IIoT Blueprint for Smart Ship
Industrial Computing and Networking Solutions

MOXA
Reliable Networks ◆ Sincere Service

Recommended Products

DNV·GL | Lloyd's Register | ABS | ClassNK

IIoT Gateway Software Suite

Secure Remote Access Suite

ThingsPro® Gateway Software	ThingsPro® Server Software	Moxa Remote Connect Server Software	Moxa Remote Connect Client Software	Moxa Remote Connect Gateways
• Ready-to-use Modbus UIs and MQTT support for field-to-cloud data acquisition • RESTful APIs for custom applications • Built-in clients for AWS, Azure, and Aliyun clouds	• Easy device management through web UIs • Batch online/offline configuration of ThingsPro Gateways • Secure remote access through VPN	• Connection Management Platform • Centralized secure connectivity software • Supports Amazon EC2	• Windows-based connectivity and control software • Apply to any existing application tools (e.g. controller programming tools)	• Ethernet or LTE WAN connectivity • Up to 25 local devices per gateway • Device-based security control with on-demand connectivity

Industrial Computing

Computers | **Panel PCs** | **Displays**

Model Series	MC-7200	MC-1100	MPC-2260/2240/2190/2150	MPC-2120/2070	MD-226/224/219
CPU	Intel® Core™ i7-3555LE / i3-3120ME / Celeron 1047UE	Intel Atom® E3845 / E3826	Intel® Core™ i7-3517UE / Celeron 1047UE	Intel Atom® E3826 / E384	-
I/Os	6 x USB 2.0 2 x USB 3.0 (Max.) 4 x LAN 2 x RS-232/422/485 2 x RS-232	2 x USB 2.0 4 x LAN (Max.) 2 x RS-232/422/485 (Max.)	-	-	-
Panel Size	-	-	26/24/19/15-inch	12/7-inch	26/24/19-inch
Brightness	-	-	300 nits 1,000 nits (MPC-2150)	350 nits 1000 nits	300 nits
PCI/PCIe	2 x PCI 1 x PCIe (MC-7200-MP-T)	-	-	-	-
I/Os	-	-	4 x USB 2.0 2 x LAN 2 x RS-232/422/485	2 x USB 2.0 2 x LAN 2 x RS-232/422/485	1 x RS-232 (DB9-M) 1 X RS-422/485
NMEA 0183 Ports	8 (terminal block) (Max.)	-	Up to 8 (terminal block)	-	-
Video Output	2 x DVI-D, 1 x VGA	-	1 x DVI-D, 1 x VGA	-	1 x DVI-D, 1 x VGA
Type Approvals	DNV GL, CCS	DNV GL	DNV GL, ABS, CCS	DNV GL*	DNV GL, ABS, CCS

Industrial Ethernet Infrastructure

Industrial Ethernet Switches | **Secure Routers** | **Network Management Software**

Model Series	EDS-408A	EDS-510E	IKS-6726A/6728A	Model Series	EDR-G903 EDR-G902	EDR-810	MXview
Switch Type	Managed	Managed	Managed	No. of Ports	3 GE / 2 GE	2 GE + 8 FE	• Network topology visualization
No. of Ports	8	10	26/28	Interface	2/1 WANs 1 LAN	WAN/LAN	• Event notification alarms sent via SMS and email, or locally to a screen or siren
Gigabit Ethernet	-	3	2/4	Functions	NAT/Firewall/ DMZ/VPN	NAT/Firewall/VPN	• Auto-backup, update, and management of the configuration file
Fast Ethernet	8	7	24	Routing	Max. 500 / 300 Mbps	Max. 100 Mbps	
Type Approvals	DNV GL	DNV GL, ABS, LR, NK	DNV GL, ABS, LR, NK	Others	DMZ (EDR-G903)	Layer 2 switching	

INDUSTRIAL COMPUTING AND NETWORKING
Enabling Smart Marine Solutions

Through adherence to strict maritime standards and incorporation of the latest developments in industrial IoT (IIoT), Moxa has created a blueprint that extends mission-critical marine automation to cloud service delivery to improve the safety, reliability, and efficiency required for ship and port operations.

Benefits
- Helps ship owners optimize vessel operation
- Helps system integrators accelerate IIoT application deployment
- Streamline crew operations with remotely-accessible support and service
- Simplify maintenance with industry-proven product solutions

Features

Ship-to-Shore Visibility
ThingsPro® Suite makes it easy to connect your ship to open cloud platforms for field-to-cloud data monitoring, processing, and remote device management from anywhere on shore.
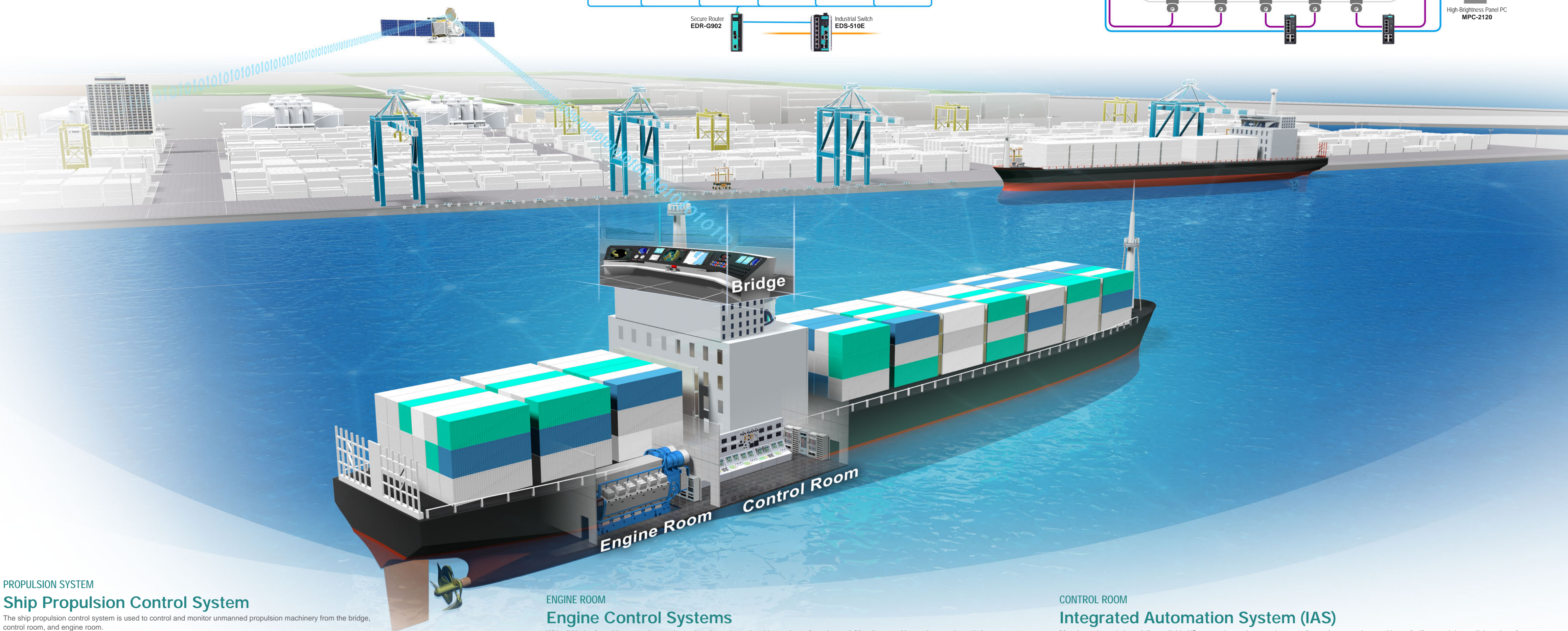
Remote Technical Support
Ships no longer have to be isolated when operating; remote technical support that includes system diagnostics, maintenance, and firmware upgrades are made possible through highly secured Moxa Remote Connect solutions.

Integrated Navigation Systems
Moxa delivers best-in-class ECDIS computers, HMI panel PCs, and displays for efficient navigation and precise displays to ensure the safety of your voyage.

Reliable Network Infrastructure
Moxa provides marine-proven network infrastructure solutions that consolidate multiple protocols into a single ship-wide network, and can withstand harsh marine conditions in compliance with DNV GL regulations.

BRIDGE
Integrated Navigation System (INS)

In the Bridge, a clear display integrated with ECDIS, Radar, and Conning systems can facilitate intuitive operation of the ship, improving navigational safety and efficiency. Additionally, being able to take advantage of cloud applications would mean more ship-to-shore data for communication and collaboration.

System Requirements
- Processing of high volumes of data from various workstations to create accurate ECDIS displays
- Type-certified ECDIS displays
- Extreme operational reliability in maritime conditions
- Protect critical equipment from unwanted access
- Secure communication to enable remote support

Why Moxa?
- One-stop-shopping for marine-grade computers, HMIs, and industrial Ethernet solutions
- MC-7270 high-performance marine computers with up to 8 NMEA interfaces for connection to multiple devices
- MD-224/226 ECDIS displays that comply with the IEC 61174:2015 standard
- EDR-G902 secure routers provide 3-in-1 firewall/NAT/VPN to safeguard bridge networks
- Moxa Remote Connect allows for remote maintenance of machinery through easy-to-set-up cloud-based VPN tunnels
- ThingsPro Gateway provides easy edge-to-cloud data connection and analysis, as well as connection to extended cloud services such as Microsoft Azure and AWS

Legend: Ethernet / Wireless / Fiber / I/O Signal / NMEA
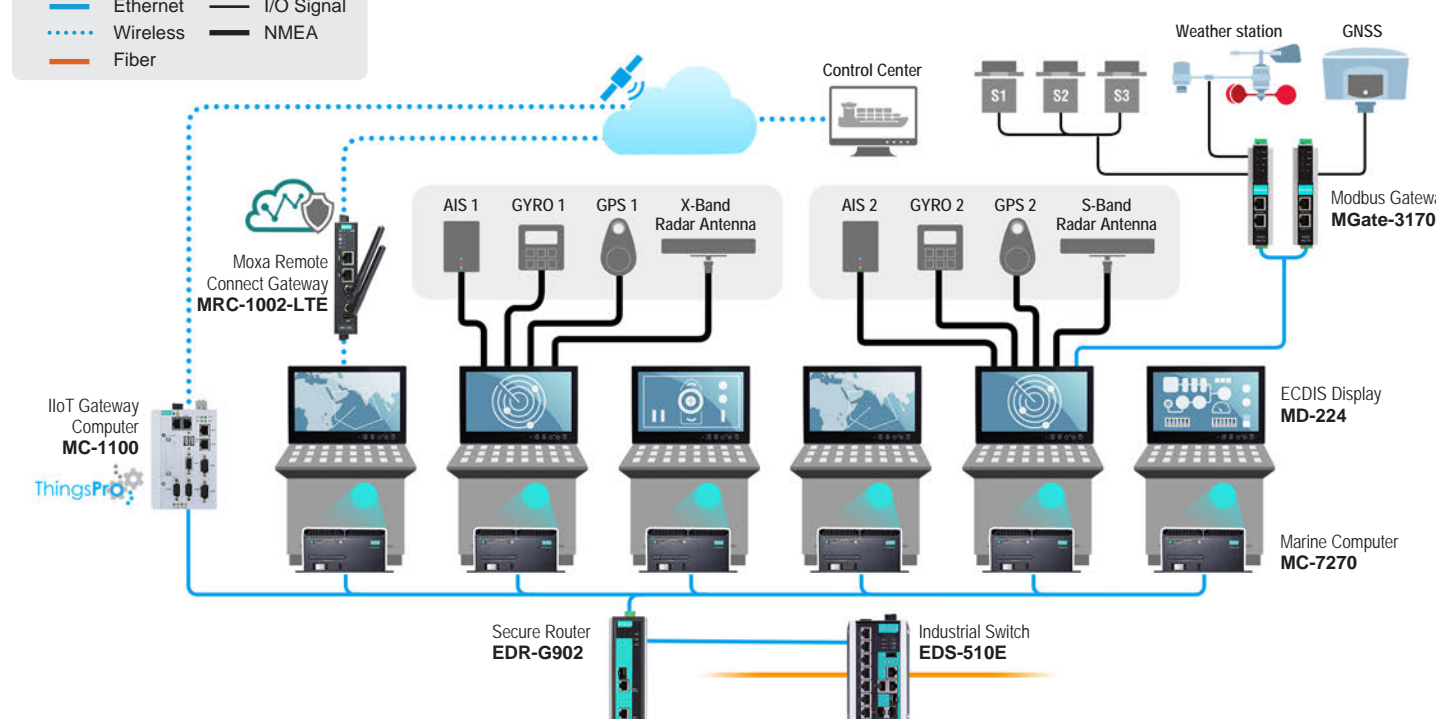
PORT CRANE
Optical Character Recognition (OCR) System

Moxa's PoE+ switches provide up to 60 W per PoE+ link to support a port crane Optical Character Recognition (OCR) system that facilitates automatic freight container loading, unloading, and tracking at port terminals.

System Requirements
- Power output of 60 W per port to support PTZ cameras
- Robust switches that can withstand outdoor environments
- High-reliability networks to ensure real-time image data processing and transmission
- Easy-to-use network management software for network visualization

Why Moxa?
- EDS-P506E-4PoE switches offer up to 60 W output per PoE+ link to reliably power PoE/PoE+ PTZ cameras
- High EMI/surge protection and a –40 to 75°C operating temperature range
- Support for automatic PD failure detection and device rebooting for network recovery
- Turbo Ring technology provides recovery times under 50 ms to ensure reliable data transmission
- MXview network management software enables remote monitoring and management

Legend: Ethernet / Fiber / PoE/PoE+
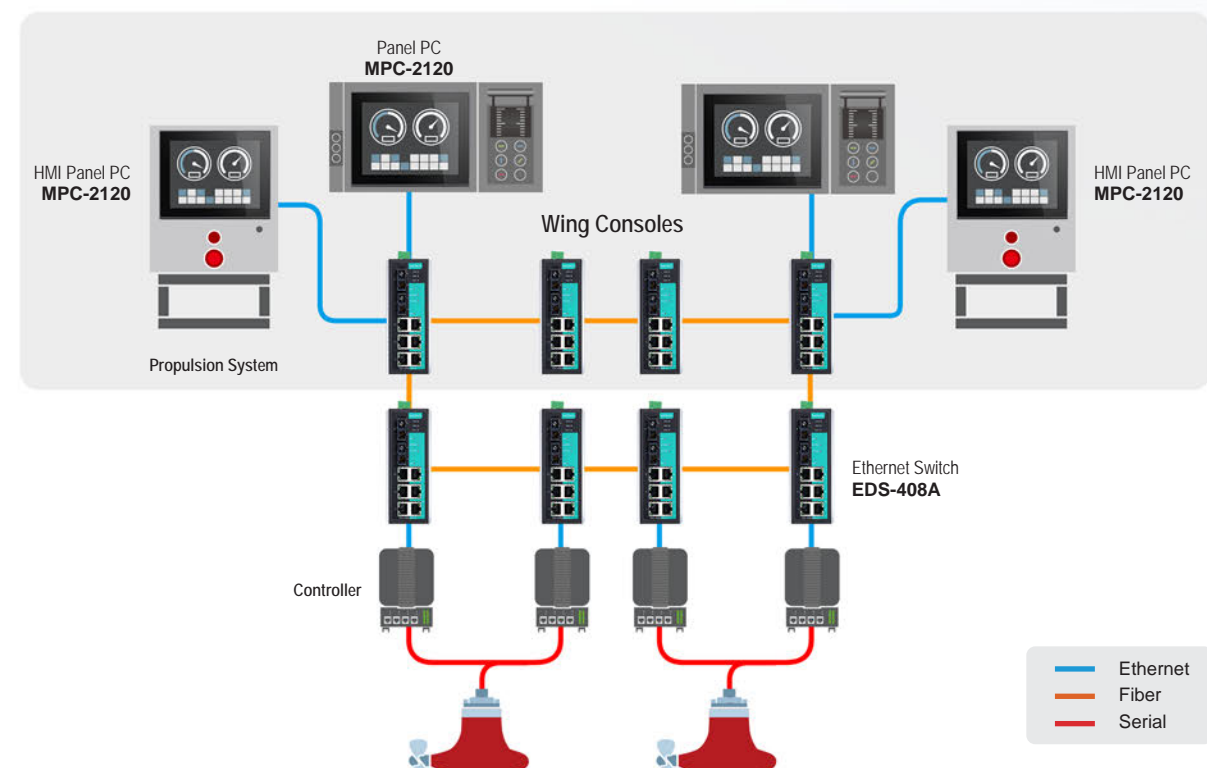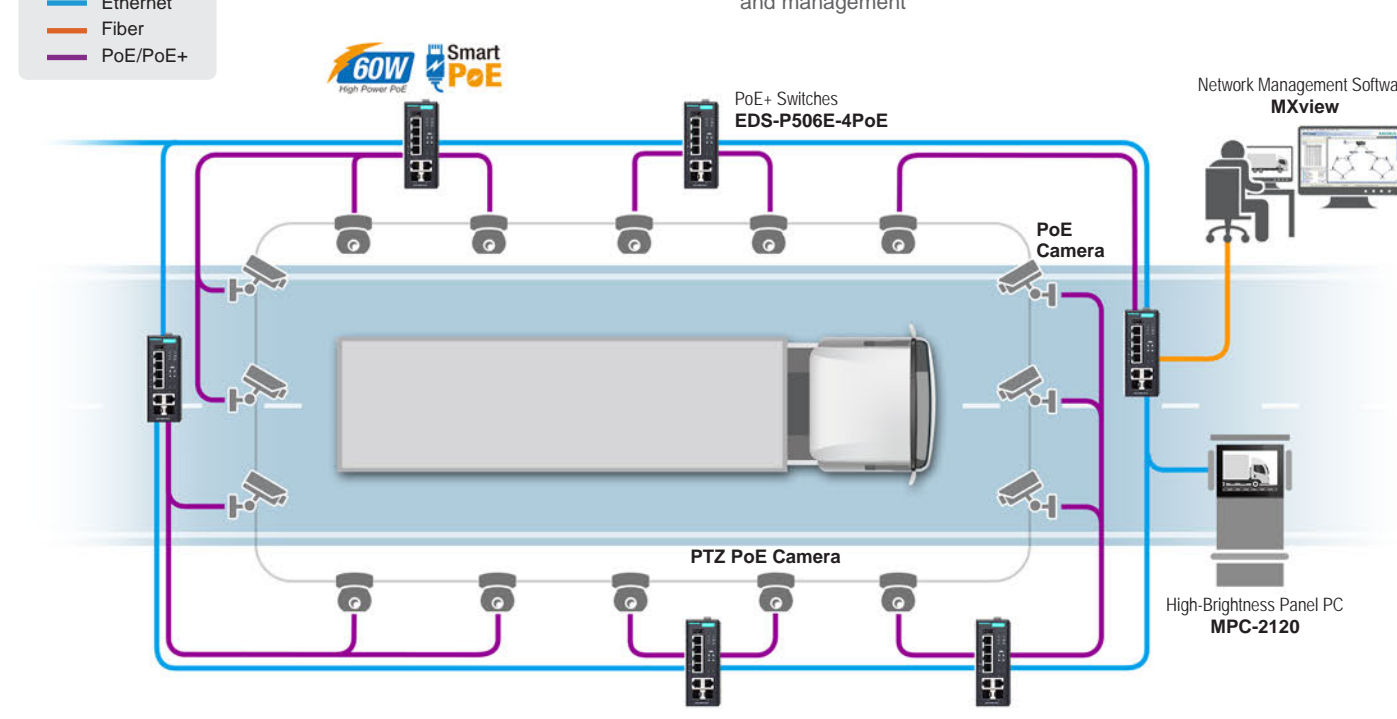

PROPULSION SYSTEM
Ship Propulsion Control System

The ship propulsion control system is used to control and monitor unmanned propulsion machinery from the bridge, control room, and engine room.

System Requirements
- Global Marine certified Ethernet switches
- Rugged products that can withstand harsh environmental conditions
- Seamless communication for continuous operation

Why Moxa?
- DNV GL, ABS, LR, and NK certified Ethernet switches
- MPC-2120 Series all-in-one touch panel computers for HMI displays
- Turbo Ring redundancy technology for fast recovery times under 20 ms

Legend: Ethernet / Fiber / Serial

ENGINE ROOM
# Engine Control Systems

With all kinds of machinery running continuously to keep the entire ship running safe and sound, Moxa's networking and computing solutions provide superior reliability with designs that withstand the vibration, electrical noise, and heat conditions present inside engine rooms.

System Requirements
- Rugged design with EMI/EMS resistance for engine rooms
- Compliance with IACS UR E10/IEC 60945 standards
- Seamless real-time communication for precise control
- Global Marine certification

Why Moxa?
- Rugged design compliant with IACS UR E10/IEC 60945 standards for harsh environments
- Turbo Ring redundancy technology to ensure high network availability
- QoS and IEEE 1588v2 PTP support for precise control
- Compliant with international maritime standards such as DNV GL, ABS, and LR

Legend: Ethernet / Fiber
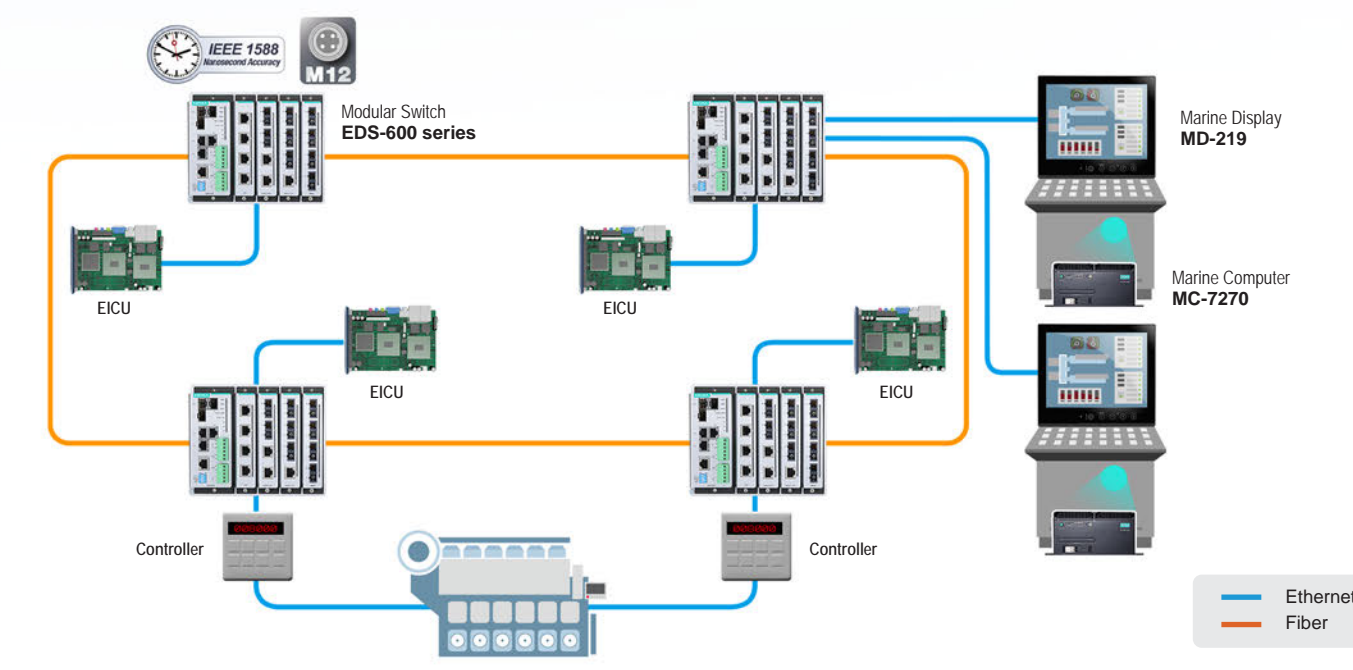
CONTROL ROOM
Integrated Automation System (IAS)

Moxa's marine solutions deliver reliable I/O connection and processing as well as uninterrupted networking to facilitate real-time collaboration of disparate machinery and control systems for mission-critical control rooms.

System Requirements
- Compact size for space-restricted installation
- HMI panel computers
- Reliable network that can handle continuous operation
- Real-time monitoring of network status and events

Why Moxa?
- DIN-rail mountable MC-1100 computers and EDS switches for installation in control cabinets
- Rich I/O and network interfaces to consolidate connection of various devices
- MPC-2190 panel PCs for multiple independent displays to enable efficient monitoring
- Turbo Ring technology enables millisecond-level recovery to maximize availability
- MXview industrial network management for smart topology visibility and event traceable troubleshooting
- DNV GL compliance to ensure long-lasting and reliable operation

Legend: Ethernet / Fiber / Serial / I/O