



Australian Government

Assessment Requirements for MARH031

Apply knowledge of core 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.

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 on at least one occasion and include:

- completing an Autonomous Surface Vessel (ASV) ‘walk-around’ identifying key components, including safe lifting points and ‘no-touch’ areas
- completing an ASV mission under supervision, including preliminary briefing, analysis and post-mission presentation
- conducting a launch and recovery (LAR) from stationary platform safely by hand and with a davit system
- correcting ballast on a ASV for optimum buoyancy, trim and stability
- initialising an ASV on ‘shore’ power, determining current battery levels and safely completing charging operations
- producing a post-mission analysis report which includes preliminary post-mission analysis and vehicle performance analysis
- surface piloting an ASV in a realistic maritime environment with obstacles that inhibit direct line of sight
- unpacking an ASV from storage and preparing for transportation to operational area safely
- using a radio frequency (RF) link to track and locate a lost ASV
- using a simulator to test ASV missions, with and without emergency procedures.

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 positioning systems, including:
 - accuracy of positioning
 - augmentation systems (SBAS)
 - eLoran
 - global navigation satellite systems (GNSS)
 - interference
 - real-time kinematic (RTK) and post-processing
 - sources of errors

- VHF data exchange system (VDES) R-mode
- application of hydrostatics on ASV ballast, including:
 - environmental conditions relevant to ballasting
 - optimal ASV pose
 - safe ballasting of ASV
- application of the International Regulations for Preventing Collisions at Sea (COLREG) when conducting ASV operations and lessons learned from historical cases of vessel collision
- automatic identification systems (AIS), including:
 - Class A/Class B
 - range limitations
 - update rates
- commonly used mission planning software packages, including processes to:
 - estimate total mission length and timing
 - set start and end mission points
 - set waypoints and transects
 - source and load a navigational chart
- critical ASV performance parameters, including:
 - impacts of drag on speed and current consumption
 - loiter radius
 - maximum speed and revolutions per minute (RPM)
 - minimum turn radius
- key elements of a pre-mission briefing, including:
 - objective
 - operational timing
 - payload
 - region-of-interest
 - risk assessment and mitigation
 - team roles
- key elements of a post-mission briefing, including:
 - lessons learnt
 - recap of objectives
 - sensor performance
 - summary of outcomes
 - vehicle performance
- key working components of an ASV, including:
 - ballasting system
 - buoyage and lights
 - communication and navigation systems
 - data transfer system
 - power, control and propulsion systems

- sensor payloads
- oceanographic and environmental factors for consideration in ASV mission planning, including:
 - flotsam
 - obstacles
 - strong currents
 - uncertain bathymetry (coastline)
 - wind
- principles of RF theory, including:
 - electric and magnetic components of RF waves
 - propagation at various frequencies
 - received signal strength indicator (RSSI)
 - receiver sensitivity
 - relative power (dBm) and Watts
 - spectrum management
 - wave motion (reflection, refraction, diffraction, scattering and absorption)
- principles of radar and radar navigation, including:
 - automatic radar plotting aid (ARPA)
 - basic components of a marine radar
 - electromagnetic radiation hazards
 - factors impacting radar performance
 - using range and bearing to determine speed and course
- safe handling techniques for an ASV, including:
 - process for transferring data of mission and payload data
 - safe lifting points and sensitive (no touch areas)
 - safely transitioning an ASV from storage to operational area
- safe launch and recovery (LAR) techniques for ASV operations, including:
 - critical factors for safe LAR operations
 - davit ASV LAR from stationary vessel
 - deck-handling skills and equipment
- surface piloting techniques, including:
 - adjusting ASV speed and course to negotiate obstacles
- tracking technologies, including:
 - strategies for focusing ASV search and rescue operations
 - RF link.

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>