Current developments and challenges
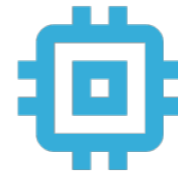## in the maritime sector

In the maritime industry, we often come across new and revolutionary developments. However, these advancements also come with challenges and questions that require our expertise and focus.

SUSTAINABILITY

MODAL SHIFT

DIGITALISATION

PERSONNEL SHORTAGE

Possible solutions
for these developments

The industry is currently being presented with the following possible solutions.

| SUSTAINABILITY | MODAL SHIFT | DIGITALISATION | PERSONNEL SHORTAGE |

Alternative fuels

Alternative fuels and propulsion methods such as hybrid, electric, hydrogen, ammonia etc.

Information systems

Providing more information systems for the operator to use, during operations.

Autonomous

Moving towards semi- and fully autonomous as well as remote controlled shipping.

Consequences
of implementing these solutions

The proposed solutions for some of the challenges the market is facing, aren't without consequences for the operators and in some cases make it even more difficult to optimally control and get a sense of control with the vessel

Complex Operating Systems

Adding even more screens & sounds

Sensory overload

Lack in sense of control

Mode unawareness

Current situation
a complex operating system

Currently information is typically transferred through audio and visuals – a channel that is already occupied by the operator looking outside. An operator receives too many impulses from lights and sounds and must deal with more and more systems because of the previously mentioned developments.

The Smart-Ship way

an intuitive information and operating system

Smart-ship establishes a fluent and intuitive information transfer by implementing force-feedback technology on ship controls. This enables the operator to intuitively receive crucial information while maintaining his focus on the outside situation.
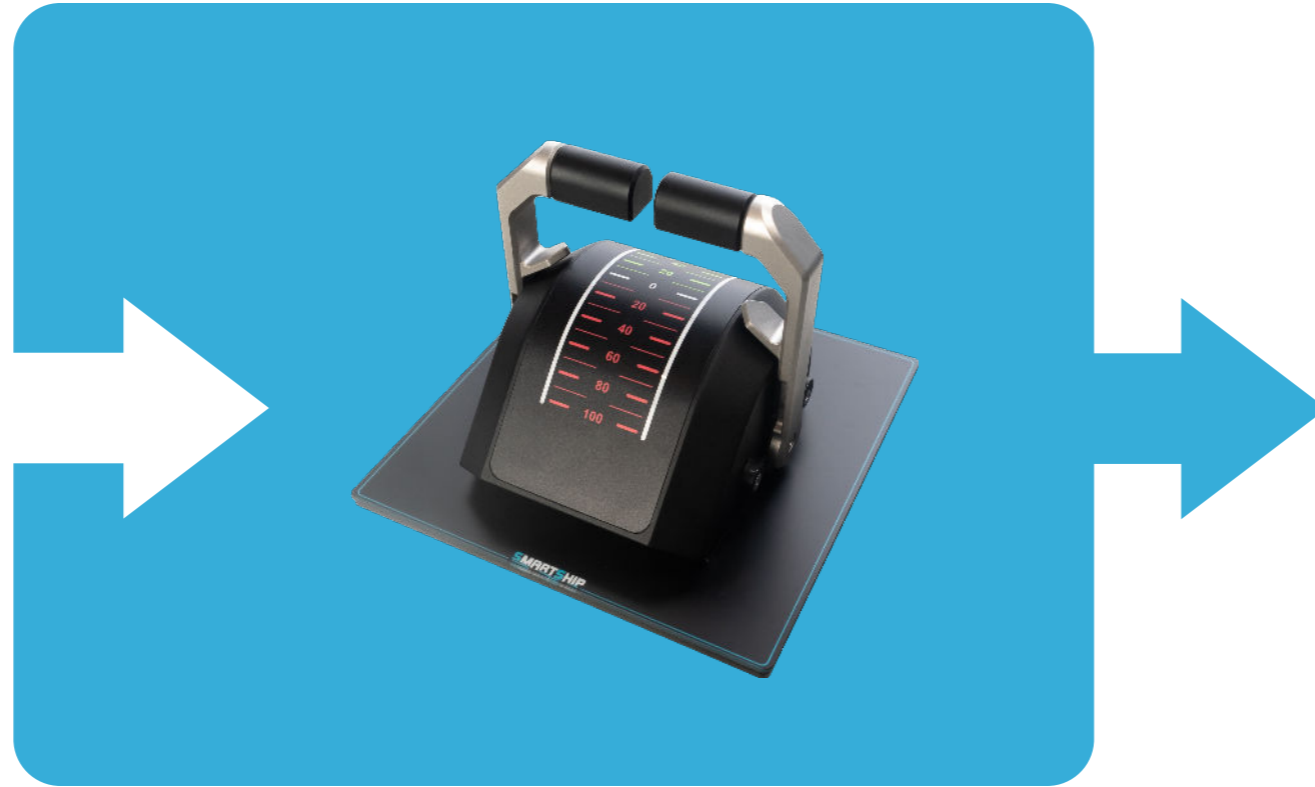
How does it work?

Traditional situation
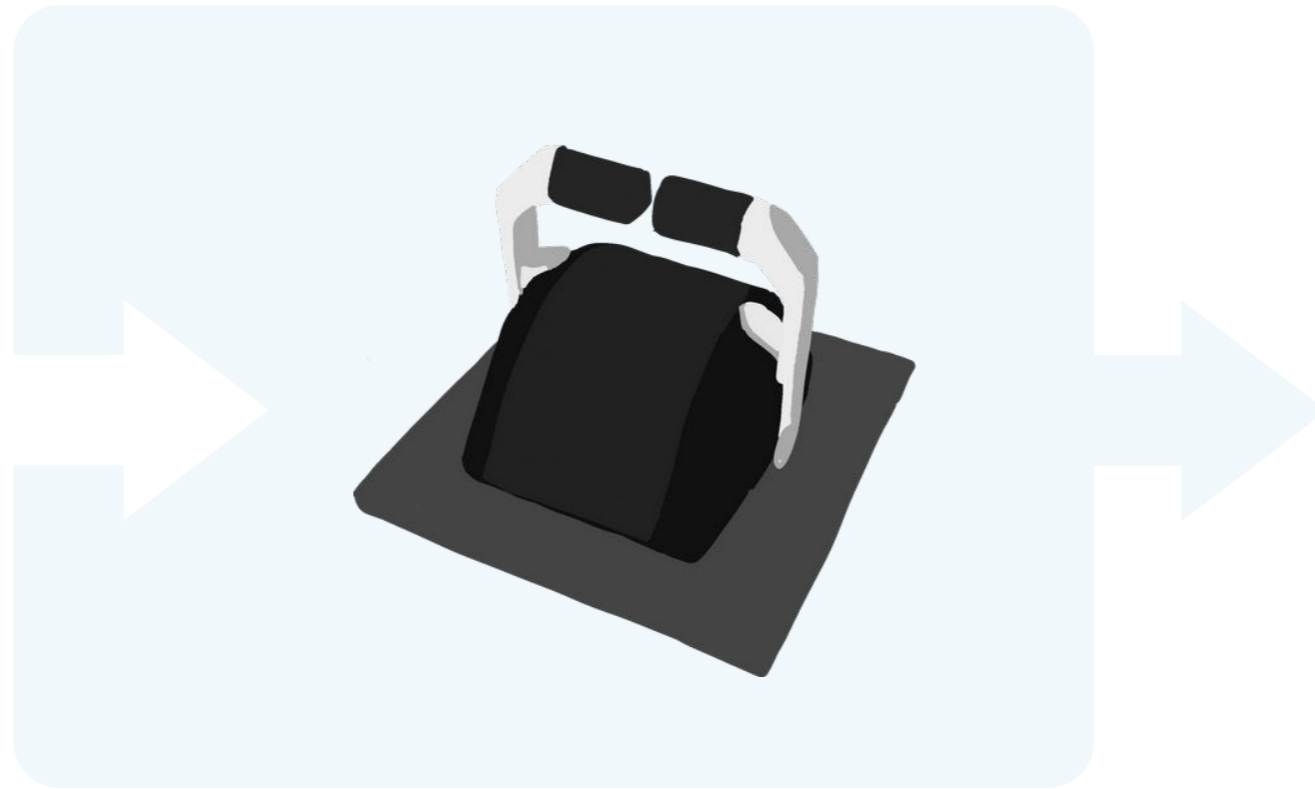
In the traditional situation, the operator will give an impulse to a control lever upon which the control then converts this impulse to an action in the vessel (engine, rudder etc.)
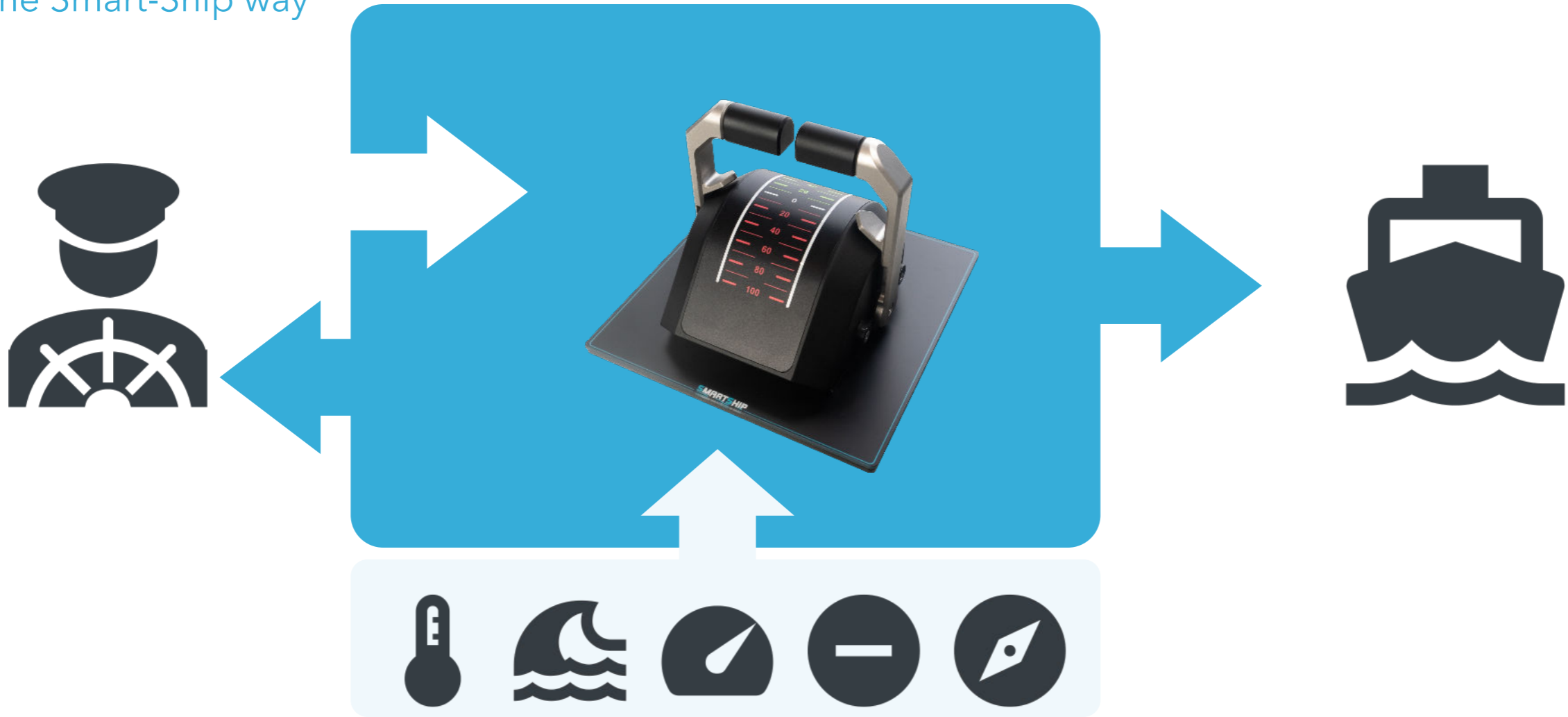
How does it work?

Our system

In the new situation, we replace the old control lever by one of our Smart-Ship controls. This enables us to link any kind of sensor data to the lever and provide the operator with real-time crucial operational feedback.

Our system explained

The Smart-Ship way

In the next step we link any kind of sensor data to the lever and provide the operator with real-time crucial operational and dynamic feedback through a force, vibration, resistance or detent. This changes the system from feed-forward to a two-channel feedback system.

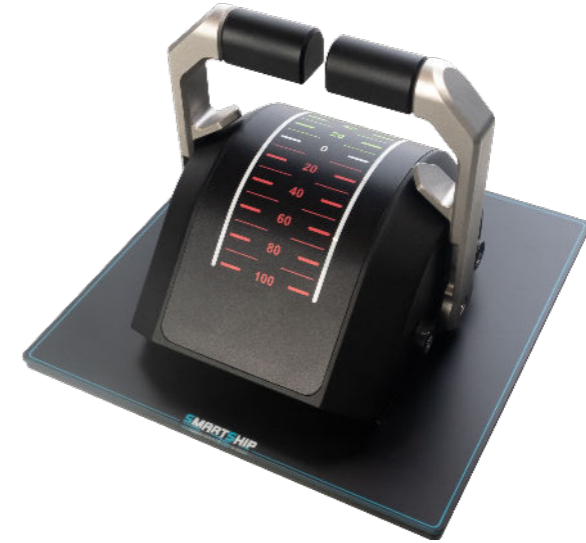# Product Overview   Fully Type Approved Lever Series

Azimuth

A top-notch control lever featuring 2 degree-of-freedom haptic feedback with full range of motion

Tiller

Rotary controller providing haptic feedback over full range of motion for all you control applications including rudder, winch and backup propulsion

Double throttle

The most versatile lever for throttling operations in the market. Can be used on bridge and open deck and comes in a bow thruster variant.

Non-Haptic

Features

Redundant sensors

LED indicators

Outputs

MODBUS RTU

CANBUS

4-20mA (with switches)
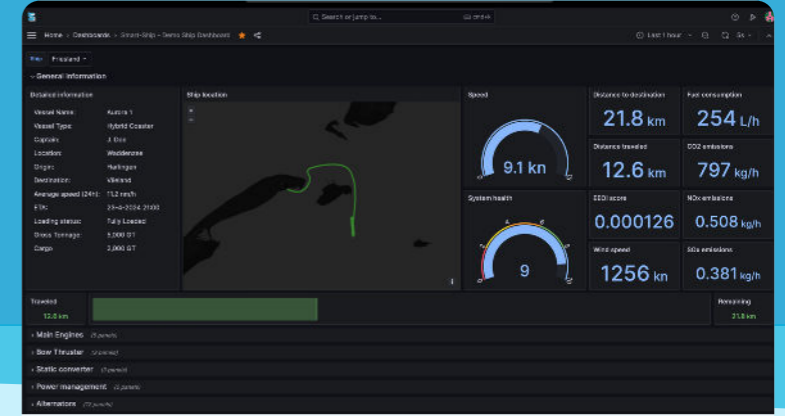
Other on request

Haptic

+ Full haptic functions

+ Interfacing

MODBUS RTU

CANBUS

HUB

Features

Advanced haptics direct from system data.

Data dashboard

Remote support

Additional HMI

🍃 Environmentally friendly   ♻ Future-proof   ⚒ Customisable

Stand alone

Haptic interface

MODBUS RTU

CANBUS

Vessel control

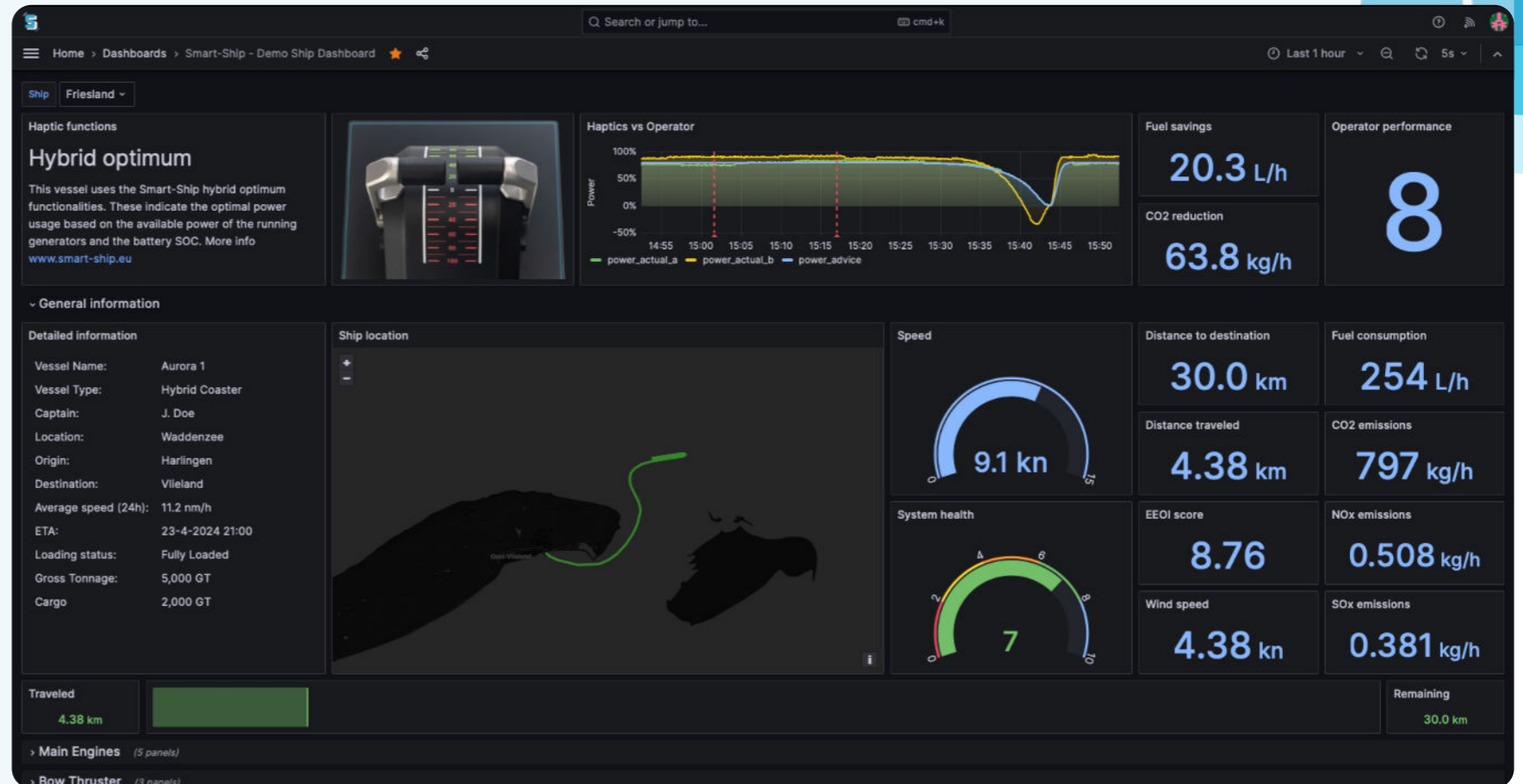4-20mA (optional: directional switches)

CANBUS

MODBUS

Added value of the HUB

Data Dashboard

Fleet overview and benchmarking

Remote Energy and performance

analysis updates

System health indications

Reporting

Long term trend detection

Remote servicing

Reduced downtime

Predictive maintainance

Fast response

Applications
Limitless possibilities

SMARTSHIP
{ FEELING IS BELIEVING }

Remote control

Our technology has been installed in several remote-control locations and can be applied in ships, cranes, public transport etc.

On board

Our technology has been installed on a wide range of vessels, from research vessels and ferries up to coasters and a super yacht.
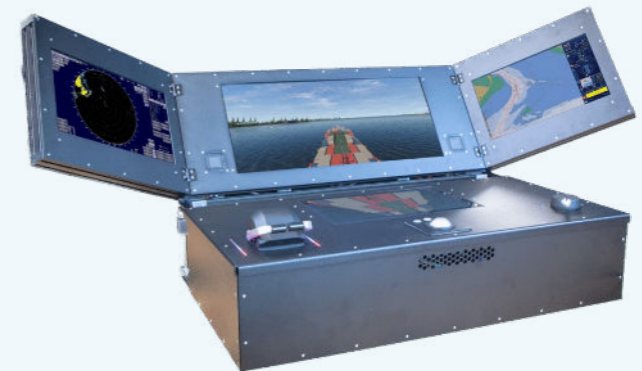
Some of the vessels are:
- Wim Wolff NIOZ
- Scintilla Maris
- Gorinchem XII and Altena VI

Simulators

Our technology has been installed in several full mission bridge simulators and we've developed our own portable simulator enabling training any time anywhere. This are used for education and testing / validating new technologies and harbors.

Integration
How do we operate along the value chain?

Shipping companies

We cooperate with shipping companies to optimise operations w.r.t. safety & sustainability

Shipyards

We cooperate with shipyards to enable them to offer high-end innovative and efficient vessels.

OEM

We cooperate with OEMs to enable them to get insight into the use of their products and

Integrators

We cooperate with integrators to make sure all crucial information is transferred to the operator

Smart-Ship ensures sustainable sailing on the Wim Wolff

On board of the Research Vessel Wim Wolff, Smart-Ship has integrated its throttle levers to allow for optimal interaction with the hybrid propulsion system.

Applications

In collaboration with D&A Electric, the haptic throttle and bow thruster levers have been installed to ensure sustainable operations. While sailing the vessel, the operator will receive feedback through forces and vibrations in the controls, informing him on the most sustainable way of sailing.

NIOZ

From the design phase onwards the goal of the Wim Wolff was clear: to be the most sustainable ship possible. For the vessel to be as sustainable in the water as designed on paper, it's crucial for the crew to use the available systems as efficiently as possible. The Smart-Ship system takes care of that regarding the propulsion, as the captain is able to feel exactly how to sail as efficiently and thus as sustainable as possible.

Enabling sustainable yachting

On board the Scintilla Maris Explorer Yacht, Smart-Ship has integrated its throttle levers to allow for optimal interaction with the hybrid propulsion system.

SUV on the ocean

The 150-foot vessel, formerly a fishing trawler called HD23 Vertrouwen, has been retro-fitted into an exploration yacht that could even travel to the North Pole by Damen Maaskant Shipyard. The owner himself calls the vessel an SUV on the ocean.

Smart-Ship throttle levers

The Scintilla Maris has been equipped with a high-tech bridge of which the Smart-Ship throttle levers form a crucial part. In collaboration with D&A Electric the haptic throttle and bow thruster levers have been installed to ensure sustainable operations. While sailing the vessel, the operator will receive feedback through forces and vibrations in the controls, informing him on the most sustainable way of sailing. See video here.

Intuitive User Interface for optimal power usage

On board the recently launched Vertom Joy, Smart-Ship has implemented its intuitive graphical user interface to allow for optimal power usage and interaction with the hybrid propulsion system.

Environmentally friendly

The 128-meter long MPP and general cargo ship has already been used to transfer windmill blades and is the fourth vessel to be sailing on the European Caribbean Line. Next to that its diesel-electric propulsion allows the vessel to sail in and out of ports on clean electric energy when slow-steaming, making it even more environmentally friendly.

Graphical User Interface

Smart-Ship's Human Factors specialists have developed HMI solutions which provide customers with more insight in their operations, energy management, maintenance and incidents. By bringing relevant data from sensors and (3rd party) information systems across the ship together in real time through our visualisation interface, operators can intuitively respond when required, improving operational efficiencies and reducing maintenance costs.

Realising safe & optimal electric operations

In 2023 Smart-Ship installed its force-feedback Azimuth controls on board of two very special, fully electric ferries Gorichem XII and Altena VI'. The vessels are currently sailing between Gorinchem, Sleeuwijk, Hardinxveld, Werkendam and Woudrichem.

Optimal battery usage

In the next steps a system will be implemented where operators can be actively guided on optimal battery usage. As can be seen in the video, the operators will be warned when requesting too much battery power in relation to the current capacity and the distance that is to be traveled. Watch the video [here](#).

Customization

The Smart-Ship system allows for endless customization and additional functionalities, meaning we will be adding more functionalities to these vessels over the coming months. Currently the system is equipped with a module that actively warns operators when sailing too fast in certain GPS-locations set by the operating company.

Increasing remote situational awareness

In 2023 Seafar and Smart-Ship embarked on a journey where Smart-Ship is going to implement its force-feedback controls in the remote control stations of Seafar in Antwerp, Duisburg and Rotterdam.


Smart-Ship levers in control desk

As of 2024 Smart-Ship has installed 6 desks for Seafar, with another 12 to follow over the course of the year. The stations are being used to control inland barges from 100+ kilometers distance. Controlling such vessels from a distance comes with certain challenges in situational awareness.

In the remote control stations, we can apply multiple functionalities where the operators are instantly informed on amongst other things:

- Crucial thruster information regarding warnings, vibrations or optimal RPM's
- Allowing for seamless switching and overruling by making sure controls always match the thrusters and configurations that are on board
- Providing warnings on maximum speeds in relation to the GPS-location
- Warning operators and guiding them when sailing close to or too fast near objects

Some more Smart-Ship vessels & projects
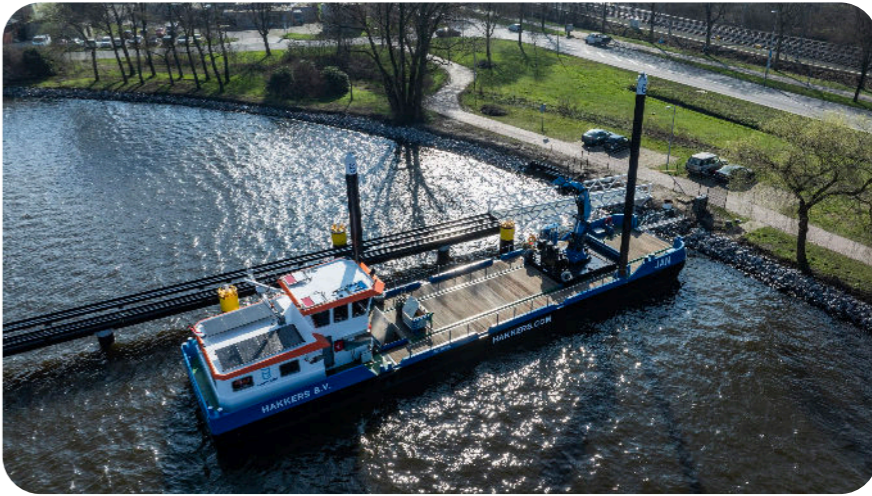
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Challenge us!

Please reach out to us for more
information or a demo of our products