

xylem

Aquaculture



Aquaculture

Applications, capabilities & solutions

Table of contents

04	Water quality	16	Current measurements
08	Handheld instruments	18	Current sensors
10	IQ Sensor Net	19	Current instruments
12	Flow & level	20	Wave measurements
14	Field & laboratory	24	Software & monitoring

Norway's aquaculture industry demands reliable water quality monitoring to ensure healthy fish stocks and minimize environmental impact.

Xylem Analytics offers a full range of instruments tailored for Norwegian aquaculture – from handheld DO meters to advanced sensors and continuous monitoring systems. Our tools deliver accurate data to support decision-making, improve efficiency, and promote fish welfare.

We take pride in delivering robust, user-friendly instruments that help improve efficiency, reduce mortality, and maintain high production quality. Our regional sales and support teams are ready to assist with any questions related to instrumentation or applications – we're here to support your work.

Parameters

- Current speed & direction
- Wave height & direction
- Turbidity
- Pressure
- Level
- Tide
- fDOM
- Rhodamine
- Depth
- Dissolved Oxygen
- pH
- Conductivity
- Temperature
- ORP
- Salinity
- Total dissolved solids
- Water velocity
- Chlorophyll
- Blue-green algae
- Nitrate
- Ammonium/Ammonia
- Chloride
- Meteorological sensors



Applications



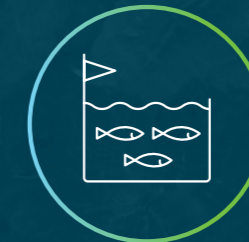
Site survey

Currents, waves and water quality



Well boats

Oxygen • CO₂ • pH



Land based RAS and flow through systems

Oxygen • Salinity • Turbidity • pH/ORP



Closed or semi-closed cages

Oxygen • Salinity • pH
Temperature • Turbidity



Open or submerged cages

Oxygen • Salinity • Current
Temperature • Turbidity
Wave and tide

Water quality

Maintaining optimal water conditions is essential for healthy and productive aquaculture systems. Modern water quality sensors continuously monitor key parameters such as dissolved oxygen, temperature, pH, salinity, and turbidity – providing real-time data that helps farmers respond quickly to environmental changes.



Aqua optode

The Aqua Oxygen Optode 4531 is an optical oxygen sensor for measuring O₂ concentration, air saturation, and temperature. The sensor is robust, reliable, and factory-calibrated at 40 points, ensuring high accuracy.

It has very low drift – only 0.1–0.5 % during the first year, and even less in the following years. The stable and durable sensor foil has a lifespan of over 10 years, providing minimal maintenance requirements for the end user. The foil shall only be replaced if physical damaged.

Parameters: Oxygen concentration, Saturation, Temperature

Output format: 4–20 mA/0–5V, RS-232 (Aanderaa loggers and third party equipment) and RS-485 Modbus

 aanderaa.com/oxygen-sensors



Conductivity/Salinity

Salt water conductivity sensors from Aanderaa are compact, fully integrated sensors for measuring water conductivity.

Measuring conductivity of salt water is a key parameter for *in-situ* measurements of several fundamental physical properties of water. The Smart sensor, including the conductivity sensor can be mounted directly on the top-end plate of the Aanderaa SmartGuard datalogger, in a String System node or connected to the SeaGuard and hence automatically detected and recognized.

Parameters: Conductivity, Temperature, Salinity, Density & Speed of Sound, Raw data

Output format: RS-232 (Aanderaa loggers and third party equipment)/RS-422/RS-485, and AiCaP CANbus

 aanderaa.com/conductivity-sensor



Turbidity

Calibrated across multiple points, the Aanderaa Turbidity Sensor stands out as the most accurate and reliable turbidity sensor on the market today. It detects infrared light scattered by particles suspended in water and features a scratch-free optical glass, ensuring long-term clarity and durability even in harsh environments. The sensor is more robust, with enhanced optics, calibrations, internal processing, stability, resolution, and temperature compensation.

Parameters: Turbidity, Temperature, Raw data

Output format: RS-232 (Aanderaa loggers and third party equipment) and AiCaP CANbus

 aanderaa.com/turbidity-sensor



ODO™ RTU

YSI's ODO RTU utilizes advanced optical dissolved oxygen technology and can be seamlessly integrated into any Modbus system. It supports multi-drop configurations, allowing multiple sensors to be connected on the same network for efficient, scalable installations.

ODO RTU is also available with built-in conductivity measurement to automatically compensate for salinity. Designed with land-based and fixed installations in mind, the ODO RTU connects directly to a PLC or data logger, making it ideal for reliable monitoring in treatment plants, industrial sites, and other onshore operations.

*The ODO RTU with hardware 1.0 or greater support multi-drop network configurations.

Parameters: Dissolved Oxygen (optical), Temperature, Conductivity*, Salinity* (*Available on ODO/CT version)

Output format: RS-485 Modbus

 ysi.com/ODORTU



pHix® Compact

MJK pHix Compact is an innovative pH meter and ORP transmitter suitable for measurements in fish tanks and silage tanks. It is user-friendly and easy to calibrate. pHix Compact is IP68 secured and can therefore withstand up to 1 bar/10 mWG pressure and full immersion. This unique design eliminates any known problems with high impedance electrodes and, furthermore, no special tools are required for installation.

Parameters: pH, Temperature, ORP/Redox

Output format: RS-485 Modbus and 2 x 4-20mA

 xylemanalytics.com/en/general-product/id-mjk203160/mjk-phix-compact-ph-and-redox-measurement

EXO™ Sondes



EXO3 & EXO3^S

EXO1 & EXO1^S

EXO2 & EXO2^S

YSI's EXO Multiparameter Sondes are a versatile and rugged water quality monitoring solution, offering exceptional data quality, unmatched reliability for extended deployments, and seamless integration with any monitoring system.

Anti-Fouling Central Wiper

The industry-leading anti-fouling wiper extends your deployments by removing buildup and protecting sensors for up to 90 days between service intervals.

Parameters: Dissolved Oxygen (optical), Conductivity & Specific Conductance, Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Algae, Salinity, Turbidity, Chlorophyll, Nitrate, Chloride, Ammonium, Temperature, Depth, pH, ORP, fDOM



ysi.com/EXO

Handheld instruments

The industry-leading YSI Professional Series handheld systems are trusted around the world and known for their field durability, ease of use, and – most importantly – providing reliable water quality data. Pro Series systems are available in a variety of parameter configurations, enabling you to choose the perfect instrument for your application!

ProDSS®

The ProDSS is a multiparameter handheld with customizable features and proven quality and reliability. Connect any four smart sensors for unparalleled performance. The ProDSS is a true field instrument, built tough with aquaculture facilities in mind.

Parameters: Dissolved Oxygen (optical), Conductivity & Specific Conductance, Turbidity, pH, ORP/Redox, Salinity, TDS, Resistivity, TSS, Depth, Seawater Density, GPS Coordinates, Chlorophyll, Total Algae, Ammonium, Ammonia, Chloride, Nitrate, Temperature, Barometric Pressure



ysi.com/ProDSS

ProSolo

The ProSolo is designed for easy, portable dissolved oxygen measurements. It utilizes YSI's reliable Optical Dissolved Oxygen (ODO) technology.

Parameters: Dissolved Oxygen (optical), Temperature, Salinity*, Conductivity*, Barometric pressure, TDS*

*Available on ODO/CT probe and cable assembly.



ysi.com/ProSolo



Pro10

Parameters: pH, ORP/Redox, Temperature

ysi.com/Pro10



Pro20

Parameters: Dissolved Oxygen (Galvanic, Polarographic), Temperature

ysi.com/Pro20



Pro30

Parameters: Conductivity, Salinity, TDS, Temperature

ysi.com/Pro30



Pro1020

Parameters: Dissolved Oxygen (Galvanic, Polarographic), pH, ORP/Redox, Temperature

ysi.com/Pro1020



Pro1030

Parameters: pH, ORP/Redox, Conductivity, Salinity, TDS, Temperature

ysi.com/Pro1030



Pro2030

Parameters: Dissolved Oxygen (Galvanic, Polarographic), Conductivity, Salinity, TDS, Temperature

ysi.com/Pro2030

IQ Sensor Net

Improve operational performance with 24/7 online data from IQ Sensor Net. The benefits of monitoring your aquaculture system include better visibility and management of your water quality, less grab sampling, process control capabilities, and peace of mind knowing your fish stocks have a healthy environment to grow.



2020 3G Controller

WTW's **IQ Sensor Net 2020 3G** is a modular, continuous water quality monitoring controller that brings real-time visibility and control to aquaculture systems, helping operators maintain optimal conditions for fish health and growth. Designed to network up to 20 parameters with a scalable plug-and-play architecture, it reduces reliance on manual grab sampling while delivering consistent, actionable data for processes like dissolved oxygen, pH, temperature, and more.

Continuous monitoring and control capabilities enhance system management and support proactive responses to changes in water quality, safeguarding stock and improving operational efficiency. Built with an intuitive interface and flexible expandability, it empowers aquaculture facilities to optimize production and protect aquatic environments.

Parameters: Temperature, pH, ORP, TSS, Turbidity, Ammonium, Nitrate, Dissolved Oxygen (optical or electrochemical), Potassium, Chloride, TOC (Total Organic Carbon), Conductivity/Specific conductance, Orthophosphate, Salinity

[WTW 2020 3G Controller - Xylem Analytics Germany](#)



281/282/284 Controller

The **IQ Sensor Net 281, 282, and 284** controllers are a modular, continuous monitoring system that delivers reliable, real-time data to support healthy stock and efficient system operation. Its scalable design accepts up to four sensors and can monitor a wide range of key parameters – such as dissolved oxygen, pH, temperature, and more – enabling aquaculture operators to track critical water quality factors with confidence.

Continuous measurement and easy add-on sensor capability reduce manual sampling needs and help facilities respond proactively to changing conditions. Built for flexibility and long-term adaptability, this controller enhances visibility into your water quality network and supports smarter, more productive aquaculture management.

Parameters: Temperature, pH, ORP/Redox, TSS, Turbidity, Ammonium, Nitrate, Dissolved Oxygen (optical or electrochemical), Potassium, Chloride, TOC (Total Organic Carbon), Conductivity/Specific conductance, Orthophosphate, Salinity

[WTW 281 Controller - Xylem Analytics Germany](#)

[WTW 282 Controller - Xylem Analytics Germany](#)

[WTW 284 Controller - Xylem Analytics Germany](#)



TetraCon® 700 IQ/IQ SW

The **TetraCon 700 IQ** is a rugged, four-electrode conductivity sensor designed to deliver stable, accurate salinity and TDS measurements in demanding aquaculture environments. Its flat-surface cell minimizes fouling and polarization, providing reliable performance in RAS, flow-through, and marine systems with high bio-load. With a wide measurement range and integrated temperature compensation, it supports precise water-quality control for both freshwater and marine species. Seamless IQ Sensor Net integration enables continuous, real-time monitoring across your entire facility.

Parameters: Conductivity, Temperature

[WTW IQ conductivity measuring cell - Xylem Analytics Germany](#)



FDO® 700 IQ/IQ SW

The **FDO 700 IQ** is a luminescence-based optical dissolved-oxygen sensor built for continuous, real-time monitoring of DO and temperature in aquaculture systems. Its factory-calibrated sensor cap requires no electrolyte or routine calibration, reducing downtime and maintenance in RAS, tanks or sea-water cages. The 45° sensor tip design helps avoid over-reading caused by surfacing bubbles, providing reliable data for aeration control and fish/shellfish health monitoring. Seamless integration into the IQ Sensor Net network lets you centralize DO analytics across your facility, enabling proactive management of oxygen regimes.

Parameters: Dissolved Oxygen, Temperature

[WTW FDO probes - Xylem Analytics Germany](#)



SensoLyt® 700 IQ/IQ SW

The **SensoLyt 700 IQ** is a digital pH/ORP probe designed for stable, continuous water-chemistry monitoring in aquaculture systems. Its durable, double-junction electrode delivers low-drift performance across freshwater, brackish, and marine environments, while SensCheck diagnostics monitor electrode health for reliable data in high-bio-load conditions. The sensor can be quickly disconnected for laboratory calibration and reconnected onsite without losing stored calibration data—streamlining maintenance and ensuring consistent measurement accuracy. Integrated with IQ Sensor Net, SensoLyt provides continuous pH/ORP insight to support fish health, biofilter stability, and feed-conversion efficiency.

Parameters: pH, ORP/Redox, Temperature

[WTW IQ pH/ORP armatures - Xylem Analytics Germany](#)

Flow & level

Xylem Analytics provides with its brand MJK, hydrostatic level instruments and float switches made tough for the demanding conditions of aquaculture facilities.



Level switch

The **MJK Level Switch 7030** is produced without old fashion mercury contacts and is instead delivered with an electromechanical switch system. Thus, in order to protect the environment as best as possible, the level switch has a built-in fully secured micro switch. When the level switch changes position in the liquid, the hermetic micro switch is activated by a moving weight. Electrodes give an alarm or a pump signal when the level changes. Level switches are therefore typically used to alert on too high levels.

Parameters: Level

xylemanalytics.com/en/general-product/id-mjk202810/mjk-7030-level-switch



Expert™ level transmitters

Expert™ Level Transmitter is suitable for all kinds of level measurements. It can control and supervise levels in fish tanks – including aggressive and polluted media.

Parameters: Level

Output format: **Expert 3400:** 4–20 mA loop, RS485 Modbus

xylemanalytics.com/en/products/listing-mjk-all

Field & laboratory

Portable, multiparameter instruments for water quality testing in the field and laboratory.



9800 Photometer

The **9800 Photometer** has a unique field-robust design that features a smart user interface with easy on-screen instructions for all test options, a backlit touchscreen display, several user-selectable options, and a 1,000 data-set storage capability. A waterproof USB port allows for both data retrieval and power.

Parameters: Alkalinity, Aluminum, Ammonia, Bromine, Calcium Hardness, Copper, Chlorine (Free), Cyanuric Acid, Fluoride, Hardness, Iron HR, Magnesium, Manganese, Nitrate, Nitrite, pH, Phosphate (LR), Potassium, Sulfate

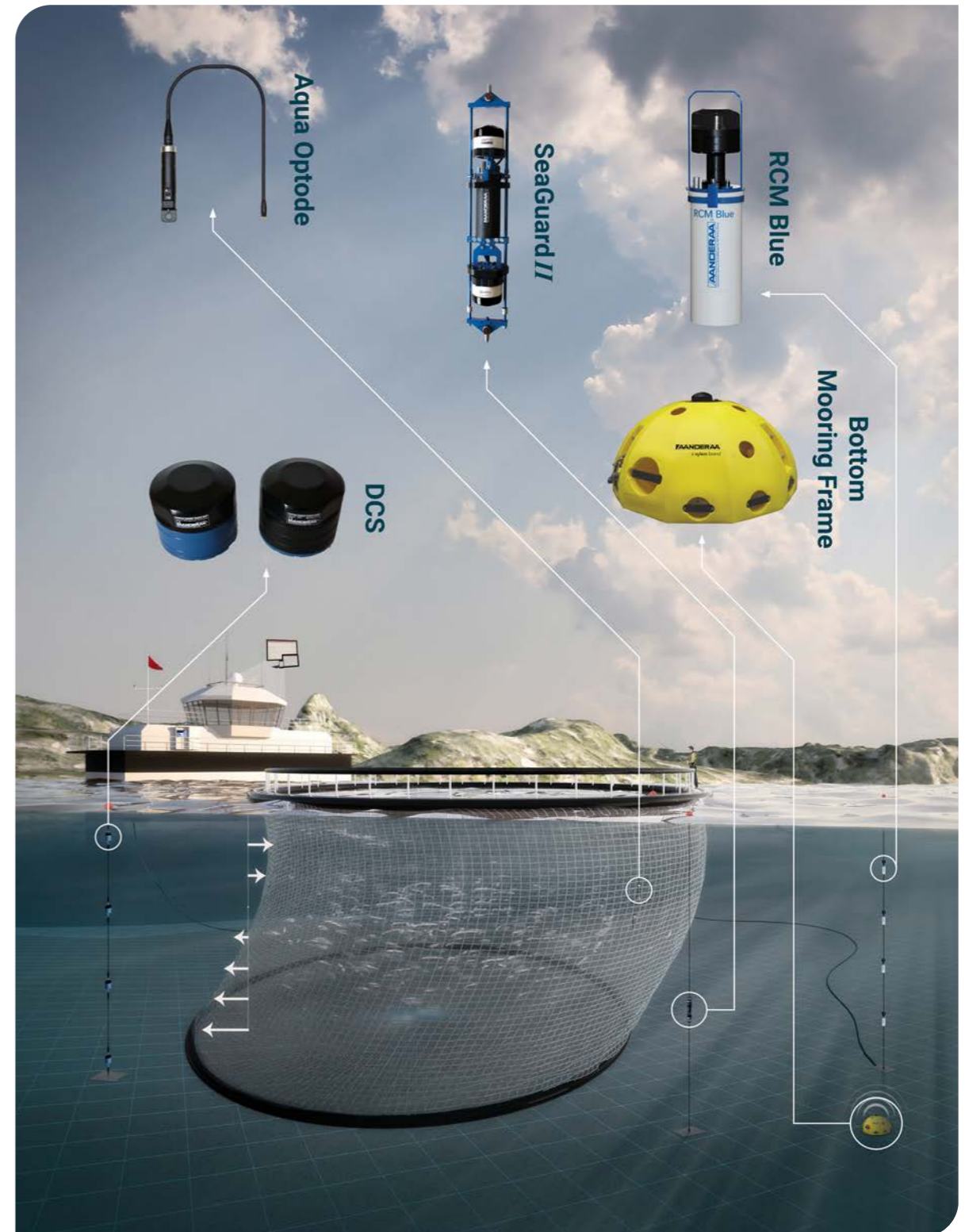
Current measurements

Ocean currents are driven by winds, tides and density differences. The ocean circulation regulates the earth's climate by transporting heat. The flowing water affects offshore and coastal construction and also carries particles, animals, plants, nutrients, pollutants and dissolved gases.



Water currents shift rapidly, requiring continuous measurement for reliable data. Xylem's current sensors – used in aquaculture for years – are ideal for long-term monitoring. They support site surveys in accordance with NS 9415, real-time monitoring, delousing, fish delivery, feed optimization, and more.

Our Doppler Current Sensors are robust, calibration-free, and resist fouling. They send acoustic pulses into the water, which reflect off particles and bubbles. The frequency shift in the returned signal reveals current speed and direction – delivering accurate, dependable results even in demanding marine environments.



Current sensors

The Aanderaa current sensors are available in a profiling and a single-point version with three depth ratings. Our current offerings include the Doppler current profiler sensor, Doppler current sensor. Our current offerings include the Doppler current profiler sensor, and the Doppler current sensor.



DCPS

The **Doppler Current Profiler Sensor (DCPS)** is a medium-range, 600 kHz current profiler smart sensor. It offers high-quality ocean current measurements and is ideally suited for cabling directly to various systems or dataloggers via serial or AiCap bus. With integrated compensation for tilting and movement, the sensor is commonly used to measure current from buoys and other moving platforms. A variant (DCPS-P) includes a built-in pressure sensor to also provide depth and optional acoustic wave.

Parameters: Current speed/direction, Backscatter level, *Optional – Temperature, Depth*

Output format: RS-232 (Aanderaa loggers and third party equipment), RS-422 and AiCaP CANbus

aanderaa.com/stand-alone-current-sensor



DCS

The **Doppler Current Sensor** is a rugged, true vector averaging current sensor for measuring current speed and direction in the sea.

Sensor features include: a built-in compass and tilt sensor outputting sea temperature, a speed range of 0 to 300 cm/s, low current drain and flexible sampling schemes. Our ZPulse technology achieves better performance using only half the power than previous models.

Parameters: Current speed/direction, Backscatter level, *Optional – Temperature*

Output format: RS-232 (Aanderaa loggers and third party equipment), RS-422 and AiCaP CANbus

aanderaa.com/stand-alone-current-sensor

Current instruments

Using acoustic Doppler current sensors from moving surface platforms is challenging. Constant changes in tilt and heading need to be compensated for with every measurement. Magnetic disturbances from metal parts and acoustic reflections against objects below the surface could introduce speed and directional errors.



SeaGuardII

SeaGuardII is a versatile, self-recording datalogger with multisensor support and optional DCS or DCPS. Combining SeaGuard electronics with SmartGuard firmware, it serves as a smart data hub with real-time capabilities, long deployment times, and robust performance in challenging upper-ocean environments. It is available with alkaline, lithium, or lithium-ion batteries.

SeaGuardII supports smart sensors for temperature, pressure, conductivity, oxygen, wave, tide, and turbidity, with depth ratings of 300, 3000, 4500, and 6000 meters, plus analog and serial interfaces for real-time data transmission.

Parameters: *Optional – Current speed/direction, Temperature, Depth, Tide, Wave, Turbidity, Oxygen, Salinity*

Output format: RS-232 (Aanderaa loggers and third party equipment), RS-422.

aanderaa.com/profiling-current-meter



RCM Blue

The **RCM Blue** is a self-recording current meter for water temperature measurements in both saltwater and freshwater environments. It can be equipped with a pressure sensor for precise depth measurement, offering 0.01% accuracy and a depth rating of up to 300 meters. Additional sensors can be integrated, making it a reliable and flexible choice for site surveys.

Configuration and data retrieval are handled via Bluetooth, eliminating the need to open the pressure housing between deployments. Alkaline, lithium, and lithium-ion battery options support optimized deployment duration and maintenance planning.

Parameters: Current speed/direction, Temperature, Backscatter, *Optional – Depth, Oxygen, Salinity*

Output format: RS-232 (Aanderaa loggers and third party equipment), bluetooth.

aanderaa.com/bluetooth-recording-current-meter-rcm-blue

Wave measurements

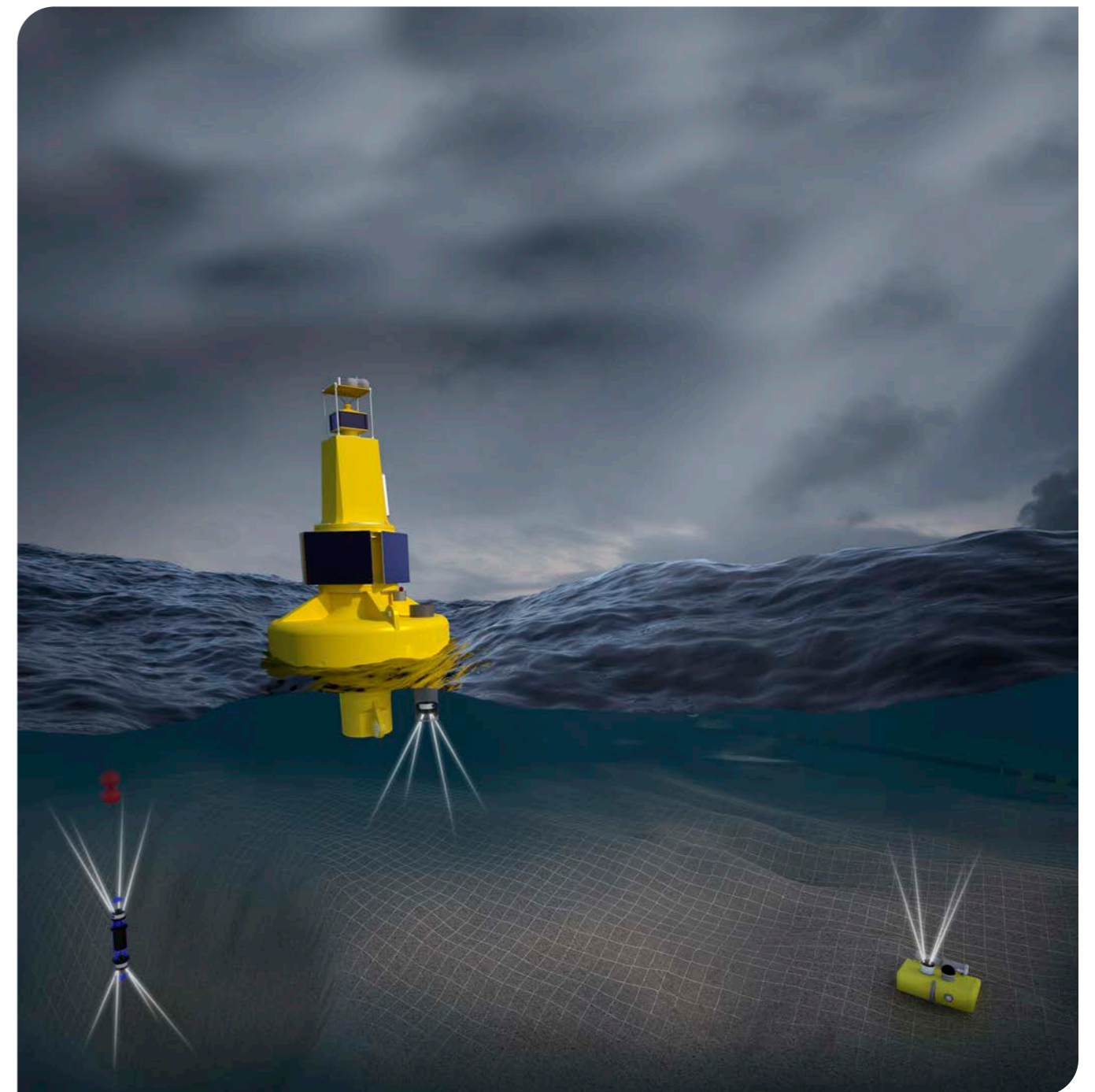
There are a range of technologies to measure ocean waves including microwaves from space, various radars and spot measurements from below or at the surface.



At Xylem, we focus on three distinct systems for spot measurements of ocean waves: motion-based measurements using the Aanderaa MOTUS stand-alone directional wave sensors, acoustic directional sensors mounted below the surface, and pressure-based sensors also mounted below the surface.

Spot measurements using instruments and buoys are well suited for capturing additional hydrological and environmental data through instruments deployed in available moonpools. The MOTUS Wave Buoy, with a diameter of 1750 mm, provides a stable and flexible surface platform for combined wave and environmental monitoring.

Ocean waves vary over time scales from seconds to hours, requiring instruments to operate continuously over extended periods. Due to this variability, a minimum calculation period of 15 minutes is recommended to reliably assess prevailing wave conditions.





Directional wave buoy

The **MOTUS (movement in Latin) wave buoy** is a perfect solution for collecting environmental data in coastal areas. The platform used for collecting data is the robust MOTUS buoy which has proven to be an excellent platform for providing high accuracy and reliable hydrological, meteorological, and oceanographic data parameters.

Basic parameters such as wind, waves, and currents can easily be expanded to include sensor packages with different biofouling-protected water quality sensors. Data is controlled and synchronized by the data management systems that Xylem Analytics offers which also controls and powers the real time communication. This provides a low power efficient system offering long-term deployment capabilities.

Parameters: *Optional – Current speed/direction, Depth, Temperature, Tide, Wave, Turbidity, Oxygen, Salinity, Wind*

aanderaa.com/motus-buoy



MOTUS stand-alone sensor

Turn your buoy into an intelligent data-collecting platform with the **Aanderaa MOTUS Wave Stand-Alone Sensor**. There are numerous ways of measuring ocean waves and at Aanderaa, we focus on three measurement types: pressure, acoustic, and motion.

The **MOTUS Directional Wave Sensor** is suitable for integration on different buoy types. It is intended for commercial as well as research use. The directional stand-alone sensor processes wave data and is configurable to directly present parameters and wave spectrum.

Parameters: Wave height/direction

Output format: RS-232 (Aanderaa loggers and third party equipment), and AiCaP CANbus

aanderaa.com/motus-stand-alone



SeaGuard II DCP Wave

This **ADCPs** is an optimal solution for measuring acoustic-based directional waves, currents, and water quality.

For wave measurements, the instrument uses adaptive pulse technology that automatically switches between three acoustic modes (broadband and narrowband) to optimize measurement accuracy. The recommended deployment depth for wave measurements is 10 to 40 m, with the instrument fixed to the seabed.

It is available as a self-recording instrument or can be easily integrated into real-time systems with reliable two-way communication. Redundant wave measurements for QA/QC can be implemented by adding the wave and tide sensor 5218.

Parameters: Wave height/direction, Current speed/direction

aanderaa.com/SeaGuardII-DCP-Wave



Wave and tide sensor

The **Wave and Tide Sensor 5218** is a compact fully integrated sensor for measuring wave and tide conditions. The sensor is a compact intelligent sensor designed to be used with Aanderaa SmartGuard or SeaGuard as well as in other measuring systems.

The sensor application areas are in fixed installations, either deployed in a seabed installation in shallow waters, or mounted onto a fixed structure in the upper water column.

Parameters: Wave height, Temperature

Output format: 5218 version - AiCaP CANbus, RS-232 (Aanderaa loggers and third party equipment), 5218R version - RS-422

aanderaa.com/Wave-sensors

Software & monitoring

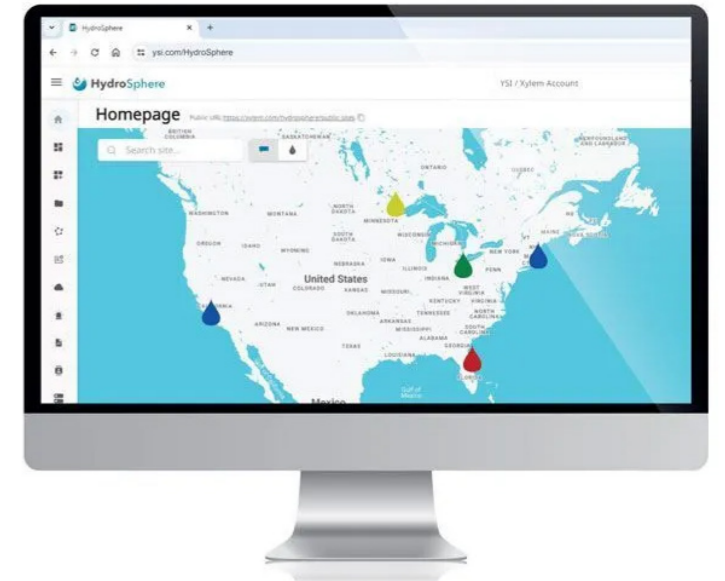
Marine data is only useful once it reaches its intended end user. A reliable data management and delivery system starts with sensors and instruments that enable end-to-end data transmission of rich data sets.



HydroSphere

HydroSphere is a collaborative web-based data visualization platform for environmental monitoring. Take full control over how you view, manage, and respond to your environmental data, with flexible, user-driven features. With HydroSphere, you can connect and upload data from a wide range of instrumentation, create custom dashboards for quick analysis, and set data-driven alarms with configurable notifications.

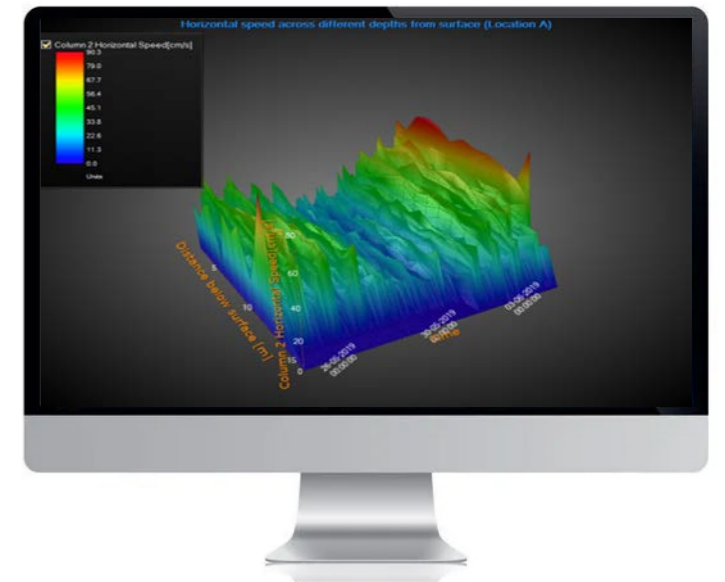
ysi.com/HydroSphere



Data Studio 3D

Data Studio 3D is a free data analysis software available to Aanderaa SeaGuard and SmartGuard users. To aid in data analysis, Aanderaa has developed their own propriety software, Data Studio 3D which allows users to download field data and plot them on different graphical plots. This mode of data analysis can be carried out within minutes to help user to compare parameters, view trends, anomalies, and to control the data quality.

aanderaa.com/datastudio3d



Real-time data

Quality real-time data is the foundation for any data management system. In the ocean industries, monitoring equipment utilized has, in many cases, only allowed for very basic data points to be made available in real time. The backbone of the Aanderaa sensors and systems is a rich data set describing the quality, range, units, resolution, and information to make the display and usage of real-time data easy. Aanderaa protocols also secure data flow from end to end and detect missing data to enable re-transmit. All this allows for our equipment to be part of Aanderaa's real time data management delivery system.

aanderaa.com/data-delivery

Xylem l'zīlāmī

- 1) the tissue in plants that brings water and nutrients upward from the roots.
- 2) a leading global water solutions company.

Xylem is a leading global water solutions company dedicated to advancing sustainable impact and empowering the people who make water work every day. Xylem connects diverse capabilities and innovative technologies to provide tailored solutions across the entire water cycle. From moving, treating and measuring water to optimizing and maintaining water systems, Xylem collaborates with customers to solve their most critical challenges. Together, through partnerships with utilities, industrial manufacturers, building operators, and communities, we are building a more water-secure world.

For more information on how Xylem can help you, visit xylem.com.



Aanderaa Data
Instruments AS

Sanddalsringen 5b, PB 103
Midtun, N-5843 Bergen,
Norway

+47 55604800
aanderaa.info@xylem.com
aanderaa.com

All information presented herein is believed reliable and in accordance with accepted engineering practices. Xylem makes no warranties as to the completeness of this information. Users are responsible for evaluating individual product suitability for specific applications. Xylem assumes no liability whatsoever for any special, indirect or consequential damages arising from the sale, resale or misuse of its products. Subject to change without notice.

© 2026 Xylem Inc. or its affiliates. All rights reserved.

B204

The Xylem logo, consisting of the word "xylem" in a lowercase, blue, sans-serif font.