HiMAP

Solid State Navigation

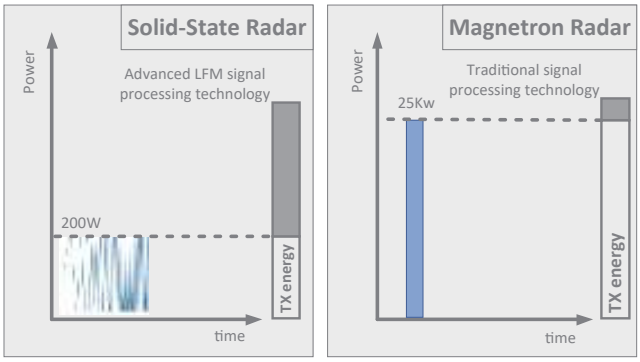
RADAR HRD-RADAR 900S

Fully Automatic Working Radar
Auxiliary Collision Avoidance Radar

Compliance with the Following Normative Standards:
IEC 60945(2002)incl.Corrigendum 1 (2008)
IEC 61162-1(2016) IEC 61162-2(1998)
IEC 61162-450(2018)
IEC 62288(2021)
IEC 62923-1(2018) IEC 62923-2(2018)
IEC 62388:2013/COR1:2014

【Longer Detection Range】

The solid-state radar adopts low-power transmission, large signal bandwidth and pulse compressiontechnology. The new signal form and processing architecture greatly improve the target detection capability, especially the capability to detect long-range targets. It can achieve more than the detection power of traditional radar with only 1/100 of the transmission power.

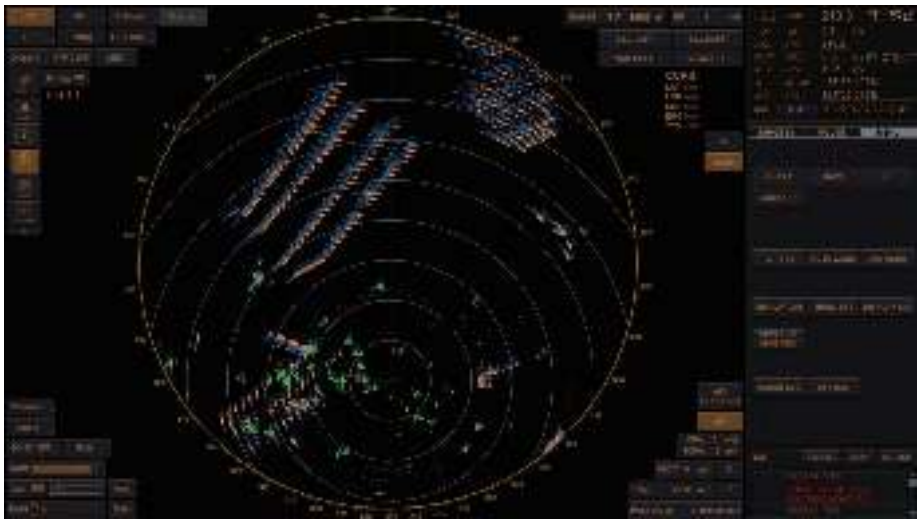


Low power, long pulses　High power, short pulses

Detection range of a standard 10㎡ sphere at X-band (IMO standard 4.9NM))

【Higher Distance Resolution】

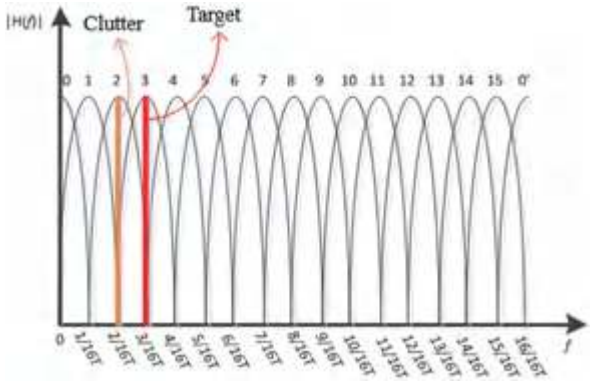
The solid-state radar achieves narrower equivalent pulse width through pulse compression technologgy, improving distance resolution and resolving the contradiction between traditional radar's distance resolution and long-range detection capability.



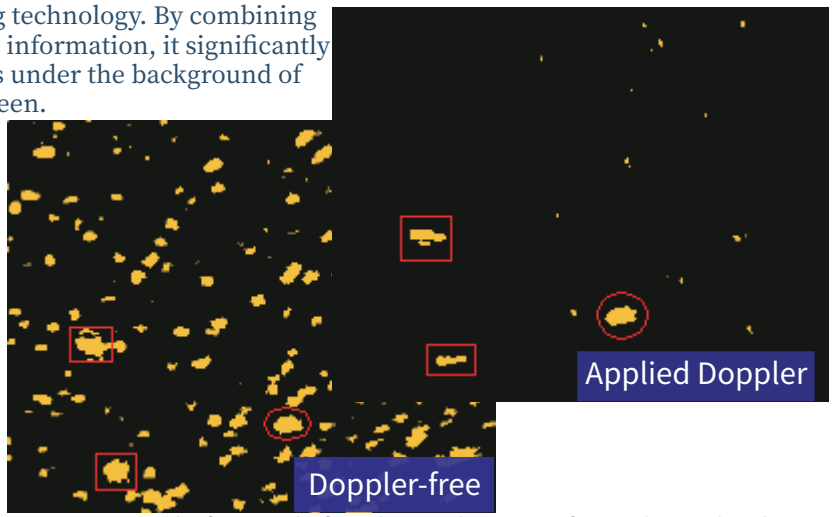
Schematic diagram of target detection in offshore wind farms and aquaculture area ("Dolphin" solid-state X-band radar, July 2023)

【Target Detection Capability under Stronger Clutter】

The solid-state radar adopts a new Doppler processing technology. By combining the processing of frequency domain and time domain information, it significantly improves the capability to detect small moving targets under the background of strong clutter and displays them separately on the screen.



Doppler processing channel (16 channels)



Comparison before and after the application of Doppler technology (The red circle indicates a high-speed target, while the red square indicates a large low-speed target.)

【High Reliability, Low Maintenance Costs】

The solid-state radar is based on third-generation semiconductor gallium nitride (GaN) power devices, combined with frequency converter modules and digital baseband modules to achieve high reliability and lower maintenance costs for the transceiver unit.

GaN Amplifier Module

Frequency Converter Module

Digital Baseband Module

【Intelligent Collision Avodiance Assistance】

The solid-state radar adopts Doppler clutter suppression technology to improve the quality of target detection and realize accurate perception of dynamic information such as position, velocity, and azimuth of the target. The intelligent collision avoidance algorithm processes the dynamic information of the target, evaluates and predicts the collision risk of the target, and gives reasonable operation suggestions. The crew adjusts the navigation handling according to the operational recommendations to avoid the risk of collisions and accidents.

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【Radar Health Management】

On the BITE system health display interface, the real-time operational status of the radar system is displayed through visualized images. When a malfunction occurs, the system interface will provide an alarm notification, indicate the fault location, specify the fault level, and offer maintenance suggestions.

【Enhanced anti-interference capability】

Solid-state radar adopts full-phase-parameter pulse-voltage processing combined with superheterodyne receiver architecture, which enables it to have enhanced capability in spurious emission suppression and anti-co-channelinterference capability.

【No tuning、No preheating】

Solid-state radar has stable signal frequency and is capable of precise frequency control without the need for tuning.
Solid-state radar is ready to use immediately, without the need for preheating.

【HLD-RADAR 900 Series Configuration】

(X-BAND)

Antenna	HLD-AT106/108/109
Transceiver Unit	HLD-TU220/TU230
Display Unit	HLD-DU133/134/135/138 HLD-DU162/163/164/165
Random Cable	HLD-NIK
HMI Unit	HLD-IU600
Main Control Unit	HLD-MCU770
Power Conversion Unit	HLD-PCU600
Optional	
ECDIS key	HLD-LIC900
Console (shading plate)	
Tabletop stand	
De-icing device	

(S-BAND)

Antenna	HLD-AT112
Transceiver Unit	HLD-TU225
Display Unit	HLD-DU133/134/135/138 HLD-DU162/163/164/165
Random Cable	HLD-NIK
HMI Unit	HLD-IU600
Main Control Unit	HLD-MCU770
Power Conversion Unit	HLD-PCU600
Optional	
ECDIS key	HLD-LIC900
Console (shading plate)	
Tabletop stand	
De-icing device	

*The specific configuration is subject to the type approval certificate.

【Dimensional Drawings】

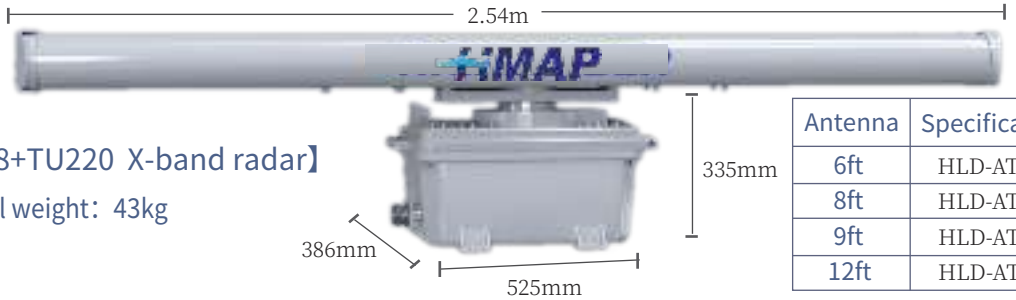
【Power conversion unit HLD-PCU600 4kg】

【Human machine interaction unit HLD-IU600 3kg】

【Display unit 24" HLD-DU134 10kg】

【Main control unit HLD-MCU770 6kg】

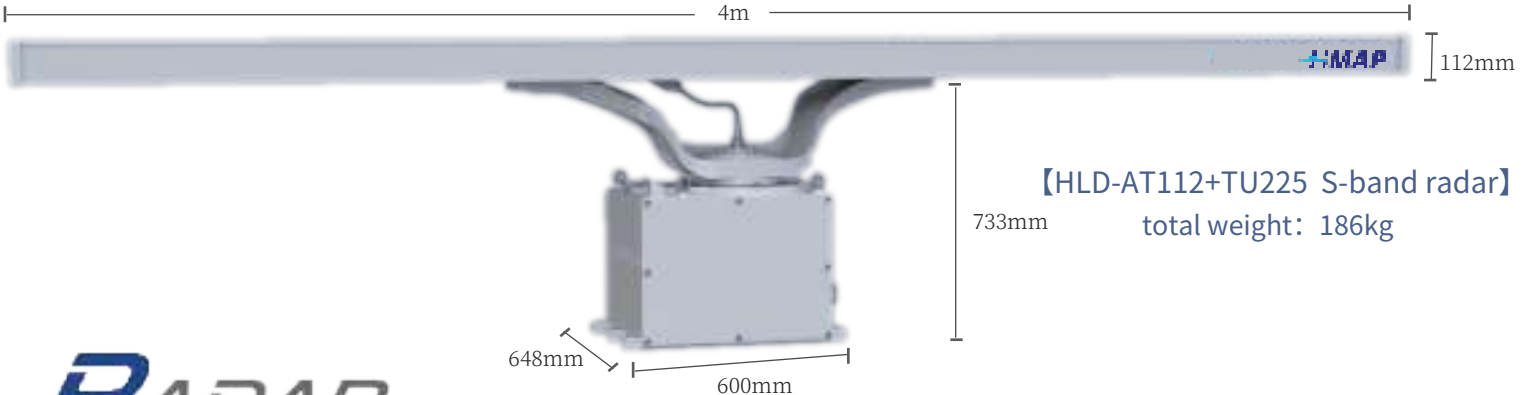
Name	Specifications	Length (mm)	Depth (mm)	Height (mm)	Weight (kg)	Specifications	Length (mm)	Depth (mm)	Height (mm)	Weight (kg)
Display unit 19"	HLD-DU162	429	69	382	7	HLD-DU133	429	75	382	8
Display unit 24"	HLD-DU163	605	69	397	10	HLD-DU134	593	70	384	10
Display unit 26"	HLD-DU164	621	91	435	16	HLD-DU135	621	99	435	16
Display unit 27"	HLD-DU165	650	70	420	11	HLD-DU138	650	70	437	11



【HLD-AT108+TU220 X-band radar】

total weight：43kg

Antenna	Specifications	Length (m)	Weight (kg)
6ft	HLD-AT106	1.93	7
8ft	HLD-AT108	2.54	9
9ft	HLD-AT109	2.7	25
12ft	HLD-AT112	4	66



【HLD-AT112+TU225 S-band radar】

total weight：186kg

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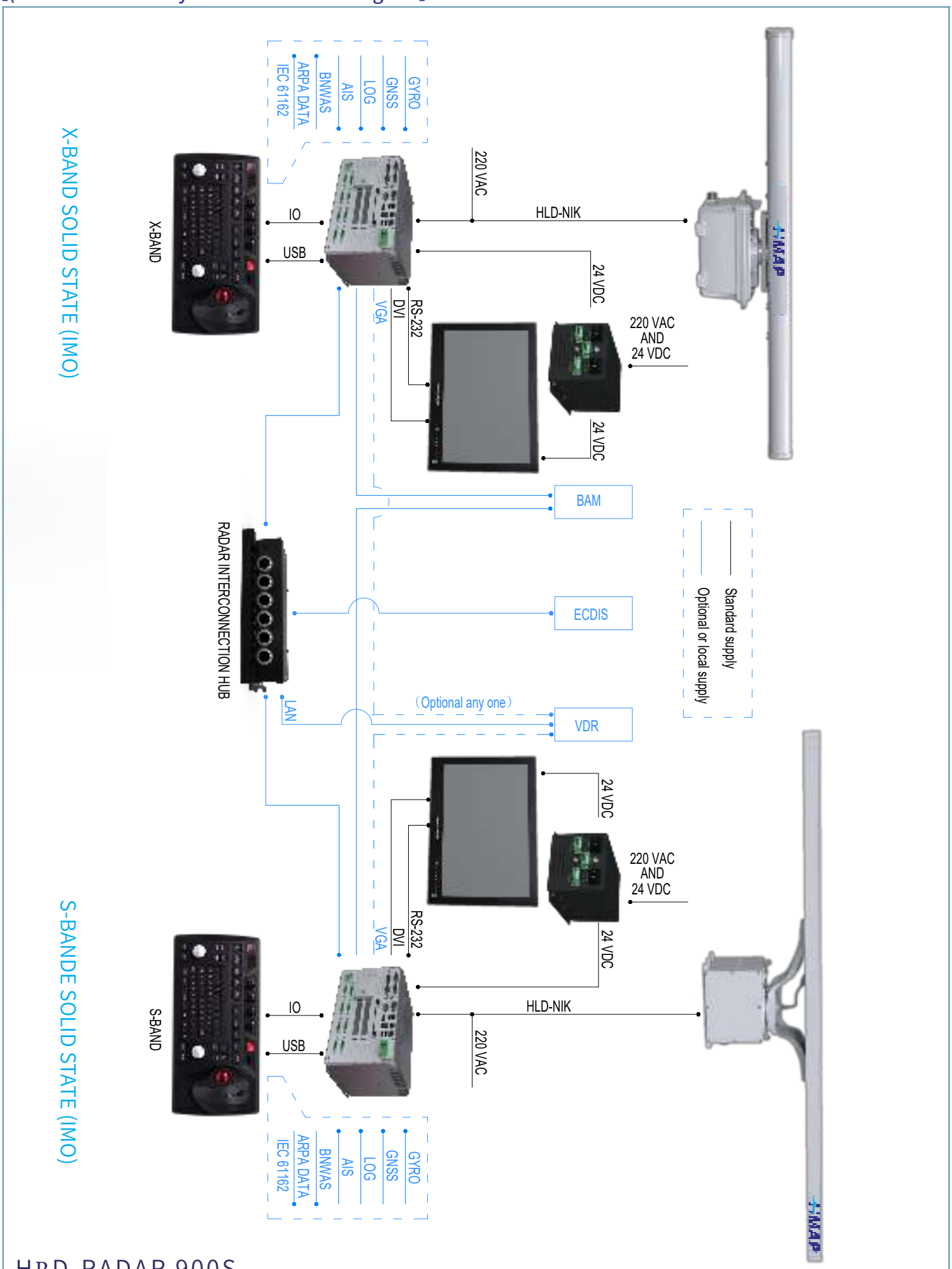
【(X-BAND+S-BAND System Connection Diagram】



HRD-RADAR 900S

【Technical Specifications】

Antenna band		X-Band				S-Band
		HLD-AT104{1}	HLD-AT106{2}	HLD-AT108{2}	HLD-AT109	HLD-AT112{2}
Length（ft）		4	6	8	9	12
Peak transmit power（W）		200{3}/300{4}				250{4}
Beam Width	Horizontal（°）	2.0	1.3	1.0	0.9	2.0
	Vertical（°）	22±2°				
Polarization mode		Horizontal				
Antenna rotation speed		Not higher than 42 rpm				
Operating frequency（MHz）		9300±100				3000±100
Number of sub-bands		8				
Transmission frequency stability（ppm）		1				0.5
Mode and repetition rate	Short pulse groups	0.1μs/10μs/40μs, 1700~2000Hz				
	Medium pulse groups	0.16μs/10μs/40μs, 1200~1500Hz				
	Long pulse groups	0.3μs/10μs/70μs, 600~900Hz				
Intermediate frequency（MHz）		60				
Clutter suppression	Sea clutter	Manual/Automatic				
	Rain and snow clutter	Manual/Automatic				
Number of Doppler channels		Up to 32				
whether to preheat during boot		No need				
Mean time between failures of transceiver units（MTBF, hr）		100000				
Mean time to repair of transceiver unit (MTTR, hr)		0.5				
Maximum detection distance（nm, 10 square standard balls）		8.9	9.2	10.6	11.2	7.5
Range resolution (m)		19				17*
Azimuth resolution (°)		2.0**	1.5**	1	0.9	1.8*
Display resolution (19 / 24 / 26 / 27 inches)		1280×1024 / 1920×1080 / 1920×1200 / 1920×1080				
Display mode	Motion mode	True motion, relative motion				
	Direction mode	Bow up, true north up, course up, stern up				
Display range (nautical miles)		0.125-96				
ARPA target capture		Up to 100				
Automatic target capture		Support，2 auto-capture zones				
AIS target activity		Up to 100				
AIS/ARPA target associations		Support				
High-speed dangerous target recognition		Support				
Test maneuver ship		Support				
Chart radar function		Optional				

* Actual measurement results witnessed by DNV certification engineer
**Actual measurement results witnessed by CCS certification engineer
{1}Products that obtained CCS and comply with international standards
{2} Products that obtained CCS&DNV and comply with international standards
{3} products that meet the standards of inland navigation
{4} products that meet international navigation standards

RADAR

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