



**Australian Government**

# **MEA702 Produce avionics engineering related graphics**

**Release: 2**

# MEA702 Produce avionics engineering related graphics

## Modification History

Release 2. Equivalent to MEA702 Produce avionics engineering related graphics with amended prerequisite codes.

## Application

This unit of competency applies to avionic products, projects and related system modifications. It is suitable for people working in avionics related design, drafting and maintenance support at the paraprofessional level.

The unit covers the application of graphical techniques for avionic engineering related purposes. Graphics techniques include sketching, computer graphics and the application of drawing standards.

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

|           |                                                                                   |
|-----------|-----------------------------------------------------------------------------------|
| MEA162    | Write aviation technical publications                                             |
| MEM30007A | Select common engineering materials                                               |
| MEM30012A | Apply mathematical techniques in manufacturing, engineering or related 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. Review the fundamentals of engineering graphics for avionic applications | 1.1 | Review uses for avionic graphics                                                                |  |
|                                                                             | 1.2 | Review engineering drawing standards                                                            |  |
|                                                                             | 1.3 | Review graphical imaging or modelling techniques and conventions                                |  |

- 1.4 Review conventional representations of mechanical features and components, electrical, electronic and fluid control circuits
  - 1.5 Review computer-aided design (CAD) and other related software for currency and relevance
  - 1.6 Check and determine relevance of work health and safety (WHS) and regulatory requirements, codes of practice, risk assessment and registration requirements for graphical representation tasks
  - 1.7 Confirm the availability and features of a range of standards related to avionic system and component design, maintenance and modification
  - 1.8 Review typical criteria for avionic designs
2. Apply avionic graphics
  - 2.1 Determine engineering graphics required by avionic applications
  - 2.2 Apply relevant standards
  - 2.3 Represent avionic components and systems with sketching and computer graphical techniques, including orthogonal, three-dimensional imaging, wiring diagrams, circuit diagrams and system schematic drawings
  - 2.4 Determine and apply required dimensioning, tolerancing for limits and fits, surface finish, weld symbols, electrical, electronic and other required graphical convention information appropriate to avionic engineering applications
  - 2.5 Seek technical and professional assistance or clarification of design information as required
  - 2.6 Confirm final graphical representations with professional engineering staff and other stakeholders, including making any required adjustments
  - 2.7 Engage appropriate licensed technical and professional assistance for advice as required
3. Provide final drawings, files and documents
  - 3.1 Provide documentation, graphics, data files and clearances according to job requirements and enterprise drawing management system and procedures

## 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.

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|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Criteria for avionics designs include:</b>                           | <ul style="list-style-type: none"><li>• Function</li><li>• Design authority regulatory requirements</li><li>• Avionic design specifications</li><li>• Application of configuration management (CM) and/or integrated logistic support (ILS) requirements</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Configuration Management (CM)</b>                                    | <ul style="list-style-type: none"><li>• 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</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Integrated Logistic Support (ILS)</b>                                | <ul style="list-style-type: none"><li>• 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:<ul style="list-style-type: none"><li>• reliability engineering, maintainability engineering and maintenance planning</li><li>• supply and support</li><li>• support and test equipment</li><li>• manpower and personnel</li><li>• training and training support</li><li>• technical data and publications</li><li>• computer resources support</li><li>• facilities</li><li>• packaging, handling, storage and transportation</li><li>• design interface</li></ul></li></ul> |
| <b>Features, functions and context of engineering graphics include:</b> | <ul style="list-style-type: none"><li>• Uses of graphics for purposes, such as:<ul style="list-style-type: none"><li>• design specifications</li><li>• production specifications</li><li>• maintenance procedures</li><li>• technical specifications and descriptions</li></ul></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                  |

- Graphical representation techniques, including orthogonal, 2-D and 3-D modelling, isometric and mechanical perspective, dimensioning, limits and fits, welding and other standard symbols
  - Role of WHS and regulatory requirements, codes of practice, risk assessment and registration requirements
  - Availability and features of a range of standards related to avionic system design, maintenance and modification
  - Typical criteria for avionic designs
  - Software developments
  - Current graphical methods compared with traditional methods
  - Emerging developments in graphics and related engineering software
- Avionic systems and components include:**
- Electrical power generation and distribution
  - Electrical actuation and/or control associated with mechanical, hydraulic, pneumatic and flight control systems
  - Instruments, including compasses and inertial navigation
  - Radio communications and navigation
  - Pulse including radars and navigation systems
  - Automatic flight control systems
  - Automatic engine control systems
  - Data communications, including in-flight entertainment
- Appropriate licensed 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
  - 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
  - State and territory regulatory requirements applying to electrical work
  - Civil Aviation Safety Regulations (CASRs)

**Relevant standards include:**

- AAP7001.053 ADF Technical Airworthiness Management Manual
- Overseas airworthiness authorities where applicable e.g. Federal Aviation Administration, Transport Canada, European Aviation Safety Agency
- AS 1100.101-1992 Technical drawing – General principles
- AS 1102.101-1989 Graphical symbols for electrotechnical documentation - General information and general index
- AS/NZS ISO 31000 Set:2013 Risk Management Set
- AS/NZS 3947.3:2001 Low-voltage switchgear and control gear - Switches, disconnectors, switch-disconnectors and fuse-combination units
- AS 1403-2004 Design of rotating steel shafts
- DEF AUST Specifications applicable to avionics
- British Defence Standard 00-970 Design and Airworthiness Requirements for Service Aircraft
- US Military Specifications relevant to avionics
- US FAA design standards for avionics

## Unit Mapping Information

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## Links

Companion Volume implementation guides are found in VETNet -

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