



Australian Government

Assessment Requirements for MARH033 Conduct advanced Autonomous Surface Vessels (ASV) operations

Release: 1

Assessment Requirements for MARH033 Conduct advanced Autonomous Surface Vessels (ASV) operations

Modification History

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

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include:

- analysing numerical and graphical engineering and sensor data of Autonomous Surface Vessels (ASV) to assess performance against known benchmarks
- conducting an ASV mission in a high-current and high-wind environment
- conducting an advanced ASV search and rescue operation with a radio frequency (RF) link
- conducting consecutive ASV missions that build upon collected knowledge to improve a bathymetry survey
- conducting consecutive ASVs to collect and analysing vehicle engineering performance data
- planning, executing and analysing two diagnostic ASV missions in Near Coastal (NC) waters under supervision, including a minimum of:
 - one mission specific to impact of re-configuring sensor payloads on hydrodynamic performance
 - one mission specific to towing performance
 - completing an ASV logbook, including recording operational logbook entries for each mission
- planning, executing and analysing three operational ASV missions in NC waters under supervision, including a minimum of:
 - one mission operating in a global navigation satellite system (GNSS)-denied environment
 - one mission specific to bathymetry survey
 - one mission specific to passage planning
 - completing an ASV logbook, including recording operational logbook entries for each mission
- producing a metadata record for one vehicle data parameter and one sensor data parameter
- producing and executing a data workflow.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- advanced ASV mission operations, including:

- bathymetry mission using sonar and bottom imaging
- operating in a GNSS-denied environment
- towing operations
- ASV data management, including:
 - data plan
 - data redundancy
 - data security
 - data workflow
 - fundamental units of data
 - metadata
 - 'raw' and 'working' data
- ASV performance benchmarks, including:
 - heading
 - maximum revolutions per minute (RPM) and speed
 - minimum turn radius
 - position error
- environmental ocean dynamics and operational risks when conducting ASV operations, including:
 - coriolis, ekman transport and wind stress curl
 - estuary dynamics
 - langmuir circulations
 - ocean currents and tides
 - turbulent and laminar flows
 - waves
- methods and techniques used to determine ASV performance against standard benchmarks, including:
 - process for identifying anomalies in ASV sensor data
 - quality of ASV sensor data
- methods used to analyse data, including:
 - calculation of mean and standard deviation for sub-sampled data
 - graphical analysis for rates of change in parameters
 - use of software packages
- operational data units and conversions, including:
 - distance in metres and nautical miles
 - speed in knots and metres per second
- proportional-integral-derivative (PID) control
 - error
 - gain
 - input
 - Kp, Ki and Kd coefficients

- output
- process for conducting advanced search and rescue operations
- processes used to handle and store data including:
 - completing ASV logbooks and metadata records
 - extraction and storage of ASV engineering data
 - extraction and storage of sensor payload
 - producing a data plan and data workflow
- radio navigation.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

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

Assessment must occur in workplace operational situations, and where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

Simulated workplace may be used to augment real-world operational situations and does not replace real-world operations in prescribed water conditions.

Resources for assessment must include access to:

- applicable documentation such as workplace procedures, regulations, codes of practice, operation manuals, manufacturer instructions and procedures
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry, including:
 - ASV aligned with the required size and class that a seafarer will need to operate
 - ASV with dual-propulsion and an integrated obstacle avoidance system
 - water conditions consistent with mission requirements as outlined in this unit of competency and must include access to water in excess of 100 m, high energy tidal waters and permanently stratified waters.

Links

Companion Volume Implementation Guides are found in VETNet -

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