Australian Government

MEM234038 Apply systems engineering procedures to engineering design project management

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM234038A Apply systems engineering procedures to engineering design project management.

Application

This unit of competency defines the skills and knowledge required to apply systems engineering procedures in the management of complex engineering design projects where extensive integration of subsystems and/or components by a multi-discipline engineering team is required. The system hardware, architecture and software design aspects of systems engineering are covered in specialist design units of competency which all include a requirement for the application of systems thinking.

The systems engineering process is a comprehensive process for the design and integration of complex systems where the actual design work is performed by appropriately qualified specialist engineers. The management process ensures that the design activities are coordinated and integrated into a system that meets specified performance requirements.

Management processes in this unit can relate to all design stages and can include the development of systems software. In the production and life cycle management stages, systems engineering design stage output data can be used in the application of configuration management (CM) procedures and/or to support the application of integrated logistic support (ILS). Units MEM234036 Apply configuration management procedures in engineering project management and MEM234037 Perform maintenance-related integrated logistic support management activities, describe these activities and should be used where justified by system size and complexity or where required by contract.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

Nil

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria

Elements describe the essential *outcomes.*	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
1. Analyse and document system requirements	1.1 Identify and document customer or contractual requirements 1.2 Establish a systems engineering team and allocate responsibilities 1.3 Analyse system requirements and define functional requirements and design constraints
2. Perform functional analysis and allocation	2.1 Disassemble system functions to lower-level functions applicable to system design 2.2 Allocate design constraints to all functional levels 2.3 Define and refine internal and external functional interfaces 2.4 Define, refine and integrate functional architecture 2.5 Analyse functional analysis outcomes against requirements 2.6 Develop and document the functional baseline
3. Manage preliminary design activities	3.1 Coordinate the development of performance specifications for the system and components 3.2 Define alternatives for system concepts, components and system elements 3.3 Select preferred product and process solutions 3.4 Define and refine internal and external physical interfaces 3.5 Define and refine system software requirements 3.6 Develop and document the allocated baseline
4. Manage the detail design activities	4.1 Coordinate development of item, process and material specifications 4.2 Coordinate development of software specifications 4.3 Coordinate development of engineering drawings and associated material, component and hardware lists 4.4 Coordinate development of performance specifications 4.5 Determine product review and design verification procedures 4.6 Develop and document the product baseline
5. Provide oversight of production and delivery	5.1 Apply product review and verification procedures and initiate action to remedy design or production deficiencies 5.2 Ensure that all relevant regulatory requirements are met
6. Provide for life cycle management of the system, components and	6.1 Deliver the technical data package and define the configuration items (CIs) and baselines, where there is a contractual requirement for application of CM

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software	6.2 Deliver the technical data package and data required for the development of the relevant ILS plans, where there is a contractual requirement for ILS 6.3 Deliver the technical data package and develop procedures for the management of the configuration of the system, system components and software, where there are no contractual requirements regarding life cycle management

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.	
System requirements analysis involves inputs including:	• customer needs and objectives • regulatory requirements • the technology base • clarifying and defining functional requirements and design constraints.
Baselines document a product at a specific stage of design definition and include:	• functional baseline describing system level requirements • allocated baseline describing design requirements for items below systems level • product baseline describing the physical detail of the product.
Technical data package includes:	• engineering drawings and associated lists, technical manuals • manufacturing part programs, verification provisions, spares provisioning lists • specifications developed for the system and system components • specifications and standards from international and national bodies (government and non-government) • relevant regulatory standards and requirements.

Reference material includes:	• System Engineering Fundamentals, Dept of Defense Systems Management College • NASA/SP-2007-6105 Rev 2 NASA Systems Engineering Handbook • Project Documentation Document SPEC-0064 Rev A, ATST System Engineering Plan • 7th Annual Conference on Systems Engineering Research 2009 (CSER 2009), Systems Thinking or Systems Engineering.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM234038A Apply systems engineering procedures to engineering design project management.

Links

Companion Volume implementation guides are found in VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2