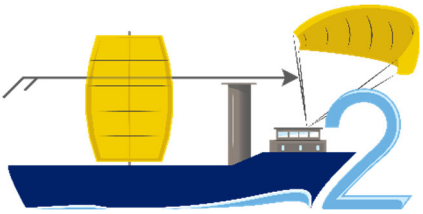
WiSP 2 Joint Industry Project

Wind-assisted Ship Propulsion

After a very successful first WiSP Joint Industry Project, some open ends and new insights were revealed. For this reason, we will launch a follow-up project: WiSP 2.

WiSP 2 will focus on the incorporation of wind assisted ship propulsion the regulatory framework (including EEDI, EEXI and CII), and on realistic operational conditions. The aim is to prove what kind of fuel savings and emission reductions ship owners can achieve, enabling them to make deliberate investment decisions and to ensure compliance with GHG regulations. WiSP 2 will be the gateway to WASP adoption by the maritime industry.



Schedule

The WiSP 2 JIP is expected to run for a period of about 1.5 years. A kick-off is scheduled for June 4th where a detailed work plan will be available.

News

For latest updates, please refer to marin.nl/jips/wisp-2

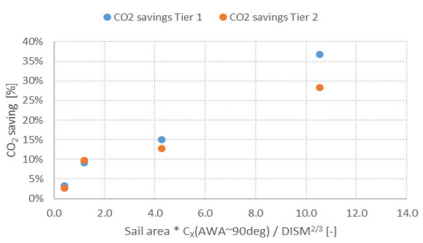


Figure 1: The previous WiSP showed the importance of using appropriate modelling methods

Background

In recent years, there has been a resurgence of research on wind-assisted ship propulsion. The slow uptake of wind propulsion is partially due to marginal profitability and finance options with the present low oil prices and the poor market. However, a study by CE Delft [1] on the market potential for wind propulsion found that another major barrier is the shortage of transparent and independently verified information and methods to predict the performance of wind propulsors. Other barriers identified are lack of sufficient practical examples and tailor-made work to demonstrate compliance with statutory and class rules and regulations. Although WiSP and the general industry made significant steps, these barriers are largely still hindering the broad uptake of WASP.

Objectives

- Improve methods for transparent performance prediction;
- Use the improved methods to provide ship owners/operators with fast low-cost predictions for their fleet;
- Further review of the regulatory perspective, recommend improvements and clarifications, and provide examples to establish compliance.
- Development of basic performance prediction tool, to be used by participants
- Proposal for (in-service) speed trials with wind assist
- Assess the influence of manoeuvring compliance and seakeeping operability on performance

Interested?
WiSP 2 is initiated by MARIN, in cooperation with American Bureau of Shipping (ABS) and together with a large number of WiSP 1 participants. WiSP 2 is open for new participants.

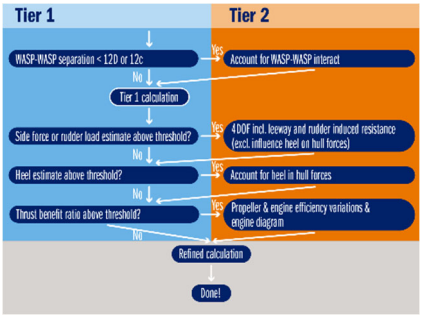


Figure 2: Calculation flow chart as part of WiSP recommendations – to be improved in WiSP2

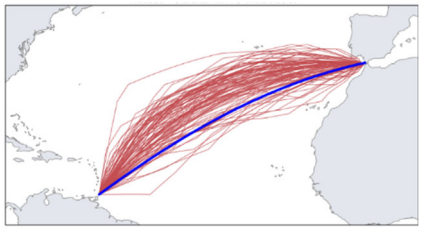


Figure 3: Example voyage simulation tracks with optimized routes (and speeds)


Figure 4: Measurements, such as already conducted on MV Ankie, should serve as validation material

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Organisation

WiSP 2 is initiated by MARIN, in cooperation with American Bureau of Shipping (ABS) and together with a large number of participants, to investigate ways to overcome barriers to wind propulsion uptake. To this end, we are pleased to present the research activities as outlined in this leaflet.
The aim is to cover the majority of marketed wind-assisted ship propulsors in this pre-competitive project, thereby extending systems considered in the previous WiSP. The project will not go into the details of company-specific design solutions.

Tasks: Performance prediction and regulatory aspects

The work of the previous WiSP is to be extended. The main issue to be addressed is still the quality, transparency and verifiability of predicting savings in fuel and emissions. Such savings are usually predicted based on calculations, but the assumptions and conditions adopted for these calculations vary wildly amongst publications. As a consequence, reported savings are not necessarily comparable, and whether predictions meet a specified quality standard is not always certain. Thus, better guidance and knowledge are required. The previous WiSP project already delivered detailed recommendations for performance predictions that should provide a more level playing field. This specific report from WiSP will be shared with WiSP 2 participants. However, although specified in a generic way as much as possible, those recommendations were based on and verified for:

- Savings up to about 40%
- Residual propulsion using combustion engines
- Flettner rotors and (wing) sails

WiSP 2 will refine and extend the previous WiSP results. The following items are considered as potentially relevant for inclusion in the work program:

- Additional demonstration cases for other technology concepts, such as kites and suction wings
- Case(s) with wind propulsion as its main propulsion
- Further develop methodologies for WASP performance assessment based on sea trials combined with numerical calculations.
- Further develop technical aspects for inclusion in EEDI and EEXI regulations. Make recommendations to IMO / MEPC.
- Consideration specific to retrofit, related to EEXI. How to evaluate and indicate potential engine or propeller issues for existing ships?
- Combination of WASP with electric or hybrid propulsion, including batteries and fuel cells.
- Voyage simulations – how to best use them for investment decisions (and CII)?
- Voyage simulations to reveal the influence of route & speed optimisation and whether that could be brought into EEDI/EEXI.
- Manoeuvring and seakeeping behaviour when using WASP. What are the potential limits on designs in order to remain compliant with IMO Resolution MSC 137(76).
- Validation: By means of full-scale wind measurements and thrust measurements on actual vessels and land-based setups, to better understand the physics and validate the lift and drag as well as interaction effects using CFD.
- Investigation and development to improve current class rules and regulatory framework for Wind Powered Vessels (vessels having >50% of power delivered by wind).
- Prediction tool: a basic performance prediction tool can be developed to be used by each participant. The findings and recommendations as derived in this JIP and before can be packaged and distributed as a software tool.