PERFORMANCE MONITORING FOR SHORT SEA SHIPPING

VESOPS REPORT DMF-2025-1

S. V. HANSEN | VESOPS APS 01 JUNE 2025

BACKGROUND

- From 2025, the EU MRV system was expanded to also include smaller ships sailing in and to/from the EU. Typically, these are ships that sail in coastal traffic and in a segment where there has not been a tradition for calculating and reporting emission figures from the ships.
- To make reporting from the ships easier, to ensure good data quality and to always have control over the ships' consumption, VesOPS has developed a performance system for the smaller shipping industry. By using this system, the user gets a system that meets all the requirements for the EU MRV reporting and can be used in the future for decision support to optimize the operation of a ship.
- The VesOPS system will help in the process of making shipping more sustainable by identifying the energy-efficient ship operations and by assisting in making decisions that can improve an existing ship's energy efficiency. Furthermore, the VesOPS system structures the reporting for compliance and keeps track of all GHG emissions.
- The development work of the system is described in the following report.

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PROJECT DESCRIPTION

Project partners who want to join the development of the product have been identified. The partners operate smaller ships in short sea traffic, and the ships form a model for how the system should be built. A system for manual reporting of data and a system for automatic reporting of data directly from sensors has been established.

Data is sent to VesOPS databases, and the data quality is assessed based on a number of validation rules applicable to the individual ship. Data that is outside the quality criteria is identified in the system and a procedure for handling non-valid data is set up in the system.

Data sent to the system comes either from manual reporting from the ship's crew, directly from a data feed in the ship, or a combination of both. The advantage of a direct data feed is that the system is continuously updated and a "here and now" picture of the ship's operation is provided. For this purpose, a "plug & play" solution was developed for collecting sensor data from ships.

When data has passed the validation requirements, it is sent to the relevant reporting, e.g. to an EU MRV report, and since this happens continuously over a reporting year, the data found in the system is constantly processed and validated. This makes the annual reporting easier/faster to send to the official verifiers, and if a ship also needs to report to systems such as EU ETS and Fuel EU Maritime, this is constantly updated in the system.

Based on the reported data, a user interface is built that shows the data flow, which provides the required reporting and shows key figures for the ship's operations throughout the year. If several ships are in the system, they are displayed together in a benchmark system, where it is possible to rank the ships on their key figures and also set performance goals for the ships – i.e. goals for optimizing operations and reducing GHG emissions from the ships.

Data, reports and key figures can also be retrieved from the system by a regular download function and by using APIs for the system's database. Which means that the information is always available to internal and approved external users.

The system also meets the requirements for ESG reporting for the ship's owner and enters the reporting for scope 1, 2 and 3.

Figure 1 Plug and play data logging

PROJECT PARTNERS

VesOPS has been responsible for the project management and has also delivered a requirement specification in collaboration with the two operators who have delivered each ship into the project, where one reported manually and the other reported from a sensor system. A service supplier has set up the sensor system on board and a software development company has delivered development hours into the project. The partners involved is as described below.

Maritime Management

It is a technical management company that performs various services for ships that mainly sail in short sea shipping in Europe. The company is based in Leikanger, Norway, and has participated in the project as part of their development of their fleet management software to also include EU MRV reporting and to expand their services with handling of the entire approval process of data and reporting to the EU.

Svendborg Kommune

It is a municipality on South Funen, which, among other things, operates 2 ferries to the smaller islands around Svendborg. One of the ferries has been part of the development project and has delivered data directly via sensors to the software system.

Init

Provides services to the maritime sector in automation, digitalization and IT infrastructure. Has participated in the project with setting up data logging from the ferry in Svendborg.

Navissoft

Delivers software development to the maritime sector and has been responsible for and led the development work of the software that has been part of the project.

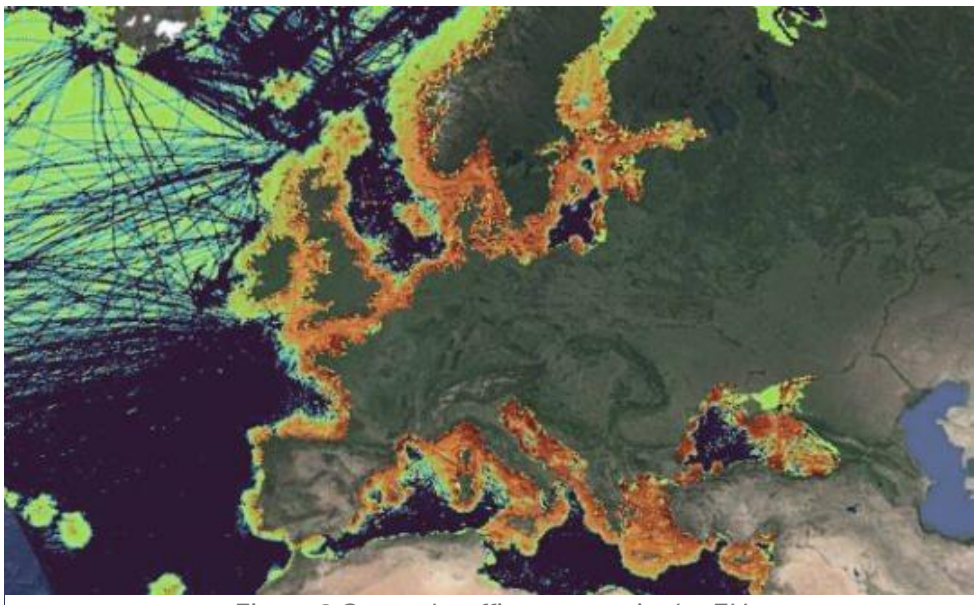
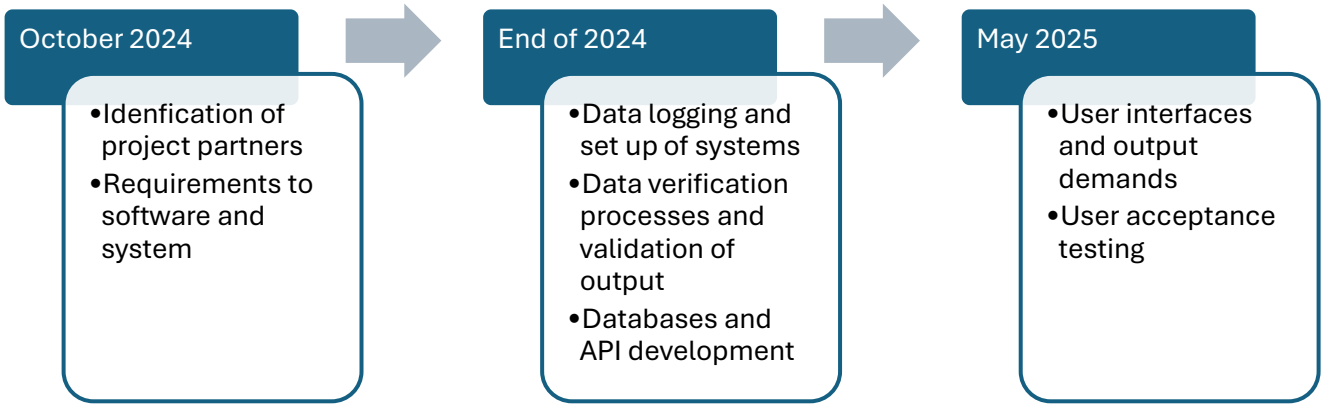


Figure 2 Coastal traffic patterns in the EU

PROJECT PROGRESS

The project has been running for 7 months in the period 2024 - 2025. The following elements have been part of the project process:



Along the way, meetings have been held with stakeholders in the process and the project plan has been continuously updated according to the conditions that were possible.

PROJECT RESULTS

A system for performance monitoring has been developed for short sea shipping. The system collects data so that the ships are able to report emission data to the EU MRV system. Data is collected from manual reporting or directly from sensors in the ship. A principal sketch of the system is shown in the figure below.

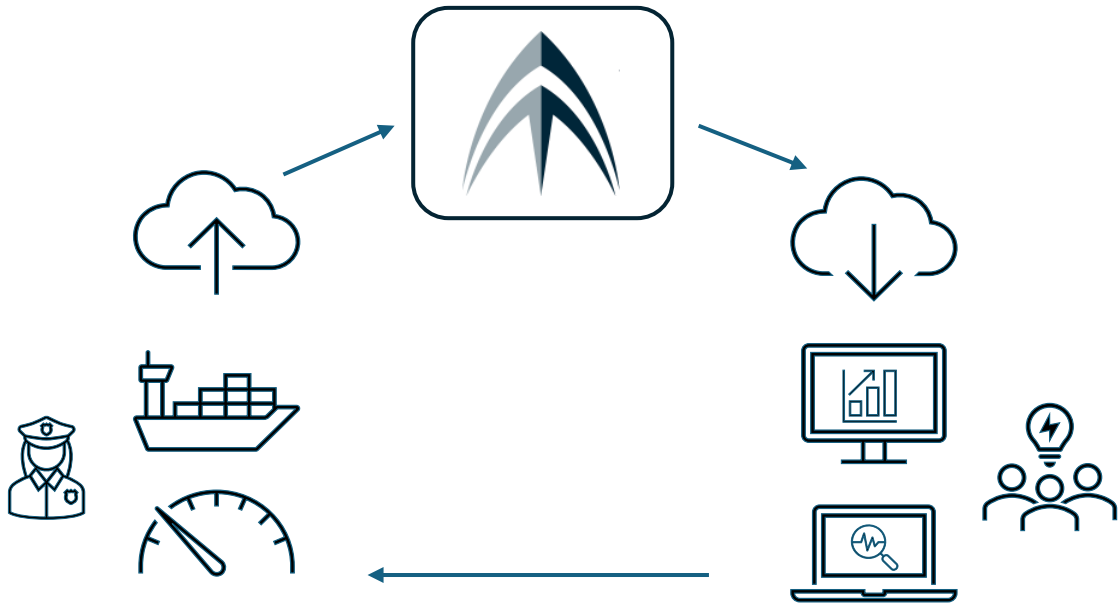


Figure 3 VesOPS system overview

Data is sent to the VesOPS databases and the data quality is assessed based on a number of validation rules applicable to the individual ship. Data that is outside the quality criteria is identified in the system and a procedure for handling non-valid data is set up in the system.

Valid data is assessed based on the individual ship and the way it is operated. The validation model is therefore not always the same for all ships, as they can be different in design and they can be operated differently. This is assessed when the ship is set up in the system and adjusted accordingly.

Data sent to the system comes either from manual reporting from the ship's crew, directly from a data feed in the ship, or a combination of both. The advantage of a direct data feed is that the system is continuously updated and a "here and now" picture of the ship's operation is provided. For this purpose, a "plug & play" solution was developed for collecting sensor data from ships. The solution is connected to the relevant sensors that provide the data necessary for reporting and for evaluating the ships' performance. Examples can be speed and distance from GPS and speedlog as well as fuel consumption on engines from flow meters.

As the ships sail close to the coast, the advantage of having a continuous data connection the shore is used in the data transfer. This is set up to work on a mobile network, making the system cost-effective and reliable. In cases where the data connection should fail, data is collected in the ship and sent to shore when the connection is restored.

When data has passed the validation requirements, it is sent to the relevant reporting, e.g. to an EU MRV report, and since this happens continuously over a reporting year, the data found in the system is constantly processed and validated. This makes the annual reporting easier/faster to send to the official verifiers, and if a ship also needs to report to systems such as EU ETS and Fuel EU Maritime, this is constantly updated in the system. Thus, the system may also be relevant for cargo owners or charterers, as they must settle and agree with the shipping company for the cost of the emitted CO2 from the ship.

Based on the reported data, a user interface has been built up that shows the data flow, which provides the reporting required and shows key figures for the ship's operations throughout the year. If several ships are in the system, they are displayed together in a benchmark system, where itis possible to rank the ships on their key figures and also set performance goals for the ships – i.e. goals for optimizing operations and reducing GHG emissions from the ships.

Data, reports and key figures can also be retrieved from the system by a regular download function and by using APIs for the system's database. Which means that the information is always available to internal and approved external users. This connection is especially useful for classification societies or other official verifiers, as they must approve the validity of data before it is sent to the EU and they thus have access to data through an API at all times.

Once data has been collected and verified, there are many options in how this data can be further used for the shipping company. The following examples are possible from the system:

- ESG reporting for the ship's owner and the cargo owner. Consumption figures and emission sources are included in the reporting for scope 1, 2 and 3.
- Performance evaluation on KPIs such as CII, EEOI, Compliance Balance and trajectories for commercial systems.
- Technical performance status of hull, propellers and engine systems
- Commercial performance against contracts with cargo owners

By having valid data available, it is possible to use the system as decision support for further reductions of GHG emissions as well as for improvements in the ship's operations.

MARKET POTENTIAL AND FURTHER DEVELOPMENT

The EU has a strategic interest in ensuring the transport of freight by short sea traffic. Short sea transport is part of the EU's policy to reduce GHG emissions from transport in the EU by 60% by 2030 and to shift 30% of the transport of goods by land over 300km to other modes of transport.

One challenge is to ensure that facilities are available for this change, that the transport takes place in the most energy-efficient way and that it has the lowest GHG emissions.

Short sea shipping accounts for over 56% (in 2023) of the transport of goods within the EU, and much of the cargo transport is carried by the smaller ships in short sea traffic.

To date, short sea shipping has not been in focus in connection with the emission measures that the EU has taken for larger ships, and there is an expectation that the emission requirements for short sea shipping will increase. The first step has been a requirement for reporting of emission data (EU MRV) from certain smaller ships from 2025 and it is expected that this will be expanded in the coming years. Furthermore, it is expected that once the reporting is in place, the short sea shipping will become part of the EU ETS and the Fuel EU Maritime system as well.

The ships that sail in the local shipping industry have a high average age and have not been used to being part of an emission reporting system. By shifting the focus to fuel consumption and thus GHG emissions, the ships will be better prepared and equipped to perform better in the market. By setting up a VesOPS system, they will gain clarity on their emissions and operations and owners will more easily be able to make decisions that can optimize operations in a longer perspective.

Worldwide, there is an expectation that the IMO will introduce a emissions tax system (from the latest MEPC 83), which may be similar to the one found in the Fuel EU Maritime system, where a shipowner pays a GHG emission tax, depending on how much is emitted from the ship. This will make it even more important to have an overview of a ship's emissions no matter the operating area and choosing a system like the VesOPS system will help in keeping track of this.

The system that VesOPS has developed will be further developed in the future. By continuously accumulating data in the system, much of the validation that is now done during an assessment in the system setup can be data-driven. In the current system, data management techniques such as Machine Learning are already in use, and in the future, this will be expanded to include AI-generated data processing. There is an expectation that it will make the system more accurate, faster in responding and safer in also being able to simulate different scenarios for a ship. Thus, by using the VesOPS system, it is possible to make long-term strategic decisions with greater accuracy.