



# VISWA ENERGY EFFICIENCY MANAGEMENT SYSTEM

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# VEEMS

*A Data Driven Energy Efficiency Augmentation Tool*

Meets with **SEEMP** of MEPC 62 (IMO)  
Meets with **IMO** MEPC.1 Circ 684, EEOI.  
European Union (**EU**) regulation 2015/757  
**MRV** Reporting.

# VEEMS

## VISWA ENERGY EFFICIENCY MANAGEMENT SYSTEM

### **Introduction:**

From 1 January 2013, the shipping industry has to comply with IMO regulations covering the Ship Energy Efficiency Management Plan (**SEEMP**). The Shipping Industry is under extreme pressure to reduce its carbon footprint and operational costs. Ship operators face a great challenge to sustain and remain in the business while meeting both the regulatory requirements and the commercial pressures. There is a 'paradigm shift' in the way the charterers select ships for carrying the cargo. It is not only based on safe and timely transportation, but also on operational efficiency and carbon footprint.

EU has regulated that every vessel plying European waters must monitor and report the verified amount of CO<sub>2</sub> emitted by their vessels on voyages to, from and between EU ports. By Aug 30, 2017, ships must submit a Monitoring plan to an accredited MRV verifier. From Jan 1, 2018, the collected data must be submitted to the verifier. The objective of this regulation, known as the MRV regulation, is to gain a better understanding of fuel consumption and CO<sub>2</sub> emissions from shipping activities within Europe and could be used to inform any future greenhouse gas reduction initiatives.

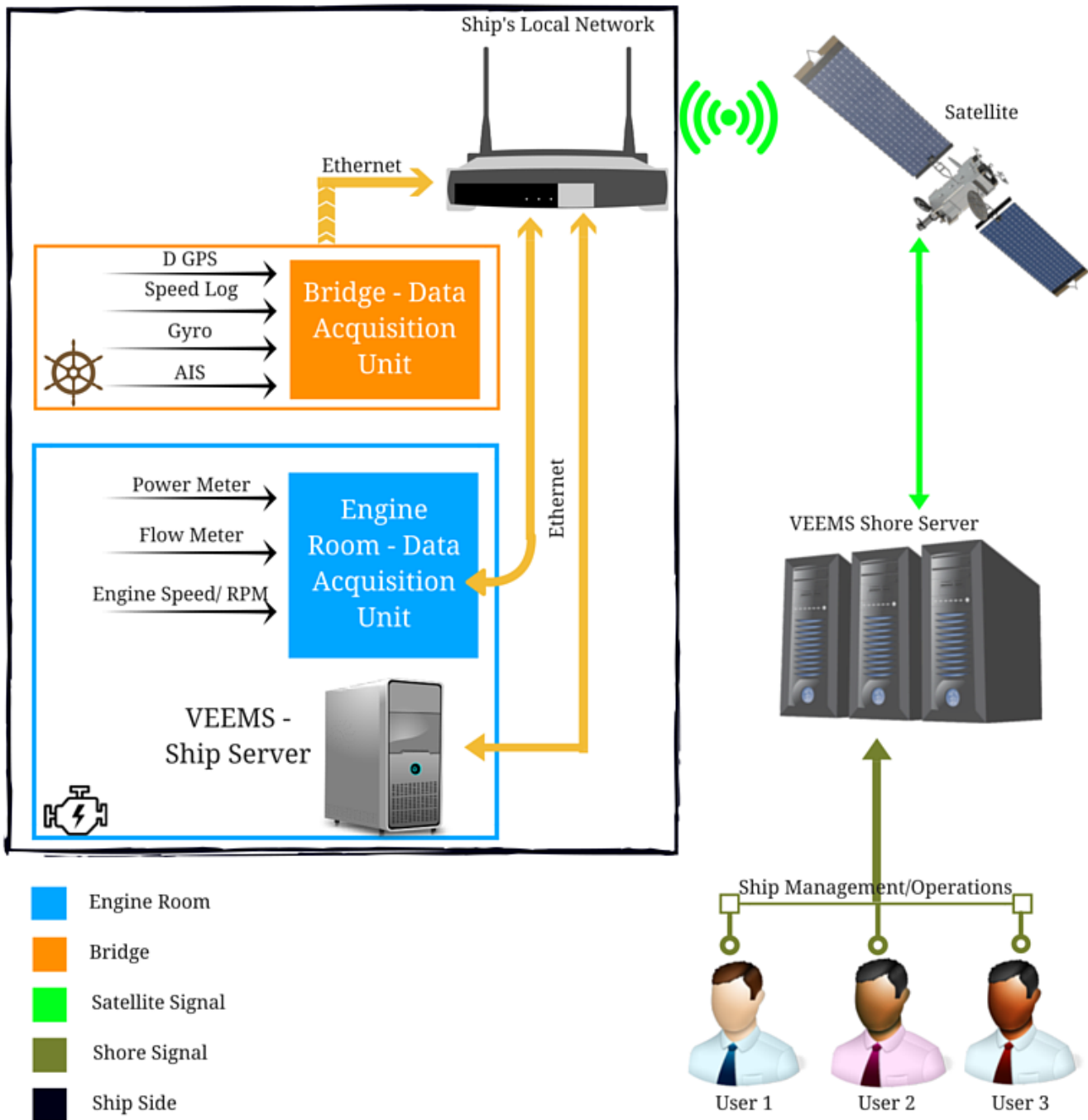
**Viswalab** is proud to announce that VEEMS (Viswa Energy Efficiency Management System) has been certified by **Verifiavia** to provide an automated onboard system which will meet the requirements of EU MRV as an ICT (Information and communication technology) system.

The first step which poses a challenge for a ship to become energy efficient is the Quality of data from the ship. More than 90% of the ships still rely on Noon reports, a discrete data, which in most cases is a manual data entry. This invites a possibility of human error and thus the quality of data degrades. Further such manual noon report data is not a dynamic capture of the current variations in the ship but is an average of the past day. When such data is made available to the technical management at shore, even with the state-of-the-art Information and Communication Technology (ICT) devices, it becomes a nugatory analysis.

VEEMS is a simple, flexible, cost-effective, data-driven energy efficiency augmentation tool to assist the Ship Operator in reaching maximum energy efficiency while at the same time meeting the regulatory requirements. The VEEMS onboard server captures data every 6 minutes and this data is collected and presented in a user-friendly dashboard to the ship staff who can use it to take corrective action. VEEMS Office allows the shore management to get an almost instantaneous overview of the fleet and the system is designed to highlight essential data which affects vessels' energy and operational efficiency. The majority of the features are automated with clear transparency and seamless connectivity between ships which are thousands of miles away from the shore management offices. VEEMS is completely flexible and customizable to match the energy monitoring needs of every ship in the fleet.

# VEEMS

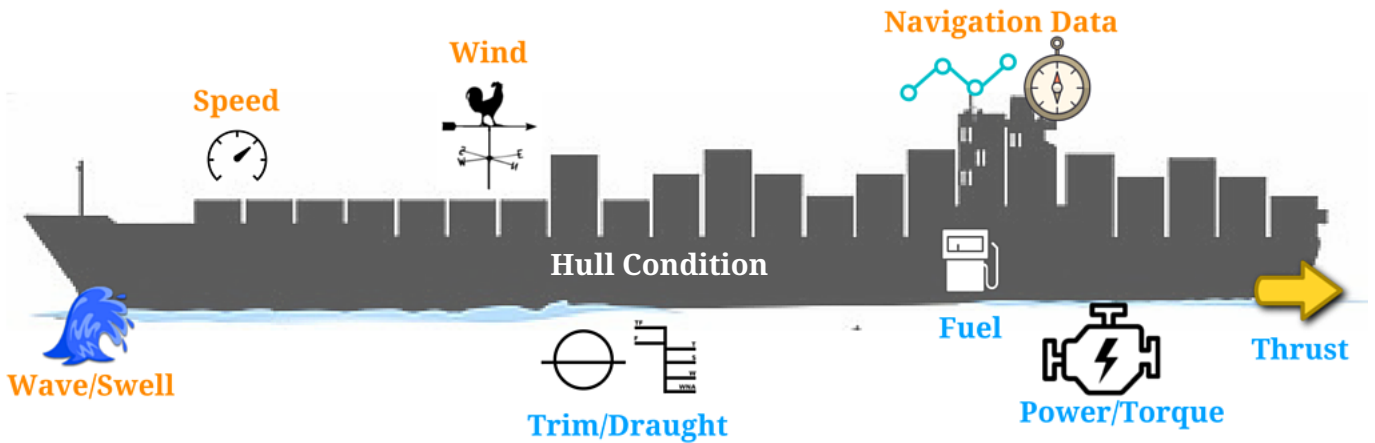
## ARCHITECTURE



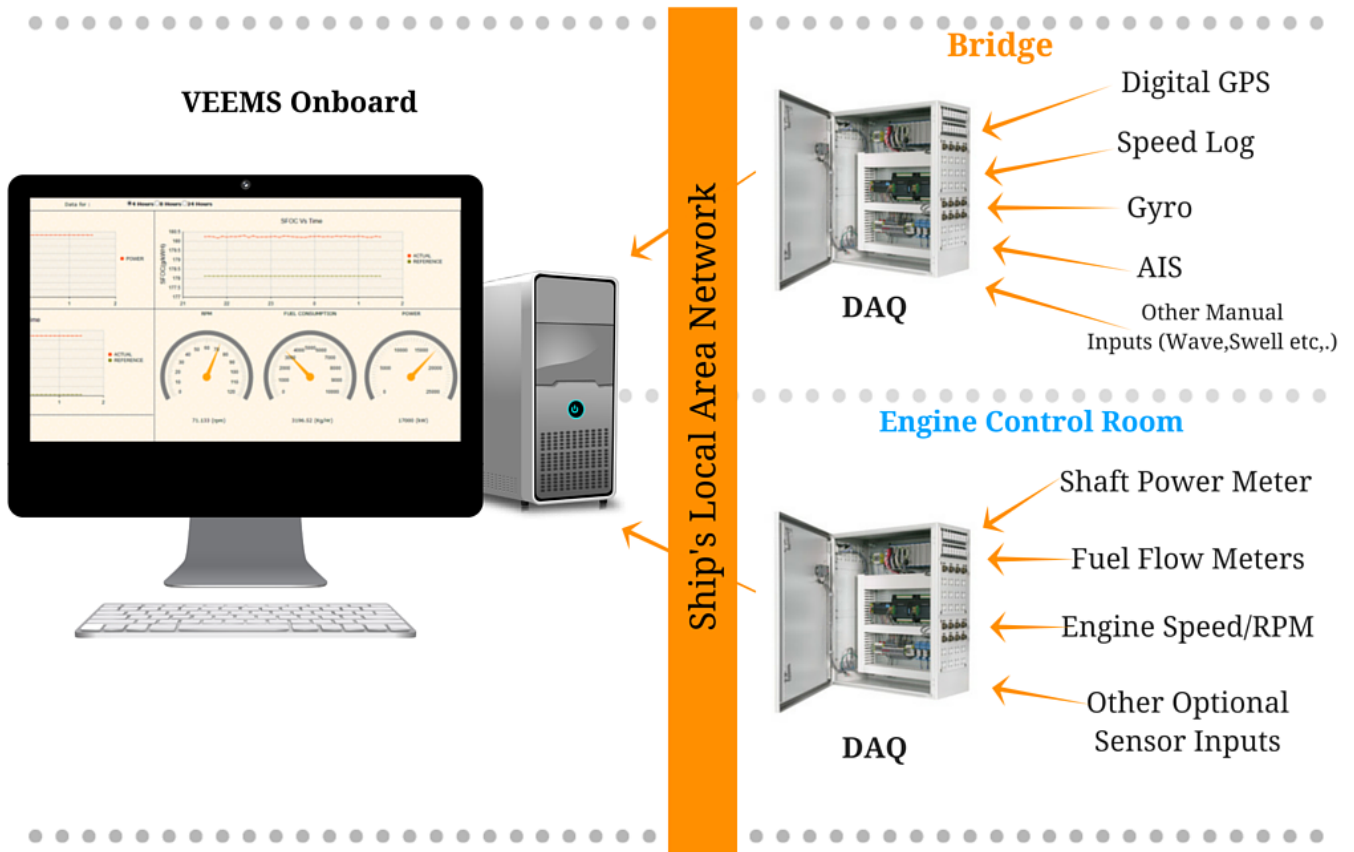
# VEEMS

## SHIP DATA RECORDERS

### VEEMS - Overview



### Data Acquisition System



# VEEMS - FEATURES

VEEMS - **Onboard** & **Office**  
- A Seamless Collaboration Between **Ship Operations** and **Shore Management**



## Fuel Management:

**1 - 2% Savings**

'VEEMS onboard' allows a multi-level approach to measure, monitor, and report fuel usage onboard, with the goals of reducing fuel consumption, increasing operational efficiency, and improving fleet management oversight. 'VEEMS onboard' offers complete transparency, inventory, and visibility of the use of resources which are key for every company. It provides an up-to-date remaining-on-board (ROB) status with accurate reporting of fuel consumption, and records discrepancies between reported fuel additions and measured fuel consumption. It can automatically pull out Fuel quality test results if the vessel tests fuel with Viswa Lab.

## Reporting & Data Management:

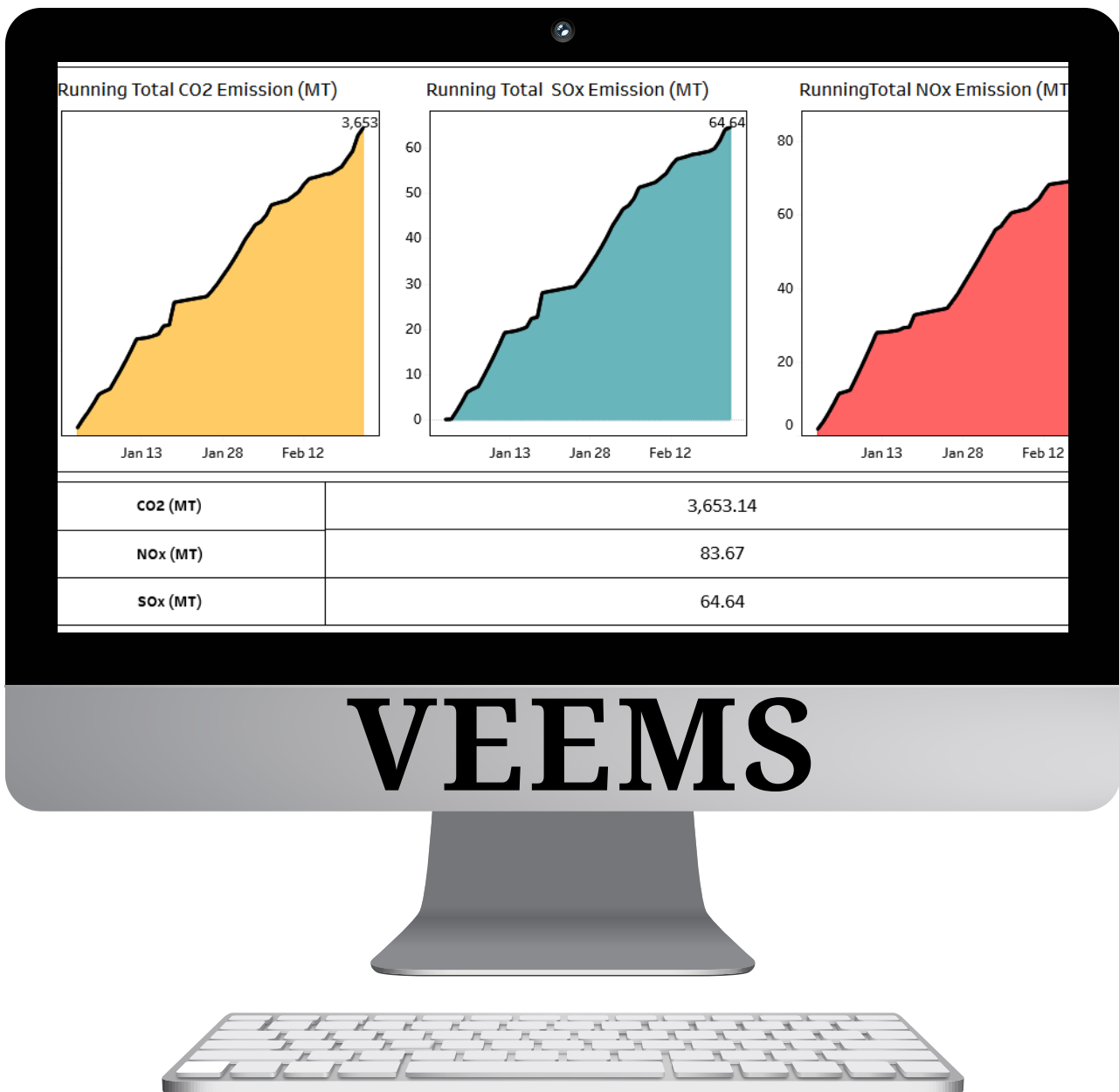
'VEEMS Onboard & Office' aims at reducing manual inputs and limits the inevitable errors while creating reports. 'VEEMS Onboard' makes it possible to create flexible, user-friendly, and technically advanced reports depending upon various states of a ship. The reports generated are automated with few or almost no manual input (depending upon the ship type) with no possibility of altering the data captured. These reports can be sent to the 'VEEMS Office' for the shore technical team to analyze and advise the ship. Data management includes powerful analysis tools for graphically trending and comparing real-time operational values over a period of time, which will assist the crew in locating focus areas for improving energy efficiency and for saving fuel.



## Engine Operational Efficiency:

**1% Saving**

VEEMS allows for monitoring the efficiency of main propulsion plant against fuel consumed, as well as the overall efficiency of the propulsion plant and associated auxiliary machinery. This helps in improving the efficiency of electrical power production and consumption by managing generator loads and reducing unnecessary use of electricity. Using device-level monitoring, VEEMS can reduce energy waste by identifying inefficiencies in real time. Devices that are taxing the vessels' fuel expenditure can be pinpointed and corrected.



## **FLEET PERFORMANCE AT YOUR FINGERTIPS:**

VEEMS Office has been developed to assist Ship Operators in maximizing onboard energy efficiency. It serves as an efficient and easy-to-use platform for monitoring Fleet information and facilitates seamless collaboration between ship & shore. Every report from VEEMS Onboard is reflected in VEEMS office, enabling the Ship Operator to have an overview of the vessel's fuel use, performance, and emissions in a simple and powerful dashboard. Performance monitoring tools have been in use for many years to collect the data for ship owners and operators. With VEEMS, the data captured is made more meaningful and usable information for both shore-based offices and vessel crews to manage vessels in real time and take fuel-saving decisions.

# VEEMS - FEATURES

VEEMS - **Onboard** & **Office**  
- A Seamless Collaboration Between **Ship Operations** and  
**Shore Management**

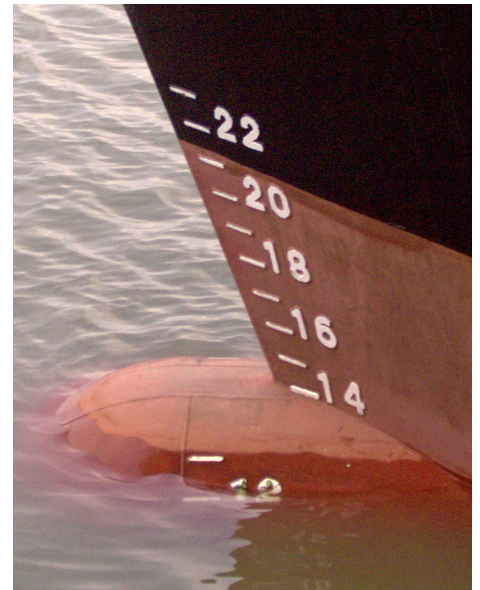


## Voyage Optimization: **6 - 12% savings**

An energy efficient voyage can bring significant savings in fuel costs. 'VEEMS Onboard' identifies speed profiles that result in minimized voyage costs for given routes and ETAs, making voyage planning simpler and the voyage more economical. This helps to cut down on Fuel consumption, voyage costs and emissions. The data gathered can be used by the ship and shore staff to decide on the most efficient speed and route for the voyage. An additional feature offered by VEEMS is trained and experienced Captains who can assist with the routing from the shore. Optimal voyage planning can easily lead to fuel-saving as much as 12% or more.

## Trim Optimization: **2 - 3% Savings**

A vessel's fuel consumption is significantly impacted by its day-to-day trim condition and thus optimum trim is highly desirable. Trim and draft optimization have for many years been known as a way to optimize the fuel efficiency of a vessel. However, there has been no simple and straightforward tool to enable a vessel to optimize its trim. Thus, VEEMS enables every ship staff to monitor parameters and thus take a decision such that a trim is chosen which yields considerable savings in fuel consumption.



## Hull & Propeller: **2 - 4% Savings**

VEEMS provides an easy interface to calculate the ship's added resistance over time and provide valuable in service performance analysis. VEEMS Onboard - 'Hull & Propeller Monitoring' provides exact figures for changes in ship resistance, and its impact on speed/power, before and after dry docking, and before and after hull and propeller cleanings. The before-and-after effects of propeller polishing techniques and new hull cleaning technologies are also quantified. With volatile fuel prices, demands to reduce emissions, the advent of environmentally-friendly hull coatings and new hull cleaning technologies, VEEMS Onboard can result in significant cost saving. Determining the cause of speed losses, for example, hull fouling, weather, and sea currents are part and parcel of VEEMS Onboard.

# VEEMS - Report Types



**Anchor/Drifting Report**



**Bunker Report**



**Sea Report**



**Harbor Report**



**Engine Performance Report**



**Stock/ROB Report**



**Off-Service Report**



**EU MRV Report**

&

**IMO Mandatory Fuel Consumption Reporting**

## MRV Annual Report -2016

Ship Name

TestShip

Select Year

2016

HFO (MT)	HFO Emission Factor	LFO (MT)	LFO Emission Factor	MDO (MT)	MDO Emission Factor	Fuel Consumption by Method A	Fuel Consumption by Method B
421.571	3.114	16.283	3.151	10.463	3.206		

**Total CO2 Emitted (MT)**  
Within the scope of EU MRV regulation

1,397.624

**Total CO2 Emitted (MT)**  
Voyages departed from EU ports

485.933

**Total CO2 Emitted (MT)**  
Voyages between EU ports

674.086

**Total CO2 Emitted (MT)**  
Voyages to EU ports

237.604

**Total CO2 Emitted (MT)**  
Within EU ports

25.093

**Total Distance Travelled**  
NMiles

3,687.589

**Total Time Spent At Sea**  
Hrs

380.400

**Total Transport Work**  
Nmiles.MT

161,589,748.410

**Avg Energy Efficiency**  
g CO2/MT.NMiles

8.6492



# Quantification of Fuel Savings

<b>Trim Optimization -</b>	<b>2%</b>
<b>Voyage Optimization -</b>	<b>2%</b>
<b>Hull &amp; Propeller Efficiency -</b>	<b>4%</b>
<b>Engine Efficiency -</b>	<b>2%</b>
<b>Onboard Energy Efficiency Measures -</b>	<b>1%</b>
<b>Lube Oil Condition Monitoring -</b>	<b>3%</b>
<b>Fuel Efficiency Optimization -</b>	<b>2%</b>
<b>Total Savings -</b>	<b>19%</b>

Values based on a fuel consumption of 50 MT/day at 17 knots, 280 days at sea, HFO 380 cSt at US \$300/MT ---

**Total annual savings - US \$1,029,133**

53 VEEMS units on order with **completed installation** on Bernhard Schulte, Navig8, Eagle Shipping and Union Marine vessels.

## VEEMS

KEY INDICATORS

**ONBOARD**      **OFFICE**

 Engine Operational Efficiency	 Hull and Propeller Performance
 Trim Optimization	 Increased Operational Visibility
 Speed & Voyage Optimization	 Fuel Management & Performance Monitoring
 Fuel Consumption	 Monitoring of Emission
 Reporting & Data Management	 SEEMP/EEOI

## Clients



Eagle Bulk Shipping Inc.



Union Marine Management Services Pte. Ltd.

## Commendations

For office and owners use ashore, VEEMS is providing a live update and various statistic data, which might be used by us on our discretion. Standardization of reporting, as per our request is also possible. VEEMS is our "Live" tool to achieve the best vessel performance. All other systems, are "post factum" indicators, which are summarized and analyzed (if at all) after some time. VEEMS is allowing to identify a reduction of performance within a couple of hours and to make necessary steps to improve it. For example, you can manipulate with vessel trim and find out best possible trimming, for present load and speed. All trim optimization programs are based on past experience, which might not be exactly same as it is now on board.

It might help us in defense to prove against comments on "underperformance" of the vessels. Recorded data might be our evidence of good vessel performance. We might propose better and more efficient operational regime for the vessel to charterers.

I am recommending very much to implement VEEMS on board of all vessels.

**Victor Tauchius,**  
**Senior Technical Superintendent.**  
**Bernhard Schulte Ship Management, Germany.**



The installation of VEEMS has been completed and we are monitoring the vessel through the system. Thanks for the excellent work and assistance tendered.

**Rajnish Bahel**  
**Asst. General Manager**  
**Eagle Ship Management LLC.**



We are a Ship Owning/ Ship Management company operating a fleet of 19 vessels. All our vessels are enrolled in Viswa lab fuel analysis program. Recently we have installed, on one of our container vessel, Viswa Energy Efficiency Management System (VEEMS) in order to better manage our ship energy efficiency management system and improve the vessel performance through more effective monitoring.

The system measures and generates reports of Energy Efficiency Operational Index (EEOI), fully compliant with IMO requirements, on a continuous basis and is able to additionally monitor the following:

1. Specific Fuel Oil Consumption (SFOC),
  2. Fuel Quantities Remaining Onboard (ROB),
  3. Propeller Slip to indicate Hull Fouling and alarm system when the fouling has exceeded predetermined limits,
  4. Operational data such as ship position, route, fuel consumption, distance travelled etc.
- Reports are generated without human intervention.

We find the system a very effective management tool for monitoring the vessel performance.

**Satish Pillania**  
**CEO,**  
**Orient Express Ship Management Ltd.**



## Commendations - Ship Crew

After initial setup, adjustment, and verification period we can state that system operates reliable and provides precise and human error free logging of energy consumption and efficiency of most important vessel operation parameters.

Most important and convenient feature of the program is the capability to create reports for any given past time with all main performance counters, readings completed automatically. This is achieved by continuous logging of all main counters, flow meters, and other performance indicators.

**Capt. Sokolov Igor,**  
**Ship Captain**

VEEMS eliminates human error and did not pose any burden on ship's crew. Problems to create various reports to many parties and all other problems are eliminated by providing all the tools for reporting in one place by one operator for any given present or past time. Any number of reports can be issued by a single on duty navigating officer without any input from engine room staff. Most importantly these reports can be planned and issued at a convenient normal day time. Also, VEEMS provides precision, real-time monitoring tools that allow monitoring with high precision and in relation to time vessel operating parameters.

**Chief Engineer**

**Contact us for a LIVE demonstration of the System**

**[veems@viswalab.com](mailto:veems@viswalab.com)**

**[www.veems.net](http://www.veems.net)**

**Watch the Video - Click the link below-**  
**VEEMS - VIDEO**



[www.viswalab.com](http://www.viswalab.com)

# VEEMS

**We make it Possible for you to achieve your Energy Efficiency Standards.**

**Only if you can measure it, you can control it.**

Disclaimer: The information provided above is subject to change without notice, at any time based on updated ship information and market conditions. A Detailed quotation can be provided after close analysis of the ship where the system is to be installed. The images used in this document are for illustration purpose only.