



Sight from Shore

Enhancing Maritime Safety and
Efficiency through Real-Time
Metocean Data Integration

A pilot boat and its crew must undertake a sometimes-risky journey to reach vessels in the port approaches, with some journeys aborted due to unsafe environmental conditions. What if these important decisions could be made before the pilots leave the shore?

Introduction

As global maritime activities intensify, maintaining the safety and efficiency of maritime operations throughout the year has never been more imperative. With a rise in the utilization of the ocean and coastal seas, maritime operators now must contend with increasingly extreme and unpredictable environmental conditions.

With vessel sizes and the quantity of marine traffic growing, access to accurate real-time meteorological and oceanographic (metocean) data becomes vital to ensure efficient cargo operations, safe berthing of commercial ships, and adherence to project deadlines. This, in turn, helps prevent logistical backlogs and shortages across the world's ports.

The Requirement

OceanWise, a Hampshire based small-medium enterprise specializing in marine data, collaborated with Associated British Ports (ABP) Southampton's Marine Pilots to enhance their "sight from shore." The objective was to provide access to accurate, real-time metocean data to support time-critical decision-making processes during pilotage operations.

Since 2014, OceanWise has been working closely with ABP Southampton to establish a comprehensive network of environmental monitoring sensors and telemetry systems. These systems provide critical data to the port's pilots, Vessel Traffic Services (VTS) operators, hydrographers, and the wider port team. Utilizing OceanWise's Port-Log online data platform, this network facilitates efficient vessel planning and decision-making.

As the UK's leading hub for deep-sea trade and a critical link in the supply chains

servicing the UK, as well as being Europe's leading turnaround cruise port, ABP Southampton's marine team operates 24/7 to manage the transit of some of the world's largest vessels. To ensure the smooth movement of commodities, the team relies on accurate, real-time environmental data to assess conditions and conduct safe passage plans for some of the world's largest vessels. Each pilotage trip involves substantial costs and carbon emissions and comes with certain risks to the personnel involved. For each vessel requiring pilotage support, a pilot boat (Figure 1) and its crew must undertake a sometimes-risky journey to reach vessels in the port approaches, with some journeys aborted due to unsafe environmental conditions.

What if these important decisions could be made before the pilots leave the shore?

The Solution

The effectiveness of any technological solution relies on capturing the end-user requirements and involving stakeholders throughout the design and implementation processes. OceanWise adopted a user-centric approach by developing a dedicated webpage which is easily accessible on any smart device via OceanWise's cloud-based data platform, Port-Log. This webpage offers marine pilots a tailored view of key real-time metocean and environmental data from the safety of the shore.

Given the time-critical nature of these decisions, which must often be made during busy operational periods, operators require clear, concise, and reliable information in a single, easily accessible location. The new custom webpage ensures data-driven decisions can be made quickly, and that operators stay fully informed about offshore conditions.

As an existing OceanWise customer, ABP Southampton already utilized an array of internal and third-party metocean data feeds from sensors situated around the Port of Southampton and the Solent. These data feeds



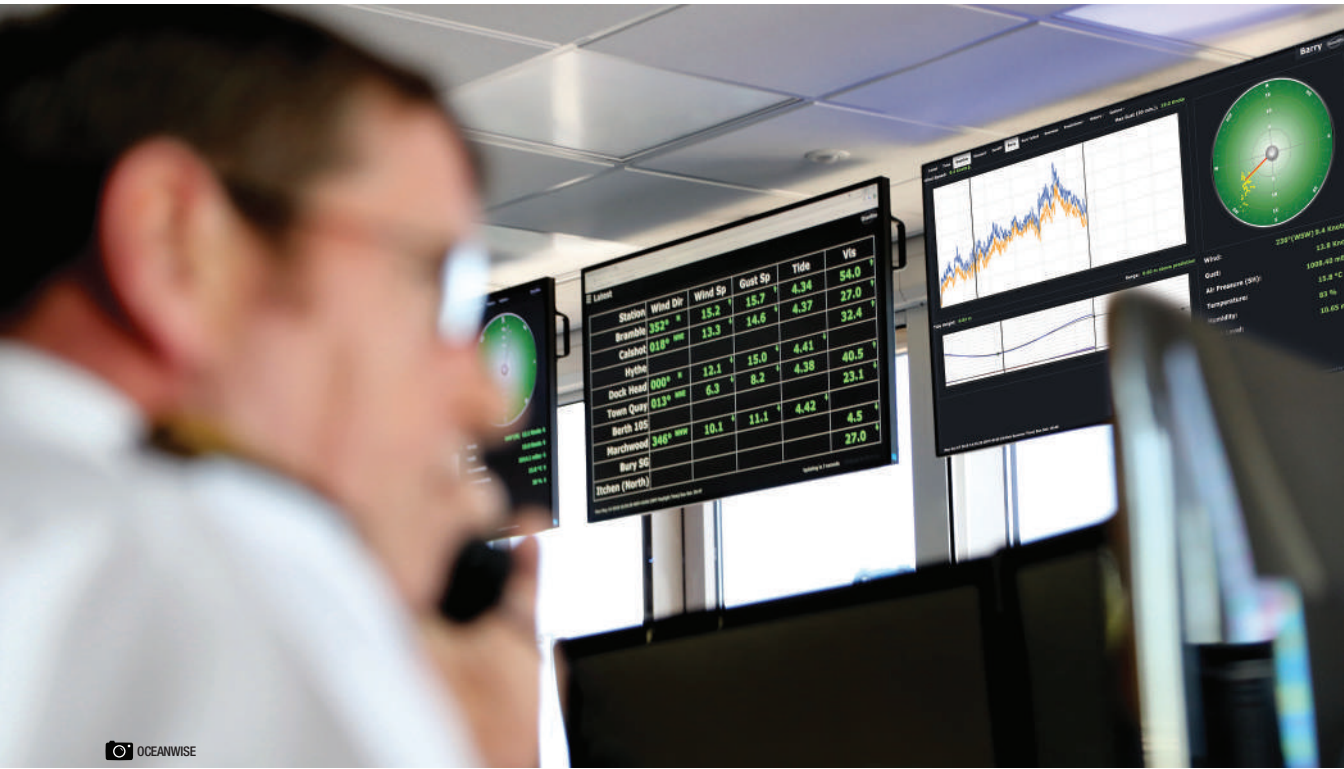
Figure 1: Using OceanWise's comprehensive network of monitoring sensors and telemetry systems, pilot boats and their crew can access accurate, real-time metocean data to support their decision-making processes during pilotage operations.

are integrated into Port-Log, providing the foundation for this project. The dedicated webpage consolidates key data feeds, including meteorological and wave buoy data from various locations within the Solent. ABP Southampton's marine pilots and launch crews monitor the webpage via a live stream at the launch station or access it remotely on smart devices (Figure 2).

The availability of up-to-date environmental data enables quick decisions regarding embarking and disembarking of pilots, reducing lost time, effort, and costs associated with aborted pilotage journeys. It also improves safety for all involved and reduces carbon emissions.

According to ABP Southampton, the Pilots page (Figure 3) has been invaluable. It provides data on the critical environmental conditions that determine the safe embarkation and disembarkation of pilots in the boarding grounds. With this data, determinations can be made from the VTS Centre and the launch station on whether to suspend or continue operations in parts of the district without putting pilots or launch crew at undue risk.

To further support the decision-making process, OceanWise has integrated an operational safety matrix established by ABP Southampton into the webpage. This matrix provides colour-coded values based on defined operational thresholds relating to ABP



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Figure 2: OceanWise's Port-Log can be monitored by marine pilots via a live stream to a variety of devices.



Figure 3: The Pilots page contains environmental data, such as tides, wind, waves, and other metocean data, to help pilots and launch crew make informed and safe decisions regarding marine pilotage.

Southampton’s risk assessment and enhances situational awareness.

The Future

Looking ahead, the integration of real-time metocean data with predictive weather forecast data services offers further opportunities for improvement in the situational awareness of operators and aids data-driven decision-making. When operating under fine timescales, having a good understanding of the speed and intensity of local weather fronts and how these may impact operations is key. While weather forecasts provide a perspective on future prevailing conditions, they can often be subject to change as weather systems evolve. Accurate real-time data on meteorological conditions, such as wind speed, direction, and gusts, from additional locations, would enhance decision-making by providing insights into approaching weather systems.

Expanding data availability through broader sensor networks would offer pilots and other port users a more comprehensive understanding of the environmental and oceanographic climate, combining forecasts with real-time and historical data. This approach would empower personnel, both shore-side and waterborne, with the

information needed to make safe, data-driven decisions.

The technology required for such advancements already exists; the challenge now lies in encouraging data sharing, changing mindsets, and expanding networks to fully realize the potential.

The Benefits of Environmental Data Sharing

Environmental data sharing among ports, shipping companies, and other maritime stakeholders offers several key benefits. By expanding the scope of data available to pilots, VTS operators, and port authorities, ports can build a more comprehensive understanding of the environmental conditions impacting their operations. Access to a wider range of real-time and historical data, combined with forecasts, enables a holistic view of the maritime environment, allowing for better anticipations and management of potential disruptions.

Furthermore, data sharing fosters greater collaboration and coordination across the maritime community. When multiple stakeholders have access to the same high-quality data, it helps establish common situational awareness, reduces miscommunication, and ensures more

consistent decision-making. This shared approach enhances safety by enabling parties to respond more effectively to rapidly changing conditions and to coordinate responses to adverse weather conditions or other environmental hazards.

Moreover, environmental data sharing contributes to sustainability goals by optimizing ship routing and port operations. By minimizing the number of aborted or delayed journeys and reducing idle times due to unforeseen environmental conditions, data sharing reduces fuel consumption, emissions, and overall carbon footprints. This is increasingly important in the context of global efforts to combat climate change and achieve carbon neutrality in the maritime sector.

Conclusion

The integration of real-time metocean data has proven invaluable in enhancing operational safety and efficiency at ABP Southampton. By developing a user-focused solution that provides access to critical environmental data, OceanWise has enabled more informed decision-making, reducing risks, costs, and emissions. As the demand for maritime operations grows, the continued development and sharing of data resources beyond a port's

boundary will be essential in supporting sustainable and safe maritime activities worldwide. The future of maritime operations will significantly benefit from fostering an open environment for data sharing and exchange, driving innovation, and building a resilient maritime infrastructure. ~



Becky Conway is the business development and oceanographic engineer at OceanWise Ltd. This role involves developing business and customer relations while supporting the marketing function with business and product development as well as supporting field activities in Scotland. She has a master's degree in

oceanography and a post graduate diploma in advanced hydrography for professionals along with over 10 years of experience working in the marine environment and specifically the ports and harbours sector where she was principal hydrographic surveyor for Associated British Ports at the Port of Southampton. In addition to her role at OceanWise, she is also the chief executive officer of The Hydrographic Society UK and Ireland (THS:UKI) where she provides strategic leadership for the promotion of the Society and the importance of the science of surveying and related disciplines.

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