Title	**Use marine radar on a restricted limits vessel**		
Level	**3**	**Credits**	**10**

Purpose	This unit standard is for people operating inshore vessels fitted with radar. People credited with this unit standard are able to: relate the operating principles and conditions of marine radar to its use for position fixing and collision avoidance; operate marine radar; and use marine radar for navigation and collision avoidance, on a restricted limits vessel.

Classification	Maritime > Navigation and Seamanship

Available grade	Achieved

Guidance Information

1 Legislation relevant to this unit standard includes:
Health and Safety at Work Act 2015.
Maritime Transport Act 1994 and subsequent amendments.

2 References
Bole, A.G, Dinely, W. O. and Wall, A. *Radar and ARPA Manual.* Oxford: Butterworth – Heinemann Ltd, 2005. ISBN 0750664347.
Maritime Rules Parts 32 and 22 and advisory circulars. Available at http://www.maritimenz.govt.nz.
Scanlan, M. *Electronic Navigation*. Auckland: Reed Publishing NZ Ltd, 2003. ISBN 0790008815.
Symbols for controls on Marine Navigational Radar Equipment. Supplement to the Recommendation on Performance Standards for Navigational Radar Equipment [Resolution A 222(VII)]. Available at https://imo.org/en.

3 Definition
Vessel operating practices refer to documented or undocumented systems on a vessel which may or may not form part of the Safe Ship Management System, and which comply with the Maritime Transport Act 1994, and Maritime Rules.

4 This unit standard is designed for operators and/or observers of non-ARPA (restricted) radar and covers the requirements of the syllabus of Maritime New Zealand Restricted Radar Certificate.

5 Assessment information

a All activities and evidence must be in accordance with vessel operating practices, and the referenced texts or equivalent texts.

b Assessment may be of evidence that is naturally occurring in the workplace or obtained from approved instruction or during attendance at an approved course, including practical demonstrations in spaces which provide realistic training conditions and simulated shipboard conditions.

Outcomes and performance criteria

Outcome 1

Relate the operating principles and conditions of marine radar to its use for position fixing and collision avoidance on a restricted limits vessel.

Range operating principles – nature of radio waves, pulse length, pulse repetition frequency, wavelength, power output, aerial design, main radar set components, tuning characteristics, 3cm and 10cm radars;
operating conditions – types of display, aerial siting, target characteristics, nature of radar reflections, weather conditions, minimum and maximum range, common faults.

Performance criteria

1.1 Operating principles and conditions are used to make predictions about the detection range and accuracy of marine radar.

1.2 Operating principles and conditions are used to explain the effects of operating the controls which are accessible to the user.

Range brilliance, gain, tuning, anti-sea clutter, differentiator (anti-rain clutter), range selector, fixed range rings, variable range marker/bearing cursor or equivalent, plot facility, alarm facility.

1.3 Operating principles and conditions are used to interpret or identify displayed targets.

1.4 Operating principles and conditions are used to explain the identification and minimisation of false echoes.

Range includes but are not limited to – side lobes, second returns, multiple echoes, spoking.

1.5 Inaccuracies, faults and limitations of radar use are explained.

Range includes but are not limited to – horizontal beam width, vertical beam width, heading marker alignment, centring, aerial size, shadow sectors cause and effect of interference from other radar transmissions.

Outcome 2

Operate marine radar on a restricted limits vessel.

Performance criteria

2.1 Marine radar set is started up, controls are adjusted, and radar is operated in accordance with the manufacturer's instructions.

Range check scanner is clear and no one is aloft, controls all turned down, off, standby, on, brilliance, centring, range scale, gain, tuning, sea clutter, rain clutter.

2.2 The internationally prescribed symbols for the user controls are identified in accordance with Symbols for controls on Marine Navigational Radar Equipment for marine radar performance.

Range radar off, standby, run, gain, tuning, brilliance, range selector, anti-sea clutter, range rings, variable range marker, bearing marker, differentiator (anti-rain clutter), pulse length, type of display.

2.3 Human factors affecting the use of radar are identified.

Range fatigue, high workload in restricted visibility, bridge resource management and the need for teamwork.

Outcome 3

Use marine radar for navigation on a restricted limits vessel.

Performance criteria

3.1 Charted features are identified on the radar screen and used to fix the vessel's position on the chart in accordance with the Radar and ARPA Manual.

3.2 Radar targets are identified on the chart and used to fix the vessel's position on the chart and to maintain navigational safety in accordance with the Radar and ARPA Manual.

Range identified target range, identified target bearing, relative bearings, calculation of relative bearings to true bearings and vice-versa, 3-point radar-range fixes, parallel index lines.

Outcome 4

Use marine radar for collision avoidance on a restricted limits vessel.

Performance criteria

4.1 Other ship targets are monitored and plotted to determine whether risk of collision or close quarters situation exists in accordance with the provisions of Maritime Rule Part 22.

4.2 Action is taken in real or simulated conditions of restricted visibility to avoid other vessels in accordance with the provisions of Maritime Rule Part 22.

4.3 Ship's obligations when using radar for collision avoidance are interpreted in accordance with the provisions of Maritime Rule Part 22.

Range lookout, safe speed, risk of collision, action to avoid collision, conduct of vessels in restricted visibility.

Planned review date	31 December 2025

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	30 July 2002	31 December 2012
Review	2	22 October 2010	31 December 2022
Review	3	26 November 2020	N/A

Consent and Moderation Requirements (CMR) reference	0054

This CMR can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.