensure that staff are competent and have at their disposal the necessary resources to carry out their tasks.

### **THE IPT CM FOCAL POINT (CMFP)**

3. The CMFP shall support the IPTL by ensuring the effective application of CM principles by IPT personnel and stakeholders. CMFP activities in the IPT will have signed and agreed terms of reference and delegations from the IPTL.

4. The CMFP is responsible for ensuring development, implementation and operation of a documented strategy for managing the configuration of a project.

5. The CMFP is responsible for the development of this plan, including the measurement of effectiveness of the plan in achieving stated aims and objectives, which is consistent with the Through Life Management Plan.

6. The CMFP is responsible for ensuring that configuration management requirements are clearly defined, achievable and translated into appropriate project documentation including measurable acceptance criteria.

7. The CMFP is to liaise with Project Risk manager to ensure those identified CM risks are included in the Project risk register and managed accordingly.

### **THE SUPPLIER**

8. The Suppliers responsibility is to fulfil the contractual CM requirements including all sub-contract CM activities in an economic and effective manner. Also, that C controls are developed in conjunction with other functions necessary to fully satisfy the requirements of the contract and its conditions/references. It is the suppliers' responsibility to ensure that their CM controls continue to be effective.

### **THE END USER**

9. The end user is responsible for the operation of the equipment.

The end user may identify and propose equipment modifications that will improve operational performance. Only in instances of operational commitments will the end user implement unauthorised modifications.

### **DEFENCE QUALITY ASSURANCE (DQA) POLICY**

10. DQA Policy will maintain the relevance of CM standards and ensure they are in line with current philosophy and best practise. They will promote discussion and carry out policy improvement reviews in order to ensure that standards are up to date and reflect

what the MOD intends and needs. They will ensure that CM functional competences are addressed in current training courses (See CM Functional Competences section)

## CHAPTER 4 - CONFIGURATION MANAGEMENT & PLANNING

1. In order to implement an effective CM process it is necessary to first undertake a rigorous planning exercise. The aim being to plan and manage the CM process such that it delivers the outputs expected when required. Configuration Management and Planning should be undertaken initially by the Project and then the Supplier, upon contract award.

2. The Configuration Management Plan (CMP) details how configuration management will be accomplished and how consistency between the Product's configuration records and the Products configuration is achieved, maintained and verified throughout the entire life cycle.

### GENERAL

3. Planning for the Configuration Management of Products and their interfaces, is essential. The plan will define the organisation and procedures used to manage the configuration, both functional and physical, of the Product, and the configuration items throughout the life of the project.

4. A well-documented (CMP) will clearly and concisely detail the processes and is useful both for training purposes and explaining the process to customers, quality assessors and auditors.

### OBJECTIVES AND BENEFITS OF A CONFIGURATION MANAGEMENT PLAN

5. The main objective of a CMP is to formally define how CM is to be carried out and detail the processes used to ensure that the Product's functional and physical characteristics conform to the requirements, throughout the life cycle of the project.

6. A well documented, and maintained, CMP is extremely valuable in correlating the application of configuration management to the ISO 9000 quality management system criteria, and explaining the process to customers and auditors. It is also useful for ensuring that personnel have appropriate training in the system / equipment and for the justification of resources and facilities.

### TYPICAL TABLE OF CONTENTS OF A CONFIGURATION MANAGEMENT PLAN

7. This table of contents is a guide to a typical CMP, and must be tailored to suit the requirements of the CM of the project. The suggested contents of the sections, although detailed, are not exhaustive and a particular project may have some CM issue not noted. Also, some of the suggested inputs to the CMP will not be required by all projects, and should be omitted.

1. Introduction
- 1.1. Purpose and scope
- This section shall:
- Define the purpose and scope of the CMP and the extent of the CM to be applied to the activities associated with the project and Product;
  - Detail the security instructions that are specific to CM, which must reflect the requirements of the Security Management Plan.
  - Contain information on any special features of the materiel, or the project programme, which have a bearing on CM.
- 1.2. Background

	<p>Gives an overview of the key contents and structure of the CMP, the Product and the project.</p>
1.3.	<p>Benefits</p> <p>Detail the benefits of following the CMP.</p>
2.	<p>Organisation and responsibilities</p>
2.1.	<p>Organisation</p> <p>Details the project's organisation and lists the points of contact in the project involved with CM.</p>
2.2.	<p>Policies, Directives and Procedures</p> <p>Lists or details the policies and procedures used by the project for the CM of the Product.</p>
2.3.	<p>Roles, Responsibilities and Resources</p> <p>Details the roles and responsibilities of the Configuration Management Team (CMT) and the Configuration Control Board (CCB).</p> <p>Identifies the relationships among the Products organisations, including the authority, supplier, sub-suppliers, design authority, suppliers in the provision of CM.</p> <p>Identifies the Configuration Change Management (CCM) authority, and the change process, at all time throughout the project's life cycle.</p> <p>Identifies the facilities such as, technical data models, databases and information systems with direct and indirect implication for the Products CM.</p>
3.	<p>Programme and Project Management</p>
3.1.	<p>CM Schedule and Milestones</p> <p>This section shall detail the schedule and list the CM milestones of the project and the Product, taken from the project management database.</p>
3.2.	<p>Risks</p> <p>This section shall define the risks for CM, and define any mitigation required.</p>
3.3.	<p>Constraints</p> <p>This section shall define the constraints on the CM of the Product.</p>
3.4.	<p>Assumptions</p> <p>This section shall define the assumptions made when developing the CMP.</p>
3.5.	<p>Dependencies</p> <p>This section shall define the dependencies of the Product and what the Product is dependent on.</p>
3.6.	<p>Under Contractor Control (UCC) to Under Ministry Control (UMC) hand-over</p> <p>Details the plan for the hand over of the CM information from the supplier to the ministry.</p> <p>Projects may contract for the supplier to manage the CM information throughout the life of the project.</p>
4.	<p>Contract</p> <p>This section should identify the:</p> <ul style="list-style-type: none"><li>• Contractual CM requirements and the role of the CMP as part of these requirements, including any specific controls to ensure compliance with the additional requirements for Air, Land or Maritime systems;</li><li>• Means of reporting difficulties in complying with the CM requirements in the contract.</li><li>• Methods used to ensure that any vendor or sub-supplier is supplying equipment or Products that conform to the CM requirements.</li><li>• In some occasions, the supplier may not be capable of conforming to the CM policy, e.g. due to inexperience or size. In these cases, the Project shall assume</li></ul>

control of the CM procedures.

## 5. Configuration Management Tasks

This section shall detail the CM tasks.

### 5.1. Selection of Configuration Items (CI)

This section shall contain sufficient information to meet the requirements of how to select a configuration item – see configuration items.

### 5.2. Configuration Item Identification

This section shall detail how the Configuration items will be identified.

To utilise the military supply this will be NSN, but the design authority will use its own numbering system.

See configuration identification for more details.

### 5.3. Configuration Change Management (CCM)

This section shall define the requirements of:

- Change Control
- Change Classifications
- Change Control Forms
- Problem Resolution Tracking
- System Change Requests
- System Change Requests Priorities
- Configuration Management Libraries
- Release Management
- Version Control

For more details on CCM – see Configuration Change Control

### 5.4. Interface Control and management

This section shall include:

- The arrangements for the use of non developmental items (NDI) and government furnished Information (GFI) and Government Furnished Equipment (GFE);
- Details of other projects and Products which may be affected by changes to the Product CIs and arrangements for the co-ordination and exchange of information;
- Methodologies to be adopted for the identification, control and documenting of equipment external interfaces;
- Relationships between databases for co-ordinating CM between Products and different equipment at the platform or system level;
- Arrangements for co-ordination with other project requirements, e.g. standardisation, codification and LSA (Logistic Support Analysis).

NOTE – Maritime combat system projects use the SiCA database for sharing of interface information between Products when used on a single platform, see DEFSTAN 21-13 for full details.

### 5.5. Configuration Status Accounting

This section shall define how the project will ensure that the configuration activities are managed throughout the life cycle of the project and should reference the processes for collecting, recording, processing and maintaining all Product configuration information.

It shall include details on:

- Formats and data elements for all configuration documentation;
- Specification, outline, installation and information drawings, where relevant.

- Design review records and certificates;
- Concessions;
- Computer software documentation;
- Proposed authorised change proposals;
- Correlation of change proposals on interfacing CIs;
- Formal review periodicity and the means for being viewed remotely by all authorised personnel;
- Archive and Retrieval of all Product configuration information.

For more information, see configuration status accounting.

#### 5.6. Baseline Management

This section shall define how and when baselines will be established and the contents of the:

- Functional Baseline
- Design Baseline
- Development Baseline
- Product Baseline

For more details see Configuration Baselines

#### 5.7. CM Repositories and Data Management

This section will describe the tools and methodologies for storing / handling the configuration management information and should cover:

- Description of all data media;
- How the management of data shall be controlled and verified throughout the Product life cycle;
- Data ownership at working and organisational levels;
- Technical publication and user data;
- Data storage details, including access / limitation to data and prevention of data loss;

#### 5.8. Support Software

This section describes how any software will be configuration managed and how this is related to the hardware.

#### 5.9. Configuration Auditing

This section shall describe how configuration audits will be managed, including; -

- Procedures for carrying out the Functional Configuration Audits (FCA) and the Physical Configuration Audits (PCA);
- Format for the reporting of the results of the FCA and PCA;
- Proposed schedules for the conducting of the configuration audits, including the relevant design reviews up to hand over to UMC.

For more information see – configuration audits.

### 6. Configuration Documents Maintenance

This section shall detail the instructions for the management of CM documents, including the CMP, with the means and methods of review, change control, change authority, approved signatures, publication and issue.

### 7. Training

This section shall describe how training requirements will be identified, developed, carried out and ensure that training meets requirements.

### 8. Appendices

#### 8.1. Glossary of Terms

8.2. Acronyms and Abbreviations

8.3. Reference Documents

Detail the reference specifications, standards, manuals and other publications applicable to the CM of the project and Product. Each document shall be completely identified by title, document number, version number, issuing authority and date of issue.

## CHAPTER 5 - CONFIGURATION IDENTIFICATION

1. The application of CM controls at a system level rarely results in effective control. For this reason, it is normal to produce a Product Breakdown Structure (PBS) and then review the PBS to identify those assemblies, sub-assemblies and components for which the control of functional and physical characteristics are critical to Product performance, safety, quality, supportability etc. The output from the PBS review is a listing of assemblies, sub-assemblies and components that will be subject to CM practices throughout the Product life cycle. These items are known as Configured Items (CI's)

### PRODUCT STRUCTURE

2. The Product structure shall detail the hierarchy of a Product. It is a representation of the physical or functional structural breakdown (usually the structural breakdown is used) of a complex Product.

3. It shall be detailed down from the end item, which must conform to the Products' requirements. Each level of the structure will reference configuration documentation (e.g. – design data, operational information, maintenance procedures, storage requirements and training requirements). The diagram shows a top-down Product structure, highlighting the relationships of the assemblies, sub assemblies and components that make up the system.

4. Figure 2 shows a graphical example of a Product breakdown structure.

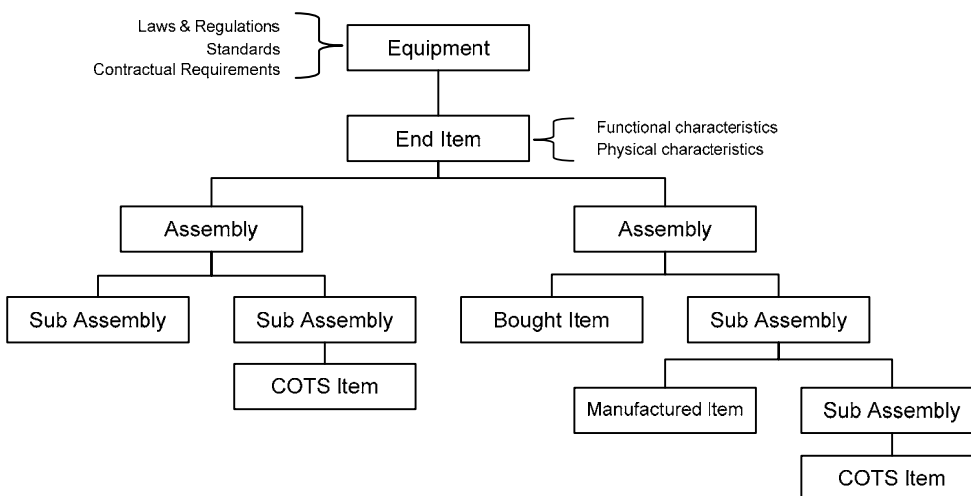


Figure 2: Example of a Product structure

5. Each item will require its own Product Configuration Information, which includes Product Definition Information and Product Operational Information. This defines the Products requirements; design information; utilisation and maintenance documentation; storage and handling requirements; training information and other information as required by the Products and project.

### CONFIGURATION ITEM IDENTIFICATION

6. Configuration Identification (CI) is defined as “The selection of configuration items and their interrelationships that shall describe the Product structure. The output from the



CI exercise is a Product Breakdown Structure and a list of assemblies, sub-assemblies and items that require configuration management”.

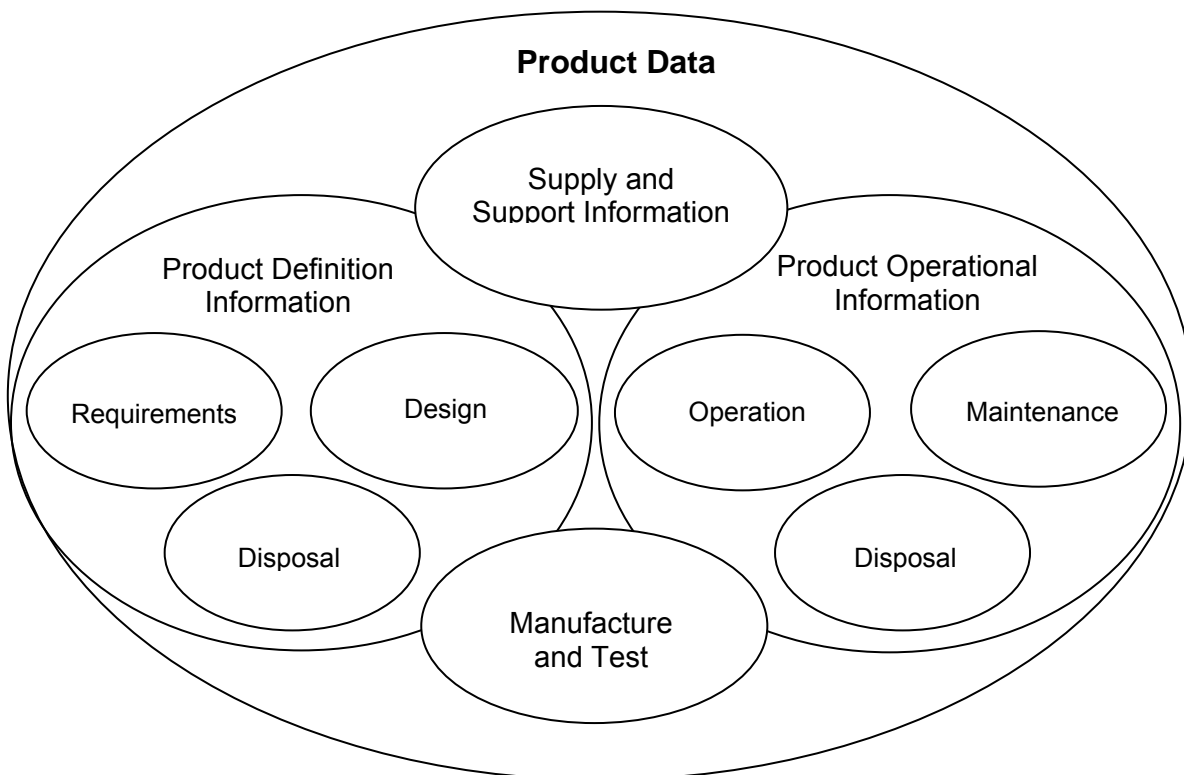
7. While identifying CIs the following topics must be taken into consideration:
  - a. Define Product structure and select sub-elements to be managed.
  - b. Assign unique identifiers.
    - (1) Adopt a structured numbering system that can trace physical or functional dependencies through the hierarchy
    - (2) Assign serial and lot numbers, as necessary, to differentiate individual units and groups of units, respectively
    - (3) Control of all variants or issues of each Product and possible fit of CIs
    - (4) NATO Stock Numbering
  - c. Marking of Products
    - (1) Where-ever possible Products shall be marked or labelled with the NSN; the manufacturer's reference/part number; variant number
    - (2) or, at least be identifiable by some appropriate method
  - d. Define Products attributes:
    - (1) Functional parameters.
    - (2) Physical parameters.
    - (3) Interfaces with other items and Products.
    - (4) Life of Products.
  - e. Conduct review and co-ordination of configuration documentation and if required obtain customer review and approval.
  - f. Establish release process; release configuration documentation; authorise use.
  - g. Baseline configuration documentation for internal design control and, as applicable, for customer configuration change management.
  - h. Ensure marking or labelling of Products and documentation with applicable identifiers enabling correlation between the Products, configuration documentation and associated data.
  - i. Select configuration documentation types and formats.

## **PRODUCT CONFIGURATION INFORMATION**

8. ISO 10007 states that “Product configuration information comprises both Product definition and Product operational information” and that “Product configuration information should be relevant and traceable.”

9. To comply with the ISO, all physical and functional information necessary to define a CI throughout its life shall be documented. This Product Configuration Information will consist of the Product Definition Information and the Product Operational Information. It shall be relevant and traceable and a numbering convention shall be established that ensures control of CIs. This numbering system shall take into consideration the existing numbering conventions, i.e. NSNs, document control systems and any relevant Project system.

10. The illustration below shows the generic categories of Product information and how they relate. The two major sets of information are configuration documentation and operational information. Only Product information necessary for control and correlation of Product attributes is included in the Product's configuration documentation.



11. The **Product Definition Information** is defined in ISO 10303 as the information that completely, and unambiguously, defines a Product's requirements, structure, geometry, properties and attributes. It provides the authoritative source for configuration definition and control.

## REQUIREMENTS

12. The [URD](#), [SRD](#) and change requirements are part of the Product's configuration information and must be recorded and updated throughout the life of the project. These will include:

- a. Verification and Acceptance criteria (how the achievement of the requirement will be tested – Integrated Test Evaluation and Acceptance ITEA )
- b. Key User Requirements (KURs)
- c. User Requirements

## DESIGN INFORMATION

13. Design information, or drawings, define the functional and physical characteristics of a Product and how the test and acceptance parameters of the Product meet the requirements. These will include:

- a. Functional design information.
- b. Physical design information (engineering drawings, parts lists/catalogue).
- c. Test and Acceptance parameters (how to measure that the Product's design meets the specified requirements)

## MANUFACTURING INFORMATION

14. Product configuration information during the manufacturing phase includes the information necessary to manufacture the Product. Any test results / records / concessions arising during the Production process will be recorded

## SUPPLY AND SUPPORT

15. The Product configuration information will need to include information and records on:

- a. Storage requirements / records (e.g. temperature and environment conditions).
- b. "Special to type" storage requirements.
- c. Handling requirements / records (e.g. lifting procedures; damage/incident records).
- d. Life requirements / records (e.g. shelf life; run-time; hours fitted; days in water).
- e. Location.
- f. Interchangeability.
- g. Usage rates.
- h. Procurement information.
- i. Transportation requirements / records.

Note 1: This list is not exhaustive.

Note 2: The information needed for the asset management and tracking system will be derived from the Product configuration information.

16. The **Product Operational Information** is defined in ISO 10303 as the information developed from Product definition Information and used to test, operate, maintain and dispose of the Product.

## OPERATIONAL INFORMATION

17. Operational information is derived from the Product's configuration information. It includes all information needed to operate the Product; operational manuals / procedures results of any testing; defect reports; and concessions.

## **MAINTENANCE INFORMATION**

18. Maintenance information is derived from the Product's configuration information. It includes all information needed to maintain the Product; maintenance manuals/ procedures / schedules; and test procedures.

## **DISPOSAL INFORMATION**

19. Disposal information is derived from the Product's configuration information. It includes all the information required to dispose of the Product.

## CHAPTER 6 - CONFIGURATION ITEM (CI)

1. A Configured Item is defined in ISO 10007 as an “aggregation of hardware, software, processed materials, services or any of its discrete portions that is designed for configuration management and treated as a single entity in the configuration management process.”

### SELECTION OF CONFIGURATION ITEMS

2. The selection criteria for CIs shall include, but is not limited to:

a. Safety.

- (1) Where the failure of the CI causes a risk to personnel safety.
- (2) Where the failure of the CI would affect the safety of the Product.

b. Criticality

- (1) Where the sole failure of the CI causes Product failure.
- (2) Where the failure of the CI would critically affect the system, causing the system to become unavailable or unable to achieve mission objectives.
- (3) Where the CI is important to the operation of the Product.
- (4) Where the CI is important for interfaces to one, or more, other systems.

c. Complexity

- (1) Where the CI is complex or an integral part of the system.
- (2) Where the CI has a long lead-time for manufacture.

d. Costs and purchasing functionality and performance.

- (1) Items which are difficult to procure or manufacture relative to state-of-the-art techniques.
- (2) Items which are used in large quantities (typically, at least 10 per cent of the configured items electronic parts count).

e. Functionality and performance

- (1) Where the failure of the CI would affect the system causing the system to become unavailable or unable to achieve mission objectives, or cause extensive/expensive maintenance and repair.
- (2) Where the failure of the CI would prevent the acquisition of data to evaluate system safety, availability, mission success, or need for maintenance/repair.
- (3) Where the failure of the CI has stringent performance requirement(s) in its intended application relative to state-of-the-art techniques for the item.

- f. Integration, Interchangeability and status as a replaceable item
  - (1) Items that are used in more than one position in a Product.
  - (2) Items that are used in more than one Product or project.
  - (3) Products, where items at different issues are interchangeable, but control is required.
  - (4) Products, where items at different issues are incompatible.
- g. Integrated Logistic Support (ILS).
  - (1) Items that have a known operating life, shelf life, or environmental exposure. This could be vibration, thermal, or a limitation which warrants controlled surveillance specified conditions.
  - (2) Items which are known to require special handling, transportation, storage and/or test precautions.
  - (3) Items that have a limited and predictable useful life and could be considered for replacement on a pre-planned basis for reliability, safety or economic reasons.

## CHAPTER 7 - CONFIGURATION CHANGE MANAGEMENT

1. ISO 10007 defines change control as “activities for control of the Product after formal approval of its Product configuration information.”
2. Figure 3 is a generic configuration change control process, which will evaluate; implement; verify and record changes to a Product or its related documentation.
3. Changes may be required due to problems being reported during test, operation or maintenance or a change to regulations. The example of a change request form and how to complete the form is detailed in the Example Modification Proposal Form at Annex A; also see DEFSTAN 05-57.

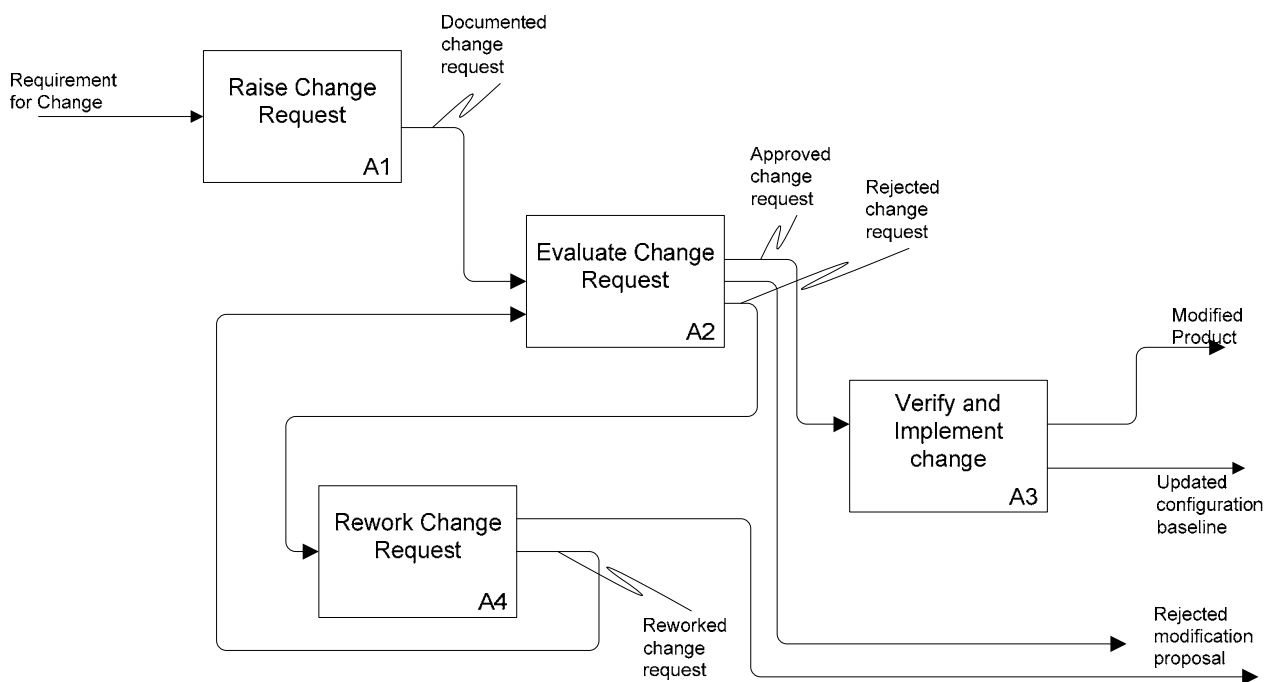


Figure 3: Configuration change process

4. The following is a sample of reasons for implementing a change request:
  - a. Improvements to safety / risk elimination.
  - b. Changes to legislation.
  - c. Improvements to Product performance.
  - d. Provide new capability requirements.
  - e. Obsolescence of Products or equipment.
  - f. Availability of spares.
  - g. Insertion of new technology.
  - h. Correct defects (both preventive and corrective).
  - i. Improve Product support.

NOTE – When a change to a Product causes the fit, form or function to change, then the Product will require a new NATO Stock Number.

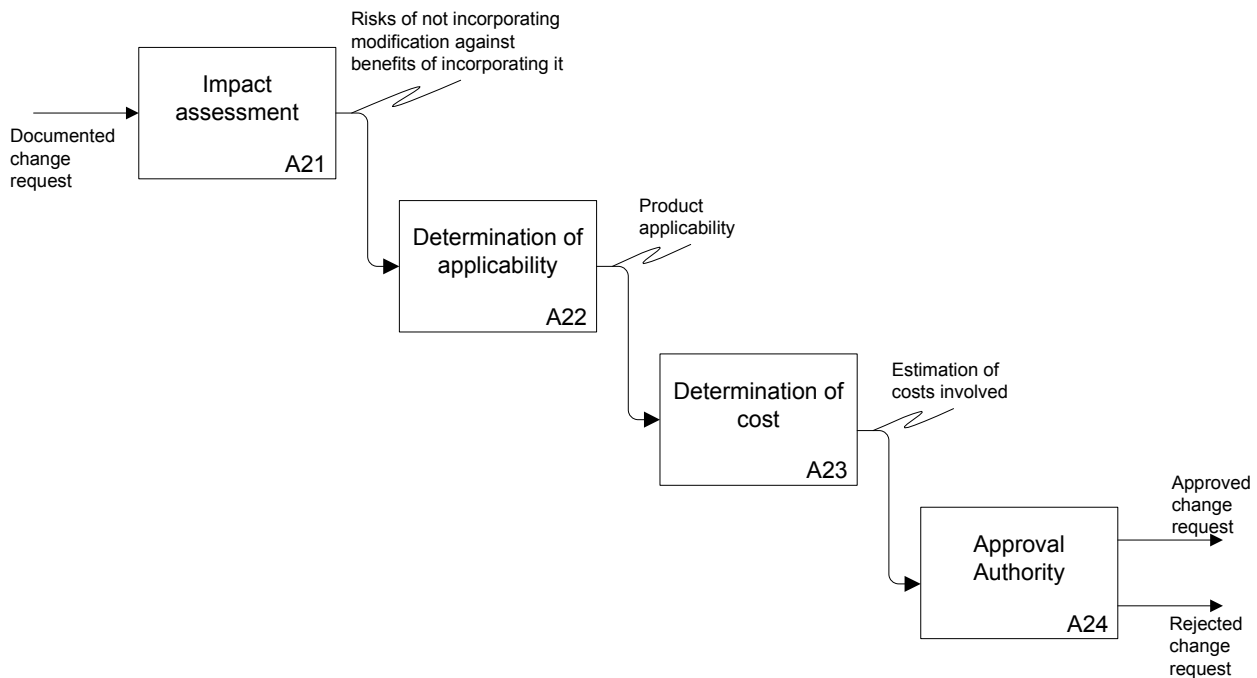


Figure 4: Evaluation process

5. Figure 4 Evaluation process shows the procedure for evaluating change requests.
  - a. **Box A21 Impact Assessment.** The impact assessment is normally carried out by the Design Authority and will give the benefits of incorporating the change / modification and detail the risks of not incorporating the change.
  - b. **Box A22 Determination of Applicability.** The Design Authority and the Project Team is required to detail the Products requiring the modification and the follow on effects.
  - c. **Box A23 Determination of Cost.** The Design Authority should detail the costs involved in incorporating the modification.
  - d. **Box A24 Approval Authority.** The approval authority normally is given at a meeting of the Change Management Committee. This group should consist of representatives from the design authority; the project office; any relevant suppliers; safety; ILS; the user and quality management.
6. They should consider the following issues:
  - a. Performance improvements.
  - b. Cost implications/ savings to the supplier, project and user.
  - c. Design, development and testing involved.
  - d. Operational and maintenance documentation updates.



- e. Training requirements.
  - f. Products affected, i.e. Products in build and / or retrofit to existing Product.
  - g. Effects on spares and replacements.
  - h. Interfaces with other equipment.
7. If the change is agreed then the change management committee should consider:
- a. When the change can be incorporated.
  - b. How the change will be incorporated.
  - c. Who will incorporate the change.
  - d. Where the change will be incorporated.

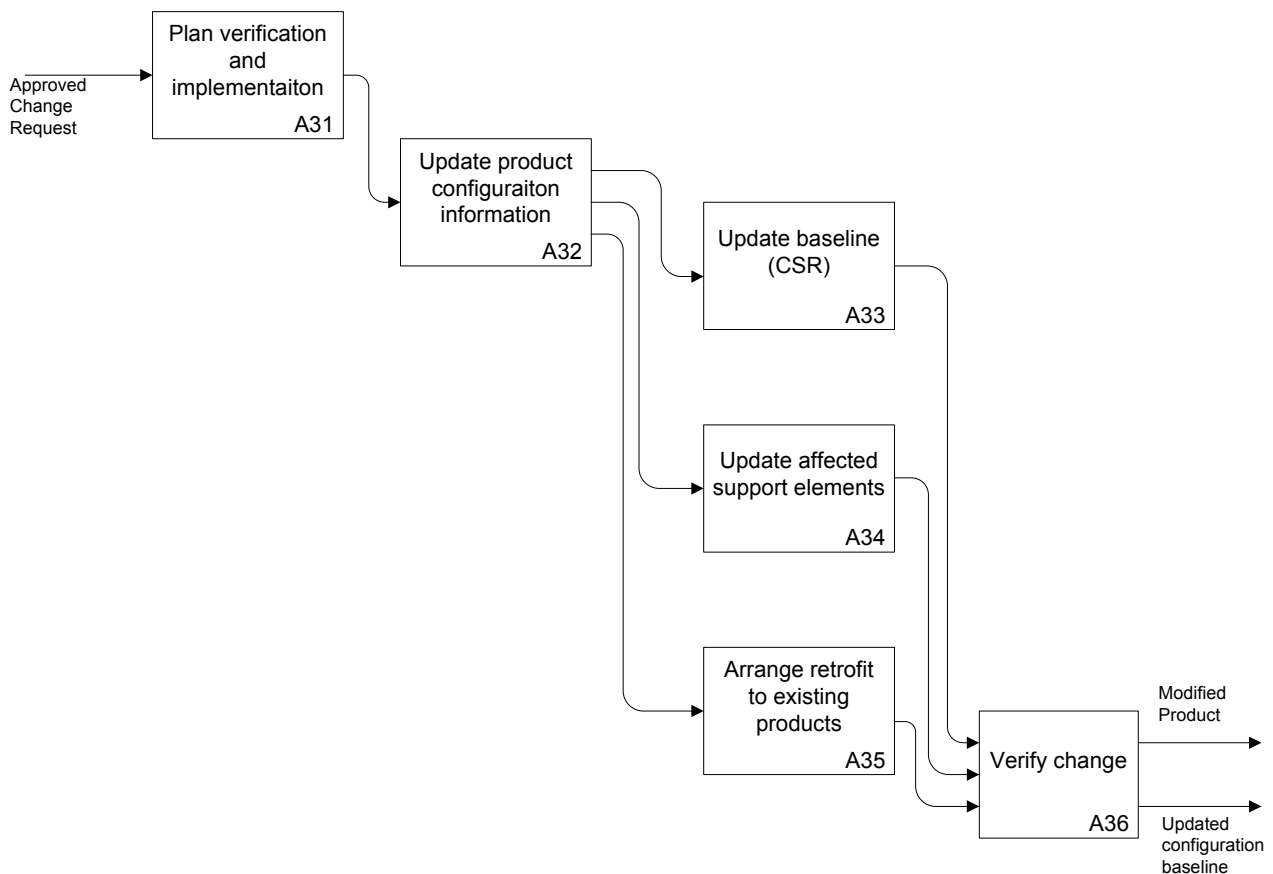


Figure 5: Implementation and verification of change request

8. Figure 5 shows the process of implementing and verifying an agreed change request.
9. Some important issues when planning for incorporating a change, modification or upgrade are:
- a. Legally required change, modification or upgrade
  - b. Safety related change, modification or upgrade

- c. Operational commitments
  - d. Stock availability
  - e. Suppliers time to carry out change, modification or upgrade
  - f. Who should do the change, modification or upgrade?
  - g. Where the change, modification or upgrade should be done?
  - h. When should the change, modification or upgrade be done?
  - i. Updating of the operational and maintenance documentation
  - j. Training updates required
10. To carry out the verification of a modification will require functional and physical configuration audits.

## CHAPTER 8 - MODIFICATION CLASSIFICATION CATEGORIES

1. The following should be considered when categorising the modification proposal:
  - a. Safety – Personnel (members of the public and Services) during the use, maintenance, transportation, storage and disposal of equipment;
  - b. Operational and/or technical value – Including overall performance and interoperability, design and reparability;
  - c. In-Service aspects – Including areas of maintenance, facilities available to the User, support costs, availability and reliability;
  - d. Time scale and cost of incorporation – Including current and retrospective action on in-Service equipment;
  - e. Environmental issues;
  - f. Financial implications – in terms of whole-life costs – Including the cost of material, labour, trials, modification kits and retrospective embodiment.
  - g. An alphabetical classification shall apply to materiel in Production as follows:
    - (1) **Class AA:** Class AA modifications are those where incorporation is essential for the initial Release to Service(s) or approval for the introduction of new equipment, and shall be embodied in all such items of main equipment prior to delivery.
    - (2) **Class A:** Modifications that are essential. Non-embodiment will involve safety, non-availability or impose severe operational limitations. They shall be embodied irrespective of any delay in delivery or scrap involved.
    - (3) **Class B:** Modifications that are high priority. Non-embodiment will involve serious operational limitations or could seriously reduce maintenance efficiency. They shall be embodied forthwith and parts made available as soon as practicable. Scrap and delay in delivery are permissible when authorised by the change committee.
    - (4) **Class C:** Modifications that are important improvements for technical or operational reasons. They shall be embodied in Production as soon as parts can be made available provided there is no delay in delivery.
    - (5) **Class D:** Modifications that are less important improvements than class C. They shall be embodied in new Production provided no scrap or delay in delivery is involved.
    - (6) **Special Order Only (SOO):** Applies to modifications, which are necessary to satisfy a limited operational need to apply to a limited quantity of Product. Examples are:
      - (a) Specific operational requirements which can be satisfied on a scale of less than one per aircraft or missile or equipment e.g. drop tanks, tropical and arctic equipment;

- (b) Those introducing special to type Service support equipment, tools or test equipment;
  - (c) Those used to evaluate a modification.
- h. A numerical classification shall apply to In-Service materiel that is held for urgent action to be taken by the user (except for nominated in-service major repair units). Numerical classifications shall apply also to materiel delivered to, or held by an In-service Supplier:
  - (1) **Class 1:** Essential Modifications. When the absence of the change would adversely affect safety or impose severe operational limitations. They shall be embodied immediately and are compulsory. Spares shall also be modified or scrapped as agreed by the change committee
  - (2) **Class 2:** Modifications that are high priority. When the absence of the change would impose serious performance or other operational limitations including the reduction of maintenance efficiency. They shall be embodied and are compulsory, the extent and the timing to be decided by the change committee.
  - (3) **Class 3:** Modifications that are important (but less than class 2) for the improvement of operational efficiency, reliability, economy, servicing or maintainability to be gained, is judged by the change committee to outweigh the cost and effort of retrospective embodiment.
  - (4) **Class 4:** Modifications that are Non-retrospective. When the change committees decide it is necessary to withdraw and modify or scrap existing spares. If required, they shall be embodied during repairs or reconditioning but only SLP is used hereafter.
  - (5) **Class 5:** Modifications that are Non-retrospective which have no effect on the interchangeability of spares. If required, shall be embodied during repairs or reconditioning or when stocks of unmodified spares are used up.
  - (6) **Class 0:** Modifications that have no In-service implications.
- i. The full classification for configuration change that is applicable either to the Supplier and/or the In-service user shall be indicated by the following appropriate classifications:
  - (1) A/2; B/1; C/2; D/4 etc. (In-Production & In-service application);
  - (2) A/-; B/-; C/-; D/- (In-Production application without In-service application designated);
  - (3) A/0; B/0; C/0; D/0 (In-Production application with no In-service application).
- j. Riders or qualifications to modifications classifications
  - (1) Supplier and Service modification classifications may have certain riders or qualifications to notify the supplier and the Services of the extent to which a

modification is to be applied. These riders or qualifications shall be included in all references to the modification.

(2) The modification committee may also recommend the use of either Service modification parties (SMP) or suppliers' working parties (CWP). The CWP may be used for the embodiment of modifications in Classes 1, 2 and 3 where the work involved is considered to be beyond the capacity of the Service.

k. Examples of such riders and qualifications are:

(1) On Removal of Unmodified Item (to be named with part/North Atlantic Treaty Organisation (NATO) stock no or On Removal of Associated Parts, e.g. engine, radar scanner or tail-plane. This means that the modification should be embodied on the first occasion that the named item or the associated part is removed, subject to the modification kit being available.

(2) On Replacement of Unmodified Item (to be named with part/NATO stock no). This means that the modification should be embodied on the first occasion that the named item becomes unserviceable, subject to a modified item being available.

(3) By Return of Unmodified Item (to be named with part/NATO stock no) to the supplier or selected Service unit (to be named). This means that the modification required to the item is considered to be beyond the scope of first and second line servicing.

(4) WOTSAC (When Old Type Spares Are Consumed). This is used to indicate that interchangeability is affected and that the modification will be embodied when old type spares are consumed.

(5) NOROR (Not On Repair or Reconditioning). This means that the modification will not be embodied on repair or reconditioning.

(6) Satisfied by . . . . . The identity will be quoted where a Service modification or corrective action taken under a special instruction (technical) and the subsequent supplier's modification are identical or there are no significant differences between them.

(7) Superseding . . . . . The identity will be quoted where there are significant differences between a Service modification or corrective action taken under special instructions (technical) and the subsequent supplier's modification.

(8) Embodiment on R&R (Repair and Recondition) at No (X) MU (Maintenance Unit). The identification of the MU concerned is to be inserted.

## CHAPTER 9 - CONFIGURATION STATUS ACCOUNTING (CSA)

1. ISO 10007 defines Configuration Status Accounting as the activity that “results in records and reports that relate to Product and its Product configuration information.” It adds that configuration status accounting activities should be performed throughout the entire life of a project.
2. To provide effective configuration management it is essential that the Products’ configuration information is current and readily available to all relevant stakeholders. It is also essential that all changes to Product configuration information are communicated to the relevant stakeholders in a timely manner.

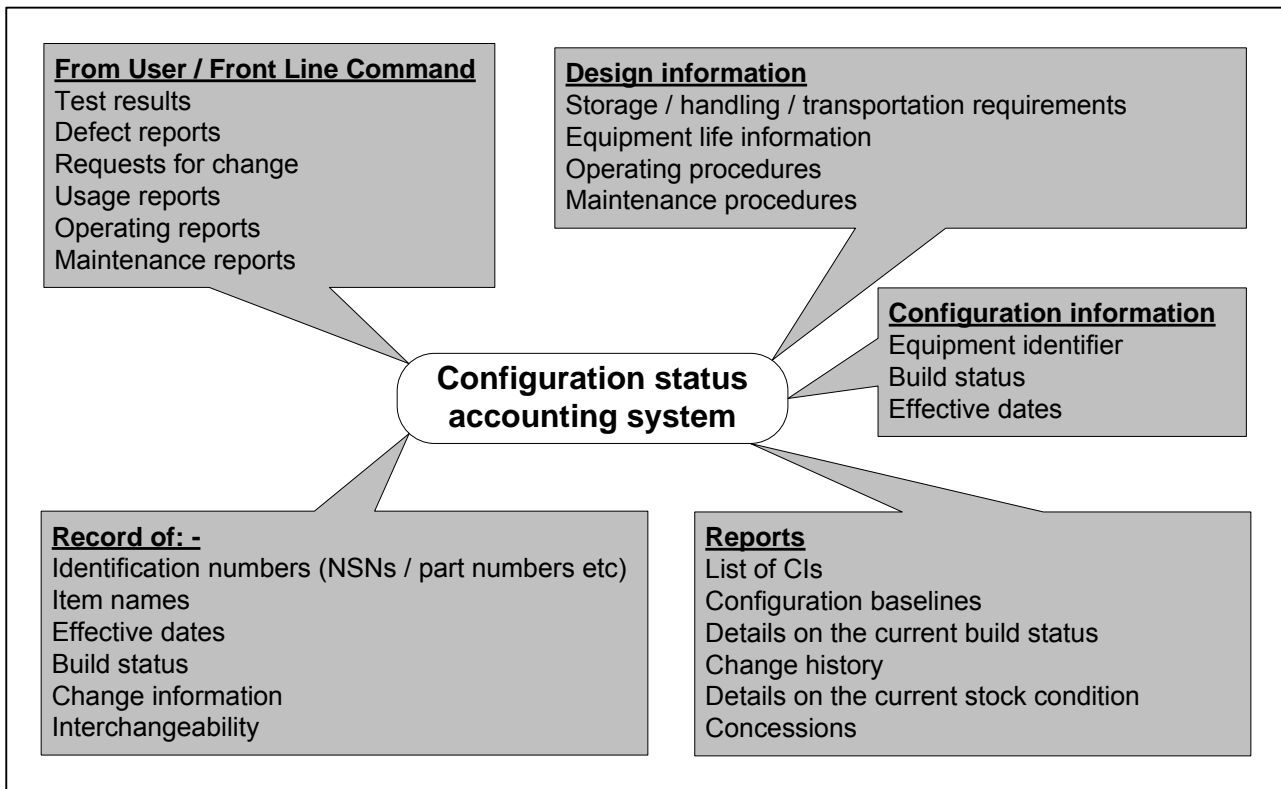


Figure 6: Inputs and outputs of a configuration status accounting system

### CONFIGURATION STATUS ACCOUNTING INFORMATION

3. Configuration status accounting information is gathered from activities, ranging from design authority / manufacturer to front line command, and must be collated and disseminated in a relevant format and to the required timescales.
4. The depth and range of the information to be captured in the CSA system should be based the nature of the Product, the environment in which the Product will be operated, the anticipated volume and complexity of change activity and the information requirements of the project.

Eg. Compare the critical nature of a weapon system, which contains ordnance devices with limited life making accurate and traceable change history records for each serial numbered unit essential, with the changing of an alternator on a vehicle.

## **CONCEPT PHASE**

5. Several documents will be produced during the concept phase that will require configuration management, namely:

- a. The User Requirements Document (URD).
- b. An outline System Requirements Document (SRD).
- c. Configuration management plan.
- d. Requirements acceptance criteria.

## **ASSESSMENT PHASE**

6. The assessment phase “down selects” to a single technological option, hence the configuration status accounting activities will be focused. The documents from the concept phase will be updated and implemented.

## **DEMONSTRATION PHASE**

7. During the demonstration phase, a Product structure is created and dynamically updated as the Products’ requirements documents and detailed configuration documents are generated, released and a baseline set.

The configuration status accounting system will need to capture information on:

- a. Product configuration information: requirements; standards; specifications; design information; CI identification; etc.
- b. Manufacturing
- c. Testing and verification procedures.
- d. Change activity and history of the proposed and incorporated change requests.
- e. The effect of any change
- f. Status and history of variants.

8. If the design of the Product evolves, a record of the release of each Product configuration information document, and subsequent revision to update the design baseline, is entered into the configuration accounting system. The accompanying data of this record’s release will detail the applicability of the updates.

9. The following documents, related to configuration management, will require updating and implementation to match the evolving design of the Product, are the:

- a. SRD.
- b. Maintain URD.
- c. Configuration management plan.
- d. Requirements acceptance criteria.

10. By the end of the demonstration phase, the design release baseline shall be verified and become the Product baseline (PBL). A Functional Configuration Audit (FCA) will also have been carried out by the end of the development phase, the results of which shall be recorded and any action required taken.

## **MANUFACTURE PHASE**

11. The information produced and accessible during the previous stages shall be available during the manufacture phase. Additional information from the manufacturing activities, such as the as-built configuration and change records, will now be available and shall be recorded and tracked.

12. The information that shall be recorded in the database from the manufacture phase includes:

- a. The as built configuration of each Product (by serial number) including installation and removal of serialised and lot numbered components.
- b. The as built configuration of each unit (by serial number) including installation and removal of serialised and lot numbered components.
- c. The identities and Product unit serial numbers, which constitute the applicability of each approved major engineering change; the identifiers of the changes that have been released for any specific serial numbered unit of a Product.
- d. Superseded configuration records that reflect prior configurations of the Product.

## **DELIVERY OF PRODUCTS FROM A SUPPLIER**

13. The Product configuration information from a supplier will be similar to that of the manufacture phase, with the addition of:

- a. Delivery dates.
- b. Warranty expiration dates for each unit.
- c. Service agreement types and expiry dates.
- d. Installation configuration (if the supplier installs the equipment).
- e. Training requirements.

## **DELIVERY OF PRODUCTS TO THE USER**

14. Normally the delivery of a Product to the user will overlap the manufacture and in-service phases, this means that the information produced during the previous stages will need to be available and will probably be updated during the delivery timescale.

15. Other information that will need to be considered during the delivery of a Product, both from a supplier and to the user, is:

- a. Delivery dates.
- b. Installation configuration.



- c. Warranty expiration dates for each unit delivered or installed.
- d. Service agreement type and expiration.
- e. Training requirements.

## **IN-SERVICE PHASE**

16. The object of the in-service phase is to support and maintain the capability to fulfil operational requirements.

17. Configuration status accounting during the in-service phase will vary greatly depending on the support implications / requirements; and any legal requirements placed on the type of Product.

18. The additional information shall be maintained on the configuration status accounting system during the in-service phase:

- a. As-maintained and as-notified baseline of the Product.
- b. Product operation and maintenance information revision status.
- c. Information change requests and change notices.
- d. Restrictions or concessions on use of the Product.
- e. Product performance degradation.
- f. Training requirements.

## **DISPOSAL PHASE**

19. Configuration status accounting during the disposal of a Product in a cost effective and safe manner will depend on:

- a. If disposal of the Product has adverse environmental implications.
- b. If the Product requires a replacement.
- c. If the Product is to be salvaged.

20. Also, the disposal of some Product will have legal and contractual implications that must be considered.

21. Typical status accounting throughout the CADMID cycle is shown at Figure 7.

Life cycle phase	C	A	D	M	I	D
Typical CSA Information & activity which is tailored to suit Product and project						
User Requirements Document (URD)	•	•	•	•	•	•
System Requirements Document (SRD)		•	•	•	•	•
Product structure / hierarchy information		•	•	•	•	•
Functional baseline		•	•	•	•	•
Design baseline			•	•	•	
Product baseline			•	•	•	•
Configuration documentation		•	•	•	•	•
Configuration documentation change proposals		•	•	•	•	•
Configuration documentation change records		•	•	•	•	•
Change request proposal	•	•	•	•	•	
Change request records	•	•	•	•	•	
Product change request proposal	•	•	•	•	•	
Product change request records	•	•	•	•	•	
Concession and variance records		•	•	•	•	•
Verification / audit reports and actions		•	•	•	•	•
Usage records			•	•	•	•
Shelf life records			•	•	•	•
Product operation information / records			•	•	•	•
Product maintenance information / records			•	•	•	•
Restrictions (operational / facilities / etc)			•	•	•	•
Product replacement information			•	•	•	•
Product interchangeability information			•	•	•	•
Product interface information			•	•	•	•
Product safety restrictions			•	•	•	•
Product environmental restrictions			•	•	•	•
Product salvage information	•	•	•	•	•	•

Figure 7: Typical Status Accounting through the CADMID cycle

## CHAPTER 10 - CONFIGURATION STATUS RECORD (CSR)

1. A Configuration Status Record (CSR) should:
  - a. Provide a record for each CI by reference to part numbers, drawings lists and specifications of the planned, current and all earlier approved baselines including, where applicable, those of variants and those of ancillary items such as modification sets and kits, special tools, handling equipment, special to type test equipment and packaging.
  - b. Provide a baseline for each CI from which to define the subsequent as-fitted and future modification states of the Product throughout its service life.
  - c. Record the change status of the Product by providing a reference to the change record of each CI, for all authorised modifications, amendments and system changes.
  - d. Provide a Product breakdown structure showing the relationship of all the CIs making up the Product by reference to drawings list numbers and/or an illustrated parts catalogue.
  - e. Enable the contract build state for each CI to be uniquely defined for Production orders.
  - f. Enable the Product design state to be defined for each Product order.
  - g. Include NDIs & Government Furnished Assets (GFA).
  - h. Identify any feature in the Product with safety or operational implications that may require special tests or examinations;
  - i. List all deliverable CM documentation for the Product as defined in the CMP; support and in-service publications; software documents and listings; quality plans; risk management plans; safety plans and interface specifications.
2. A CSR reference system shall be adopted such that higher level CIs can be cross referred to those of subsidiary and associated CIs, and vice versa.
3. The CSR for Products containing CIs common to more than one Product shall refer to the relevant configuration documentation maintained by the Design Authority (DA) for that common CI.
4. A complete Product CSR shall be created to provide an overview of constituent CIs by means of a family tree to a level of detail to be agreed by the appropriate authority as defined in the contract.
5. The Product Baseline (PBL) CSR shall be certified for accuracy by the DA responsible for that CI, prior to approval for Production and before coming UMC.
6. A CSR shall list all items used in support of the Product, such as special tools, design tools and models, special to type test equipment, handling equipment and packaging.

7. A CSR shall be in a format outlined in the CMP and agreed by the appropriate authority. Commercial database packages output shall be compatible with the Authority's data import requirements as specified in the contract.

## CHAPTER 11 - CONFIGURATION AUDIT (CA)

1. Configuration Audit and verification establishes that the performance and functional requirements defined in the Product's requirements and configuration documentation have been achieved by the design, and the design has been accurately documented in the configuration documentation. The purpose and benefits include the following:
  - a. Ensure that the Product design provides the agreed performance capabilities, ie. fills the identified capability gap.
  - b. Validates the integrity of the configuration documentation.
  - c. Verifies the consistency between a Product and its configuration documentation.
  - d. Determines that an adequate process is in place to provide continuing control of the configuration.
  - e. Provides confidence in establishing a Product baseline.
  - f. Ensures a known configuration as the basis for operation and maintenance instructions, training, spare and repairs part, etc.
2. The arrangements for each CA shall be defined in the CMP. Audit teams may perform CA at any stage during the Product life cycle to provide formal verification that the CIs conform to Configuration Baselines.
3. The timing of each CA shall be determined in a cost effective manner taking into account overall contract requirements, the work schedule of the Supplier and the availability of the CI.
4. CA reports shall be formally presented to the appropriate authority, as defined in the contract, for acceptance and evaluation of any need for corrective action.
5. There are two types of configuration audit, the Functional Configuration Audit (FCA) and the Physical Configuration Audit (PCA). For those requirements, which cannot be completely verified through the use of testing, the FCA shall determine whether adequate analysis or simulations have been accomplished and whether the results of the analysis or simulations are sufficient to ensure that the CI meets the requirements in the specification. All approved changes shall be reviewed to ensure that they have been incorporated and verified.

### PARTICIPATION AND RESPONSIBILITIES

6. As owners of the Product's requirements, the Project is responsible for the arrangement and management of configuration audits. The Project shall:
  - a. Record the official configuration audit meeting minutes.
  - b. Ensure that recommendations not accepted are recorded together with the reason for non-acceptance.
  - c. Ensure that minutes of previous sessions are available for review by both the Authority and Supplier at the beginning of successive sessions.

7. The Supplier shall support the Project by conducting configuration audits in accordance with the following requirements:

- a. The Supplier shall be responsible for ensuring that the appropriate subcontractors, vendors, and suppliers participate in the Project's configuration audits.
- b. The Supplier shall provide the necessary resources, material and the facility to perform, or assist in, the configuration audit effectively. The following list can be used to plan and conduct the type and scope of audit required by the CMP:
  - (1) Configuration audit plan.
  - (2) Specifications, Product designs information, manuals, schedules, and design and test data.
  - (3) Inspection reports, process sheets, data sheets and other documentation.
  - (4) Tools and, measuring and inspection equipment necessary for verification and validation.
  - (5) Access to the areas and facilities including – goods inwards inspection, manufacture, inspection and testing.
  - (6) Access to relevant personnel, e.g. from engineering, manufacturing, contracts, configuration and quality.
  - (7) CI(s) to be audited.

8. The Supplier will be responsible for establishing the time/place/date and agenda for each configuration audit in accordance with the master project milestone schedule, subject to co-ordination with the Customer. This shall be accomplished sufficiently in advance of each configuration audit to allow adequate preparation. In addition the Supplier shall:

- a. Ensure that each configuration audit schedule is compatible with the availability of the necessary information and CMP requirements, e.g. – engineering data (in accordance with Contract Data Requirements List, producability analysis, risk analysis, specifications, manuals, Product design information, reports, hardware, software, or mock-ups).
- b. Appoint a focal point for the audit, which may be the team leader (configuration specialist), for each configuration audit.
- c. Ensure that all presenters are prepared to discuss in detail any of the presented material within the scope of the configuration audit.

## **CONFIGURATION AUDIT PROCESSES**

### **FUNCTIONAL CONFIGURATION AUDIT (FCA)**

9. A FCA is defined as the formal examination of test data and quality assurance records for a CI, prior to acceptance of the PBL, to verify that the CI has achieved the performance and functional characteristics specified in its configuration documentation. This shall be carried out prior to the establishment of the PBL.

10. A FCA shall be conducted for each CI, or group of CIs, for which a separate development/requirement specification has been baselined, unless otherwise specified in the contract.

11. The FCA is to demonstrate that the CI, or group of CIs, has met its specified functional requirements. This shall be carried out prior to the establishment of the Product baseline.

12. Prior to the FCA date, the Supplier shall provide the following information to the Authority:

- a. Supplier representation.
- b. Identification of items to be audited – including nomenclature and specification identification number.
- c. Current listing of all concessions against the CI.
- d. A FCA check sheet that identifies documents to be audited and tasks to be accomplished at the FCA of the CI.
- e. A briefing for each CI being audited and shall delineate the test results and findings for each CI. As a minimum, the discussion shall include CI requirements that were not met, including a proposed solution to each item, a configuration status of all changes introduced and tested, and any further proposed changes that will require embodying to meet the specification requirements.

13. Data for the FCA shall be collected from the test of configuration of the item against the conformance requirements for the Product that is to be formally accepted or released for Production.

- a. During development a Product usually goes through a series of builds, each version being progressively built up to what the Product is envisaged to look like as a Production model. Each model is tested against the conformance requirements as the functionality is progressively developed.
- b. If a prototype or pre-Production models not to be produced, then the test data shall be collected from the testing of the first Production item.
- c. For complex systems, and / or CIs, the FCA may be completed in increments. In such cases, a final FCA shall be conducted to ensure that all the requirements have been satisfied.
- d. In cases where CI verification can only be completed after system integration and testing, the final FCA shall be conducted along with the PCA.

14. To review for compliance with specification requirements the supplier shall provide the following test information to the FCA team:

- a. Compliance test procedures.
- b. Results from the compliance tests.
- c. Test plans, specifications, descriptions, procedures and reports for the CI.

- d. A complete list of the successfully accomplished tests during which pre-acceptance data was recorded.
  - e. A complete list of tests required by the test requirements but not yet performed i.e. to be performed as a system or subsystem test.
  - f. Pre-Production test results.
15. An audit of formal test plans, specifications and procedures shall be made and compared against official test data. The results will be verified for completeness and accuracy.
16. Interface requirements and the testing shall be reviewed.
17. For those requirements, which cannot be completely verified through the use of testing, the FCA shall determine whether adequate analysis or simulations have been accomplished and whether the results of the analysis or simulations are sufficient to ensure that the CI meets the requirements in the specification.
18. An audit of the requirements conformance test report shall be performed to validate that the reports are accurate and completely describe the CI conformance tests.
19. A list of the Supplier's internal configuration documentation of the CI shall be reviewed to ensure that the Supplier has documented the configuration of the CI for which the test data is verified. This is to provide assurance that the Products' definition and design information is under adequate control.
20. Design information of the CI parts, which are to be provisioned, shall be selectively sampled to ensure that the test data essential to manufacturing is included on, or provided with, the design information.
21. All changes to Product design and to test equipment shall be reviewed to ensure that they have all been incorporated and completed.
22. Design Reviews and Critical Design Review minutes shall be examined to ensure that all findings have been incorporated and completed.
23. An audit report shall be produced to detail the findings; it will include test procedures and reports viewed by the FCA, and any deficiencies found.
24. Completion dates for all discrepancies shall be clearly established, agreed at the post audit meeting and documented.
25. A FCA certificate shall be issued for the CI audited by the supplier with the agreement of the FCA audit team.

### **PHYSICAL CONFIGURATION AUDIT (PCA)**

26. A PCA is defined as the formal examination of the as-built configuration of the CI against its design documentation and will normally be initiated after the FCA.
27. A PCA will be required to ensure that the CI has met its specified physical requirements. Subsequent to the PCA, the Product baseline (PBL) shall be established



and all subsequent changes will be made by the approved modification procedures. The PCA shall:

- a. be the formal examination of as-built configuration of a CI against its design documentation;
- b. not be started unless the FCA of the CI has already been successfully completed or is being carried out concurrently with the PCA;
- c. determine that the acceptance testing requirements prescribed by the documentation is adequate for acceptance of Production units of a CI by quality assurance activities;
- d. include detailed audit of Product design information, specifications, technical data, tests utilised in Production of the CIs, and design documentation, listings, and operation and support documents for the CSCIs;
- e. include an audit of the released documentation and quality control records to make sure the as-built or as-coded configuration is reflected by this documentation, and for software, the Product specification, Interface Design Document be part of the PCA;
- f. be carried out on a selected CI as agreed by the Authority and the Supplier.

28. The scheduled dates, actual accomplishment dates, for the PCA(s) shall be recorded in the CSA and CMP documentation.

29. All approved internally and external configuration changes shall be incorporated into new revisions of the applicable configuration documentation prior to the PCA.

30. Prior to the PCA the Supplier shall provide the following information to the Authority on the CI to be audited by:

- a. Description.
- b. Specification Identification Number.
- c. CI Identifiers.
- d. Serial Numbers.
- e. Design information and Part Numbers.
- f. List of concessions against the CI.

31. Reference information to the CI being audited should be as follows:

- a. CI Product specification.
- b. A list delineating both approved and outstanding changes against the CI.
- c. Complete shortage list.
- d. Acceptances test procedures and associated test data.

- e. Draft CSR and design standard.
- f. Operating and support publications, including all Maintenance manuals (or as per contract requirements).
- g. Proposed – Certification of Design.
- h. Version Description Document.
- i. Approved nomenclature and nameplates.
- j. FCA report and minutes for each CI Findings/Status of Quality Assurance Programmes.
- k. Recommended Spares List.
- l. Interface Design Document.

32. The Supplier shall collate and make available to the PCA team, as required, all Product Configuration Information (PCI), including

- a. All configuration information required to identify the CI.
- b. Relevant hardware, software and interface specifications including approved change notices and approved concessions.
- c. Identification of all incorporated changes.
- d. Identification of all required changes not completed.
- e. Release documentation and quality control records.

33. Identify any differences between the physical configurations of the selected Production CI and the development CIs used for the FCA and demonstrate, or certify, to the Authority that these changes do not degrade the functional characteristics of the selected CI.

34. Relevant Drawings or Production Instructions, which show that the Product will conform to the Design Specification, shall be reviewed.

35. As a minimum, the following inspections of selected Product design information shall be accomplished:

- a. Identification numbers, descriptions, and/or part numbers, and/or serial numbers on manufacturing processes shall match the relevant Product design information for that contract.
- b. Product design information and associated manufacturing processes shall be reviewed to ascertain that all approved changes have been incorporated into the CI.
- c. Release records shall be checked to ensure all relevant Product design information reviewed is identified.

- d. Outstanding changes to the Product shall be recorded against the relevant Product design information for that contract
- e. Concession request information shall be recorded.

36. The Supplier's Parts Catalogue shall be available for comparison to the CI / Design Standard / Bill of Materials to ensure only OEM approved parts are listed.

37. Review all records of the configuration for the CI by direct comparison with the Supplier's release system PDM or other and Configuration Change Management procedures to verify that the configuration being produced accurately reflects released data. This includes interim release of spares/repair parts provisioned prior to PCA to ensure delivery of currently configured spares/repair parts.

38. The Configuration Change Management control mechanism shall be audited to ensure that it correctly controls all internal and external changes. This will be accomplished by 'audit trailing' an internal and external change authority from concept to implementation on the CI.

39. CI acceptance test data and procedures should comply with Product specifications. The PCA team should determine any acceptance test to be re-accomplished, and reserves the right to have representatives from the Authority witness all or a portion of the required audits, inspections, or tests.

40. CIs which fail to pass acceptance testing shall be corrected, if necessary, and will be re-tested by the Supplier. The PCA team shall review the results of this re-testing in accordance with the Product specification. The Authority shall be informed of the audit review's results.

41. The Supplier shall present data confirming the inspection and test of subcontractor Product end items at point of manufacture. Inspection and test will have been witnessed by the Supplier or in accordance with the contract.

42. CIs that have demonstrated compliance with the Product specification shall be approved for acceptance. The PCA team will certify by signature that the CI has been built in accordance with the Product design information and specifications at the agreed baseline.

43. As a minimum, the PCA team on each CSCI being audited shall perform the following actions:

- a. Review all documents, which shall comprise the Product specification for format and completeness.
- b. Review FCA minutes for recorded discrepancies and actions taken.
- c. Review the design descriptions for proper entries, symbols, labels, tags, references and data descriptions.
- d. Compare detailed design descriptions with the software listing for accuracy and completeness.

- e. Examine CSCI delivery media (disks, tapes, etc.) to ensure conformance with the software requirements specifications.
- f. Review the annotated listings for compliance with approved coding standards.
- g. Review all required operation and support documents for completeness, correctness, incorporation of comments made at critical Design Review, and adequacy to operate and support the CSCI(s).
- h. Examine all related documentation to ensure that the relationships of the CSCI to the parts, components or assemblies that store the executable forms of the CSCI are properly described. For Firmware, ensure that the information completely describes the requirements for installation of the CSCI into the programmable parts or assemblies and that this information has been properly implemented. Where follow-on acquisition of the firmware items is intended, ensure that the documentation has been accomplished to the level of detail necessary for the intended procurement.
- i. Demonstrate, using deliverable or Customer owned support software, that each CSCI can be generated. The regenerated CSCI shall be compared to the actual CSCI delivery media to ensure that it is identical.

44. The following minimum information shall be recorded in the minutes for each Product design information viewed:

- a. Product design information number/title (include revision identifier).
- b. List of manufacturing process sheets (also numbers with change letter/titles) relevant to the Product design information for that contract.
- c. Discrepancies/comments.
- d. As a minimum, the following inspections should be accomplished for selected

## **FINAL CONFERENCE**

45. The authorised team leader should summarise the findings of the PCA from their perspective, and should identify all relevant remedial actions & corrective action (Discrepancies). A summary report should be available to all Authority's and Supplier team members.

46. All outstanding contractual requirements should be reviewed and any liability issues resolved.

47. The Supplier representative should summarise the Supplier's reactions and acceptance of the Authority actions on the Supplier in respect of:

- a. Certification of the CI.
- b. Outstanding contractual issues in respect to the CI.
- c. Outstanding liability issues (if any).

48. Post PCA actions:

- a. The Supplier should be notified in writing to the Authority of acceptance or rejection of the PCA, the PCA status and comments, criticisms to be corrected, or rejection of the PCA and requirements for re-accomplishment.
- b. The Supplier should, after completion of the PCA, publish and distribute copies of the PCA as specified in the contract.
- c. The Authority and the Supplier(s) should duly sign PCA certification.

49. The CSR (Specifications, Product design information, Configuration Status Accounting, etc.) should be sealed for Production initiation. The CSR should be supplied to the Authority if required.

## PHYSICAL CONFIGURATION AUDIT CHECKLIST

For Assessment of:	
Agency Name	
Project Name	
Phase/Release	
Date	

Criteria	Yes / No / NA
a. Is the Physical Configuration Audit (PCA) Plan comprehensive and complete?	
b. Has the PCA Plan been reviewed and approved by the designated approvers?	
c. Is PCA methodology feasible?	
d. Is documented methodology for the PCA unambiguous?	
e. Were all entry criteria satisfied prior to starting the PCA?	
f. Were all mandatory inputs complete and available prior to starting the PCA?	
g. Has the impact of pending change orders been assessed?	
h. Is the physical configuration of the system under examination and the system used for the Functional Configuration Audit (FCA) consistent?	
i. If the physical configuration of the system under examination and the system used for the FCA are inconsistent, has it been demonstrated that the differences do not degrade the functional characteristics of the configuration item?	
j. Has documentation that records the baseline configuration of the system been compared to the released system to verify that the documentation actually reflects the released system?	
k. If there are inconsistencies between the documentation that records the baseline configuration of the system and the released system, have the inconsistencies been documented and accepted?	
l. Has documentation that records the baseline configuration of the system been reviewed for format and completeness?	
m. Are the documentation that records the baseline configuration of the system and the released system consistent with the documented design?	
n. Does actual system delivery media conform to specifications?	
o. Are the documentation that records the baseline configuration of the system and the released system consistent with build records, confirming that the system has been build in accordance with specifications?	
p. Have all major problems and risks been identified and documented?	
q. If there are major problems and risks, are there plans to accept, address, or mitigate those problems and risks?	
r. Have all PCA exit criteria been satisfied?	

## FUNCTIONAL CONFIGURATION AUDIT (FCA) CHECKLIST

CI Description \_\_\_\_\_ Date: \_\_\_\_\_

CI/CSCI Identifier: \_\_\_\_\_  
Release No. \_\_\_\_\_

### Requirements

Yes No NA

1. Facilities for Conducting FCA Available
2. Audit Team members have been identified and informed of audit
3. Audit Team members are aware of their responsibilities
4. General Requirements Specification (GRS) or all of the following two documents: Software Requirements Specification (SRS), System Specification (SS)
5. Waiver or Deviation List Prepared
6. Verification Test Procedures Submitted (Test transactions)
7. Verification Test Procedures Reviewed and Approved (Test transactions)
8. Verification Testing Completed and results available (System Qualification Test)
9. Verification Test Data and Results Reviewed and Approved
10. Test Results submitted (if available or applicable)
11. Verification Testing Witnessed
12. Test Readiness Review I and II (TRR I and TRR II) completed
13. Test Readiness Review I and II (TRR I and TRR II) minutes and open action items from past reviews available
14. Copy of baseline and database change requests with their associated status accounting records along with all design (*Problem Reports and Deficiency Reports (PRs and DRs), etc.*) provided
15. Other inputs as specified by the functional requirements and planning documents

Signature of FCA Team Members:

Date:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

☐ Results reviewed satisfy the requirements and are accepted (See attached comments).

☐ Results reviewed do not satisfy requirements (See attached comments and list of deficiencies).

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

## CHAPTER 12 - CONFIGURATION BASELINES

1. A configuration baseline consists of all approved documents that represent the definition of the Product at a specific point and are the fundamental basis of configuration management.
2. Configuration baselines should be established whenever it is necessary to define a reference configuration during the Product life cycle; they serve as a starting point for further activities and provide affected parties an assurance of the stability and consistency of information needed for their subsequent activities.
3. The level of detail to which the Product is defined is dependent on the degree of control required.

### ESTABLISHING BASELINES

4. The detail contained in a configuration baseline may vary widely and must be tailored to suit the individual needs of a project at the time. The baseline may be simple, and under internal control, with changes controlled by a small internal group, or controlled by external suppliers, with a change committee involving the MOD.
5. Additional baselines are established when the attributes of the sub-systems stabilise, or when control of a greater level of design detail becomes necessary. These points usually signify changes in activities or commitments.
6. Examples include the following:
  - a. Transition from assessment to demonstration phases
  - b. Transition from demonstration to manufacture phases
  - c. Customer approves design concept
  - d. When a facility becomes operational
  - e. A major change is approved
7. These events typically represent a stage in a project's life when there is need for stability, or when there is a transfer of change / design authority. This being so, the documentation defining a Product's baseline must be mutually consistent, compatible and understandable by all interested parties. Each more detailed baseline must be traceable to, and be a detailed extension of, its predecessor(s). For example:
  - a. When a drawing is completed and released, the Designer relinquishes control (i.e. they can no longer make changes unilaterally) so that others can be assured of stability while creating related dependant drawings.
  - b. The authority for approval of changes to a Product baseline may be transferred to programme management when significant investment in Production tooling and facilities is committed.
  - c. A customer may need to review changes to a Product's detailed design to ensure compatibility with other Products, or with the same Product acquired from other suppliers.

8. Before any document or data set is considered to be part of a baseline, it must be reviewed to ensure that the document is complete, valid and suitable for use. A release system / process shall be employed to validate the document and file integrity.

9. Configuration change management is essentially a process for managing baselines. Baselines are tools to match the need for consistency with the authority to approve changes. A configuration management system, and plan, must include:

- a. What baselines need to be established?
- b. When they should be defined.
- c. How they should be defined.
- d. The process for assuring document and file integrity.
- e. The authority to approve changes to the baseline.
- f. If authority to change will transfer.
- g. When authority to change will transfer.
- h. The process by which proposed changes will be approved.

## **TYPES OF BASELINES**

10. There are normally 3 configuration baselines – functional, development and Production.

### **FUNCTIONAL BASELINE**

11. The functional baseline is defined as the configuration documentation formally designated during assessment.

- a. Functional characteristics.
- b. Test requirements.
- c. Interface characteristics with associated CIs.
- d. Key lower-level CIs, if any.
- e. Design constraints.

### **DESIGN BASELINE**

12. Which is defined as the configuration documentation formally designated, normally this is done at the end of the assessment phase and before the demonstration phase.

13. The design baseline is also known as the development or allocated baseline

14. The design baseline includes:

- a. Functional and physical characteristics that are allocated from the functional baseline for CIs.



- b. Test requirements demonstrating achievement of functional characteristics.
- c. Interface characteristics with associated CIs.
- d. Design constraints.

## PRODUCT BASELINE (PBL)

15. Which is defined as the configuration for a CI and formally designated at the beginning of its Production prescribing:

- a. All necessary physical and functional characteristics of CIs.
- b. The selected functional characteristics designated for Production acceptance testing.
- c. The Production acceptance tests.

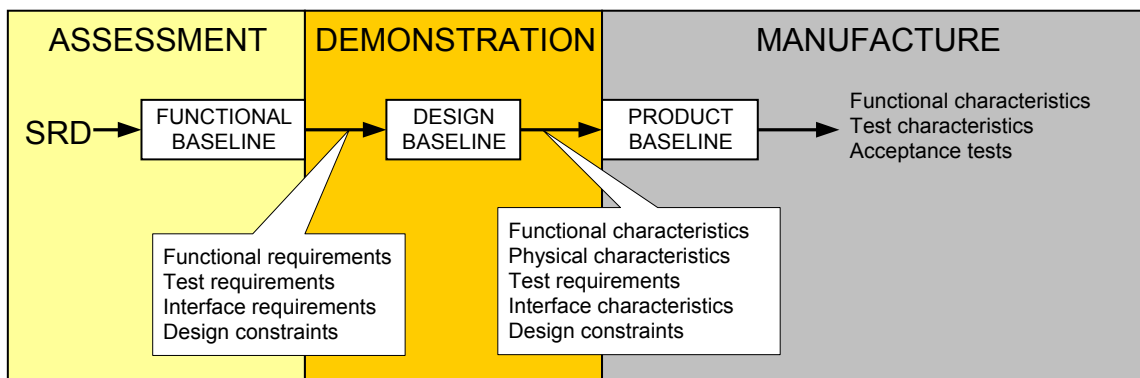


Figure 8: Baselines and the CADMID cycle

## INTERFACES

16. Any changes to an individual Product may have far reaching implications across one or more other systems and could impose the need for consequential modifications to a number of associated equipments. It is essential that the impact(s) to all affected systems, equipment or Products is considered before the introduction of a new Product or a proposed modification to a Product is implemented.

## CHAPTER 13 - REFERENCES

- A. Defence Standard (DEFSTAN) 05-57 Configuration of Defence Materiel.
- B. Allied Configuration Management Publications (ACMP) 1-7.
- C. STANAG 4159 NATO Materiel Configuration Management Policy and Procedure for Multinational Joint Projects.
- D. STANAG 4427 Mutual Agreement to use the Allied Configuration Management Publication (ACMP) series.
- E. ISO 10007:2003 Quality Management Systems – Guidelines for Configuration Management.
- F. Support Solutions Envelope (SSE) website on the AOF for Configuration Management in Governing Policy 2.4.
- G. ISO 10303 -1 Industrial Automation Systems and Integration – Product Data Representation.
- H. Defence Standard 05-10

## CHAPTER 14 - GLOSSARY

<b>Baseline</b>	A collection of technical data and formally designated documentation that is applicable at a specific point in the life cycle of the subject Configuration Item.
<b>Concession</b>	A concession is permission to use or release a Product that does not conform in full to specified requirements. A concession can also apply to Product realisation/Production.
<b>Configuration</b>	The configuration of an item is defined by the baseline documentation and any approved changes to that documentation.
<b>Configuration Audit</b>	An audit to confirm the acceptability of a Configuration Item with regard to compliance with the design functional requirements and that the Item physically represents the declared Configuration Baseline.
<b>Configuration Item</b>	Any item requiring logistic support or designated for separate procurement is a Configuration Item.
<b>Configuration Management</b>	A process for establishing and maintaining consistency of a Products performance, functional and physical attributes with its requirements, design and operational information throughout its life.
<b>Configuration Status Accounting</b>	The activity associated with the recording and reporting of information that is needed to manage the configuration effectively, including a list of the approved configuration documentation, the status of proposed changes and the implementation status of approved changes.
<b>Design Authority</b>	<p>The approved organisation controlling the Product Specification for each Contract, to which the Original Equipment Manufacturer supplies the Product.</p> <p>Where the Product is COTS, the DA controls the Issue or Revision level of that Product, as it will be supplied to each Contract.</p> <p>The DA cannot alter the details of the OEM's manufacturing processes, unless these are found to contravene either existing or known future legislation.</p> <p>The DA is not the owner of the Detail Design unless the Contract has a specific clause to this effect.</p> <p>The OEM is free to change the Specification of COTS Products.</p>
<b>Certificate of Conformity</b>	<p>The C of C is a formal declaration by The Supplier that the Product meets the Product Specification.</p> <p>Where the Product is COTS, the C of C will detail the Issue or Revision level of that Product, as it will be supplied to the Contract.</p> <p>Any design exceptions or limitations of use shall be declared on the Certificate.</p>
<b>Design Review</b>	A Design Review is the formal, documented engineering management process that is used to subject a design to a systematic critical study. Its purpose is to establish that the design satisfies the specified requirement(s).
<b>Product Breakdown Structure</b>	Describes the structure and breakdown of the XXXX Project, into Systems, sub-systems and requirements.
<b>Product Data Management</b>	An ordered way of managing the definition of a Product. It provides a single source of data for all users of that data.

## ANNEX A - MODIFICATION PROPOSAL FORM (MPF)

1. CONTRACTOR / DESIGN AUTHORITY	2. MAIN EQUIPMENT SPECIFICATION №	3. MODIFICATION № ISSUE №
4. ORIGIN	5. AUTHORITY IPT	6. EQUIPMENT GROUP CODE
7. TITLES Description Title		
8. EFFECT ON: PROJECT MODIFICATIONS a. Before & concurrent changes. b. Benefits to customer (MOD)	9. EFFECT ON: OTHER CONTRACTORS	
10. ESTIMATED DATE OF EMBODIMENT a. Trial Installation / Proof Installation b. Production c. Repair & reconditioning	11. DELAY IN PRODUCTION CONVERSION	
12. DELIVERY OF MODIFICATION KITS Date Rate		
13. MAN HOURS FOR SERVICE EMBODIMENT a. Access b. Strip c. Embody d. Re-assembly e. Test f. Total		
14. CONTRACTORS RECOMMENDATION Preparation, Trial Installation Or Production work can not commence on the basis of recommendation. Contractor / Designer Authority Signature		
15. INTEGRATED PROJECT TEAM (IPT) Meeting Number Item Date Previous Item	16. APPLICABLE CONTRACTS Preparation & trial Installation Manufacture of Modification Kits Design Incorporation Embodiment by Contractors Working Party(CWP)	
17. IS THERE AN EFFECT ON:		
17.01 INTERCHANGEABILITY (ICY) a. Functional b. Physical c. ICY LRU Major Assembly d. ICY Detailed Parts	17.14 NUCLEAR HARDENING	17.15 DOCUMENTATION a. Specification b. Design Certificate c. Trials Documentation d. Approvals Submission e. EOD Procedures f. Release to Service g. Repair Procedures h. Minimum Standard Modification List (MSML)
17.02 INTEGRATED LOGISTIC SUPPORT a. Reliability b. Maintainability c. Spares d. MSPL Schedule e. Storage f. Training g. Support Equipment h. Packaging i. Technical Documentation j. NATO Stock Number (NSN)	17.16 STRIKE NUMBER	17.17 TEMPEST CLEARANCE
17.03 INTERFACES	17.18 PERFORMANCE	17.19 ENVIRONMENTAL CONTROL SYSTEM

17.04 COMPATIBILITY <ul style="list-style-type: none"> <li>a. Materiel</li> <li>b. Explosive</li> <li>c. Chemical</li> <li>d. Electromagnetic</li> <li>e. Other / Nuclear</li> <li>f. External</li> </ul>	17.20 VULNERABILITY
17.05 <ul style="list-style-type: none"> <li>a. Mass</li> <li>b. Moment</li> </ul>	17.21 LIFE
17.06 SAFETY CASE <ul style="list-style-type: none"> <li>a. Airworthiness</li> <li>b. Structural Integrity</li> <li>c. Hull Integrity</li> <li>d. Nuclear</li> <li>e. Vehicle Weapon Safety</li> <li>f. Nuclear Weapon System Safety</li> </ul>	17.22 QUALITY ASSURANCE
17.07 HANDLING / PERFORMANCE & OPERATIONAL	17.23 TRIALS
17.08 ELECTRICAL <ul style="list-style-type: none"> <li>a. Electromagnetic Pulse</li> <li>b. Fuses &amp; Circuit Breakers</li> <li>c. Electrical Power Requirements</li> </ul>	17.24 DISCRIMINATION
17.09 HUMAN FACTORS INTERFACE (HFI)	17.25 PRODUCTION
17.10 EMBODIMENT ISSUE ITEMS	17.26 DEPOT / SITE CAPABILITIES
17.11 ITEM OF SUPPLY	17.27 TEST, MOCK UP, TRIAL AND PROOF INSTALLATIONS
17.12 BOUGHT OUT ITEMS	17.28 TEST EQUIPMENT <ul style="list-style-type: none"> <li>a. Specifications</li> <li>b. Automatic Test</li> <li>c. Special to Type</li> <li>d. Software</li> </ul>
17.13 LINE TEST <ul style="list-style-type: none"> <li>1<sup>st</sup> Software Hardware</li> <li>2<sup>nd</sup> Software Hardware</li> <li>3<sup>rd</sup> Software Hardware</li> <li>4<sup>th</sup> Software Hardware</li> </ul>	17.29 TOOLING
	17.30 MAGNETIC SIGNATURE
	17.31 ACOUSTIC SIGNATURE
	17.32 AVAILABILITY
	17.33 PORTABILITY (Software) <ul style="list-style-type: none"> <li>a. Adaptability</li> <li>b. Ease of Installation</li> <li>c. Conformance and ease of Replacement</li> </ul>
	17.34 REFERENCE EQUIPMENT
	17.35 PLATFORM
	17.36 SIMULATORS
18. MODIFICATION PROPOSAL PRICE / COSTS <ul style="list-style-type: none"> <li>a. DESIGN PREPARATION and DEVELOPMENT TRIALS <ul style="list-style-type: none"> <li>Preparation</li> <li>Bench Tests</li> <li>Trial Installation (PCA)</li> <li>Static Trials</li> <li>Mobile Trials</li> <li>TOTAL</li> </ul> </li> <li>NB Preparation / Trials costs may be authorised prior to classification of modification</li> <li>b. EMBODIMENT / MANUFACTURE</li> </ul>	<ul style="list-style-type: none"> <li>Repair &amp; reconditioning</li> <li>Return to Works</li> <li>Scrap</li> <li>Tools for Service - Embodiment</li> <li>Inspection Media</li> <li>Test Equipment</li> <li>Production Equipment</li> <li>Modification Kit</li> <li>Manufacturing Tooling</li> <li>Packaging</li> <li>TOTAL</li> <li>c. DESIGN INCORPORATION <ul style="list-style-type: none"> <li>Update Configuration Documentation</li> <li>Update Configuration Status Record</li> </ul> </li> </ul>

In Production Evaluation (GW) Retrospective Before delivery Production	Technical Documentation Amendments Modification Leaflet TOTAL
19. ADDITIONAL INFORMATION (As required)	
20. AUTHORITY IPT DECISION This decision is the authority to proceed with work subject to classification and approval by the 'Authorised Signatories' (Block 21)	21. MODIFICATION APPROVAL IPT Authority / Signature / Date Contractor DA / Signature / Date
22. SUPPORTING EVIDENCE (What, why and how)	

## COMPLETION GUIDE OF THE MODIFICATION PROPOSAL FORM

1. The Modification Proposal Form (MPF) has been designed to provide a generic means of proposing modifications when applying the requirements of this Standard. The form can be tailored to meet the specific requirements of the Product life cycle. The agreed format and information required is to be configured and identified in the CMP. The following information is given to assist in completing the MPF (reference is made to each box of the Modification proposal Form). Where it is inappropriate to complete a box, a diagonal line is to be inserted.

<b>BOX 1:</b> The name and address of the Design Authority (DA) or Contractor (if not the DA) should specified. In the latter case the name and address of the DA should also be provided.
<b>BOX 2:</b> The name of the main equipment (including project) should be specified eg Challenger, Nimrod, Astute, etc. The type or mark or model number, if applicable, and the part number and NATO stock number should also be given including the 'platform' specification.
<b>BOX 3:</b> A modification number (Notes 1) should be entered. For certain equipment the Authority may allocate a separate modification number and this should be inserted in the upper half of the box and the DA's modification number in the lower half, in brackets. In the case of a resubmission, the issue number of the MPF should be inserted below the modification number. Notes: Modification numbers should be used in a numerical sequence from a batch provided by the Authority or the Authority may accept Contractors designated numbers. The allocated modification numbers should be used in relevant correspondence. The Contractor should maintain a list of all modification numbers within the CSR.
<b>BOX 4:</b> The origin of the modification should be taken from the list provided below (paragraph 2). If a specification for the modification has been prepared its identity should be given and it would require an explanation with respect to the 'origin'.
<b>BOX 5:</b> The name of the Authority and the user Service(s) concerned should be given.
<b>BOX 6:</b> The modification group type (A/AB/B), if appropriate, into which the modification meets should be entered and explanation given. The modification groups are: GROUP A MODIFICATIONS - do not affect the interchangeability of the item with the equipment and do not require any embodiment on the main equipment by the Service unless annotated 'on replacement'. GROUP B MODIFICATIONS – are such that they justify a change of mark or type number of the equipment due to the change affecting the Physical Interchangeability or a Functional change warrants it. The main equipment would require modification action. GROUP AB MODIFICATIONS s when the equipment do not affect the physical interchangeability, but the functional change, although not warranting a change of type or mark number, gives an improvement such that early replacement by the Service(s) is justified, and it is essential to be able to identify the modified item by modification plate action or allocation of a new part number.
<b>BOX 7:</b> The name of the major assembly affected by the modification should be inserted, together with its part number and NATO stock number. The quantities of such assemblies in the main equipment defined in Box 2 should be stated. The name of the CI (if not the major assembly) which is to be modified should be entered, giving brief details of the modification, eg "Initiator (Part No 74863), plating of switch contacts". The number and identification of such items per major assembly where applicable should be stated. If a new item is to be introduced, state whether it is instead of or by conversion of an existing item. If an existing item is to be altered, the pre-modification and post-modification part numbers should be stated and NATO stock number given; if not known at the time of submission a space should be left for their insertion. When a submission is made to cover a Service, the service modification number should be

included, in brackets, at the end of the title and description.
<b>BOX 8:</b> This box should contain the number(s) of any other modifications(s) that are to be embodied beforehand or at the same time in the same or associated equipment and without which the modification could not be embodied or would not function correctly. If it is economical or convenient to embody other modifications concurrently, this should be stated in Box 19 "Additional Information", together with details of the estimated man-hours/cost saving. Also, the advantages or benefits to the customer should be stated in Box 19.
<b>BOX 9:</b> The names and locations of all other contractors to be affected by the modification, and also the title of the other materiel (items) affected (when known) should be given (see also Box 18). Insert "None" if there are no other contractors affected.
<b>BOX 10:</b> Give an estimate of the earliest embodiment point (ie date and/or item or batch or equipment number) when the modification can be embodied in the normal manufacturing sequence without delaying output. For repair, reconditioning and/or conversion date only is required. When a modification cannot be embodied in any item of the Production line enter "NIP" (not in Production). If it is possible to embody the modification earlier than quoted embodiment point, then the delay in Production and/or extra costs should be detailed in Box 19 "Additional Information". For modifications that recommend C and D classifications, the date of embodiment is only acceptable, except when retrospective embodiment by the Service(s) is required.
<b>BOX 11:</b> It should be stated if an embodiment is likely to cause any delay in delivery off the Production line or a major conversion program.
<b>BOX 12:</b> State the earliest date and the rate of delivery of modification sets by the DA. Normally the Services would supply all items that have a Service reference number and those which are common supply items. Details of such items should be given (see Box 17) for Services provisioning purposes to ensure that such items are available at the same time as the modification set. It also gives the Services the opportunity of requesting the DA to include such items in the modification set to be supplied. Note: Where appropriate, a time allowance should be made for the satisfactory completion of a proof installation.
<b>BOX 13:</b> The estimated man hours for Service embodiment should normally be given as five separate times and a total; when it is not practicable to separate these times an overall time only should be given. Normally it should be assumed that the times would be the same for Service embodiment as for Contractor embodiment but if, due to special circumstances, these times are likely to vary widely attention should be called to this fact by quoting both sets of times.
<b>BOX 14:</b> The Contractor should recommend the cost-effective method of implementation by using the 'classification' categories
<b>BOX 15:</b> The IPT affected should insert the relevant data in which the MPF was reviewed /authorised.
<b>BOX 16:</b> Should be completed by the IPT Authority.
<b>BOX 17:</b> A "yes" or "no" answer is required to the "features affected". When the answer is "yes" the relevant detail information should be available to demonstrate the affects on each feature when requested by the IPT for his consideration. The features being affected may have implications on the Product/equipment. The relevant information is to be supplied to the IPT on each modification(s) - attached with the appropriate MPF information such as, test results, reports, certification, proofs, requirements, approvals, data, records, procedures, methods, minutes, conditions, etc.
<b>BOX 17.01:</b> State whether the modification affects physical or functional interchangeability The physical interchangeability is considered to be affected when the item cannot be installed in the next higher assembly without a modification to the attached structure/fittings and the related MPF should stated the particular equipment/part and a new identification (part) number given. However, to avoid the expense of producing new drawings for small content design changes, Contractors/DAs may suffix the existing part number, which would be followed by the allocation of a new Service reference number.
<b>BOX 17.02:</b> Reliability & Maintainability: State whether the modification affects the reliability of the equipment/assembly to which it is to be fitted. Spares: State whether detailed parts listed as service spares for the item in question are made non- interchangeable by the modification. This aspect should not be confused with the effect of the modification on the interchangeability of the item in question that is covered in box 17.01. MSML Schedule: State if the modification affects the spare schedule. Storage: State if storage requirements are affected by the modification. Training: State if there is a requirement for new training for the modification implementation and subsequent support activities. Support equipment: State if the modification affects support equipment except that needed to support prime equipment software. Packaging: State if there is any change to the packaging requirements. Technical publications: State if the Service(s) technical publications are affected by the modification. If there is an impact on the extant NSNs with respect to this modification, then the item would need to be given a new NSN. This codification process is conducted by UKNCB. This activity should be in concert with Box 02.d.



<b>BOX 17.03:</b> State if any of the equipment interfaces are affected by this modification.
<b>BOX 17.04:</b> State the category of compatibility affected by material, explosives, chemicals, electromagnetic, nuclear, etc. State if the modification would require additional EMC testing prior to implementation. Also, state if the modification affects interfacing external compatibility, eg aircraft, main equipment. The name and location of the Contractor/DA affected should be entered in box 9.
<b>BOX 17.05:</b> The change in mass should be stated for equipment and installed equipment unless there is a significant moment change any mass change less than 0.5 kg should be shown as "no". The change in C of G or moment should be entered where applicable, eg where the change of mass or a change in physical location due to the modification has an effect on the equipment moment or the C of G of a guided missile.
<b>BOX 17.06:</b> State if the airworthiness is affected. State if structural integrity is affected. Structural and hull integrity are affected by any modification which directly or indirectly alters the static strength, fatigue life or corrosion resistance of the primary structure. If the answer is "yes" a copy of the modification proposal is to be referred by the IPT to the appropriate Structural/hull integrity Meeting. State if the modification to the vehicle installed or associated equipment, affects the safety of any of the vehicle's nuclear systems. A full explanation is to be provided in box 19 "Additional Information". State if the modification to the vehicle installed or associated equipment, affects the safety of any of the vehicle's weapons systems. A full explanation is to be provided in box 19 "Additional Information". State if the modification affects any nuclear weapon control system, Nuclear weapon suspension and release, Vibration characteristics and airflow around the weapon. When a modification affects the nuclear weapon system, it should be referred to IPT for approval of the safety aspects. The "features affected" box is to be marked "Yes" and the IPT approval reference is to be included in box 19 "Additional Information".
<b>BOX 17.07:</b> State if the modification affects handling/performance or operational requirements. A "yes" answer would lead to consideration by the IPT of the need for testing to assess the Safety case implications.
<b>BOX 17.08:</b> State if the electrical pulse characteristics are affected by the modification. State whether the modification affects the Fuse and Circuit Breaker Chart carried in the vehicle. State whether the modification results in changes to the electrical power requirements for the equipment being modified.
<b>BOX 17.09:</b> State whether the modification affects the HMI equipment integration.
<b>BOX 17.10:</b> State those items that are to be supplied to the Contractor from Authority sources for inclusion in the modification set.
<b>BOX 17.11:</b> State those items that are to be supplied from the Service in addition to the modification sets supplied from the Contractor OR the items to be supplied by the Service for a 'No Contractor Parts' (NCP) modification.
<b>BOX 17.12:</b> The creation of a list of material for NCP modification. To be compiled in Box 19.
<b>BOX 17.13:</b> State if Service held first to fourth line software test gear programs or hardware is affected.
<b>BOX 17.14:</b> State if nuclear hardening is affected by the modification.
<b>BOX 17.15:</b> State if any required documentation is affected by the modification, such as, Specification(s) - state if any of the Products specifications are impacted by this modification; Design Certificate - state if a new Design Certificate is required as a result of the modification (if "yes" record details in Box 19 "Additional Information"); Trials Documentation - state if any of the Products trial documentation may be affected by this modification; Approval submission documentation; EOD Procedures; Release to Service - state if the current release to service documentation is affected by this change (if yes, this may result in further clearance work for the Product); Repair procedures - state if the standard on repair procedures is affected by the modification and Minimum Standard Modification List (MSML) - state if the MSML is affected by this modification. The recommended modification classification should address any Products that are being utilised for clearance trials
<b>BOX 17.16:</b> State the strike number to be recorded on the modification plate, if applicable.
<b>BOX 17.17:</b> State whether Tempest clearance is affected by the modification. (If unsure, insert "Not known").
<b>BOX 17.18:</b> State if the modification affects the performance of the Product.
<b>BOX 17.19:</b> State if the modification affects the Environment control System of the Product.
<b>BOX 17.20:</b> State if the modification affects the Vulnerability of the Product
<b>BOX 17.21:</b> State if the modification affects the life of the Product.
<b>BOX 17.22:</b> State if the modification affects the Quality Assurance requirements of the Product.
<b>BOX 17.23:</b> State if any further trials are required to qualify/re-qualify the Product prior to modification implementation. Specify in Box 18



<b>BOX 17.24:</b> State if there is an affect on the ability to discriminate between objects or actions.
<b>BOX 17.25:</b> State if there is any impact on the Production line. This would be further addressed in the pricing data Box 18.
<b>BOX 17.26:</b> State if there is any impact on current Depot/Site capabilities/facilities in respect to modification implementation.
<b>BOX 17.27:</b> State if there is a requirement for the modification to be subjected to test or/and mock-up or/and Trial Installation/ Proof Installation activities. These require defining.
<b>BOX 17.28:</b> State if any of the test equipment requirements in respect to specification, automatic test, special to type, software are affected by this modification. These should be described within box 19.
<b>BOX 17.29:</b> State the effect on all tooling that is used for development/testing/Production/support. Prices for modifying should be provide in box 18 Price.
<b>BOX 17.30:</b> State if the modification has an affect on the Magnetic Signature of the Product.
<b>BOX 17.31:</b> State if the modification has an affect on the Acoustic Signature of the Product
<b>BOX 17.32:</b> State if the modification has an affect on the availability of the Product.
<b>BOX 17.33:</b> State if the modification has an affect on the Portability of the Product.
<b>BOX 17.34:</b> State if the special reference equipment would be affected in respect to calibration etc.
<b>BOX 17.35:</b> State if the parent platform would be affected by this modification.
<b>BOX 17.36:</b> State whether any simulators are affected by the modification.
<b>BOX 18:</b> The basis of the price quoted should be stated. When the basis for the price varies at different stages of a modification, the variation should be shown against the price to which it relates. The prices should include all cost elements including profit but excluding Value Added Tax.
<b>BOX 18a:</b> This records the price of each stage of a modification proposal, which is dealt with by the appropriate committee. If any stage is not required the words "not required" are to be inserted. The MPF would only be accepted as a contractual document when the relevant contract number is shown. Multiple contracts should be covered using sequential MPF's eg PDS for "modification preparation" resulting in a "special task" contract for design continuation, the contract number should to be quoted for the appropriate stage of the proposed submission. Details of any costs incurred in preparing the MPF for submission should be shown under "Preparation" and identified as having already been incurred. Where a Trial Installation (TI) is carried out by a Contractor's Working Party (CWP), the cost of travel, accommodation, etc. should not be included. When preparation or trial installation has been authorised and a subsequent MPF is being submitted, "Authorised £-----", should be shown against the stages concerned. Where test trials are required the number of hours/miles usage should be stated in Box 19 "Additional Information". Structural tests should be included in this box under ground/bench tests.
<p><b>BOX 18 b &amp; c:</b> The price in Production/embodiment is the difference in price between producing the unmodified item and the modified item. If the modification causes fewer rejects and other savings these should be reflected in the price. It should be stated whether the figures shown are an increase or decrease, and whether they are per item or Product or equipment set. When a modification affects a part of an assembly, both the part and assembly are provisioned as spares, then the price for both embodiment should be given separately. The Retrospective Before Delivery Production is the price of introducing the modification into the Products that have already been completed or partly manufactured but has not yet been delivered. The estimate should include the price of rework including stripping and re-testing.</p> <p>It should not include the price of re-testing sub-assemblies not affected by the modification and which have already passed final test prior to the retrospective work on the other assemblies. The price quoted should be the sum of these individual prices excluding the price of modification sets. The numbers of equipment involved should also be state. The Repair and Reconditioning is the labour price necessary to embody the modification, if so classified, into each Product returned for repair or reconditioning. When estimating is difficult, the price, exclusive of any stripping and reassemble, should be stated, and so annotated.</p> <p>The price of embodying Class A and B modifications should include the price of additional stripping. The price of embodying Class C modifications should be for embodiment only. Where items are to be modified by return to the DA's works, the price quoted for each equipment should include Labour (actual work on the items detailed for return (including stripping, re-assembly, testing and additional items) enabling the return to the Service of the modified items);</p> <p>Tooling (the price of new tools and special tools/equipment including Production test equipment and quality assurance measuring or checking equipment, new equipment); and/or modifications to existing tools required for Production of the modification parts or modification set or to facilitate embodiment of the modification by the DA in Production or retrospectively, should be shown separately under this heading);</p>

<p>Scrap (Scrap prices incurred on items being purchased from another DA that has its own modification committee should not be quoted as this would be covered by that DA's companion modification, only the estimated price of any tooling and / or special factory test equipment that becomes redundant as a result of the modification, nor scrap arising from spares and maintenance);</p> <p>In-Production (the in Production scrap prices quoted should be the total price of scrap arising on new Production only and includes all parts manufactured or partially manufactured plus materials/items procured for incorporation in new Production, that are rendered surplus by the modification in relation to the stated embodiment point) and Retrospective Before Delivery (RBD) (the RBD redundancies price quoted should be the total price of all parts manufactured and rendered redundant by retrospective embodiment of the modification); Maximum scrap price (this is an alternative to scrap (RBD) and scrap in Production when required by the modification committee. It is the estimated price of any materials that become redundant plus the price of any work that has been done on such materials as a result of embodying the modification at a stated embodiment point. The maximum scrap estimate should not be exceeded without prior sanction of the appropriate modification committee).</p> <p>Special Tools For Service Embodiment is the price of special tools for Service embodiment which is to be kept separate from the price of the modification set, as such tools would be supplied on a different scaling. A list of such tools, including nomenclature and part numbers, should be given in Box 19 "Additional Information".</p> <p>Modification Set is the price of the modification set excluding embodiment loan items.</p> <p>Design Incorporation is the price of design incorporation excluding technical publication prices.</p> <p>Modification Leaflet is the individual total prices of the modification leaflet (ML) and should be inserted.</p> <p>Technical Publications is the price of the technical publications. A breakdown of the price showing each publication affected, the associated price and respective publication authority should be included in Box 19 "Additional Information".</p>	
<p><b>BOX 19:</b> Any additional information pertinent to the modification in particular, where relevant is to be provided, including supplementary information called for in Boxes 8 and 9 and listing called for in Box 17 requirements as required. Where the DA is not the main equipment DA and a modification affects the 'safety case' (Box 06) (eg when changes alter primary structural strength or services such as controls, electrical, hydraulic or other systems) the main equipment DA should be consulted. State that the modification has been referred to the main equipment DA and the approval reference.</p>	
<p><b>BOX 20:</b> Should be completed by the relevant IPT. The following standard statements may be included, as appropriate. Recommendation - Production work cannot proceed on a "recommendation". Decision - "This is the authority for work to proceed on this modification (subject to the agreement of a fair and reasonable price by both parties - the price must be agreed first) in accordance with the following decision". Note 1: the Decision would include the modification classification. Note 2: the recommendation may include a recommended modification classification.</p>	
<p><b>BOX 21:</b> The MPF should be signed by the Authority or delegated signatory (IPTL) and the Contractor/DA. The DA signature is to confirm agreement with the contents including any changes agreed by the IPT. Note: The MPF is initially approved by the Authority or delegated signatory (IPTL) with the agreement of the commercial branch to proceed subject to contract amendment.</p>	
<p><b>BOX 22:</b> Give a brief statement of why the modification is necessary and how it achieves its purpose if this is not apparent from the "title and description" box. Details of known failures (Service or civilian) should be given, including the incidence of faults or defects. If the modification proposal is being resubmitted record the issue number of the MPF and state the reason for the re-submission. Where a modification is introduced either as a result of a change in specification or as a result of a new specification requirement, this should be stated and the specification identity and issue quoted. When the design of a trial installation for another modification is proceeding concurrently and there is a possibility of duplication of effort, this should be made known in the evidence as early as possible. Reference should not be made to correspondence or documentation that is not available to the IPT unless extracts from this correspondence or documentation are also given.</p>	

2. The following is a standard list of origins for modifications. Each Modification Proposal Form should include a heading from **Column 1**, followed by one or more from Column 2 or as appropriate.

COLUMN 1	COLUMN 2
MOD User Requirement.	Subsequent to specification
Service Customers' Requirement	Brought about by Service use
MOD Requirement	Consequent upon role change

Design Improvement Design Change Design Fault Failure To Meet Design Requirements Failure To Meet Design Specification Requirements Financial Saving Commercial Telecommunication Requirements Production Improvement Production Easement Quality Improvement Recording Requirement Improved Reliability Incompatibility Legal Requirements Safety	Promulgated by User Requirement Form Promulgated by Service Radio Installation Modification requirement To save weight Resulting from manufacturing experience Resulting from civil operator's experience Brought about by DA trials Brought about by experimental trials Due to non-availability of component To ease servicing To extend life of item To meet a Joint Requirement Consequent upon a change to another item To cover design change in embodiment loan equipment Consequent upon circuit or system change. Consequent upon a change of material Resulting in/from a foul Resulting in/from a fire hazard Bought to light by strength tests Bought to light by fatigue tests Bought to light by environmental tests To eliminate radiation hazard To introduce frequency change in previous modification
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