Australian Government

MEA717 Evaluate avionic digital systems

Release: 1

MEA717 Evaluate avionic digital systems

Modification History

Release 1 - New unit of competency

Application

This unit of competency applies to avionic digital communication, navigation, instrument display, on-board computer and automatic flight systems and software for these systems. It involves evaluation of systems for compliance with design and performance standards and with airworthiness regulatory requirements within both civil and military environments.

Also covered is documentation of the evaluation process within management systems, such as configuration management (CM) and integrated logistic support (ILS).

It is suitable for people working as paraprofessionals within aircraft design teams, within the engineering departments of aircraft maintenance organisations or employed within Continuing Airworthiness Management Organisations (CAMOs) and Approved Engineering Organisations, and for those pursuing qualifications or careers in those fields.

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

MEA712	Apply avionic digital design techniques
MEA727	Apply calculus in avionic engineering situations

Competency Field

Unit Sector

Elements and Performance Criteria

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.
1.	Prepare to evaluate avionic digital system	1.1 Confirm and apply safe electrical working practice
		1.2 Review the effects of electricity on humans and identify dangerous high currents and voltages and regulatory requirements related to extra low, low and high voltage applications and relate these to aircraft

			digital system operation and maintenance
		1.3	Determine parameters and context of applications and purpose of evaluation
		1.4	Confirm personal functions and responsibilities, team and support functional group interdependencies and communications
		1.5	Confirm that tasks and responsibilities are appropriate to qualifications and delegations and that appropriate support, including technical and professional assistance, is available
		1.6	Determine chain of responsibility for the activity evaluation, reporting arrangements and timelines
		1.7	Identify work health and safety (WHS) and regulatory requirements with particular emphasis on safety, codes of practice, performance requirements and standards, including airworthiness regulatory requirements for avionic systems, risk management and organisational procedures
2.	Identify principles and techniques required for evaluation of avionic digital system and system components	2.1	Identify features and functions of avionic digital systems and components
		2.2	Review avionic digital system design and layout requirements and techniques
		2.3	Identify system power requirements and interfaces with aircraft and avionic analogue systems
		2.4	Identify electro-magnetic interference protection requirements
3.	Evaluate avionic digital system and system components	3.1	Evaluate proposed modifications to avionic digital systems, system components and software
		3.2	Evaluate avionic digital system and system component maintenance requirements
		3.3	Evaluate avionic digital systems and system component reliability and defect history
		3.4	Evaluate proposed component and piece part substitution
		3.5	Evaluate application for compliance with WHS Acts, regulations, codes, directives and

			standards/specifications, including those related to risk management
4.	Report results	4.1	Report results of scoping, principles and techniques identification and evaluation of applications
		4.2	Provide documentation, such as system schematics, software, wiring diagrams and data required by CM and/or ILS, and for compliance with airworthiness regulations

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.

Avionic digital systems include:

- Digital communications, including high frequency (HF), very high frequency (VHF), ultra-high frequency (UHF) and satellite
- Aircraft communication addressing and reporting (ACAR) system
- Display, including primary flight, multi-function and engine indicating and crew alerting
- Head-up display
- Automatic flight control
- Full-authority digital engine control
- Flight management computer
- Area navigation (RNAV)
- Traffic alert and collision avoidance
- Enhanced ground position warning
- Global navigation
- Inertial navigation and inertial reference
- Integrated modular avionics
- Cabin systems
- On-board maintenance computers
- Interfaces with avionic analogue communication and navigation systems

Digital system components include:

- Receivers
- Transmitters
- Transceivers
- Racks and cooling fans
- Tuners
- Computers and micro-processors
- Displays (CRT or LCD)
- Antennas and related cables and hardware
- Digital electronic circuitry and components
- Data buses
- Pitot/static system components
- Wiring and related hardware
- Fuses and circuit breakers
- Synchros and servos
- Gyroscopes
- Sensors
- Power supplies

Standards and guidance material include:

- ADF AAP7001.054 Airworthiness Design Requirements Manual
- CASA AC 21-46(0) Airworthiness Approval of Avionic Equipment
- FAR Part 23 Airworthiness Standards for Airplanes in the Normal, Utility, Aerobatic or Commuter Categories
- FAR Part 25 Airworthiness Standards for Airplanes in the Transport Category
- EASA CS-23 Certification Specifications for Aeroplanes in the Normal, Utility, Aerobatic or Commuter Categories
- EASA CS-25 Certification Specifications for Airplanes in the Transport Category
- CASA AC 21-99 Aircraft Wiring and Bonding
- RTCA DO-160D Environmental Conditions and Test Procedures for Airborne Equipment
- RTCA DO-178B (also EUROCAE ED-12B) Software Considerations in Airborne Systems and Equipment Certification
- IEEE/EIA 12207 Information technology – Software life cycle processes
- Military Specification MIL-E-7016F: Electrical Load and Power Source Capacity, Aircraft, Analysis of
- SAE Aerospace AS50881 Wiring Aerospace Vehicles
- CASA AC21.16(0) Approval of material, parts, processes and appliances
- CASA AC21.145(0) Manufacture of parts during the

	course of maintenance • CASA AC21.601(0) Australian Technical Standards Order Authorisation • CASA CAAP35-7(0) Design approval of modifications and repairs • FAA AC 43-13-1B Acceptable Methods, Techniques and Practices – Aircraft Inspection and Repair • The Avionics Handbook • FAA-H-8083-6 Advanced Avionics Handbook
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
Appropriate technical and professional assistance includes:	• Assistance from individuals with CASA maintenance certification licenses or those with supervisory authorisations in the ADF regulatory system • Professional support from engineers employed within: • organisations with CASA continuing airworthiness management or maintenance approvals • approved engineering organisations under the ADF regulatory system • Engineers employed within organisations recognised by overseas airworthiness organisations
WHS, regulatory requirements and enterprise procedures include:	• WHS Acts and regulations • Relevant standards • Industry codes of practice • Risk assessments • Registration requirements

- Safe work practices
- 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

Unit Mapping Information

Release 1 – new unit based on MEM23096A Apply avionic system design principles and techniques in avionic engineering situations, MEM23096A Apply avionic system design principles and techniques in avionic engineering situations and MEM23098A Apply automated system principles and techniques in avionic engineering situations – 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