Sofar Spotter

The smart buoy that delivers real-time weather data from anywhere in the ocean.

Real-time ocean data is sparse and notoriously difficult to collect. Spotter changes that. This turnkey marine sensing device gathers wave, wind, sea surface temperature, and barometric pressure data, and delivers insights via Sofar's Spotter Dashboard and API. Spotter gives you instant, accurate visibility of ocean conditions.

Real-time data, OTA updates, sharing, & API

24/7 satellite and cellular connectivity provides access to real-time weather data and system updates at any time. Share data through the Spotter Dashboard, use the API to connect your data to wherever you need it, or use our native ESRI map layer. Cellular-enabled over-the-air firmware updates mean your Spotter is always getting new features and new capabilities.

Compact, Portable, and Easy to Deploy

Roughly the size of a basketball, Spotter can be shipped anywhere around the world, carried by hand, and deployed from any size vessel. Every Spotter comes with 1 year of Iridium satellite data credits included, so it is immediately ready to deploy.

Spotter Data

Wind + Wave

Spotter collects 3D displacement time series, and calculates the wave spectrum, which is stored onboard and can be transmitted through the dashboard. In addition, you receive updates for:

- Position / time
- Wave mean / peak period
- Wind speed / direction
- Wave mean / peak directional spread
- Significant wave height
- Wave mean / peak direction
- Wave mean directional spread

Sea Surface Temperature

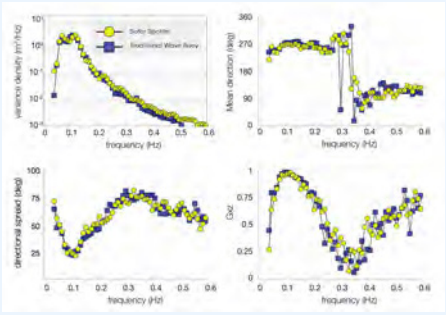
Spotter comes equipped with a compact, digital temperature sensor to provide high-fidelity Sea Surface Temperature (SST) measurements. The sensor is mounted in an insulated stainless steel penetrator to provide excellent thermal contact with the water and is rated for 0.1°C absolute accuracy and 0.02°C resolution.

Barometric Pressure

The barometer measures atmospheric pressure at the sea surface with rated initial accuracy of + / - 1 mbar between 0°C to 50°C at an operating range of 700 to 1100 millibars. Accuracy is relative to single-point calibration reference. Accuracy drift of up to 1mbar/year.

Data Partitioning

In addition to the standard bulk parameters, Spotter can provide the same parameters over 'sea' and 'swell' wave partitions.

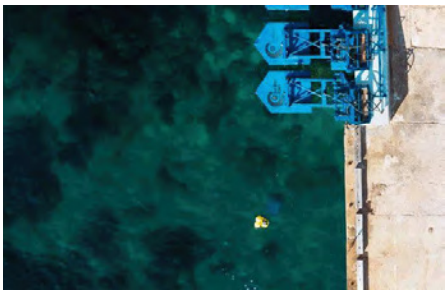


Comparison of spectral variables estimated from data recorded on 4/19/17, 15:00(UTC). Clockwise from top left: variance spectrum, mean direction, directional spread, and cross-coherence Gxz.

Spotter Success Stories

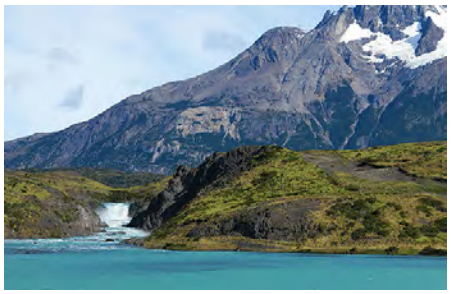
Protecting Beluga Whales in the Canadian Arctic

This long-term program uses coastal observatories (seabed moorings with acoustic recorders and oceanographic sensors and weather stations) to investigate the influence of changing environmental parameters (waves, weather, ice, and coastal erosion) on beluga habitat use, water column biogeochemistry, and underwater noise and vessel impacts.



Powering Wave Energy Innovation in Gibraltar

"Spotter provides integral information as it allows us to conduct accurate measurements of wave height, period and direction in the exact location of our wave energy power station, thereby providing us with the possibility to perform a high accuracy comparison between the wave characteristics and the energy produced," said Marina Gurevich of Eco Wave Power.



Supporting Sustainable Aquaculture in Chile

Among several efforts to understand the relationships between aquaculture production and the marine environment, a real-time monitoring network of environmental variables is underway at salmon farming sites around Southern Chile. This network aims to promote sensible management of aquaculture production and coastal risk alert systems through large scale data analysis.

Trusted by:

USGS science for a changing world

IOOS Integrated Ocean Observing System

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

FUGRO

Office of Naval Research Science & Technology

US Army Corps of Engineers®

東京大学 The University of Tokyo

Oregon State University

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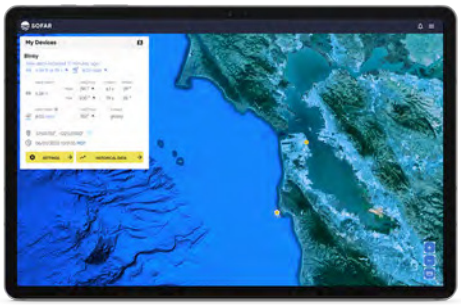


Solar-powered

The combination of solar panels and a rechargeable battery means that you never have to worry about running out of power. Spotter is self-contained, low maintenance, and always ready to collect data.

Rugged design

The ocean is a rough place. Every part of Spotter is built to withstand the harshest ocean elements in any weather condition, anywhere on our planet. Spotters have logged over 10 million ocean hours.

Spotter dashboard

The Spotter Dashboard and API provide access to real-time and historical data. The dashboard enables you to change your Spotter's settings from anywhere in the world, set up alerts for weather conditions, and get notified if your Spotter is outside of its geofence.

Spotter Technical Specifications

Specs

External dimensions [w X h]	42 cm x 31 cm (16.4 in x 12.2 in)
Weight	7.45 kg (16 lbs, 7 oz)
Connectivity	Iridium SBD (satellite)
Primary power source	Solar powered, 5x 2 Watt, 6 Volt solar panels
Battery	Lithium-ion, capacity 11,200 mAh, 3.7v (rechargeable)

Motion Sensing

Motion data format	Easting, northing, elevation, latitude, longitude
Wave frequency range	0.03-1 Hz (30s to 1s)
Wave direction resolution	0 - 360 degrees (full circle)
Sampling rate	2.5 Hz (Nyquist at 1.25Hz)
Wave displacement accuracy	Approximately +/- 2cm accuracy depends on field of view, weather conditions, and GPS system status
Calibration	Not needed, ever

Additional Onboard Sensors

Sea surface temperature (SST)	-5°C to 50°C range, ±0.1°C absolute accuracy, ±0.02°C resolution
Barometer	Range: 700...1100mbar, Accuracy: +/-0.5 mbar at 25°C

Data Storage

On-board (SD card)	Records time series of 3D displacement data, ships with 16GB (256GB max capacity), FAT16 or FAT32 Format required
Cloud storage (online dashboard)	Online account includes: Real-time and historical data outputs, Spotter configurations, alerts, maps and 2-way communication

Data Outputs

* Can derive from SD card data.

	Standard mode	Spectrum mode	On device
Significant wave height	x	x	x*
Peak period	x	x	x*
Mean period	x	x	x*
Peak direction	x	x	x*
Mean direction	x	x	x*
Peak directional spread	x	x	x*
Mean directional spread	x	x	x*
Variance density spectrum		x	x
Directional moments (a1, b1, a2, b2)		x	x
3D displacement time series @ 2.5 Hz (x,y,z)			x
Sea surface temperature	*Not available with Smart Mooring units.*		
Wind speed	x	x	
Wind direction	x	x	x*
Drift speed			x*
Drift direction			x*
Geographical coordinates (lat, lon)	x	x	x*

Misc. specs

System monitoring	Battery power status
Advised mooring depth	Any depth
Visibility LED	1 flash every 2.5 sec, at least 1 mile visibility under normal conditions.
Firmware upgrade	Standard micro-USB (cable included)
Usability	Magnetic on/off switch, run/idle mode, user LED's and integrated grab handles.

Smart Mooring

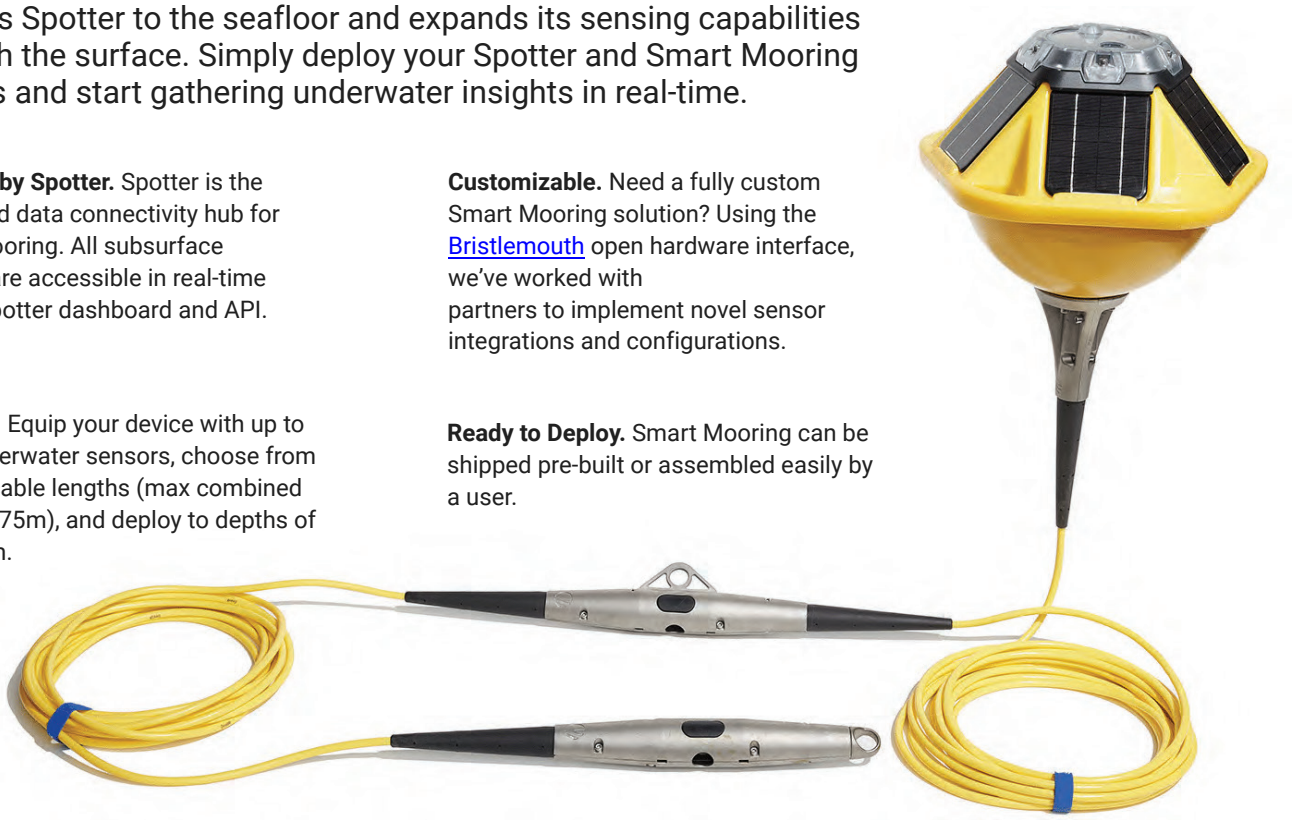
Smart Mooring is the underwater extension of our Spotter platform. It anchors Spotter to the seafloor and expands its sensing capabilities beneath the surface. Simply deploy your Spotter and Smart Mooring devices and start gathering underwater insights in real-time.

Powered by Spotter. Spotter is the power and data connectivity hub for Smart Mooring. All subsurface insights are accessible in real-time via the Spotter dashboard and API.

Customizable. Need a fully custom Smart Mooring solution? Using the Bristlemouth open hardware interface, we've worked with partners to implement novel sensor integrations and configurations.

Versatile. Equip your device with up to three underwater sensors, choose from variable cable lengths (max combined length of 75m), and deploy to depths of up to 50m.

Ready to Deploy. Smart Mooring can be shipped pre-built or assembled easily by a user.



Specifications

Smart Mooring has fully modular and interchangeable architecture that features different cable lengths and different node types.

Available Cable Lengths	5m, 10m, 15m, 25m, 35m, 50m
Jacketing	Thermoplastic polyurethane, high-visibility yellow, UV stabilized, biofouling resistant. Marked every meter.
Conductors	2-conductor, 16 AWG (power + data)
Reinforcement	Kevlar braid
Diameter	14.5mm

Usage Guidelines

Maximum Working Load*	1300 N (~300 lbf)
Winch/Capstan Use*	Tested for 200+ continuous cycles over a 4.25" sheave with a 3" capstan with a weight of 450lbs.

*Maximum working load and winch/capstan use guidelines are calculated and tested using new cables. Repeated use and the various mooring configuration and environmental considerations may alter these guidelines. [Have a question? Please contact support@sofarocean.com]

Compatible Sensor Specifications

Sofar Temperature Sensor

Accuracy	+/- 0.1 C
Resolution	0.02 C
Range	-5 C to 50 C

RBRcoda³ D Pressure

Calibration Depths	20dbar, 50dbar
Accuracy	+/- 0.05% full scale
Resolution	< 0.001% full scale
Frequency	2Hz

RBRcoda³ T Temperature

Accuracy	+/- 0.002 C
Resolution	< 0.00005 C
Range	-5 C to 35 C

RBRcoda³ T.D is available (has both temperature and pressure sensors on one device)