



Australian Government

MEA714 Integrate avionic fundamentals into an engineering task

Release: 1

MEA714 Integrate avionic fundamentals into an engineering task

Modification History

Release 1 - New unit of competency

Application

The unit of competency applies to engineering or related projects requiring avionic engineering skills and includes the identification, application and integration of avionic fundamentals. It includes identifying task parameters, personal and team function, chain of responsibility and work health and safety (WHS) guidelines. It includes investigation of aircraft electrical, instrument, radio and data systems and components and avionic fundamentals, including electrical and electronic methods and processes, workshop techniques, materials, scientific and mathematical principles and computer software. It requires completion of the task in cooperation with the team and documentation of the process and outcomes.

It is suitable for people pursuing paraprofessional careers and qualifications in avionic engineering.

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

MEA706 Apply basic scientific principles and techniques in avionic engineering

and

MEM23004A Apply technical mathematics

PLUS

MEM23007A Apply calculus to engineering tasks

or

MEA727 Apply calculus in avionic engineering situations

Competency Field

Avionic engineering

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1.	Investigate scope of engineering task	1.1	Determine task parameters and context
		1.2	Confirm personal functions and responsibilities, team and support functional group interdependencies and communications
		1.3	Confirm that task and responsibility is appropriate to qualifications and delegations and that appropriate support including technical and professional assistance is available when required
		1.4	Determine chain of responsibility for the activity
		1.5	Determine WHS, regulatory requirements, risk management and organisational procedures
2.	Evaluate task for avionic fundamentals requirements	2.1	Evaluate methods, processes and workshop techniques required by task
		2.2	Evaluate avionic fundamentals required by task
		2.3	Evaluate functions and features of avionic components and systems related to the task
		2.4	Evaluate software techniques required for basic programming, analysis and graphics
3.	Integrate avionic fundamentals	3.1	Plan the task
		3.2	Communicate, cooperate and negotiate with stakeholders, use systems thinking to address contingencies and constraints, problem solving and decision making and continuous improvement to achieve integration task
		3.4	Integrate avionic fundamentals to achieve task objectives
4.	Report results	4.1	Report results of investigation, evaluation and integration
		4.2	Provide documentation, such as diagrams and

calculations

- 4.3 Provide documentation, such as modification instructions and maintenance manual or manual amendment and other documentation required by configuration management (CM) or integrated logistic support (ILS) procedures, where applicable

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.

Appropriate technical and professional assistance includes:

- Assistance from holders of specific licenses and authorisations required by the relevant airworthiness regulator, CASA or the ADF
- Technical support and advice relating to elements which have intrinsic dangers, for example:
 - high pressure
 - energised fluid vessels
 - high temperatures and heat energy capacity
 - wiring with high current control voltages above extra low voltage
- Professional support for technologies, such as:
 - specialist electric motor drives and controllers
 - specialist materials, plastics, metal alloys and nano materials
- Special processes, foundry, alloy welding, heat treatment, sealing and fastening

WHS, regulatory requirements and enterprise procedures include:

- WHS Acts and regulations
- Relevant standards
- Industry codes of practice
- Risk assessments
- Registration requirements
- Safe work practices
- State and territory regulatory requirements applying to

	electrical work • Civil Aviation Safety Regulations (CASRs) • AAP7001.053 ADF Technical Airworthiness Management Manual • Overseas airworthiness authorities where applicable e.g. Federal Aviation Administration, Transport Canada, European Aviation Safety Agency
Systems thinking includes:	• The process of developing solutions within the context of an entire system • Recognising that an improvement in one subsystem can adversely affect another subsystem
Continuous improvement implementation	• Continuous improvement implementation relates to plant, products, processes, systems or services including design, development, implementation or manufacture, commissioning, operation or delivery and maintenance. Continuous improvement is part of CM and ILS • Improvement processes, including: • balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and using of software • training for improvement systems participation • technical training
Constraints and contingencies include:	• Financial • Organisation procedural or culture • Physical constraints, such as limits to resources, limits to site access or logistical limitations • Airworthiness regulatory requirements
Configuration management (CM)	• CM is a process for control and documentation of the design and development process and for the management of system, component and software throughout the service life
Integrated logistic support (ILS)	• ILS is an integrated approach to the management of logistic disciplines originally developed for the management of military systems from design concept to final disposal at life-of-type. It covers: • reliability engineering, maintainability engineering and maintenance planning • supply and support

	• support and test equipment • manpower and personnel • training and training support • technical data and publications • computer resources support • facilities • packaging, handling, storage and transportation • design interface
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Unit Mapping Information

Release 1 – new unit based on MEM14084A Apply avionic fundamentals to support design and development of engineering projects and MEM23074A Select and apply avionic engineering methods, processes and construction techniques – units not equivalent

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 MEA714 Integrate avionic fundamentals into an engineering task

Modification History

Release 1 - New unit of competency

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:

- communicating, cooperating and negotiating with stakeholders to achieve integration task
- determining task parameters and context, chain of responsibility, WHS, regulatory requirements, risk management and organisational procedures
- confirming personal, team and support personnel tasks and responsibilities
- evaluating task requirements, principles, techniques, avionic components and systems, including software requirements, and software for basic analysis and graphics
- planning the task
- integrating avionic fundamentals to achieve task objectives
- solve problems and making decisions using systems thinking and continuous improvement to address contingencies and constraints and application of CM and/or ILS procedures
- reporting and documenting results of investigation, evaluation and integration, diagrams and calculations.

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:

- WHS and organisational safe working procedures
- task parameters and broader context
- personal function and responsibilities
- chain of responsibility for the activity
- team interdependencies
- avionic fundamentals, including:
 - mathematics
 - materials properties
 - mechanics
 - chemistry
 - light, sound and electromagnetic effects, including avoidance of electro-magnetic interference
 - thermodynamics and heating, aircraft air conditioning and cabin pressurisation

- fluid mechanics
- fluid power
- electrical and electronic fundamentals
- fundamentals of system interfacing and signal conditioning
- computing
- graphics, including computer aided design and drafting (CAD) systems
- typical workshop processes
- methods and processes, including:
 - basic electrical and electronic control circuit assembly, including production of printed circuit boards
 - wiring and soldering, including high reliability hand soldering
 - simple programming
 - simple interfacing and signal conditioning
 - machining, such as turning, milling, broaching, boring, shaping, planning, drilling, reaming, sawing, grinding and threading
 - hot and cold working processes
 - press operations, such as drawing, punching, cropping and forging
 - fabrication and welding of metals and plastics
 - powder metallurgy
 - heat treatment
 - moulding, casting and forging
 - assembly, sealing, fastening and gluing
 - jigs and fixtures
 - surface plating and coating
 - computer-aided engineering (CAE) processes, such as CAD/computer-aided manufacturing (CAM)/computer-numerically controlled (CNC)/rapid processes
- functions and features of avionic components and systems, including:
 - electrical systems and related wiring and components (power generation, distribution, circuit protection, control interfaces with hydraulic and pneumatic systems, and caution and warning systems)
 - mechanical and electro-mechanical flight instruments (pitot/static, barometric and gyroscopic) and indication systems (quantity, pressure, temperature and position)
 - electronic systems and components (communications, radio navigation, pulse, display, automatic flight control, flight management and engine management)
 - air conditioning and cabin pressurisation control systems
 - automatic test stations, adapters and software
- integration of avionic fundamentals required for task
- communication requirements of task
- current options and trends in software, including circuit and system layout and simulation
- integration management methods.

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:
 - communicate, cooperate and negotiate with stakeholders to achieve integration task
 - determine task parameters and context, chain of responsibility, WHS, regulatory requirements, risk management and organisational procedures
 - confirm personal, team and support personnel tasks and responsibilities
 - evaluate task requirements, principles, techniques, typical applications and software
 - plan the task
 - integrate avionic fundamentals to achieve task objectives
 - solve problems and make decisions using systems thinking and continuous improvement to address contingencies and constraints
 - report and document results.
- 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

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