



KONGSBERG INFORMATION MANAGEMENT SYSTEM

JAWS – Just Add Water System

BENEFITS

- JAWS is a trim and draft advisory software application that helps reduce fuel costs and emissions
- The JAWS onshore application visualizes vessel and fleet performance with energy-savings
- JAWS does not require hull performance test data or any additional hardware
- JAWS has been developed, tested, and verified by Shell on operating vessels
- The JAWS technology has undergone DNV's technology qualification process

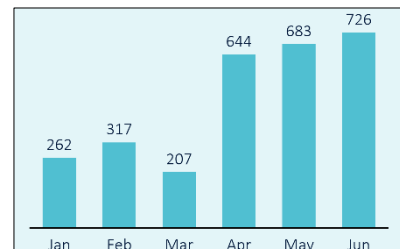
JAWS is a data-driven trim and draft advisory application, available on Kongsberg Maritime's Information Management System (K-IMS).

The JAWS-application is made available onboard the vessel. The user-friendly interface provides advice on optimal trim and draft settings in current, or planned, vessel conditions for various speed segments to the crew.

The JAWS onshore version enables the ship operators to track energy-savings, before and after JAWS. Savings can be tracked per vessel or fleet. The parameter in the application 'missed energy-savings' shows further potential savings that can be achieved with JAWS.

Captains and crew change, JAWS ensures that the vessel continues to sail with optimal trim and draft settings at all times. JAWS is a key-enabler to help shipowners quickly reduce CO2-emissions, and one building block in helping shipowners meet the Carbon Intensity Index requirements.

The graph shows a vessel in operation with JAWS software. Bars indicate cumulative kWh savings in thousands over a period of six months. That specific vessel had followed JAWS advice 38.4% of the time and saved 726 000 kWh, an average energy saving of 3.81% for that six-month period. JAWS savings are compared to the crews best practice trim and draft settings before JAWS deployment.



JAWS Performance Data

FEATURES

- JAWS uses a vessel's data to provide vessel specific advice on optimal trim and draft settings for current, or planned vessel conditions
- JAWS is easy to install and comes with user-friendly interfaces for onboard and onshore team
- Several KPI-cards, tables, and graphs are available for onshore operational teams to easily track fleet and vessel performance

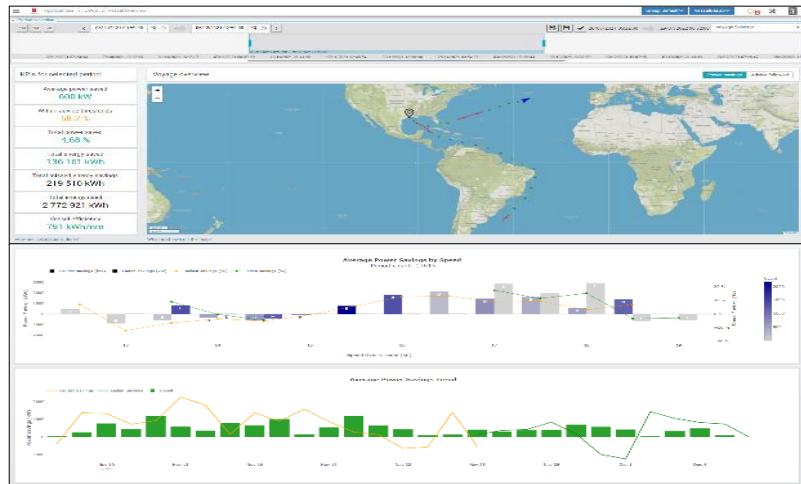
Intuitive and User-Friendly User Interfaces

The onboard JAWS version provides a graphical and easy to understand view for optimal trim and draft settings to the crew for different vessel conditions and speed segments.



JAWS Onboard View

The onshore JAWS version provides key KPI-cards to track JAWS onboard usage, energy savings and vessel efficiency. The time and voyage selector enables operators to analyze and compare JAWS performance over time e.g. before and after a crew change. Several performance tables are made available to further analyze performance data, along with a map to track voyages.



JAWS Onshore View

How does JAWS work?

The patent protected JAWS methodology has five stages:

Data Gathering and Processing

JAWS utilizes readily available historic and real-time data sources e.g. date and time, absolute speed, speed relative to water, main engine power and speed, time since last hull cleaning, etc.

Trim and Draft Database Generation

Historic data are rounded and grouped in bins. Data is further averaged using random forests regression analysis. Each bin will ultimately contain one draft, one trim, one speed, and a calculated average power value.

Recommending Optimal Trim and Draft Profiles

Using current speed and sea conditions, JAWS relays the recommended trim and draft to the ship's crew via a graphical user interface.

Operating Profile Adjustment

The ship's crew adjusts the trim and draft profiles according to JAWS advised optimum.

Actual Savings Realized

Power savings are recorded by comparing the power consumption before and after implantation of JAWS trim and draft advise.

