Any offshore wind service vessel with walk to work gangway deployed will benefit from accurate real-time sea state measurements, as well as wave and vessel motion prediction to safeguard its operations

Increasing the certainty in offshore wind

Given the multitude of challenges currently facing the offshore wind industry, project developers will appreciate having one less thing to worry about. Increasing costs, grid issues, and logistical bottlenecks are all things that are largely out of a company's hands. But certainty over waves and weather measurement need not be left to chance.

Renowned globally for its reliable high-accuracy wave sensors and disruptive technology, Miros has been constantly evolving its radar-based systems to remain at the forefront of the energy industry. The company's technology gauges live ocean data, including waves, currents, sea levels, and weather conditions, providing comprehensive real-time insights, as well as offering short-term predictions of waves and vessel motion.

Miros provides tailored, cloud-based solutions to clients, keeping them up to speed on the ever-changing environment offshore through IoT-enabled sensors, and crucially, the Sea-State-as-a-Service subscription model.

'Our customers enjoy a host of benefits from the as-a-Service solution, especially when compared with the traditional hardware-based purchasing model,' explains Lars Ivar Leivestad, Sales Manager Offshore Wind.

A subscription-based solution

By subscribing to Miros' technology, rather than buying it outright, clients receive premium support and guaranteed uptime inclusive, increasing the operational output of wind turbines.

Under as-a-Service, warranty of the state-of-the-art technology is unlimited, and the latest Microsoft Azure cybersecurity is included as a standard. If any matters or questions arise, Miros experts are ready to address them.

'Should any barriers occur, we usually solve them quickest remotely; in the rare case that's not possible we'll send an expert to do the job in person,' says Richard Chen, Technical Manager Offshore Wind. 'However, if a client decides to solely buy hardware from us or any other competing brands without a cloud subscription, they will also need to handle any hiccups themselves or send the equipment for repair. That takes more time and might have a big impact on the operations and safety of their asset.

'Also, if we own and monitor the equipment, we make sure that it is future-proof. We will regularly upgrade the software remotely, so it always holds the highest standards. That way it won't become outdated as technology progresses and performance interruptions will be avoided.

'Then there's co-creation and the ability for multiple users to benefit from the same interface. Measurements from the wave radars are sent right to the cloud, meaning they can be viewed wherever and whenever on any device, and shared with other companies that are working on the wind farm.

'Having this first-hand access to both the technology and the data we facilitate a close and powerful cooperation with our customers that allows us to continuously improve the applications as well as immediately take necessary measures should any data irregularities be spotted.'

Sharing data across multiple stakeholders

Given the number of potential stakeholders in an offshore wind project, owners, installers, O&M crews, asset integrity analysts, the value in sharing data is clear, and the intuitive, easy-to-use Data Explorer cloud dashboard is key to unlocking that.

'If you access the live data on the Miros app, you can arrange the real-time measurements in a manner that suits you best, to see the data that matter the most to you in a preferred view, it's not pre-configured by us. There is also the option to access historical data, which is useful if you work in asset integrity and want to know what impacts the waves have had on your structure. You can easily display all the relevant data in one dashboard across all your assets.

'By ensuring complete transparency and access to live facts and figures as-a-Service, the solution helps ensure safer and more efficient operations, lowering various cost points for wind farm developers,' Leivestad adds.

Much-needed cost relief

That cost point is crucial, considering the huge pressure that wind farm developers are currently under. Because Miros owns, insures, and maintains the sensors under the as-a-Service model, the upfront investment for asset owners is low and the risk element is removed.

Moreover, raw material inflation has trimmed the financial margins of wind companies, making turbine downtime more costly. The as-a-Service solution means that maintenance can be planned strategically around real-time sea state insights, improving efficiency and sustainability by streamlining the number of trips that engineers need to make.

Leivestad says: 'There is a lot of offshore wind activity going on currently and these projects are very expensive to deliver. Wave measurement can help to reduce costs by helping companies better schedule their maintenance based on reliable data, thereby extending the lifespan of assets and ensuring the safety of workers.

'For example, if a turbine requires maintenance but it cannot be approached by vessels because of wave heights, then the data will flag this. The maintenance team can then reschedule to do other work at another location at the wind farm in the meantime, rather than having to turn back to port and wait for a break in the conditions. Better data means better scheduling, up-to-date details, and clearer information.

'Also, there's an insurance element to consider. Certain contracts for offshore supply vessels will allow for paid weather downtime. With live data, developers can accurately assess whether it is safe for crews to work or not. Of course, you agree on a wave height and a safe operation limit; access to live sea state data just means you can accurately say when that limit is reached, rather than leaving it up to looking out the window.'

But don't simply take Miros' word for it, the results speak for themselves. The as-a-Service model is in use at the Hywind Scotland Floating Offshore Windfarm, which operator Equinor has hailed as 'the world's first and best-performing floating offshore wind farm', with a capacity factor of 54% during its first five years of operations.

Miros also carried out research alongside Trios Renewables and the University of Strathclyde into the benefits of scheduling maintenance. This project found that by having real-time sea-state understanding across the wind farm, there is a clear uplift in operators' ability to achieve an optimised maintenance routine. Weather windows can be accurately identified precisely across all corners of the site.

Altogether, the study found that up to £1m a year can be saved by minimising failed attempts to board turbines for maintenance work when having accurate real-time sea-state monitoring across the site. This doesn't include the additional energy generated, and therefore profit, stemming from the extra uptime gained. This study was based on an existing offshore wind farm, which is comparably smaller than newer offshore wind farms going live. Therefore, larger cost savings should be achievable at larger sites and turbines.

'By planning maintenance with the right data, you can reduce turbine downtime. This translates to higher energy production and profit,' says Chen.

The risks of ignoring waves

It is also worth developers considering the potential implications of not having access to high-quality, real-time sea condition data and swift support.

Not having the right wave and weather information can have severe consequences, especially around safety for offshore workers and assets. Making decisions based on incomplete information increases the chances of accidents, vessel collisions, equipment damage, and worst-case loss of life.

Many offshore operations are also subject to regulatory requirements and safety benchmarks that become more difficult to adhere to without proper information, potentially leading to fines, legal issues, and reputational damage.

'Put simply, if you have access to local real-time data and know what the offshore conditions are like, it reduces the likelihood of you being caught off guard,' says Chen.

Preparing for the next breakthrough

Of course, the offshore wind industry is still in its early stages and there are many technological breakthroughs that are yet to be made.

As it has been for the last four decades, Miros works at the forefront of research and development in the offshore sector and has been engaged with wave and motion prediction for some years already.

Gunnar Prytz, Chief Technical Officer, says: 'It would allow operators to know what waves are coming ahead of time, reducing the chances of a surprise. Any captain, whether on a crew transfer vessel (CTV) or a Service Operation Vessel (SOV), would like to be warned if a big swell, and the motion of the vessel as a result of it, is due to hit and prepare for it accordingly. If we are able to see into the future, even if only for a moment, we could improve offshore safety.

'Predicting waves is something that we have been comprehensively researching and testing for quite some time and we have a solution for it. For over 40 years Miros has been developing sensors and carrying out

Knowledge of accurate local wave and weather conditions facilitates optimised operations, reduced risk, and enhances overall efficiency and safety in offshore environments

Real-time sea state data are critical for execution of safe and efficient maritime operations in offshore wind

tests and measurements in the harshest environments of the North Sea. All this experience supports the creation of this latest kit for all sorts of offshore vessel operations.

'We have experienced staff, we do the research and development, we do lots of intense testing. Everything is controlled by us as we want to ensure it is being done to the highest standard. Only reliable quality measurements provide a sufficient basis for valuable wave and motion prediction.

'We always know the source that measures the data you get displayed on a dashboard. That's why we can guarantee the quality. Our Chief Commercial Officer, Jonas Røstad, wrote recently that it's not about the sensor, it's about the data. That is possible because we know our sensors deliver quality measurements so well that we can focus on other things like continuous improvement of user interfaces, and the development of new applications to provide further value for our users.

'With Miros' solutions, you don't need to worry about the hardware, you can solely focus on the data that really creates the real value for you.

'There are a lot of challenges in offshore wind; if you can get someone to reliably help you to solve ones around weather-sensitive operations at sea, that is hugely beneficial. We provide you with critical sea state data and make it easily accessible at any time. In the coming decades, there will be many bumps in the road for the offshore wind sector, and we can help you with the challenges as and when they arise, so you can fully concentrate on your work.'

www.miros-group.com

Lars Ivar Leivestad, Sales Manager Offshore Wind

Lars Ivar Leivestad is a seasoned Sales Manager for Offshore Wind at Miros with a comprehensive operational, technical, and commercial background within the energy sector.

Lars Ivar brings a unique blend of technical prowess and strategic management skills to his role, making significant contributions to bringing real-time ocean insights to the forefront of the offshore wind sector.

Richard Chen, Technical Manager Offshore Wind

Richard Chen is a dedicated Technical Manager for Offshore Wind at Miros. With a career spanning both the wind industry and information technology.

He brings a wealth of experience and expertise, and seamlessly merges his knowledge of wind farms and cloud computing to provide invaluable support to customers.

Richard's unwavering commitment to staying at the cutting edge of new technologies and exploring potential integrations underscores his passion for innovation and driving progress in the industry.