

the power to control

bachmann.

On Course for Autonomy

Secure. Profitable. Independent.



It feels good to be autonomous

— *With haptics to autopilot of the future*

We have a number of tools and technologies ready for autonomous shipping – All unbeatable for reliability, performance and security. Bachmann brings autonomous shipping within reach.

Haptic feedback is changing the maritime industry. The technology connects operators to systems and devices by stimulating the senses of touch. Similar to modern cars, assistance systems provide haptic feedback when controlling steering and speed. Assistance systems on ships support captains, not only through tactile feedback to warn of imminent danger, but also to assist in optimizing navigation. This systemic support is not only important when ships are operated remotely, but also represent the next step towards fully autonomous shipping.

FACT BOX

- *Guaranteed performance with robust, high-performance hardware and software*
- *Superior condition monitoring systems for intelligent, strategic smart maintenance*
- *State-of-the-art visualization with web-based HMI and SCADA*
- *In control under all conditions with built-in redundancy and protected from -40 °C to + 70 °C 100% RH*

Reliable

Machine Learning (ML) supports continuous monitoring, keeping systems running smoothly

- **Redundancy:** For continuous, availability of the systems in all critical areas
- **Real-time multitasking:** Rapid processing is crucial in critical situations
- **Certification:** We are fully certified for harsh conditions where reliability is essential
- **Simulation:** Virtual vessel commissioning reduces errors, increases the quality of the system and improves functional reliability in real-world operation

THE BENEFITS ARE CLEAR

Significantly reduced fuel costs

Optimal navigation leads to fuel savings and reduces environmental impact.

Maximum security - Minimum risk

"AI-enhanced shipping" eliminates human error, ensuring safe navigation and preventing collisions and maritime accidents.

Lower maintenance costs

Combining and analyzing condition and operational data enables optimized maintenance and repair planning and their corresponding costs. Early detection of emerging damage prevents major downtime and reduces the cost of repairs.

Overview and insight through reduced complexity

Environmental conditions, high-traffic shipping lanes, and unforeseen course changes pose a complex challenge for reliable vessel control. Simplifying this complexity, without sacrificing what is important, helps you focus on what matters.

Increased sustainability, clean image

Not only do our technologies offer long-term benefits, such as reduced fuel consumption, improved working conditions for crew, energy savings, and prevention of serious accidents, but they also actively increase reliability and therefore profitability.

PHASES OF DEVELOPMENT IN AUTONOMOUS SHIPPING



2020
Manned Vessel



2025
Remotely Operated
Vessel



2030
Semi-Autonomous
Vessel



2035
Fully Autonomous
Vessel

Autonomous shipping used to be a vision

— With our technology you can make it a reality

Powerful

Remote operation goes hand in hand with automation

- **Components:** Automation technology, power management, condition monitoring and visualization – our portfolio is versatile and our competence delivers benefits
- **Strong:** Our powerful CPUs effortlessly process complex control algorithms, enabling full integrated functional systems
- **BigData:** Aggregating and processing large amounts of data is a prerequisite for secure vessel operation
- **Flexibility:** HIL tests and digital twins – we offer modern technology to ensure the quality and efficiency of your applications
- **Service:** We pave the way for classification approval with our experience and pragmatic approach

Secure

Our promise, our standard – always integrated

- **Cybersecurity:** Indispensable for autonomous ship control
- **Comprehensive:** Security is an integral part of the development of all our solutions
- **Extensive:** Versatile control platform includes all relevant hardware and software interfaces
- **Modern:** A programming environment that enables simulation, modern languages and scripting
- **Connectivity:** Guaranteed connectivity to all components such as bow thrusters, generators, control levers
- **No Limits:** Rapid cycle times for user-friendly haptic control

FURTHER INFORMATION



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Our reward: success stories from our customers!

Smart Ship

„The security functions, hardened operating system and the process Power offered by Bachmann is more than enough to securely run a full dynamic model in real time – making it easier to test new systems and develop new ideas, allowing us to maintain our quality.“

Roy Kok, Founder of Smart-Ship



Argonics GmbH

„With the help of Bachmann electronics' modern control architecture, we can offer modules for all areas of navigation, monitoring and fleet management for inland vessels, allowing us to jointly facilitate the daily activities of captains and shipping companies.“

Dr. Alexander Lutz, Founder and Managing Director of Argonics GmbH



Real-Time Innovations, Inc. (RTI)

„The Bachmann controller supports Connex[®] software from Real-Time Innovations (RTI), the largest software framework provider for autonomous systems. Connex[®] is based on Data Distribution Service (DDS[™]) – an open standard for message exchange with high data connectivity and a scalable architecture for real-time applications.“

**Lynne Canavan,
Director of Ecosystems at
Real-Time Innovations, Inc. (RTI)**



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