

Integrated Navigation System



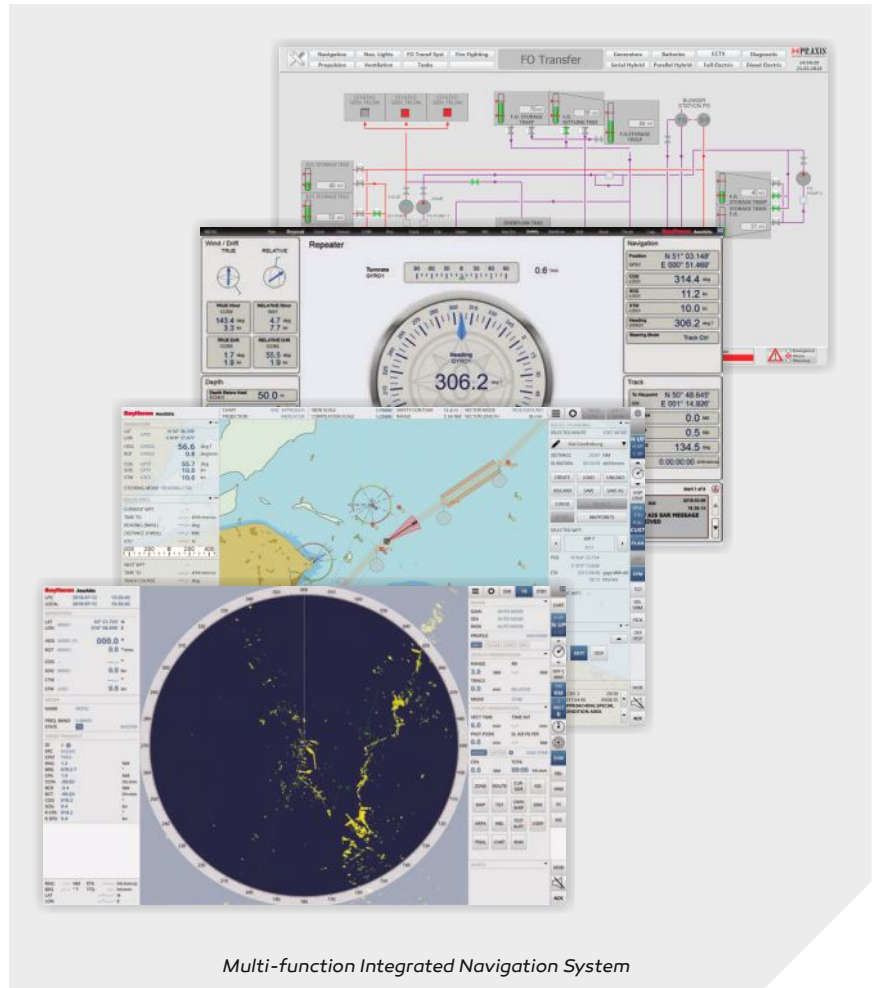
Integrated Navigation System

Features

The Mega-Guard Integrated Navigation System (INS) is an advanced system for perfect navigation for ships. Mega-Guard INS is a modular system which can be tailor made based upon ship's navigation requirements. Both IMO compliant and non IMO compliant variants are available to suit all ship navigation applications. The Mega-Guard Integrated Navigation System is based upon a minimum of three multi-function Operator Workstations. Mega-Guard INS integrates all bridge navigation equipment and presents the data in an uniform way on the multi-function Operator Workstations.

On each Operator Workstation the following functions are available:

- ▶ ARPA Radar
- ▶ ECDIS or ECS
- ▶ Conning
- ▶ Vessel Management System (option)
- ▶ Central Alert Management (option)



Mega-Guard INS can be easily extended with the following independent Mega-Guard **navigation** products:

- ▶ Heading Control System
- ▶ Propulsion Control System
- ▶ Dynamic Positioning System
- ▶ BNWAS Watch Alarm System
- ▶ Navigation Light Control
- ▶ Wiper Control System

The Mega-Guard Heading Control System includes an independent Steering Control System as well.

Additional functions such as control of horn, searchlight, anchor and others can be implemented with Navigation Operator Panels.

In addition, Mega-Guard INS can also be integrated with Mega-Guard **automation** and **electric propulsion** products:

- ▶ Vessel Management System
- ▶ Power Management System
- ▶ Fire Alarm System
- ▶ CCTV Video Distribution
- ▶ Ship Performance Monitor
- ▶ Fleet Management System
- ▶ Energy Management System
- ▶ Electric Propulsion Motor
- ▶ Electric Steerable POD
- ▶ High Power Inverter
- ▶ DC Bus Generator
- ▶ Electric Energy Storage
- ▶ Electric Fin Stabilizer

System lay-out and operation

A typical Mega-Guard INS is built-up with the following main components:

- ▶ Operator Workstations
- ▶ Navigation sensors and Navigation Operator Panels

A redundant Ethernet network inter-connects all components. Mega-Guard INS is in most cases extended with a Mega-Guard Heading Control System and Mega-Guard Vessel Management System as a minimum.

Mega-Guard INS supports optionally Track Control and/or Cruise Control modes. In addition, CAM functionality in compliance with IMO can be added for an uniform presentation and handling of alarm and alerts.

Operator Workstations are equipped with touchscreen and an integrated marine personal computer with high performance CPU (HP type) and Windows 7 or 10 embedded operating system. Solid state disk is applied and the Operator Workstations are available in high definition touchscreen sizes ranging from 18.5" to 86".

Navigation sensors

The following navigation sensors are typically interfaced to Mega-Guard INS:

- | | |
|---------------------------|----------|
| ▶ X and S Band Radar | ▶ Wind |
| ▶ Gyro and/or Compass GPS | ▶ AIS |
| ▶ DGPS | ▶ Navtex |
| ▶ Speed | ▶ VDR |
| ▶ Depth | |

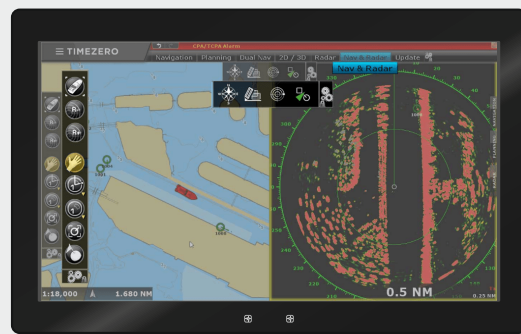
The navigation sensors are of black box type and all NMEA data from the sensors is made available on the redundant Ethernet network. Operator Workstations and Navigation Operator Panels can make use of this data as these are connected to the redundant Ethernet network. Navigation Operator Panels can be installed to reach independent and continuous indication of rudder angle, heading, position, speed, depth and wind in order to fulfill customer and/or IMO requirements. A Navigation Operator Panel is equipped with a 5.7" or 8" touchscreen, with full glass or metal front for intuitive operation and monitoring.

IMO and non IMO Integrated Navigation System

The Mega-Guard INS integrates a radar transceiver with corresponding software from either Raytheon (IMO compliant) or Furuno (non IMO compliant). The radar transceivers from both Raytheon and Furuno are upmost configurations with direct connection to the redundant Ethernet network.



Operator Workstation with Raytheon



Operator Workstation with Furuno

INS market segments

Market segments

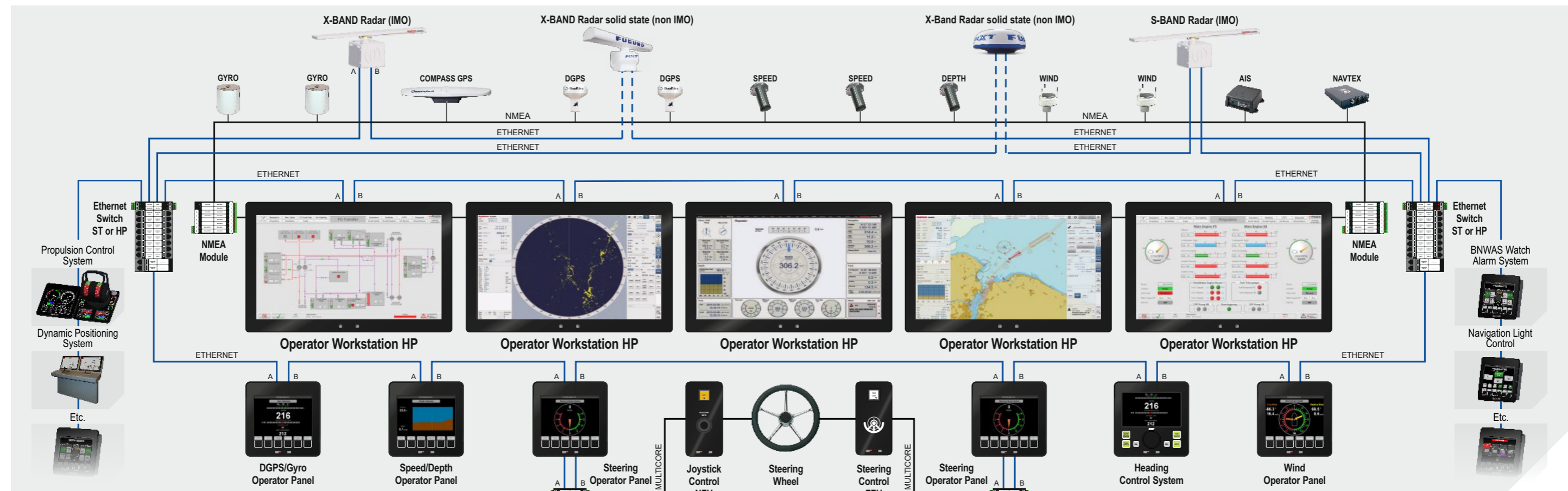
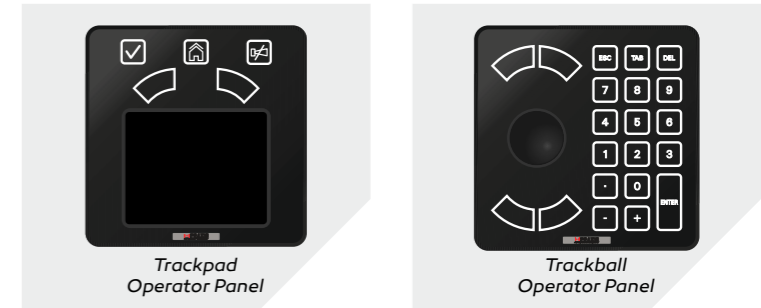
The INS Integrated Navigation System is applied in all type of ships. Four market segments are distinguished:

- ▶ **Commercial ships** ; IMO version with Raytheon core
- ▶ **Mega yachts** ; IMO version with Raytheon core
- ▶ **Yachts and non IMO ships** ; Non IMO version with Furuno core
- ▶ **Navy ships** ; IMO version with Raytheon core and WECDIS

INS Workstations and Operator Panels for mega yachts are delivered with highly esthetic glass fronts and for commercial ships a metal front with integrated pushbuttons is applied. Navy ships require a more robust INS with higher shock and vibration resistance. In addition, navy ships may require added functionality such as WECDIS.

Trackpad and Trackball

Workstations can be operated with touchscreen. In addition to this two types of input devices are available: a Trackpad and Trackball Operator Panel. The Trackpad Panel offers a large trackpad for accurate and easy selection of the required function on the Workstation. The Trackball Panel is equipped with a trackball for function selection and a keypad is also integrated in this panel.

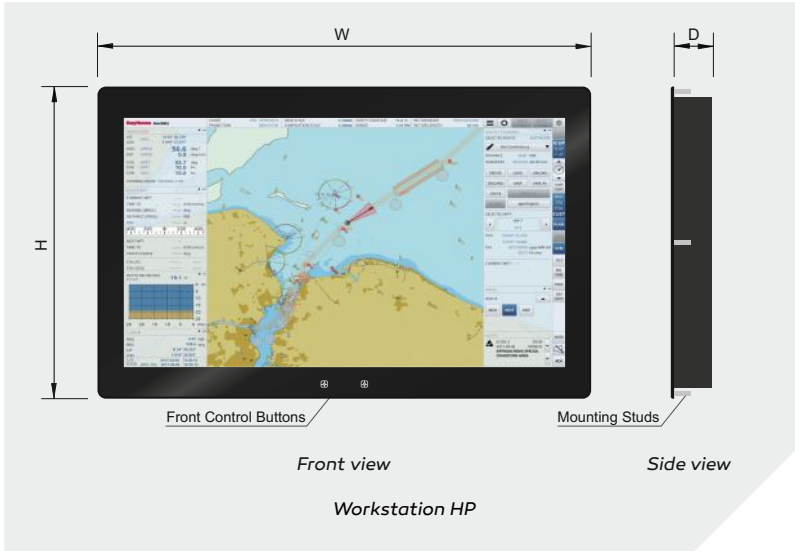


Mega-Guard INS Specification ; IMO version	
Workstation function	ARPA Radar, ECDIS, Conning, CAM and VMS
Workstation software	Windows 7, Raytheon Synopsis NX and Mega-Guard VMS
Workstation INS size	Widescreen 24", 26", 27", 32", 55" and 86" with integrated CPU
Workstation front	Full glass or metal border
Workstation mounting	Desktop, flush panel or integrated in bridge glass plate
INS extension	Mega-Guard Heading Control System
Radar	Raytheon X-Band and S-Band Radar Ethernet transceivers Open array type
Navigation sensors	Gyro, DGPS, Depth, Speed, Wind, AIS, Navtex, Rudder, VDR
Network HP type	Redundant Ethernet 1 Gb

Mega-Guard INS Specification ; Non IMO version	
Workstation function	ARPA Radar, ECDIS, Conning and VMS
Workstation software	Windows 10, Furuno TimeZero and Mega-Guard VMS
Workstation INS size	Widescreen 18,5", 22", 24", 26", 27" and 32" with integrated CPU
Workstation front	Full glass or metal border
Workstation mounting	Desktop, flush panel or integrated in bridge glass plate
INS extension	Mega-Guard Heading Control System
Radar	Furuno X-Band Radar solid state Ethernet transceivers Dome and open array type
Navigation sensors	Gyro, DGPS, Depth, Speed, Wind, AIS, Navtex, Rudder, RPM
Network ST type	Redundant Ethernet 100 Mb

INS configuration

Mounting & dimensions

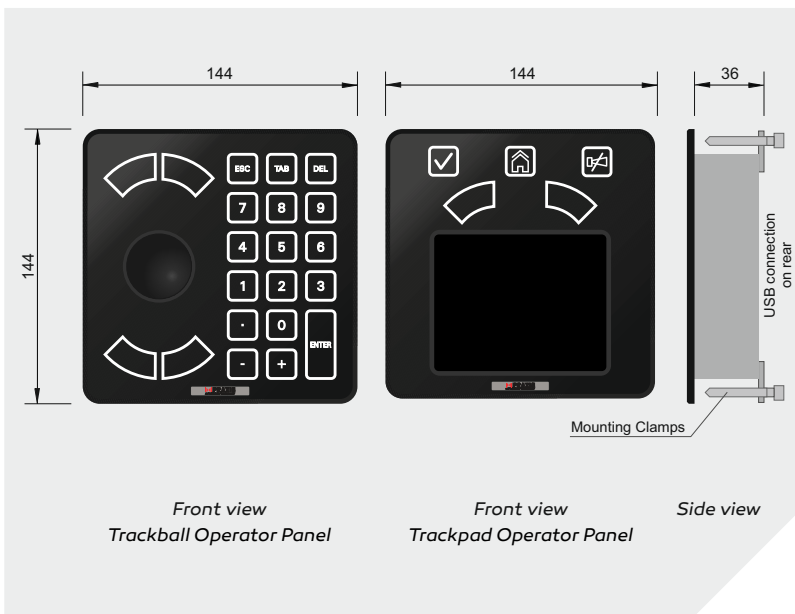


Workstation and Monitor - Models (HP type)

Size	Resolution	Ratio	Dimensions
18,5"	1920x1080	16:9	482x304x45mm
22"	1680x1050	16:10	542x372x45mm
23"	1600x1200	4:3	584x482x60mm
24"	3840x2160	16:9	590x372x45mm
26"	1920x1200	16:10	630x424x45mm
27"	3840x2160	16:9	650x412x45mm
32"	3840x2160	16:9	772x490x65mm
55"	3840x2160	16:9	1310x780x92mm
86"	3840x2160	16:9	2020x1200x96mm

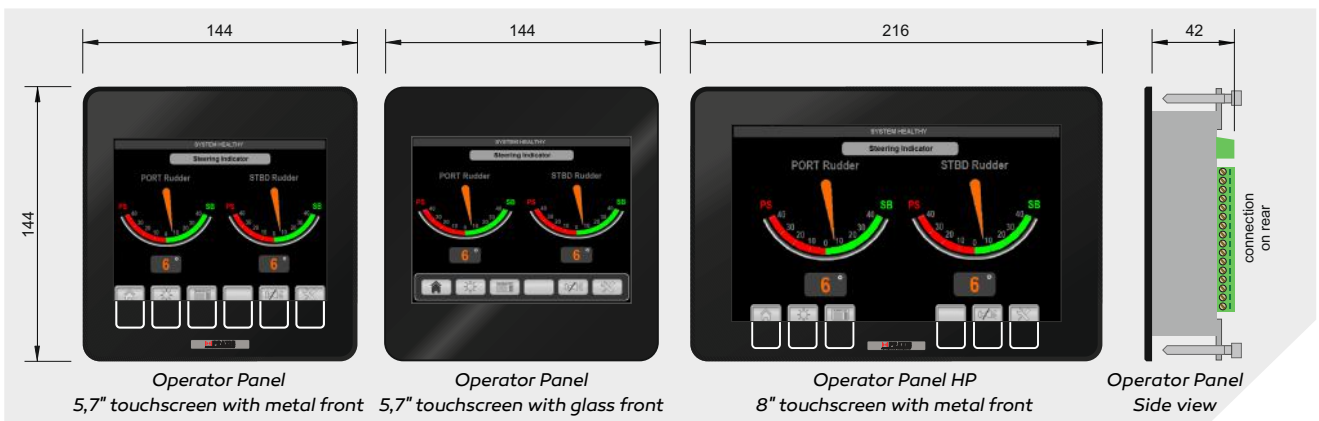
Workstation and Marine PC - Performance (HP type)

Operating System	Windows 10 embedded
CPU HP type	Dual Core I5 Pentium at 2,4GHz
Solid state disk	128GB; 256GB optional
Ethernet	2 port; 3rd port optional
NMEA input	1 port (supports dimming)
NMEA output	1 port
NMEA Module extension	8 port input and 2 port output
USB	4 port; 5th to 12th port optional
HDMI and VGA	1 port
Horn output	Potential free relay
Fail output	Potential free relay
Touchscreen PCAP	option
Dimming	0-100%, Front buttons Up/Dwn or via NMEA
Brightness	400nits; 1000nits optional
Front	metal or glass front
Power supply	24VDC (-25% ~ +30%)
Power consumption	Depending on size of Workstation

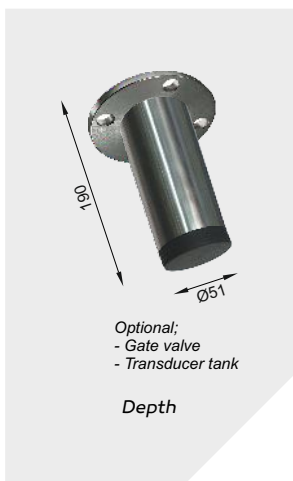
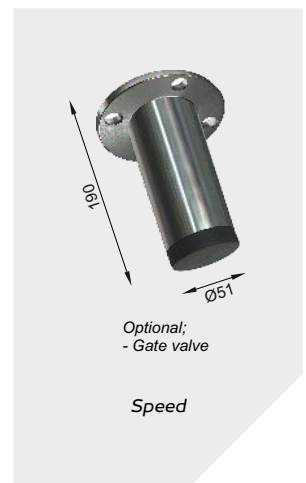
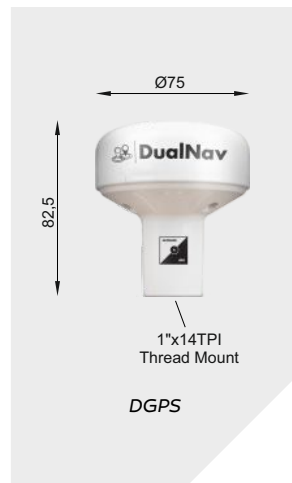
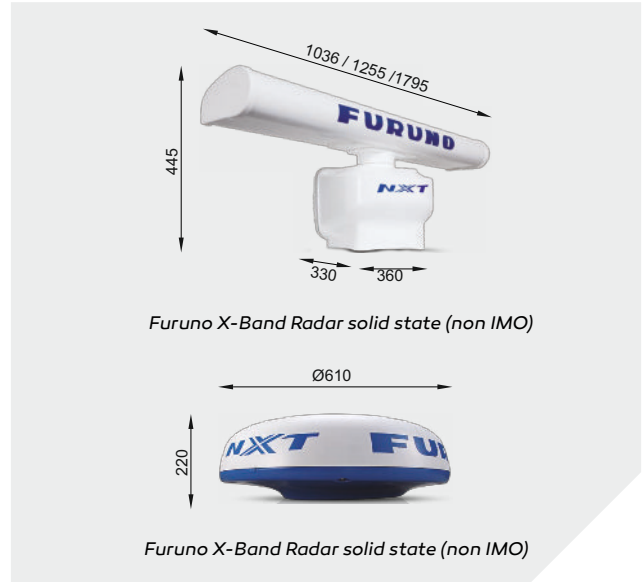
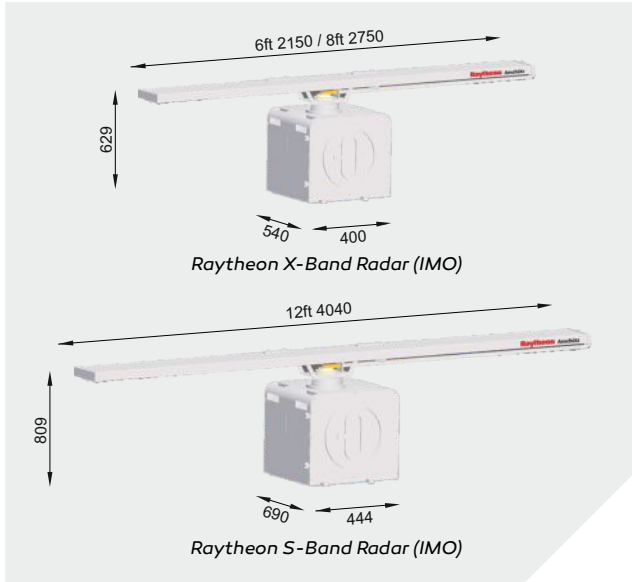


INS environmental and approvals

Environmental conditions	IEC60945
Ambient temperature	-25 - 70°C
IMO approval	✓
Class approval	LRS, DNV-GL, ABS RINA, BV, RMRS, CCS, NKK, PRS, KR



Mounting & dimensions



Vessel Management System



Power Management System



Fire Alarm System



CCTV Video Distribution



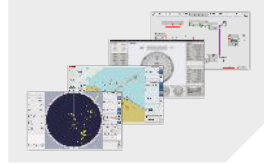
Ship Performance Monitor



Fleet Management System



Integrated Navigation System



Heading Control System



Propulsion Control System



Dynamic Positioning System



BNWAS Watch Alarm System



Navigation Light Control



Wiper Control System



Energy Management System



Electric Propulsion Motor



Electric Steerable POD



High Power Inverter



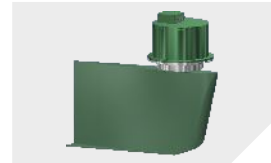
DC bus Generator



Electric Energy Storage



Electric Fin Stabilizer



*Ship automation,
navigation and
electric propulsion*