SEABED GAZETTE

2025

MIWB: From classroom to the real World

Seabed goes Canada

SEABED

Getting to the bottom of things

www.seabed.nl

Seabed Winch

The Seabed Winch is a fully automated Winch, useable for a wide number of applications. With its stainless-steel AISI 316 frame, the Winch can be placed on the rear of the vessel, on a buoy, or on a quayside, or any other location the Winch can be used to monitor the environment. And to make the Winch even more versatile deployable, the setup can be powered by a solar panel.

SEABED

Getting to the bottom of things

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CELEBRATION

Seabed BV was founded in 2004, and in 2024, the company celebrated its 20th anniversary. This milestone deserved to be celebrated in grand style, with special guests including suppliers, customers, colleagues, and family. What better way to mark such an occasion than aboard a boat, enjoying delicious food and fantastic music? It was a celebration to remember, marking two decades of success and collaboration with those who made it possible.

www.seabed.nl

Seabed Orinoco Solo V3

Based on the successful Orinoco line of tide gauges, the OrinocoSolo V3 is the latest offspring. The basic unit is a high capacity data logger with up to eight analogue inputs and up to four RS232 inputs (optional) and one serial data output which supports multiple formats.

SEABED

Getting to the bottom of things

Meet...

Panagiotis Tsakonas

Junior Engineer

Date of birth?
23/02/1991. My birthday aligns with the Greek Carnival period, so I enjoy hosting carnival parties and inviting friends.

Single, in a relationship or married?
Single

Any hobbies?
I enjoy reading books (science, philosophy, self-improvement, history), listening to music (I'm open to various genres, but my favorites are Greek hip-hop and Epic Metal), going to the theater, cooking, playing board games, and playing volleyball.

Fast food, bistro or Michelin starred restaurant?
A little bit of everything—life needs variety and lots of colors. Also, I enjoy cooking, so I rarely have “lazy” dinners or lunches.

Netflix or the cinema? And what is your favourite TV-series or movie?
I was born in the '90s, and cinema is something deeply connected to how we grew up. Who can resist a bag of popcorn and a comfy seat in front of the big screen?
I don’t really watch TV series, but I have a few favorite movies, such as The Blind Side (a true story), The Lord of the Rings trilogy, Inside Out (Pixar), and Avatar 2.

What kind of job did you want growing up?
Over the years, I wanted to do many things. As an athlete, I considered becoming a physiotherapist or dietitian. On the other hand, a close relative of mine is an electrical engineer, and as a kid, I was fascinated by his work stories. Another dream of mine was to become a pilot in the Greek Air Force.

What is it you like most about your current job?
What I like most is that I can contribute in a way that helps people secure their plans. I truly believe my work has a great impact, considering where all this equipment is used. Additionally, I enjoy learning fascinating new things about the marine world and the technology behind it.

What do you learn from your colleagues?
How I can become better at the tasks I need to complete.
Also, I enjoy our small talks—through them, I get to know my colleagues as individuals, and they get to know me. As a result, each day feels better than the one before.

If you would win the lottery, what would your life look like?
A peaceful life. Money doesn’t change who we truly are. If we fail to realize this, we may spend our lives chasing it, mistaking it for happiness.

From Classroom to Real-World: The Comprehensive Survey Project at MIWB

At the Maritime Institute Willem Barentsz (MIWB), we pride ourselves on providing our Ocean Technology students with not just theoretical knowledge but practical, hands-on experience that prepares them for the challenges of the hydrographic surveying industry. One of the cornerstones of our Cat-A certified hydrographic surveyor training is the Comprehensive Survey Project (CSP) "Oosterom," an intensive learning experience that truly tests our third-year students' capabilities.

Bridging Theory and Practice

The CSP serves as the ultimate integration of all theoretical knowledge our students have acquired over their years at MIWB, combined with the practical skills developed during their six-month industry internships. The project requires students to execute a complete hydrographic survey from start to finish – from planning and mobilization to data acquisition, processing, and final reporting.

Working in small teams, students must demonstrate competency across all aspects of professional surveying: writing comprehensive Survey Method Statements, mobilizing and calibrating sophisticated equipment, systematically acquiring hydrographic data, processing raw data to meet client specifications, and finally presenting their findings with appropriate recommendations.

Real-World Challenges, Real-World Solutions

What makes the CSP particularly valuable is its authentic nature. Students survey actual waterways in the Oosterom area, including challenging targets such as the wrecks of the Walsum 10 and the Boetak. They must adhere to professional standards, following IHO S-44 guidelines and creating deliverables that match industry expectations, including Notice to Mariners and chart correction blocks.

The project purposely presents students with the kinds of unexpected challenges that professional surveyors encounter daily. Equipment malfunctions, weather delays, and data anomalies all become valuable learning opportunities. Students must demonstrate not only technical skills but also problem-solving abilities, effective communication, and professional teamwork.

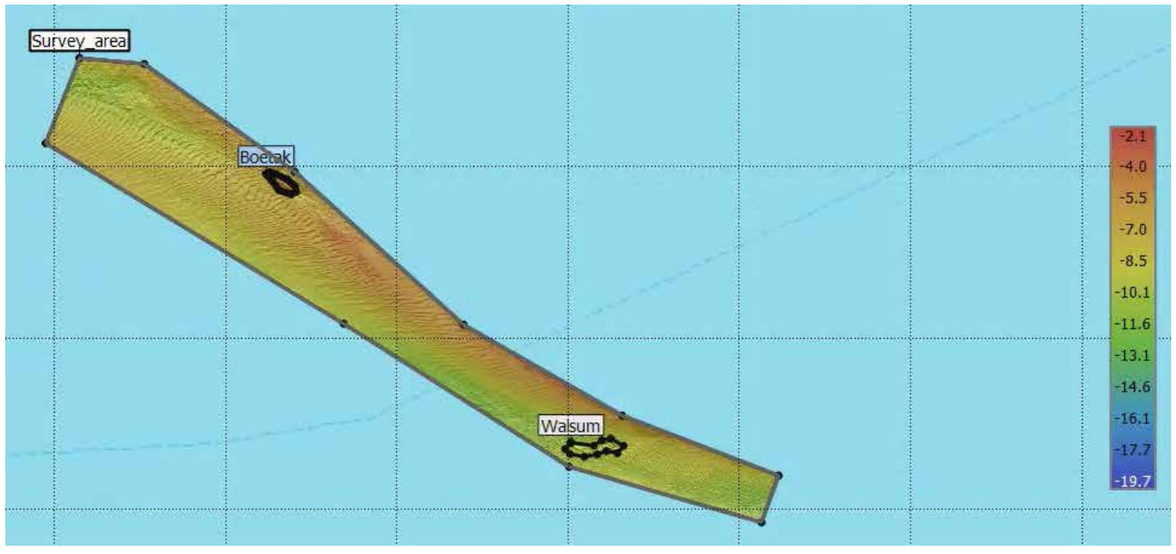
Industry Collaboration

The success of our CSP program would not be possible without the generous support of our industry partners. We are particularly grateful to Seabed for providing us with their state-of-the-art Norbit multibeam system. This equipment has significantly enhanced our students' learning experience, allowing them to work with cutting-edge technology that they will encounter in their professional careers.

The results achieved with the Seabed equipment have been outstanding, allowing students to produce high-resolution bathymetric data that meets professional standards. This made the analysis and reporting phases of the project that much more rewarding and educational.

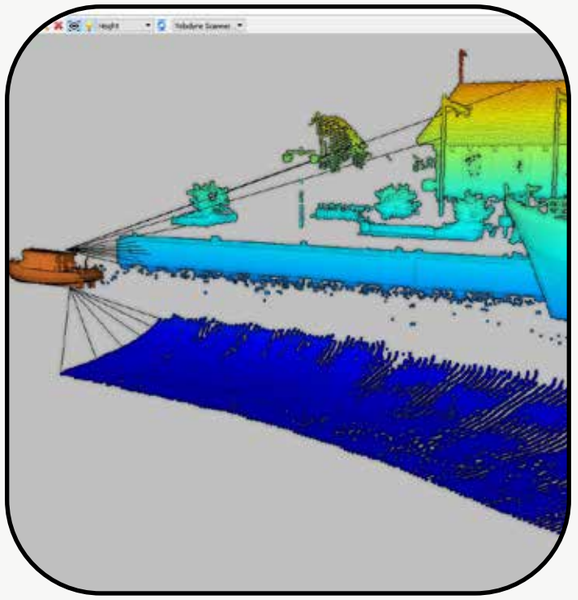
The saga continues

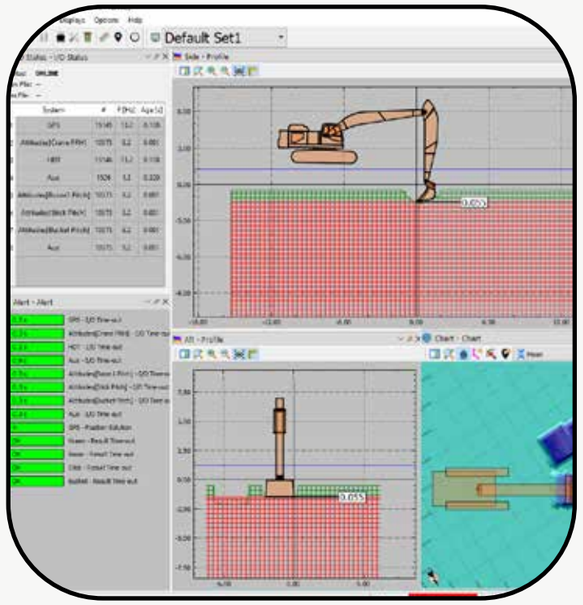
As educators, there is no greater satisfaction than seeing students apply their knowledge in challenging situations and succeed. The Comprehensive Survey Project continues to be an invaluable component of our curriculum, ensuring that MIWB graduates are fully prepared to excel as Cat-A certified hydrographic surveyors in the maritime industry. So we're looking forward to using yet another Norbit system this year for our students, provided again by Seabed!



BeamworX

Hydrographic Software Suite





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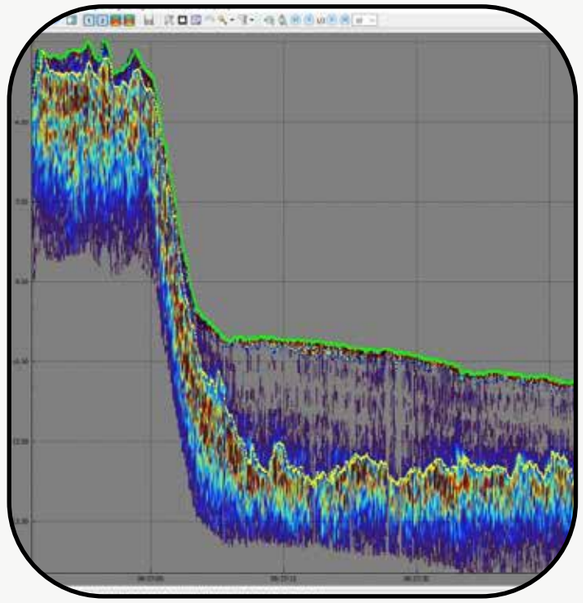

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www.beamworx.com

www.seabed.nl

AML-6 CTDSV with Seabed Timing Module (STM) integration

The benefits of having a timing module inside the AML6 is, that only one instrument is required with the highest quality timestamped with a synced GNSS UTC time.

The following key features are included with the STM:

- STM is housed inside the AML instrument.
- Data is available at a maximum of 20 Hz.
- STM is WebUI accessible over Ethernet.
- STM delivers SV output via serial.
- GNSS ZDA can be inputted via Ethernet or Serial.
- Settings for serial in and output can be adjusted in the WebUI.

The STM has been designed to meet all the requirements of the AML6, so the AML6 manual can be referenced for all power and deployment requirements. For more information on the AML 6 please scan the QR code.

If you are looking for real-time timestamped UTC synchronized data for an ROV deployment; Seabed and AML can provide you with the solution.

Seabed developed a miniature circuit board to integrate GNSS synchronized time output with the loggings of the AML6 instrument, with an easy integration in any subsea navigation system. The seabed timing module (STM) communicates with the AML6 internally and adds the time stamp from the ZDA string and sends the resulting data out over Ethernet. This integrated timestamp can be implemented in all acquisition programs.

For more information or assistance please call +31(0)20 636 84 43 or visit our website www.seabed.nl/contact/

SEABED

Getting to the bottom of things

Advertorial

“This simplifies everything”

The First Infinite Endurance Profiling Instrument Designed Specifically for USVs

Figure 1: The Endura-3 deployed on Saildrone’s Surveyor SD-3002.

Uncrewed Surface Vessels (USVs) are rapidly transforming the oceanographic industry: it is now indisputable that uncrewed survey is more efficient and cost effective than traditional crewed survey, and with ever greater endurance, the efficiency gains increase accordingly. Unfortunately, these advances have not been matched by paralleled growth in automated profiling capabilities. While USVs challenge conventional crewed survey vessels in many ways, they still rely on the frequent collection of accurate data profiles. In short, these revolutionary, powerful platforms are held back by their weakest link.

Profiling capability is limited by finite battery life and the fragility of mechanical connectors, forcing operators to compromise on deployment duration or the number of casts. Right?

Wrong. Introducing the Endura-3 and the Endura-6, the first connector-free, wirelessly charging instruments on the market. Designed specifically for USV deployments, the Endura Loggers unlock the potential to do unlimited casts for every parameter of interest. Did we mention we have the widest array of end-cap sensors on the market? Whether your mission is hydrographic, environmental, or scientific, the Endura Loggers enable unlimited profiling from your USV platform.

The Endura’s extended deployment capability is a direct result of its wireless charging. Wireless charging is simple enough in controlled conditions, but recharging in a harsh, uncontrolled environment is difficult. Doing it reliably is even harder.

External connectors may be considered the Achilles heel of any oceanographic instrument design, particularly when considering uncrewed platforms. They increase the probability of required human maintenance or intervention. So.. we got rid of them. By removing the need for connectors (there is a USB connector on the instrument for convenience in the workshop) we also eliminate cabling from the profiling solution. By far, connectors and cabling are the most common cause of complication, wear, and tear.

Origin Story of the Endura Loggers

So why hasn’t this been done before? Well, it has… sort of. While the industry has seen earlier designs that demonstrated the potential for autonomous water column profiling, they ultimately fell short of meeting the rigorous demands of extreme environments. For years, the market relied on electromechanical cables - complex, expensive systems that require constant maintenance. We knew there had to be a better way.

In 2019, Saildrone approached AML with the need to conduct a hydrographic profile on their long-endurance uncrewed sailing surface vehicle. At the time, we developed an AML-6 wireless charging solution using technology based on modern Qi-compatible devices like smartphones. Saildrone included this solution into their Voyager and Surveyor bathymetry platforms, proving the first truly independent long endurance USV-based hydrographic

survey. While it functionally met the requirement for wireless charging, the first generation of this solution had its limitations.

The primary limitation of the first-generation Qi charging system was the alignment requirements. The system worked well within its tightly prescribed operating window but required precise axial and radial alignment. Achieving this level of precision in a challenging environment was almost impossible.

Figure 2: The Endura loggers have no radial alignment requirement. Simply pull the instrument into thetube of the charger (shown left) and the instrument will charge wirelessly, every time.

The second-generation systems - Endura-3 and Endura-6 - simplify this requirement in two ways. The first is an increased axial tolerance for charging. The second-generation system has five times the range of the first, making it very compliant to harsh conditions. Further, the second-generation systems have no radial alignment requirement. The cylindrical form factor ensures alignment is a one-dimensional exercise. Systems can be aligned with any winch that provides rough alignment by winching to the set point or integrated into a hardstop to ensure alignment.

Additionally, the second-generation systems bring state indication to the USV toolset. Along with the LED indicator on the front panel (useful for humans in the workshop), a GPIO pin pattern (useful for the robot at sea) can be used to evaluate the operating state of the system. The state of the charger can be determined using three of the six pins on the charger; multiple error conditions can be diagnosed remotely.

Overall, the primary focus on this development was to deliver a charging system that provides reliable, robust performance in challenging uncrewed environments. The Endura Loggers were designed to “set and forget”.

The Endura-3 and Endura-6 development project has been meticulously and rigorously engineered. Extensive in-house bench testing, combined with thousands of hours of deployments - including extended deployments with Saildrone and SeaTrac’s remote platforms - has demonstrated its reliability under the most demanding conditions.

The Endura Loggers have transformed operations for early adopters, setting the industry standard for remote data collection.

With more than 50 years of experience manufacturing oceanographic data loggers, sondes, and probes, it’s our job to adapt to the evolving needs in our industry. Embrace change, or get left behind! With USVs becoming the go-to technology for more and more commercial organizations, reliability becomes more important than ever.

The Endura Loggers are now on our website, check them out at **AMLoceanographic.com**, or contact **sales@amloceanographic.com** for more information.

AML OCEANOGRAPHIC

Figure 3: The Endura-3 deployed on Seatrac’s SP-48 USV. In partnership with the University of Southern Mississippi (USM), SeaTrac conducted a fourteen-day mission to analyze potential hypoxia levels and their impact on marine life in the US Gulf Coast. We asked James, the lead from USM about the impact of the Endura-3: he said, “this simplifies everything.”

"This capability allows us to gather oceanographic data for months at a time, unlocking new possibilities for long-duration, persistent monitoring in ways that were previously impossible. AML Oceanographic's wireless charging sondes are a game changer for SeaTrac."

Hobie Boeschenstein
Director of Operations and Business Development, SeaTrac

Hemisphere GNSS Compass Solutions

Hemisphere's all-in-one Vector GNSS compass solutions provide precise heading and positioning for dredging, commercial applications, hydrographic surveying vessels, fishing vessels, leisure boats, and other general marine navigation applications.

The rugged and reliable design of these compasses are ideal solutions to replace traditional gyrocompasses, at a fraction of the cost. Combining Hemisphere's single and multi-frequency technologies and multi-path resistant antennas, the Vector compasses bring a collection of robust features including heave, pitch, roll, and output both serial and CAN.

New to the portfolio of all of Hemisphere products is the support of the Galileo HAS correction service. This only requires a one-off multi Frequency activation on the receiver and because all of Hemispheres mFreq capable products are tracking all constellations available, the integration of the HAS correction service was just a natural further step. Next to the well-known Atlas PPP service this now offers a standalone correction service with better than 20cm accuracy level, today almost worldwide.

One of the key differences between a standard PPP service and the Galileo HAS service is the fact, that standard PPP is transmitted by a geostationary satellite while the HAS service is broadcasted by all Galileo E6 capable satellites. This results in a better and more stable availability as blockings by construction structures (houses, bridges) is almost avoided.

For some of the marine applications this might be thought of as a standard fallback option for the PPP service. For other operations where no redundancy is required this might be the only correction service required then.

Both correction services can also be used for Hemispheres GradeMetrix Excavator Machine Control solutions that can ease up operations for the land based fleet of larger dredging organizations when transfer of expensive on barge equipment is not an alternative.

Hemisphere®

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CONQUER THE OPEN WATER

ATLAS L-BAND | CYGNUS INTERFERENCE MITIGATION | ATHENA RTK

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Survey Equipment

NORBIT WINGHEAD i77h

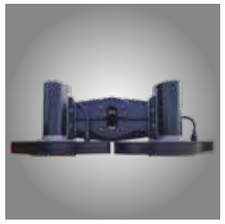
The NORBIT WINGHEAD i77h is a compact ultra-high resolution curved array broadband multibeam sonar offering tight integration with GNSS/INS (Applanix OceanMaster) that is designed for use in the most demanding operational environments such as under bridges or in rough sea conditions. Characterized further by a small form factor; low power draw and tight integration, WINGHEAD i77h installation can occur on surface survey platforms ranging from small USVs to large vessel permanent hull mounts.

NORBIT WINGHEAD B41

is the most compact sonar designed for use on all platforms including subsea ROVs and AUVs. With low power consumption, the system is suitable to operate from battery. NORBIT's wideband multibeam technology facilitates long range real-time data collection and at the same time achieves high resolution data.

NORBIT WINGHEAD B43

Ultra High-Resolution Curved Array Bathymetric System for Subsea Operations.
The first cylindrical ultra-high resolution curved array bathymetric system, designed with 1500m depth rating for installation on ROV's, AUV's and Towed vehicles.
The WINGHEAD B43, due to its high performance beamformer and 0.5° receive beam width, is able to generate industry leading beam density, allowing operators to reveal the smallest details on pipelines and other subsea assets whilst achieving even the most demanding of survey requirements.



NORBIT WINGHEAD Dual Head configuration

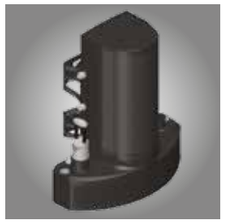
The NORBIT WINGHEAD Dual Head configuration i77h and B41 is a compact ultra-high resolution curved array broadband multibeam sonar offering tight integration with GNSS/INS (Applanix OceanMaster) that is designed for use in the most demanding rough sea conditions and in operational environments with poor GNSS coverage, such as around offshore platforms. Characterized further by a small form factor; low power draw and tight integration, WINGHEAD Dual Head uniquely facilities both wide coverage and increased sounding density from a single user interface.

NORBIT iWBMS

The NORBIT iWBMS. This all-in-one tightly integrated broadband multibeam turnkey solution offers high resolution bathymetry over a wide swath. The high-end sonar with Applanix WaveMaster II (globally leading GNSS/INS system) embedded into the unit ensures fast and reliable mobilisation and highest quality sounding for surveys in all conditions.

NORBIT iWBMSh STX

The NORBIT iWBMSh STX with Applanix OceanMaster uses rapid electronic transmit beam scanning to combine proven 2D bathymetry into 3D georeferenced bathymetry. For dredge application, a 4D experience is achieved by visualising the change in 3D bathymetry as a function of time. Hands-free system tuning ensures quality data on the first survey.



NORBIT iWBMSh X

The NORBIT iWBMSh Stabilised Compact High-Resolution Integrated and Motion Stabilised 3D&4D Shallow Water Bathymetric System. This cylindrical high-resolution curved array bathymetric system is designed to function effectively in extreme operational environments with high vessel motion. It offers rapid mobilisation at any location and time, providing active roll, pitch and yaw stabilised bathymetry. Additionally, it delivers standard imagery and backscatter outputs, ensuring the highest quality survey data performance.

Survey Equipment

NORBIT WBMS STX

The NORBIT WBMS STX ultra compact and high-resolution multibeam sonar designed for use on all platforms. The Wideband multibeam technology facilitates long range real-time data collection and at the same time achieves high resolution data in 3 dimensions, using rapid electronic scanning to combine proven 2D bathymetry into 3D georeferenced bathymetry and 4D experience.

NORBIT WBMS

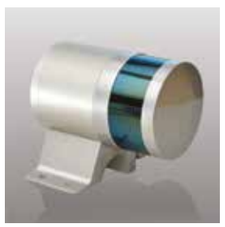
The NORBIT WBMS ultra compact and high-resolution multibeam sonar designed for use on all platforms. The wideband multibeam technology facilitates long range real-time data collection and at the same time achieves high resolution data.

NORBIT iWBMSh-Dual Head

The NORBIT iWBMSh-Dual Head is a Compact and high-resolution Dual head curved array bathymetric mapping system. This all-in-one tightly integrated broadband multibeam turnkey solution offers high resolution bathymetry over a wide swath. . The high-end sonar with globally leading GNSS/Inertial Navigation System (Applanix OceanMaster) embedded into the unit ensures fast and reliable mobilisation and highest quality sounding for installations in all conditions.

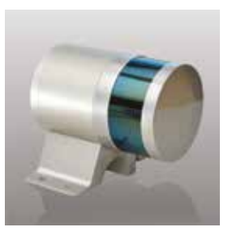
NORBIT STX360, iSTX360 and NORdredge

NORBIT STX360, iSTX360 and NORdredge, 4D Multibeam Solution for Underwater Construction, Dredging and Rock Dumping. NORdredge provides instantaneous 4D information to operators and project managers about the job progress through the Real-time dredging progress display, facilitates immediate corrective actions and increases operational efficiency.



NORBIT iLiDAR

The NORBIT iLiDAR is the most compact terrestrial mapping sensor fully integrated with a high resolution bathymetric multibeam system. With 300k data points per second in 30x360deg coverage, it is an ideal tool for mapping above water surface terrain for a complete picture from a single pass.



Z300 iLiDAR

The Z300 iLiDAR is an all-new multi-sensing concept that combines multiple tightly integrated sensors into one hardware platform with a single LAN connection to survey laptop. Supported sensors include any combination of bathymetric MultiBeam Echo-Sounder, Forward Looking Sonar, Forward Looking Bottom Detection and LiDAR.

Survey Equipment

Airmar

Airmar single beam SS510. This broadband 200 kHz transducer has a Q of 2 and very good sensitivity. It enables users to perform accurate surveys in shallow-water with high resolution.

Exail USBL GAPS M7

Exail USBL GAPS M7, a high performance Ultra Short Baseline positioning and communication system for locating and communicating subsea assets. It combines an USBL antenna and a fiber-optic inertial navigation system (INS) in the same housing.

Geometrics' G-882 Marine Magnetometer

Geometrics' G-882 Marine Magnetometer is the leading marine system in the industry . The G-882 is the only system that meets the standards required for UXO clearance in the North Sea. This very high-resolution Cesium vapor marine magnetometer is small in size, and offers flexibility for professional surveys in shallow or deep water.

Falmouth Scientific HMS-621-LITT CHIRP

Falmouth Scientific HMS-621-LITT CHIRP, Sub-bottom profiling applications in diverse sediments in shallow water environments require compact tools as well as multiple frequency bands to support a variety of survey requirements. The HMS-621 CHIRPceiver LittTM and transducer arrays fill this wide range of survey needs. The user selectable frequency bands supported by the HMS-621 include standard LF (1KHz-10KHz), or HF (8KHz-23KHz).

Falmouth Scientific HMS-624

Falmouth Scientific HMS-624 Side Scan Sonar System utilizes advanced technology to provide superior imaging capabilities for deep and shallow water applications. The Tow Fish electronics incorporate FSI's CHIRPceiverTM 24-bit CHIRP signal processing along with dual simultaneous 100/400 KHz operation which results in very high resolution side scan data at towing depths up to 2,000 meters.

AML Moving Vessel Profiler (MVP)

AML Moving Vessel Profiler (MVP) is the market leader in underway profiling systems. The world's only automated, real-time solution is backed by 20 years of experience and thousands of successful surveys. Accommodates CTDSV, SVPTu, CTD, SVP and multi-parameter instrumentation

Survey Equipment

AML-6 CTDSV with Seabed Timing Module (STM) integration

Seabed developed a miniature circuit board to integrate GNSS synchronized time output with the loggings of the AML6 instrument, with an easy integration in any subsea navigation system. The seabed timing module (STM) communicates with the AML6 internally and adds the time stamp from the ZDA string and sends the resulting data out over Ethernet. This integrated timestamp can be implemented in all acquisition programs

Seabed Winch

The Seabed Winch is a fully automated Winch, useable for a wide number of applications. With its stainless-steel AISI 316 frame, the Winch can be placed on the rear of the vessel, on a buoy, or on a quayside, or any other location the Winch can be used to monitor the environment. And to make the Winch even more versatile deployable, the setup can be powered by a solar panel.

PortusPole

Built specifically for NORBIT's integrated sonar systems the new PORTUS Pole fits in a single airline checked luggage case. With a combined weight of 60lbs/27kg, including wheeled hard ski case, it is safely transported to your next vessel of opportunity and set up by a single person.

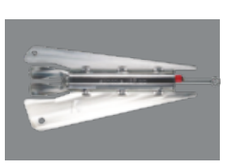
Environmental

AML-3

The AML-3 is THE most versatile, multi-sensor oceanographic instrument currently available. The AML-3 has three sensor ports on the endcap; sensor payload is modular and can be field-swapped to meet project requirements, for example SVP or CTD.

AML-6

The AML-6 is a multi-parameter sonde, designed to combine CTD data with other oceanographic parameters such as Dissolved Oxygen, pH, ORP or Fluorometric sensors. This instrument has six sensor ports on the endcap; sensor payload is modular and can be field-swapped to meet project requirements.



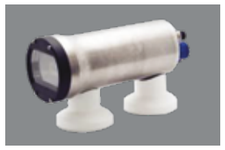
The admodus®USP pro

The admodus®USP pro is an innovative in situ measuring probe for online monitoring of the nautical bottom in harbours and waterways. The system provides a depthdependent density profile quickly and reliably, as well as a variety of other indicators for characterising suspended matter and sediments.

Environmental

Ocean Sonics IcListen HF

Ocean Sonics IcListen HF, records high-frequency underwater sounds with the cutting-edge real-time smart digital hydrophone. Small enough to carry in one hand, the simple, accurate, and reliable icListens allow users to collect, analyze, and listen to ocean sound data in real-time.

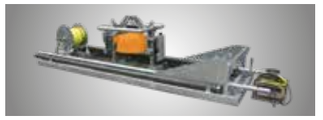


Sub C Imaging Rayfin Benthic or Coastal camera

Sub C Imaging Rayfin Benthic or Coastal camera, Recording and viewing your underwater survey in real-time is made easy. The Rayfin Benthic has a depth rating of 6000m and is fully compatible with ROV, AUV, drop, tow, and observatory systems.

Orinoco Solo

Orinoco Solo tide gauges multiple sensor data acquisition system. The basic unit is a high capacity data logger with up to eight analogue inputs and up to four RS232 inputs (optional) and one serial data output which supports multiple formats.



Seabed SVC500E

Seabed SVC500E, the Electric vibrocorer has been designed to obtain cylindrical cores in soft, cohesive soils at a maximum water depth of 50 meters (standard version).

Positioning

R632 GNSS

The R632 GNSS receiver is a full- solution product in a compact and powerful package, built on the foundation of Hemisphere's new Lyra, Cygnus and Aquila core technologies, the R632 offers amazing new interference rejection and multipath mitigation. The result is an exceptional combination of performance, communications, and connectivity.

S631 GNSS

The S631 GNSS receiver is powered by Athena RTK technology. With Athena, S631 provides state-of-the-art RTK performance when receiving corrections from a static base station or network RTK correction system. With multiple connectivity options, the S631 allows for RTK corrections to be received over radio, cell modem, Wi-Fi, Bluetooth, or serial connection. S631 delivers centimeter-level accuracy with virtually instantaneous initialization times and cutting-edge robustness in challenging environments.

Hemisphere VS-i8

Inertials systems, such as Hemisphere VS-i8 with a 0.03° heading, 0.015° pitch and roll accuracy on a 2m baseline. Applanix Wavemaster II with up to 0.02° roll and pitch performance and Applanix Oceanmaster with 0.01° roll and pitch performance.

Telemetry

Telemetry, different services and instruments available such as correction signals, modems, WIFI bullets and Satel radio's.

Positioning

Exail Rovins Nano

Exail Rovins Nano merges the established high-grade iXblue inertial navigation system with our competitive IMU. Built on iXblue's renowned FOG solid state technology and offshore instrumentation expertise, Rovins Nano offers the unbeatable stability and accuracy of the inertial position while simplifying the operation with its autonomous external sensor management.

Exail Octans

The fifth generation Octans is an all-in-one product for diverse challenging applications. Octans raises the industry standard in measurement accuracy for roll, pitch, heave. IMO-HSC and certified, Octans is built on Exail's trusted and unique ultimate-performance Fiber-Optic Gyroscope (FOG) technology with thousands of units manufactured.

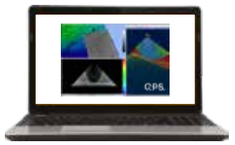
Exail Hydrins

Hydrins is a high-performance Inertial Navigation System (INS) based on Exail Fiber-Optic Gyroscope (FOG) technology, electronics, and embedded processing. Compact and lightweight, it delivers highly accurate real-time position, heading, attitude, motion (heave, surge, sway), and speed data, for direct spatial referencing.

Exail Phins

Phins is an Inertial Navigation System (INS) providing
position, true heading, attitude, speed, depth and heave. Its high-accuracy inertial measurement unit is based on Exail's Fiber-Optic Gyroscope (FOG) technology coupled with an embedded digital signal processor that runs an advanced Kalman filter.

Software



QPS powerful software from hydrographic data collection to piloting. Offering Qinsy for Survey planning, acquisition, and real-time hydrographic data processing, Qimera for Hydrographic data processing made simple and intuitive, while also containing the most advanced and cutting-edge tools and Fledermaus the 4D analysis toolbox, with movie-making tools and integrated video. The gold standard for presentation and communication..

Beamworx specialized in the acquisition, processing and integration of single- and multibeam echosounder data. OfferingNavAQ, a user-friendly and versatile online navigation and data acquisition program for Single/Multibeam Echosounders/ Laser Scanners and Sidescan Sonar and Autoclean as User-friendly and robust point cloud cleaning program for Bathymetric and Lidar point data. In times where software becomes more and more complex we present a new cleaning tool that is focused on day to day cleaning on board of survey vessels or near site.

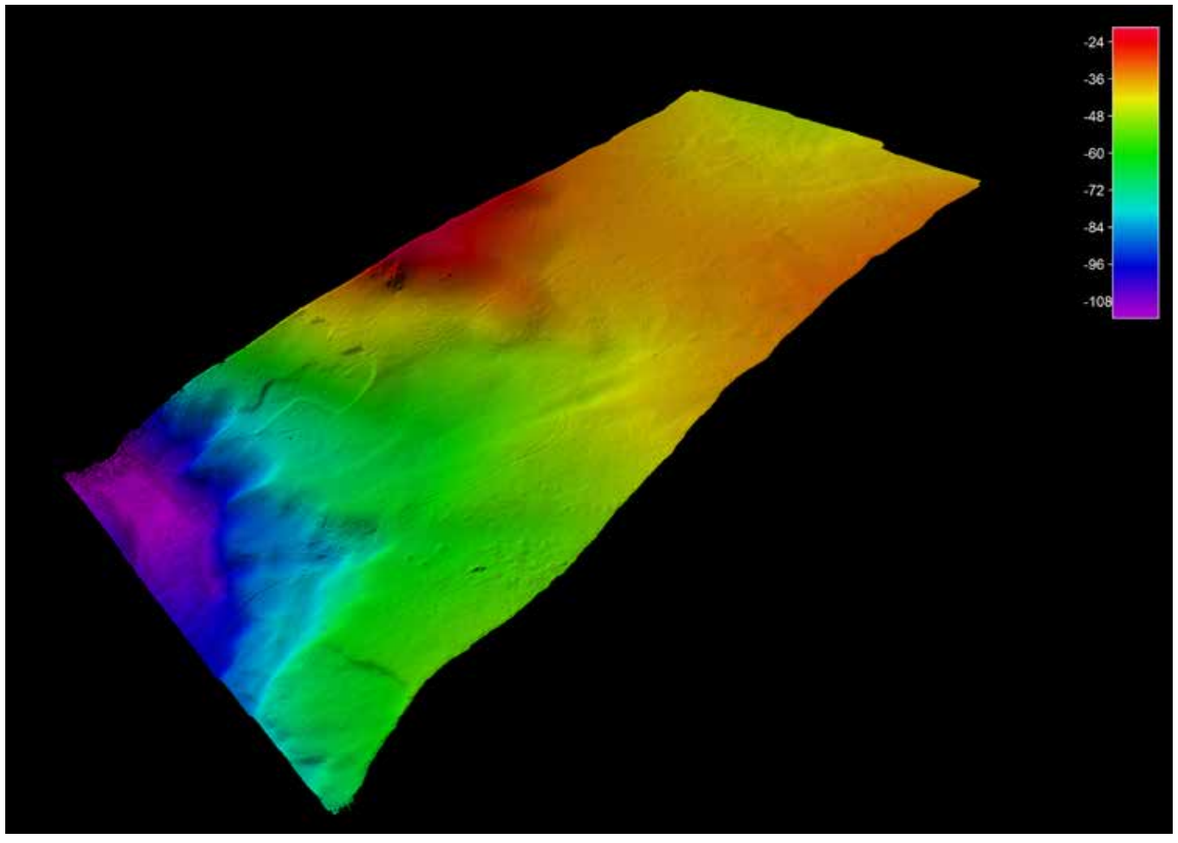
Go to www.seabed.nl/rental or contact us at sales@seabed.nl for rates and availability.

Seabed goes Canadaaaaah!


Adventures Ltd.

Introducing the New NORBIT WBMS X System

The NORBIT WBMS X is a modular multibeam sonar platform designed for high-precision subsea surveying. Engineered for adaptability, it delivers exceptional performance in diverse operational environments, including those with significant vessel motion. Built on decades of expertise in underwater acoustics, the WBMS X system integrates advanced wideband multibeam technology to ensure high-resolution seafloor mapping, focusing on data reliability, efficiency, and stability. Its modular architecture optimises power consumption while maximising accuracy, making it ideal for long-duration surveys in remote locations. The system is also compatible with USVs (Unmanned Survey Vehicles) and ROVs (Remotely Operated Vehicles), ensuring seamless integration into various survey workflows.



Key Features

Active Motion Stabilisation

The WBMS X system features Active Pitch, Yaw, and Roll Stabilisation, ensuring consistent sounding density by dynamically compensating for vessel motion. Unlike conventional systems that rely solely on roll stabilisation, this advanced feature actively corrects for pitch and yaw variations, minimising data gaps and reducing the need for additional infill passes.Transmit beam steering enhances performance by dynamically adjusting for pitch and heading fluctuations, ensuring uniform seafloor coverage.

Dual Swath Transmission

The system supports Dual Swath capability, transmitting two swaths per ping cycle to double along-track sounding density. This enables:

- Increased survey efficiency, allowing higher-density coverage at standard vessel speeds.
- Optimised survey speed, reducing data acquisition time while maintaining required sounding density.

With support for up to 2048 True beams per ping, the WBMS X enhances along-track resolution and minimises the number of required survey lines.

Backscattering Strength Output (BSO) for Seafloor Classification

BSO provides fully repeatable backscatter results as well as compatibility with physical models for seafloor and habitat classification

Backscatter data

The sonar can also produce bathymetry and multiple forms of backscatter data simultaneously:

- Sidescan
- Snippets
- Bathymetric intensity (intensity at the bottom detection point)
- Water column data

STX Scanning

The STX scanning function enables rapid electronic transmit beam steering, allowing the sonar to sweep an along-track sector for improved coverage in obstructed environments. This is particularly beneficial for:

- Surveying behind quay walls and infrastructure, where traditional sonars fail to capture data.
- Enhancing coverage in complex environments by reducing shadow zones in bathymetric datasets.

NORBIT's steerable transmission technology enables beam steering,

improving data acquisition in areas that would otherwise require multiple survey passes.

Pipeline Mode for Infrastructure Inspections

The Pipeline Mode optimises transmit pulse settings and beam distribution for enhanced subsea pipeline detection. This feature improves target definition for infrastructure surveys, ensuring superior data quality.

Data Acquisition

The WBMS X system can be delivered with software tools for real-time data acquisition, enabling Immediate data availability and faster decision-making.

GNSS/INS Integration Options

The system supports fully integrated OEM GNSS/INS solutions from Applanix or SBG. These solutions are seamlessly integrated into the multibeam sonar software, ensuring precise georeferencing and enhanced navigational accuracy.

The WBMS X is redefining what is possible from a high-resolution multibeam sonar, building on the hugely successful WBMS. It offers multiple customization options while retaining the ultra-compact form factor, ease of use, and rapid mobilisation that you expect from a NORBIT multibeam sonar.

For further information, contact NORBIT Subsea.

NORBIT

BEST MONTH EVER!

The team at Seabed BV is dedicated to hard work and continuous growth. We are incredibly proud to announce that December 2024 was our best month ever in terms of sales. During that month, we successfully shipped numerous products, including 10 Wingheads, 4 WBMS units, 2 SVC500E systems, 7 LIDARs, and an AML6 STM. And all of this was accomplished within a brief three-week period, thanks to the holiday season. It's a true testament to the commitment of our team and the trust our customers have in us, driving Seabed BV to new heights each year.

Oceans of Quality, Waves of Innovation, Echoes of Excellence

Acoustic Current Meter

Visit us at
Ocean Business
Booth W86

AquaPulse™ Accoustic Sources

VLF Transducer

Falmouth Scientific Inc.
33 Jonathan Bourne Dr, PO Box 326, Pocasset, MA 02559 USA
sales@falmouth.com • Tel: +1-508-564-7640 • Fax: +1-508-564-7643 • www.falmouth.com

Acoustic Sensors / Seismic Profiling Systems / Transducers

AquaPulseTM Acoustic System

The AquaPulse Acoustic System is a versatile and efficient sediment profiling tool for marine research and surveying. The extremely high pulse repeatability and depth of penetration make it an ideal tool for sub-bottom and seismic 2D and 3D ultra-high resolution (UHR) surveys. academic studies, oil and gas site investigation, coastal engineering, and renewable energy projects. The 18-inch man-portable models are compact and suited for small vessels, coastal and inland waterways using only a standard 2KW generator. The larger 36-inch source configurations are capable of imaging in water depths ranging from 5m to 2000m, with depths of penetration over 1000ms in 5-10m water depth. This expands its capability for deeper or more expansive surveys.

The reduced energy with a short pulse duration of the AquaPulse's acoustic signal compared to an air gun (less than 1/10th of the acoustic pulse length) offers a much shorter signal duration for a less intrusive source for acoustic surveys, which is important for minimizing acoustic exposure to marine mammals and ecosystems.

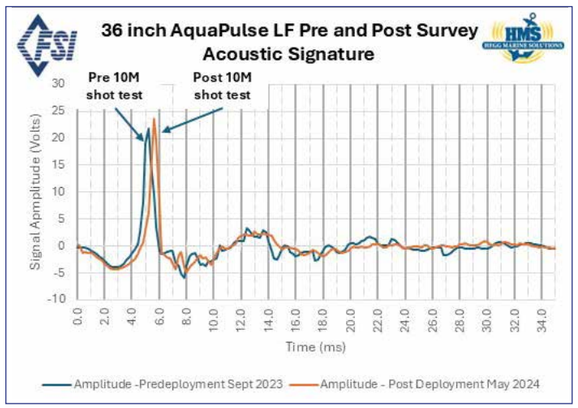
The fact that the system maintains a repeatable acoustic output signature without requiring specialized power sources operating using a standard 120V/220V outlet or small generator. This adds even more value, making it easy to integrate into various size vessels, reducing operational complexities and ensuring minimal disruption during deployments.

AquaPulse Proven Results

After a recent UHR survey, pre and post source signature measurements revealed the AquaPulse Acoustic System exceeded 10 million shots without maintenance or any degradation in performance, truly demonstrating the system's outstanding reliability and signal repeatability—critical factors for extended, large-scale marine geophysical surveys. The ability to produce high-quality acoustic images penetrating to depths of 1000m, even in shallow water depths as low as 10m, is a significant advantage for a broad range of seismic and subbottom data acquisition requirements.

"AquaPulse's ability to sustain repeatable accoustic performance over millions of shots without maintenance sets a new standard for reliability in marine surveys."

Fred Hegg VP of Business Development
at Falmouth Scientific



Acoustic Transducers and Arrays

Falmouth Scientific offers a wide range of standard and bespoke piezoelectric transducers and arrays, catering to a variety of underwater acoustic applications, from sonar and communications systems to sub-bottom profiling and full ocean depth sources. With such a diverse number of products—ranging from standard transducers like pingers, transponders in omni and directional applications, to very low frequency flextensional projectors and cantilevered benders. FSI's capabilities are able provide acoustic solutions for a broad spectrum of needs in marine science, exploration, and communication applications.
Contact **sale@falmouth.com** for specific custom transducer requirements.

High power flextensional transducer designed to operate in the 200Hz to 2kHz range.

VLF Transducer with cantilevered bender design. High power, very Low frequency, full ocean depth transducer designed to operate in the 10Hz to 1000Hz range.

Sub-Bottom Profiling Systems

The **Falmouth Scientific HMS-622 Sub-bottom Profiling System** is a versatile, high-power tool designed for a variety of sub-bottom profiling applications, whether towed, hull-mounted, or deployed over the side. Its use of **linear swept FM** (also known as **CHIRP** technology) in multiple frequency bands makes it capable of high resolution and deep penetration images into different sediment types. This is particularly useful in geophysical, coastal engineering surveys, environmental assessments, and 10,000m hull mounted applications.

A high power1-10KHz tonpilz

Acoustic Current & Wave Meters

The Falmouth Scientific 3-Dimensional Acoustic Current & Wave Meters (ACM-PLUS Series) are highly sophisticated instruments designed to collect precision, real-time current velocity data in three dimensions, making it suitable for a range of environmental and oceanographic monitoring applications. The ACMProPlus software makes it easy to configure, deploy, and manage the data in a user-friendly way. The long battery life and onboard storage capability allows for long term in-situ data collection. Real-time high sampling data can also be acquired for moored and fixed mounted powered configurations. The inclusion of additional optional sensors, such as CTD, enhances the system's flexibility for different surveying needs.

WAVE-TIDE-PLUS

Falmouth Scientific, Inc. (FSI)

is a leader in providing high-quality, innovative sensor and survey solutions for marine environments with the ability to deliver cutting-edge products and services for global applications in both saltwater and freshwater environments.

FSI's modern manufacturing facility supports the production of a wide range of marine products, from seismic and sub-bottom sonar systems to current, wave, and tide meters, along with electro-acoustic transducers and acoustic relocation systems.

The facility includes specialized areas such as an acoustic test tank, a pressure chamber, and a calibration lab to carry out qualification tests on various products. These spaces ensure that each product is rigorously tested before deployment in real-world environments.

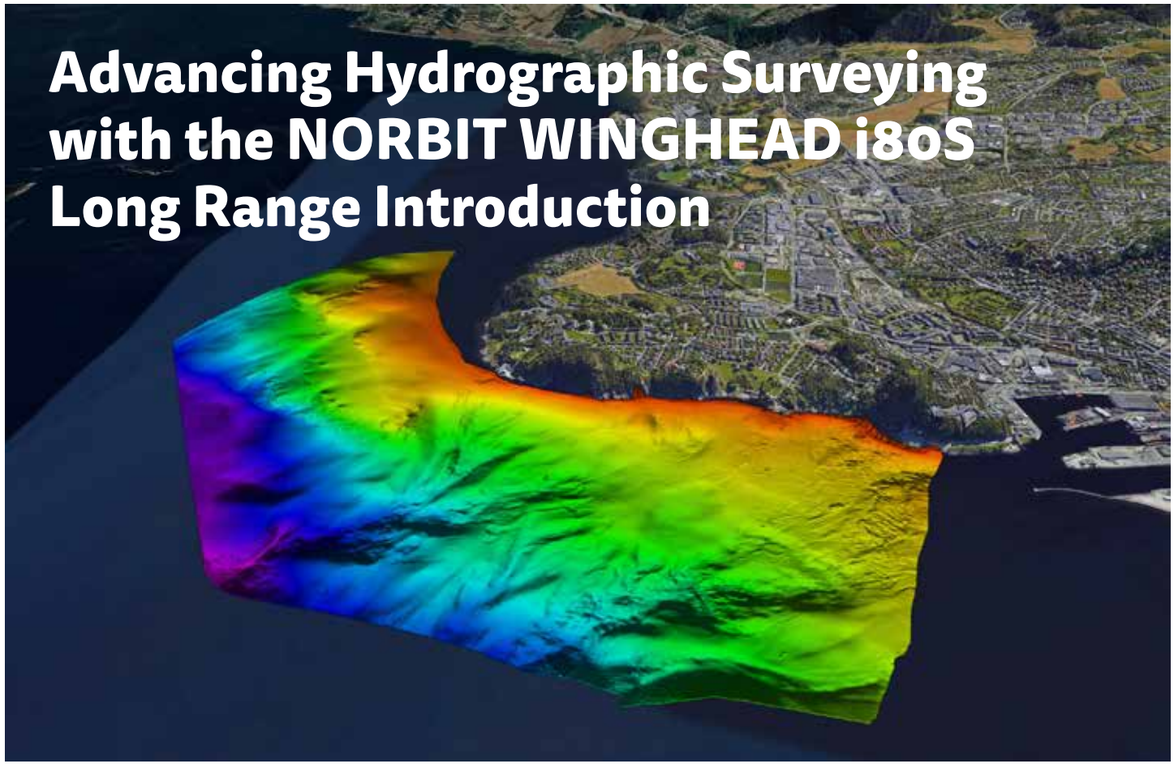
FSI was founded in 1989 based on WHOI technology licenses, and is located in the heart of the New England marine technology cluster on Cape Cod in Pocasset, Massachusetts

More detailed information on any Falmouth Scientific products can be found at www.falmouth.com

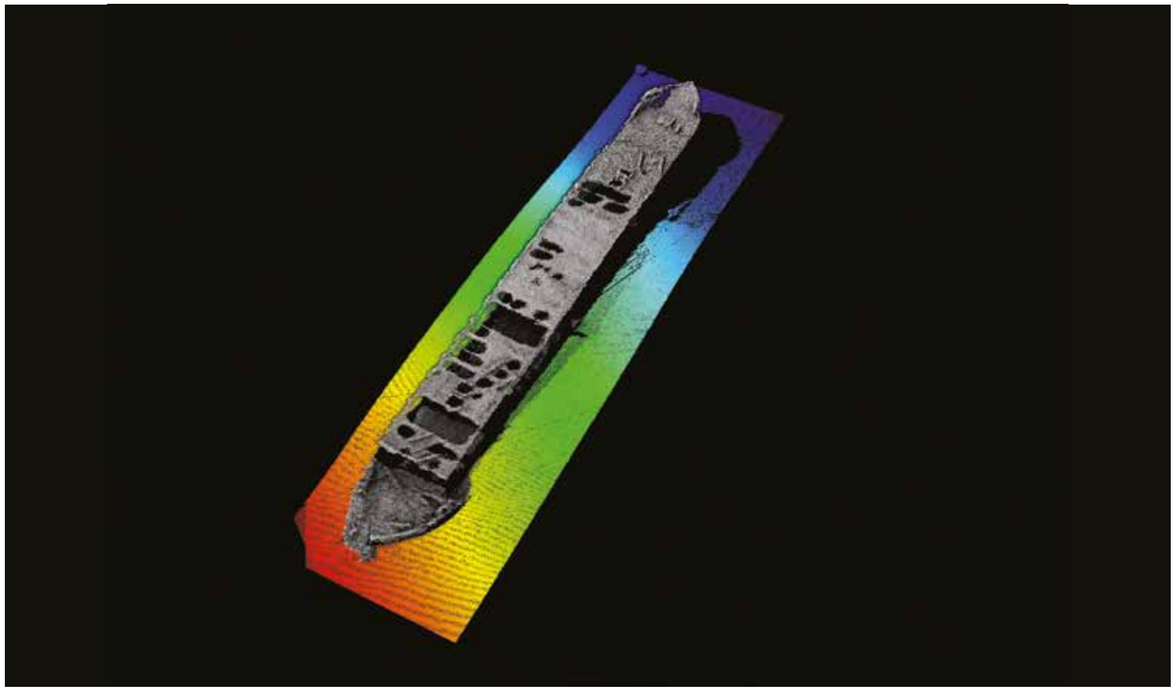
SEABED END OF SUMMER DEMO DAYS 2024

We can look back on two very successful demo days, where our 20th anniversary added a festive touch to the entire event. We hope to welcome you again in 2025!

Advancing Hydrographic Surveying with the NORBIT WINGHEAD i80S Long Range Introduction



Hydrographic surveying continues to push the boundaries of technology, requiring advanced sonar systems that provide high-resolution data while maintaining ease of use and portability. The NORBIT WINGHEAD i80S Long Range (LR) is a compact, fully integrated multibeam survey system designed to meet these demands.



This article presents a case study showcasing the performance of the WINGHEAD i80S LR in the challenging underwater environment of the Trondheim Fjord, Norway. An area of 4.5 km² across depths ranging from 5m to 340m was surveyed.

Innovative Sonar Technology for Wide Depth Ranges

The WINGHEAD i80S LR delivers high-resolution data with wide swath coverage, making it highly versatile for various underwater environments.

Key specifications include:

- Beam widths of 0.5° × 0.9° at 400kHz and 1.0° × 1.8° at 200kHz
- Frequency agility from 200kHz to 700kHz
- 1024 dynamically focused beams per ping
- Up to 600m range performance
- Steerable transmission for full motion stabilisation (roll, pitch, and yaw)

This combination allows for exceptional target detection in both shallow and deep water, ensuring uniform sounding coverage even in dynamic sea conditions.

Installation and Deployment

One of the standout features of the WINGHEAD i80S LR is its rapid deployment capability. The system's compact size (8.0 kg in air) and single-cable solution allow for quick mobilisation. For this case study, the sonar was mounted on NORBIT's vessel, MARMEL, using the NORBIT PORTUS mounting pole.
The sonar's compact size allowed for easy transportation to the vessel, as the entire system, including cable, conveniently fits into a single Pelican case.
The fixed and known offsets of the NORBIT PORTUS pole, combined with the wizard-based INS setup tools in the NORBIT GUI, ensured a quick and easy setup. This streamlined installation process simplifies the learning curve for less experienced surveyors, minimising complexity and reducing the risk of operator error.

Performance in Deep and Shallow Waters

Deep Water Range Performance

The WINGHEAD i80S LR's long-range detection capabilities were demonstrated in deep waters up to 300m, where the system achieved a swath coverage of 2 times water depth. The ability to transmit longer pulses in deep waters significantly increases the coverage area without compromising data quality.

High-Resolution Target Detection in Shallow Water

For shallow water operations, the system can operate at 700kHz, producing narrower beams for ultra-high-resolution mapping.
A sunken 20m barge in 15m of water was surveyed, and the raw point cloud data revealed small features with high clarity, highlighting the system's capability for detailed detection.

Deep-Water Target Detection: WWII Aircraft & Infrastructure

The deep-water target detection capabilities were further proven by a survey of a Short Sunderland seaplane resting at a depth of 67m. The aircraft, which has remained on the seabed since 1945, was captured with a detailed 700kHz point cloud, accurately mapping its 26m length and 36m wingspan.

Additionally, a 56cm stormwater line was clearly visible in 1m DTM data at 70m depth, demonstrating the system's ability to detect small-scale underwater infrastructure.

Enhancing Survey Efficiency with Dual Swath & Yaw Stabilization

The Dual Swath feature of the WINGHEAD i80S LR enables the system to transmit multiple pings simultaneously, effectively doubling the number of soundings per ping. This allows for:

- Increased along-track sounding density
- Higher survey speeds while maintaining data resolution
- Fewer coverage gaps, particularly in dynamic conditions

Active yaw stabilisation compensates for natural changes in vessel heading, preventing gaps in coverage and providing uniform sounding density in the outer beams. This ensures uniform-sounding density and reduces the need for infill lines.

Backscatter Imaging for Seafloor Characterization

Beyond bathymetric mapping, the WINGHEAD i80S LR generates multiple imagery and backscatter outputs, including Water column, Snippets and Sidescan.

These outputs provide valuable insights into seafloor composition, which is crucial for environmental studies, sediment classification, and offshore infrastructure assessments.

Conclusion: A Powerful Solution for Modern Hydrography

The NORBIT WINGHEAD i80S Long Range is a versatile mapping system that delivers exceptional performance while maintaining the high standard of portability that NORBIT products are renowned for.
Despite its small size, the system delivers high-resolution data and wide swath coverage across a range of depths, making it suitable for installations on platforms of all sizes, from ocean-going vessels to small USVs/ASVs. The integrated INS tools in the NORBIT software simplify the software setup compared to traditional systems together these features makes

the WINGHEAD i80S LR a powerful, efficient, and user-friendly solution that meets the evolving demands of modern hydrography.

NORBIT

Meet the Seabed Team

From left to right in the back row:
Federico de Francesco - Mechanical Engineer,
Bart Admiraal - Electronical Engineer
Evert Bootsman - Senior Engineer, Remy Pronk - Engineer,
Hans Tuinman - Director,
Front row:
Robert Hooiveld - Sales Admin, Suzanne Cranfield - Process Manager,
Anya Siemons - Financial Admin, Elice Collewijn - General Manager,

Do you want to join our team?Send an e-mail to sales@seabed.nl

Profiles in New Technology: A Fully Autonomous, Set-and-Forget Underwater Camera System

All photography courtesy of Dr. Todd Bond, The University of Western Australia, and SubC Imaging.

There is a new way to conduct underwater imaging and data collection with minimal intervention. The SubC Autonomous Timelapse System is a purpose-built solution for marine research, environmental monitoring, and offshore inspections. Designed for short and extended deployments, it provides high-resolution imaging, advanced scripting capabilities, and a rugged design that withstands deep-sea and shallow-water conditions. Its industry-first hibernation mode sets it apart, allowing for months or even years of continuous operation without draining battery life. Combined with an intuitive visual script builder, this system offers unmatched control over capture intervals, lighting, and exposure settings. Here's a closer look at its advanced features, proven performance in the field, and the industries putting it to work.

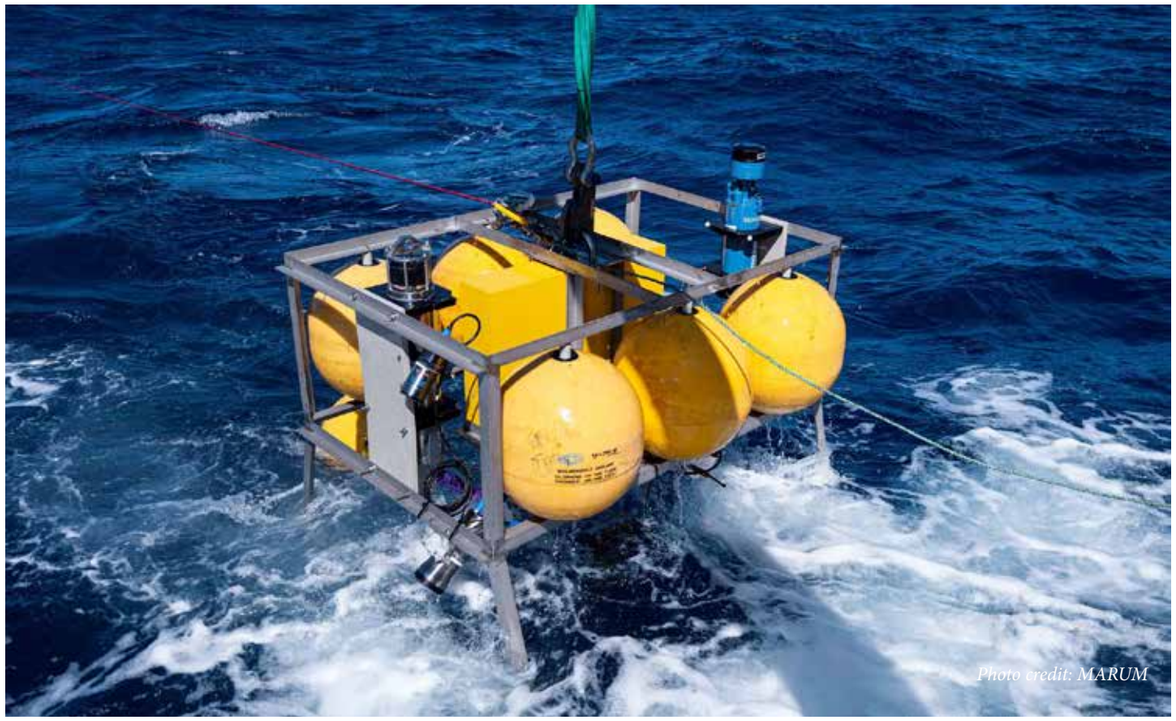


Photo credit: MARUM

Core Capabilities for Autonomous Imaging & Data Collection

Marine professionals face significant challenges in conducting effective battery-powered research and underwater monitoring. Limited battery options, operational uncertainties, and complex setups can hinder their ability to collect reliable, high-resolution data.Issues like lens biofouling and inefficient data workflows further complicate projects.The SubC Autonomous Timelapse System tackles these issues head-on. It integrates the industry-leading Rayfin camera with optional LED lighting and laser modules for precise imaging. The system includes pre-deployment status indicators, giving users confidence that the camera is ready before it enters the water. It captures 12.3-megapixel stills and 4K video with adjustable white balance, focus, and exposure settings, ensuring crisp imaging in varied underwater conditions. Each image is embedded with metadata, including date, time, and sensor data, simplifying post-processing and data organization.

Another highlight is customizable timelapse scheduling. The system's visual script builder simplifies programming, allowing users to set capture intervals, lighting, and exposure settings easily. By enabling long-term time-lapse sequences, it helps researchers and industry professionals detect gradual changes that conventional monitoring might miss. The intuitive interface ensures a seamless setup, allowing users to create reliable automated scripts without requiring advanced technical expertise.

Its available hibernation mode is a game-changer. No other system offers this level of power efficiency. This feature maximizes battery life, allowing for deployments that stretch across days, months,

or years without intervention. With optional biofouling control, the system ensures clear, uninterrupted imaging over extended deployments.

Streamlining Data Management for Actionable Insights

Collecting data underwater is only the first step; organizing and processing it efficiently is just as crucial. The Autonomous Timelapse System is designed to streamline every stage of data management, ensuring that your insights are actionable and accessible. Data management is streamlined through integrated logging and pre-set directory templates that keep files organized.

A web-based interface allows fast, secure data downloads and transfers, simplifying post-mission analysis and ensuring quick access to collected imagery.This system reduces the time spent handling files, whether managing large-scale research projects or targeted subsea inspections, so you can focus on making data-driven decisions.

Versatile Across Industries

Designed for flexibility, the system integrates with drop frames, landers, baited remote underwater video systems, and autonomous underwater vehicles. It serves a wide range of applications, including marine research, environmental monitoring, offshore inspections, and aquaculture. Scientists use it to monitor bio-diversity, track species behavior, and analyze habitat changes. Environmental monitoring teams rely on it to assess pollution impact, climate shifts, and oceanographic conditions. Offshore industries employ it to inspect oil and gas infrastructure, subsea cables, and renewable energy installations. In aquaculture and fisheries, it helps assess fish populations, water quality, and ecosystem health.

Reducing Costs and Increasing Efficiency

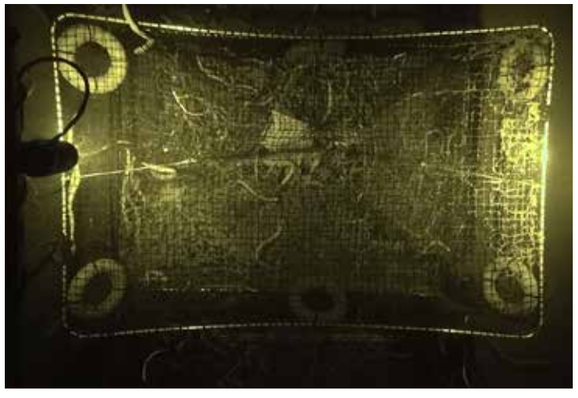
By minimizing the need for frequent vessel trips and manual interventions, the SubC Autonomous Timelapse System helps organizations cut costs. The ability to program the system for extended data collection means fewer retrievals and deployments, making it an efficient choice for long-term monitoring.

The system's intuitive software and streamlined data management reduce the time required for image processing and analysis. Instead of navigating cumbersome file structures or dealing with inconsistent data, users can focus on extracting meaningful insights.

Field-Proven Results from Leading Institutions

The University of Washington and the University of Western Australia have both deployed the SubC Autonomous Timelapse System in extensive marine research projects, demonstrating its reliability and effectiveness in extreme environments.

The University of Western Australia integrated the system into deep-sea observatories within Australia's Marine Parks, using it to monitor ecosystems at depths exceeding 5000 meters. Over 18 months, the system continuously captured high-resolution



images, delivering critical insights into marine snow dynamics, benthic activity, and seasonal environmental shifts. The ability to operate autonomously for such an extended period provided researchers with unprecedented data without the need for frequent retrievals.

The University of Washington leveraged the system for long-term studies on marine biodiversity and habitat changes in the Pacific Ocean. Researchers focused on monitoring methane seep activity at the Southern Hydrate Ridge, a region known for its dynamic seafloor venting and gas-rich hydrate formations. The system continuously captured images to analyze fluctuations in seep intensity, hydrate stability, and interactions between methane seeps and surrounding marine life. By using the advanced scripting and hibernation mode, researchers ensured continuous monitoring while conserving battery power.

Ready to Support Your Mission

The upgraded Autonomous Timelapse System is now available and shipping worldwide to support the work of marine professionals and scientists.

For more information about the system's capabilities or to schedule a demonstration, visit subcimaging.com.

Autonomous Timelapse System Components

Autonomous Timelapse System Specifications	
Max Operating Depth	500m with Rayfin Micro | 6000m with Rayfin Benthic | 11,000m - Coming Soon Rayfin Trench
Digital Stills	12.3 Megapixel
Video Resolution	SD | HD | 4K
Storage	Up to 1TB, expandable for extended data capture
Battery Options	Supports integration with existing battery systems or optional SubC-sourced solutions tailored to meet specific deployment needs.
Sensors	Depth, tilt, roll, NMEA data logging
Data Analysis Integration	BIIGLE
Operational Functionality	Supports autonomous and live monitoring modes. Adaptable and scalable for long-term investment in diverse applications.
Biofouling Control (Optional)	Wipers (<200m)
LED Lumens (Optional)	16,000 lumens (lamp) / 50,000 lumens (strobe) - 2x LEDs
Lasers (Optional)	Parallel dots, lines, grids, or crosshairs for accurate scaling and measurements. FDA-certified; qualified for shipping in the United States, Canada, and Internationally.

SubC Imaging

SEABED AT THE EXPO'S

Bedrijvendag MIWB 2024

Oceanology International 2024

Hydrography – growing in importance

Safety for maritime traffic and harbours

International trade is booming, and shipping along with it. Given the ever growing quantity of shipments and the expansion of harbour locations, there is a corresponding increase in requirements for the secure maintenance of waterways and harbour basins.

In many of the world's largest harbours, appropriate hydrographic monitoring of suspensions accumulating as fluid mud, as well as sediments in the form of more or less consolidated silt, is a necessary requirement in order to keep dredging costs for maintaining a satisfactory nautical bottom[1] within commercially sensible limits.

Every year in Germany alone action taken to secure the prescribed water depth produces an accumulation of around 45 million cubic metres of dredged material, the disposal of which entails high financial and environmental costs. Accurately determining the nautical bottom allows for a considerable reduction in operating costs, since dredging work can be carried out more systematically and efficiently.

[1] The nautical bottom is defined as „the level where physical characteristics of the bottom reach a critical limit beyond which contact with a ship's keel causes either damage or unacceptable effects on controllability and manoeuvrability"
(Joint PIANC-IAPH Report on Approach Channels: A Guide for Design, Vol. 2, 1997)

admodus® solutions for cost-effective waterway management

Echo-sounding is an internationally recognised technique for establishing the depth of a body of water. Dual frequency echo sounders such as the admodus®*SONAR* work with signals of differing frequency. Where there is a firm subsurface, both signals deliver identical readings for the depth of water, and in this case the readings correspond to the nautical bottom. However, if the results show greater variance this indicates the presence of sediment suspension: while the high frequency signal is dispersed at layers of low density, the low frequency signal penetrates through the suspended matter almost entirely, and is only reflected from deeper, more solid layers. Even though this technique succeeds in identifying accretions of low-viscosity suspended matter and fluid mud, it is not possible to determine the exact location of the nautical bottom. For this, an additional in situ analysis is required.

A method of analysis still frequently used, albeit one which is very time- and cost-intensive, is that of sampling combined with subsequent offline analysis in the laboratory.
An innovative and significantly more cost-effective option is the highly accurate online characterisation of suspensions and sediments achieved using the admodus®*USP pro* depth-profiling probe. The probe is lowered from the vessel, and can thus carry out real-time measurement of the density profile of the layers through which it penetrates, as well as record other parameters of rheological value. With the help of this profile, the nautical bottom can be established on the spot and with great accuracy[2].

[2] The nautical bottom can be defined area-dependently by a limiting density of approximately ρ=1.20 g/cm3.
„Determining the Nautical Bottom", Markus Jänen

admodus®*USP pro*

Determining nautical depth in real time

The admodus®*USP pro* is an innovative in situ measuring probe for online monitoring of the nautical bottom in harbours and waterways. The system provides a depth-dependent density profile quickly and reliably, as well as a variety of other indicators for characterising suspended matter and sediments.

The probe is a robust and easy-to-use device made of seawater-resistant stainless steel. With its high inherent weight it can be used even in extreme flow conditions

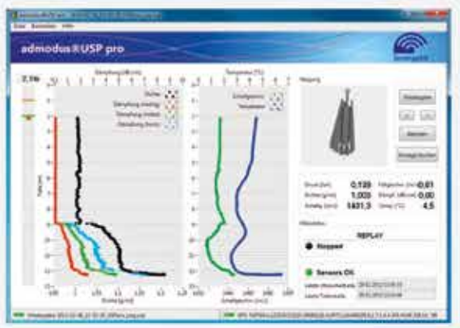
The admodus®*USP pro* is linked via high-speed Ethernet to a PC which displays all measurement data clearly laid out and in real time, stores them, and exports them as a PDF report as required. The user software features an automatic recording mode which permits serial measurements without interaction.

As the probe descends it continuously records its depth and inclination, as well as the density, frequency-dependent acoustic loss, speed of sound and temperature of the medium.

- Monitoring the navigability of harbours and waterways
- Supporting intelligent dredging management by technically efficient measurement
- Silt and sediment characterisation
- Analysis of fluid mud layers (e.g. in estuaries)
- Monitoring in sedimentation basins
- Investigation of sediment transport
- Online analysis in place of costly sampling

The measurement data ascertained can be stored together with the GPS data of an external receiver, so that the precise location of measuring points and a correlation with echo sounder bearings are both easily achieved.

The highly accurate point-by-point measurements achieved with the admodus®*USP pro*, combined with the area data capturing of the dual-frequency admodus®*SONAR* echo sounder, are one of the most accurate methods for hydrographic surveying currently available.



admodus®*SONAR*

Registering and recording sediment layers

The admodus®*SONAR* dual-frequency echo sounder is especially suited for hydrographic surveying of harbours, waterways and coastal water areas.

The admodus®*SONAR* can be operated as a self-contained echo sounder with a variety of different transducers. Furthermore, it can be used as a passive digital supplement to existing analogue echo sounders.

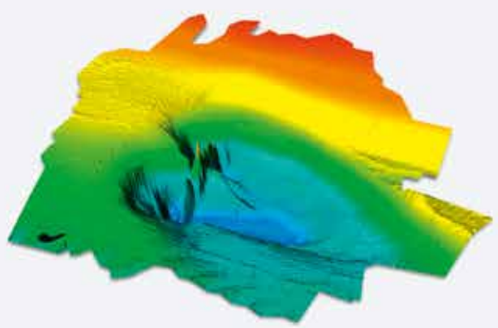
The single beam system with dual frequencies enables effective surveying of seafloor conditions, and of the different layer formations of suspended matter and sediments, ranging from fluid mud to well consolidated silt.

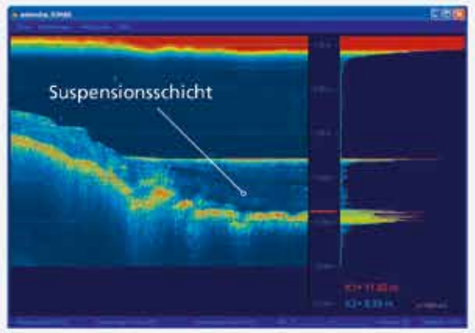
All data are transferred in real time to a computer via Ethernet, then visualised and stored. In addition, the admodus®*SONAR* user software provides an interface with widely available surveying software programs such as QINSy, WinProfile and Profile 2000, so that the horizons identified can also be externally recorded and further processed.

With its compact dimensions and the splash-proof design of its housing, the system is also highly suitable for mobile field work.

The area data capturing of the dual-frequency admodus®*SONAR* echo sounder, combined with the highly accurate point-by-point measurements achieved with the admodus®*USP pro*, is one of the most accurate methods currently available for hydrographic surveying.

- Hydrographic surveying of harbours, waterways and coastal water areas
- Area monitoring of fluid mud and silt layers
- Supporting intelligent dredging management by technically efficient measurement
- Creation of digital terrain models
- Digitalisation of existing analogue echo-sounder systems



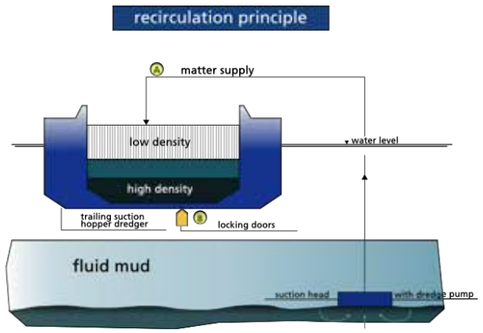


DENSITY matters...

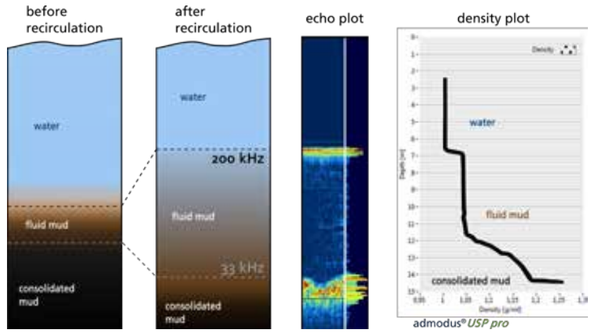
Port of Emden, Germany
reducing dredging costs by 90%

In many of the world's largest harbours, appropriate hydrographic survey is a necessary requirement in order to keep dredging costs low. The port of Emden succeeded in reducing the dredging costs by 90% with the help of a new dredging management and hydrographic survey using the density probe **admodus®** *USP pro*.

In 1994, after many years of research, the port authority managed to maintain the fluidity of suspended sediments, which were carried into the harbour basin by the river Ems. This so called "sediment conditioning" is mainly based on the prevention of the fluid mud's reconsolidation process by a regular treatment (recirculation). As a result, these sediments no longer have to be **removed** from the harbour basin and a lot of disposal costs can be saved.



Recirculation principle



Fluid mud layer before and after recirculation.

The challenge:

How to monitor the density of this 'fluid mud' or measure the nautical depth in the harbour basin in a fast and reliable way, in order to guarantee navigability?

After 10 years of experience and development, **admodus® MARITIME DEVICES** released the new **admodus®** *USPpro* in 2013, with improved precision, ruggedness, better software and easier handling like the one-man-automatic-mode. The port of Emden was the first customer who purchased and still uses this device with great success.

Conclusion

A lot of maintenance costs can be saved by an intelligent dregding management. Investigations in recent years have shown, that ships can navigate safely through fluid mud layers up to a density of 1.15kg/dm³ at the port of Emden. This 1.15kg/dm³ horizon is often much deeper than the 200kHz horizon of an echo sounder. Thus, there is 'more water' under the keel with less dredging.

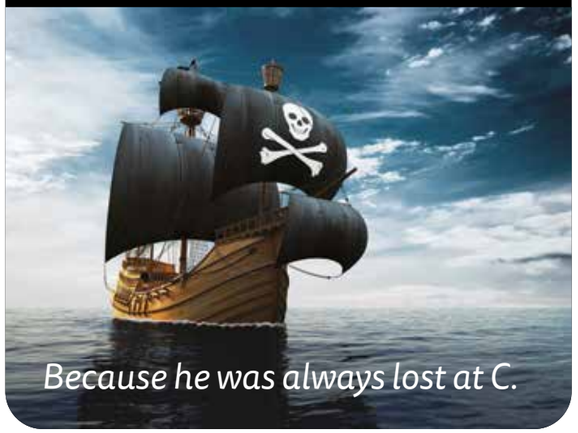
admodus®MARITIME DEVICES is a brand of Synergetik GmbH - Am Nusskopf 20 – 66578 Schiffweiler, Germany
Phone: +49 6821 40172-0 - Fax: +49 6821 40172-11 - E-mail: info@admodus.de

Save the Date

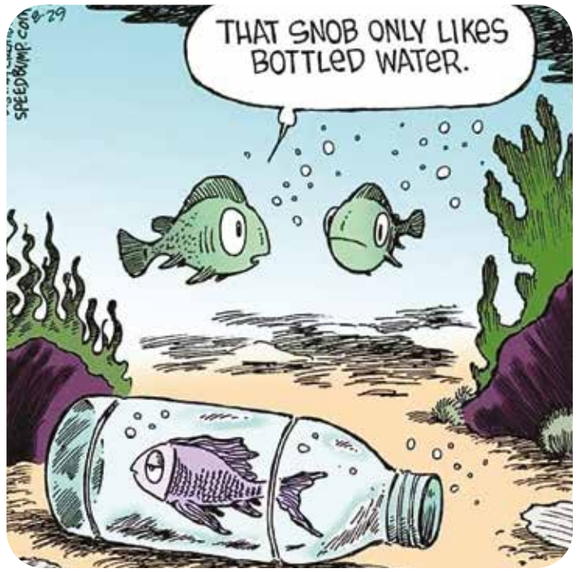
Wednesday 10th and Thursday 11th of September 2025.
Restaurant het Bosch at the Nieuwe Meer in Amsterdam.
Looking forward seeing you! Please sign in via rsvp@seabed.nl

SEABED
END OF SUMMER
DEMO DAYS
2025

Why couldn't the Pirate learn the alphabet?



Because he was always lost at C.



Make them laugh

When you're single and people tell you there's plenty more fish in the sea, but your inbox looks like this...

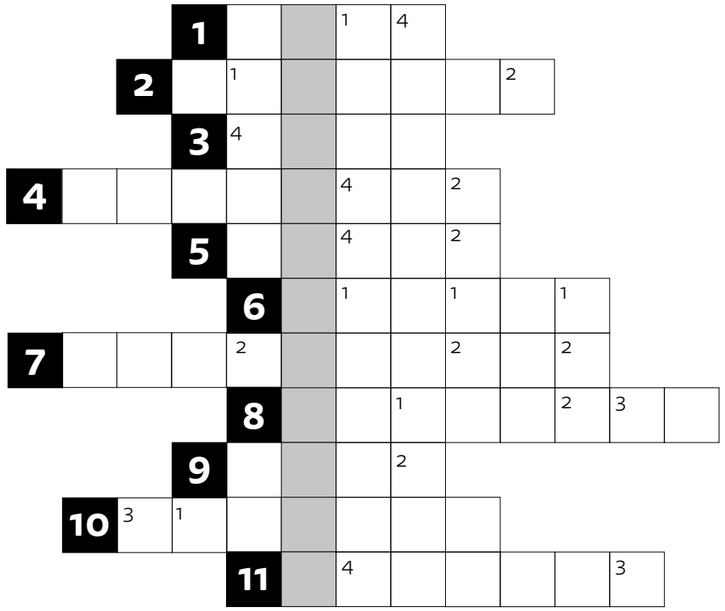



What's a sea lion's favourite subject in school?

Art Art Art!

Puzzle

The object of the puzzle is to find words using the hints below. The letters in the grey column will form the name of Seabeds' line of Tide Gauges.



2. Where ships dock.

3. Ebb and flow.

6. North American country

9. Front...
Back...
Trap...

11. Soft bodied, eight-limbed sea creature

Contact

Seabed BV
Asterweg 117
1031HM Amsterdam
The Netherlands

Tel: +31 (0)20 6368443
E-mail: sales@seabed.nl
Website: www.seabed.nl

Colophon

Editor: Elice Collewijn
Design: RBREG Concept & Art Direction
Words: Elice Collewijn, Ray Breg & guest writers
Photography: Elice Collewijn, Stock

www.seabed.nl

Seabed Electric Vibrocoror (SVC) series

The SVC-series have a long track record and are successfully being used by our clients world wide on various types of soil including soils containing gravel. The Seabed vibrocorer has been designed to obtain cylindricalcores in soft, cohesive soils at a maximum water depth of 200 meters.

SEABED