

YOUR PROPULSION EXPERTS



AUTOMATION SYSTEMS & MARINE SERVICES

Demand Your Vessel's Full Potential

PropControl

The fully redundant propulsion control system enables reliable and economical control of SCHOTTEL's controllable pitch propeller on any kind of vessel.

Highly standardized and based on a centralized processing unit, PropControl allows for maximum flexibility while also fulfilling all demands regarding real-time capability, redundancy and cybersecurity.

+ FULL FOLLOW-UP

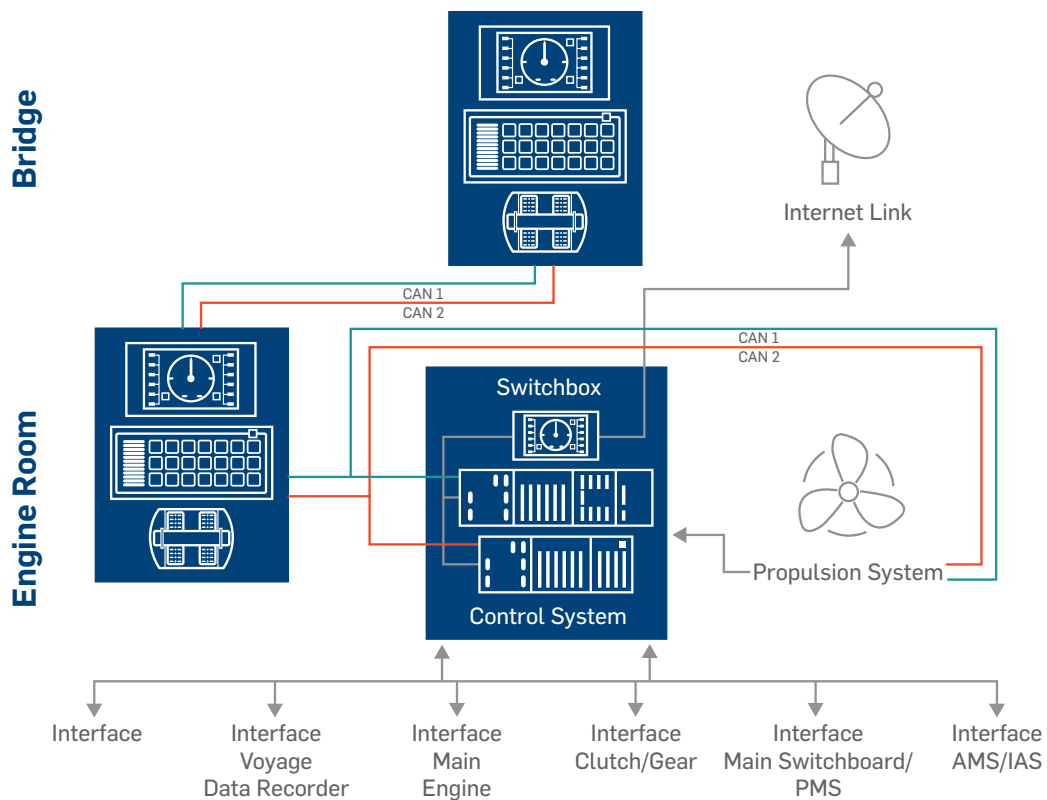
Redundant back-up system with bumpless transfer

+ SCALABLE ARCHITECTURE

Exchangeable software modules combined to optimally fit the application

+ IoT CONNECTIVITY

Allowing remote support, software updates and operational analysis



FEATURES

- ▶ **Powerful PLCs**
 - Centralized computing leading to fewer components, reduced maintenance efforts and improved reliability
- ▶ **HMI Display**
 - Clear and user-friendly HMI for system control, setup or maintenance actions
- ▶ **Dual CAN bus**
 - Redundant, real-time capable and well-known standard protocol
- ▶ **Multiple Interfaces**
 - Interfacing main engine, clutch/gear (main switch board, AMS, IAS, PMS)

MariHub

MariHub is the data acquisition and IoT Gateway solution from SCHOTTEL. It collects, analyzes and transfers signals from sensors, machinery and other ship equipment to an onshore cloud server.

With MariHub, the vessel operator benefits from data-driven services such as performance evaluations and on-board high-speed data processing for real-time condition analysis. The local recording in a ring buffer prevents the loss of data even if the internet connection is interrupted. It is available as a stand-alone system or integrated as a SCHOTTEL's Automation Systems.

+ CONNECTED

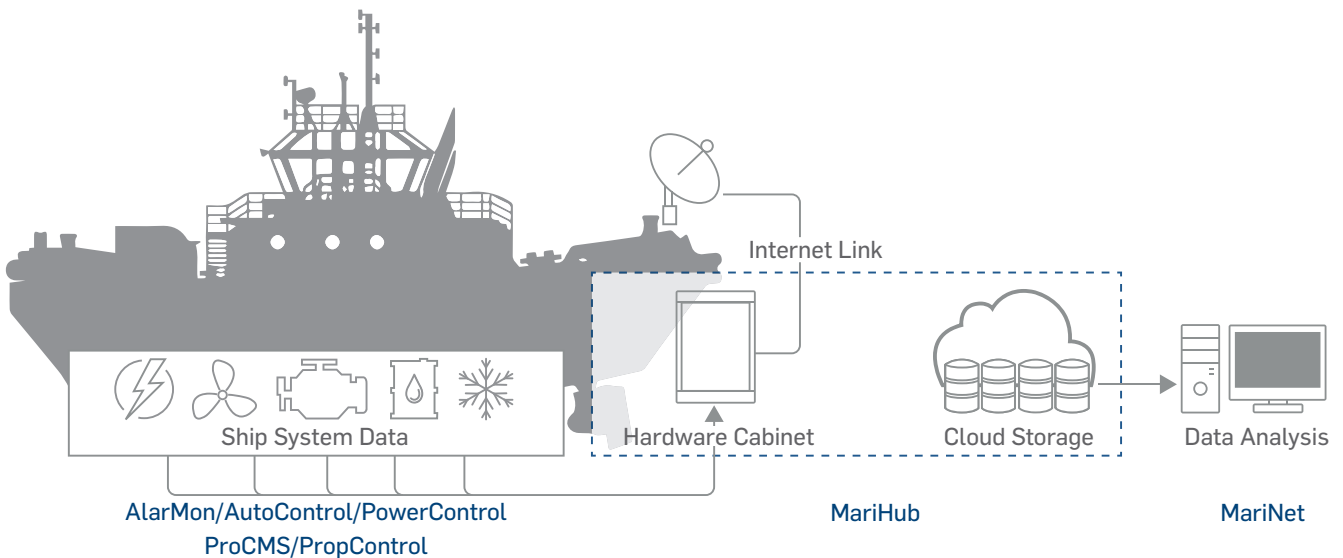
Link equipment from ship to shore

+ ANYTIME

24/7 real-time data and insights

+ SECURE DATA

Reliable and secure data transfer



FEATURES

- ▶ **Data Harvest**
 - Signal collection from any ship equipment or sensor and safe transmission to a cloud
- ▶ **Offline Function**
 - Data buffering and full offline functionality
- ▶ **Thruster Monitoring**
 - Enabling condition monitoring applications for thrusters
- ▶ **Remote Support**
 - Allowing remote commissioning support, failure diagnosis and updates
- ▶ **Operation Panel**
 - HMI display with dashboards, status information and setup options

MariNet

The SCHOTTEL MariNet IoT platform enables vessel operators to identify potential for enhancing daily vessel operation. By analyzing and visualizing data to support decisions, operators have a better chance of getting the best out of the vessel's capabilities.

The cloud-based MariNet IoT platform forms the basis for remote data services and data analysis applications.

+ COMPETITIVE

Advantages due to higher awareness of the vessel's performance

+ ProCMS

Propulsion condition monitoring service by SCHOTTEL experts

+ ProData

Remote data service with historical and live data view



FEATURES

- ▶ **Web Application**
 - Access via any web-enabled device
- ▶ **IoT Platform**
 - Providing analysis tools and clear overviews for multiple vessels and equipment
- ▶ **Live Data**
 - Live insight into the vessel status, position, operational data and more
- ▶ **Cloud Service**
 - Data handling, storage, downloads and integration with 3rd party APIs

ProData

With ProData, operators benefit from historical and real-time data visualization of the monitored equipment and systems aboard a vessel. Reducing the disparity between the crew and the office in terms of the level of information, the remote data service allows for an improved support of the crew as well as close monitoring of the operation and status of a vessel.

The basic version of ProData is included for every vessel with a MariHub data acquisition and transfer system.

+ INCREASED AWARENESS

Information about operation and status of the vessel and monitored equipment

+ REMOTE SUPPORT

For the crew during operation, maintenance or emergencies

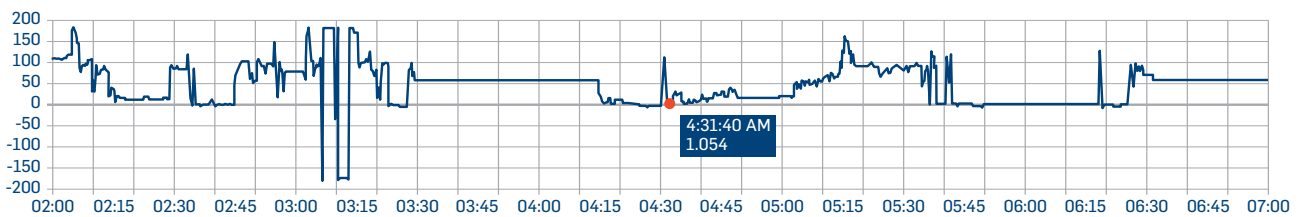
+ EASY ACCESS

Web-based application available via tablet or computer

Speed [rpm] – Diesel Engine (PS, Stern 1)



Steering Angle [°] – SRP 510 FP (PS, Stern 1)



FEATURES

- ▶ **Data Handling**
 - Data is being classified, visualized, stored and made available for download
- ▶ **Vessel Data**
 - Information about ship speed and position or power and fuel consumption
- ▶ **Equipment Data**
 - Running hours or any sensor values, such as temperature, pressure or vibration
- ▶ **Flexible Data Usage**
 - Option to use available MariNet applications or to export data to 3rd-party systems

ProCMS

Knowing the condition of the propulsion equipment is key for the safe operation of the vessel and an efficient maintenance scheduling.

With ProCMS, operators benefit from a 24/7 condition analysis algorithm as well as regular monitoring by SCHOTTEL experts who provide recommendations for the right course of action at the right time.

+ INCREASED UPTIME

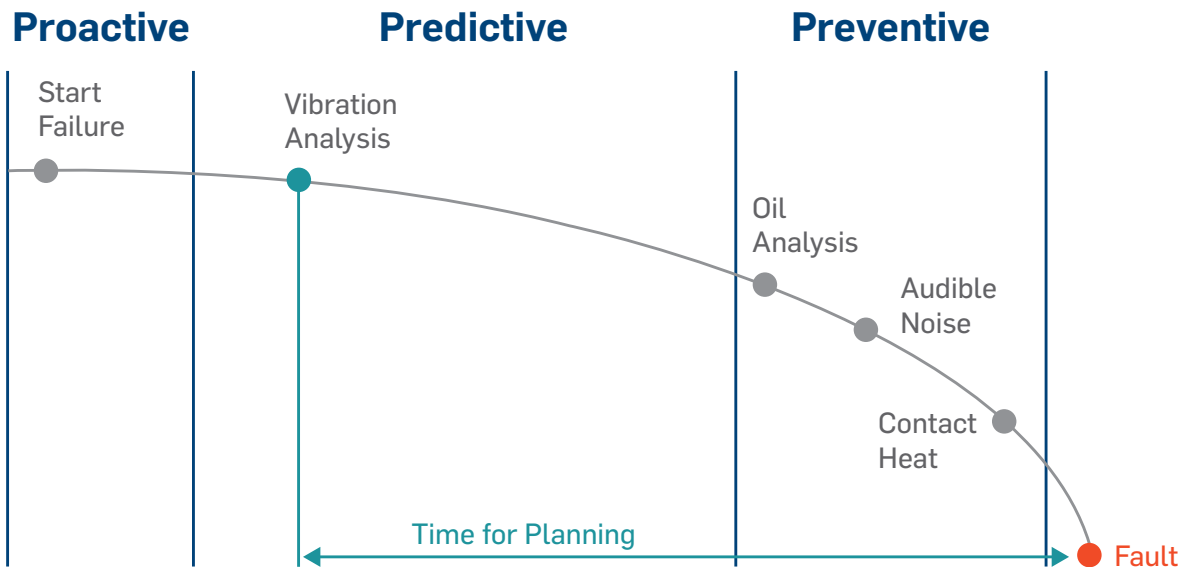
Due to condition-based equipment evaluation

+ QUICK RESPONSE

Shortened process time for solving problems

+ PREDICTIVE

Early failure detection to keep downtimes to a minimum



FEATURES

- ▶ **24/7 Monitoring**
 - On-board surveillance of the propulsion units even in full offline mode
- ▶ **Reporting**
 - Continuous monitoring by SCHOTTEL experts including regular reports
- ▶ **Sensor Package**
 - Comprising acceleration, speed, bearing, oil temperatures and water saturation
- ▶ **Remote Support**
 - Troubleshooting via remote connection
- ▶ **Flexible Agreement**
 - On demand, as a prepaid package or a subscription-based agreement on running hours

Your Propulsion Experts

Since the invention of the rudderpropeller in the early 1950s, SCHOTTEL has acquired a wealth of expertise in the development, design and production of state-of-the-art marine propulsion and control systems.

Today, a team of more than 100 engineers develops propulsion systems and digital solutions, which are manufactured to the highest quality standards in our modern production facilities in Germany.

MECHANICAL DESIGN

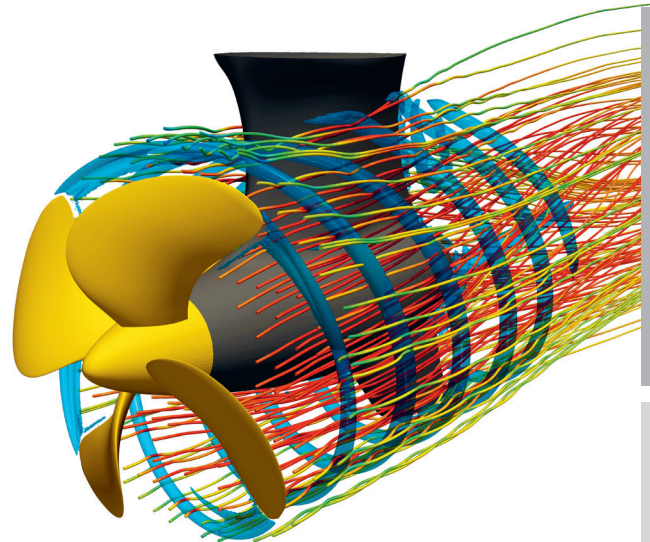
- ▶ Mechanical power transmission
- ▶ Structural mechanics
- ▶ Hydraulics & pneumatics
- ▶ Sealing technology

HYDRODYNAMICS

- ▶ Propeller design
- ▶ Model testing
- ▶ Computational fluid dynamics

ELECTRICAL ENGINEERING

- ▶ Automation
- ▶ Power electronics
- ▶ Assistance systems



+ GERMAN ENGINEERING

+ CUSTOMER-ORIENTATED DEVELOPMENT WITH EXPERIENCED IN-HOUSE R&D

+ SUSTAINABLE MANUFACTURING FACILITIES FOR STATE-OF-THE-ART PROPULSION SOLUTIONS

YOUR QUALITY BENEFITS

- ▶ Standardized FAT procedures
- ▶ Permanent certification processes throughout production plants
- ▶ Continuous quality check/audit of 100+ key suppliers

During The Vessel's Lifetime

Delivering state-of-the-art propulsion and automation solutions is not enough for us. Thanks to decades of experience in the field

of propulsion technology, we are able to offer high-quality services tailored to your individual needs throughout the lifetime of the vessel.



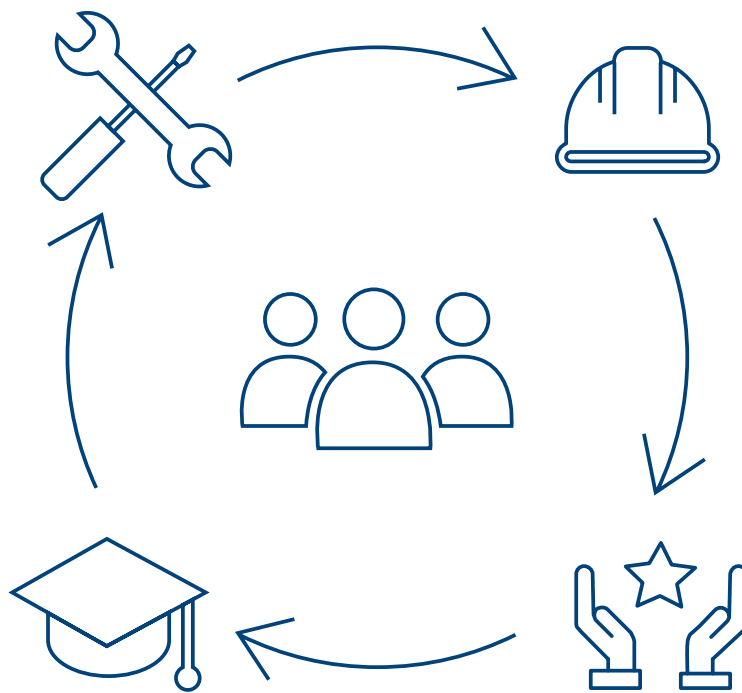
SPARE PARTS

- ▶ 24/7 reliability
- ▶ Package solutions
- ▶ Maintenance agreements
- ▶ Trusted quality as OEM for decades



MAINTENANCE

- ▶ Globally standardized and proven high-quality service levels
- ▶ Proactive service concepts
- ▶ More than 150 highly qualified service technicians worldwide



ACADEMY

- ▶ Customer training courses in local language
- ▶ Trainings on site or in one of 3 SCHOTTEL training centres (GER, USA, AUS)
- ▶ Permanent international knowledge transfer for service technicians



UPGRADES

- ▶ Increase of the shipowner's profit

UPGRADE LEVELS:

- ▶ Control systems
- ▶ Thrusters
- ▶ Systems for intelligent operative monitoring

SCHOTTEL Worldwide

