



VTSW System Requirements Tender Specification (VSE)

Description of

Supply of radar systems for Waddenzee and Wijk bij Duurstede Lot B

Case number: 31180393

This document has been translated to English to make it easier for non-Dutch entities to determine whether or not they want to participate in this tender. In case of contradictions between the Dutch and English variants of this document, the Dutch variant will prevail.



Colophon

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1 Introduction

1.1 Identification

The System Requirements Tender Specification [**Vraagspecificatie Systemeisen; VSE**] is part of the tender documents of the European tender "Supply of radar systems for Waddenzee and Wijk bij Duurstede", with case number 31180393. The total set of tender documents forming part of this European tender is set out in the Descriptive Document [**Beschrijvend document; BD**].

This document concerns the [**VSE**] for plot B 'Wijk bij Duurstede'.

1.2 Purpose of this document

The purpose of this [**VSE**] document is to list all qualitative requirements that the systems and products to be supplied must satisfy.

1.3 Reader's guide

Requirements are identifiable because they are included in boxes and have unique numbers [**xxx-yyy**] and titles, both displayed in **bold text**, where the requirement is described in more detail in the following manner:

[Category] indicates whether the relevant requirement applies to category B, category C, or both.

[Eis] defines the requirement in more detail, in which the included sub-requirements are numbered to allow unique references, where:

- If reference is made to a [Requirement], this means that this must be satisfied *unconditionally* and *without reservation*. If this is not satisfied, the offer will be disregarded.
- If reference is made to a [Wish], that means that it is not required to be satisfied. Satisfying the [Wish] may result in a higher rating.

[Explanation]: (optional) provides an additional explanation of the requirement so it can be interpreted properly. They can also be references to indicate traceability, for example. Enumerations in the explanations are usually not numbered.

[Verification]: for each requirement [Requirement], it describes how verification takes place. The notation in bold text at [Verification] shows the verification method. The verification method may be supplemented by further details in non-bold text. Verification methods are described in section 1.4.

In all other respects:

- All other texts serve to introduce, explain or provide background information and context;
- The **definitions and abbreviations** should be read first so as to properly interpretate the requirements and texts. These are included in the [**VSP**];
- If a reference is made to the [**VSP**], such a reference should be interpreted as a reference to the [**VSP**] and all underlying documents listed in the tables as referenced documents;
- References in a specific [**XXX**] document should be interpreted as a reference to that document and all referenced documents indicated in this document and (in the relevant tables).



1.4 Verification methods

The verification methods indicated for the requirements have the meanings given below.

Method	Description
Analysis	The use of documentation data, test data, simulations, and/or calculations, or simulations under predefined conditions, to demonstrate that one or more requirements are satisfied under prescribed/defined conditions.
Certification	If present: the submission of the certificate, or if not present: verification by an independent expert on the subject from a party authorised in this regard.
Demonstration	A qualitative representation of the functional performance of one or more requirements for the system or a component of the system through use of the system.
Document check	Assessment of the content of documents such as system descriptions, design documents, test and measurement reports, drawings, diagrams etc. in terms of completeness, consistency, correctness and in accordance with the requirements specified. These may be standard documents.
Inspection	Visual inspection of the delivery for completeness and absence of (external/internal) damage.
Test	Methodical approach, through the performance of test procedures, to demonstrate that the system satisfies the requirements specified.

1.5 Definitions

Please see the **[VSP]** for the glossary.

1.6 Abbreviations used

Please see the **[VSP]** for the list of abbreviations.

1.7 Referenced documents

Normative documents are documents that contain requirements for functionality, technology, process control and services to be supplied. These documents form an integral part of the contract. The following documents are normative:

Identifier	Name
[BD]	The Descriptive Document (<i>Beschrijvend Document</i>) "Supply of radar systems for Waddenzee and Wijk bij Duurstede", case number 31180393, dated October 23 rd 2023, version number 1.0



Identifier	Name
[BIO]	Government Information Security Baseline (<i>Baseline Informatiebeveiliging Overheid</i>), 2020 version 1.04 https://bio-overheid.nl/media/13kduqsi/bio-versie-104zv_def.pdf
[CAT010]	EUROCONTROL Specification for Surveillance Data Exchange Part 7: Category 010 Transmission of Monosensor Surface Movement Data, SUR.ET1.ST05.2000-STD-07-01, edition number 1.1, edition data March 2007.
[CAT034]	EUROCONTROL Specification for Surveillance Data Exchange ASTERIX Part 2b Category 34 Mono Radar Service Messages, Edition: 1.29, Edition date: 15 March 2021, Reference no.: EUROCONTROL-SPEC-0149-2b
[CAT048]	EUROCONTROL Specification for Surveillance Data Exchange ASTERIX Part 4 Category 048 Monoradar Target Reports, Edition: 1.31, Edition date: 03/10/2022, Reference no.: EUROCONTROL-SPEC-0149-4
[CAT240]	EUROCONTROL Specification for Surveillance Data Exchange ASTERIX Category 240 Radar Video Transmission. Document identifier: Eurocontrol-spec-0149-240, edition number 1.3, edition data 13/05/2015.
[IALA1111]	IALA Guideline 1111, Preparation of Operational and Technical Performance Requirements for VTS systems, edition 1.1, January 2022.
[IRSIDD]	Interface Requirements Specification / Interface Design Description Nautical Radar (Radar Distribution Layer RDL), Nautical Radar ASTERIX CAT 240, date 01/06/2023, version number 1.6
[NEN1991]	NEN-EN 1991-1-4+A1+C2:2011/NB:2019+C2:2023 nl: National Appendix to NEN-EN 1991-1-4+A1+C2: Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions
[VSE]	The System Requirements Tender Specification (<i>Vraagspecificatie Systeem Eisen</i>) "Supply of radar systems for Waddenzee and Wijk bij Duurstede – plot B" case number 31180393, dated October 23 rd 2023, version number 1.0 (this document).
[VSP]	The Process Requirements Tender Specification (<i>Vraagspecificatie Proceseisen</i>) "Supply of radar systems for Waddenzee and Wijk bij Duurstede", case number 31180393, dated October 23 rd 2023, version number 1.0



2 Background

2.1 General

The Client aims to replace end-of-life radar systems in two regions. Four radar systems on lighthouses on the Wadden Islands Texel, Terschelling, Ameland and Schiermonnikoog must be replaced. Along and near the Amsterdam-Rhine Canal between Maarssen and Tiel, fourteen radar systems are to be replaced. These are radar systems used by the traffic control centre in Wijk bij Duurstede (Lekdijk Oost 11, Wijk bij Duurstede). In addition to the replacement of radar systems also some spare radar systems and spare components are taken in stock.

This [VSE] describes the specifications for traffic control centre Wijk bij Duurstede: lot B.

2.2 Installation of radar systems

2.2.1 Traffic control centre Wijk bij Duurstede

Wijk bij Duurstede's fourteen radar systems are to be placed at various sites between Maarssen and Tiel. This concerns two types of radar systems: category B and category C (see the definitions in [VSP]). The map below, figure 1, shows the locations of the radar systems. The coordinates are listed in the table below.

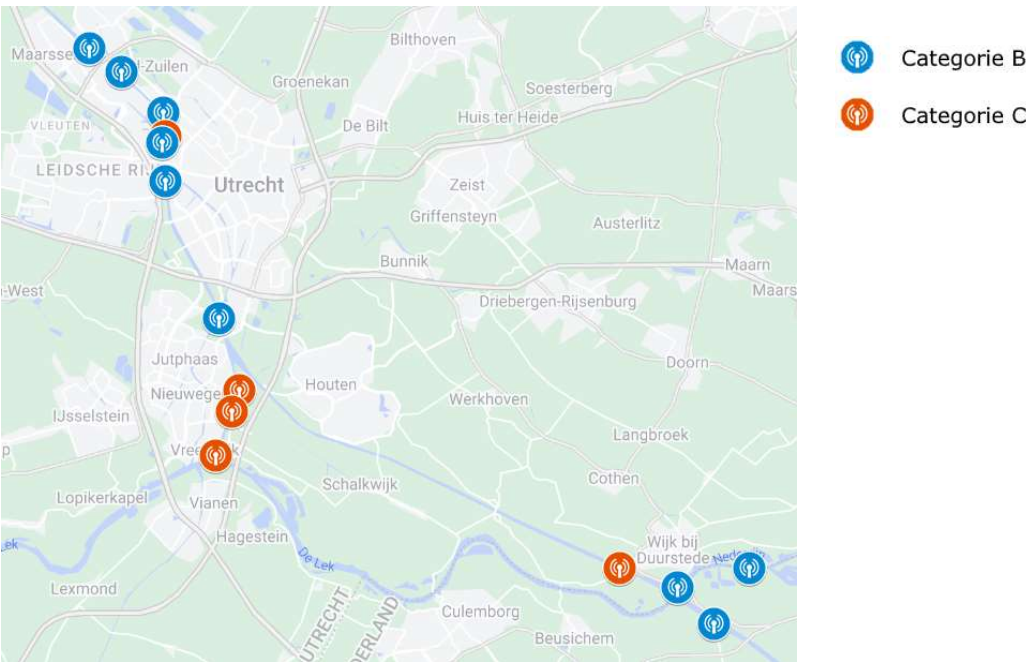


Figure 1 - Locations of radar systems of traffic control centre Wijk bij Duurstede

Site Coordinates (NB, OL)	Category	Antenna height	Location in building, connector location (distance to server)
Maarserbrug 52.133308, 5.038481	B	10 m	Radar housing, 10 m



Site Coordinates (NB, OL)	Category	Antenna height	Location in building, connector location (distance to server)
Vechtsluis 52.126412, 5.055366	B	12 m	Radar housing, 10 m
Demkabocht 52.113113, 5.076649	B	12 m	Radar housing, 10 m
Lageweide 52.106079, 5.077557	C	10 m	Radar housing, 6 m
Kernhaven 52.104147, 5.075597	B	10 m	Radar housing, 10 m
KUS 52.091939, 5.077496	B	6 m	Radar housing, 10 m
Zuidersluis 52.048654, 5.105151	B	8 m	Radar housing, 10 m
Beatrixsluis Noord 52.025825, 5.115793	C	12 m	Radar cabinet, 1.5 m
Beatrixsluis Zuid 52.005074, 5.102932	C	12 m	Radar cabinet, 1.5 m
Beatrixsluis Deurenbergplaats 52.018976, 5.111113	C	12 m	Radar cabinet, 1.5 m
Irenesluis 51.969510, 5.310511	C	10 m	Radar cabinet, 1.5 m
Traffic control centre Wijk bij Duurstede 51.963637, 5.339788	B	12 m	Server room, 10 m
Ravenswaay 51.952379, 5.358612	B	10 m	Radar housing, 10 m
Gravenbol 51.969815, 5.376933	B	14 m	Radar housing, 10 m

The entire area of traffic control centre Wijk bij Duurstede falls within Wind Area III according to **[NEN1991]**. This is the wind area with the least severe winds in the Netherlands.

2.3 Overview of the system chain

The radar systems are to be connected to Rijkswaterstaat's VTS system. The figure below shows the category B or C radar system with the interface with other systems. The "Radar Management tools" refer to tools provided by the Contractor within the scope of this offer.

Data from category B and C radar systems is not transmitted to external parties. There is therefore no interface with RDL (unlike in category A). An interface with monitoring tools through SNMP is optional for categories B and C.

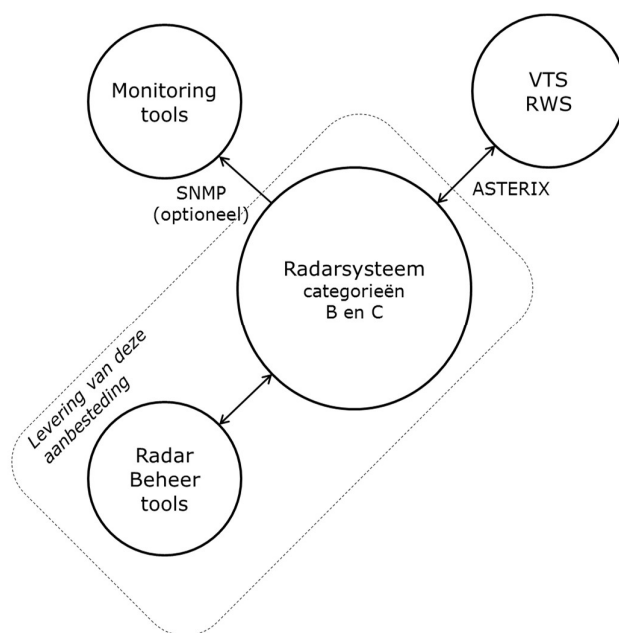


Figure 2 - System context – categories B and C

In addition to the data interfaces described above, radar systems have:

- Electrical interfaces: power supplies, motor control;
- Mechanical/mounting interfaces: mounting in and on building and/or pedestal.



3 System requirements

3.1 Components

VSE-001	Components of the radar system
Category	B and C
Requirement	The Contractor must supply a complete radar system. This consists of at least the following components: 1. radar antenna; 2. transceiver; 3. radar signal processing software and interface software; 4. motor; 5. motor control unit; 6. transmission; 7. connection box; 8. waveguide; 9. power supply unit; 10. signal cabling and connectors; 11. power cabling and connectors.
Explanation	The transceiver will be placed in 'Location in Building' as specified in the table in section 2.2.1. The supply of components, such as waveguide, must provide for this positioning of components.
Verification	Inspection

VSE-002	Redundant transceiver
Category	B
Requirement	The Contractor must implement transceiver redundancy for one radar system.
Explanation	The redundant system will be installed at traffic control centre Wijk bij Duurstede. Currently, there is also redundancy for the transceiver there.
Verification	Inspection before supply of the hardware. Test for functionality redundancy.

3.2 Quality of radar data

VSE-102	Radar data quality – category B
Category	B
Requirement	The radar system must satisfy the IALA Standard category specifications.
Explanation	IALA Guideline 1111 ([IALA1111]) names several specifications that apply to a radar system in the Standard category. The radar system must satisfy all these specifications.
Verification	Document check, Analysis



	Demonstration in OSD
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VSE-103	Radar data quality – category B
Category	C
Requirement	The radar system must satisfy the following requirements: 1. The maximum single scan detection range must be at least 2 km for an IALA class 1 target in 4 mm/h rain; 2. Over the entire range, the capacity to resolve in range must be better than 20 m. (according to IALA definition of spatial resolution); 3. Within a distance of 1 km from the radar, the capacity to differentiate in angular directions must be better than 20 m (according to IALA definition of angular resolution); 4. Within a distance of 1 km, the capacity to differentiate in angular directions must be better than 20 mrad (1.1°) (according to IALA definition of angular resolution).
Explanation	The current radar systems satisfy the specifications described here. The new radar systems must at least be equivalent in this respect.
Verification	Document check, Analysis Demonstration in OSD

VSE-104	Short range targets
Category	B and C
Requirement	The radar system must be able to detect targets at close range, at least from 35 m.
Explanation	If the radar system does not provide plots and tracks but video data (ASTERIX CAT240), the quality of that video data at 35 m must be such that the VTS data handling can extract plots of nearby vessels.
Verification	Document check, Analysis Demonstration in OSD

VSE-109	Filtering in SPS
Category	B and C
Requirement	The signal processing software (SPS) must at least have filtering for: 1. Noise suppression; 2. Interference suppression; 3. Wave clutter suppression; 4. Rain clutter suppression. In addition: 5. Filtering must be adjustable; 6. Filtering must automatically adapt to conditions.
Explanation	Interference suppression refers to interference from other radar systems.



	Automatic adjustment of filtering can apply to rain clutter suppression, for example. The degree of filtering then depends on the amount of rainfall. It is preferred that filtering setting can be stored in profiles.
Verification	Document check Demonstration in OSD

VSE-110	Plots and tracks
Category	B
Requirement	The radar system must be able to determine plots and tracks from raw data.
Explanation	RWS firstly wants plots and tracks to be calculated in the VTS, based on ASTERIX CAT240 data provided by the radar system. RWS wants to keep the option of having plots and tracks calculated by the radar system open. Requirement VSE-503 "ASTERIX - CAT010, CAT034 and CAT048" describes sending plots and tracks from the VTS to RWS.
Verification	Demonstration

3.3 Technical parameters

3.3.1 Radar technology

VSE-201	Designated frequency space
Category	B and C
Requirement	The radar system must limit the transmission of radio waves to the frequency space designated to RWS of 9.3 GHz to 9.5 GHz.
Explanation	<u>All</u> frequencies used to transmit radio waves must fall within the designated frequency range of 9.3 GHz to 9.5 GHz. This is the frequency space designated to RWS for VTS. Please note that the radar system must be able to offer all required functionalities within the designated frequencies. If the radar system can also transmit outside the frequency space listed here, and it is possible to limit use to the designated frequency space, then all the requirements in this VSE apply to the situation where the radar system transmits exclusively within the designated frequency space. The designated frequency range will probably be extended to a range of 9.2 GHz to 9.5 GHz. At the time of publishing this has however not been formally decided. The notice of information for this tender will state whether the designated frequency range has been formally changed at that time and, if so, to what range.
Verification	Document check



3.3.2 Format

VSE-208	Climatic conditions inland waterways
Category	B and C
Requirement	The radar system must be able to operate within the climatic conditions of the Central Netherlands region.
Explanation	The entire area of traffic control centre Wijk bij Duurstede falls within Wind Area III according to [NEN1991] .
Verification	Document check

3.3.3 Safety

VSE-210	Fire-proof materials
Category	B and C
Requirement	The radar system must be constructed with fire-proof materials.
Explanation	-
Verification	Document check

VSE-211	No radioactive substances / materials / components
Category	B and C
Requirement	The radar system must not contain any radioactive substances, materials or components.
Explanation	-
Verification	Document check

3.3.4 Limiting environmental nuisance

VSE-230	Reflections of light
Category	B and C
Requirement	The radar system must be designed in such a manner that bothersome reflections of light to nearby residents are limited.
Explanation	The radar system is located in the immediate vicinity of inhabited areas. Nuisance to local persons living nearby should be avoided as much as possible.
Verification	Document check



VSE-231	Sector blanking
Category	B and C
Requirement	The radar system must have sector blanking.
Explanation	The radar systems are located in the immediate vicinity of inhabited areas, where transmitting outside waterways must be limited.
Verification	Document check

3.4 Security

VSE-300	Management functionality authentication
Category	B
Requirement	Access to the management functionality must be secured by means of authentication.
Explanation	-
Verification	Document check Demonstration in OSD

VSE-301	Passwords
Category	B
Wish	The authentication (VSE-300) must satisfy the following requirements: 1. Strong passwords are mandatory, in accordance with the definition in [BIO] ; 2. Passwords may not be reusable; 3. Default passwords must be changed on first use.
Explanation	Please note that this is a <u>wish</u> .
Verification	Document check

VSE-303	Blocking network services and ports
Category	B
Requirement	The radar system must limit communications to necessary network services and ports: 1. Non-necessary data network services must be able to be switched off; 2. It must be possible to block access to unused ports.
Explanation	'Ports' refers to any physical interface with the radar system. This includes for example USB-ports.
Verification	Document check



VSE-304	Logging
Category	B
Requirement	The radar system must keep activities in a log.
Explanation	Logged activities concern security. This concerns, for example: • Signing in (time, username) • Changing parameters
Verification	Document check Demonstration in OSD

VSE-305	Access to log
Category	B
Requirement	The log must only be accessible through the management interface.
Explanation	The log referred to here is the log from requirement VSE-304.
Verification	Document check Demonstration in OSD

3.5 Availability

VSE-400	Mean Time Between Failure
Category	B and C
Requirement	The radar system must have a minimum Mean Time To Failure (MTBF) of at least 1 year (365 days).
Explanation	The radar system may malfunction less than once a year on average, ensuring high availability, while simultaneously reducing corrective maintenance.
Verification	Document check

3.6 Data interface

VSE-502	ASTERIX - CAT240
Category	B and C
Requirement	The radar system must exchange data in accordance with ASTERIX protocol CAT240.
Explanation	The Interface Requirements Specification / Interface Design Documentation [IRSIDD] describes how RWS uses ASTERIX to exchange radar video data. It is preferred that the radar system conforms to [IRSIDD] .



Verification	Test
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VSE-503	ASTERIX - CAT010, CAT034 and CAT048
Category	B
Requirement	The radar system must exchange data in accordance with the ASTERIX protocols: 1. CAT034 in accordance with [CAT034] 2. CAT010 and/or CAT048 in accordance with [CAT010] and [CAT048], respectively
Explanation	There is currently no specific implementation for CAT010, CAT034 and CAT048 by RWS. Requirement VSE-110 "Plots and tracks" describes the creation of the plots and tracks sent to RWS's VTS using CAT010 and/or CAT048.
Verification	Document check

3.7 Installation and maintenance

3.7.1 Installation and maintenance

VSE-610	Cables
Category	B and C
Requirement	The radar system must be supplied including cables from the antenna to the transceivers, and from the transceivers to the network the cabinet.
Explanation	-
Verification	Inspection The Contractor must check whether the supply is complete before transport to a location of RWS and provide a checklist in this respect. This checklist must take into account the required cable length for the specific target location.

VSE-615	Locking rings and lifting rings
Category	B
Requirement	The radar system must be supplied including the following mounting assemblies: 1. Locking rings for installing new actuators; 2. Lifting rings and/or lifting beams on the actuators.
Explanation	-
Verification	Inspection The Contractor must check whether the supply is complete before transport to a location of RWS and provide a checklist in this respect. This checklist must include the locking rings and lifting rings.



VSE-613	Corrective maintenance: repair by replace
Category	B and C
Requirement	It must be possible to repair a defective radar system by replacing the defective part with a spare part.
Explanation	Repair by replace contributes to higher availability by reducing the Mean Time To Repair. Examples include components like the antenna the turning unit and potentially the magnetron tube.
Verification	Document check The Contractor must describe, or show in drawings, that repair by replacement is possible for every part.

VSE-614	Additional monitoring features
Category	B and C
Wish	The radar system should have the following additional monitoring features: 1. Oil level sensor; 2. Electrical power meters.
Explanation	Please note that this is a <u>wish</u> .
Verification	Document check

3.8 Management

VSE-703	Local and remote control
Category	B and C
Requirement	It must be possible to set up and maintain the radar system both locally and remotely (remote control over the network). This in any event includes: 1. Starting and stopping the radar system; 2. Configure all necessary parameters; 3. Performing software updates.
Explanation	-
Verification	Demonstration in OSD