Interreg North Sea Region WASP
European Regional Development Fund

EUROPEAN UNION

Project Duration
18 June 2019 - 30 June 2023

Total Budget: **€5,393,222**
EU funding: **€2,251,612**

https://northsearegion.eu/wasp

WASP News

Putting the Sail Back into Sailing

May - 2023

The WASP (Wind Assisted Ship Propulsion) project

Funded by the Interreg North Sea Europe programme, part of the European Regional Development Fund (ERDF) it brings together universities, wind-assist technology providers with ship owners to: research, trial and validate the operational performance of a selection of wind propulsion solutions on five vessels, thus enabling wind propulsion technology market penetration and contributing to a greener North Sea transport system through harvesting the regions abundant wind potential.

Final Events

The WASP project was rounded off by attending and presenting at a flurry of final events from February to April with large gatherings in Hamburg, London and Majorca along with webinars and education seminars...

Market News

The WASP project technology providers continue to expand into the market, picking up new customers, expanding into new segments and launching new projects...

Work Packages

As the WASP project draws to a close, this newsletter features a summary of all of the key working groups covering; Engineering, Performance Validation, Business, Policy and Communications...

WASP Project & Wider Industry Meet in Hamburg

01-03 of March 2023 was an important time for the WASP project and our partners. Hosted by the Hapag-Lloyd Center for Shipping and Global Logistics at Kühne Logistics University (KLU) in Hamburg, the first day of the International Academic Conference on Shipping Sustainability & Solutions saw a very well attended WASP project meeting where we were able to discuss the outcomes and impacts of the project and plan the subsequent few months before the project ends in mid-2023.

This meeting was then followed by two excellent academic conference days under the theme of 'Shipping, Sustainability and Solutions.' The event was kicked off by an inspiring recorded keynote speech from Hamburg native and world famous professional sailor, Boris Herrmann and Team Malizia's representative Cornelius Eich. There were 28 conference presentations on themes covering innovation, alternative energy, energy efficiency, sustainable finance, regulation etc. Much of what was covered reflected developments in the EU, but we also had presentations and perspectives from Columbia, Nigeria, the Marshall Islands and the United States. Full Program

There was of course a strong wind propulsion representation from wind propulsion technologies and operations with six presentations focused on WASP project deliverables from SSPA/RISE (SE), HHx blue (DE), Kühne Logistics University (DE), Nord University (NO), Chalmers University (SE), KU Leuven (BE) and IWSA (UK).

The event was then wrapped up with a interesting discussion panel featuring Sönke Felix Diesener (NABU e.V.), Prof. Michele Acciaro (Copenhagen Business School), Prof. Orestis Schinas (hhx.blue), Marko Möller, (Scandlines) and moderated by Gavin Allwright (International Windship Association) which attempted to bring together the sustainability themes from the previous two days and that led to quite a lively and ultimately positive exchange of views, including the very engaged audience.

We would like to thank all of the participants, panellists and presenters for contributing to a fascinating couple of days and to the organisers from KLU for all of their hard work and warm welcome.

RINA & IWSA Wind Propulsion Conference 2023

In February, a number of WASP project partners travelled to London to the International Maritime Organization (IMO) headquarters to present papers and findings from the WASP project.

This was the third RINA Wind Propulsion conference conference. It is a conference that is held every 18 months. The 2023 conference featured presentations on Key Performance Indicators for Wind-Powered Ships by Sofia Werner from RISE and also from one our project technology providers, Norsepower. The keynote speech on the second day of the conference was also delivered by Gavin Allwright, Secretary General of the International Windship Association. The full papers from the conference will be available from RINA and a summary paper of the proceedings has been submitted to IMO as MEPC80/INF.33.

FlettnerFLEET Project Launched

We are delighted to see that one of our project partners, Rörd Braren and one of our technology partners, ECOFlettner have joined forces with MARIKO, the maritime competence centre in Leer, North Germany and a host of other project partners to launch a €7 million project funded by BMWK (PTJ Jülich). This three-year project will further optimize the ECO Flettner rotor technology and widen the testing of the rotor systems on different ship types. The additional project partners include: abh Ingenieur-Technik, Bureau Veritas, Dirks Elektrotechnik, Enercon Logistic, Fehn Ship Management, HB Hunte Engineering, Hochschule Emden/Leer, IBK-fibertec, ISSIMS, Krey Schiffahrts, NSB Niederelbe Schiffahrtsgesellschaft, Schottel GmbH and Winterthur Gas & Diesel from Switzerland.

Read more...

Norsepower Installations

In February, Norsepower installed two tilting 35m x 5m Rotor Sails on the CLdN MV Delphine, a Ro-Ro vessel in operation between the UK, Ireland and Europe, which is reportedly the largest short sea Ro-Ro vessel operating in the world today.

Read more...

In January, Norsepower secured an Ilmastorahasto – The Finnish Climate Fund capital loan for €10 million for increasing its production capacity Read more... along with signing a contract with SOCATRA and TotalEnergies for the installation of two 35m x 5m rotor sails on a French flagged *Alcoyne* MR tanker by the end of the year. Read more... This was followed in early March by a Mitsui O.S.K. Lines (MOL) and VALE agreement to install two of the same sized rotors on an in-service 200,000dwt Capesize Bulk Carrier in Q2 2024. Read more... and finally by another contract signed with Iino Kaiun Kaisha Ltd for the installation of two 20m x 4m rotor sails on a newbuild Very Large Gas Carrier (VLGC) which has already been delivered wind-ready from Daewoo Shipbuilding & Marine Engineering Co, Ltd. that will also be installed in Q2 2024. Read more...

Econowind Developments

In April, the Singapore-based Ocean Network Express (ONE) announced it will install two 10.5m x 2.8m containerized Ventofoils (an upgraded Ventifoil) wind assist units supplied by Econowind on the Norse-owned, 143m, 1036 TEU feeder container ship the MV Kalamazoo by the end of 2023.

As far as we know, this will be the first container ship with some form of wind-assist capability. Read more...

Four Dutch shipowners have worked closely with Econowind and gained experience with the first two generations of VentiFoils and will now pioneer the 3rd generation 'VentoFoils' and become active Ambassadors of for Econowind. The group includes WASP project partners Boomsma Shipping and Van Dam Shipping Read more...

Work Package 3 - Engineering of Wind Propulsion Technologies

Through the use of several 4 degree-of-freedom, physics-based numerical tools (ShipCLEAN of Chalmers and digital twins of KU Leuven) and sea trial validation data provided by SSPA, the performance of wind propulsion technologies (WPT) across the five ship use cases of the WASP project were characterized (an example of this physics-based approach is shown in Figure 1). These models were able to capture the potential fuel savings based on wind energy capture for the vessels along real world routes. The results will be compiled in a comprehensive report that will be released in the near future.

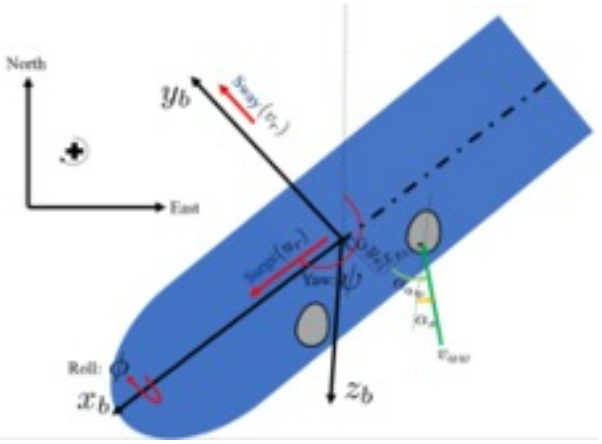


Figure 1. A schematic representation of WPT forces and ship dynamics used in the digital twin models

These studies also provided insight into avenues for future, high-impact work. One such direction is further investigation of integrated wind-hybrid propulsion systems aboard vessels. While fuel savings can be realized through the increase of vessel speed due to wind energy capture (and therefore the decreased total time the engine operates over the course of a shorter journey), additional savings are possible by maintaining service speed and allowing the WPT and propulsion engine to work together to provide the vessel power requirement. We can see this impact in Figure 2, as the fuel consumption of the vessel in favorable wind conditions is reduced when operating in the integrated wind-hybrid mode in comparison with the use of the WPT only for increased speed (reaching a reduction of nearly 40% when comparing the minimal fuel consumption for each case at optimal wind conditions).

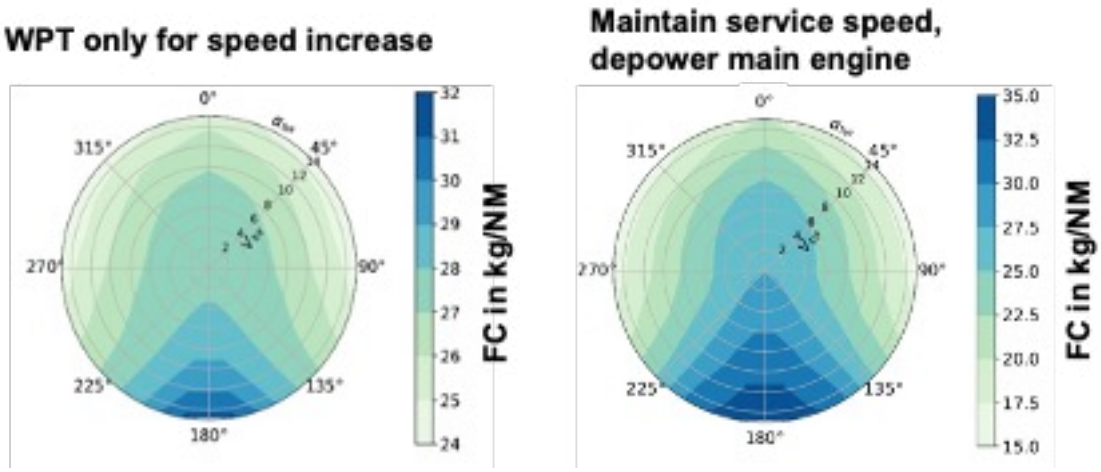


Figure 2. Polar plots of fuel consumption (FC) of the Frisian Sea for a range of true wind directions (given by the angle) and speeds (given by the labeled concentric circles)

In the near future, we will present the first experimental force measurements of suction sails at the scale of a short sea vessel, utilizing strain gauges installed on one of the WASP ships. These measurements will provide additional insight into the thrust forces generated by the suction sails over a wide range of wind conditions and will be directly valorized to improve the fidelity of the numerical tools.

We would also like to recognize the collective efforts of the members of WP3 (SSPA, Chalmers University and KU Leuven) for their dedication to the WASP project and helping to bring an understanding of WPT capabilities to the broader public.

Work Package 4 - Policy and Viable Business Case

Work Package 4 deals with regulatory and business-related issues that are often major barriers to the uptake of new technologies. The viable business case for Wind Assisted Ship Propulsion (WASP) technologies was developed through several interviews, workshops, industry events and simulations in order to understand what aspects should be considered and which factors drive the installation of such technologies.

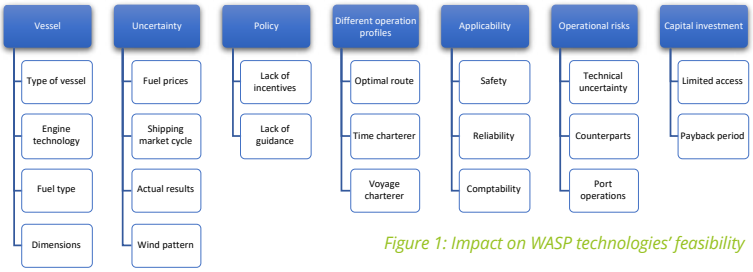


Figure 1: Impact on WASP technologies' feasibility

Key drivers for companies to invest in WASP technologies include the expectations of fuel savings, the potential for brand value enhancement and the desire to pursue a corporate green agenda. Policymakers and customers are considered critical stakeholders who can encourage companies to adopt WASP technologies. Other key stakeholders with an influential role in accelerating this adoption process are insurance companies, classification societies and the crew. To accelerate the adoption of WASP technologies, companies should facilitate direct communication between technical experts and upper management to ensure a fast and efficient decision-making process. Additionally, building a viable business case requires a thorough evaluation of technical, operational and financial risks. However, it is difficult to determine the precise payback period for such an investment, as it depends on several factors, such as the technology installed, ship size and type, operational routes, weather conditions and bunker savings, among others.

Figure 2: Building the business case for WASP technologies

While the benefits of wind-assisted propulsion are clear, the upfront costs of installing such systems can be prohibitive for many shipowners. This is where innovative financing solutions come into play. Examples are the "pay-as-you-save" and "pay-as-you-use" models, in which risks and benefits are shared to overcome the split incentives, and the optimum solution is found for both shipowners and technology providers. Other financing solutions are being developed to be integrated into the business model. These include decision support models, investment/finance tools and solutions, market conditions, and fuel/emission saving predictions for different scenarios, that are being fed with real-life data from the WASP sea trials. Ultimately, the business case for WASP is heavily influenced by the technology's performance in terms of emission reduction and power and fuel savings. Characterization, simulation and in the end validation of the performance make the results of different technical solutions transparent and comparable. This is a major achievement of the WASP project and strengthens the business case.

In addition to these financing solutions, there are also various government incentives and regulations that can encourage the adoption of WASP. Policies to promote WASP technology adoption should focus on incentives to reduce the upfront costs of installation and a significant carbon levy should be introduced that is being raised substantially yearly. By leveraging these financing solutions, shipowners can reap the benefits of reduced fuel consumption and emissions while also achieving cost savings and enhancing their competitiveness in the market. Overall, WASP technologies are part of the potential solutions to accelerate the efforts for decarbonizing the shipping industry.

We would like to acknowledge the joint endeavors of WP4 members for their commitment to the WASP project and their contribution in disseminating knowledge about WASP, including Green Transition Denmark for leading the regulatory aspects, hhx.blue for providing innovative financial solutions, Nord University for performing business modelling and scenario development for the technology's uptake, and Kühne Logistics University for leading the business case.

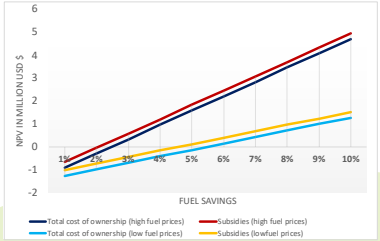


Figure 3: Example of Net present values (NPV) for several scenarios with real-life data

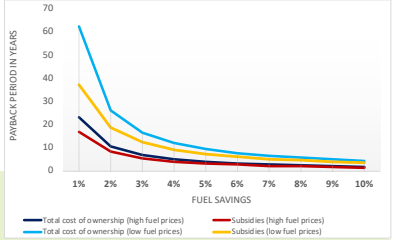


Figure 4: Payback period for several scenarios with real-life data

Work Package 5 - Operation of WPT and Performance Measuring

Sea trials

The purpose of WP5 was to demonstrate the performance of the installed wing propulsion technologies in real life. To do so, we first had to develop the methods for full scale validation. Since wind propulsion in modern commercial shipping is still a novelty, the community has not converged towards a standard procedure for conducting full scale verification tests.

A practical methodology for sea trials was developed and tested in the project. The effect of the wind propulsion technology is derived by comparing speed and power of single runs with and without WPT for the same wind condition. This is repeated for 5-6 wind directions. No additional instrumentations onboard are required than the speed log and power torque meter or fuel flow meter. The result is combined with statistical voyage analysis to derive the power saving potential.

The developed "WASP-Sea trial" method was applied to the 5 vessels in the project. The trials were conducted by SSPA in co-operation with the ships' master's and crew. The result showed very clearly that significant power saving is possible with all the tested wind propulsion technologies.

Performance indicators

A second task for WP5 was to develop key performance indicators (KPI) for wind-assisted ships. In the autumn of 2022, the WASP project joined forces with the International Wind Ship Association (IWSA), and the International Towing Tank Conference (ITTC) to develop and propose KPIs. Several online workshops were held, open to all stakeholders from the wind propulsion community. The outcome was a set of recommended KPIs, which has been presented to the industry at several conferences.

Impact

By demonstrating the performance of several WPTs in real life, the project has contributed to building trust in the technology and this will hopefully convince more ship owners to invest in this green technology.

The developed sea trial methods and key performance indicators will be translated into ITTC Guidelines, which will be published in 2024. Therefore, the project outcome will have a very large impact on the industry standards and working practices. This is important for the level playing field in the new and developing wind propulsion industry.

Acknowledgment

As WP5 lead I wish to thank the ship owners, masters and their crew for the support and co-operation with the sea trials: Rasmus Nielsen and Captain Allan Bach (Scandlines), Tessa Remery and Captain Pasatiuk (Boomsma Shipping), Anna Braren and Captain Mehren (Rörd Braren), Jan van Dam (van Dam shipping), Jan Albert Bosma (Tharsis shipping). Furthermore, I would like to thank the technology providers for invaluable technical discussion and support: Frank Nieuwenhuis, Sanne Swaan and Maxime Broer (Econowind), Ralf Oltmanns and Michael Vahs (Ecoflettner), and Ville Paakkari (Norsepower). Finally, on behalf of the WP5 partners, I deeply thank the Interreg North Sea Region for enabling this important work towards a greener shipping. Thanks to the financial support to the WASP project, the transition will be faster.

Sofia Werner, RISE – SSPA Maritime Centre, SWEDEN

“We are proud to be part of this amazing project. By the WASP installations realized and evaluated during the project lifetime, wind technology proved to be an important element of the decarbonization process of shipping. For Scandlines, the positive results were a decisive factor to install another rotor sail on the sister ferry of the ‘Copenhagen’.”

Marko Möller, Manager Special Projects at Scandlines

“If shipowners had to pay for global warming and the health effects related to their emissions, wind technologies would rapidly be paid back. This documents that wind technologies are very favorable investments for society and that only a marked failure, caused by huge externalities from ships fossil fuel burning, limits the market access.”

Kare Press-Kristensen, Senior Advisor on Climate & Air Pollution at Green Transition Denmark

“We believe energy efficiency is key and are always open to new developments. That is why we are sailing with the eConowind VentiFoils on MV Frisian Sea. I think the three major factors - unit costs, fuel prices and European ETS legislation - are combining in such a way that wind-assisted propulsion will soon become one of the standard solutions.”

Johan Boomsma, Co-owner of Boomsma Shipping

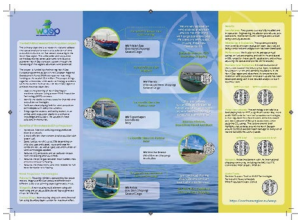
“As a consultant for Reeleaf (NL), specialized in EU funded projects, I provided project management of the Interreg NSR WASP project for my client Netherlands Maritime Technology, the Lead Partner, as a service. It was great fun to be part of this dedicated consortium of partners. The cooperation between partners, the results the project realized and the ongoing impact WASP has on the decarbonization of the maritime sector now and in the (near) future are a very good example of what European Teamwork can do. Very proud to be a part of this impactful project!”

Jacqueline Brouwer, Project Manager WASP for NMT

Work Package 2 - Communications

It is a little difficult to condense three and a half years of outreach and impact assessment down into a single page, however the WASP project has been a important example of wind-assist installation throughout this period and has generated some significant learnings, deliverables and has contributed to the general development of the wind-assist sector both in the North Sea region and beyond.

WASP as an Example



The WASP project was launched a few short months before the COVID19 pandemic swept across Europe and during this period, the five installations of wind propulsion technology have served as an important example to the industry of how systems can be deployed on various different vessels. These installations have contributed to the generation of three points of reference for industry stakeholders to help them make investment decisions going forward, as we can see on page 3 of this newsletter. Policy makers in both the EU and IMO have also seen this practical example of wind propulsion implementation and testing as a positive step. IMO documents such as MEPC75/INF.26 , MEPC79/INF.21 and MEPC80/INF.33 all carry material generated by the WASP project along with photo exhibitions and an impactful side event at MEPC79 attended by over 140 delegates. Within the EU, the WASP project has been presented at EU Maritime days, has featured in a photo exhibit at the EU Parliament during the FuelEU Maritime deliberations and has again featured as a key example of projects underway in meetings of the European Sustainable Shipping Forum, STEERER group and so on.

WASP as a Knowledge Hub

The WASP project has an extensive website which features information about the technology installations, the ships in the fleet and up-to-date news on further installations and other market developments. We have also developed an important Knowledge centre, with copies of all of the deliverables from the project partners, including: reports, policy briefs, academic papers, finance and decision making tools and of course copies of all of the newsletters and recordings of the informative webinars. All together, this information has reached thousands of industry stakeholders and policy makers and collectively the WASP project events and presentations by project partners have added hundreds more. What impact has this all had? While it is difficult to give a tangible calculation of that impact, we can say that this has contributed to a far better informed shipping sector in the EU when it comes to wind propulsion technologies and the region continues to be at the forefront of developments in the field.

WASP as an Educational Tool

The project has also had a strong focus on the educational field quite extensively through the twelve key education events that have been held at some of the project partner universities, Enkhuisen Maritime Academy and the Delft Technical University in the Netherlands and the World Maritime University in Sweden. These events have been attended by hundreds of students over the last three years, some of whom have gone on to study wind propulsion technologies further. We have also had seven main academic papers submitted to journals and conferences, along with a number of others that have been published elsewhere, thus contributing further to the body of research available to students and researchers alike.

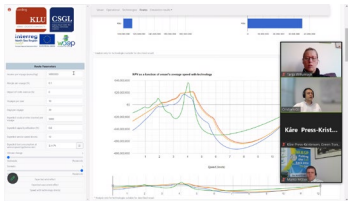
WASP in the Future

As the project draws to a close, we look to the future and the continued use of the deliverables from the project to inform the industry and policy makers going forward. The website will remain active and project partners will continue to build on the foundations laid by the project. The International Windship Association (IWSA) has already pledged to continue to integrate these deliverables into their work and to maintain the Expert Knowledge Centre.

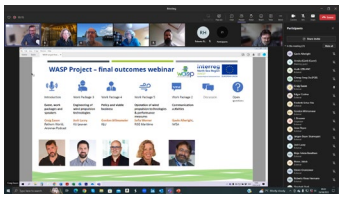
Other Events and Activities

Webinar: Wind technologies for cleaner shipping

On 20 April, we presented and discussed the key project results from the WASP project in a webinar chiefly aimed at EU policy makers but also wider maritime stakeholders. The webinar was organised by Green Transition Denmark and featured presentations and panellists including: Dr Kare Press-Kristensen, Senior Advisor, Green Transition Denmark, Gavin Allwright, Secretary General, International Windship Association, Dr Cristiam Gil, Senior Researcher, Kühne Logistics University and Marko Möller, Manager, Special projects, Scandlines. Watch here



Webinar: Gone with the wind, WASP project results and impacts



On the 26 April, we hosted our final WASP project webinar to discuss further the deliverables, results and impacts of the project along with representatives from all of the main work groups. The webinar was moderated by Craig Eason and featured contributions from Dr Josh Lacey, KUL, Dr Sofia Werner, RISE, Dr Gordon Wilmsmeier, KLU and Gavin Allwright, IWSA. Watch here

Best Practice Exchange Webinar

This webinar held in February discussed linking technological capabilities to the business case for Wind Assisted Ship Propulsion and featured Dr Josh Lacey, KU Leuven, Associate Professor Roberto Herrmann, North University Business School and PhD Candidate Lara Pomeska, Kühne Logistics University Watch here

Blueweek: Natural Propulsion Seminar, Palma de Mallorca

WASP project members travelled outside of the North Sea region to deliver presentations at MARIN's Natural Propulsion Seminar as part of the broader Blueweek conference in April. This annual event brings together wind propulsion projects, marine renewable energy proponents, zero-emissions shipping advocates and other experts in the sustainable maritime transition.

This year saw contributions from SSPA/RISA and IWSA along with a number of the WiSP 2 joint Industry project presenters, a project that we have been collaborating with on technology validation and KPI standards among other things Find out more...

Upcoming Final Education Event: Data and Sustainable Navigation Conference

25-26 May, 2023 - EM business school, Le Havre, Normandie, France

One of our WASP partners, Associate Professor and Researcher, Roberto Rivas-Hermann of the North University (Norway) will present his paper titled: Forecasting zero and low carbon fuels; current status future development and data needs. The presentation will be complemented with a workshop facilitating the discussion on how data (fleet register, fuel prices, technological forecasting) is used to manage fleet investments. Questions to be addressed include: (i) What is the potential of cost forecasting tools to identify best scenarios of environmental technological upgrade in current fleets? (ii) What is the maturity level and forecasting status of zero and low carbon fuels? Find out more...

Additional Project Deliverables

There will be additional deliverables posted on the WASP website over the coming few weeks including; further academic papers as they are published, links to the Expert database, Best Practice manual, the final version of the Decision Support Model tool etc. Click here

Partners & Contact

1 NETHERLANDS MARITIME TECHNOLOGY
2 GREEN TRANSITION DENMARK
3 HHX .blue
4 IWSA International Windship Association
5 KLU KÜHNE LOGISTICS UNIVERSITY
6 KU LEUVEN
7 NORD University
8 Scandlines
9 Scheepvaartbedrijf van Dam
10 B
11 BOOMSMA
12 SSPA Your Maritime Solution Partner
13 CHALMERS UNIVERSITY OF TECHNOLOGY
14

To learn more about WASP, visit:
www.maritimetechnology.nl

Netherlands Maritime Technology
Boompjes 40
3011 XB Rotterdam
Tel.: +31 (0) 88 44 51 035