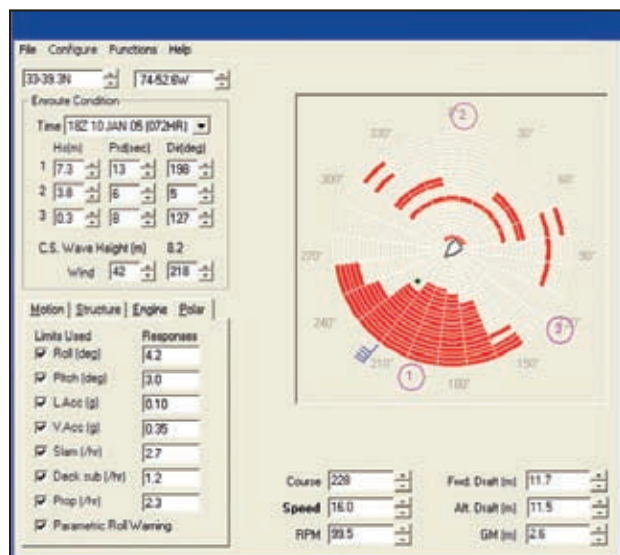
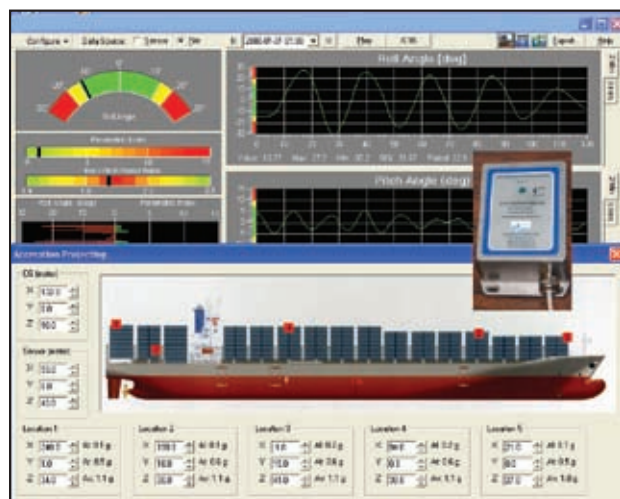


Vessel and Voyage Optimization Services



VVOS Seakeeping polar diagram guidance



VVOS Motion Sensor for Parametric Roll warning

WHAT SETS VVOS APART:

SHIP-BASED TOOLS

VVOS has become a favorite of ship captains who embrace on-board decision support tools enabling them to make the best passage plans for their specific ship. Today's cost-effective satellite communication allows the compressed digital forecast data to be sent to ships at sea on daily a basis.

ADVANCED ROUTING ALGORITHMS

VVOS utilizes advanced routing algorithms to accurately and comprehensively optimize each route for on-time arrival while minimizing fuel consumption and avoiding heavy weather damage. The voyage plan created on VVOS can be exported to an ECDIS or Integrated Navigation System (INS) for safety check and execution

SEAKEEPING

Using sophisticated hydrodynamic modeling, computations, and highest resolution ocean forecasts the VVOS guidance system recommends speed and heading changes to manage ship motions to minimize heavy weather damage.

Unlike traditional weather routing services and programs on the market, VVOS includes a detailed model of ships' motion, engine and propeller characteristics. This 'virtual' ship accurately estimates speed made good under forecast wind, wave and ocean current conditions for a given engine power and propeller RPM, as well as ship motion limitations defined in the 'Safe Operating Envelope'.

MOTION MONITOR PROFILE

VVOS includes a real-time monitoring, recording and warning system for excessive motions and accelerations, particularly for Parametric Roll. Once underway the system also monitors ship motion response and engine condition, and provides alarms if safe operating limits are exceeded.

MINIMUM SYSTEM REQUIREMENTS

- Modern desktop or notebook PC with P3/P4 processor running Windows 95/98/2K/XP O/S
- Color graphics card with SVGA/XVGA support
- 10 Mb of free local disk space
- Mouse, Keyboard, Serial Port for the optional motion sensor
- Sound card (optional) to listen to the VVOS training tutorial
- INMARSAT A/B/M, Fleet 77/55, C-Band, Wi-Fi, communication to VVOS Weather Server via Internet or modem dial-up.

FOR MORE INFORMATION

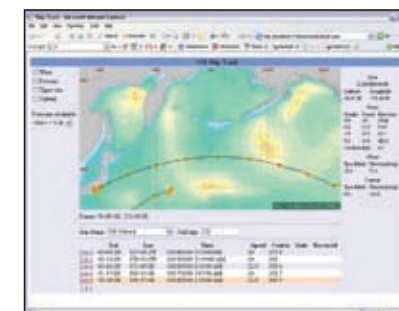
Visit us on the web at:
www.jeppesen.com
 Email: marineinfo@jeppesen.com

Or call us at:
 Global: +1 434.973.0622

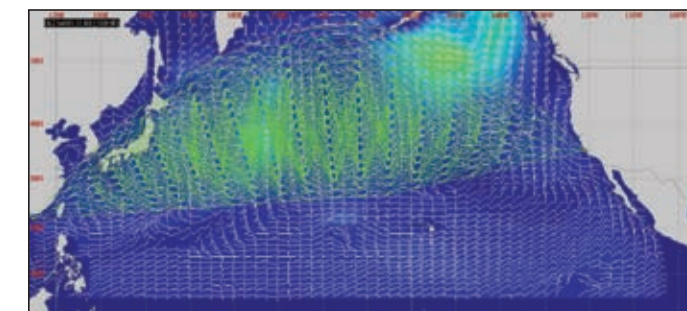
Arrive on time.
 Conserve fuel.
 Avoid heavy weather losses.

Jeppesen Vessel and Voyage Optimization Services (VVOS) can help make every one of your voyages more profitable by enabling each vessel in your fleet to attain higher efficiency and operating margins. This is done through tools which optimize schedule adherence, improve safety, and achieve new levels of customer satisfaction and competitive advantage.

VVOS is a highly-advanced decision support tool intended to meet the needs of vessel masters and shore-side managers as they work to plan safe and efficient voyages. The VVOS system uses Boeing-proprietary optimization algorithms to factor in sea state and ocean area forecasts as well as detailed vessel performance models, all of which leads to outputs which can dramatically improve the efficiency of any operation.



VVOS ship track Pacific Wind and Waves



VVOS optimization considers all possible solutions

Vessel and Voyage Optimization Services

The VVOS software allows the user to plan the optimal passage by simulating and optimizing routes for given arrival times while minimizing fuel consumption and avoiding weather damage. Accurate ETA predictions are possible using industry-best met-ocean forecasts in conjunction with sophisticated vessel performance models and advanced route optimization algorithms.

Once at sea, ships simply download current ocean area forecasts via satellite communication. Routes are modified as new forecasts become available or operational requirements change during a passage. With this process of daily continued refinement, a safer and more economical passage is possible. And given the nature of the system, the ships' crew is provided with decision support tools which allow them to run through various scenarios selecting the one which best meets their specific operational objectives.

Vessel safety and risk management is further improved through the continuous monitoring of real-time vessel motions and the ongoing analysis of vessel performance metrics.

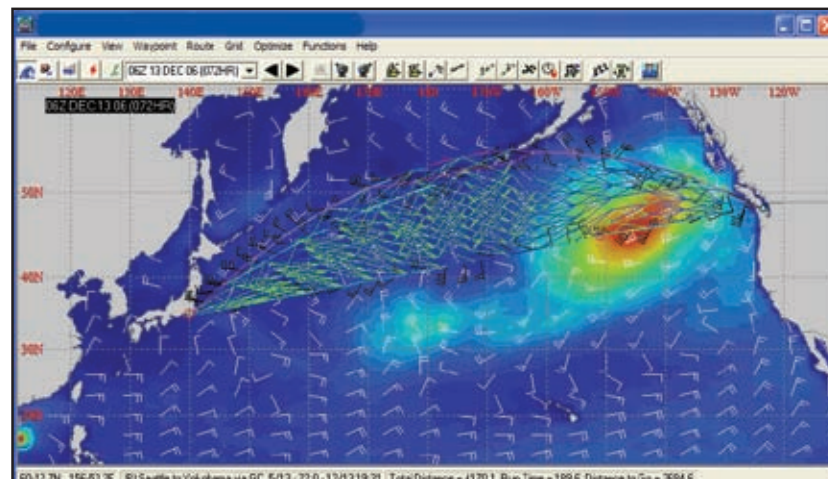
When fully implemented within an integrated bridge system, VVOS can reduce risks associated with vessel and cargo damage, reduce fuel costs, increase on-time schedule performance, and prolong the operating life of your assets.

BENEFITS

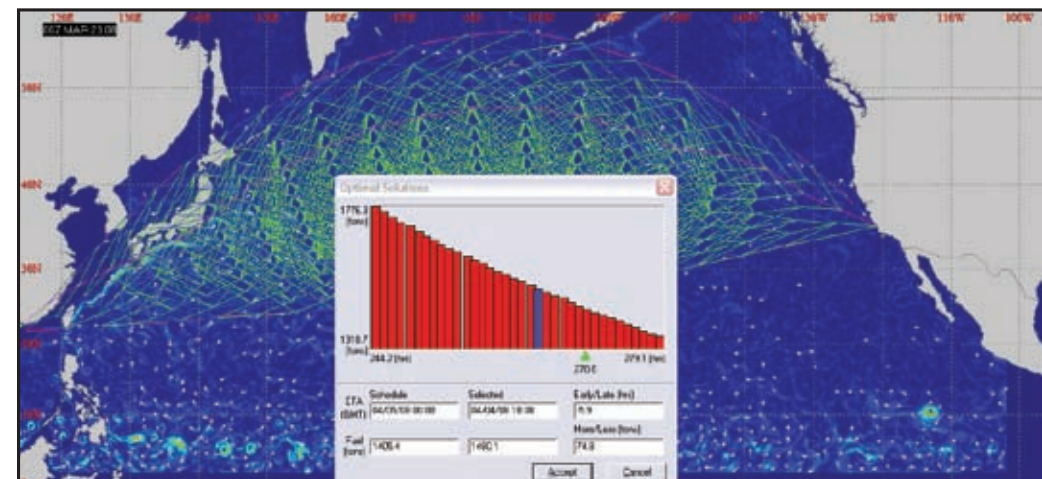
- :: Assists your environmental initiatives
- :: VVOS optimization is an operational measure that helps maximize energy efficiency and reduces the ships' carbon footprint.
- :: Identify the most fuel-efficient route and 'just-in-time' most efficient operating passage strategy.

VVOS produces measurable results. A long-time client found:

- :: The actual number of hours delayed due to heavy weather decreased by 80%.
- :: The number of structural damage claims due to heavy weather decreased by 73%, while the cost of claims declined by 29%.
- :: Cargo damage claims due to heavy weather decreased by 87%.
- :: **Fuel savings of up to 6% over sample period.**



VVOS optimization process and wind/wave forecast



Available VVOS Optimization Solutions



- :: Enhance safety, efficiency and lower fuel consumption.
- :: Voyage optimization constantly integrates latest ocean forecasts to increasingly optimize the route and engine settings assuring on-time arrival and eliminating the "sprint-loiter" operating profile.
- :: Risk reduction – guidance system provides speed and course recommendations based on operational priorities – best fuel, fixed time; and factoring in a tolerance for heavy weather.
- :: Real-time monitoring and warning systems for excessive motions/ accelerations, particularly Parametric Roll.