



**Australian Government**

**MARH035 Demonstrate fundamental  
knowledge of Autonomous Maritime  
Systems (AMS)**

**Release: 1**

# **MARH035 Demonstrate fundamental knowledge of Autonomous Maritime Systems (AMS)**

## **Modification History**

**Release 1.** This is the first release of this unit of competency in the MAR Maritime Training Package.

## **Application**

This unit involves the skills and knowledge required to demonstrate fundamental knowledge of Autonomous Maritime Systems (AMS).

This includes defining Autonomous Under Vehicles (AUV) and Autonomous Surface Vessels (ASV); describing components of AMS; applying basic theory of hydrostatics, hydrodynamics, fundamental principles of AMS communications and navigation; and applying practical approaches to AMS sensors and missions.

This unit applies to people working in the maritime industry in the capacity of:

- AUV and ASV Operators
- AUV and ASV Technicians
- a person managing, leading or supporting an AMS operation.

This unit applies to AUV and ASV operations being conducted in Near Coastal (NC) waters within the limits of the operators AMSA Certificate of Competency.

## **Licensing/Regulatory Information**

No licensing, legislative or certification requirements apply to this unit at the time of publication.

## **Pre-requisite Unit**

Not Applicable

## **Competency Field**

H – Navigation

## **Unit Sector**

Not applicable

## Elements and Performance Criteria

### ELEMENTS

### PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

#### 1. Define AUV and ASV

1.1 Key differences between crewed, uncrewed, uninhabited and autonomous platforms are identified

1.2 Key differences between autonomous and remotely operated platforms are outlined

1.3 Types of AUV and ASV are identified

#### 2. Describe components of an AMS

2.1 Importance of well-defined mission objectives are articulated

2.2 Key logistic considerations around access to AMS mission arena are outlined

2.3 Critical factors relating to launch and recovery (LAR) systems and practices are detailed

2.4 Different types of AMS communication systems are identified

2.5 Different types of localisation and navigation for an AMS are outlined

#### 3. Apply basic theory of hydrostatics in relation to AMS

3.1 Principles of salinity and temperature are understood in relation to density and stratification

3.2 Marine engineering principles of buoyancy, trim and stability are outlined with respect to AMS

3.3 Principles of ballasting AUVs for different environments are detailed

#### 4. Apply basic theory of hydrodynamics in relation to AMS

4.1 Forces in the horizontal and vertical planes and resultant motion are explained

4.2 Principles of thrust and power are outlined and common methods of propulsion are identified

4.3 Principles of how control surfaces work and vary across AMS is outlined

- 4.4** Components of drag are outlined and factors to increase or reduce drag identified
- 5. Explain fundamental principles of AMS communications**
  - 5.1** Principles of AMS communications through air are explained
  - 5.2** Principles of AMS communications through water are explained
  - 5.3** Commonly used communication systems are identified
- 6. Explain fundamental principles of AMS navigation**
  - 6.1** AMS localisation is explained
  - 6.2** Navigation by dead-reckoning, including inertial navigation systems (INS) and improved dead-reckoning with doppler velocity logger (DVL), is explained
  - 6.3** External positioning, including long baseline (LBL), ultrashort baseline (USBL) and inverted USBL (iUSBL) systems, are explained
  - 6.4** Concept of building and improving a navigation solution is outlined
- 7. Apply practical approaches to AMS sensors and missions**
  - 7.1** Typical AMS sensors are identified and operated
  - 7.2** General process of AMS mission planning for optimal sensor coverage is explained
  - 7.3** Commonly used AMS search mission patterns are outlined
  - 7.4** Fundamental elements of basic mission planning are summarised.

## Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

## **Range of Conditions**

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the MAR Maritime Training Package Companion Volume Implementation Guide.

## **Unit Mapping Information**

This is a new unit. No equivalent unit.

## **Links**

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>