datum electronics

CASE STUDY

Measuring AI Wind Assisted Ship Propulsion with Shaft Power Monitoring

Wind-assisted propulsion systems (WAPS) are attracting increasing interest as vessel operators seek practical ways to reduce fuel consumption and meet emissions targets. Unlike switching to alternative fuels, WAPS can often be retrofitted to existing vessels, potentially offering a low-risk route to improved efficiency.

However, proving the effectiveness of these technologies presents a new challenge. With propulsion performance influenced by a myriad of factors including changing weather conditions, geopolitical events, vessel load and user behaviour, it can be difficult to isolate the impact of any given energy-saving device.

Accurate, independent, and continuous measurement of propulsion power is therefore essential in enabling analysts to gauge performance under real operating conditions – supporting developers to optimise the platform and establishing the business case for wider adoption.

The Clean Maritime Demonstration Compeition is funded by UK Government through the UK Shipping Office for Reducing Emissions (UK SHORE) programme in the Department for Transport. UK SHORE has allocated over £230m to develop the technologies necessary to decarbonise the UK maritime sector and capture the economic growth opportunity of the transition. Innovate UK, part of UK Research and Innovation, is the main delivery partner for UK SHORE interventions.

The Project

Project AirTwin was an Innovate UK-funded Clean Maritime Demonstration Competition (CMDC6) project investigating how advanced AI-driven control systems could improve the performance of wind-assisted propulsion technology. Led by GT Wings, the consortium combined the company's AirWing™ system with a reinforcement learning (RL) controller, digital twin modelling, and voyage optimisation tools to maximise the fuel savings of the commercial cargo vessel MV Vectis Progress.

To validate performance outside of a simulated environment, the project required continuous, real-world torque and shaft power measurements. These readings would form part of a wider dataset to help assess the effectiveness of the AirWing™ system and support the further development of the platform.

The Solution

In support of the project, Datum Electronics supplied and installed two type-approved Marine Shaft Power Meters aboard the MV Vectis Progress, including a high sample rate system capable of monitoring thrust and specific fuel oil consumption (SFOC).

Designed to provide continuous measurement of shaft torque and power throughout the project, these systems captured live data from the vessel's propulsion system while the AirWing™ was in service across three commercial transatlantic voyages.

The project also aligned with industry efforts to establish objective performance assessment methodology for WAPS. Datum collaborated with GT Wings in applying newly published sea-trial guidelines from the International Towing Tank Conference (ITTC) that aims to improve the consistency and credibility of performance evaluation within the sector.

"Datum's Torque Meter on board the Vectis Progress has been an essential part of the performance assessment. Our thanks also to Datum for keeping in touch with us on board as we continue to gather more data to build the picture of the performance of the AirWing and its associated systems"

George Thomson
CEO, GT Wings

The Outcome

The data gathered from onboard measurements delivered clear results. Analysis of matched ON/OFF propulsion test pairs between April and September 2025 showed that, in 47 of 51 tests, the AirWing™ ON condition consistently reduced required shaft torque, in addition to significant fuel savings achieved by weather routing and voyage optimisation.

For the consortium, the significance of the work extended beyond the headline figures. The trials provided the first independent, instrument-based evidence of the AirWing™ system's propulsion benefit, while supplying a valuable dataset for ongoing development, and helping to close the Sim2Real gap between what an RL-based controller can achieve in a simulation environment versus in the real-world.

The results are helping to inform future phases of a proposed CMDC7 project, including enhanced measurements, further trials, and the continued development of innovative technologies in support of a cleaner maritime sector.