Offshore Wind
- Gateway to Norwegian world class technology and competence

Complete Offshore Wind Catalogue
4Subsea offers a wide range of engineering services related to offshore wind systems. We provide dedicated expertise for concept development and detailed engineering of offshore floating wind, as well as system design and analysis of inter-array and export cables. 4Subsea has unique experience with structural assessment, damage investigation and monitoring of submarine power cables and umbilicals and we offer advisory services to design, fatigue, testing and integrity management.

4Subsea experience with floating wind turbines – Hywind projects 2010-2019:
- System / concept / key driver insight
- Marine design
- Structural design
- Mooring design
- Floating substation design for wind park
- Cable configuration design
- Global analysis
- Marine operations and Commercial

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Offshore Wind Engineering Services

Contact

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Offshore Wind Sensor Monitoring

2019-08-22 - 4Subsea

Category: System Integration/Digitalization
Subcategory: Digital twins
Type: Product

4Subsea delivers key decision support for optimised production from offshore wind turbines with the SMS Guard™ - an autonomous sensor kit for monitoring of floating and bottom-fixed offshore wind sub-structures. The retrofittable sensors, combined with advanced machine learning algorithms and 4Subsea domain expertise, help operators realise the significant potential of reduced LCOE using digital tools.

The solution gives operators full control of the loads acting on- and the motions of the tower and substructure. The data can be used for continuous integrity monitoring and early detection of anomalies both in the turbine itself, in the tower and substructure and the seabed support of the substructure.

Technology readiness level (TRL)

According to API RP 17N

TRL 5: Technology integration tested Full-scale prototype built and integrated into intended operating system with full interface and functionality tests

Reference

Offshore Wind Sensor Monitoring

Contact

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Miros Wave & Current Radar
2019-08-12 - Miros

Category: System Integration/Digitalization
Subcategory: Internet of things
Type: Product

The Miros Wave & Current Radar is a high-performance, remote, dry sensor for the measurement of directional wave spectra and surface currents. Our Wave & Current Radar is based on proven technology which has been successfully providing ocean insights to the maritime market for over 35 years. Real-time knowledge of local sea state and weather conditions can contribute substantially to personnel safety, and the performance and efficiency of offshore operations. These insights can reduce operational costs and support onshore decision-making processes too. Our dry, IoT-enabled Wave & Current sensor provides real-time and historical data to all life-of-field interfaces, anytime, anywhere. Miros technology monitors local environmental conditions and makes the data accessible on- or offshore.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about the Miros Wave & Current Radar here
Miros Wave & Current Radar Datasheet
One Pager - Offshore Wind
How to Use Cloud-Integrated Wave Radars to Mitigate Risk
While Creating Operational and Cost Efficiencies?

Contact

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Miros Wave & Current Radar

2019-08-12 - Miros

Category: Maritime Operations and offshore logistics
Subcategory: Other
Type: Product

The Miros Wave & Current Radar is a high-performance, remote, dry sensor for the measurement of directional wave spectra and surface currents. Our Wave & Current Radar is based on proven technology which has been successfully providing ocean insights to the maritime market for over 35 years. Real-time knowledge of local sea state and weather conditions can contribute substantially to personnel safety, and the performance and efficiency of offshore operations. These insights can reduce operational costs and support onshore decision-making processes too. Miros technology widens weather windows, reducing “waiting on weather” and helping you operate closer to established limits.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about the Miros Wave & Current Radar here
Miros Wave & Current Radar Datasheet
One Pager - Offshore Wind

Contact

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www.miros-group.com
Miros RangeFinder

Category: System Integration/Digitalization
Subcategory: Internet of things
Type: Product

The Miros RangeFinder is a high-frequency vertical microwave radar providing sea level, tide, non-directional wave monitoring, ride control and air gap measurements. The measurement principle provides accurate measurements undisturbed by fog, rain and water spray (unlike laser sensors). Real-time knowledge of local sea state and weather conditions can contribute substantially to the safety, performance and efficiency of offshore operations.

RangeFinder is a stand-alone sensor with embedded processing and storage, enabling data to be easily and securely accessed both locally and remotely using modern IoT technologies. The sensor is truly plug-and-play, only needing power and an internet connection to give secure access to immediate, real-time data about the ocean state.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about Miros RangeFinder here
One Pager - Offshore Wind
NOAA Give Miros Top Marks: Microwave Radar Water Level Sensors
RangeFinder Datasheet

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Miros RangeFinder

2019-08-12 - Miros

Category: Maritime Operations and offshore logistics
Subcategory: Other
Type: Product

The Miros RangeFinder is the ultimate stand-alone sensor for airgap, tide, water level, draught and wave measurements. Rangefinder is a dry, radar-based sensor, measuring with millimetre accuracy (+/- 1mm) in all weather conditions, undisturbed by fog, rain and water spray. Miros is a trusted provider of reliable, real-time weather and sea state data to both fixed and floating offshore wind farms. We understand that accurate data is critical for safe and efficient operations and have spent 35 years delivering it to our customers around the world. Real-time knowledge of local sea state and weather conditions can contribute substantially to the safety, performance and efficiency of offshore operations. These insights can reduce operational costs and support onshore decision-making processes.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about the Miros RangeFinder here
RangeFinder Data sheet
NOAA Give Miros Top Marks: Microwave Radar Water Level Sensors

Contact

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Miros WaveFinder

Category: System Integration/Digitalization
Subcategory: Internet of things
Type: Product

WaveFinder is a stand-alone sensor specifically designed for motion-compensated wave monitoring. The sensor provides accurate measurements undisturbed by fog, rain and water spray. The value of the WaveFinder lies in increased situational awareness through high-accuracy and high-availability sea state data. This translates into wider weather windows, increased performance within the weather window and increased safety from accurate, real-time wave data. WaveFinder is also available as an IoT-based sensor, meaning that it is truly plug-and-play, only needing power and an Internet connection to give secure access to immediate, real-time data about the ocean state. WaveFinder is a decision-support solution which provides all stakeholder with access to real-time data, anytime, anywhere.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about the Miros WaveFinder here
Every Step of the Way: How Miros Supports the Offshore Wind Farm Lifecycle
WaveFinder Data Sheet

Contact

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Miros WaveFinder

Category: Maritime Operations and offshore logistics
Subcategory: Other
Type: Product

WaveFinder is the ultimate stand-alone sensor for motion-compensated airgap, tide, water level, draught and wave measurements. It is a dry, radar-based sensor, measuring with millimetre accuracy in all weather conditions. The sensor is specifically designed to be mounted on floating assets and is the only DNV GL-certified product on the market for alpha-factor related wave monitoring. The value of the WaveFinder lies in increased situational awareness through high-accuracy and high-availability sea state data. Real-time knowledge of local sea state and weather conditions can contribute substantially to the safety, performance and efficiency of offshore operations. These insights can reduce operational costs and support onshore decision-making processes too.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

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Read more about the Miros WaveFinder here
Every Step of the Way: How Miros Supports the Offshore Wind Farm Lifecycle
WaveFinder Data Sheet

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Miros WaveWeather

2019-08-12 - Miros

Category: System Integration/Digitalization
Subcategory: Internet of things
Type: Product

Miros WaveWeather delivers accurate, real-time measurements of local sea state and weather conditions to any user, on any device. High-quality data regarding local environmental conditions is fundamental for successful planning, decision-making, and execution of activities. WaveWeather provides this critical insight for all relevant stakeholders, on- or offshore. The compact solution is easy to install, simply requiring Internet and a power supply to get started. The environmental data is then immediately accessible anywhere, without the need for any external processing. This dry, Cloud-integrated solution makes the costly maintenance associated with underwater equipment a thing of the past and can be leveraged to support safe and efficient operations.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about WaveWeather here
WaveWeather data sheet
The Winds of Change: WaveWeather Arrives at ORE Catapult’s Levenmouth Demonstration Turbine

Contact

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Miros WaveWeather

Category: Maritime Operations and offshore logistics
Subcategory: Other
Type: Product

Miros WaveWeather delivers accurate, real-time measurements of local sea state and weather conditions to any user, on any device. High-quality data regarding local environmental conditions is fundamental for successful planning, decision-making, and execution of activities. WaveWeather provides this critical insight for all relevant stakeholders, on- or offshore. The compact solution is easy to install, simply requiring Internet and a power supply to get started. The environmental data is then immediately accessible anywhere, without the need for any external processing. This dry, Cloud-integrated solution makes the costly maintenance associated with underwater equipment a thing of the past and can be leveraged to support safe and efficient operations.

Technology readiness level (TRL)

According to API RP 17N

TRL 7: Proven technology integrated into intended operating system. The technology has successfully operated with acceptable performance and reliability within the predefined criteria

Reference

Read more about WaveWeather here
WaveWeather data sheet
The Winds of Change: WaveWeather Arrives at ORE Catapult’s Levenmouth Demonstration Turbine

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Semisubmersible transport and installation vessel

2019-06-24 - OHT Management

Category: Foundation Installation
Subcategory: Offshore installations
Type: Service

In 2021 OHT will bring to market the largest and most innovative, custom-built offshore wind foundation installation vessel in the world. The Alfa Lift design vessel will feature a 3,000 t main crane, a 10,000+ m² smart deck, capable of carrying and installing up to 16 XL monopiles or 10 jackets per voyage, and will be able to fully submerge the main deck to a depth of 15 m.

Free deck length: 148 m
Free deck area: 8,310 m² main + 2,470 m² fcstl
Accommodation: 100 people

The vessel is a 48,000 dwt semi-submersible offshore windfarm foundation installation vessel of Alfa Lift design (patent pending), ready for work early 2021.

Technology readiness level (TRL)

According to API RP 17N

Not appl: Not applicable.

Reference

OHT Alfa Lift vessel

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WAVECRAFT Crew Transfer Vessels

2019-06-25 - Umoe Mandal

Category: Maritime Operations and offshore logistics
Subcategory: Crew transport
Type: Product

WAVECRAFT™ series of new generation crew and passenger transfer vessels is our latest contribution to the Renewables, Oil & Gas, Passenger and Naval sectors. WAVECRAFT vessels are based on proven surface effect ship and air-cushion catamaran design.

We build all our high-performance navy and commercial vessels in composite sandwich materials, where low structural weight presents several benefits, including: high speed, high payload fraction, reduced displacement, lower power requirements, and up to 20-30% lowered fuel consumption than aluminum vessels, resulting in lower emissions.

Our vessels guarantee rapid transit time, excellent seakeeping and passenger comfort, superior fuel economy and reduced environmental footprint.

Technology readiness level (TRL)

According to API RP 17N

Not applc: Not applicable.

Reference

Umoe Mandal website
Operator of WAVECRAFT vessels

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