SATLAB GEOSOLUTIONS

Hydrography & Oceanography Profile

SATLAB GEOSOLUTIONS

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About SatLab

Geosolution i Göteborg AB is a global provider of satellite positioning solutions based in Sweden, with 9 regional offices and over 100 reputable dealerships worldwide. Our advanced innovations in GNSS, Optical, LiDAR, and Sonar technologies, combined with our expertise in data processing and analysis software development, empower customers across a range of industries including civil engineering, construction, mining, forestry, agriculture, hydrology etc.

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HydroBoat
Unmanned Surface Vehicle (USV)

About USV

Unmanned Surface Vehicles (USVs), also known as uncrewed surface vessels, are autonomous watercraft that operate without a human crew. They can be remotely controlled or navigate independently using onboard systems and sensors, and they support a variety of payloads tailored for specific missions.

Why HydroBoat?

SatLab proudly introduces the HydroBoat series USVs, a versatile fleet of unmanned vessels redefining marine operations. Developed through rigorous research and innovation, these adaptable platforms are built to tackle the most demanding tasks across various industries.

Each HydroBoat model can be equipped with specialized payloads for hydrography, surveying, environmental monitoring, and more. The series includes three powerful USVs, each designed to support a wide range of underwater missions:

HydroBoat 990

Bathymetric USV for
precise depth measurements

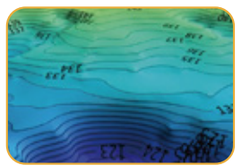
HydroBoat 1200

Multi-Purpose USV for
adaptable operations

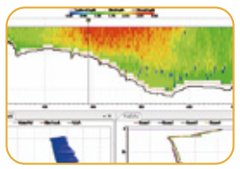
HydroBoat 1500

Multibeam USV for
three dimensional measurement

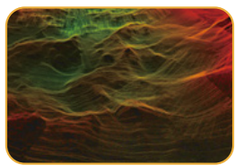
Applications



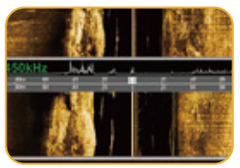
Bathymetric Surveys



Hydrographic Surveys



Underwater Terrain Surveys



Water Search & Rescue

HydroBoat 1500

Multibeam USV Platform for
Underwater Topography

HydroBoat 1500
Multibeam Echo Sounder USV

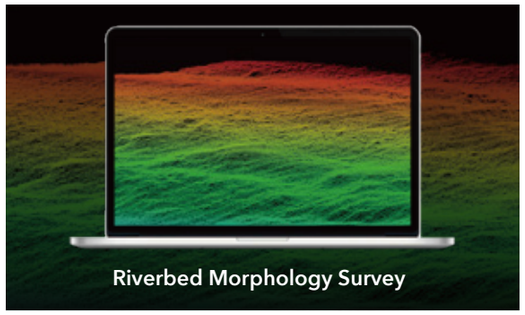
Exceptional Payload Capacity
Accommodates up to 65 kg of payloads with a through-hull design to adapt to various surveying tasks.

Intuitive Android Control
Simplify operations with the user-friendly SLHydro USV software, featuring route planning, boat control, and status monitoring features.

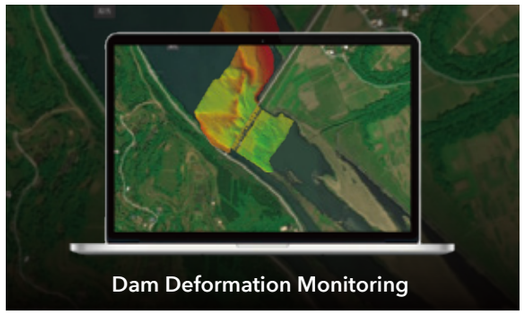
Unlimited Range Transmission
Experiences 4G and 2.4G dual-channel control and communication for limitless reach and real-time data collection, even from the office.

Uncompromising Safety
Navigate with confidence thanks to a 360° omnidirectional camera, millimeter wave radar, double-layer anti-sink hull, and shallow water hovering capabilities.

Applications with Multibeam Echosounder


Riverbed Morphology Survey


Underwater Slope Inspection


Dam Deformation Monitoring


Channel Topography Survey


Dry End


Software


Wet End


Controller

Specifications

Vehicle Specifications	Hull dimension (L × W × H)	Monohull: 1528*694*494 mm, Trimaran: 1528*1034*494 mm
	Weight	40 kg (without battery)
	Max Load	60kg
	Material	Carbon fiber, rubber bumper
	Anti-wave & Wind	4th wind level & 3rd wave level
	Waterproof	IP67
	Indicator light	Two-color light
	Camera	360° omnidirectional video
	Anticollision sensor	Detection distance 10-30 meters
	Propeller	Veering without steering engine
	Direction control	5.7m/s
	Maximum speed	4*Brushless Propeller
	Battery endurance	Two batteries 4.5h with 1.5m/s, total 6 batteries
Controller	System	Android System
	Software	SLHydro USV
	Control range	1.3km on 2.4GHz; Unlimited on 4G
GNSS Performance	Satellite system	GPS, BDS, GLONASS, Galieo
	RTK Positioning accuracy	H: ±8mm + 1 ppm RMS V: ±15mm + 1 ppm RMS
	Heading accuracy	0.2° @1 m baseline
	INS accuracy	2.1°/h, <1m/20s
	Refresh Rate	200Hz
Software	SLHydro USV	Mission planning
		Vessel Monitoring
		Coordinate conversion
		Bathymetric data acquisition
		Bathymetric data download
Expandable Sensors		Multibeam Echo Sounder
		Ping DSP
		Single Beam Echo Sounder

HydroBoat 1200

Mult-Purpose USV Platform for Hydrographic Surveys and Monitoring

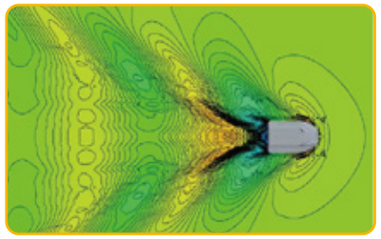
Features

Adaptive Water Flow

Precise hovering and efficient trajectory tracking, unaffected by waves or wind. Follows a predefined path with accuracy, even in challenging environments.

New INS Combination Algorithm

Measure changes in velocity and orientation, and able to solve the accurate position information in GNSS-blocked areas to complete the planned work.



Stability by Design

Hydrodynamically efficient design for the USV's intended operations, guided by CFD simulation, enhances hull stability and noise reduction under varied water conditions and loads.

HydroBoat 1200

Multi-Purpose USV

Portability

1. 10 kg lightweight hull
2. 1229 mm small size hull
3. Multi-function Android boat control software

Versatility

1. 240 mm large moon pool
2. Supporting transparent data transmission
3. Reaching maximum boat speed of 6 m/s for efficient movement

Safety

1. 360° PTZ camera
2. Millimetre wave obstacle avoidance radar
3. Smart battery management platform

Specifications

Vehicle Specifications	Hull dimension (L × W × H)	1185 mm*593 mm*397 mm
	Weight	25kg(No Battery)
	Max Load	25kg
	Material	Carbon fiber, Rubber Bumper
	Anti-wave & Wind	3rd Wind Level & 2nd Wave Level
	Waterproof	IP67
	Indicator light	Two-color light
	Camera	360° Omnidirectional Video
	Anticollision sensor	Detection distance 10-30 meters
	Propeller	2*Brushless Propeller
	Direction control	Veering without steering engine
	Maximum speed	6m/s
	Battery endurance	One battery 4.5h with 1.5m/s, total 2 batteries
Controller	System	Android System
	Software	SLHydro USV
	Control range	1.3km on 2.4GHz; Unlimited on 4G
GNSS Performance	Satellite system	GPS, BDS, GLONASS, Galieo
	RTK Positioning accuracy	H: ±8mm + 1 ppm RMS V: ±15mm + 1 ppm RMS
	Heading accuracy	0.2° @1 m baseline
	INS accuracy	2.1°/h, <1m/20s
	Refresh Rate	200Hz
Built-in Single Beam Echo Sounder	Depth range	0.15m - 200m
	Accuracy	±0.01m + 0.1% x D (D is the depth of water)
	Frequency	200 kHz
	Beam angle	5±0.5°
Software	SLHydro USV	Mission plannin, Vessel Monitoring, Coordinate conversion Bathymetric data acquisition, Bathymetric data download
	SLHydro Sounder	Bathymetric data processing, Bathymetric data correction Bathymetric data export
Expandable Sensors		Acoustic Doppler Current Profiler Single Beam Echo Sounder Side-scan Sonar Multi-parameter Water Quality Meter

HydroBoat 990

An Android-powered USV System for Bathymetric Surveys

HydroBoat 990

Bathymetric USV

Usability

- Operate in One Versatile app
- Time-saving Turn on and Survey
- Network without Base Station
- Integration with GNSS and SBES
- Connection with Indicator Lights

Functionality

- Stable Hovering Function
- Avoid Collision with Obstacles
- Real-time Video Patrol
- 4G Remote Control
- Auto-reverse in the Shallows

Reliability

- IP67 Double Hull
- Anti-Collision & Wear-Resisting
- IHO Standard & CE Certification
- Automotive Grade INS Integration
- Onboard Water Depth Logging

Specifications

Vehicle Specifications	Hull Dimension(L × W × H)	1035 mm*560 mm*345 mm
	weight	20kg(No Battery)
	Material	Carbon fiber, rubber bumper
	Anti-wave & Wind	3rd wind level & 2nd wave level
	Waterproof	IP67
	Indicator light	Two-color light
	Camera	360° omnidirectional video
	Anticollision Sensor	Detection distance 10-30 meters
	Propeller	2*Brushless Propeller
	Direction control	Veering without steering engine
	Maximum speed	6m/s
	Battery endurance	One battery 5h with 1.5m/s, total 2 batteries
Controller	System	Android System
	Software	SLHydro USV
	Control range	1.3km on 2.4GHz; Unlimited on 4G
GNSS Performance	Satellite system	GPS, BDS, GLONASS, Galieo
	RTK Positioning accuracy	H: ±8mm + 1 ppm RMS V: ±15mm + 1 ppm RMS
	Heading accuracy	0.2° @1 m baseline
	INS accuracy	2.1°/h, <1m/20s
	Refresh Rate	200Hz
Built-in Single Beam Echo Sounder	Depth range	0.15 m - 200 m
	Accuracy	±0.01 m + 0.1% x D (D is the depth of water)
	Frequency	200 kHz
	Beam angle	5±0.5°
Software	SLHydro USV	Mission planning
		Vessel Monitoring
		Coordinate conversion
		Bathymetric data acquisition
		Bathymetric data download
	SLHydro Sounder	Bathymetric data processing
		Bathymetric data correction
		Bathymetric data export

USV Boat Control

- Adaptive water flow
- Position hovering
- Low battery return
- Shallow water protection
- Video surveillance
- Intelligent obstacle avoidance

SLHydro USV Android Software

- Usability mission layout
- Multi-differential settings
- Multiple basemap displays
- Bathymetric data acquisition
- Real-Time flow monitoring
- Coordinate conversion
- Project management

HydroBeam M4
Portable Multibeam Echo Sounder

About Multibeam Echo Sounder

A multibeam echosounder (MBES) is a type of sonar that is used to map the seabed. It emits multiple acoustic beams in a fan shape beneath the transceiver, and measures the time it takes for the sound waves to reflect off the seabed and return to the receiver to calculate water depth.

What are the key features of MBES?

High-resolution mapping: Produces detailed 3D maps of the seafloor, revealing features such as underwater mountains, valleys, and shipwrecks.

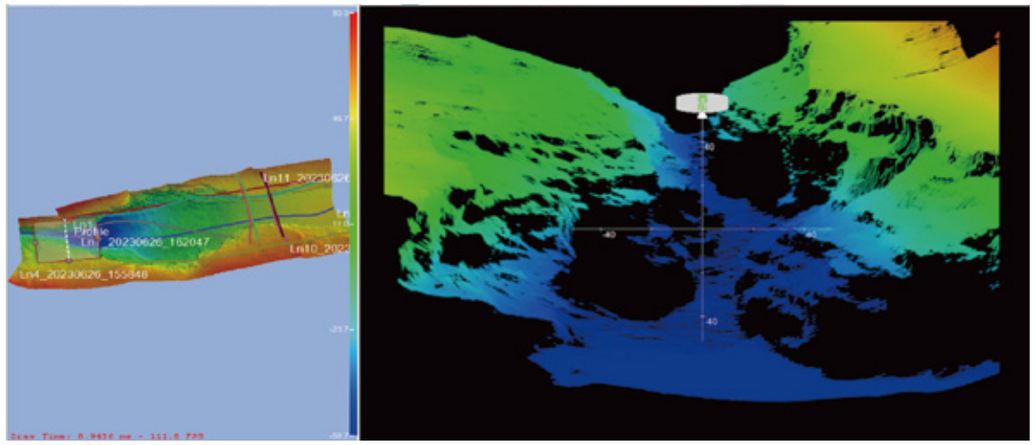
Wide coverage: Maps a wide swath of the seabed with each ping, making surveys more efficient.

Accurate depth measurements: Provides highly accurate depth data, essential for navigation, construction, and scientific research.

Versatility: Can be used in a variety of water depths and environments, from shallow coastal waters to the deepest oceans.

Applications

- Pipeline Survey
- Dredging Project
- Hydrographic Survey
- Underwater Archeology
- Harbor Survey
- Reservoir Storage Survey
- Environmental Research
- Rescue and Salvage



Features

- Diverse Compatibility
- Strict Compliance with Standards
- Reliable Performance
- Intelligent Operation
- Real-time Roll Stabilisation
- High Efficiency
- Seamless Integration

Specifications

Frequency	400 Khz
Beam Width	1° * 2°
Number of Beams	512(max 1024)
Swath Coverage	8°-150°
Depth Range	0.2-200 m
Resolution	7.5 mm
Work Modes	Equal-angle/Equal-distance/High density
Max Ping Rate	30 HZ
Signal Type	CW
Depth Rating (Sonar Head)	50 m
Roll Stabilization	±10°
Built-in Heading Accuracy	0.08°(2 m base line); 0.05°(4 m base line)
Built-in Attitude Accuracy	0.02°
Position Accuracy	H: ±8 mm+1 ppm; V: ±15 mm+1 ppm
Heave Accuracy	5 cm/5%
SVS Accuracy	±0.02 m/s
SVS Resolution	0.001 m/s
Sound Velocity Range	1375~1900 m/s
Input Voltage	AC: 110-240V; DC: 10-32V
Power Wastage	60W
Transducer Dimension	Φ228 mm*175 mm
Transducer Weight	5.9 kg(air)
Deck Unit Dimension	230 mm*180 mm*80 mm
Deck Unit Weight	2.6 kg(air)
Operational Temperature	+4°C~+40°C
Storage Temperature	-20°C~+60°C

HydroBeam S2
Dual-Channel Echo Sounder

About Echo Sounder

For small and shallow water surveys, single beam echo sounders (SBES) remain the preferred choice due to their simplicity, affordability, and ease of installation. From basic fish finders to professional bathymetric instruments, SBES operates on a straightforward principle—calculating depth by measuring the time interval between transmitted sound pulses and their returning echoes. This proven technology continues to be a fundamental tool in hydrographic surveys.

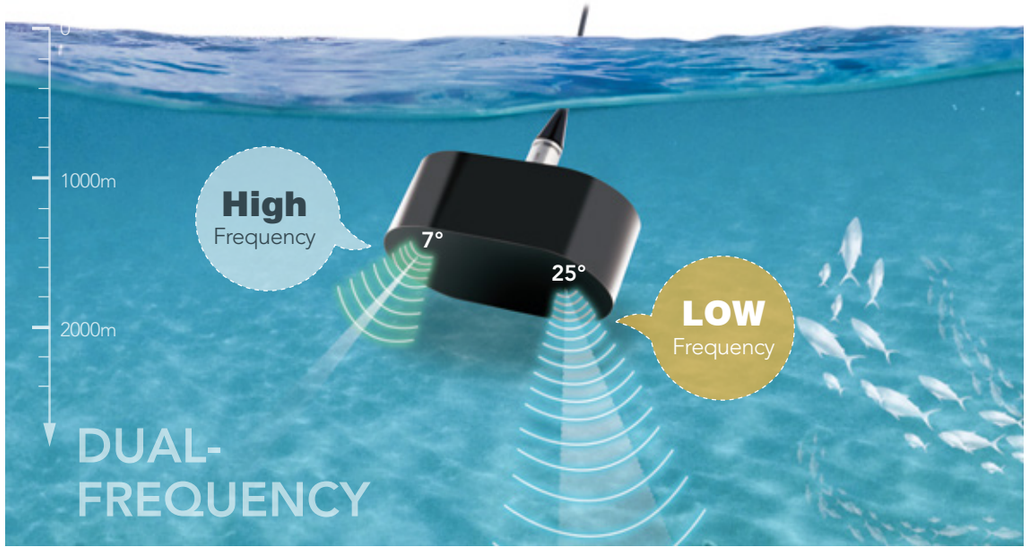
Why Dual-frequency?

Echo sounders come in both single and dual-frequency configurations. Most SBES units use a high frequency of around 200kHz, offering a narrow beam and high precision, ideal for depths between 100 and 200 meters.

The HydroBeam S2, SatLab's latest dual-channel echo sounder, features a 24kHz & 200kHz transducer for versatile performance. The 24kHz low-frequency signal penetrates sediment to detect harder bottoms at depths up to 2000 meters, while the 200kHz high-frequency signal ensures precise measurements in rivers, lakes, and coastal waters. With SmartEcho 2.0, SLHydro Sounder software, and an IP66-rated design, the HydroBeam S2 delivers reliable and efficient hydrographic data collection.

Applications

- Dredging
- Deep Water Exploration
- Turbid Water Measuremen
- Reservior Assessment



Features

- Dual-frequency
- Rugged Industrial Platform
- Windows 10
- Multiple I/O Interfaces
- 15-inch HD Screen
- IHO Standards
- The Full-featured SLHydro Sounder Software
- Integrated Temperature Sensor
- 128GB + 1TB SSD Storage
- New SmartEcho 2.0 Algorithm

HydroBeam S2

Transcribe

Specifications

Transducer Type	High Channel	Low Channel
Operation Frequency	100kHz ~ 1MHz	10kHz ~ 50kHz
Depth Range	0.15 ~ 300m @200kHz	1~ 2000m @24kHz
Accuracy	±0.01m ± 0.1% of depth @200kHz	±0.1m ± 0.1% of depth @24kHz
Resolution	1cm@200kHz	10cm@24KHz
Temperature Sensor	-55℃ to +125℃ ; Resolution 0.5℃	
Ping Rate	50Hz	
Weight	8.1kg	
Storage	128GB + 1TB SSD	
Operating Temperature	-5℃ to +55	
Interfaces	PPS*1, Trigger*1, RJ45*1, RS232*3, USB*3, HDMI*1, Transducer*1, Power*1	

Software

SLHydro Sounder

SLHydro Sounder bathymetry software. The software supports access to GNSS receivers, bathymetry and auxiliary equipment for survey work. Main functions of the software: project management, boat design, plan line design, CAD and sea chart import, bathymetry, data sampling and correction, result preview and export.

HydroFlow
Acoustic Doppler Current Profiler

About ADCP

Water flow can be measured in many different ways, such as rotating-element current-meter, float run method, slope-area method, and now we use acoustic Doppler devices to quickly and accurately measure water flow.

Acoustic Doppler devices use sound waves and the Doppler effect to measure velocity fluctuations underwater. The main Doppler techniques used in ADCP are water tracking - measuring the movement of the water relative to the ADCP, and bottom tracking - measuring the movement of the river bottom or seabed relative to the ADCP.

What Platforms Are Needed?

The ADCP is usually fixed underwater or mounted on a survey vessel or USV. ADCPs that are bottom-mounted need an anchor to keep them on the bottom, batteries, and an internal data logger. Vessel-mounted instruments need a vessel with power, a shipboard computer to receive the data, and a GPS navigation system (so the ship's movements can be subtracted from the current data). ADCPs have no external read-out, so the data must be stored and manipulated on a computer. Software programs designed to work with ADCP data are needed. We supply vessel-mounted HydroFlow ADCP and self-developed SLHydroFlow software to get your job done!

Applications

- River Hydrology
- Irrigation Monitoring
- Environmental Impact Studies
- Fisheries Studies
- Flood Warning
- Circulation Studies

Features

- Multiple Built-in Sensors
- Long Profiling Range Multiple Cells
- High Precision Discharge Measurement
- Easy to Use Software

Specifications

Model	HydroFlow 600	HydroFlow 1200
System Frequency	600kHz	1200kHz
Beam	4 Beams Janus, 20°	5 Beams Janus, 20°
Profiling Range (Distance)	0.3-90m	0.1-40m
Depth Range	0.4-120m	0.15-50m
Velocity Range	±5m/s typical, ±20m/s maximum	
Accuracy	+ 0.25%±0.2cm/s	
Resolution	1 mm/s	
Cell Size	0.05-4m	0.02-2m
Cell Number	1~260	
Range/Accuracy/Resolution	Internal Sensors Temperature: -10℃ ~ +60℃ / ±0.1℃ / 0.001℃	
	Compass: 0°~360° / ±0.5° / 0.001°	
	Motion Sensor: ±30° / ±0.2° / 0.001°	
Power Input	9~18VDC (standard 12V)	
Power Consumption	3.5W (average), 0.5W (sleep), 30W (peak)	
Temperature	Working: -5℃~+45℃	Storage: -20℃~+60℃
Float Configuration	Unpowered Trimaran, HydroBoat 1200	

Software

SLHydroFlow
(Windows system)

SatFlow
(Android system)

Key Features:
- *Instrument Parameter Configuration*
- *Data Acquisition Setup*
- *Measurement Plot Visualization*
- *Post-Processing and Additional Functions*

Njord
GNSS Receiver

About GNSS Receiver

GNSS Receivers are the core product for satellite positioning. They convert signals from visible satellites into a position on earth. The amount of visible satellites is dependent on the number of constellations the receiver is compatible with, such as GPS, GLONASS, GALILEO, and BDS.

The Njord is a SatLab next-generation multi-GNSS, multi-frequency, position and heading receiver designed specifically for marine and construction applications with the capability of L-Band correction and multiple I/O interfaces for versatile data communication.

How to Implement Heading?

The Njord receiver is connected to two GNSS antennas for positioning and heading. The farther the distance between the two GNSS antennas, the higher the accuracy of the heading. The accuracy will not be improved all the time due to the increase in the distance; the maximum distance can be controlled at 10 meters. The satellite signals received by the primary antenna and the secondary antenna are slightly different. The primary antenna is mainly used for positioning, while the secondary antenna assists the primary antenna to provide heading information together.

Applications

- Marine Engineering Measurement
- Navigation and Positioning
- Displacement Monitoring of Operating Platforms
- Tide Level Monitoring

Features

- 1408-Channel Signal Tracking
- Multiple I/0 Interface
- Benchmark PPP Service
- L-Band Correction
- Multi-system Satellite Reception
- Centimeter-Level RTK Positioning Accuracy

Specifications

System	CPU & OS	Cortex-A8, AM3358, Linux
	Storage	8 GB Internal Storage, Support External SD Card
	Channel	1408
	Signal Tracking	BDS: B1/B2/B3 GPS: L1/L2/L5 GLONASS: L1/L2 GALILEO: E1/E5 QZSS: L1/L2/L5 Support L-Band
GNSS Performance	RTK Accuracy	H:± 8 mm + 1 ppm V:± 15 mm + 1 ppm
	Static Accuracy	H:± 2.5 mm + 0.5 ppm V:± 5 mm + 0.5 ppm
	Autonomous	H:±1.5m（RMS） V: ± 3 m（RMS）
	SBAS	H:±0.5 m（RMS） V: ± 0.85 m（RMS）
	PPP	H:±5 cm（RMS） V: ± 10 cm（RMS）
	Heading Accuracy	0.05° @ 4.0 m Antenna Separation
	Positioning Rate	20 Hz Max
	Message Type	RTCM2.x, RTCM3.x
Internal Cellular	Operation Frequencies	LTE:900/1800/1900/2100/2300/2500/2600 MHz WCDMA:850/900/1900/2100 MHz; GSM:900/1800 MHz
Radio UHF	Protocols	TRIMTALK450S, TRIMMARKⅢ, TRANSEOT, SOUTH
	Frequency	410-470 MHz, -116 dBm
	Channels Power	116, Editable from 100 to 115 2 W, 1 W, 0.5 W
Interface	Bluetooth	2.4 GHz, 4.0/2.1+EDR
	WIFI	2.4 GHz，802.11 b/g/n
	Display	1.3 inch LED Display, 128*64
	Buttons	Power and FN (Function)
	Indicators	LED for Satellites, Data, and Power
	Web UI	LAN IP: 192.168.20.1

HYDROFLOW ADCP

HYDROBEAM M4 MBES

HYDROBEAM S2 SBES

NJORD GNSS RECEIVER

HYDROBOAT 990 USV

HYDROBOAT 1200 USV

HYDROBOAT 1500 USV

UNLOCK YOUR SUBSEA INSIGHT