

mtu NautlQ - Marine automation solutions

CONTROLLING THE POWER



A Rolls-Royce solution



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Marine automation solutions

CONTROLLING THE POWER WITH **mtu** Nautio Solutions

Our engines are powerful and technologically advanced. But in order to offer the best efficiency, reliability, safety, and environmental compatibility, they need more than just power. They need intelligent electronic management. Modern engine management systems handle the control and monitoring of the hardware and enable perfect performance. Our marine automation solutions mtu NautlQ are designed to offer the ideal combination of performance and precision individually for your applications from a wide range of solutions.

Naval

Through years of partnership with navies worldwide, we have developed unique expertise and unparalleled focus on the expectations and needs of modern fleets. We provide customers with customized and complete propulsion, automation and intelligent control systems tailored to the sensitive marine sector.

Our engineers and data experts understand that each fleet has its own unique requirements, the answer to which lies in customized solutions. That's why we support customers at every step of the implementation of our systems and beyond, with training and IT services tailored to their needs.

Commercial Marine

The decision for our ship automation solutions is a decision for state-of-the-art reliability and individual, dedicated customer service. As a provider of solutions from bridge to propeller, our complete systems are perfectly matched to each other and to customer needs.

Our systems sail aboard cargo ships, barges, crew ships, ferries and many other types of vessels worldwide, and our experience has made us an indispensable partner to commercial shipping on the world's oceans.

Yachts

High standards of quality, innovation and maximum flexibility are the basis of our portfolio of solutions for megayachts. Our customized automation systems, developed with passion by our team of longstanding experts, ensure unprecedented reliability on board yachts large and small.

Globally, we can support customers through strong partnerships in design, technical feasibility and comprehensive maintenance, while the custom-fit solutions of our *mtu* NautlQ suite answer the demands and challenges of modern yacht operations.

mtu NAUTIQ PORTFOLIO THE FUTURE OF MARINE CONTROL

INTEGRATED SHIP AUTOMATION AND PERFORMANCE & EQUIPMENT HEALTH MANAGEMENT SOLUTIONS

mtu NautlQ Master mtu NautlQ Core mtu NautlQ Foresight

INTEGRATED BRIDGE SOLUTION mtu NautlQ Bridge (only for Yachts)

PROPULSION AND GENSET MONITORING & CONTROL SOLUTIONS

mtu NautlQ BlueVision NG mtu NautlQ Genoline NG

DIGITAL SOLUTION mtu Go

REMOTE & AUTONOMOUS CONTROL SOLUTIONS

mtu NautlQ CoDirect mtu NautlQ CoOperate mtu NautlQ CoPilot

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INTEGRATED SHIP AUTOMATION & INTEGRATED BRIDGE SOLUTION

FEATURES AT A GLANCE

Features:	<i>mtu</i> NautlQ Master	<i>mtu</i> NautlQ Core	<i>mtu</i> NautlQ Foresight	<i>mtu</i> NautlQ Bridge
Monitoring	•	•		
Alarms	•	•		
Control (remote, automated and manual)	•	•		
Limited Automation Logic	•	•		
Extensive Automation Logic	•			
Propulsion Control Any configuration/engine	•	•		
External Systems Integration	•	•		
Damage Control System (DCS)	•			
On Board Training System (OBTS)		•		
Integrated Bridge				•
Equipment Health Management			•	
3rd Party engines/ systems	•	•	•	•
Application	N + Y,C	Y,C + N	Y,C + N	Y

N = Naval C = Commercial marine Y = Yacht



mtu NautlQ Master

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INTEGRATED PLATEORM MANAGEMENT SYSTEM



Scan the QR-code for more details about **mtu** NautlQ Master

mtu NautlQ Master is an Integrated Platform Management System and offers the optimal solutions to meet a wide range of requirements for all types and sizes of vessels. Typically used on military and complex commercial projects.

Integrated Platform Management System (IPMS)

With marine naval design becoming more sophisticated, and more capability being integrated with fewer people on board, only proven designs and software functionality can truly meet the demands within modern project time scales and risk profiles. As world experts in the field of integration, we introduce *mtu* NautlQ Master, the latest evolution of our powerful IPMS solution, allowing more COTS product integration. It is a true System of Systems capable platform.

This powerful mix of *mtu* NautlQ Master distributed processing and highly redundant architecture, coupled to industry standard equipment and protocols allows for a truly supportable platform, with minimal obsolescence risk. This reduces platform cost, integration time and commissioning/installation issues, whilst retaining the survivability and power of the original *mtu* NautlQ Master, with its scalability and flexibility in terms of system architecture.



Multiple operator workstations

Integratable Propulsion Control System (PCS)



Damage Control System (DCS)



Multi-level redundant networking including fibre optics

mtu NautlQ Master overview

mtu NautlQ Master offers advanced bespoke solutions designed to suit the complex automation and integration requirements for operators of specialist vessels.

mtu NautlQ Master is capable of providing a fully integrated turnkey electrical and automation solution, being a scalable and feature rich system capable of incorporating the following sub-systems and plug in modules:

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System (APMS)



Equipment Health Monitoring and Dynamic Analysis



Remote Data Collection and Control Units



On Board Training Systems (OBTS)

- Navigation Bridge System
- Vessel Management System
- Communications
- Digital CCTV Surveillance
- Propulsion Control
- On Board Training System
- Power Management
- Condition Based Monitoring System
- Damage Control System

mtu NautlQ Master - IPMS Incorporates:

Propulsion

The Propulsion Control System (PCS) sits on a separate network that can be fully integrated into the IPMS. It accommodates all propulsion configurations including gas turbine, diesel and electric drives. Fixed and Controllable Pitch Propeller (CPP) shaft arrangements as well as Azimuth pods can be accommodated.

Fluids

Monitoring and management of fluid systems such as fuel, lube oil, cooling systems, ballast, bilges, aircraft refuelling and fire systems. Integration into damage control system.

Electrical

Remote monitoring of electrical systems, generators & switchboards with automatic management of load requirements, blackout starts and duty set rotation. Advanced integration of propulsion system.

HVAC

Remote or automated operation of ventilation and extraction systems, maintenance of ambient atmosphere for comfort and life preservation. Integration into damage control system.





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Damage Control

Graphical presentation of safety systems with remote or automated operation of hatch, door and ventilation closure; extraction systems; bilge and flood control; fire fighting systems; fire suppression systems; and resource deployment.

Resilient Networks

Dual redundant networking of alternative architectures to meet specific customer requirements, including ARCNET or Ethernet over standard cable or managed fibre optic arrangements.

Simulation

Sophisticated training simulation that makes use of ship trial data or pre-defined scenarios on selected workstations. Work stations utilise replica mimic sets without the need to create an alternative software programme and run with actual ship data.



mtu NautlQ Core

ALARM, MONITORING AND CONTROL SYSTEM

mtu NautlQ Core Alarm, Monitoring and Control System (AMCS) option is an entry-level system that offers a reliable and highly cost-effective solution and is designed using pre-engineered building blocks incorporating built-in expansion for future proofing. A selection of display systems are available to meet operational requirements and console design.

mtu NautlQ Core has been specifically created to deliver Commercial craft. The standard *mtu* NautlQ Core packages are future-proofed Off-The-Shelf (COTS) solutions for all shipping sectors including: bulk allowing for later integration of additional hardware, software and carriers, container ships, tankers, passenger ships, offshore support auxillary equipment through the vessels lifetime. vessels, tugs and salvage vessels, inland waterway and small leisure

Key features:

Cost Efficient

- Placing Remote Terminal Units (RTU) near the process reduces cabling
- Pre-engineered solution reduces engineering costs
- Self-diagnostic features help to improve maintenance scheduling

Flexible

- Option to interface with external systems
- Modular design allows for customisation
- Up to 50% expansion available within each RTU

mtu NautlQ Gate

Opens up a new world of connectivity

mtu NautIQ Gate has been specifically created to deliver compact and modular solutions for all shipping sectors including: smaller passenger ships, offshore support vessels, tugs and salvage vessels, inland waterway and luxury yachts. The standard *mtu* NautlQ Gate packages are future-proofed allowing for later integration of additional hardware, software and auxiliary equipment through the vessel's lifetime.

The *mtu* NautlQ Gate unit is the latest design from the *mtu* ship automation solutions featuring unparalleled flexibility across the



Scan the QR-code for more details about **mtu** NautlQ Core





User-Friendly

- Unified interface across devices
- Intuitive HMI
- Simple modular design



Safe and Reliable

- Multiple levels of redundancy
- BITE safeguards the network while
- safeguards the vessels systems
- COTS hardware with no moving parts

entire range of legacy, current and future *mtu* NautlQ installations. The NautIQ Gate platform allows a single unit to be built with the correct number of interfaces. The *mtu* NautlQ Gate platform allows connection to Ethernet and/or ARCNET networks via single or preferably, dual interfaces. This allows *mtu* NautlQ Gate to function not only within any *mtu* NautlQ system but it can also be used to retrofit most other manufacturers' old, unsupportable systems.

mtu NautlQ Foresight

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FROM BRIDGE TO PROPELLER



Scan the QR-code for more details about *mtu* NautIQ Foresight

mtu NautlQ Foresight is an Equipment Health Management System. It allows you to monitor and have full control over the technical condition of your vessel from bridge to propeller.

The system maximizes the availability of your vessel, and you can even use it to monitor a whole fleet. By providing system status at a click, *mtu* NautlQ Foresight makes availability management easier than ever before. It provides support for the maintenance and upkeep 24 hours a day, 7 days a week – and thus helps minimize vessel downtime.

With *mtu* NautlQ Foresight you can collect and analyze data from *mtu* systems and third-party key components on the vessel, considering additional factors, such as navigational data.





Propeller

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It's all about uptime. Real-time data analytics combined with artificial intelligence and machine learning techniques reduce unplanned downtime and maximize asset availability. The real-time sensor data on vibration, pressure, and temperature is compared with long-term figures for the respective operating conditions and ideal characteristic curves. The results enable optimum operation.

WIND [m/s]

Gearbox

POWER [kW]

DEPTH [m]

Optimized life cycle costs

Maximized availability and peaked performance optimize life cycle costs. Due to the improved plannability, downtimes are reduced to a minimum and unplanned maintenance is turned into planned maintenance.



Power Genereal

TURBOCHARGER I°C

Propulsion Engine

TORQUE [Nm]

VIBRATION [Hz]

CONSUMPTION [g/kWh]

Peaked performance

Monitoring fuel oil consumption and measuring torque is the first step to understanding the state of the vessel. This information, combined with the health monitoring data, allows you to analyze and improve the vessel's performance. Weather and navigational data let you draw conclusions about factors such as hull condition. Additionally, the optimal speed can be determined. This performance monitoring system enables fuel cost optimization and contributes to reduced emissions.

Reduced emissions

mtu NautlQ Foresight bundles all operational data in one system. The combination of engine, power generation, navigational and weather data enable in-depth analytics of the vessel's movement and its performance. In the next step, the operation of the vessel can be adjusted to run in a more efficient and environment-friendly manner.

mtu NautlQ Bridge

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FULLY INTEGRATED **BRIDGE SOLUTION**



Scan the QR-code for more details about *mtu* NautlQ Bridge

mtu NautlQ Bridge is a fully integrated bridge solution. Created in partnership with yacht specialists Team Italia, this outstanding ensemble raises overall ship performance, improves safety and offers a new level of customer experience.

Integration from bridge to propeller

One platform: Full integration

The navigation equipment and all the yacht subsystems necessary to monitor and control the entire vessel can be seamlessly integrated in one platform. There is no need to modify third party equipment or subsystems integrated into *mtu* NautlQ Bridge.

- Easy and consistent user interface to navigation equipment
- In-depth integration of propulsion system
- Multicontrol system consistent control through a single device
- Touchscreen controls allow easy HMI customization and software updates
- Equipment health monitoring and vessel optimization
- Connectivity & remote diagnostic of equipment condition

One design: Elegant, intuitive, user-optimized

All the information is presented in one elegant and user-optimized design. Easy and consistent user interface to navigation equipment.

- Total Navigation Control, simplified management
- Innovative design and functionality
- Safe and user-friendly thanks to consistent user interface
- Seamless user interface across all integrated subsystems

One source: Dependability for builders and owners

All the technology and services come from one source.

- One face to the customer for complete vessel operating system
- Global service support, anytime, anywhere
- Seamless integration of product and technology
- Scalable, to integrate additional functions
- High flexibility for updates and upgrades



Fully integrated mtu solution From bridge to engine room



One face to the customer For complete vessel operating system



Global service support Anytime, anywhere



Scalable To integrate additional functions



Seamless integration Of product and technology



Unique innovation Customized design and product features





PROPULSION AND GENSET MONITORING & CONTROL SOLUTIONS



Features:	mtu NautlQ BlueVision NG_Basic	mtu NautiQ BlueVision NG_Advanced	<i>mtu</i> NautlQ BlueVision NO
Monitoring			
Alarms			
Control (remote, automated and manual)	•		
Propulsion Control <i>mtu</i> Series 2000/4000 & FPP	•		
Classifiable		•	
Operator station			
Application	Y,C,N	Y,C,N	Y,C





mtu NautlQ BlueVision NG_Basic

THE AUTOMATION SYSTEM FOR YOUR PROPULSION SYSTEM



Scan the QR-code for more details about mtu NautlQ BlueVision NG Basic

mtu NautlQ BlueVision NG_Basic is a non-classifiable monitoring and remote control system, incorporating a simple design and complete basic functionality.

The automation system for the propulsion system consists of monitoring control and remote control. It is configured by an engineering system and is connected via interfaces to the engine control system, the transmission system, the propulsion system and the auxiliary systems.

designed for *mtu* Series 2000 and Series 4000 engines. It comes with 1 to 4 shafts / engines and fixed pitch propeller (FPP) propulsion plants. It features compact hardware for easy installation and commissioning. Local operating panels (LOP) offer basic functionality for installation in the engine room.

Primarily used in smaller yachts, *mtu* NautlQ BlueVision NG_Basic is

Key features:

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Compact hardware



Compact size makes for easy installation and commissioning



Local Operating Panels (LOP) For installation in the engine room



mtu NautlQ BlueVision NG_Basic

Connected control



Integrated ZF autotroll Function for ZF gear boxes

Pininfarina Bridge Components

With the optional available Pininfarina bridge componentens we have responded to the increasingly exacting aspirations of yacht buyers. With this design line we offer an entirely new design concept for control lever, digital touch displays, control panels and analogue display instruments featuring unified and distinctive styling.



pininfanina



Emotional design meets engineering proficiency: our bridge components from the cooperation with the Italian designer Pininfarina.

mtu NautlQ BlueVision NG_Advanced

THE EXTENDED MONITORING AND CONTROL SYSTEM

Our standard automation systems are delivered ready for installation, perfectly matched to your propulsion system, giving you a complete package where everything is fine-tuned to your requirements: powerful engine performance, maximum efficiency, uncompromising reliability and green credentials.

The modular system design allows for a flexible configuration: intelligent data technology ensures reliable data exchange and reduces the need for excessive cabling. Optimized interfaces between the propulsion and automation systems result in complete integrated solutions that guarantee security, efficiency and reliability – and all from one source.

mtu NautlQ BlueVision NG_Advanced

The extended monitoring and control system is available for *mtu* Series 2000 and Series 4000 engines. It comes with 1 to 4 shafts / engines and fixed pitch propeller (FPP) propulsion plants.

Our highly developed hardware is individually configured according to the respective application and customer requirements. That means components are designed with Commercial Off-The-Shelf products (COTS) to create modular, scalable solutions that work for you.

Key features:

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Type-approved components LOP, control lever, display and instruments.



((:

Local Operating Panels (LOP)

Comes with a color display and advanced functionalities such as clutch and speed control.

Data communication Via redundant Ethernet ring bus.



Connected control Of all components installed throughout the ship.



Compact hardware Compact size makes for easy installation and commissioning.



Scan the QR-code for more details about *mtu* NautIQ BlueVision NG_Advanced



Control Lever (CL)
Operating Panel (PAN)
Color Display MTD2

 Shaft Stbd
 Propulsion

 60
 0
 °C
 120
 rpm

 0
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 120
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 120
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mtu NautIQ - Marine automation solutions Controlling the power.





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mtu NautlQ BlueVision NG_Avantgarde

A SOPHISTICATED SOLUTION



Scan the QR-code for more details about mtu NautlQ BlueVision NG_Avantgarde

mtu NautIQ BlueVision NG_Avantgarde provides the most sophisticated and extensively developed solution for standard propulsion automation and includes a monitoring and remote control system package for your *mtu* engines and systems.

Without exception, we can always supply a complete system individually tailored to suit your vessel - all from a single source. *mtu* NautlQ BlueVision NG_Avantgarde provides optimum complete solutions which guarantee safety, efficiency and reliability.

mtu NautlQ BlueVision NG_Avantgarde enables you to get an excellent overview of what matters most on your ship, allowing you to manage the ship's propulsion plant easily. The system is designed for mtu Series 2000 and Series 4000 engines and one to four engine propulsion plants.

Key features:



Type-approved components LOP, control lever, display and instruments.



Connected control Of all components installed throughout the ship.



and commissioning.



A clear vision The sophisticated color screen gives you a crystal-clear overview of what's happening on your propulsion system.



Grafical User Interface (GUI) 24 " - 16:9, Color Display











mtu NautlQ Genoline NG

MADE FOR ONBOARD POWER GENERATION PLANTS.

With the *mtu* NautlQ Genoline NG system, your engine and generator set are optimized to work at their best, whatever the operating conditions.

The modular system's design ensures optimum adaptation of the diesel engine and generator set to the variety of operating conditions that exist for onboard power generation. *mtu* NautlQ Genoline NG is available for *mtu* Series 2000 (on request) and Series 4000 engines.

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Features:



Maximum reliability

Availability and maintenance-friendly design for minimal downtime.

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Low lifecycle costs

Effective operation, low fuel consumption and long service intervals.

Some of the features of mtu NautlQ Genoline NG

- It controls and monitors the diesel engine and generator and provides the required interface
- Modular system guarantees optimum adaption of the diesel engine to the diversity of operation conditions in onboard power generation
- Easy to integrate and install
- It is available with *mtu* Factory acceptance test as well as a fully classified version
- Simple interface handling
- The interface provides analog and binary signals (I/O), CANopen, J1939, Modbus TCP/IP and ModBus RTU.

mtu NautlQ Genoline NG is compatible with the following applications:

- Diesel-electric propulsion plant non-classified and classified
- Special applications
- MIL
- Shock
- EMC



Ultimate compatibility

All *mtu* components are integrated, thoroughly tested and supported. Everything's designed to work together, which means less maintenance downtime for you.



Reduced emissions

Advanced technology meets applicable emissions and environmental regulations.



Scan the QR-code for more details about *mtu* NautlQ Genoline NG

Delivering actionable insights through digital solutions

mtuGo



Scan the QR-code for more details about **mtu** Go

FEATURES AT A GLANCE

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Features:	<i>mtu</i> Go
Remote Functions	
Application	Y,C



Connect all your equipment Data collection from your yacht, system and engine

Connectivity is the basis for all the advantages of digitally supported

service. Using our edge software connected to the control unit, you and your service network can monitor relevant deviations from the optimum condition remotely. We offer several ways of collecting data, including the creation of interfaces to already existing data sets. In doing so, we always adhere to the highest data privacy and security standards of our industry.



Monitor your yacht

Visualization of data for a quick and accurate overview of your yacht

With the *mtu* Go platform, predefined users, such as captains or yacht — All important data and alarms available at a managers, can view the system data and perform initial analyses by using diagnostic tools. By accessing the technically relevant information, your service network can provide fast support in handling alarms and planning necessary maintenance together with you. Open interfaces allow you to interface directly to your existing dashboards or systems.

Manage your yacht

Digital solutions for your detailed data analysis on necessary actions

Supported by *mtu* Go your Service Network is able to analyze all relevant data from your equipment and compare it with data trends. From this we together can proactively derive recommendations for action.

In future, the analysis can be enriched with additional external data sets, such as environmental influences or time schedules to create new opportunities for optimized planning.

Access your data

- Data privacy and security to the highest industry standards
- Different device and software options ensure optimal connectivity
- Remote monitoring, available for individual or multiple yachts

Keep track of your data

- glance for efficient monitoring
- Intuitive and clear design for easy operation
- Visual comparison of data using the diagnostic tools for initial analyses

Learn from your data (under development)

- Algorithms for proactive early detection of deviations
- Troubleshooting based on large amounts of data with artificial intelligence
- Comparison with data outside own fleet leads for faster knowledge transfer and optimal service tool for initial analyses

mtu NautlQ - Marine automation solutions Controlling the power.

REMOTE & AUTONOMOUS CONTROL SOLUTIONS

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mtu NautlQ CoDirect

WHEELHOUSE CONTROL FROM THE BEST VANTAGE POINT

mtu NautlQ CoDirect is a wireless, remote-helm system that controls a vessel's engines, steering and transmission as well as payload functions like pumps, winches or cranes. It allows marine crews to operate a vessel from a distance of up to 1,000 meters - from the safest vantage point

Key features:

Better visibility

Operators can go outside the wheel house and work from places with better visibility, for example, when a small tug is moving a large cargo ship in a crowded port.



Fewer communication errors

With better visibility, the operator of the remote control does not solely rely on guidance from crewmates

Safer operations

The vessel can perform tasks in potentially hazardous conditions while the operator controls ship position from the safest vantage point.



Lower costs

Force multiply

Thanks to optimized manpower utilization and through precision-control leading to fewer in-service incidents.

Operating from outside the wheelhouse creates

operating multiple vessels simultaneously.

new capabilities for the crew and vessels, such as

Intuitive equipment for remote navigation

mtu NautlQ CoDirect consists of an onboard enclosure and a remote user interface. The two elements are connected by a secure radio link with a 1,000-meter range.

The onboard enclosure connects to the vessel's engines, steering, transmission and auxiliaries plus payload controls for elements such as fire pumps, sonar, winches, cranes, ROV or a moonpool.

The user interface has joysticks for gear and throttle, a steering knob, 11 assignable switches and a color LCD screen. It can be worn as a beltpack.

mtu NautlQ CoDirect has regulatory approval from the United States Coast Guard (USCG), the American Bureau of Shipping (ABS) and Bureau Veritas (BV).

Remote control applications

Remote helm control adds visibility, safety and efficiency to many types of marine operations:

- Tugboats
- Pushboats
- Tenders Response vessels
- Target boats
- Offshore daughter craft (LARS)







Scan the QR-code for more details about mtu NautlQ CoDirect

FLEXIBILITY, VISIBILITY AND SAFETY

mtu NautlQ CoDirect provides a flexible solution to common challenges from the field and creates operational advantages.

More visibility for tugboats and pushboats

In many cases, tugboats have limited visibility from the wheelhouse during complex maneuvers, such as dockings. mtu NautlQ CoDirect allows crews to perform the primary control from practical vantage points, such as the dock or the deck of the main vessel. For pushboats. mtu NautlQ CoDirect allows the master to control thrusters from the front of the barge train.

Enabling safer emergency response

Dangerous response missions such as marine fires, spills and searchand-rescue operations can benefit from using a remotely controlled vessel to avoid putting crews at risk. Survey and offshore operations in hazardous environments also require reduced operational risk.

More efficiency for tenders

Tenders ferrying people and cargo from ship to ship or a harbor to a superyacht can be operated remotely, with minimal crew.

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mtu NautlQ CoOperate FLEXIBLE VESSEL CONTROL FROM ANYWHERE

mtu NautlQ CoOperate is an optionally self-piloting ship navigation and command system. It enables off-boat remote command, including all payloads on board, and offers situational awareness using cameras, sensors and other equipment, from a second location on another vessel or on shore.

Key features:

Increased flexibility

Where a secure link infrastructure is available, mtu NautiQ CoOperate allows vessels to be commanded from anywhere using IP radio, 4G networks or satellite communications.

Increased possibilities

Creates new business opportunities by enabling reduced-crew vessel configurations. Also Increased possibilities by taking over routine and monotonous tasks and allowing crews to focus on their mission and work.



Lower costs Reduced operating cost through optimal crew tasking, increased efficiency and productivity in operation.

Autonomous self-piloting capabilities

mtu NautlQ CoOperate consists of an onboard enclosure with flexible sensor integration and a ruggedized laptop. The system can also be used with the optional *mtu* NautlQ CoDirect beltpack for remote control when operated within 1,000 m of the vessel.

Where a secure link infrastructure is available, *mtu* NautlQ CoOperate allows vessels to be commanded from anywhere using IP radio, 4G networks, or satellite communications. The vessel can also move autonomously from waypoint to waypoint, execute a survey or search-and-rescue pattern, or match the course and speed of the mothership. The system can also be set for timed tasks, such as loitering at a waypoint or activating a payload.







Scan the QR-code for more details about mtu NautlQ CoOperate



Increased productivity

Lengthens operational periods by reducing limitations like stop-work periods and crew changes or conditions in which humans cannot operate.



Health and safety

Increases health and safety by mitigating crew risk in dynamic, toxic or dangerous marine operations. In addition, supervised system obstacle detection and avoidance also helps reduce human errors.



Crew comfort and cargo safety

Regulates vessel motions during missions and voyages, reducing wave-induced slamming, heave or other motions, and keeps them below configurable limits.

Autonomous command applications

Autonomous command and control integrates with existing vessel systems and sensors to manage pre-planned and dynamically charted missions. Applications include:

- Patrol vessels
- Hydrographic survey
- Tugboats
- Pilot boats
- Search and rescue (SAR) Guard and Standby
- Aquaculture
- Ferries

mtu NautlQ CoPilot

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COMING SOON: THE VIRTUAL COPILOT AT YOUR SIDE



Scan the QR-code for more details about **mtu** NautIQ CoPilote

As an autonomous pilot assist system, *mtu* NautlQ CoPilot is our most advanced autonomous system, using digital marine sensors, embedded electronic charts, advanced autonomous algorithms and broad-area computer vision to support human-manual vessel operations with enhanced real-time understanding of objects, obstructions and traffic.

Key features:



Increased safety

Autonomously handles re-routing and obstacle collision avoidance to significantly increase crew and vessel safety. It also reduces the risk of manual errors that could lead to accidents.



Increased productivity

It fully independently executes the navigation of routine transit routes, boosting vessel efficiency and productivity.



Increased capabilities

By supporting operators of steering and navigation duties, it allows them to focus on other tasks and potentially change their daily operations onboard.

Greater accuracy

Always on the watch, *mtu* NautlQ CoPilot perceives and analyzes more data than a human, detecting objects commonly missed by Automatic Identification System (AIS) and radar.

Choose from three operating modes

mtu NautlQ CoPilot consists of an onboard processing unit, camera system and processor, and user interface touch screen. Depending on the mission, *mtu* NautlQ CoPilot allows operators to choose between three data-driven automated vessel navigation modes – Guide, Guard and Voyage.

Guide Mode – visual indication and audible alert of potential transit conflicts with vessels or other obstacles as well as low depth. No active control.

Guard Mode – visual indication and audible alert of potential conflicts, giving operators signal to act. If no action is taken, the system takes over control to avoid dangerous situations.

Voyage Mode – autonomous control of a planned voyage from start to finish with many built-in behaviors and features specially developed to support a diverse set of on-water operations.

Autonomous command at your control

Operating under the command and in complete accordance with the mission plan of the onboard crew, *mtu* NautlQ CoPilot provides multiple benefits to operators:

- Enhanced situational awareness through sensor fusion and visual AI
- Navigation assistance or full autonomous command (3 modes)
- Reduced crew fatigue by being freed from routine tasks
- Voice command



mtu NautlQ CoPilot offers a broad spectrum of applications for customized autonomous command and control.

A new way of flexibility

Captains and bridge crews are no longer confined to the wheelhouse, allowing for greater flexibility and productivity onboard recreational crafts. Whether this be crews transiting between superyacht tenders and mother vessels, ferrying people and cargo, or enjoying a remotely controlled pleasure craft focusing on those onboard, the *mtu* NautlQ CoPilot allows for a new way of spending time on the seas. All with the advantage of reducing risk with enhanced situational awareness enabled by computer vision.

Transit autonomy

Operators can establish a transit mission by plotting navigational waypoints and legs and call on the system to autonomously navigate the course along the waypoints. *mtu* NautlQ CoPilot automatically controls and adjusts the vessel's helm for heading and course, the propulsion for speed according to preestablished variables, position, electronic chart information and environmental awareness.

Mission pattern autonomy

mtu NautlQ CoPilot can generate and conduct missions to perform pre-established patterns of waypoints and legs, for example, to conduct a geographic area survey where the system automatically generates a series of waypoints and leg-paths along the waypoints. The system automatically controls and adjusts the vessel's helm and propulsion according to the generated survey grid and pre-established variables.

Collaborative vessel autonomy

mtu NautlQ CoPilot can control a host vessel to autonomously track and follow a "mother" vessel at a pre-defined distance and position. This feature requires an optional communication beacon for installation on the mothership. It processes the speed, position and heading of the mothership and transmits the data to the host vessel, and also supports collision avoidance, low depth protection, and seakeeping behaviors.

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