



Australian Government

MARH033 Conduct advanced Autonomous Surface Vessels (ASV) operations

Release: 1

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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 conduct advanced Autonomous Surface Vessel (ASV) operations.

This includes applying knowledge of environmental dynamics and radio frequency communication principles; explaining control theory in relation to performance; conducting advanced vehicle performance analysis, post-mission analysis, search and rescue operations, and advanced ASV missions; and following operations procedures for planning, execution and analysis.

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

- ASV Operator
- ASV Technician.

This unit applies to 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

MARH031 Apply knowledge of core Autonomous Surface Vessels (ASV) operations

MARH034 Demonstrate fundamental knowledge of Autonomous Maritime Systems (AMS) operations

MARH035 Demonstrate fundamental knowledge of Autonomous Maritime Systems (AMS)

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. Apply knowledge of environmental dynamics when planning ASV operations	1.1 Surface layer upwelling and downwelling due to wind stress curl and frontal activity and their potential impact on ASV operations is outlined
	1.2 ASV operations are planned with specific consideration for the risks associated with ocean currents and tides
2. Apply knowledge of radio frequency (RF) communication principles to optimise ASV missions	2.1 Principles of ASV mission planning and execution in a global navigation satellite system (GNSS)-denied environment are outlined
	2.2 ASV missions with enhanced RF techniques are conducted
3. Explain control theory in relation to ASV performance	3.1 Concepts of input, output, error, feedback and gain for a simple control system are described
	3.2 Principle of tuning the three components of proportional-integral-derivative (PID) control to improve the achievement of an ASV navigation goal is outlined
4. Conduct advanced vehicle performance analysis	4.1 Post-mission extraction and storage of ASV engineering data is conducted following a data plan
	4.2 Numerical and graphical analysis of ASV engineering data is conducted using nominated software package
	4.3 ASV performance is assessed relative to original equipment manufacturer (OEM) standard benchmarks of USV operation
5. Conduct advanced	5.1 Extraction and storage of sensor payload data is

post-mission analysis	conducted following a data plan
	5.2 Numerical and graphical analysis of sensor data is conducted using nominated software package
	5.3 ASV sensor data quality is assessed relative to OEM standard benchmarks of USV operation
	5.4 Anomalies in ASV sensor data is assessed relative to vehicle performance analysis
6. Conduct advanced search and rescue operations for a lost ASV	6.1 ASV location operation with RF link is conducted in visual line of sight (VLOS) conditions according to operational requirements
	6.2 ASV location operation with RF link is conducted in beyond visual line of sight (BVLOS) conditions according to operational requirements
7. Conduct advanced ASV missions following operations procedures for planning, execution and analysis	7.1 ASV mission applying advanced knowledge of navigation options for GPSS-denied environment is conducted
	7.2 ASV bathymetry mission applying advanced knowledge of sonar and bottom imaging is conducted
	7.3 ASV mission applying knowledge of passage planning is conducted
	7.4 ASV mission examining towing performance is conducted
	7.5 ASV mission examining impact of sensor positioning on hydrodynamic performance is conducted
	7.6 Operational logbook entries are completed

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>