



**Australian Government**

# **MARH5004A Use bridge equipment to determine vessel position**

**Release 1**

# MARH5004A Use bridge equipment to determine vessel position

## Modification History

Release 1

This is the first release of this unit.

## Unit Descriptor

This unit involves the skills and knowledge required to maintain safe navigation of a vessel through the use of radar and other bridge equipment to determine vessel position.

## Application of the Unit

This unit has application for a Watchkeeper Deck, Master < 500 GT and Master (Unlimited).

## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

Not applicable.

## Employability Skills Information

This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

- |                                  |  |
|----------------------------------|--|
| <b>1 Set up bridge equipment</b> | 1.1 <b>Bridge equipment</b> is initialised and displays are set up and maintained  |
|                                  | 1.2 Operational performance and accuracy of bridge equipment is confirmed and appropriate action is taken when performance is out of |

- limits
- 1.3 Any false echoes and *misrepresentations* are detected, identified and rejected
- 2 Use radar to safely navigate**
- 2.1 Radar is operated according to manufacturer instructions to produce data on position of vessel, other vessels and fixed objects
- 2.2 Radar plot is constructed on radar plotting sheet and automatic plotting devices are initialised
- 2.3 Systematic radar observations of vessels in the vicinity are made and risk of collision is determined
- 2.4 Radar data is used to obtain a position fix for vessel using electronic bearing lines and variable range markers
- 2.5 Radar bearings are corrected for vessel heading and compass error as appropriate
- 2.6 Adjustments are made to vessel course and speed to maintain safety of navigation
- 2.7 Manoeuvring signals are made at appropriate time according to regulations
- 3 Use bridge equipment to safely navigate**
- 3.1 Bridge equipment is safely and efficiently used to conduct navigation of vessel
- 3.2 Position of vessel is monitored during voyage to ensure planned passage is followed
- 3.3 Movements of vessels in the vicinity are monitored to ensure collision situations do not occur
- 3.4 Adjustments are made to vessel course and speed to maintain safety of navigation
- 3.5 Manoeuvring signals are made at appropriate time according to regulations
- 3.6 Bridge equipment is maintained according to manufacturer requirements and organisational procedures
- 4 Maintain navigational records**
- 4.1 *Navigational data* produced by bridge equipment that should be retained to conform with organisational procedures and regulatory requirements is identified
- 4.2 Navigational data is stored electronically or in hard copy as required by organisational procedures and regulatory requirements

4.3 Security and access requirements for data are adhered to according to organisational procedures

## Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

### Required Skills:

- Clearly and concisely communicate at all times in a seamanlike manner
- Correctly interpret and analyse information obtained from radar and automatic radar plotting aids (ARPA) taking into account the limitations of equipment and prevailing circumstances and conditions
- Correctly interpret information received from other bridge equipment and apply appropriate corrections
- Determine latitude by meridian altitude
- Make adjustments to vessel course and speed to maintain safety of navigation
- Make decisions to amend course or speed in a timely manner according to accepted navigation practice
- Make manoeuvring signals at the appropriate time according to International Regulations for Preventing Collisions at Sea 1972 as amended
- Plan and conduct celestial observations using a sextant and plot a position
- Take action to avoid close encounter or collision according to International Regulations for Preventing Collisions at Sea 1972 as amended

### Required Knowledge:

- ARPA system performance and accuracy, tracking capabilities, limitations and processing delays
- Course and speed of other vessels
- Critical echoes, exclusion areas and trial manoeuvres
- Detecting course and speed changes of other vessels
- Detection of misrepresentation of information, false echoes, sea and rain clutter etc., racons and search and rescue transponders (SARTs)
- Effect of changes in own vessel course and speed or both
- Factors affecting performance and accuracy of radar and other navigational equipment
- Fundamentals of radar and ARPA
- Ground and sea stabilisation and their effects on ARPA data
- Identification of critical echoes
- International Regulations for Preventing Collisions at Sea 1972 as amended
- Meeting overtaking vessels
- Methods of position fixing using celestial observations with a sextant
- Methods of target acquisition and their limitations
- Parallel indexing

- Plotting techniques and relative- and true-motion concepts
- Principal types of ARPA, their display characteristics, performance standards and the consequences of over reliance on ARPA
- Range and bearing by radar
- Sea and ground stabilisation and their effect on ARPA data
- Setting up and maintaining displays on radar
- Time, distance and bearing of closest point of approach of a closing vessel
- True and relative vectors, graphic representation of target information and danger areas
- Use of operational warnings and system tests
- Work health and safety (WHS)/occupational health and safety (OHS) requirements and work practices

## Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

### Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- attention to appropriate level of detail in recordkeeping
- ensuring currency of relevant legislative and regulatory knowledge.

### Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where using bridge equipment may be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

### Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate using bridge equipment
- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

### Guidance information for assessment

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be

combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.



## Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

Bridge equipment may include:

- ARPA
- Automatic identification systems
- Automatic pilot
- Azimuth mirrors and other bearing measurement devices
- Bridge alarm systems
- Chronometer
- Electronic chart display and information system (ECDIS)
- Echo sounder
- Differential satellite navigation systems
- Doppler and electro-magnetic speed logs
- Integrated navigation systems
- Loran C navigation systems
- Magnetic and gyro compasses including rate of turn gyro
- Navigation light systems
- Radar
- Satellite navigation systems
- Sextant
- Signalling devices
- Voyage data recorders

Misrepresentations may include:

- Compass errors
- False echoes
- Incorrect radar settings for heading marker and range marker
- Incorrect setting up of electronic chart system (ECS) or ECDIS
- Incorrect setting up of satellite navigation systems
- Satellite and differential satellite navigation system errors
- Sea and rain clutter returns

Navigational data may include:

- Navigation safety warning
- Recording of courses steered
- Weather and oceanographic reports

## **Unit Sector(s)**

Not applicable.

## **Competency Field**

Navigation