



Australian Government

**MEA730 Apply systems engineering
procedures to airworthiness engineering
design project management**

Release: 2

MEA730 Apply systems engineering procedures to airworthiness engineering design project management

Modification History

Release 2. Equivalent to MEA730 Apply systems engineering procedures to airworthiness engineering design project management with amended prerequisite codes.

Application

Systems engineering procedures are applied in setting up management procedures for engineering design projects involving the design of complex systems that require the integration of subsystems and/or components by a multi-discipline engineering team. The management processes may relate to all design stages and may include the development of systems software. In the production and life-cycle management stages, systems engineering design stage output data may be used in the application of configuration management (CM) procedures (MEA729 Apply configuration management procedures in airworthiness engineering management) and/or to support the application of integrated logistic support (ILS) (MEA139 Perform aviation maintenance-related integrated logistic support management activities) where justified by system size and complexity or where required by contract.

This unit is used in workplaces that operate under the airworthiness regulatory systems of the Australian Defence Force (ADF) and the Civil Aviation Safety Authority (CASA).

Pre-requisite Unit

MEA135	Use computers in aviation maintenance-related integrated logistic support activities
MEA162	Write aviation technical publications

Competency Field

Airworthiness engineering management

Unit Sector

Elements and 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 system requirements and relevant regulatory requirements |
| | | 1.2 | Set up 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 | Decompose 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 | Review functional analysis outcomes against requirements and revise where necessary |
| | | 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 the development of item, process and material specifications |
| | | 4.2 | Coordinate the development of software specifications |
| | | 4.3 | Coordinate the development of engineering drawings and associated material/component/hardware lists |
| | | 4.4 | Coordinate the development of item 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 being met
6.	Provide for life-cycle management of the system, components and software	6.1 Where there is a contractual requirement for application of CM, provide the technical data package and define the configuration items and baselines
		6.2 Where there is a contractual requirement for ILS, provide the technical data package and data required for the development of the relevant ILS plans
		6.3 Where there are no contractual requirements regarding life-cycle management, deliver the technical data package and develop procedures for the management of the configuration of the system, system components and software that meet relevant regulatory requirements

Foundation Skills

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.

- Systems engineering process management:**
- The systems engineering process is a comprehensive process for the design and integration of complex systems that cover a range of engineering disciplines. The actual design work will be performed by appropriately qualified specialist engineers and the

	management process ensures that the design activities are coordinated and integrated into a system that meets specified performance requirements and complies with relevant airworthiness regulations
System requirements analysis:	• System requirements analysis involves inputs, such as customer needs and objectives, regulatory requirements and the technology base. It must clarify and define functional requirements and design constraints
Functional analysis and allocation:	• Functional analysis and allocation provides a greater understanding of what the system has to do and allocates overall system performance requirements to lower level subsystem and component functions. In so doing, it provides information essential to optimising physical solutions
Baselines:	• The functional, allocated and product baselines document a product at a specific stage of design definition. The functional baseline describes system level requirements, the allocated baseline describes design requirements for items below systems level and the product baseline describes the product physical detail
Technical data packages include:	• 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 materials include:	• System Engineering Fundamentals, Dept of Defence Systems Management College • NASA/SP-2007-6105 Rev 1 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
Airworthiness regulations are found in:	• AAP7001.053 Technical Airworthiness Management Manual • Civil Aviation Safety Regulations (CASRs) and related documentation/publications

Unit Mapping Information

Release 2. Equivalent to MEA730 Apply systems engineering procedures to airworthiness engineering design project management

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

Assessment Requirements for MEA730 Apply systems engineering procedures to airworthiness engineering design project management

Modification History

Release 2. Equivalent to MEA730 Apply systems engineering procedures to airworthiness engineering design project management with amended prerequisite codes.

Performance Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria under the specified conditions of assessment, and must include:

- setting up and managing procedures for systems analysis and control that comply with relevant airworthiness regulations
- setting up and managing a systems engineering team
- developing and implementing procedures for identification of systems engineering process inputs
- managing, and recording the outcomes of, requirements analysis
- managing and recording the outcomes of functional analysis and allocation and apply the requirements loop process
- developing and documenting the functional baseline
- managing the development of the system specification and preliminary design
- developing and documenting the allocated baseline
- applying the design loop process
- managing the detail design process and using outputs to develop a technical data package that meets airworthiness regulatory requirements
- developing and documenting the product baseline
- maintaining oversight of the production and delivery phase
- providing process outputs for the establishment of CM procedures or ILS plans
- determining requirements for life-cycle management where CM or ILS is not required and setting up and documenting a life-cycle management system that complies with relevant airworthiness regulations.

Knowledge Evidence

Evidence required to demonstrate competency in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- the systems engineering process and management procedures, including relevant airworthiness regulations
- how to set up and manage the activities of a systems engineering design team
- development of specifications and standards

- identification of applicable published specifications and standards
- how to set up and manage a systems analysis and control database
- how to use process outputs to set up CM and ILS systems for through-life management
- how to develop and document an applicable life-cycle management system where CM or ILS is not prescribed or is inappropriate
- ethical considerations in systems engineering.

Assessment Conditions

- This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is, the candidate is not in productive work, then a simulated working environment must be used that reflects realistic workplace situations and conditions.
- The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.
- Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
- Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application.
- Assessment may be applied under project-related conditions (real or simulated) and require evidence of process.
- Assessment must confirm a reasonable inference that competency is able not only to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.
- Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in managing the application of the systems engineering process.
- Assessment may be in conjunction with assessment of other units of competency where required.
- Assessors must satisfy the requirements of the National Vocational Education and Training Regulator (Australian Skills Quality Authority, or its successors).

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>