



Certificate no.:
TAA00003RJ

TYPE APPROVAL CERTIFICATE

This is to certify:

that the RADAR

with type designation(s)
MINERVAR Radar

issued to

NAVANTIA S.A., S.M.E.
Cadiz, Spain

is found to comply with

IMO Res. A.278(VIII), IMO Res. A.694(17), IMO Res. MSC.191(79), IMO Res. MSC.192(79), IMO Res. MSC.302(87), IMO MSC.1/Circ.1349, ITU-R M.1177-4 (04/11)

Application:

Product approved by this certificate is accepted for installation on AVANTE 2200 (AVT) Corvettes classed by DNV.

Issued at **Hamburg** on **2025-09-19**

This Certificate is valid until **2027-09-18**.

DNV local unit: **Area NB/CMC Iberia**

for **DNV**

Approval Engineer: **Jörg Rebel**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

The MINERVA navigation radar, intended for the AVANTE 2200 (AVT) Corvettes project comprises the following components necessary for functioning:

Component	Model/Version	Notes
<u>Main Processing Unit incl.:</u> Mother board Graphic board SSD disk Mother board power supply UPS <u>Interfaces:</u> LAN USB DVI VGA Serial J4 Serial Com1	MFP-16M Processor Module X10SRH-CLN4FI nVidia Quadro K2000D SKC600/512G BEH-630C SLM-TM489 REALTEK/RTL8211 CL	Xeon processor E5-2620 v4, Intel C612J 512 GB SATA Redundant input 115/230V. Power out to mother board power supply, monitor and operator panel. 2 for Navigation 4 ports for internal use 2 ports for display units Not used For internal use For internal use
<u>Operation and Control Unit incl.:</u> Keyboard Trackball USB Buzzer	CP-16 Operator panel	
<u>Display Unit:</u> 26" LCD with touch	SAINSEL/FS26T	DVI signal to be used for video
<u>Network components:</u> Switch Converter Power supply	EDS-G516E-T NPORT IA-5250-T QUINT4-PS/1AC/24DC/10	
<u>BlackBox Radar:</u> Processor	Phantom 6001M/V1.0/RAn	
<u>Software:</u> Operating system Minerva Navigation Radar application SW BlackBox radar Software	Red Hat Enterprise Linux ver. 7.4 VC.3.0.0-SC11 Software version: 5.3.7.	

Application/Limitation

MINERVA Radar is to be installed according to manufacturer's instructions.

MINERVA Radar is approved for CAT 1, CAT 2 and CAT 3.

Tests carried out

- Environmental and EMC testing: IEC 60945 (2002) incl. Corrigendum 1 (2008)
- Interface testing: IEC 61162-1 (2016), IEC 61162-2 (1998) and IEC 61162-450 (2018)
- Presentation testing: IEC 62288 (2014)
- Bridge alert management testing: IEC 62923-1 (2018) and IEC 62923-2 (2018)
- Performance testing: IEC 62388 (2013)

Type Approval documentation

DNV No.	Document ID	Rev.	Description
30	2021900463-AMB	1	Report: Alter Technology Environmental Test, Rev: 2A (Air Flow Modification)
29	SL_PA041_PRP_02_ed4	4 (2020-08)	Report: FS26T Flicker Test Procedure
28	20/36400424	2020-03-09	Report: Applus, C2I, Corrosion test
27	19/31703426	2019-07-12	Report: Applus, C2I, Vibration Test
26	19/31703509M1	2020-01-28	Report: Applus, C2I, Protection against accidental access to dangerous voltages
25	19/31703429	2019-11-21	Report: Applus, C2I, Electromagnetic Compatibility
24	19/31703423	2020-03-03	Report: Applus, C2I, Environmental Testing
23	19/31708236M2	2020-03-03	Report: Applus, C2I, Determination of sound pressure level
18	4428.DOC010302	2020-11	Manual: RAN, Synapsis Service Tool
17	IMH/AVT/006	2024-09-17	Manual: Navantia, Service for MINERVA Navigation - Configuration of interface according to IEC 61162-450
16	AVT.4.97.PT.008	7/5 (2025-09)	Manual: Navantia, Operation of MINERVA Ship Data Distribution System (SDDS) - Volume IV
15	AVT.4.97.PT.008	7/5 (2025-09)	Manual: Navantia, Operation of MINERVA Navigation RADAR (NRADAR) - Volume II
14	AVT.4.97.PT.008	7/5 (2025-09)	Manual: Navantia, Operation of MINERVA System - Volume I
13	AVT.4.86.NV.002	B (2025-07-10)	Manual: Navantia, Installation of MINERVA RADAR
12	9314.01 / 12	2012-09-24	Report: Aucoteam, Tests for DVI-System 2 (VL-6605, VL-66062, VC160, VL-85114, STEP-PS/1AC/24DC/1,75, S0121) according to IEC 60945, 8.2 to 8.4, 8.7, 12.1
11	D/12/3938/01	2012-06-22	Report: Teseq, Tests for DVI-System 2 (VL-6605, VL-66062, VC160, VL-85114, STEP-PS/1AC/24DC/1,75, S0121) according to IEC 60945, 9 and 10
9	JCT/AVT/001	2024-10-02	Report: Navantia, Test summary report according to IEC 61162-450 (2018)
8	AVT.4.89.NV.203D	2024-09-12	Report: Navantia, Tests according to IEC 61162-450 (2018)
7	-	2025-07-03	Report: AN, Test summary report acc. to IEC 62923-1/-2
6	IEC62923 1 Ed1 2018	2025-08-26	Report: AN, Tests according to IEC 62923-1/-2
5	-	2025-07-09	Report: AN, Test summary report acc. to IEC 62388 (2013), 10.4.4.2 e+f, 10.5.3.2 b, 11.2.2.2 g+h and 11.2.3.2 a to d
4	IEC62388 Edition 2.0 2013-06	2025-07-08	Report: AN, Tests acc. to IEC 62388 (2013), 10.4.4.2 e+f, 10.5.3.2 b, 11.2.2.2 g+h and 11.2.3.2 a to d
3	-	2022-04-08	Report: RAN, Test summary report according to IEC 62288 (2014) and IEC 62388 (2013)
2	IEC 62388 Edition 2.0 2013-06	2022-04-07	Report: RAN, Tests according to IEC 62388 (2013)
1	IEC 62288 Edition 2.0 2014-07	2022-04-07	Report: RAN, Tests according to IEC 62288 (2014)

Marking of product

According to IEC 60945, Sect.4.9:

The product to be marked with following information, where practicable:

- Identification of the manufacturer,
- Equipment type number or model identification under which it was type tested,
- Serial number of the unit,
- Compass safe distance.

Alternatively, the marking may be presented on a display at equipment start-up, and in case of fixed equipment compass safe distance may be given in the equipment manual.

Periodical assessment

A renewal assessment will be performed at renewal of the certificate. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>.

END OF CERTIFICATE