MariGreen
Maritime Innovations in Green Technologies

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Nr. 7 Windship Modelling and Voyage Optimisation

Background:

Ship Efficiency is currently one of the most important issues for shipping companies to keep their fleets competitive. A wide range of technical offerings has been developed to improve efficiency, but a common problem of all measures is demonstrating effectiveness and forecasting actual savings on a particular ship in its area of operation. This is due to the strong dependence of the efficiency parameters on environmental conditions and operational variables. All relevant factors influencing the speed/power ratio must be taken into account in order to make an assessment of efficiency within the required precision. Complex data integration, ship modelling and simulation are required.

Content:

For this purpose a software-based system was developed, which combines the data of the ship sensors with weather, environment and navigation data and integrates them with ship modelling software. A special focus was placed on the so-called 'user interface', which provides the user with a quick overview of the ship efficiency in the context of relevant ship operation and environmental data, as well as the identification of improvement potentials and the optimization of the planned voyage. A link to the core element of navigation, the electronic nautical chart (ECDIS), was also established for this purpose. This system can best be described as a complex service that brings together data from a variety of sources (ship, weather, sea chart) to generate an „optimal" voyage plan. This voyage plan includes the route guidance taking into account safety aspects, weather, ocean currents and the performance of the ship under the given conditions. The system is also designed to simplify route planning for crews on board. It uses a route network that includes all mandatory fairways and traffic separation schemes. The calculated route follows nautical principles and can be used for navigation after a final safety check by the crew. The optimized route can then be automatically integrated into the vessel's electronic navigation system, making every voyage of the ship even more efficient.

Leadpartner: MARIKO

Co-partner: FME POWERED BY DUTCH TECHNOLOGY

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Results:

A concept was developed with the following specifications*:

- Complex integration of travel planning, navigation, security and travel optimization in one software package
- Combination of parametric and statistical modelling
- Use of Energy Model Grids for trip optimization, including wind energy for use in sail propulsion
- Especially for ships with sail propulsion: Evaluation of ship efficiency and performance potential of sail propulsion systems by data analysis and simulation of ship voyages considering relevant ship, weather and environmental parameters

*all details with reservation

Advantages:

- More efficient
- Reduction of energy consumption
- Simplifies route planning for crews on board
- Optimized route can be automatically integrated into the vessel's electronic navigation system

Partners:

MeteoGroup

DST

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