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SERTICA WHITE PAPER

OPTIMIZING SHIP PERFORMANCE

The power of digitalization in reducing carbon emissions

The power of digitalization in reducing carbon emissions

By Michela Schenone

Shipping companies face a significant challenge - the need to reduce carbon emissions on a global scale while staying competitive on the market.

Fleet performance management and digitalization play a key role in optimizing operational measures by monitoring efficiency, ensuring compliance with upcoming regulations, and streamlining onboard reporting.

Given the upcoming regulations, it is vital to understand a ship's performance and predict its behaviors in various situations while striving for environmentally friendly fleet operations.

In this article, we will briefly discuss how you can:

- Optimize Fleet Performance through Streamlined Data Collection
- Ensure Data Quality
- Use Data for Monitoring and Optimization
- Improve Performance with Alerts
- Work with Automatic data acquisition

Optimizing ship performance

Optimize fleet performance

Through streamlined data collection

Effective analysis and decision-making depend on reliable data. This is where on-board data collection and data preprocessing play a significant role in the entire process.

Automatic data collection systems, comprised of both hardware and software, continuously gather, process, and transmit data from a ship's systems and sensors in real-time. This optimization enhances performance and safety for both on-board and onshore teams.

The data collector works by continuously gathering, filtering, processing, and storing data in real-time, with adjustable frequency settings. It further enriches this data by integrating external sources like weather data and manual inputs from the crew.

Here are some examples of relevant data to collect:

- **Fuel consumption rates:** Monitor the ship's fuel usage over time, including consumption per hour or per nautical mile. Analyzing this data identifies trends and optimizes fuel efficiency, saving costs and reducing environmental impact.
- **Engine performance data:** Includes power output, fuel combustion efficiency, temperature, pressure, and RPM (Revolutions Per Minute). Monitoring these parameters helps you detect issues early, schedule maintenance proactively, and ensure peak engine efficiency.
- **Navigation and route data:** This data category involves capturing the ship's course, speed, and planned route. It helps in optimizing voyage planning, reducing fuel consumption by choosing the most fuel-efficient routes, and ensuring vessels arrive at their destinations on time.
- **Weather conditions and forecasts:** Information about wind speed, direction, wave height, temperature, and precipitation are crucial for maritime operations. It helps you make informed decisions, adjust routes, and ensure the safety of the crew and cargo.
- **Maintenance and machinery data:** Involves collecting information on ship systems and machinery, including engine maintenance records, machinery operating hours, and equipment status. Regular monitoring ensures scheduled maintenance, reducing breakdown risks and optimizing reliability.
- **Emissions and environmental impact metrics:** Focuses on tracking ship emissions, including greenhouse gases and other pollutants. Understanding emissions data is crucial for compliance with environmental regulations and reducing the vessel's environmental impact, contributing to sustainability goals.

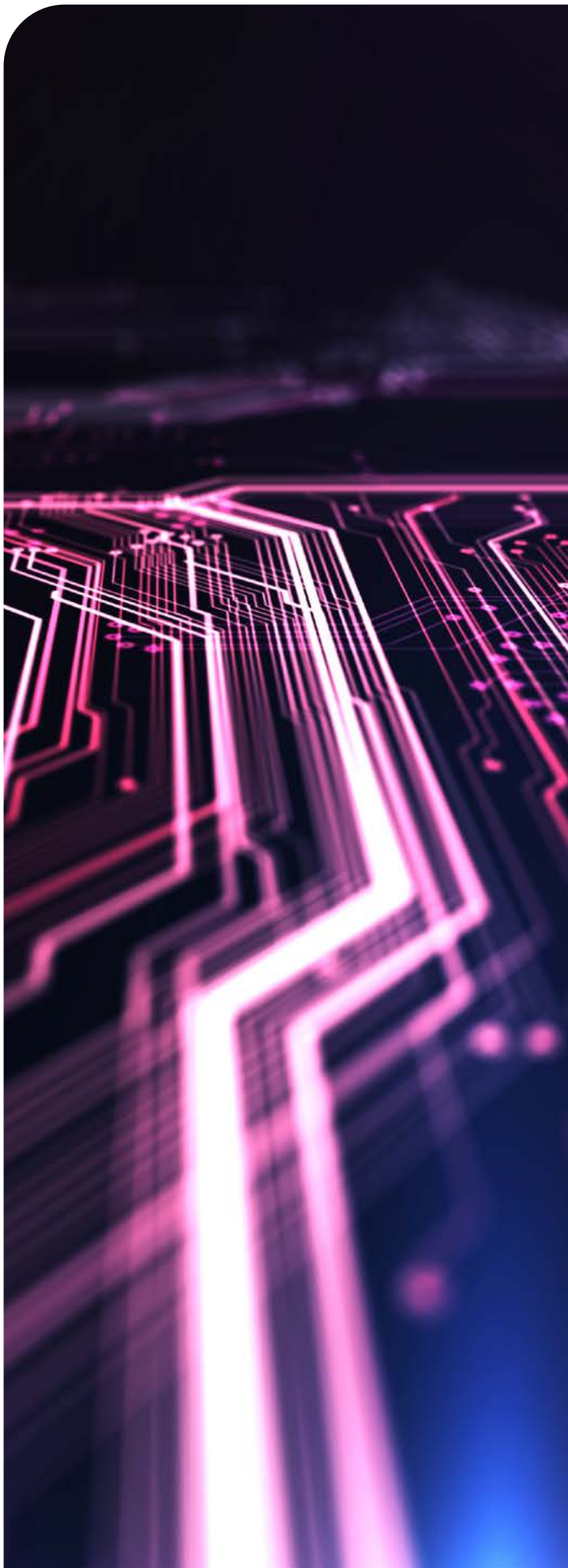
Ensure data quality

Maintaining sensors and ensuring data quality is essential. Identifying data anomalies can be challenging, as unreliable data cannot be used for analysis until sensor issues are resolved.

To ensure your data is reliable, it is crucial to have a process in place for timely intervention:

- Define automatic alerts generated by the performance system.
- Regularly analyze data to detect implausible information that may have been missed by automatic alerts.
- Once issues are confirmed, plan for onboard sensor calibration or replacement.

Additionally, onshore systems should offer tools that make it easy for you to manage the first two steps effectively.

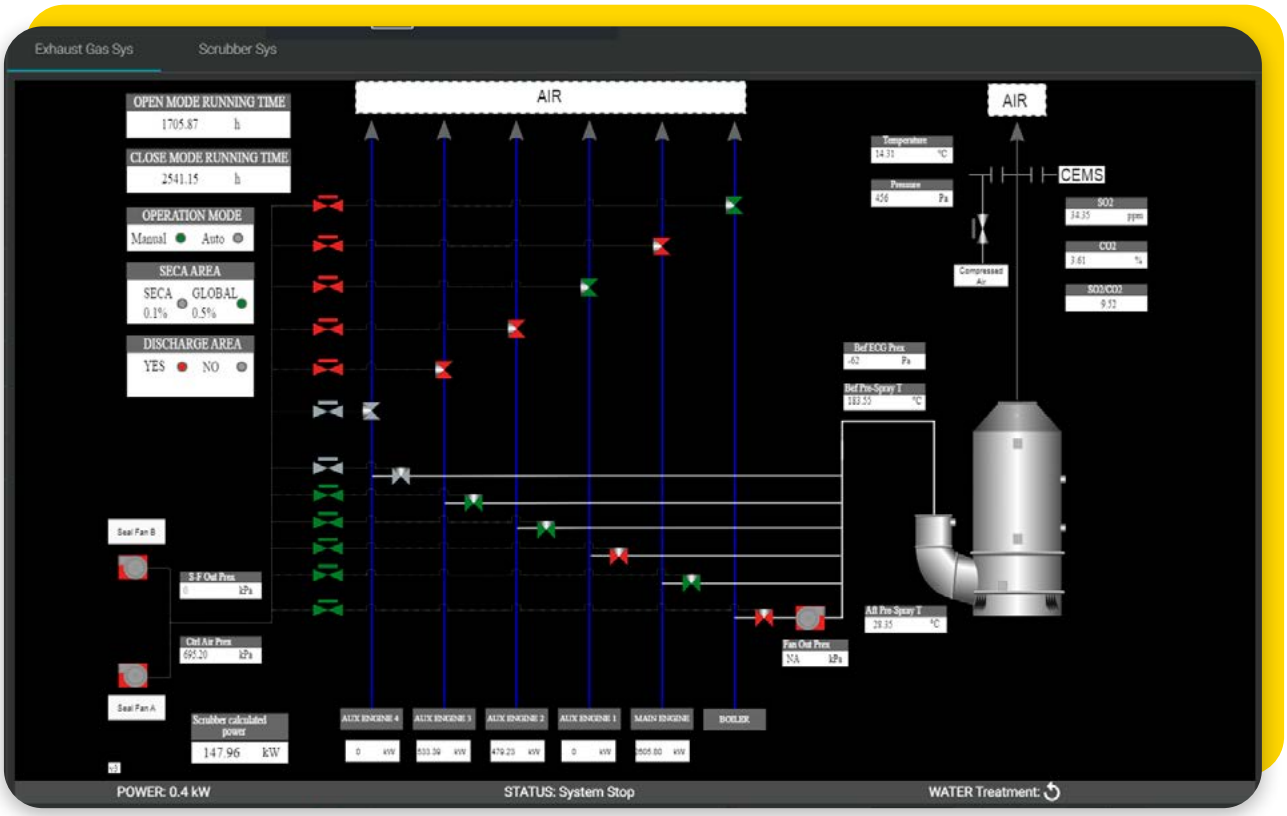


Use data for monitoring and optimization

Real-time monitoring of vessel operations enables cooperation among stakeholders, onboard and onshore, enhancing crew awareness and leading to better vessel operations and fuel savings.

On the other hand, performance monitoring enhances consequent fuel saving and transparency between ships, shores, and business partners. It is the key to unlocking hidden energy-saving opportunities.

For example, to handle complex systems that are meant to ensure compliance like scrubbers, you need to be able to monitor, assist the vessel, and act on time.

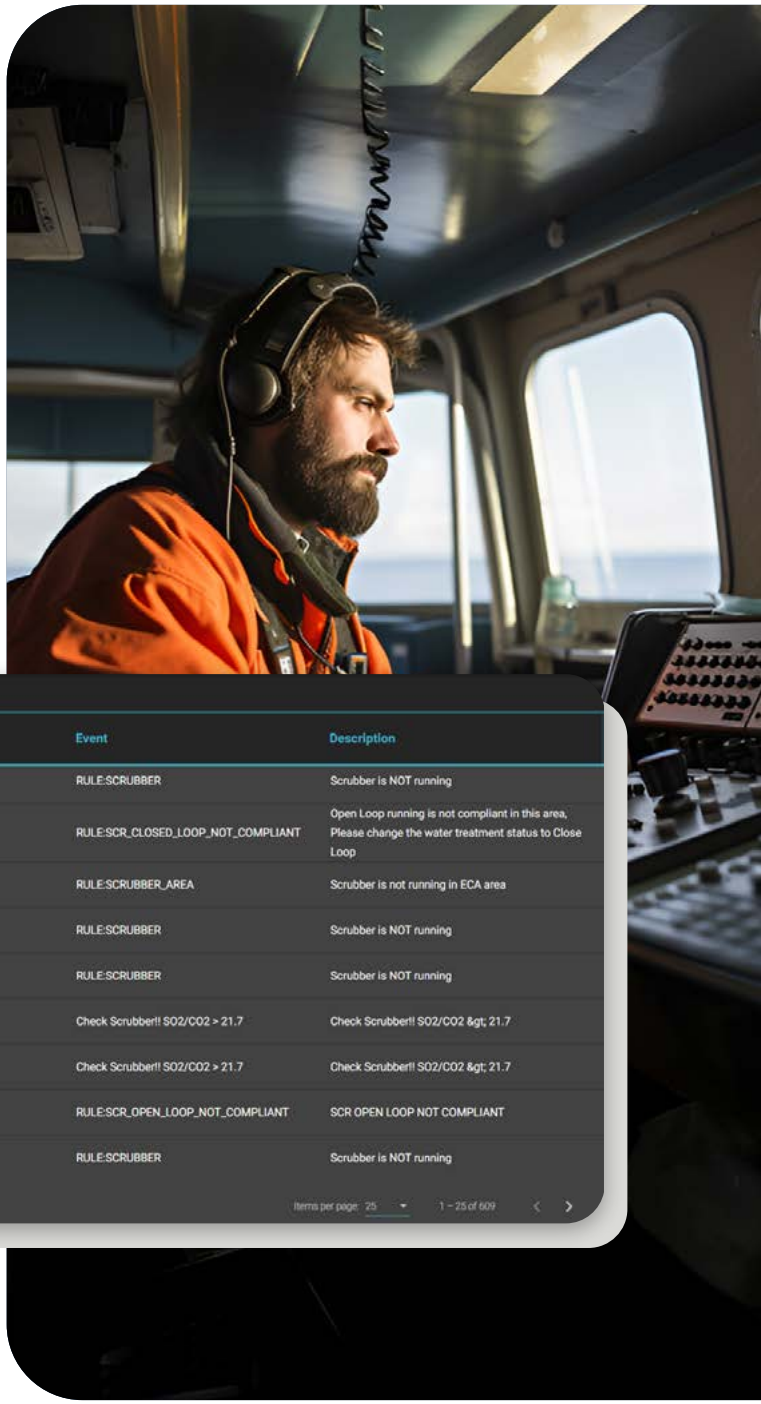


Improve performance with alerts

Alerting capabilities are vital in performance monitoring, identifying missing or implausible data, and aiding both onshore and onboard operators in improving vessel operations and regulatory compliance.

When an alert is generated, the system sends emails both onboard and ashore, warning you about critical situations.

Examples of alerts:



Alerts list | Filters enabled

Status	Severity	Last Receive	Name	Event	Description
	WARNING	an hour ago		RULE:SCRUBBER	Scrubber is NOT running
	CRITICAL	2 hours ago		RULE:SCR_CLOSED_LOOP_NOT_COMPLIANT	Open Loop running is not compliant in this area, Please change the water treatment status to Close Loop
	CRITICAL	2 hours ago		RULE:SCRUBBER_AREA	Scrubber is not running in ECA area
	WARNING	2 hours ago		RULE:SCRUBBER	Scrubber is NOT running
	WARNING	2 hours ago		RULE:SCRUBBER	Scrubber is NOT running
	CRITICAL	2 hours ago		Check Scrubber!! SO2/CO2 > 21.7	Check Scrubber!! SO2/CO2 > 21.7
	CRITICAL	3 hours ago		Check Scrubber!! SO2/CO2 > 21.7	Check Scrubber!! SO2/CO2 > 21.7
	CRITICAL	3 hours ago		RULE:SCR_OPEN_LOOP_NOT_COMPLIANT	SCR OPEN LOOP NOT COMPLIANT
	WARNING	4 hours ago		RULE:SCRUBBER	Scrubber is NOT running

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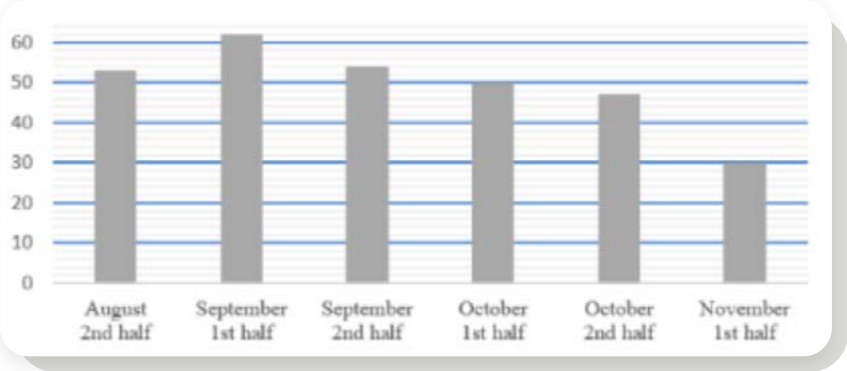
DG MCR alerts

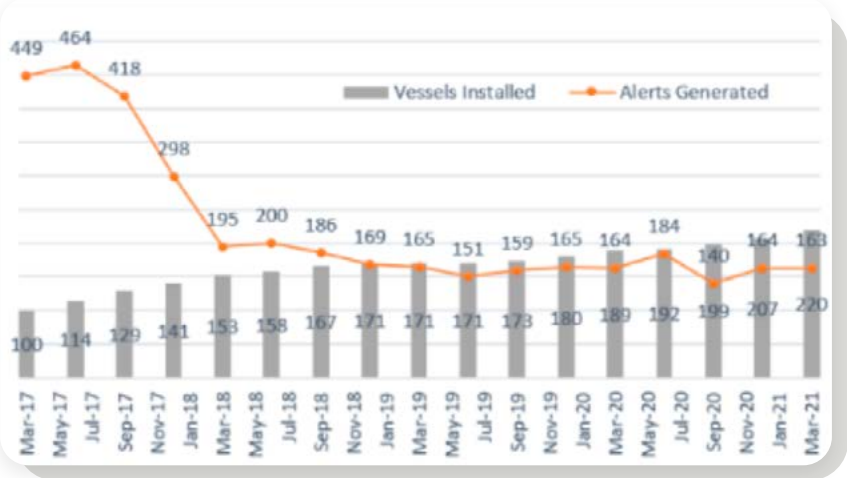
Crews tend to run extra Diesel Generators (DG) at low Maximum Continuous Rating (MCR) for safety, resulting in unnecessary fuel consumption. The alerting system improved onboard practices by monitoring and correcting inefficient DG usage.

This alert, detecting DGs and their MCR, was implemented in two companies, with positive outcomes: fewer alerts over time in the first case, and stable alerts despite increasing installations in the second.

Alerts do not only allow to promptly react to an event but have proven useful to create good habits onboard and to be a successful tool to enforce company procedures.



DG MCR usage alerts generated over time

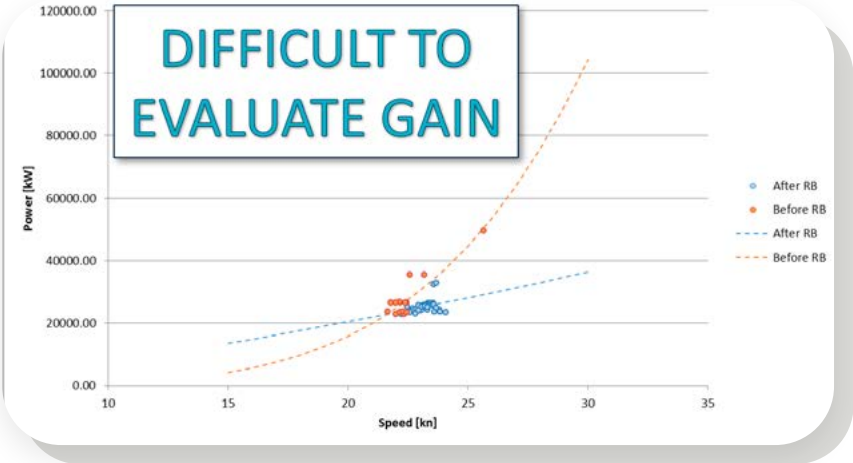


Vessels installed VS alerts generated

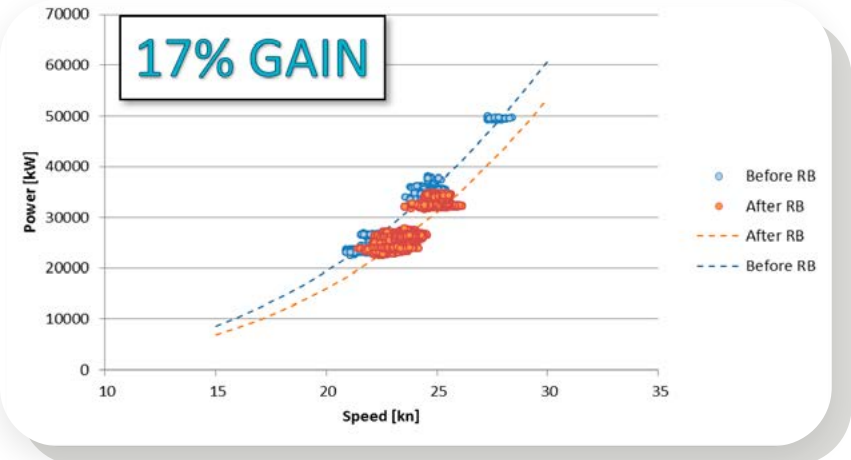
Work with automatic data acquisition

Traditionally, noon reporting relied on daily manual data input to collect vessel information across operations. However, evolving market conditions and new regulations are driving the adoption of automatic data logging systems on modern vessels.

With noon report data, assessing the retrofit's benefits seems impossible, whereas data collected automatically confirms overall improvement in hydrodynamic efficiency. Quantifying such improvements benefits your technical operations.



The first example represents the results of the analysis of a propeller change obtained on data collected manually.



The next example shows theresults on data automatically collected on board with a 17% gain.

Data-driven performance management

In the pursuit of decarbonization and enhanced fleet performance, effective data collection and analysis are essential.

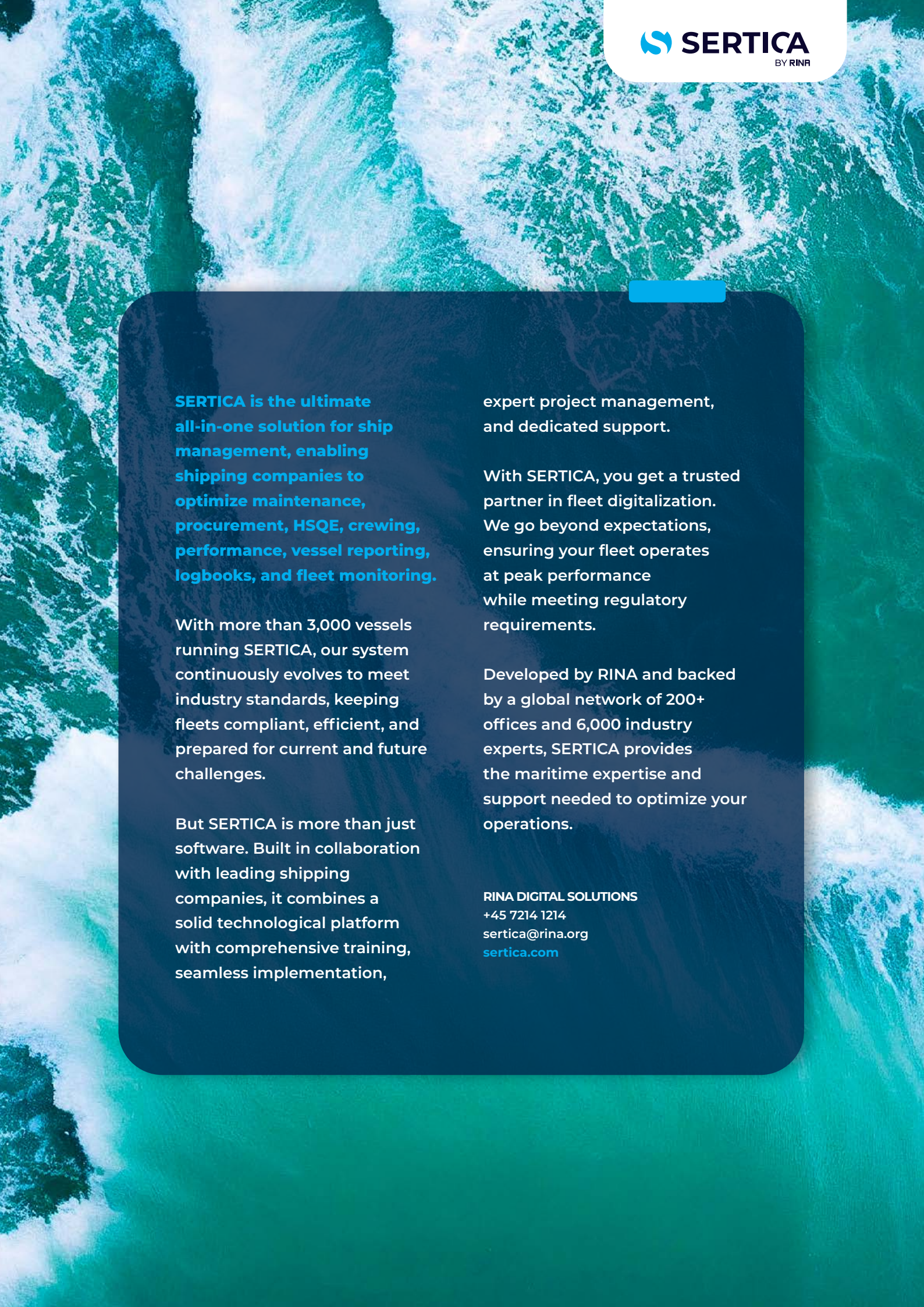
Shipowners and management companies face the challenge of reducing carbon emissions globally, making performance management and digitalization pivotal in achieving operational efficiency and regulatory compliance. Streamlined data collection, automatic data logging systems, and the integration of various data sources are vital components of this process.

In our quest for efficient, eco-friendly maritime operations, there are key data categories we must focus on. However, it's not just about collecting data; it's about nurturing its quality through sensor maintenance and calibration.

Moreover, we must recognize that real-time monitoring, performance alerts, and collaboration between stakeholders are the wind in the sails of operational optimization and cost-saving.

SERTICA Performance offers a comprehensive solution to elevate maritime operations by optimizing vessel performance and boosting fuel efficiency and enhancing environmental sustainability.

As a part of our marine consultancy services, we offer comprehensive CII and MRV/ETS consulting services to assist shipowners and management companies in their decarbonization efforts. Our services include value calculations, operational profile evaluations, and tailored solutions in compliance with the latest IMO requirements and fleet performance enhancement.



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SERTICA is the ultimate all-in-one solution for ship management, enabling shipping companies to optimize maintenance, procurement, HSQE, crewing, performance, vessel reporting, logbooks, and fleet monitoring.

With more than 3,000 vessels running SERTICA, our system continuously evolves to meet industry standards, keeping fleets compliant, efficient, and prepared for current and future challenges.

But SERTICA is more than just software. Built in collaboration with leading shipping companies, it combines a solid technological platform with comprehensive training, seamless implementation, expert project management, and dedicated support.

With SERTICA, you get a trusted partner in fleet digitalization. We go beyond expectations, ensuring your fleet operates at peak performance while meeting regulatory requirements.

Developed by RINA and backed by a global network of 200+ offices and 6,000 industry experts, SERTICA provides the maritime expertise and support needed to optimize your operations.

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