



LUV VTS - Minimum requirements

Proof of Ability

Radar Object Tracking System

Version 4.4

Credits

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1 Introduction

This document describes the minimum requirements to be satisfied to obtain a reference for the use of a radar object tracking chain on the rivers, canals and other waterways managed by Rijkswaterstaat. This reference can be obtained upon a positive result of what is known as the Proof of Ability (PoA).

A number of requirements have to be satisfied to obtain a reference. These requirements are subdivided into:

1. Basic requirements
2. Qualitative requirements

Basic requirements

Basic requirements are the system requirements that are preconditions to start with the PoA. These requirements are important to:

- carry out the tests as objectively as possible;
- ensure that the system provides a certain functionality required for the implementation of traffic control at Rijkswaterstaat (RWS).

Qualitative requirements

The qualitative requirements are requirements upon the quality of the radar object tracking chain. These are the minimum requirements for being able to deploy the system for smooth and safe traffic management by Rijkswaterstaat.

Verification methods

Verification:

The purpose of verification is to demonstrate objectively that the requirement is complied with.

The following methods are observed in this document.

Abbreviation	Verification method
A	Analysis
B	Calculation
C	Certification
D	Demonstration
DI	Document inspection
K	Inspection
M	Measurement
Mo	Monitoring
T	Test
To	Assessment

TOP REQUIREMENT

<ID>	Top requirement Object Tracking System	Upper-level requirement	Lower-level requirement	Requirement initiator
1.000	The object tracking system must serve the following purpose for the VKL (<i>traffic control system</i>). To provide a current traffic image. The presented traffic image is a representation of the actual state of affairs on the waterway.	-	2.001 - 2.034 2.101 2.201	RWS
Source:				
Verification method: D				
Requirement complied, if the lower-level requirements are complied with.				
Explanation:				

BASIC REQUIREMENTS

1.1.1 Presenting traffic images

<ID>	Traffic image monitor	Upper-level requirement	Lower-level requirement	Requirement initiator
2.001	The object tracking system must feature 2 30" traffic image monitors, with a user interface for the VKL.	1.000	-	RWS
Source:				
Verification method: D				
Explanation: Desired monitor resolution 2560x1600				

<ID>	Accuracy radar echoes	Upper-level requirement	Lower-level requirement	Requirement initiator
2.002	The object tracking system must present dimension and positions of raw radar vessel echoes in accordance with the specifications for position accuracy and resolution of the radar(s) used, while the best possible resolution and accuracy of the (integrated) radar used is decisive.	1.000	-	RWS
Source:				
Verification method: T				
- Resolution requirements apply measured on the screen of the traffic image monitor for the (integrated) radar image. - The highest possible resolution (tangential and/or radial resolution) of the radars that cover an area is decisive.				

<ID>	Presenting radar video	Upper-level requirement	Lower-level requirement	Requirement initiator
2.003	Presenting all available radar videos on top of each other is not permitted. The presented radar video must be derived from the radar with the qualitatively best radar video in the area in question. It must be possible to adjust and configure these areas. The presented radar video must provide the traffic controller with an impression of the length and width of the object.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Digitising radar video	Upper-level requirement	Lower-level requirement	Requirement initiator
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2.004	It may be necessary to digitise the analogue radar video for the purpose of transmission of the radar video signal. The digitisation parameters of the radar video must be chosen in such a manner that for a sample: - taken perpendicularly to the radar antenna, the width of a random sample of an object is smaller than or equal to the tangential resolution of the radar installation in question; - taken perpendicularly to the radar antenna, the length of a random sample of an object is smaller than or equal to the radial resolution of the radar installation in question.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Presentation of digitised radar video	Upper-level requirement	Lower-level requirement	Requirement initiator
2.005	The presentation of the radar video on the traffic image screen must be equal to the digitised radar video and must be composed of the samples derived from the radar installation in question. The intensity of the colour displaying the sample of the radio video must be suitable to distinguish the strength of the received radar signal. The system must be suitable to display at least 16 intensity levels.	1.000	-	RWS
Source:				
Verification method: DI				
Explanation:				

1.1.2 Initiating tracks

<ID>	Data source for tracks	Upper-level requirement	Lower-level requirement	Requirement initiator
2.006	The object tracking system must use radar data for initiating and maintaining tracks.	1.000	-	RWS
Source:				
Verification method: DI				
Primary use of radar data appears from the system (design) documentation.				
Explanation:				

<ID>	Several sources for overlapping radar coverage	Upper-level requirement	Lower-level requirement	Requirement initiator
2.007	For those areas with overlapping or double (or even multiple) radar coverage, the object tracking system must use several and, if necessary, all (radar) sources within the coverage area for track maintenance and track initiation.	1.000	-	RWS
Source: spec				
Verification method: D, Di				
Demonstration by switching radar sensors on/off.				
Complied if primary use of radar data appears from system (design) documentation.				
Explanation:				

1.1.3 Maintaining tracks

<ID>	Buoy tracking	Upper-level requirement	Lower-level requirement	Requirement initiator
2.008	For buoy tracking, the object tracking system must suppress interfering radar echoes (including radar echoes from buoys and current ripples) of the stationary objects within the coverage	1.000	-	RWS

	area.			
Source:				
Verification method: D				
Explanation: Stationary objects presented as confirmed tracks are considered ghost tracks.				

<ID>	Detecting track loss	Upper-level requirement	Lower-level requirement	Requirement initiator
2.009	Directly when a confirmed track is lost, the object tracking system must: - generate an optical signal on the traffic image monitor (present the track in question optically differently); - display a message on the traffic image monitor concerning the track of which the status has been reduced.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

1.1.4 Symbols display

<ID>	Track symbols shape	Upper-level requirement	Lower-level requirement	Requirement initiator
2.010	The object tracking system must display the track symbols to be used within the radar coverage area with the lengthwise direction or the point of the symbol matching the vessel's heading. Track symbols must be scalable. Explanation: The intention is that objects can be distinguished irrespective of the zoom level.	1.000	-	RWS
Source:				
Verification method: D				

<ID>	Symbol type	Upper-level requirement	Lower-level requirement	Requirement initiator
2.011	The object tracking system must display tracks: within the radar coverage area in accordance with the symbol of a tentative, confirmed or lost track. Track symbols must be scalable. Explanation: The intention is that objects can be distinguished irrespective of the zoom level.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Heading of the track symbols	Upper-level requirement	Lower-level requirement	Requirement initiator
2.012	The measured heading of tracks on the monitor must not deviate more than $\pm 5^\circ$ from the true heading (all measurements for all radar sensors must be within the margin).	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

1.1.5 Making controls available

<ID>	Controls at the workplace	Upper-level requirement	Lower-level requirement	Requirement initiator
2.013	The object tracking system must allow the VKL to completely control the system from one workstation with a (QWERTY)	1.000	-	RWS

	keyboard and mouse. The keyboard must be used for entering data. The mouse must also be used as a pointer for measuring and selection purposes on the traffic image monitor.			
Source:				
Verification method: D				
Explanation:				

<ID>	User interface	Upper-level requirement	Lower-level requirement	Requirement initiator
2.014	The object tracking system must feature a user-friendly user interface for control by the user. The control system must be menu-driven. The user interface must be equipped with shortcut buttons and a menu bar, while options can be selected with the mouse as well as with the keyboard. At least the following shortcut buttons must be available: • "Label function" • "Zoom function" • "Pan function" • "Filter function for bad weather conditions" • "Distance measurement from an object to a site or object to be selected" • "Measurements CPA" •	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Making pointer available	Upper-level requirement	Lower-level requirement	Requirement initiator
2.015	The object tracking system must have a pointer available to the VKL that always keeps the same size, irrespective of the choice of scale or the range setting, and that can be positioned on the traffic image monitor with an accuracy of +/- one pixel.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Display pointer position	Upper-level requirement	Lower-level requirement	Requirement initiator
2.016	The object tracking system must display the geographical position of the pointer permanently in WGS84 on the edges of the traffic image monitor in question without obstructing the traffic image display.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Switching off ECDIS information	Upper-level requirement	Lower-level requirement	Requirement initiator
2.017	The object tracking system must enable the VKL to switch off certain information of the ECDIS chart. This refers to all information that can be switched off in the charge by default.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

1.1.6 Labelling objects

<ID>	Name label	Upper-level requirement	Lower-level requirement	Requirement initiator
2.018	The object tracking system must be able to display a name label	1.000	-	RWS

	at a track with the following data: • unique track number, <i>or</i> • a manually entered name.			
Source:				
Verification method: D				
Explanation: A unique track number generated by the system.				

<ID>	Track label	Upper-level requirement	Lower-level requirement	Requirement initiator
2.019	The object tracking system must be able to display a track label at a track with manually entered data of the vessel in accordance with the track label settings.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Presentation label info	Upper-level requirement	Lower-level requirement	Requirement initiator
2.020	The object tracking system must display label information as follows, through a: • name label linked to a track; automatically displayed at first presentation of the vessel on the traffic image monitor. In addition, it must be possible to: • switch the name label of one track on or off; • switch all name labels on or off	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Track label settings	Upper-level requirement	Lower-level requirement	Requirement initiator
2.021	By default, the object tracking system must display the following data in the track label: • Course over ground • Object length • Object width • Speed in km/h •	1.000	-	RWS
Source:				
Verification method: D				
Explanation: If not manually entered, length and width of the object must be determined on the basis of the received radar video.				

<ID>	Entering and modifying label data	Upper-level requirement	Lower-level requirement	Requirement initiator
2.022	The object tracking system must enable the VKL to manually modify or enter the data of the name label and the track label. That must be possible for the following data: • Name • Object length • Object width •	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Label position and orientation label staff	Upper-level requirement	Lower-level requirement	Requirement initiator
2.023	The object tracking system must enable the VKL to drag the position of the label and the connected label staff at the vessel symbol individually for each vessel to a random different position than the default position. The label staff and the label staff	1.000	-	RWS

	orientation must follow.			
Source: spec GVC DH				
Verification method: D				
Explanation:				

1.1.7 Displaying objects

<ID>	Presenting objects	Upper-level requirement	Lower-level requirement	Requirement initiator
2.024	The object tracking system must enable the VKL to present in a window to be selected on the traffic image monitor any combination of the following. - Raw radar information displaying the radar echo strength in not less than 16 echo strength levels (from dark to bright). - Track information from radar tracks. - Course/speed vectors. - Measuring information with adjustable reference points. - Track history of at least the past hour one specific track or all tracks (the track made good by a vessel). The track history must display the position of the object per 3 seconds.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

1.1.8 Displaying dynamic object information

<ID>	Determining bearing and distance	Upper-level requirement	Lower-level requirement	Requirement initiator
2.025	The object tracking system must enable the VKL to have the system determine the bearing and distance between at least two objects or an object and a certain fixed point.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Displaying bearing and distance	Upper-level requirement	Lower-level requirement	Requirement initiator
2.026	The object tracking system must present the VKL, after determining bearing and distance, the bearing in degrees and distance in metres and nautical miles for the object in question. The presented data must not obstruct the traffic image display.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Determining CPA	Upper-level requirement	Lower-level requirement	Requirement initiator
2.027	The object tracking system must enable the VKL to have the system determine the Closest Point of Approach (CPA) and Time to Closest Point of Approach (TCPA) of two objects or an object and a certain fixed point.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

<ID>	Display CPA and TCPA	Upper-level requirement	Lower-level requirement	Requirement initiator
2.028	After determining the CPA, the object tracking system must present the CPA graphically and numerically to the VKL for the objects in question, including the connected TCPA. The presented data must not obstruct the traffic image display.	1.000	-	RWS

Source:
Verification method: D
Explanation:

<ID>	Displaying speed vector	Upper-level requirement	Lower-level requirement	Requirement initiator
2.029	After the VKL has indicated a track, the object tracking system must display the speed vector with the connected numeric values of the course over ground and speed. The vector length must be adjustable by the VKL and be indicative for the measured speed and direction in accordance with the measured course. The presentation accuracy of course and speed must be: - Course over ground +/- 2° - Speed +/- 0.3 m/s	1.000	-	RWS

Source:
Verification method: D
Explanation:

1.1.9 Adjusting settings

<ID>	Adjusting afterglow setting	Upper-level requirement	Lower-level requirement	Requirement initiator
2.030	The object tracking system must enable the VKL to set the afterglow (Raw Radar Video Afterglow) between 0 and 15 seconds.	1.000	-	RWS

Source:
Verification method: D
Explanation:

<ID>	Adjusting settings track history	Upper-level requirement	Lower-level requirement	Requirement initiator
2.030a	The object tracking system must enable the VKL to set the track history between 0 and 360 seconds.	1.000	-	RWS

Source:
Verification method: D
Explanation:

1.1.10 Integrating background charts

<ID>	Presentation ECDIS chart	Upper-level requirement	Lower-level requirement	Requirement initiator
2.031	The object tracking system must present the integrated radar information on an Electronic Chart Display and Information System (ECDIS).	1.000	-	RWS

Source:
Verification method: D
Explanation: RWS supplies the (inland) ENC's for the POA area.

1.1.11 Adjusting areas and charts

<ID>	Adjusting coverage area	Upper-level requirement	Lower-level requirement	Requirement initiator
2.032	The object tracking system must enable the VKL to adjust the presented coverage area per window, including: - fluently zooming in and out between 10% and 100%; - shifting the centre.	1.000	-	RWS

Source:
Verification method: D
Explanation:

<ID>	Response time	Upper-level requirement	Lower-level requirement	Requirement initiator
2.033	The video and track presentation must not be interrupted for longer than one second while shifting the centre or while zooming in and out.	1.000	-	RWS
Source:				
Verification method: D				
Explanation:				

External interface requirements

1.1.12 Interface Object Tracking System – Radar System

<ID>	Reading in radar data	Upper-level requirement	Lower-level requirement	Requirement initiator
2.034	The object tracking system must continuously (24-hour registration) read radar data from one or more radar sensors of the radar coverage area for which the object tracking system is used, for the purpose of displaying the current traffic conditions on the traffic image.	1.000	-	RWS
Source:				
Verification method: D				
Explanation: The candidate will receive dedicated output from the radar installation from the Principal for realisation of the PoA.				

2 Requirements Registration System

2.1.1 Registration VTS data

<ID>	Registration VTS data	Upper-level requirement	Lower-level requirement	Requirement initiator
2.101	The VP Registration System must continuously (24-hour registration) and synchronously record: - the traffic image as continuously displayed on the traffic image monitor including the underlying (electronic navigation) charts; - the object tracking and label information; - the raw radar (video) data; - the status (changes) of the object tracking system; - the date and time (accurate in seconds; in local summer and winter times) linked to the dynamic data.	1.000	2.102 - 2.113	RWS
Source:				
Verification (product)	Method: D			
Explanation: track status changes such as track loss etc. must also be registered.				

2.1.2 Storing VTS data

<ID>	Integrated system	Upper-level requirement	Lower-level requirement	Requirement initiator
2.102	The VP Registration System must be an integrated system for storage and presentation of the VTS data.	2.101	-	RWS
Source:				
Verification (product)	Method: D			
Explanation:				

<ID>	Retention period of the VTS data	Upper-level requirement	Lower-level requirement	Requirement initiator
2.103	The VP Registration System must retain all VTS data for at least 3 months. No data must be lost in the event of a storage medium failure.	2.101	-	RWS
Source:				
Verification (product)	Method: DI, D			
Explanation:				

<ID>	Storage capacity	Upper-level requirement	Lower-level requirement	Requirement initiator
2.104	The VP Registration System must have sufficient storage capacity for: - All VTS data that must be stored according to requirement VPR.2.101.	2.101	-	RWS
Source:				
Verification (product)	Method: B			
Explanation:				

<ID>	Making available VTS data to third parties	Upper-level requirement	Lower-level requirement	Requirement initiator
2.105	The Principal or third parties must be able to watch/play the recordings independent of their location. For that purpose the system must comply with one of the following requirements (2.015a of 2.015b): 2.015a: The VP Registration System must be able to export VTS data in such a manner that is possible for third parties to directly start the recordings from the storage medium and, without additional data processing or installation actions, to watch and listen to those time-synchronously at any PC equipped with Windows Operating System version 7 or higher. 2.015b: If requirement 2.015a is not a basic functionality of the candidate's system, the following applies. The VP Registration System must be able to export recordings to a laptop that the candidate has issued in loan for this purpose. It must be possible to watch the exported data on this laptop. For both requirements it applies that the software functionality provides for the functionality demanded under 2.1.3 and 2.1.4.	2.101	-	RWS
Source:				
Verification method: D				
Explanation: RWS wants to assess the test data through a cd/dvd or mobile system at a later time.				

<ID>	No influence between recording and playing the VTS data	Upper-level requirement	Lower-level requirement	Requirement initiator
2.106	The VP Registration System must at all time prevent that playing traffic images and other recorded information influences the operational process and the recording of the VTS data.	2.101	-	RWS
Source:				
Verification (product)	Method: D			
Explanation:				

2.1.3 Presenting recorded data

<ID>	Presenting recorded data	Upper-level requirement	Lower-level requirement	Requirement initiator
2.107	The VP Registration System must present VTS data on the request of the user. In such event the VP Registration System must report to the user that recorded data are being presented.	2.101	-	RWS
Source:				
Verification (product)	Method: D Criteria: - It must be possible for the user to state the time interval at the moment of requesting. - Fast forward and fast reverse must be possible for the user within the time interval. - The time lapse between requesting and start playing must not exceed one second. - In locale time			
Explanation:				

<ID>	Displaying track made good	Upper-level requirement	Lower-level requirement	Requirement initiator
2.108	The VP Registration System must be suitable to present the track history.	2.101	-	RWS
Source:				
Verification (product)	Method: D			
Explanation: The historic track positions are graphically displayed on the screen. The desired portrayal is a white dot.				

<ID>	Replay controls	Upper-level requirement	Lower-level requirement	Requirement initiator
2.109	While replaying the traffic images, the VP Registration System must enable the user to use all controls as described in the relevant component specifications (zooming in and out, measurements, labels, etc.). This must be done with the standard user interface of the VP Registration System, and without manipulating or changing the original recording.	2.101	-	RWS

Source:
Verification method: D
Explanation:

<ID>	Displaying time while playing	Upper-level requirement	Lower-level requirement	Requirement initiator
2.110	While playing, the VP Registration System must show the user on screen the data and local time (hh/mm/ss) of the recorded VTS data.	2.101	-	RWS

Source:
Verification (product) Method: D
Explanation:

<ID>	Screens to be used	Upper-level requirement	Lower-level requirement	Requirement initiator
2.111	The VP Registration System must offer the user the possibility to play the recordings on the same screens that are used for the operational VKL object tracking system.	2.101	-	RWS

Source:
Verification (product) Method: D
Explanation:

2.1.4 Searching recordings

<ID>	Search options	Upper-level requirement	Lower-level requirement	Requirement initiator
2.112	The VP Registration System must offer the user the possibility to search for recordings on the basis of date and time.	2.101	-	RWS

Source:
Verification (product) Method: D
Explanation:

<ID>	Time base for searching	Upper-level requirement	Lower-level requirement	Requirement initiator
2.113	The VP Registration System must offer the user the possibility to search in local summer and winter times.	2.101	-	RWS

Source:
Verification (product) Method: D
Explanation: Local time refers to the actual time applicable at the date in question and at the location in question. That means the system must take summer and winter time into account.

QUALITY REQUIREMENTS

<ID>	Presenting all objects	Upper-level requirement	Lower-level requirement	Requirement initiator
2.201	The object tracking system must detect, initiate, maintain and present all objects that come within the object characteristics and that are located within the (POA) radar coverage area (with the exception of the screened off and shielded areas). The characteristics in accordance with IALA V-128 Schedule 2 table 5-1 apply for the objects. The applicable capability level is "Advanced"	1.000	2.202 - 2.210	RWS
Source: Verification method: The requirement is verified by lower-level requirements. For Radar Pd (detection chance) IALA V-128 section 5.3.1 applies, with a minimum Radar Pd of 0,9 (safety) for track initiation and maintenance.				
Explanation: For objects, Definitions List.				

<ID>	Time delay object presentation	Upper-level requirement	Lower-level requirement	Requirement initiator
2.202	Within a maximum of 3 seconds after retrieving the raw data from the various radar sites, the object tracking system must present the radar images (echoes and/or tracks) on the traffic image monitor in the operating room.	2.201	-	RWS
Source: Verification method: T, M DGPS measurement of test vessel at position x at time t0 to be compared with presentation of the test vessel at position x at time t+y. Acceptance criterion: y is lower than or equal to 3 seconds.				
Explanation:				

2.1.5 Initiating tracks

<ID>	Track initiation	Upper-level requirement	Lower-level requirement	Requirement initiator
2.203	The object tracking system must be able to initiate tracks in the following manners: - manually by allocation by the operator; - automatically, while the system has created a confirmed track within an average of 16 seconds.	2.201	-	RWS

Source:
Verification method: T During the PoA test run, the test is carried out for verification of the requirement on indication of the Principal at least 1 time and no more than 3 times. Test 2.117-1, standard track initiation For the first 30 vessels, the time is measured from the moment when the vessel's bow passes a defined line until a confirmed track is displayed. The time starts at the first detection possibility, in practice when the vessel's bow has passed the line. The average is determined by taking the total of the number of seconds until a confirmed track is displayed for all 30 vessels and dividing the total by 30. If creating a track takes longer than 16 seconds, the time after 16 seconds is counted double (e.g.: if track creation takes 18 seconds, a time of 20 seconds is recorded) Acceptance criterion: The average track creation per test takes 16 seconds or less. Test 2.117-2, track initiation in coverage area The test vessel sails into the sector together with a vessel to be determined later, while the mutual distance is such that they are displayed as one track. In the POA test area, the test vessel moves away from the other vessel. The test vessel must have its own track within 16 seconds. If creating a track takes longer than 16 seconds, the time after 16 seconds is counted double (e.g.: if track creation takes 18 seconds, a time of 20 seconds is recorded) The time is measured from the moment when the test vessel is 25 metres away from the other vessel. This test is carried out in upstream and downstream directions. Acceptance criterion: The average track creation per test takes 16 seconds or less. Explanation:

2.1.6 Maintenance tracks

<ID>	Prevention track loss	Upper-level requirement	Lower-level requirement	Requirement initiator
2.204	The object tracking system must prevent track loss unless: - the object leaves the radar coverage area; - the movements do not come within the definition of objects; - the resolution in accordance with the design specifications of the radar does not permit track maintenance; - in the event of multiple radar coverage, there is multiple shielding (not all sources can see the object).	2.201	-	RWS

Source: spec GVC DH
Verification method: Mo During the PoA test run, at least 1 and no more than 3 periods are chosen on indication of the Principal for performance of monitoring against the requirement. Within these periods, the traffic image is monitored during 4 hours and it is verified whether the requirement is complied with. Acceptance criterion: Track loss results in a score of 3 points. In addition, the following applies. If in the relevant case of track loss recovery takes place within 16 seconds, 2 points are deducted from the score. If in the relevant case of track loss recovery takes place within 20 seconds, 1 point is deducted from the score. If in the relevant case of track loss recovery does not take place within 60 seconds, 1 point is added to the score. The average score over the periods must not exceed 20 points.

<ID>	Track recovery after shielding	Upper-level requirement	Lower-level requirement	Requirement initiator
2.205	The object tracking system must automatically recover at least 90% of the lost radar tracks due to shielding within 16 seconds after shielding.	2.201	-	RWS
Source:				

Verification method: T The test vessel carries out manoeuvres to force track loss. When the test vessel's track is lost, the test vessel will make itself visible for the radar again. When the radar video of the test vessel can be observed again, the track must be recovered within the prescribed period of time. During the PoA test run, at least 1 and no more than 3 periods are chosen on indication of the Principal for performance of the test against the requirement. This test is carried out once upstream and once downstream. Acceptance criterion: On an average of the test periods more than 90% must have been recovered within the defined period of time. Verification method: Mo Within performance of the monitoring for requirement 2.132, track loss is monitored. During the monitoring moments, the number of cases is counted in which tracker loss is recovered. Acceptance criterion: On an average overall periods, in 90% of the cases the registered track loss is recovered within 16 seconds. Explanation: This refers to track loss <i>other</i> than for <u>defined</u> area shielding, for instance mutually between vessels. Track loss in a defined and shielded area is not permitted, see requirement 2.133.
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<ID>	Maximum number of ghost tracks	Upper-level requirement	Lower-level requirement	Requirement initiator
2.206	The object tracking system must generate or display fewer than 8 ghost tracks per 24 hours in the test area.	2.201	-	RWS
Source: Verification method: Mo During the PoA test run, at least 1 and no more than 3 periods are chosen on indication of the Principal for performance of monitoring against the requirement. Within these periods, the traffic image is monitored during 24 hours and it is verified whether the requirement is complied with. Acceptance criterion: A ghost track results in a score of 2 points. In addition, the following applies. If the ghost track is phased out within 20 seconds, 1 point is deducted from the score. The average score over the periods must not exceed 16 points. Explanation: Definition: Ghost tracks are tracks created from ghost echoes, stationary objects and/or track forking . Definition ghost echo: An undesired signal that appears on the screen caused by echoes that experience multiple reflections before the receiver is reached (ref. Barton and Johnson).				

<ID>	Track interchange and merging	Upper-level requirement	Lower-level requirement	Requirement initiator
2.207	The object tracking system must prevent interchanging of tracks, merging of tracks and loss of label data under one or more of the following conditions: - vessel length difference between objects (behind each other) >20% <i>or</i> >10m - mutual distance between objects perpendicular to the radar sounding: >20m - speed difference between objects >0.5m/s - if the condition of one or several objects is not compatible with the required accuracy under table 5-2 of Schedule 2 in [V-128]. - course difference between objects >5°	2.201	-	RWS
Source: Verification method: T The test vessel carries out manoeuvres on the fringe of the conditions laid down in the requirement During the PoA test run, at least 1 and no more than 3 periods are chosen on indication of the Principal for performance of the test against the requirement. This test is carried out once upstream and once downstream. Acceptance criterion: In the event of track interchange, with connected label, and merging at a vessel length difference of >10m and a mutual distance between 20 and 25 metres, this results in a score of 1. In the event of track interchange, with connected label, and merging at a vessel length difference of >10m and a mutual distance between 26 and 35 metres, this results in a score of 2 points. The average score over the periods must not exceed 2 points. Explanation: Interpretation of said table must be based on "type of capability" "Advanced"				

<ID>	Track behaviour on course change	Upper-level requirement	Lower-level requirement	Requirement initiator
2.208	The object tracking system must ensure that the course of the radar track remains the same as the current course over ground of the object with a margin of +/- 5 degrees. This requirement applies for course changes smaller than or equal to 10 degrees	2.201	-	RWS

	per second.			
Source:				
Verification method: T The test vessel, equipped with a rate of turn indicator, makes a turn (in the coverage area or from an access waterway) with a maximum of 10 degrees per second. The course over ground of the track must follow the test vessel within the defined margins. The test is carried out 3 times within a period. During the PoA test run, at least 1 and no more than 3 periods are chosen on indication of the Principal for performance of the test against the requirement. Acceptance criterion: In the event of a course deviation of the radar track outside the defined margin, this results in a score of 1 point. The average score over the periods must not exceed 1 point.				
Explanation:				

2.1.7 Symbols display

<ID>	Lapsed for PoA	Upper-level requirement	Lower-level requirement	Requirement initiator
2.209	•			
Source:				
Verification method:				
Explanation:				

2.1.8 Making controls available

<ID>	Response time	Upper-level requirement	Lower-level requirement	Requirement initiator
2.210	When operated by the user, the object tracking system must respond immediately within human observation.	2.201	-	RWS
Source:				
Verification method: Mo				
Explanation:				