



Australian Government

MEA716 Evaluate avionics analogue systems

Release: 1

MEA716 Evaluate avionic analogue systems

Modification History

Release 1 - New unit of competency

Application

This unit of competency applies to avionic analogue communication, navigation, instrument and automatic pilot systems. It involves evaluation of systems in accordance with standards and regulatory requirements within both civil and military environments for compliance with design and performance standards and with airworthiness regulatory requirements.

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 within aircraft design teams, within the engineering departments of aircraft maintenance organisations or employed within Continuing Airworthiness Management Organisations (CAMOs) and Approved Engineering Organisations (AEOs), and for those pursuing paraprofessional 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

MEA711 Apply avionic analogue design techniques

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.

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|----|---|-----|--|
| 1. | Prepare to evaluate avionic analogue 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 radio frequency 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 analogue system and system components
 - 2.1 Identify features and functions of avionic analogue systems and components
 - 2.2 Review avionic analogue system design and layout requirements and techniques
 - 2.3 Identify system power requirements
 - 2.4 Identify electro-magnetic interference protection requirements
 3. Evaluate avionic analogue system and system components
 - 3.1 Evaluate proposed modifications to avionic analogue systems and components
 - 3.2 Evaluate avionic analogue system and system component maintenance requirements
 - 3.3 Evaluate avionic analogue system and system component reliability and defect history
 - 3.4 Evaluate proposed component and piece part substitution

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|----|----------------|--|
| | 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, 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 analogue systems include:

- High frequency (HF) communications
- Very high frequency (VHF) communications
- Ultra-high frequency (UHF) communications
- Satellite communications
- Internal communications and public address
- Automatic direction finder
- VHF omni-directional range (VOR)
- Pulse:
 - weather radar
 - radar altimeter
 - air traffic control (ATC) transponder
 - doppler navigation
 - distance measuring equipment (DME)
- Automatic pilot
- Tactical aerial navigation (TACAN)
- Aircraft communication addressing and reporting (ACAR)
- Instrument landing system (ILS)

Avionic analogue system components include:

- Electro-mechanical flight and indicating instruments
- Compasses
- Interfaces with avionic digital systems, such as:
 - flight management
 - automatic flight control
 - electronic display, including flight instruments and centralised aircraft monitoring
 - area navigation (RNAV)
- Receivers
- Transmitters
- Transceivers
- Racks and cooling fans
- Tuners
- Indicators
- Antennas and related cables and hardware
- Analogue electronic circuitry and components
- Electro-mechanical flight instruments
- Electro-mechanical measuring instruments
- Pitot/static system components
- Wiring and related hardware
- Fuses and circuit breakers
- Synchros and servos
- Gyroscopes
- Sensors
- Flight instruments (air speed indicator, vertical speed indicator, altimeter, turn and slip, artificial horizon and directional gyro)
- Pitot/static components
- Compass indicators
- Flux valves
- Amplifiers
- Power supplies

Standards and guidance material include:

- ADF AAP7001.054 Airworthiness Design Requirements Manual
- 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
 - 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
- 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 include:**
- 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

WHS, regulatory requirements and enterprise procedures include:

- Engineers employed within organisations recognised by overseas airworthiness organisations
- 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 and MEM23096A Apply avionic system design 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>