

SMARTER CONNECTIONS

Towards environmental compliance with the next generation of onboard decision support

ABB’s decision support software provides a common platform integrating ship data within a tool providing real-time decision support.

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By utilising a single interface, the technology supports ship officers and engineers in making proactive safety and efficiency decisions, resulting in immediate benefits. On shore, details about the impact of external factors, such as weather against the loading computer parameters and propulsion data, allow staff to assess the safety and full cost of future charters, as well as providing suitable route options and delivery dates. Historic voyage data can also contribute to raising efficiency across a whole fleet through intelligent analytics.

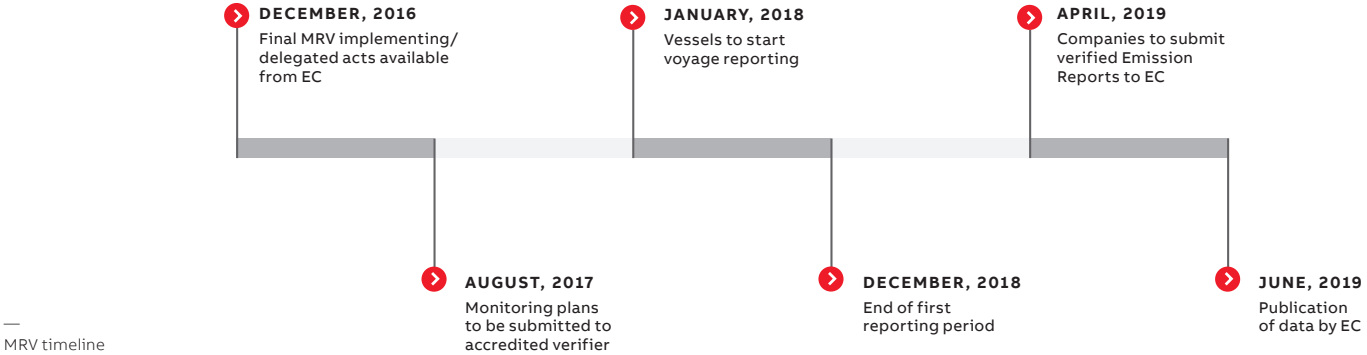
On the same platform users can access a range of information including data about vessel trim, bunker transfer, fuel consumption, power plant optimisation, electricity use, speed advice, propulsion power analysis and hull cleanliness.

The ABB MRV option
ABB’s latest generation software tool is a full suite of advisory vessel management software that is currently installed on over 450 ships. It is the maritime industry’s most extensive suite of onboard digital decision-making tools, using the data generated by sensors and other inputs to feed analysis and enhance planning, routing and the decision-making to optimise vessel performance. Inputs include external information, such as weather or cargo load parameters, whose impact can be combined with propulsion and other sys-

tems information to yield optimal advice. By collecting data in real time, including variations in speed, draft, water depth, wind and waves, the complete package harmonises an unmatched range of datasets to support optimised decision-making for greatest net vessel efficiency.

By August 31st, 2017, shipowners must be approved by an accredited verifier as having plans in place to monitor and report their carbon emissions. From the European perspective, the MRV (Monitoring, Reporting and Verification) is the regulatory response to an industry whose current contribution to GHGs is not otherwise mediated through an Emissions Trading Scheme (ETS) or the so-called Effort Sharing Decision on CO2.

In April 2017, ABB received certification from EU-accredited verifier Verifavia covering its MRV module. This new software module within ABB’s digital suite has been developed to help owners meet MRV requirements under EU regulation 2015/757. ABB’s MRV software relieves shipowners of the burden of preparing fuel monitoring, reporting and verification plans, offering an integrated software solution that enables input of fleet wide ‘per-voyage’ fuel consumption and CO2 emissions collection. The system incorporates a tool to deliver an annual emission report, as required within the MRV regulation.



ABB’s MRV technology has been structured as ‘user-proof’, with windows and prompts designed in a logical way to avoid reporting errors. It transforms the monitoring/reporting task into a straightforward data inputting procedure lasting minutes at the beginning of the voyage, with a similarly simple checking out routine at its conclusion.

Open-ended system
In 2017, shipping remains in a negative phase; analytics, and by extension management software, have been identified as keys tools in realising cost savings. Whether by obligation or not, a newly formalised or modernised fuel consumption monitoring and reporting procedure should be seen by owners as an opportunity to keep track of one of their key costs. Put another way, despite the looming MRV deadline, rather than feeling under pressure to choose off-the-shelf software quickly to comply, solutions should be considered for their ability to perform as a building block for greater ship efficiency.

ABB’s MRV software is notable both for its standalone functionality that has been certified to ensure compliance, but also for its potential to be integrated into the wider vessel management software from ABB.

Every shipowner must meet the same conditions to comply with MRV, but it is also fair to point out that each will set out from a different starting point. ABB’s digital application is completely scalable, meaning that owners can make an initial installation to cover fuel monitoring without compromising potential to add modules that cover other functionality.

Selecting ABB’s MRV application means that a company is immediately compliant. Furthermore, with no obligation, the customer’s path to a full vessel management package that can optimise trim, bunker transfer, fuel consumption, power plant, electricity use, routing and speed advice, propulsion power analysis, and hull cleanliness remains open.

ABB suggests that, in being tailored to individual vessels and taking account of conditions such as the wind, currents and swell and their effects on a ship’s behavior, one ‘good’ routing decision taken using ABB’s digital application could pay for itself in fuel savings.

Other outputs
Crucially, users can select the scale they want, based on different parts of the full functionality palette. Looking beyond the MRV software for example, Torvald Klaveness recently installed a SEEMP-compliant digital management solution to measure and display fuel consumption and torque. These Key Performance Indicators are shown in real time to the operating crew and are available for analysis onshore using ABB’s fleet portal. In addition, the fleet management tool uses historical data to create benchmarks for future performance, working in combination with a new Torvald Klaveness special operations center using ABB’s digital application to monitor ship performance.

Looked at more generically, ABB’s Energy Management System is a decision-support tool to minimise the overall energy costs for individual vessels and whole fleets. It compares and analyzes historical and operational data, then

calculates and advises on improvements using easy-to-understand displays.

Ultimately, ABB’s digital application can combine wave measurements, weather forecasts, and navigation data like speed, course, RPM and the voyage plan, with ship characteristics, loading conditions, and motion sensor measurements. This facilitates continuous monitoring as well as forecasting of the ship responses and performance. As a result, the system makes the main tasks of the officer on watch easier, supporting safe and economic navigation, damage avoidance and route planning. ABB’s digital application also acts as a hub for vessel data that can improve efficiency across a whole fleet.

Software outreach

Overall, ABB’s experience is that when an owner makes an initial commitment to its digital application for specific reasons, far-reaching adoption of the software follows. When that happens, owners reap the full benefits, as their ships skirt adverse conditions and arrive on-time at optimum cost, with their cargoes delivered safely and in good condition.

In fact, the modular nature of the software suite has proved to be one of its most compelling appeals.

Part of the suite is a state-of- the-art modular ship motion monitoring and decision support system, with around 80-90% of the heavylift ships in the world now including ABB’s maritime software onboard. The software responds to the hydrodynamic properties of the vessel, its loading parameters and the ship’s onboard weather forecasting to create a polar chart that maps the safest and most efficient voyage route, allowing ship’s officers to update course or speed decisions continuously during the passage.

When shipowners choose ABB’s digital application, they can also choose the modules most relevant to their operations. For example, an owner of an LNG carrier would plan routes to avoid in-tank sloshing, basing its decisions on the limits set by motion measurements and LNG storage tank sloshing modelling provided by cryogenic specialist Gaztransport & Technigaz (GTT).

Similarly, the system functionality designed to optimise trim is of particular use in ferry operations, while a cruise ship owner might want to monitor vessel motions using the parameters that best ensure passenger comfort.

Meanwhile, an offshore vessel owner might want to make precise predictions for dynamic positioning, with vessel motion parameters set to make the most of a safe time-window for weather-sensitive operations, in this case based on data drawn from thrusters plus the environmental and weather forecasting conditions that are integral to ABB’s digital application.

Initial interest from Maersk, meanwhile, focused on the use of ABB’s digital application as a support tool to avoid the type of weather that risked containers falling off ships. Today, 140 Maersk containerships use motion-monitoring, forecasting and decision-support software with SPOS Seakeeping plug-ins from weather forecasting specialist MeteoGroup to optimise routing.

A holistic approach to optimisation of ship operations

ABB believes that the MRV option offers a gateway, through which an off-the-shelf compliance tool with ABB’s fleet portal reporting can be the first step towards optimised vessel efficiency.

As one of the most active technology companies supporting sensor-based ship and marine equipment management, ABB sees advisory software as vital in the industry’s journey towards remote diagnostics, maintenance planning and performance monitoring. The complete suite provides seamless exchange of data, full integration of sensors, automation, ship software and cloud solutions, demonstrating ABB’s philosophy of ‘bridge to propeller’ thinking. It also sees shipping’s future as lying in greater connectivity and more automated processes supported by shore-based engineering and maintenance staff able to respond to data gathered from vessels and optimise fleet efficiency. But ABB never forgets that owners need to see these efficiencies at the level of the single vessel, as well as fleet-wide. Maritime software is a critical component in ABB’s strategy to combine platforms into a single interface, leverage the Internet of Things, Services

and People (IoTSP), and support the real-time decision-making by engineers and ships officers that enable safer and more efficient ships. For owners, bringing external factors such as weather into the decision-making process that considers vessel loading computer parameters and propulsion data allows shore staff to assess the safety and full cost of future charters, as well routing options and delivery dates. Historic voyage data can also feed the analytics software that raises efficiency across a whole fleet, or at the individual ship level.

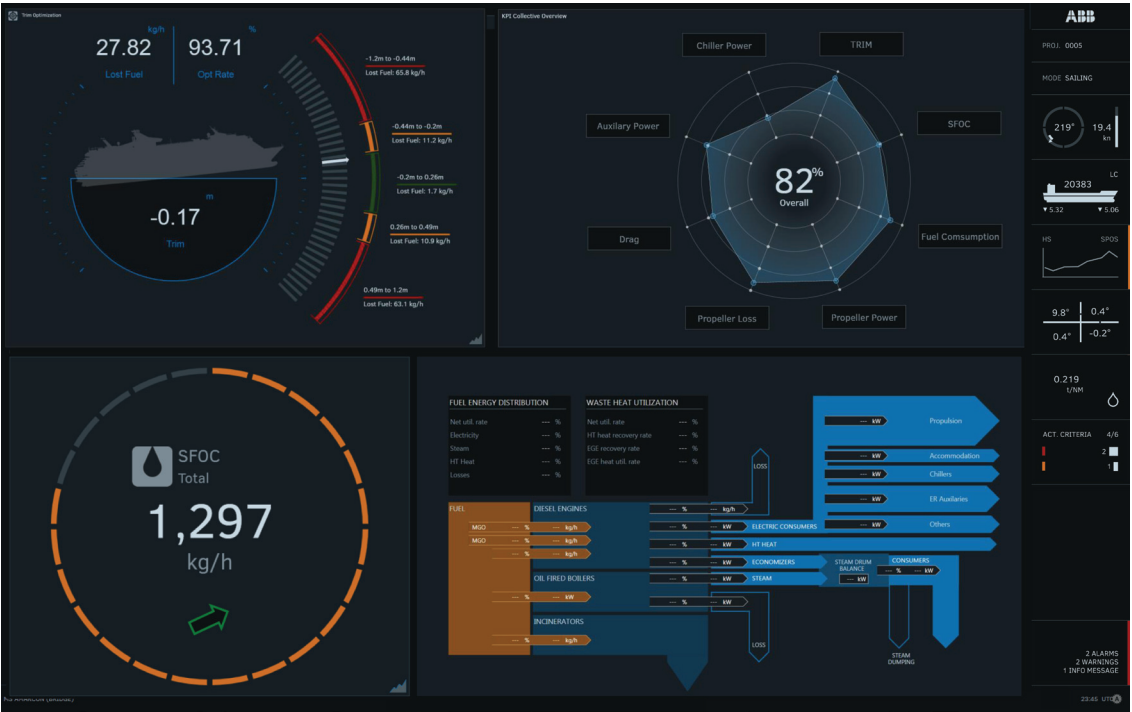
Increasingly, better connectivity between ship and shore means that monitoring and maintenance, and even operational decision-making can be coordinated in real-time. ABB has invested heavily in shoreside expertise, analytics firepower and engineering availability to provide 24/7 support from Remote Operations Centers that support troubleshooting, maintenance planning, benchmarking, and interventions based on predictive diagnostics.

At group level, ABB frames its solutions to digitalise the maritime industry within ABB Ability™,

supporting fleet-wide intelligence gathering to reduce costs and an owner’s environmental footprint. As a technology developer, ABB is also continuously improving its offer, as witnessed by the newly-launched Torductor torque measurement system, which uses contactless sensors facing the propeller shaft to send information to the digital onboard application.

But the group also never forgets that the journey towards all of these things can start with a single ship. Tallink Megastar, for example, is one of the most advanced ferries in the world, operating on the Helsinki – Tallinn route. The 212.2 m long ship carries about 2,800 passengers and is the shipping company’s first ship operating on liquefied natural gas (LNG).

ABB has supplied the power production, electric propulsion and energy management system on board, and offers support to the vessel from its Helsinki Remote Operations center. Tallink Megastar also benefits from vessel management software from ABB, which is being used to monitor the use of energy in the entire ship in real time, focusing specifically on fuel consumption.



OCTOPUS-8 modules