PRAXIS
AUTOMATION TECHNOLOGY
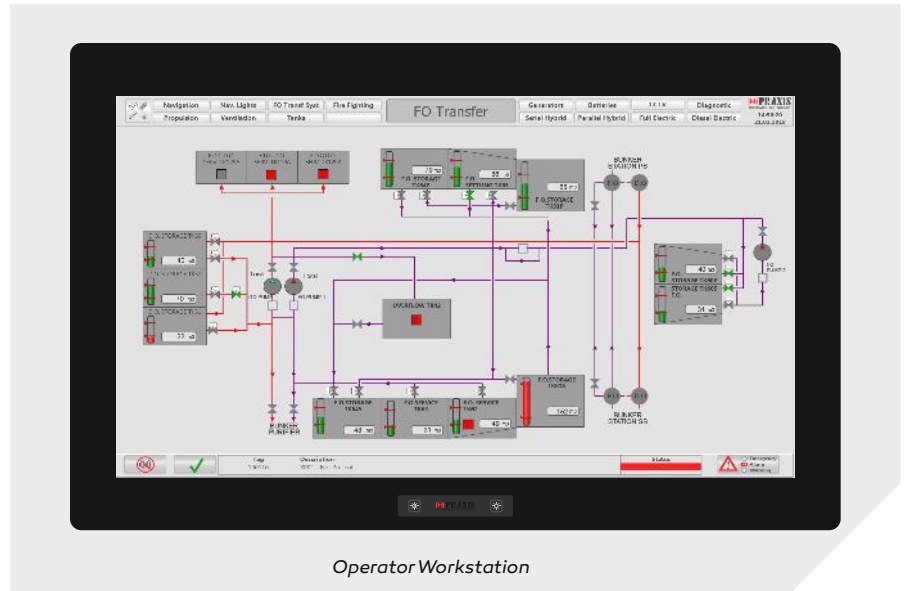
Vessel Management System

Vessel Management System

Features

The Mega-Guard Vessel Management System (VMS) is an advanced system for perfect ship automation for medium to large size ships. Mega-Guard VMS is a modular system which can be tailor made based upon ship's automation requirements. Often realized functions with Mega-Guard VMS include the following:

▸ Alarm and monitoring system
▸ Extension alarm system
▸ Valve, pump and fan control
▸ Cargo control and monitoring
▸ Tank gauging
▸ Fuel oil transfer
▸ Automatic ballasting
▸ Anti heeling
▸ Firefighting
▸ Conning
▸ Etc.

Operator Workstation

Mega-Guard VMS can be extended with the following independent Mega-Guard **automation and navigation** products:

▸ 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

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

▸ Energy Management System
▸ Electric Propulsion Motor
▸ Electric Steerable POD
▸ High Power Inverter
▸ DC Bus Generator
▸ Electric Energy Storage
▸ Electric Fin Stabilizer

Control Processor
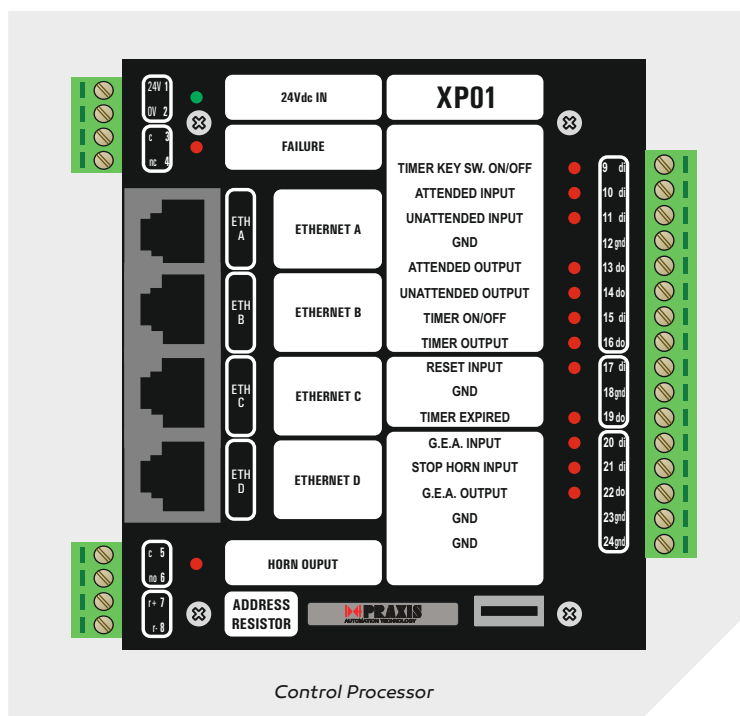
Application

The Mega-Guard Vessel Management System is the most reliable and field proven automation system as can be found on the market and is built-up with the following components and features:

▶ **Operator Workstations**

Workstations are equipped with touchscreen and an integrated marine personal computer under Windows 10 embedded operating system. Solid state disk instead of hard disk is applied and multi-server structure ensures safety and reliability. The ruggedized Operator Workstations are available in touchscreen sizes ranging from 10" to 86". The high definition widescreen Workstations are available with HD (1920x1080) and UHD (3840x2160) resolution. The Operator Workstation can be extended with a Trackpad and Trackball Operator Panel and a hard copy printer.

▶ **Control Processors**

Control and monitoring logic (PLC) is executed by powerful Control Processors. Sensor inputs and actuator outputs are connected to I/O Modules. A Control Processor has four Ethernet ports and up to eight I/O Modules. A Control Processor is also able to communicate with external systems through multiple protocols over Ethernet, RS485/422 and Canbus communication links. Control Processors and I/O Modules are mounted on DIN rails inside cabinets, switchboards and consoles.

▶ **Operator Panels**

Operator Panels combine local operation and control logic in one device. An Operator Panel is built-up with a 5.7" or 8" touchscreen and a built-in Control Processor which is able to communicate to up to eight I/O Modules. Example applications include Extension Alarm System, Power Management System, Propulsion Control System and Fire Alarm System. The stylish Operator Panel is flush mounted.
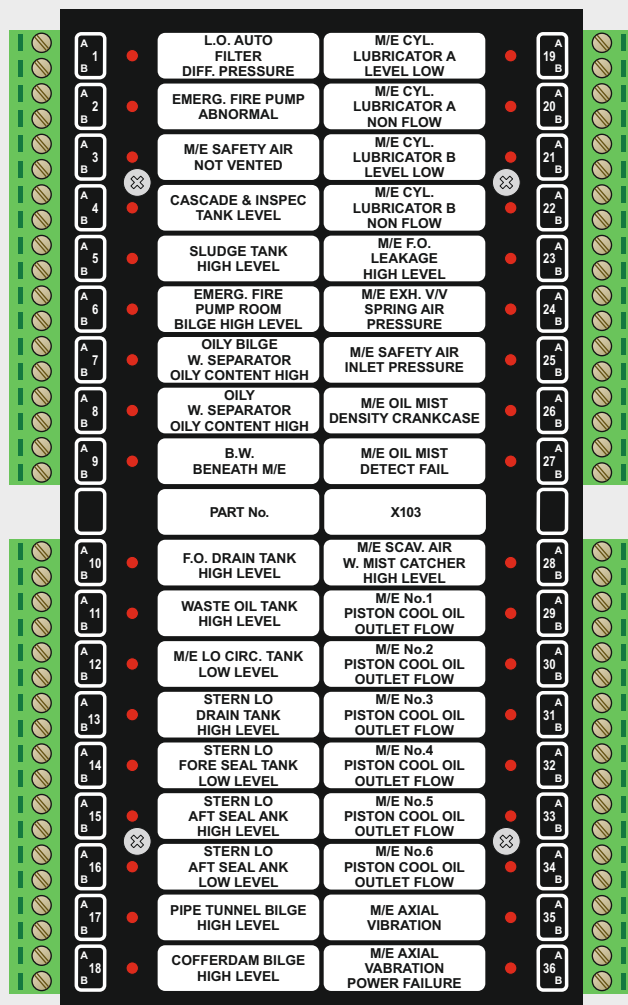
▶ **Redundant Ethernet**

Operator Workstations, Control Processors and Operator Panels are interconnected by redundant Ethernet link. Cabling with Star topology or Ring topology or a combination of Star and Ring topology is supported.

▶ **Configuration standard**

Programming in accordance with international PLC programming standard IEC61131-3 (ST) and 3D graphic design in accordance with latest standards.
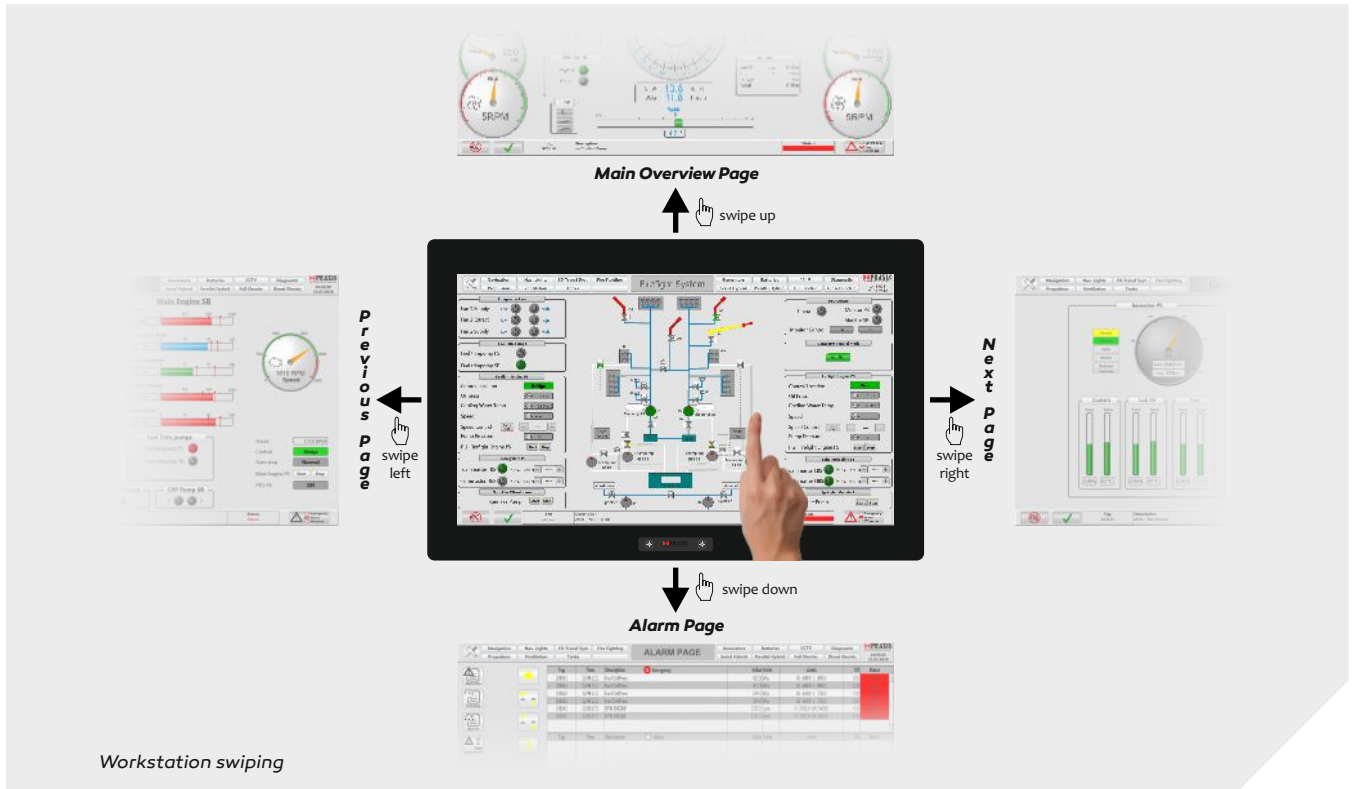
▶ **Type approval**

Type approved by all major class classification societies such as Lloyds Register of Shipping, DNV-GL, American Bureau of Shipping, Bureau Vertitas, RINA, Russian Maritime Register of Shipping, CCS, NKK, PRS, KR etc.


I/O Module

VMS operation

Swiping and zooming

Main Overview Page

swipe up

Previous Page — swipe left

Next Page — swipe right

swipe down

Alarm Page

Workstation swiping

Operator Workstations and Operator Panels are equipped with the latest 3D graphic software package for an intuitive and dynamic operation. The Workstation touchscreen allows for instance swiping in between pages and swiping to alarm list. The zooming function provides more detailed information regarding the zoomed-in area. Up to 4 layers of additional data can be presented depending on the zooming level. Pop-up menus give more detailed information regarding the selected device as well. The pop-up can be made in a realistic way (photo) so that it resembles the actual to be controlled device.

Zoom In/Out

Workstation zooming

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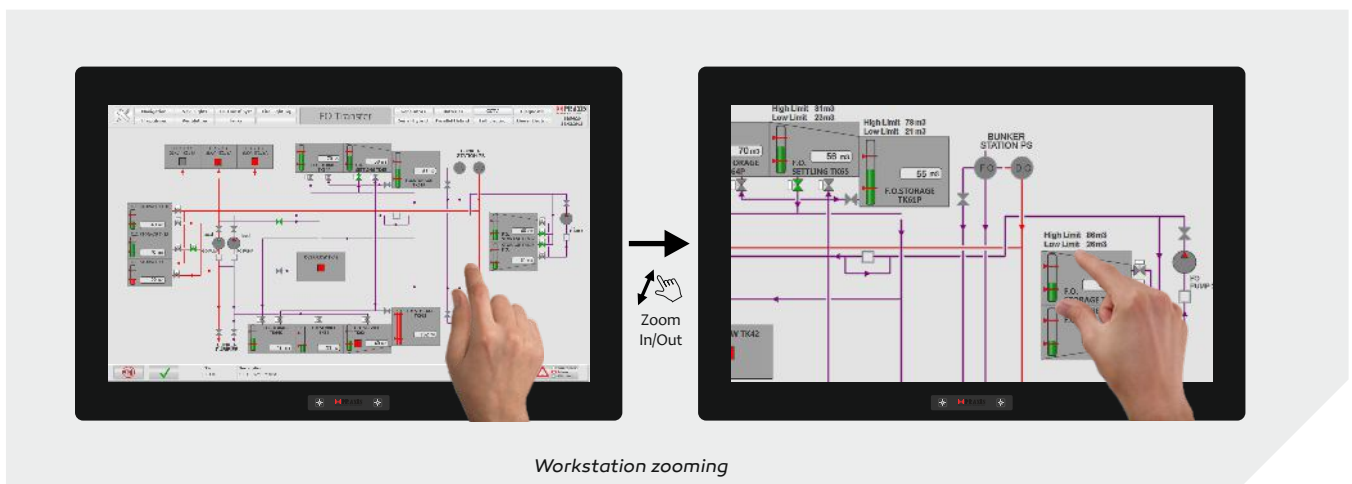
EAS Operator Panel

The Extension Alarm System (EAS) is a highly reliable engineer calling system, which extends the Mega-Guard VMS for unmanned machinery space operation. On duty selection and engineer calling functions are executed on a dedicated mimic on the Workstation.

The dedicated mimic display on the Workstation contains the following fields:

▶ On duty selection
▶ Attended / unattended (manned/ unmanned) engine room
▶ Engineer calling
▶ Patrol timer / engineer safety system (dead man timer)

EAS Operator Panels are installed in bridge and accommodation areas. They provide detailed alarm and on duty information on the 5.7" touchscreen.

EAS Operator Panel

In addition the operator is able to select grouped data such as fuel tanks, main engine, generators etc for viewing. The touchscreen has an automatic sleep function and awakes again when an alarm is presented or when the touchscreen is touched.

Marine PC

The Workstation contains a built-in Marine PC. The Marine PC is also available as a separate product and this is used when a 3rd party monitor is applied. The Marine PC is very compact and can be bulkhead mounted. The Marine PC is available in two versions:

▶ Standard version with Intel quad core Celeron CPU at 2Ghz
▶ High performance version with Intel dual core I5 Pentium CPU at 2.4GHz

Marine PC

Both versions require extremely low power which guarantees a long life and a high mean time between failure. Solid state disks are available in ranges from 32GB (standard) to 256GB. The Marine PC is powered by 24VDC and contains relays outputs for failure indication and connection of an external horn.
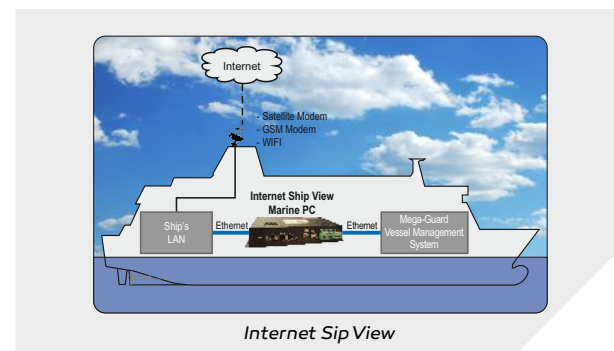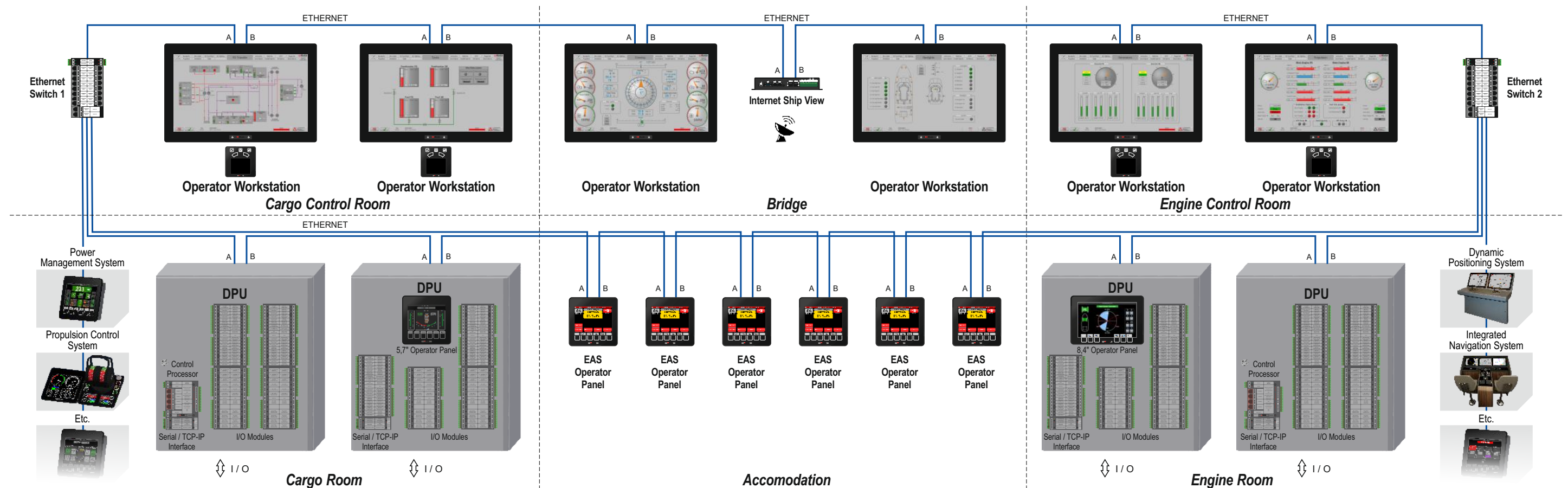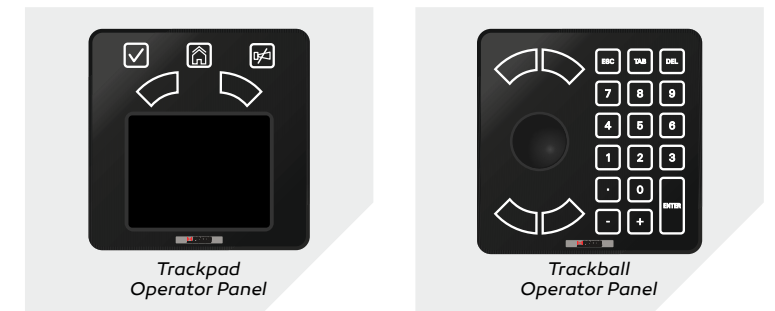
VMS system lay-out

VMS Market segments

The VMS Vessel Management System is applied in all type of ships. Three market segments are distinguished:

- **Commercial ships**
- **Mega yachts**
- **Navy ships**

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

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 or monitor.
The Trackball Panel is equipped with a trackball for function selection and a keypad is also integrated in this panel.

Trackpad Operator Panel

Trackball Operator Panel

ETHERNET

Ethernet Switch 1

Ethernet Switch 2

Operator Workstation — Operator Workstation
Cargo Control Room

Operator Workstation

Internet Ship View

Operator Workstation
Bridge

Operator Workstation — Operator Workstation
Engine Control Room

Power Management System

Propulsion Control System

Etc.

ETHERNET

DPU
Control Processor
Serial / TCP-IP Interface — I/O Modules
I/O

DPU
5,7" Operator Panel
Serial / TCP-IP Interface — I/O Modules
I/O
Cargo Room

EAS Operator Panel × 6

Accomodation

DPU
8,4" Operator Panel
Serial / TCP-IP Interface — I/O Modules
I/O

DPU
Control Processor
Serial / TCP-IP Interface — I/O Modules
I/O
Engine Room

Dynamic Positioning System

Integrated Navigation System

Etc.

The Internet Ship View (ISV) system allows the ship owner (shore based) to view the VMS Vessel Management System (ship based) through the internet. Shore based standard PC's with internet browser can be used to log-in to the VMS. This gives the same view as available on the ship based VMS Workstations. Praxis service department is also able to log-in in case of requests for commissioning support or trouble shooting. Secure communication and double log-in procedures are applied for protection against unauthorized users.

Internet Sip View

Touchscreen Operator Panels are flush mounted in console, wall or cabinet. The 5.7" touchscreen Operator Panel is applied in commercial ships and mega yachts (glass version). The 8.4"touchscreen Operator Panel is mainly used for navy ships.
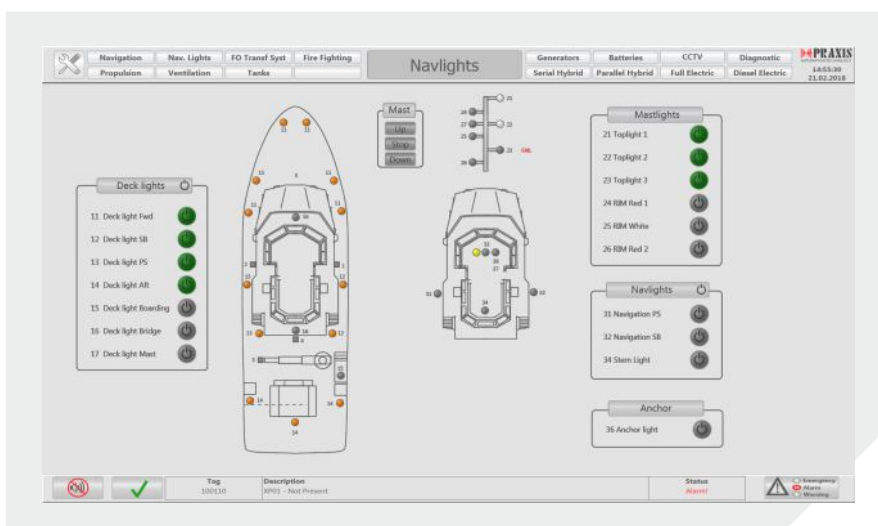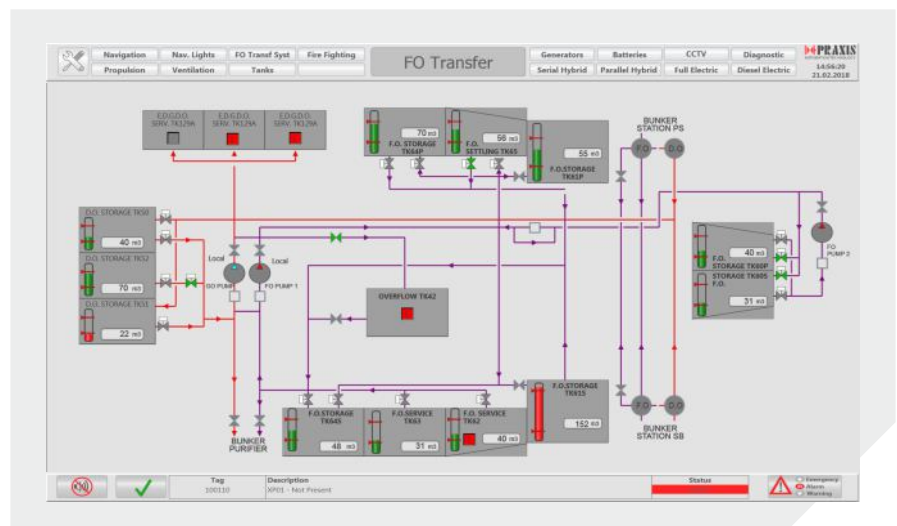

Operator Panel with 5,7" touchscreen

Operator Panel with 8" touchscreen
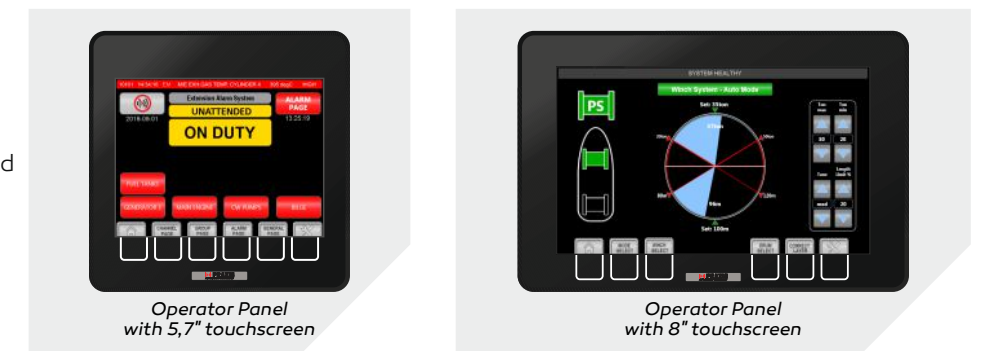
VMS mimics

Example mimics

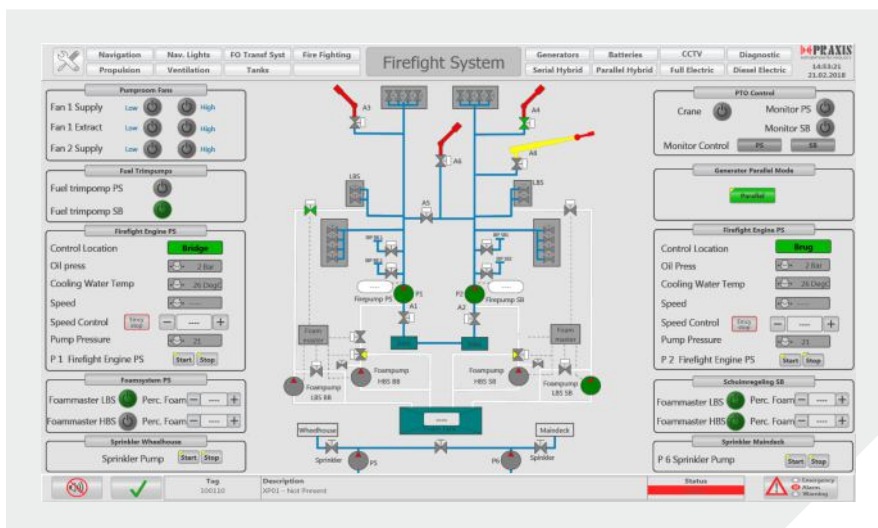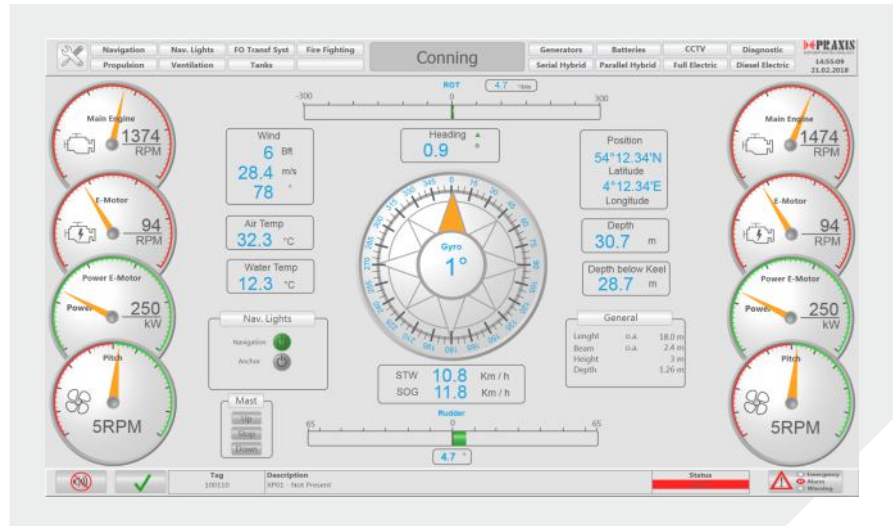Mimics are designed in close cooperation with ship owner

Colors, fonts and symbols are freely selectable
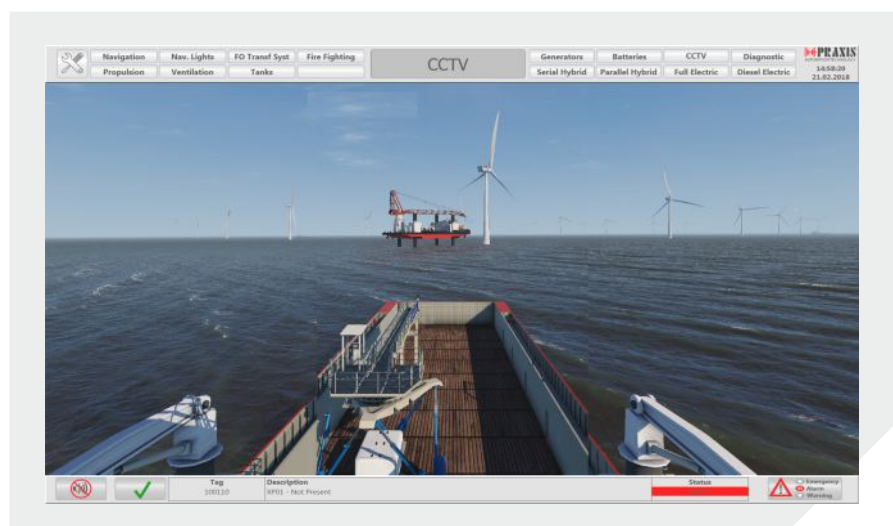

Direct swiping to Alarm Page and Main Overview Page

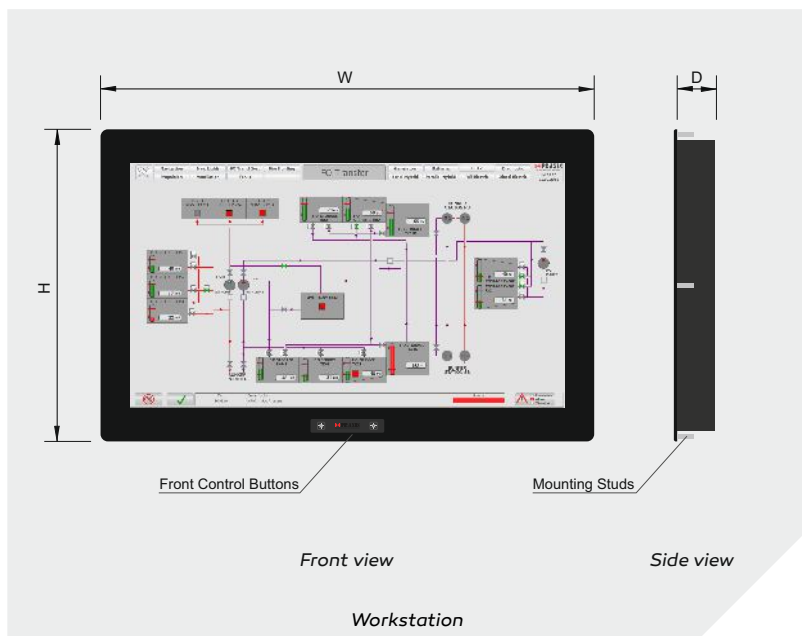# Example mimics

3D effects can be applied in the mimic

Intelligent zooming with additional info layers

CCTV cameras embedded in the mimics

VMS configuration

Mounting & dimensions

Front Control Buttons

Mounting Studs

Front view

Side view

Workstation

Filter Ventilation Outlet on rear

4x Mounting hole Ø4,5

Ventilation Intlet on top

Top view

Front Connections (ETH/USB/VGA/HDMI)

Screw terminals for Power/Signals

Front view

Marine PC

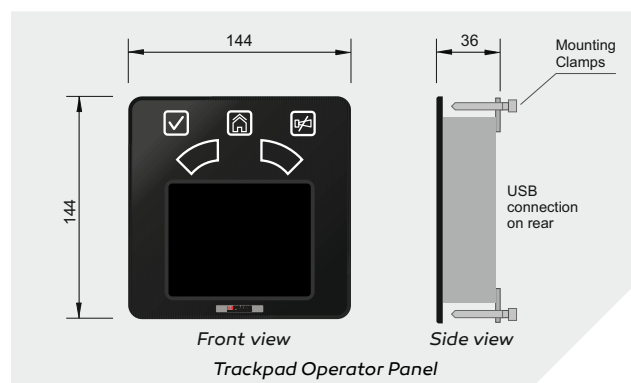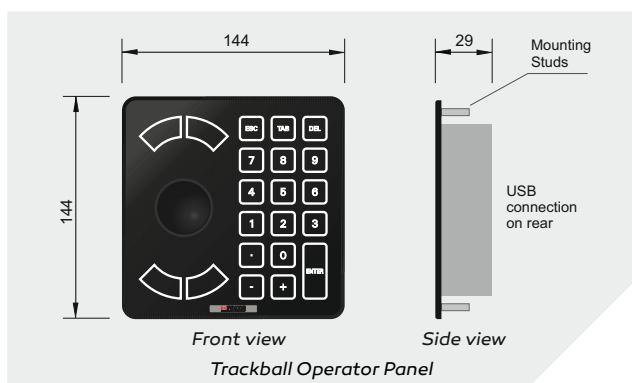| Workstation and Monitor - Models (ST type)			
Size	Resolution	Ratio	Dimensions
10"	1280x800	16:10	280x200x45mm
13,3"	1920x1080	16:9	346x236x45mm
15,6"	1920x1080	16:9	400x268x45mm
17"	1920x1080	16:9	452x290x45mm
19"	1280x1024	5:4	450x380x52mm
22"	1680x1050	16:10	542x372x45mm

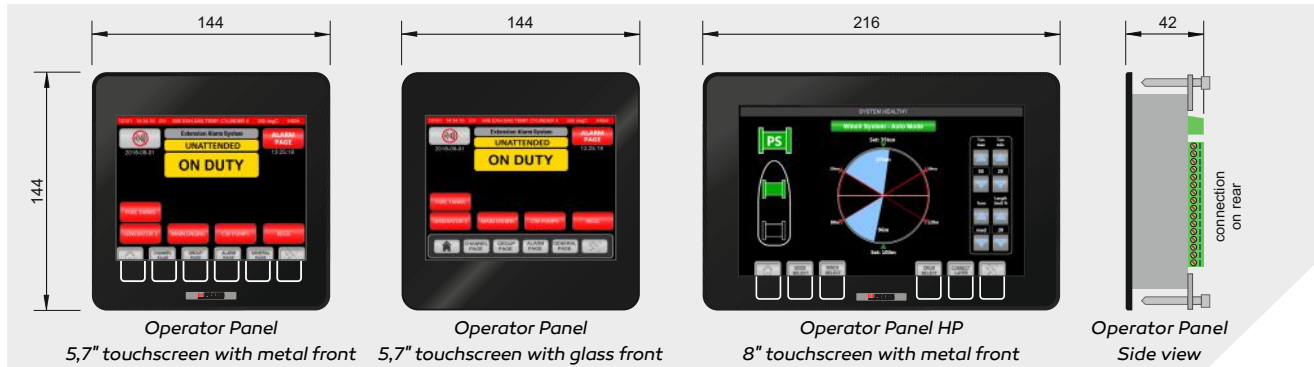| Workstation and Monitor - Models (HP type)			
Size	Resolution	Ratio	Dimensions
18,5"	1920x1080	16:9	482x304x45mm
22"	1680x1050	16:10	542x372x45mm
23"	1600x1200	4:3	584x482x60mm
24"	3840x2160	16:9	590x372x45mm
26"	1920x1200	16:10	630x424x45mm
27"	3840x2160	16:9	650x412x45mm
32"	3840x2160	16:9	772x490x65mm
55"	3840x2160	16:9	1310x780x92mm
86"	3840x2160	16:9	2020x1200x96mm
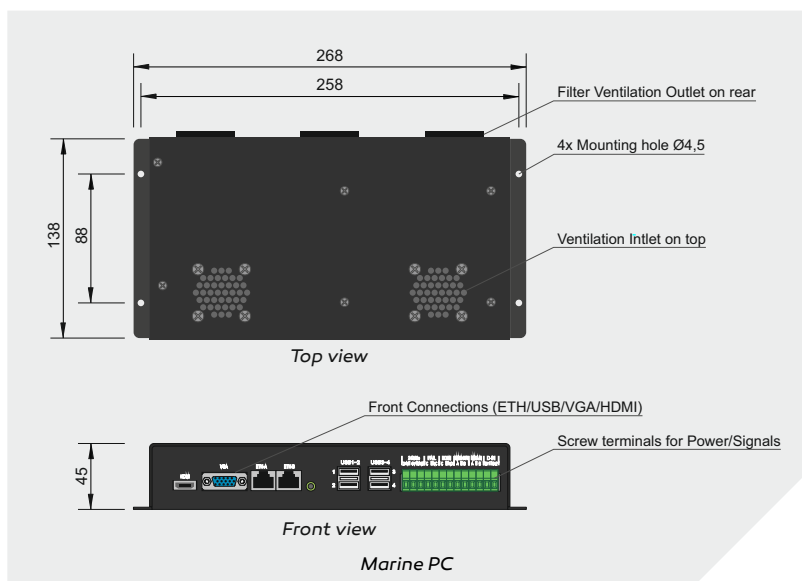
Workstation and Marine PC - Performance	
Operating System	Windows 10 embedded
CPU ST type	Quad core Celeron at 2GHz
CPU HP type	Dual Core I5 Pentium at 2,4GHz
Solid state disk	32GB; 128 and 256GB optional
Ethernet	2 port; 3rd port optional
NMEA input	1 port (supports dimming)
NMEA output	1 port
USB	4 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

Mounting Studs

USB connection on rear

Front view

Side view

Trackball Operator Panel

Mounting Clamps

USB connection on rear

Front view

Side view

Trackpad Operator Panel

Mounting & dimensions

| 144 | 144 | 216 | 42 |

Operator Panel
5,7" touchscreen with metal front

Operator Panel
5,7" touchscreen with glass front

Operator Panel HP
8" touchscreen with metal front

Operator Panel
Side view

Control Processor (ST type)

Microprocessor	ARM at 72MHz
Ethernet ports	4x 100Mb
PLC programming	IEC61131 loop up to 0.1sec
Max. I/O Module	8
Max. Serial I/O Module	4 (RS232/422/485)
Max. I/O Points	1152
Power supply	24VDC (-25% ~ +30%)
Power consumption	5W
Mounting	TS35 DIN rail

Control Processor (HP type)

Microprocessor	ARM dual core 1.2GHz
Ethernet ports	4x 1Gb
PLC programming	IEC61131 loop up to 0.01sec
Max. I/O Module	8
Max. Serial I/O Module	4 (RS232/422/485)
Max. I/O Points	1152
Power supply	24VDC (-25% ~ +30%)
Power consumption	5W
Mounting	TS35 DIN rail

Operator Panel 5,7" touchscreen (ST type)

|	
Microprocessor	ARM at 72MHz
Ethernet ports	4x 100Mb
PLC programming	IEC61131 loop up to 0.1sec
Touchscreen	5.7" or 8"
Pushbuttons	6
Front	metal or glass
Graphic editor	✓
Max I/O Modules	8
RS485 ports	2
Max I/O Points	1152
Power supply	24VDC (-25% ~ +30%)
Power consumption	10W
Mounting	Flush panel with 2 mounting brackets

Operator Panel 8"touchscreen (HP type)

Microprocessor	ARM dual core 1.2GHz
Ethernet ports	4x 1Gb
PLC programming	IEC61131 loop up to 0.01sec
Touchscreen	5.7" or 8"
Pushbuttons	6
Front	metal or glass
Graphic editor	✓
Max I/O Modules	8
RS485 ports	2
Max I/O Points	1152
Power supply	24VDC (-25% ~ +30%)
Power consumption	10W
Mounting	Flush panel with 2 mounting brackets

Ethernet Switch Module (ST type)

Ethernet ports	8x 100Mb or 16x 100Mb + 2x 1Gb
Protocol	Ring network and/or redundant star
Power supply	24VDC
Power consumption	20W
Fibre optic	option
Mounting	TS35 DIN rail

Ethernet Switch Module (HP type)

Ethernet ports	16x x 1Gb
Protocol	Ring network and/or redundant star
Power supply	24VDC
Power consumption	20W
Fibre optic	option
Mounting	TS35 DIN rail

Control Processor
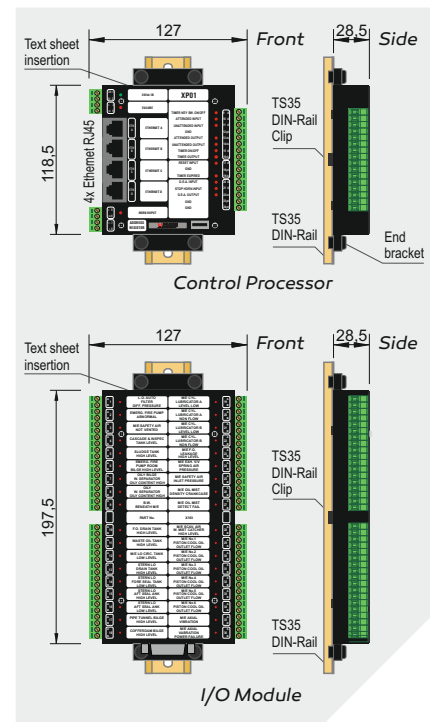
I/O Module

I/O Modules

Digital input	36 channels
Digital in-/output	18 input channels, 18 output channels
Analog input	24 channels
Mixed in-/output	20 configuarable channels
Serial I/O module	RS232/422/485

VMS environmental and approvals

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

PRAXIS
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Vessel
Management System

Power
Management System

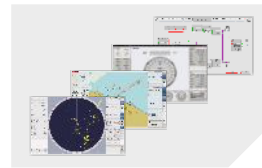Fire
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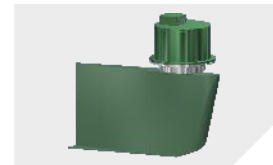
Electric
Steerable POD

High
Power Inverter

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*Ship automation,
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