SOFAR

Spotter Platform

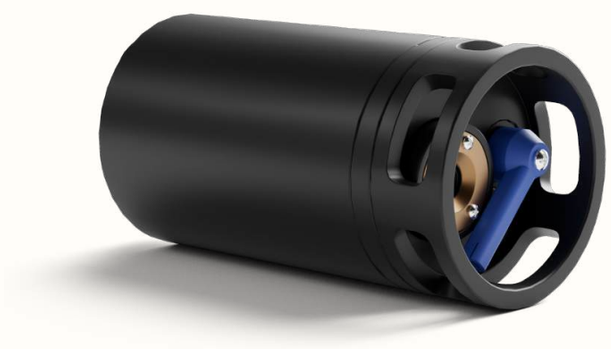
SPECIFICATIONS

Spotter Platform

Spotter Buoy
Access Real-Time
Surface Data

Spotter with Smart Mooring
Simplify Subsurface Sensing

Hydrophone
Real-time Intelligent
Acoustic Monitoring



Dissolved Oxygen Sensor
Actionable Water Quality Measurement

Temperature Sensor
Profile the Water Column

Pressure Sensor
Real-Time Water Level

Current Meter
Complete Sea State Awareness

Bristlemouth Development Kit
Custom Subsurface Sensing

Talk to an expert

Click here

Spotter Buoy • *Access Real-Time Surface Data*

A flexible and rapidly deployable metocean buoy that delivers real-time wave spectra, wind (derived), sea surface temperature, and atmospheric pressure data.

1. **Instant Data Access**
   View observations of waves & other surface variables in real time via dashboard and API to improve operational safety & efficiency.

2. **Scalable**
   Significantly lower total cost of ownership vs. traditional platforms. Easily deploy a network to maximize spatial density.

3. **Rugged & Reliable**
   Engineered to operate continuously in harsh marine conditions, from polar ice to extreme heat.

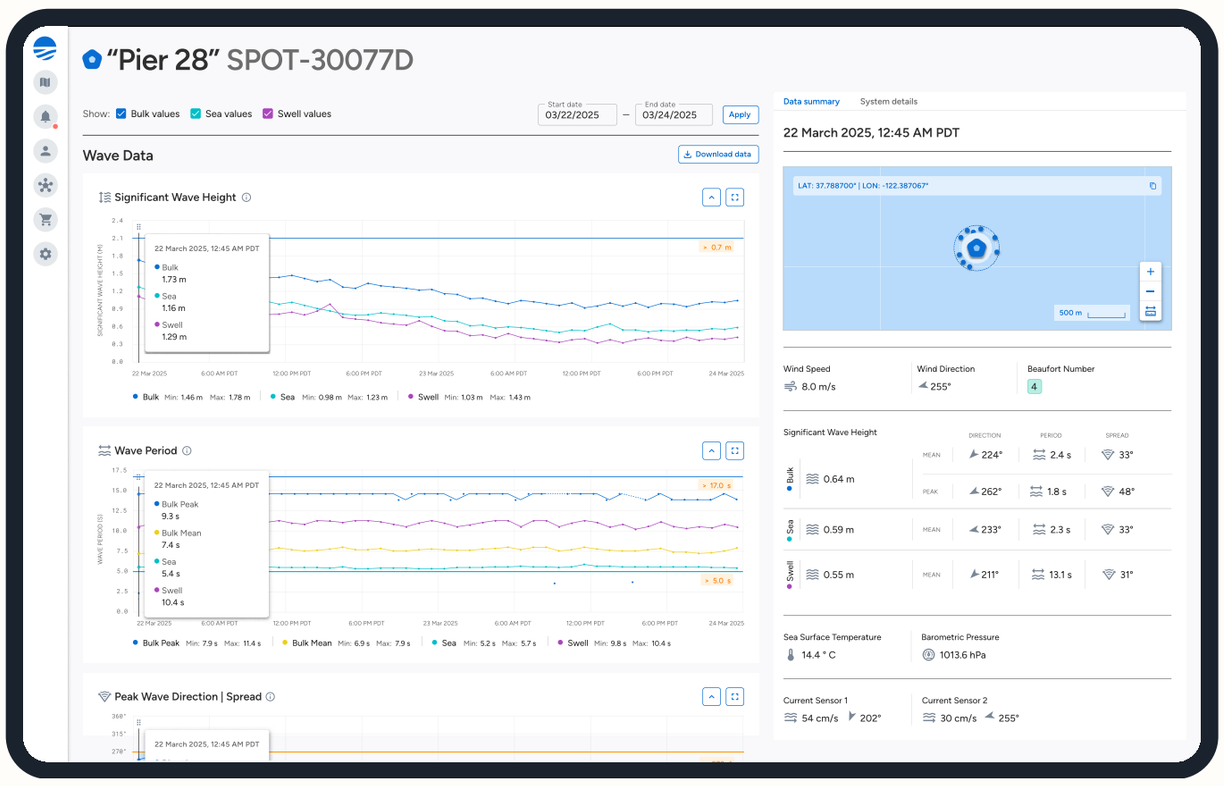
Spotter Measurements Wave & Wave Spectra — Wind (Derived) — Sea Surface Temperature — Atmospheric Pressure

User-Friendly Dashboard & API

View data sent in real time via satellite/ cellular or download historical data stored in the cloud.

Remotely adjust settings and initiate over-the-air firmware updates with two-way communication to reduce downtime.

Leverage API to build custom dashboards that visualize forecast data and direct observations.



Trusted by

USGS · IOOS Integrated Ocean Observing System · Department of the Navy ONR Science & Technology · National Oceanic and Atmospheric Administration NOAA U.S. Department of Commerce · 東京大学 The University of Tokyo · US Army Corps of Engineers

Core Specifications

Dimensions	Width: 42 cm (16 in), Height: 31 cm (12.2 in)
Weight	7.45 kg (16 lb 7 oz)
Connectivity	Satellite (Iridium SBD) and Cellular
Primary Power Source	Solar-powered, 5× 2 Watt, 6 Volt solar panels
Battery	Rechargeable lithium-ion 13,400 mAh capacity, 3.7 Volts

Motion Sensing

Motion Data Format	Easting (mm), northing, elevation, latitude, longitude
Wave Frequency Range	0.03 - 0.8Hz (30s - 1.25s)
Wave Direction Range	0 - 360°
Sampling Rate	2.5Hz
Wave Displacement Accuracy	Approximately ±2cm accuracy depends on field of view, weather conditions, and GPS system status

Data Outputs

	Standard Mode	Spectrum Mode	On Device
Significant Wave Height	●	●	●*
Peak Period	●	●	●*
Mean Period	●	●	●*
Peak Direction	●	●	●*
Mean Direction	●	●	●*
Peak Directional Spread	●	●	●*
Mean Directional Spread	●	●	●*
Variance Density Spectrum	○	●	●
Directional Moments (a1, b1, a2, b2)	○	●	●
3D Displacement Time Series @ 2.5 Hz (x,y,z)	○	○	●
Sea Surface Temperature	●**	●**	●**
Barometer	●	●	●
Wind Speed	●	●	○
Wind Direction	●	●	○
Drift Speed	○	○	●*
Drift Direction	○	○	●*
Geographical Coordinates (lat, lon)	●	●	●

Additional Onboard Sensors

Sea Surface Temperature (SST)	
Accuracy	±0.1°C absolute
Resolution	±0.02°C
Range	-5°C - 50°C

Barometer	
Accuracy	±0.5mbar at 25°C
Range	700 - 1100mbar

Data Storage

Onboard (SD Card)
Records time series of 3D displacement data, ships with 16GB SD card (supports up to 2TB, FAT32 format required)

Cloud Storage (Online Dashboard)
Online account includes real-time and historical data outputs, Spotter configurations, alerts, maps, and two-way communication

Misc. Specifications

System Monitoring
Battery voltage, solar panel power, internal humidity

Advised Mooring Depth
5 - 300m

Visibility Light
.5s flash every 2.5s (configurable), minimum 1 mile visibility in normal conditions

Firmware Updates
USB-C and over-the-air updates (cellular only)

Usability
Physical on/off switch, run/idle magnetic toggle, user LEDs and integrated grab handles

*Can derive from SD card data
**Sea Surface Temperature is not available with Smart Mooring

Spotter with Smart Mooring • *Simplify Subsurface Sensing*

Extend Spotter's data collection capabilities underwater. Measure subsurface temperature, water level, currents, acoustics, dissolved oxygen, and more in real time.

1. **Real-Time Data Access**
   Access real-time subsurface data via dashboard and API. Spotter acts as a hub for power and connectivity.

2. **Adaptable and Durable**
   Fully modular design enables flexible sensor configurations. Interchangeable architecture is extremely resilient to severe ocean conditions.

3. **Customizable**
   Easily add off-the-shelf sensors using the Bristlemouth open connectivity standard.

Smart Mooring Nodes

Nodes are universal and extremely durable. Add up to three subsurface sensors throughout the water column. Colocate and combine subsurface data with Spotter's surface measurements to maximize understanding of the operating environment.

Hydrophone

Real-time intelligent acoustics

Dissolved Oxygen Sensor

Actionable water quality measurement

Current Meter

Complete Sea State Awareness

Temperature Sensor

Profile the water column

Pressure Sensor

Real-time water level

Bristlemouth Development Kit

Custom subsurface sensing

Core Specifications

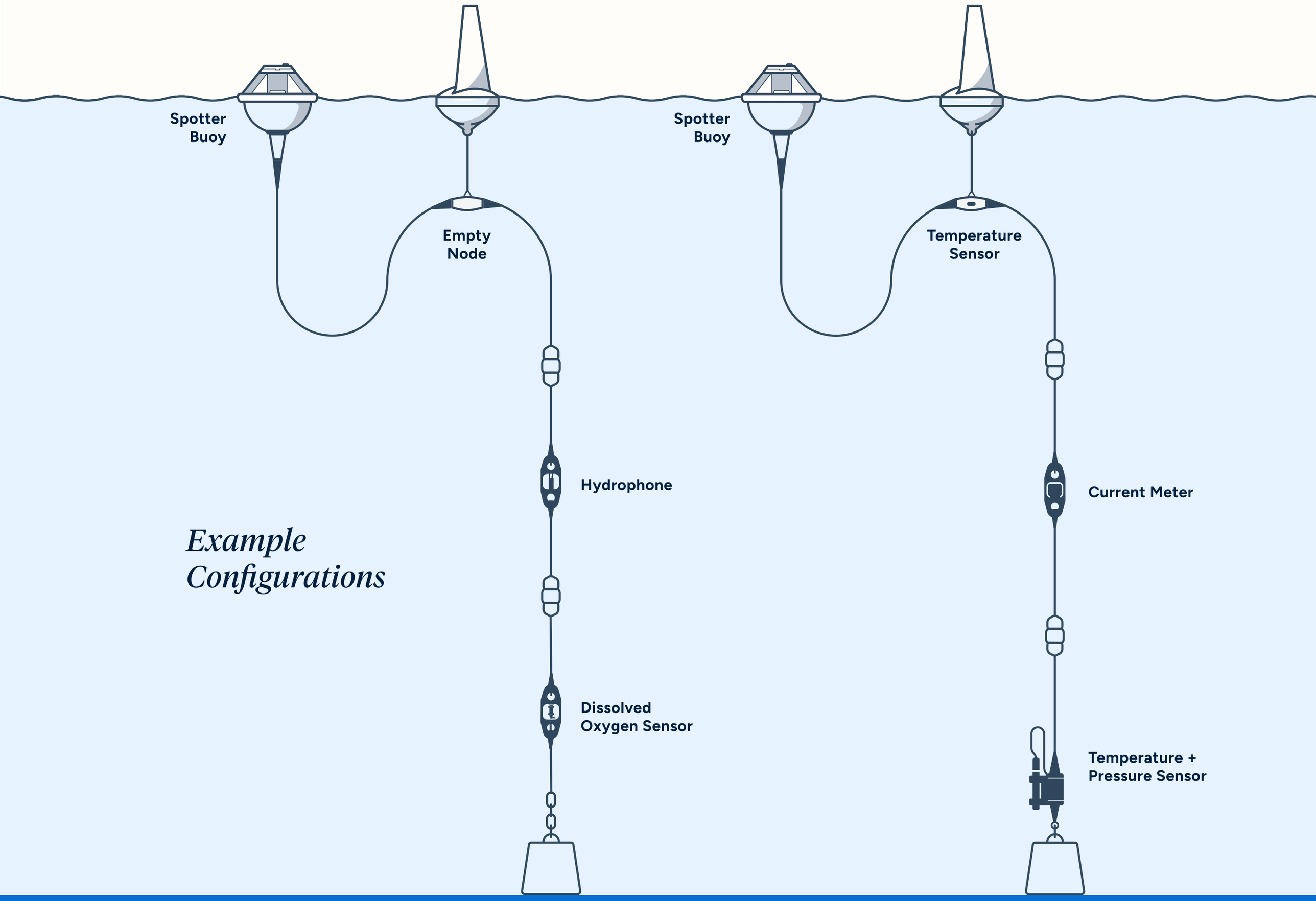
Available Cable Lengths	5m, 10m, 20m, 25m, 35m, 50m
Jacketing	Thermoplastic polyurethane, high-visibility yellow, UV stabilized, biofouling resistant
Diameter	14.5mm
Reinforcement	Kevlar braid
Conductors	2-conductor, 16 AWG (power + data)

Usage Guidelines

Maximum Working Load*	1,780 N (~400 lbf)
Winch/Capstan Use*	Tested for 200+ continuous cycles over a 4.25” sheave with a 3” capstan with a weight of 450 lbs.
Max Deployment Depth	50m

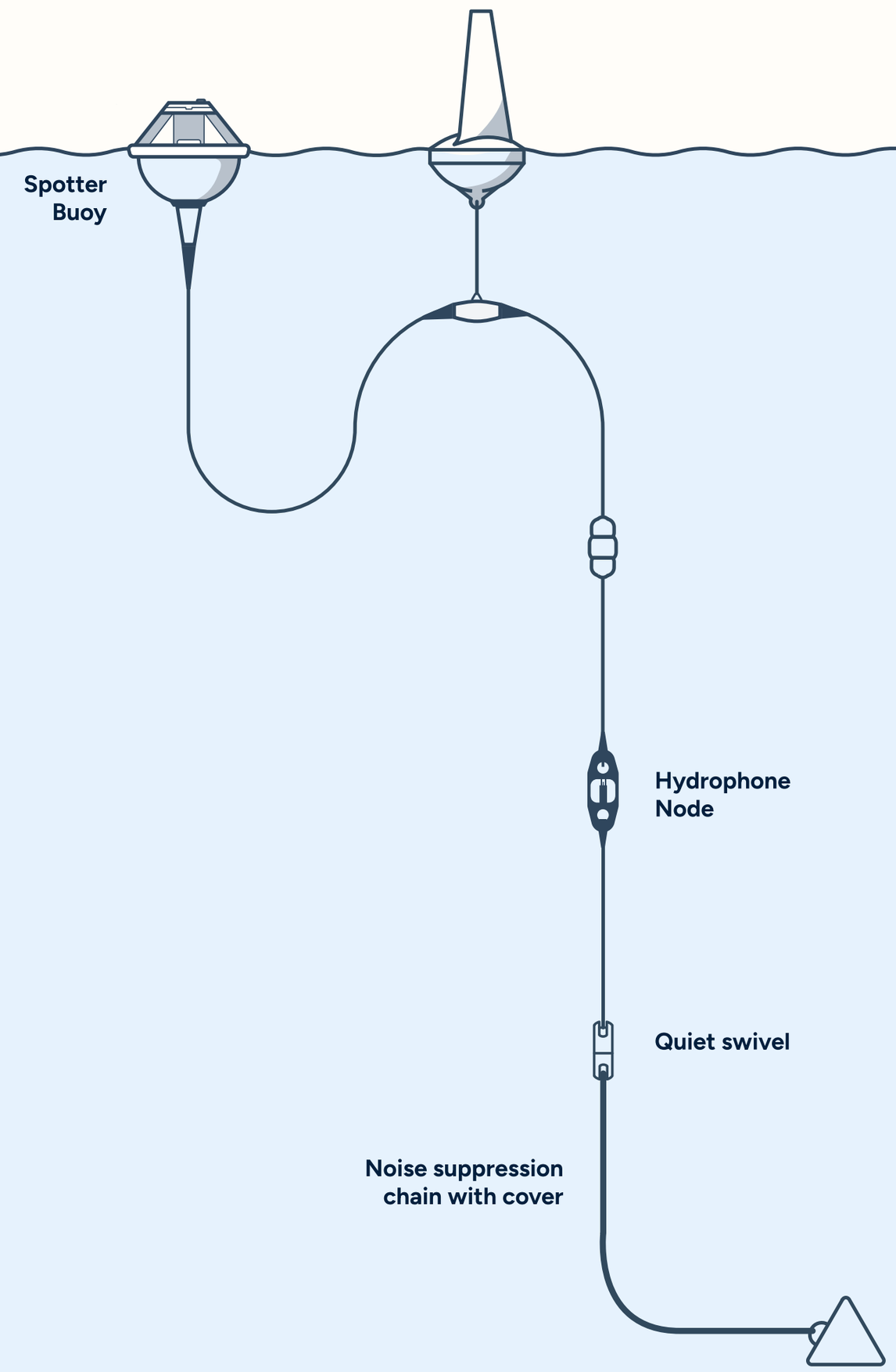
*Maximum working load and winch/capstan use guidelines are calculated and tested using new cables. Repeated use and the various mooring configuration and environmental considerations may alter these guidelines.

Example Configurations



Hydrophone • *Real-Time Intelligent Acoustic Monitoring*

Capture underwater sound data at scale with a robust, turnkey hydrophone engineered for real-time noise detection and analysis. Advanced acoustics technology and edge data processing reduce cost and complexity, enabling broader coverage and extended deployments.



HIGH-IMPACT USE CASES

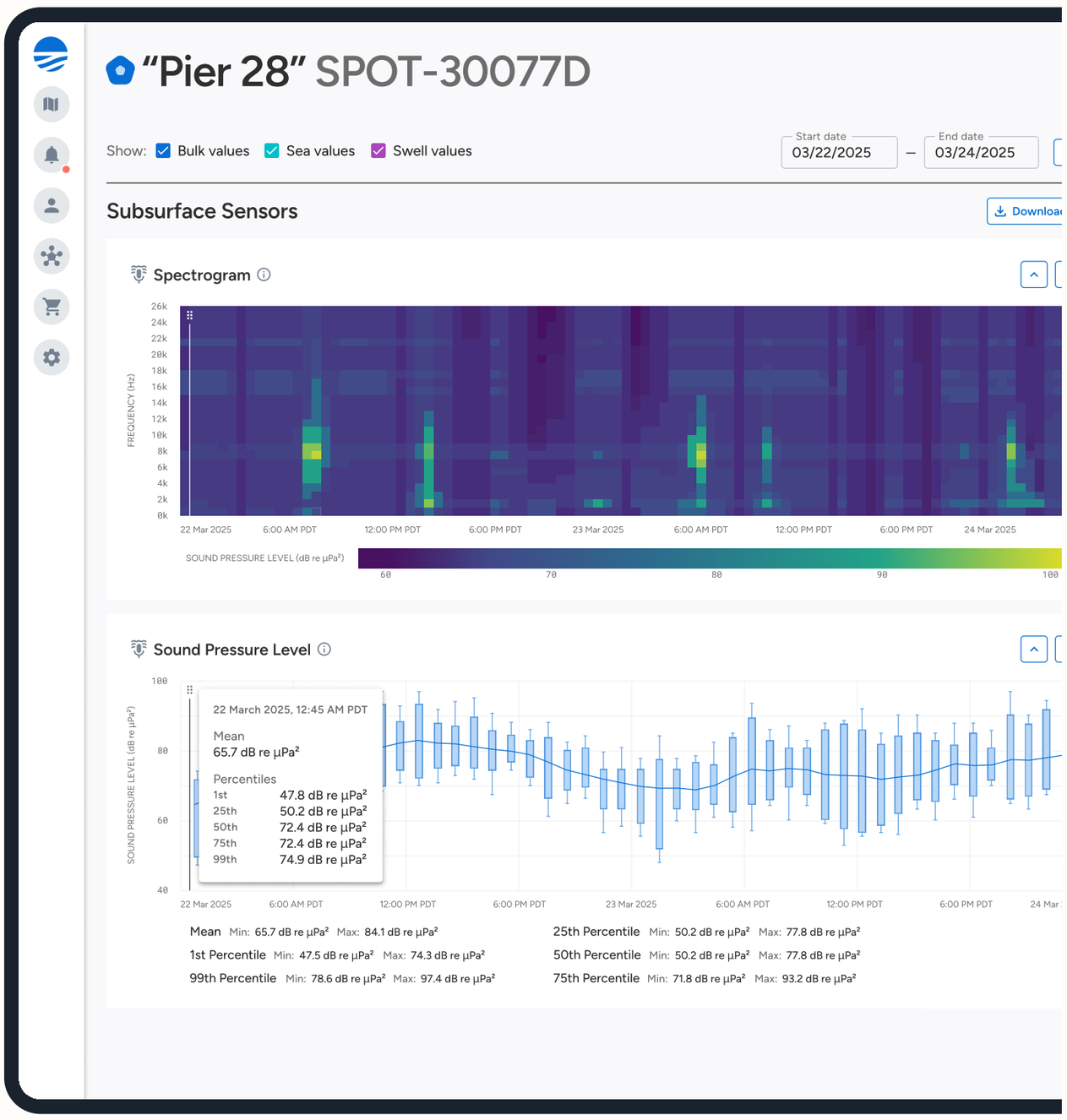
Marine Research & Conservation
Collect continuous or event-triggered acoustics data for marine mammal monitoring and research.

Offshore Engineering
Measure changes to the soundscape from construction noise to meet environmental regulations.

Defense & Security
Detect unauthorized vessels, coordinate search & rescue, and improve maritime situational awareness.

Core Specifications

Sensor	Applied Ocean Sciences Borealis
Sensor Type	Piezoelectric
Frequency Range	18 Hz - 25 kHz
Sensitivity	-203 dB re 1V/µPa
Self-Noise	<31 dB re 1 µPa²/Hz
Power Consumption	35 - 75 mW (mode dependent)
Sleep Power	<5 mW in standby mode
Sampling Rates	15k, 20.8k, 31.25k, 62.5k sps (configurable)
Directional Response	Omnidirectional
Pre-amp Gain	26.4 dB before ADC
Bit Depth	24-bit ADC (dithered to 16-bit logged)
Maximum Depth	50m
Power Supply	Spotter's Li-ion battery (solar-rechargeable)
Operating Temperature	-5°C - 35°C
Size (Dia. x Len.)	~51 mm × 254 mm
Weight	0.85 kg (< 2 lb)
Interface Standard	Bristlemouth-native (plug-and-play)



Data Collection & Outputs

Collection Modes

Continuous
Always-on recording with scheduled data offload

Duty Cycling
Record intermittently to extend battery/SD usage

Event/Trigger
Automatic detection triggers high-resolution logging

Data Outputs

Waveform
Full acoustic waveform data for detailed analysis

Spectral
Frequency domain data for sound characterization

Event/Trigger
Timestamped acoustic events based on thresholds

Sound Pressure Level (SPL)
Timestamped acoustic events based on thresholds

Sound Exposure Level (SEL)
Cumulative sound energy measurements

Our system computes key noise metrics—such as SPL and SEL—by factoring in both the hydrophone's inherent low self-noise and any added noise from the mooring setup. This combined approach ensures that environmental acoustic signals are captured accurately, free from system interference.

Deployment & Best Practices

Configuration Options
Ideal for moored coastal deployments with one Spotter or a network. Integrate up to two more devices (e.g. pressure/oxygen) per Smart Mooring (max 3 total)

Depth Placement
Optimal depth placement (10-25m)

Remote Configuration & Controls
Direct control via Spotter Dashboard, binary/ASCII commands, and Sofar remote support

Maintenance
Rinse sensor with fresh water after retrieval

Data Access & Analysis

Spotter Dashboard
View real-time data and insights

API Access
Retrieve data programmatically with our secure API

Onboard Storage
Download complete spectrogram via Spotter and wav files via BOREALIS SD cards for offline analysis

Edge Processing
Supports real-time event detection with minimal bandwidth

Transmission
Satellite and cellular options

Dissolved Oxygen Sensor • *Actionable Water Quality Measurement*

Monitor dissolved oxygen (DO) concentration and saturation in real time with a compact, long-dwell DO sensor. An integrated anti-fouling wiper and ultra-low power solar-rechargeable battery enables extended deployments and continuous access to water quality insights.

HIGH-IMPACT USE CASES

Marine Research & Conservation

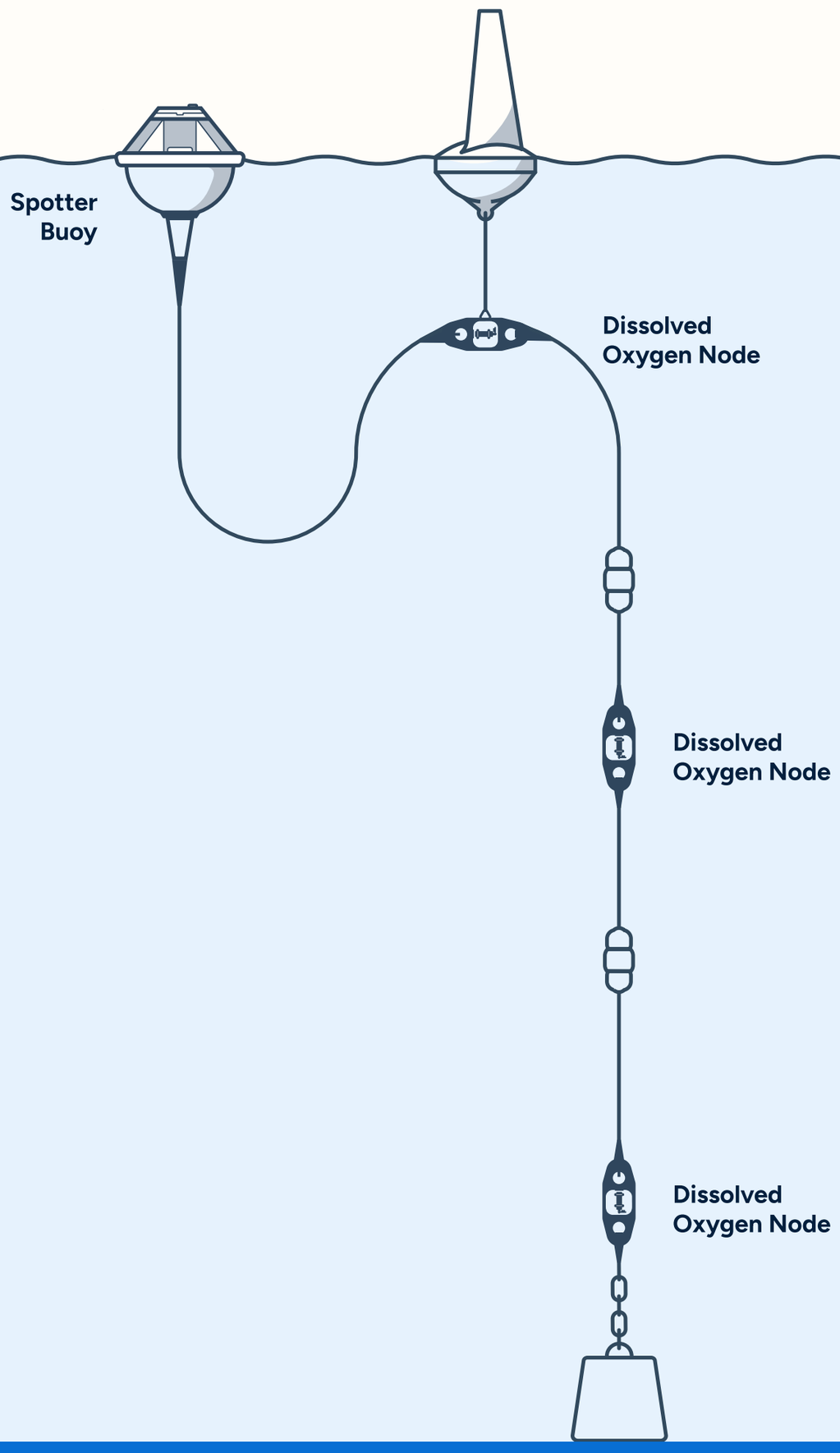
Identify hypoxic “dead zones,” track ocean climate change, and protect threatened ecosystems like coral reefs.

Aquaculture

Monitor long-term DO levels to streamline site assessment and track habitat health.

Offshore Engineering

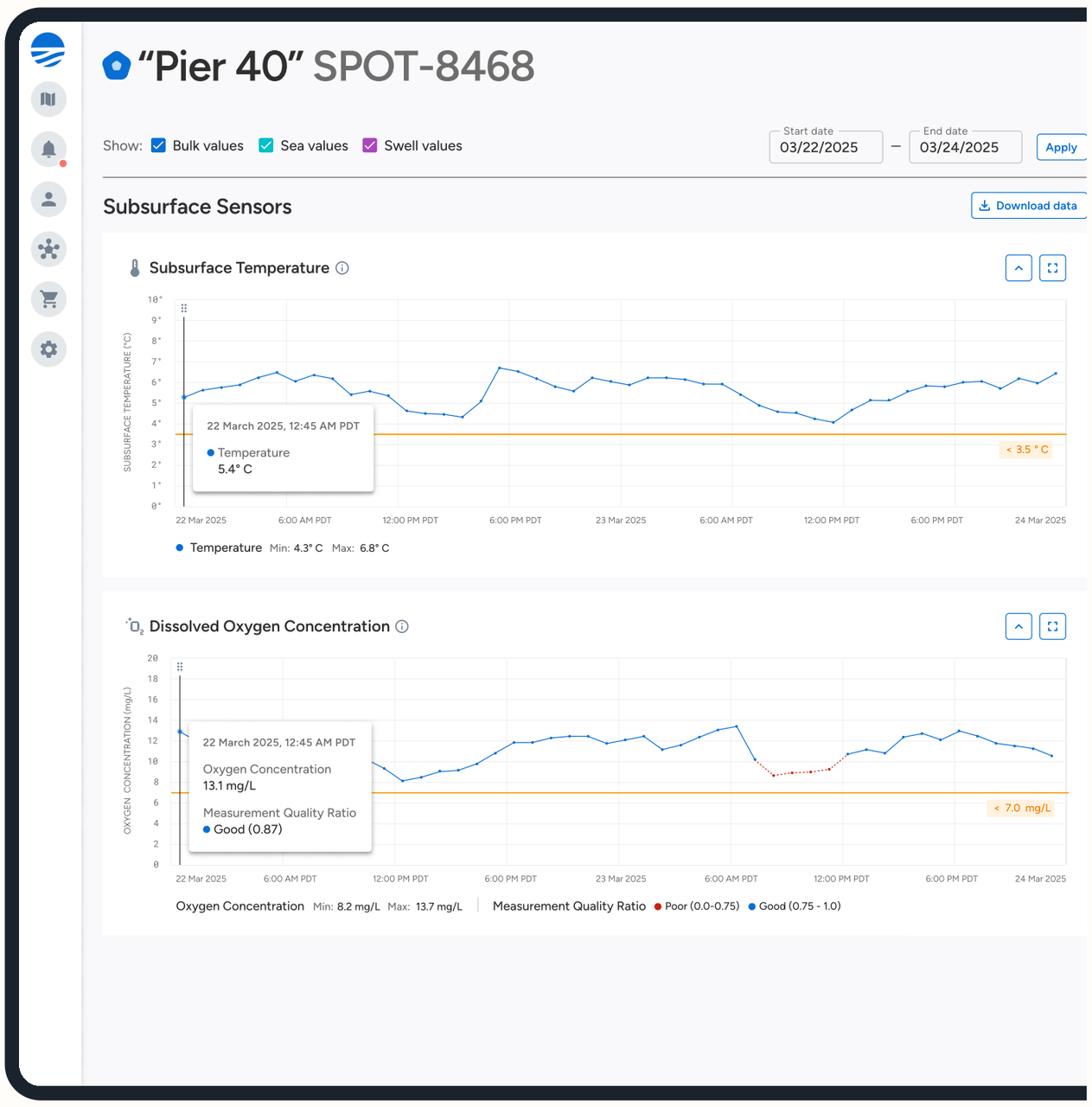
Measure impacts of construction on water quality to comply with environmental regulations.



Core Specifications

Sensor	PME MiniDOT Logger (DO + Temperature)
Sensor Type	Optical
Dissolved Oxygen	Accuracy: ±5% or ±0.3 mg/L
	Resolution: 0.001 mg/L (1 µg/L)
	Range: 0 - 150% saturation
Temperature	Accuracy: ±0.1°C
	Resolution: 0.001°C
	Range: 0°C - 35°C
Oxygen Response Time	~30s to 90% step change
Sampling Rates	5 s to 24 hr interval, user-set
Calibration Method	96-point factory calibration
Maximum Depth	50 m
Power Supply	Spotter's Li-ion battery (solar-rechargeable)
Size (Dia. x Len.)	~76 mm × 203 mm
Weight	.34 kg (< 0.75 lb)
Interface Standard	Bristlemouth-native (plug-and-play)

When combined with salinity data, this sensor enhances measurement accuracy by providing salinity-compensated O_2 concentration (µmol/L) and O_2 saturation (%) readings.



Anti-Fouling Wiper

This submersible, self-contained device uses a rotating brush to sweep the sensor surface, reducing organism growth and preventing biofouling. After each pass, the brush retracts to avoid interference, ensuring accurate, continuous monitoring.

Deployment & Best Practices

Configuration Options
Ideal for moored coastal deployments with one Spotter or a network. Integrate up to two more devices (e.g. pressure/current) per Smart Mooring (max 3 total)

Mounting
Mount sensor horizontally; avoid sediment or bubble interference

Remote Configuration & Controls
Direct control via Spotter Dashboard, binary/ASCII commands, and Sofar remote support

Maintenance
Rinse sensor with fresh water after retrieval. Clean sensing foil periodically; verify calibration annually

Data Access & Analysis

Spotter Dashboard
View real-time data and insights

API Access
Retrieve data programmatically with our secure API

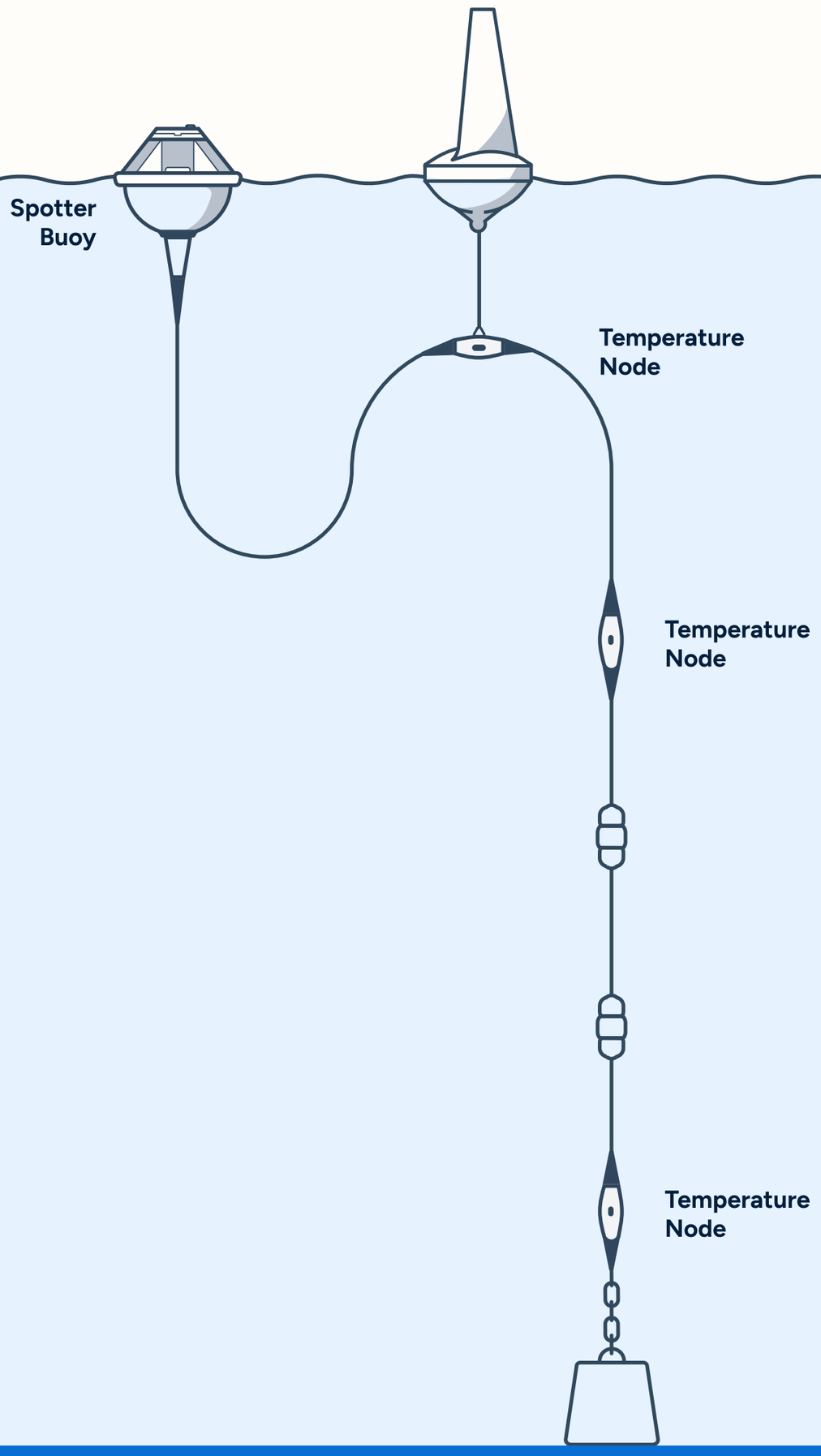
Onboard Storage
Download data via SD card for offline analysis

Transmission
Satellite and cellular options

Temperature Sensor • *Profile the Water Column*

Profile real-time, high-resolution water temperature with a rugged, ocean-grade thermistor. Measure continuously with exceptional accuracy, minimal drift, and energy-efficient solar-rechargeable power.

RBRCODA³ T: TEMPERATURE SENSOR



HIGH-IMPACT USE CASES

Marine Research & Conservation

Record a continuous temperature profile to establish benchmarks, pinpoint fluctuations, and monitor long-term impacts on marine ecosystems.

Aquaculture

Track seasonal temperature changes throughout the water column to assess potential sites and prioritize fish health.

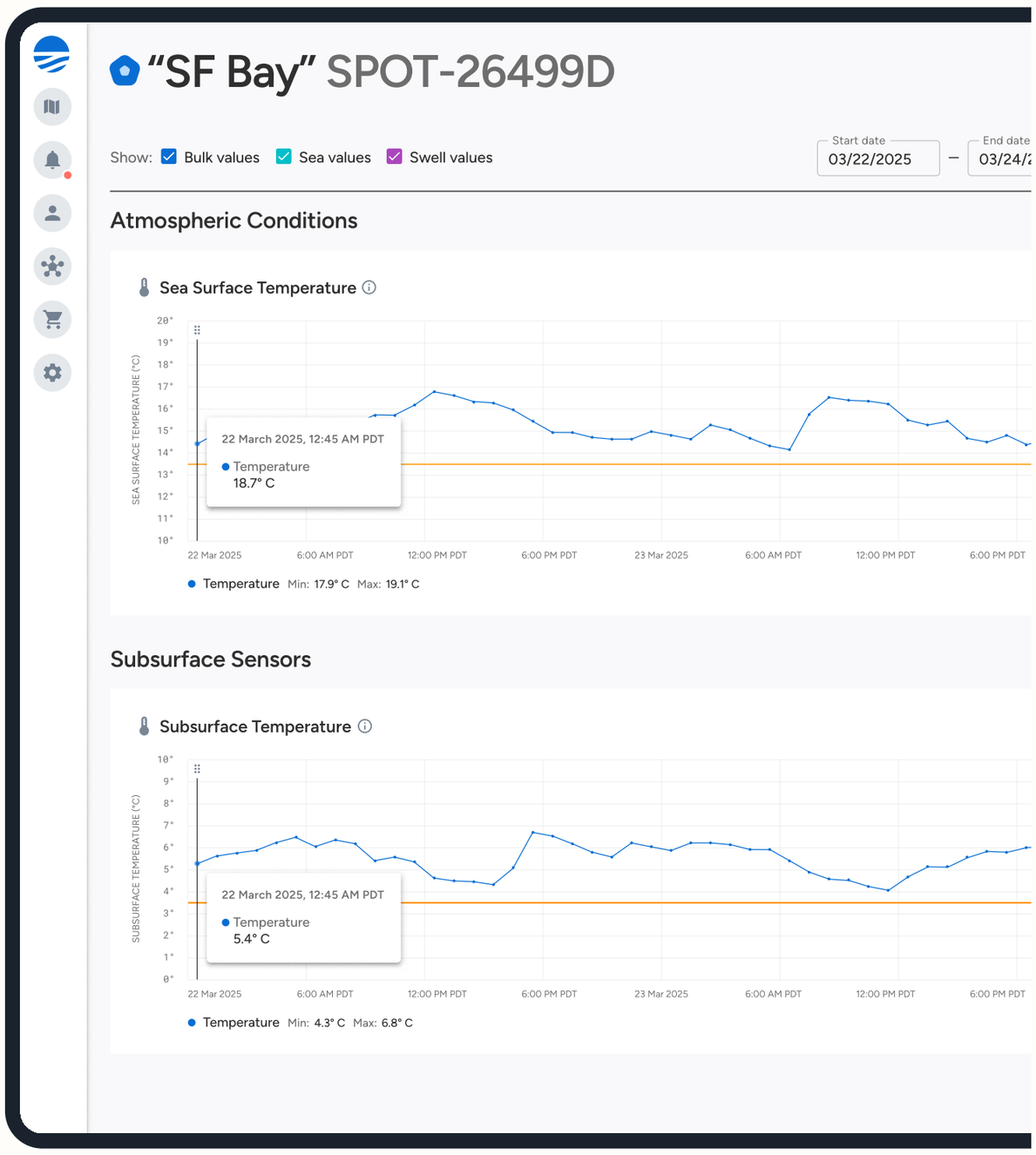
Extreme Weather Forecasting

Monitor subsurface temperature and Spotter's sea surface temperature to inform climate models and improve storm forecasting.

Core Specifications
RBRcoda³ T: Temperature Sensor

Sensor	RBRcoda³ T: Temperature Sensor
Sensor Type	Thermistor
Accuracy	±0.002 °C
Resolution	<0.00005 °C
Range	–5 °C to 35 °C
Stability	±0.002 °C per year
Response Time	<1 s time constant (standard sensor)
Sampling Rates	2 Hz standard; 1 Hz low-power (slow) or up to 32 Hz high-speed
Maximum Depth	50 m
Power Supply	Spotter's Li-ion battery (solar-rechargeable)
Size (Dia. x Len.)	~25 mm x 245 mm
Weight	~160 g (<0.4 lb)
Interface Standard	Bristlemouth-native (plug-and-play)

RBRcoda³ T.D: Temperature & Pressure (depth) is also available to combine measurements on a single device.



Core Specifications
Sofar Temperature Sensor

Sensor	Sofar Temperature Sensor
Sensor Type	Thermistor
Accuracy	±0.1°C
Resolution	0.02°C
Range	–5 °C to 50°C
Maximum Depth	50 m
Power Supply	Spotter's Li-ion battery (solar-rechargeable)

Deployment & Best Practices

Configuration Options
Ideal for moored coastal deployments with one Spotter or a network. Integrate up to two more devices (e.g. pressure/oxygen) per Smart Mooring (max 3 total)

Remote Configuration & Controls
Direct control via Spotter Dashboard, binary/ASCII commands, and Sofar remote support

Maintenance
Rinse with fresh water after retrieval

Data Access & Analysis

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View real-time data and insights

API Access
Retrieve data programmatically with our secure API

Onboard Storage
Download data via SD card for offline analysis

Transmission
Satellite and cellular options

Pressure Sensor • *Real-Time Water Level*

Monitor real-time water level and subsurface pressure with a rugged, ocean-grade piezoresistive sensor. An ultra-low power solar-rechargeable battery enables continuous access to precise, high-resolution measurements with minimal drift.

HIGH-IMPACT USE CASES

Coastal Resilience

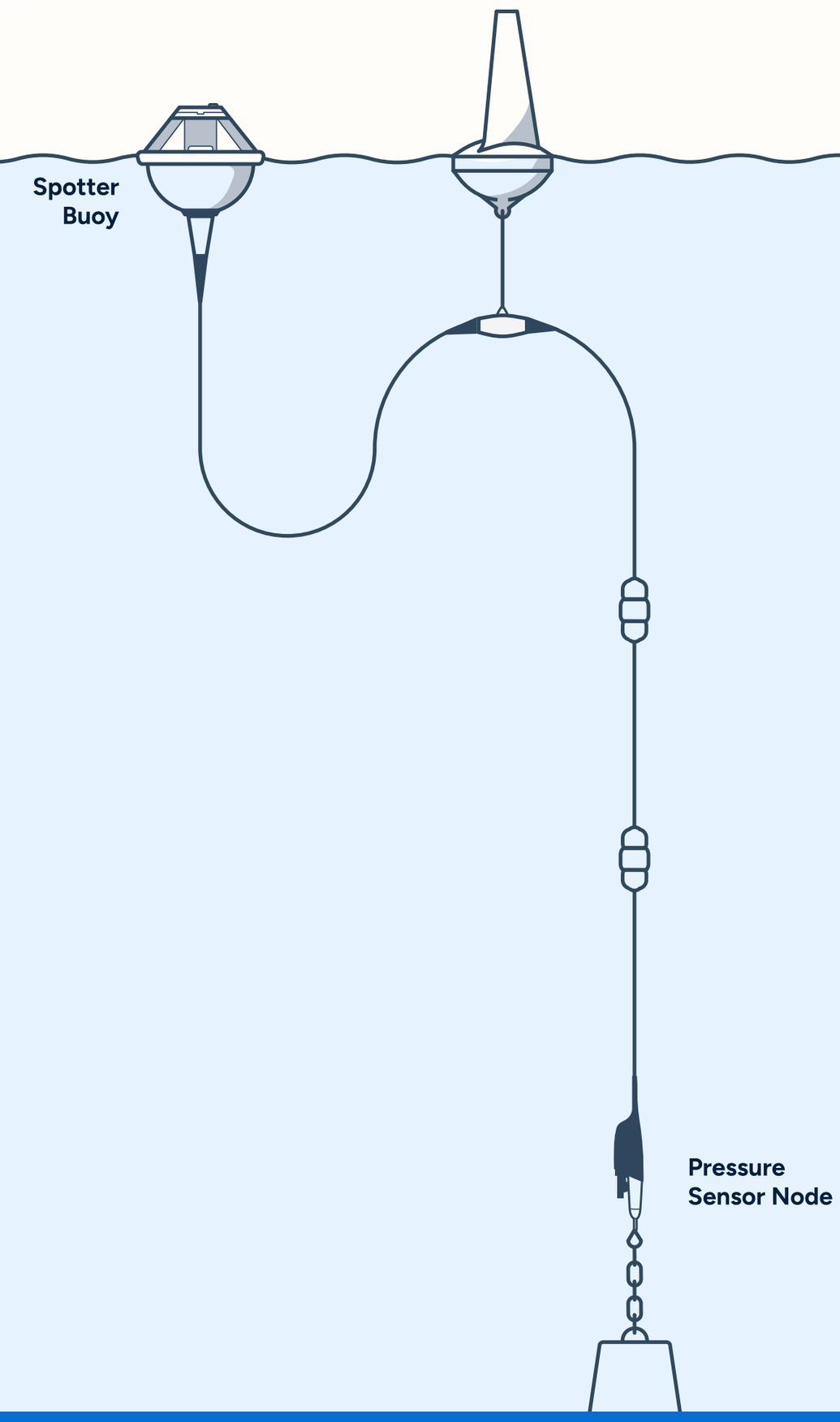
Continuously monitor water level nearshore to protect port infrastructure and coastal communities from storm surge and sea level rise.

Offshore Engineering

Remotely assess water level offshore to ensure safe navigation, operations, and ongoing maintenance.

Geological Monitoring

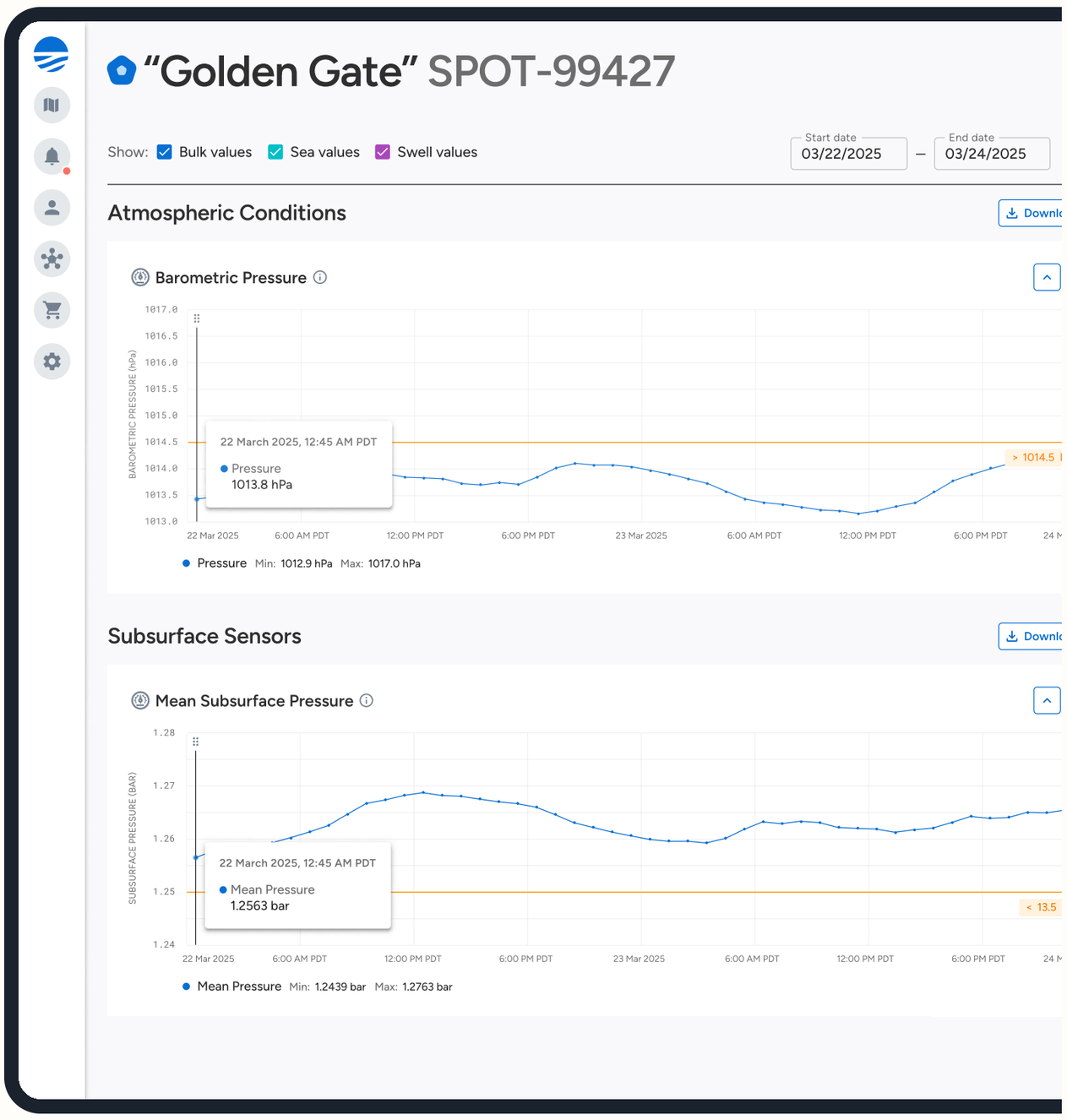
Detect dangerous shifts in subsurface pressure to inform early warning systems for tsunamis.



Core Specifications

Sensor	RBRcoda³ D: Pressure Sensor (depth)
Sensor Type	Piezoresistive pressure transducer
Accuracy	±0.05% full scale
Resolution	<0.001% full scale
Range	20–1000 m
Stability	±0.05% full scale per year (typical drift)
Response Time	<10 ms
Sampling Rates	2 Hz (standard); up to 32 Hz (fast option)
Maximum Depth	50 m
Power Supply	Spotter's Li-ion battery (solar-rechargeable)
Size (Dia. x Len.)	~25 mm x ~235 mm
Weight	170 g (<0.4 lb)
Interface Standard	Bristlemouth-native (plug-and-play)

RBRcoda³ T.D: Temperature & Pressure (depth) is also available to combine measurements on a single device.



Deployment & Best Practices

Configuration Options
Ideal for moored coastal deployments with one Spotter or a network. Integrate up to two more devices (e.g. temp/current) per Smart Mooring (max 3 total)

Calibration
Recalibrate annually to offset drift (±0.05% FS/year)

Mounting
Mount with sensor head (pressure port) pointing downward to prevent debris clogging

Remote Configuration & Controls
Direct control via Spotter Dashboard, binary/ASCII commands, and Sofar remote support

Maintenance
Rinse with fresh water after retrieval

Data Access & Analysis

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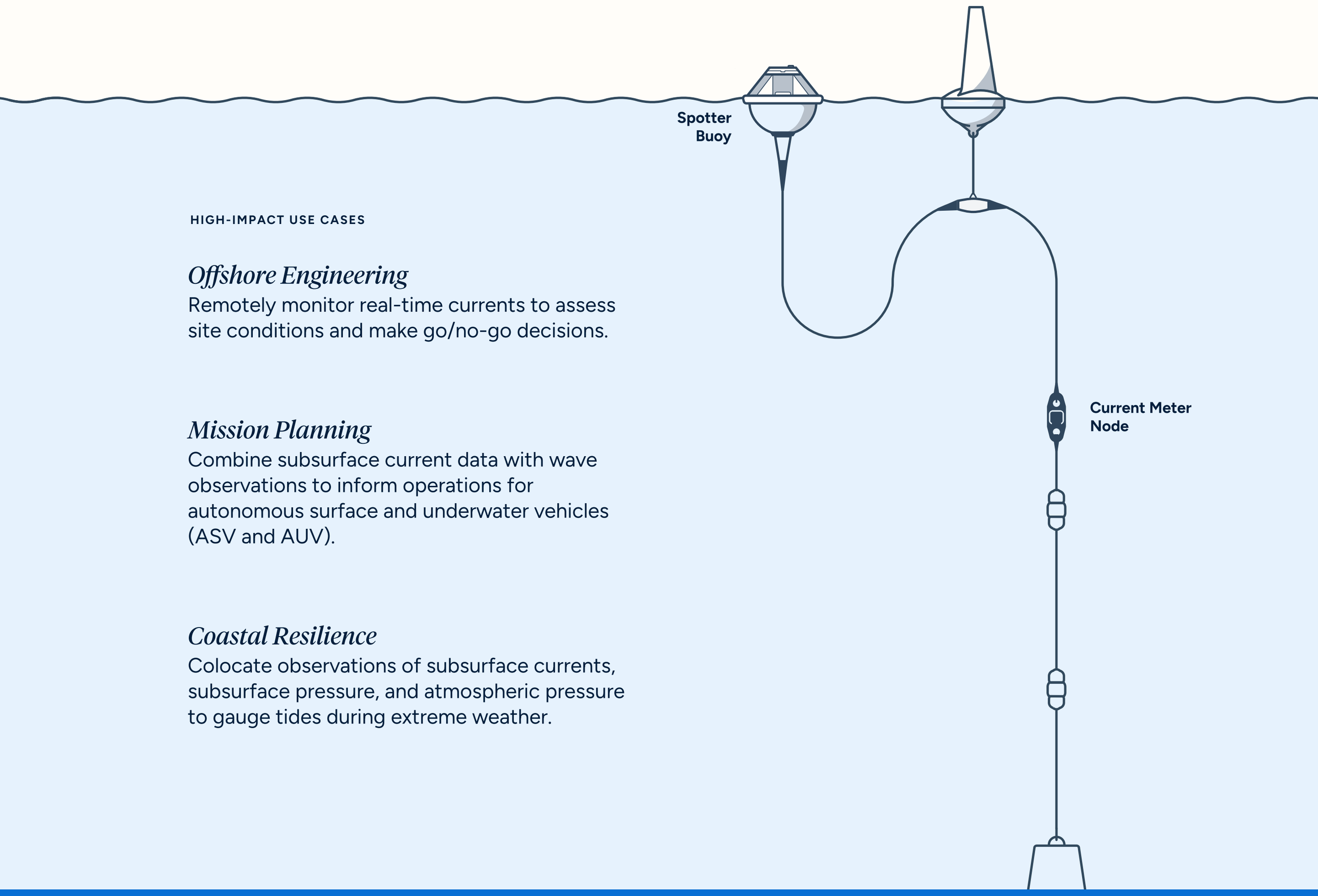
Transmission
Satellite and cellular options

Current Meter • *Complete Sea State Awareness*

Measure subsurface current speed and direction in real time with a rugged single-point current meter. Sample precisely and rapidly with motion-tolerant, tilt-compensated performance and energy-efficient solar-rechargeable power.



HIGH-IMPACT USE CASES

Offshore Engineering

Remotely monitor real-time currents to assess site conditions and make go/no-go decisions.

Mission Planning

Combine subsurface current data with wave observations to inform operations for autonomous surface and underwater vehicles (ASV and AUV).

Coastal Resilience

Colocate observations of subsurface currents, subsurface pressure, and atmospheric pressure to gauge tides during extreme weather.

Core Specifications

Sensor	Aanderaa 4830 ZPulse® Doppler Current Sensor (DCS)
Category	Single-point acoustic Doppler current meter
Current Speed	Accuracy: ±0.15 cm/s or 1% reading
	Resolution: 0.1 mm/s
	Range: 0–300 cm/s (0–100 cm/s max when deployed)
Current Direction	Accuracy: ±5° (for tilt 0–15°) ±7.5° (tilt 15–35°)
	Resolution: 0.01°
	Range: 0–360° (magnetic)
Tilt Circuitry	Accuracy: ±1.5°
	Resolution: 0.01°
	Range: 0–35°
Compass Circuitry	Accuracy: ±3°
	Resolution: 0.01°
	Frequency: 1.9 to 2.0MHz
Temperature	Accuracy: ±0.1°C
	Resolution: 0.01°C
	Range: -5°C – 40°C
Sampling Method	~150 pings/axis; vector average; user-set interval
Transducers	4 units; 1.9–2.0 MHz; 2° beam; cell: 0.4–1.0 m
Maximum Depth	50 m
Power Supply	Spotter's Li-ion battery (solar-rechargeable)
Size (Dia. x Len.)	120 mm × 108 mm
Weight	1.8 kg (~4 lbs)
Interface Standard	Bristlemouth-native (plug-and-play)

Data Access & Analysis

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View real-time data and insights

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Retrieve data programmatically with our secure API

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Download data via SD card for offline analysis

Transmission
Satellite and cellular options

Deployment & Best Practices

Configuration Options
Ideal for moored coastal deployments (single Spotter or network). Supports up to two current sensors per Smart Mooring, plus one additional device (max 3 total).

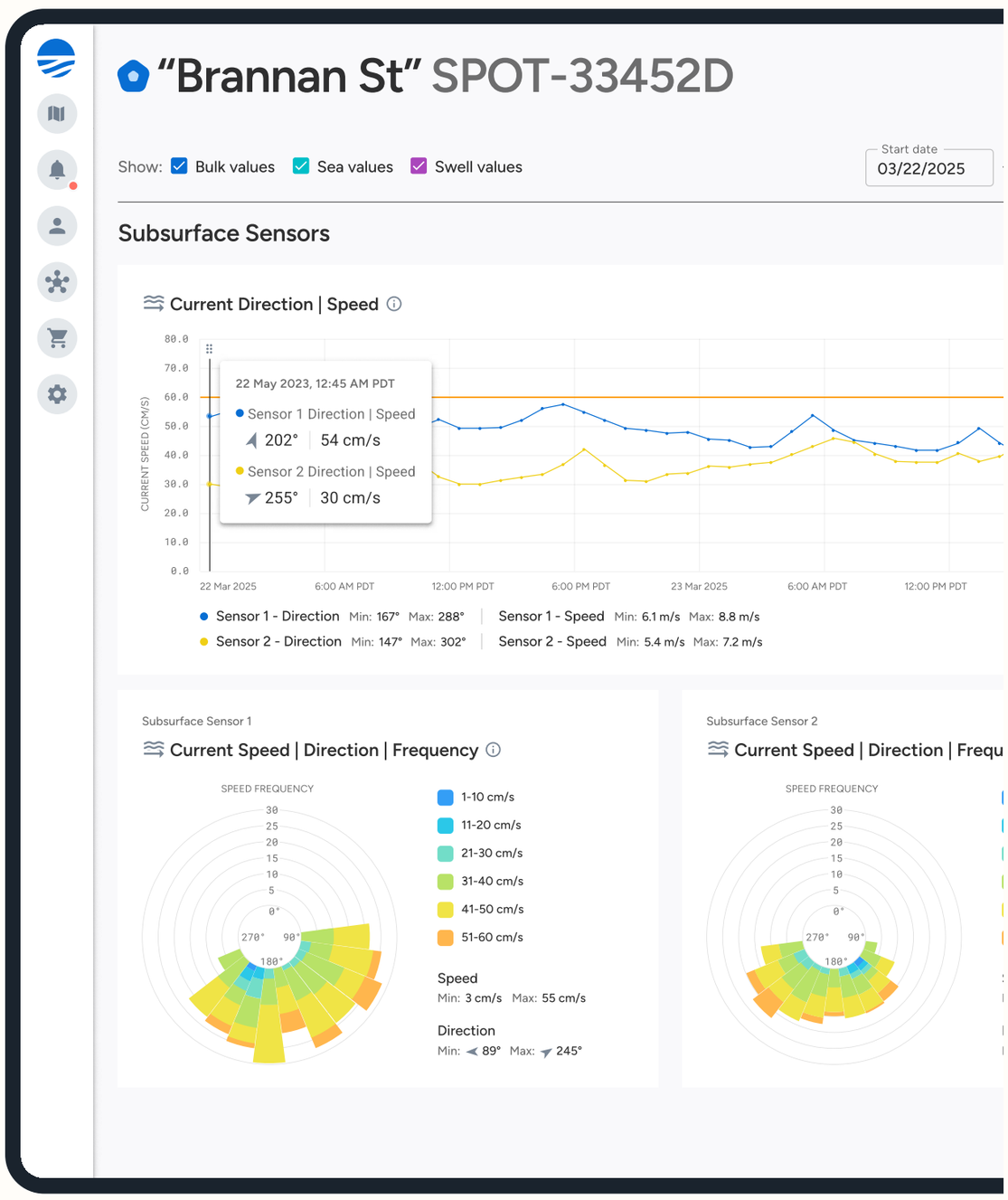
Max Operational Conditions
Up to 100cm/s current velocity

Calibration
Recalibrate annually (~0.50% FS drift)

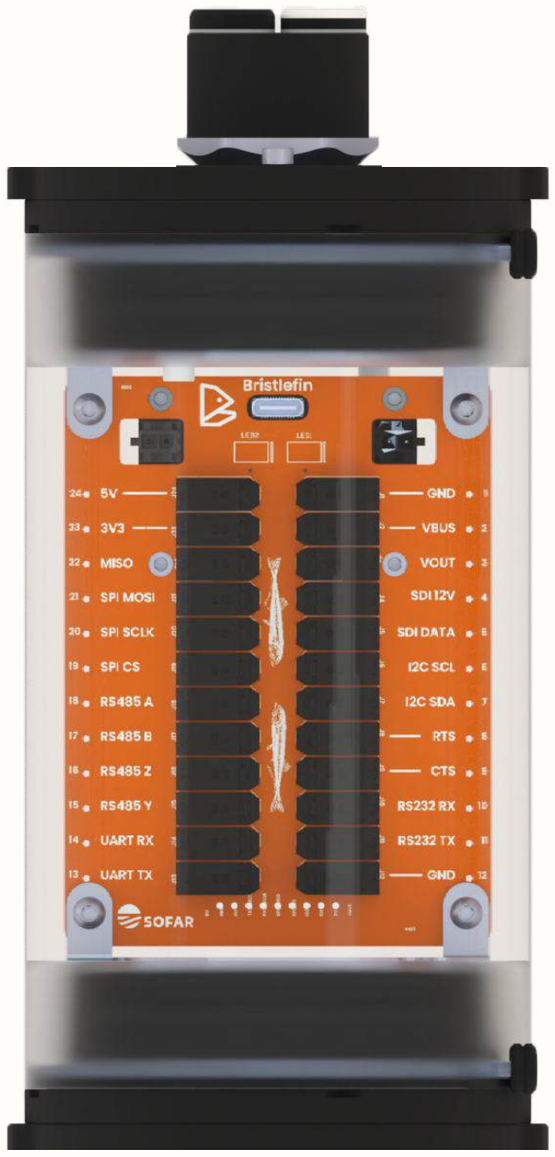
Mounting
Mount with sensor head (pressure port) pointing downward to prevent debris clogging

Remote Configuration & Controls
Direct control via Spotter Dashboard, binary/ASCII commands, and Sofar remote support

Maintenance
Rinse with fresh water after retrieval. Clean the pressure port to remove debris



Bristlemouth Development Kit • *Custom Subsurface Sensing*



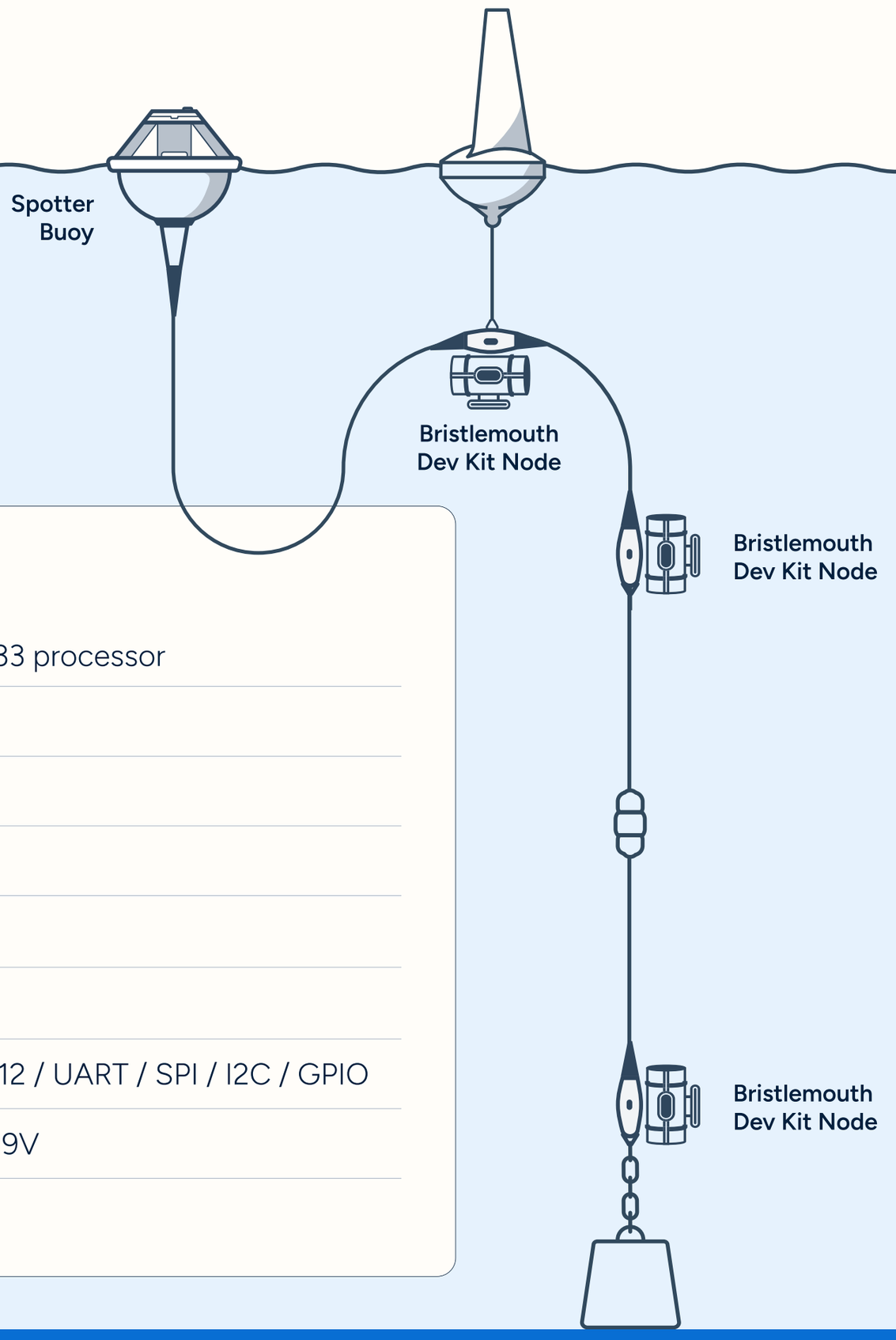
Integrate custom or off-the-shelf devices with Spotter to expand your subsurface sensing suite.

1. **Powered by Bristlemouth**
   The Development Kit utilizes Bristlemouth, our open standard that delivers plug-and-play hardware interfaces for marine technologies.

2. **User-Friendly Development Board**
   Rapidly add existing off-the-shelf sensors or prototype Bristlemouth-powered devices using I/O connection and digital interfaces for embedded integration.

3. **Plug-and-Play**
   Increase speed and scale of sensor integration using dual Bristlemouth ports that support daisy-chain configurations.

4. **Ocean-Proof Marine Housing**
   Ensure continuous data collection with a robust two-conductor connector, watertight enclosure, and modifiable endcap for cabling to external devices.



Core Specifications

Processor	STM32U575CI ARM Cortex-M33 processor
Firmware	Open source C/C++
Memory	64 Mbit NOR FLASH
External Kit Dimensions	O.D. 76 mm, Length 200 mm
Maximum Power	Up to 10W continuous
Data Rates	10 Mbit/s
Interfaces	RS232 / RS422 / RS485 / SDI-12 / UART / SPI / I2C / GPIO
Output Voltages	3.3V, 5V Selectable: 9V, 12V, 19V
Maximum Operational Depth	100 m

SOFAR

Sofar Ocean is the global leader in marine weather intelligence. We deliver the most accurate marine weather, powered by the world's largest network of real-time ocean sensors, to improve safety and efficiency at sea.

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