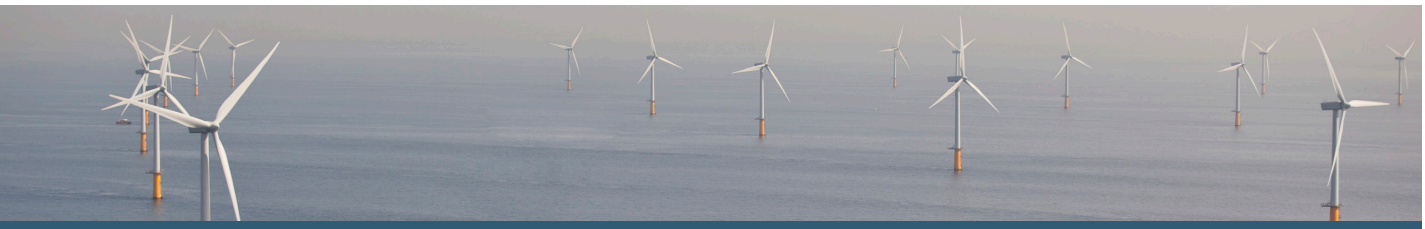
SEAWATCH Wind LiDAR Buoy



The Wind LiDAR buoy is a cost-effective and reliable solution for measuring wind profiles, waves and current profiles.

Wind Profile, Wave and Current Measurements

The SEAWATCH Wind LiDAR Buoy represents the next generation of multi-purpose buoys tailored for the renewable energy industry. The buoy accurately measures the speed and direction of wind across the diameter of wind turbine rotors, whilst sensors provide oceanographic parameters such as ocean waves and current profiles.

Features

- Collects data for wind resource assessments and/or for engineering design criteria
- Buoy mast wind profile measurements at 2.5 m, 4 m and 5 m
- Configurable LiDAR wind profile measurements at 10 levels from 12.5 m up to 300 m
- Configurable ocean wave measurements and sea current profiles
- Full on-board processing of all measured data
- Two-way communication link for data transfer and control
- Real-time data transfer and presentation
- Flexible configuration of sensors and data collection
- Modular hull for easy transport and local assembly
- Safe and easy handling and deployment
- Robust and reliable in all weather and temperature extremes
- Position tracker for increased safety
- The Wavescan buoy platform has a successful track record worldwide since 1985

Accurate measurement of wind profile using SEAWATCH Wind LiDAR Buoy

SEAWATCH Wind LiDAR Buoy

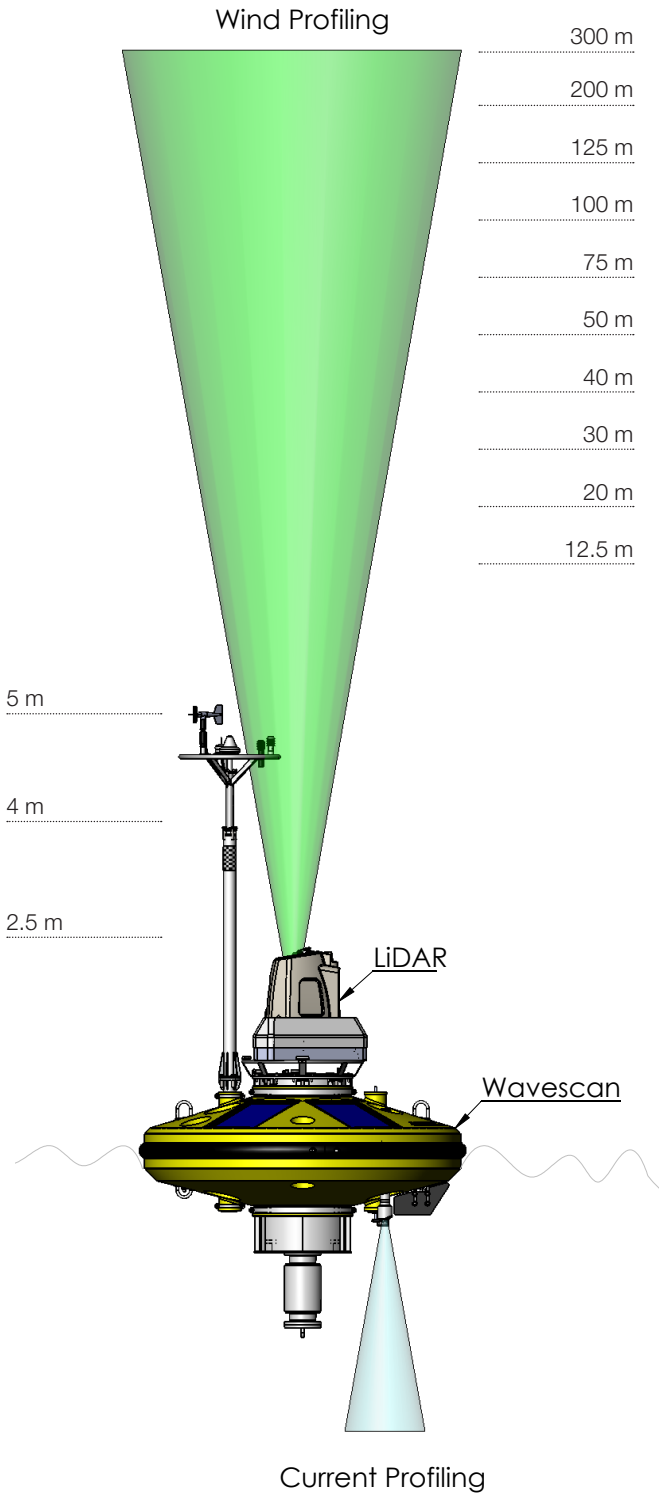
A Unique Cost-Efficient Solution

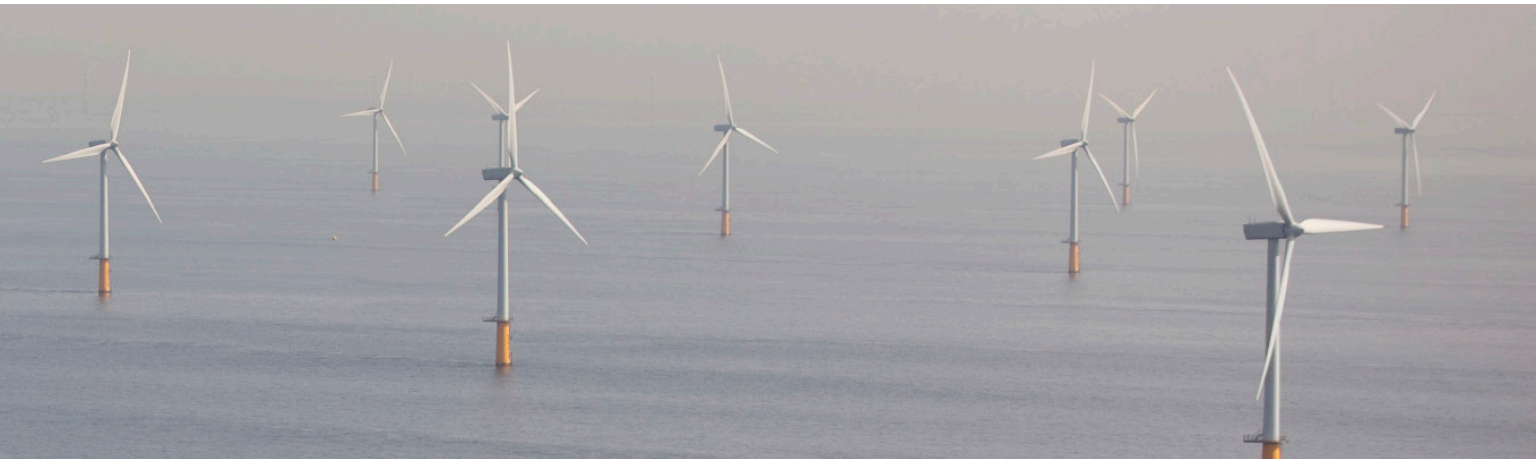
The SEAWATCH Wind LiDAR Buoy is a cost-efficient way to measure wind data at heights of conventional offshore wind turbines for wind resource assessments and engineering design criteria.

It is the first single compact buoy capable of measuring:

- Wind profiles across the blade span of the largest offshore wind turbines
- Ocean wave height and direction
- Ocean current profiles from the surface to the seabed
- Meteorological parameters
- Other oceanographic parameters as required

The smaller SEAWATCH Wind LiDAR Buoy is a proven ocean monitoring solution and is easily deployed and relocated (by towing or lifting onboard vessels) enabling data gathering across multiple locations. This is a more cost-effective alternative to existing wind profiling solutions such as fixed met masts or larger floating buoys.





Proven Platform and Technology

The SEAWATCH Wind LiDAR Buoy is built on the Seawatch Wavescan platform which has been deployed for a large number of satisfied clients in the most hostile oceanographic environments since 1985.

Its well proven SEAWATCH technology, includes the GENI™ controller, an intelligent power management unit and the ZephIR LiDAR.

ZephIR LiDAR

The ZephIR LiDAR was selected after years of testing and comparison of various concepts. The ZephIR 300 provides highly accurate measurements across the entire rotor diameter and beyond and can be configured to measure up to 10 different heights from 12.5 to 300 metres above the sea surface.

Low power consumption of the ZephIR 300 and intelligent power management are key to efficient operation when using a small low-cost platform.

Successful Collaboration

The SEAWATCH Wind LiDAR Buoy is the result of a successful joint industry R&D project, utilising offshore and wind technology expertise from Norwegian universities, research institutes and the energy company Statoil.

The Wind LiDAR Buoy validation took place at an exposed location, off the coast of Norway. The tests were designed to compare wind data collected by the Wind LiDAR Buoy, to data from a similar LiDAR located on land and from a fixed met tower. Wind velocities up to 20 m/s and wave heights up to 5 metres were recorded. The average deviation in wind speed measurements between the Wind LiDAR Buoy and the reference stations was less than 2%.

SEAWATCH Wind LiDAR Buoy

Technical Specifications

General

Material	Polyethylene, Aluminium, Stainless Steel
Flash light	LED based, 3-4 nautical miles range
	IALA recommended characteristic
Positioning	GPS (Inmarsat-C, Iridium, Standalone Receiver)

Buoy Dimensions

Weight (approx)	1200 kg
Overall height	6.1 m
Diameter	2.8 m
Net buoyancy	2500 kg
Mast height (above water)	3.5 m

Power Supply

Solar panels (optional)	180 W
Lead-acid battery bank (optional)	Up to 248 Ah
Lithium battery bank	Up to 9792 Ah

Processing

512 MB data storage

Real-time operating system (Linux)

Large number of serial and analogue inputs

Flexible data acquisition software

Data Communication

Short range	GSM / GPRS
	UHF / VHF radio (two-way)
Long range	Inmarsat-C and Iridium (two-way)
	ARGOS (one-way)

Directional Wave Data Sensor

Parameter	Range	Accuracy
Heave, Surge, Sway	± 25m (adjust)	< 10 cm
Direction	0 - 360°	0.3°
Wave period	2 - 30 sec	< 2% of value

Full wave directional analysis on-board based on spectral analysis and user-friendly configuration tools

Wind Profiler - ZephIR 300 CW LiDAR

Measurement height (configurable)	10 m – 300 m
Probe length at 10 m	0.07 m
Probe length at 100 m	7.7 m
Number of simultaneous heights measured	Up to 10
Sampling rate	50Hz
Average period (configurable)	1 second upwards
Scanning cone angle	30°
Wind speed accuracy	< 0.5%
Wind speed range	< 1 m/s to 70 m/s
Wind direction accuracy	< 0.5°

Various additional sensors are available on request, including but not limited to:

Oceanographic Sensors

Current velocity

Current direction

Water temperature

Conductivity / Salinity

Current profile

CTD profile

Meteorological Sensors

Wind speed/direction

Air pressure

Air temperature

Humidity

Precipitation

Solar radiation

Water Quality Sensors

Dissolved oxygen

Light attenuation

Chlorophyll-a

Hydrocarbon

Turbidity

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