

Training for Small and Medium Enterprises

on

CONFIGURATION MANAGEMENT

This material is for general instruction purpose only. It is not meant to take precedence over applicable project requirements, documents or definitions.

Section 0 - Introduction and Table of Contents

- Introduction

The following presentation material for a training course in Configuration Management has been prepared under ESA's initiative to familiarize personnel of small and medium enterprises in space business related project management and engineering practices.

In regard of Configuration Management matters as discussed herein, the author was committed to treat Hardware and Software Configuration Management peculiar issues with equal attention.

Primarily, and to the extent possible, terminology, definitions and processes established by the new European Cooperation for Space Standardization (ECSS) are used. In addition, when suitable, differences to NASA terminology and definitions are addressed.

Students taking this course should be aware that Configuration Management is strongly tied to Systems Engineering practices and thus, involving a broad variety of subjects to be covered. This is especially the case when focusing Software Configuration Management.

The lecturing material contained herein could, depending on the time scheduled for this course, be too extensive for being covered by the lecturer's presentation in all aspects and in sufficient detail. Taking this in account, training handouts were prepared in a style which permits self-educational exercise after attendance at the course.

Section 0 - Introduction and Table of Contents

- Table of Contents
 - Section 1: Explaining Configuration Management
 - About the term “Configuration”
 - A variety of definitions for CM from worldwide accepted standards
 - A very general, yet good explaining definition for CM
 - The evolution of CM as a technical-administrative discipline
 - The objectives of CM
 - Benefits for an enterprise gained through application of CM
 - Section 2: Policy and Principles of CM
 - Implementing CM policy by task assignment
 - Configuration Management Tasks
 - Two CM cornerstone principles

Section 0 - Introduction and Table of Contents

- Table of Contents (contd)
 - Section 3: The Four plus One Functions of CM
 - Configuration Identification
 - Configuration (Evolution/Change) Control
 - Configuration Status Accounting
 - Configuration Verification Review and CM Audit
 - Configuration Management of digital data
 - Section 4: Configuration Identification
 - Purpose of the configuration identification function
 - Controlled evolution of the configuration
 - Structuring the product
 - Assigning Configuration Items

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- Table of Contents (contd)
 - Section 4: Configuration Identification (contd)
 - Identify the configuration through requirements
 - Identify the configuration through design
 - Identifying product interfaces
 - Establishing product interchangeability criteria
 - Making the product traceable to its definition data
 - Section 5: Configuration Control
 - Purpose of the configuration control function
 - Defining engineering changes and configuration departures
 - Establishing “change authorities”
 - Configuration control board participation
 - Configuration control board activities

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- Table of Contents (contd)
 - Section 5: Configuration Control (contd)
 - CM`s role in the CCB / CRB process
 - Classifying engineering changes and designating deviations
 - Designating waiver
 - Prioritizing engineering / software changes
 - Initiating an engineering or software change by problem reporting
 - The engineering / software change cycle
 - Typical change documentation in the process of an engineering change
 - The change implementation process
 - Verifying the incorporation of engineering changes and deviations
 - A generic engineering / software change or deviation process
 - Initiating hard- or software changes caused by firmware problems

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- Table of Contents (contd)
 - Section 5: Configuration Control (contd)
 - Requesting deviations and waivers
 - Processing a request for deviation
 - Processing a request for waiver
 - A generic waiver process

 - Section 6: Configuration Status Accounting
 - Purpose of the configuration status accounting (and reporting) function
 - Why to perform an accounting exercise in CM ?
 - The configuration status accounting activity model
 - CSA capabilities vs. progression of the system life-cycle
 - A basic configuration data flow

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- Table of Contents (contd)
 - Section 6: Configuration Status Accounting Primary CSA data elements (contd)
 - Primary CSA data elements
 - Typical CSA information related to project phases
 - A variety of CSA reports
 - CSA in an automated information system environment
 - Section 7: Configuration Verification Review and CM Audit
 - Purpose of the configuration verification and CM audit function
 - Planning and preparing Configuration Verification Reviews
 - The Configuration Verification Review activity model
 - Conducting Configuration Verification Reviews
 - The configuration certification package content
 - Auditing CM organizations
 - Major topics for CM audits

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- Table of Contents (contd)
 - Section 8: Project activities with significant CM involvement
 - CM in technical data / documentation management
 - CM in project technical reviews
 - CM in subcontractor / supplier operations control
 - CM in subcontractor design control
 - CM in survey of non-developmental items, critical materials and critical manufacturing processes
 - CM and the Nonconformance Review Board
 - Section 9: Understanding ECSS-M-40A
 - The original scope for the ECSS CM standard
 - Yet to be established level 3 CM guidelines
 - Walking through section 5 and evaluating the requirements: Configuration Identification

Section 0 - Introduction and Table of Contents

- Table of Contents (contd)
 - Section 9: Understanding ECSS-M-40A (contd)
 - Walking through section 5 and evaluating the requirements: Configuration Control
 - Walking through section 5 and evaluating the requirements: Configuration Status Accounting
 - Walking through section 5 and evaluating the requirements: Configuration Verification
 - Walking through section 5 and evaluating the requirements:
Application Methods: Implementation Documentation for Configuration Management
 - Conclusion and the future of the ECSS CM standard
 - Section 10: Tailoring of standard CM requirements for project needs
 - What size and style of CM organization is affordable for the enterprise?
 - The level of design control envisaged
 - Interface control requirements in a multi-design-authority scenario
 - The logistics support concept

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- Table of Contents (contd)
 - Section 11: Establishing a Configuration Management Organization
 - At which organization level to install CM ?
 - A centralized CM organization or a project governed CM ?
 - Example for a three-level configuration management operation
 - Hardware and software CM; combined or separated
 - Staffing the CM organization
 - Establishing links to the organizational periphery
 - Funding CM operations
 - Section 12: Preparing a CM Implementation Document
 - The generic enterprise CM manual
 - The project CM plan
 - Procedures complementing and executing the CM plan
 - A breakdown of typical CM / TDM procedures

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- Table of Contents (contd)
 - Appendix 1: Software related Documents and their Purpose
 - Appendix 2: Index of CM and Software Life-cycle Standards publicly available
 - CM and CM related standards
 - Software life-cycle standards
 - Appendix 3: Some CM Literature