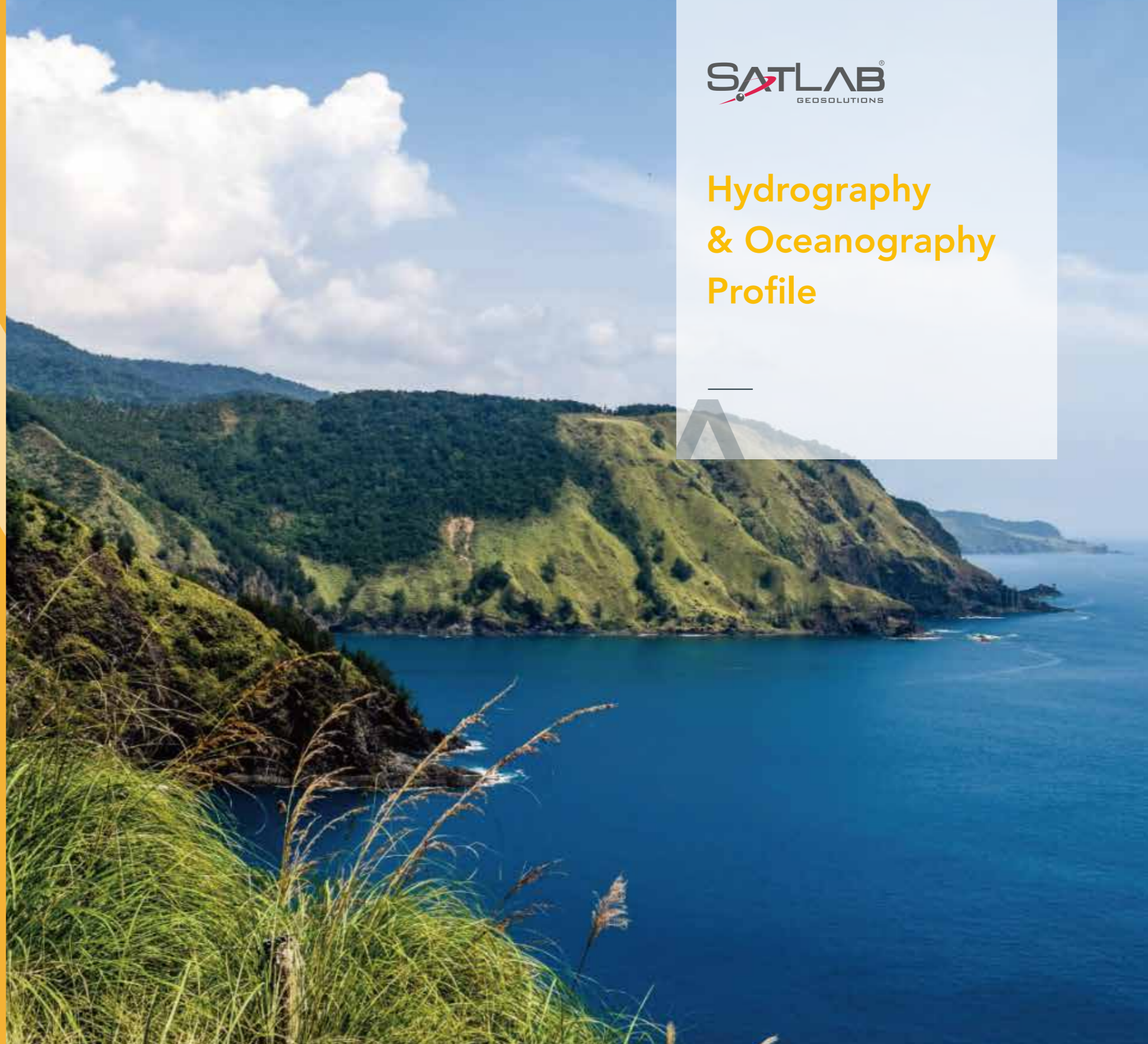




Hydrography & Oceanography Profile



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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 Vehicle (USV), also known as uncrewed surface vessel, is autonomous vessel that operate on the water's surface without a human crew onboard. It is controlled remotely or navigate autonomously using onboard systems and sensors, and equipped with diverse sensor payloads to suit specific tasks.

Why HydroBoat?

SatLab proudly presents the HydroBoat series USV, the versatile unmanned vehicle revolutionizing marine operations. Born from relentless research and development, the adaptable platform is ready to navigate your most demanding tasks across diverse industries.

Effortlessly equip the HydroBoat with specialized payloads to tackle challenges in hydrography, surveying, environmental monitoring, and beyond. Three Powerful Series are tailored for various underwater missions:



HydroBoat 990

Bathymetric USV for precise depth measurements



HydroBoat 1200

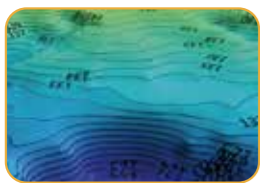
Multi-Purpose USV for adaptable operations



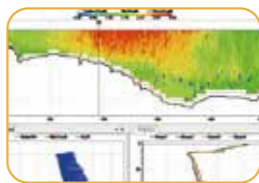
HydroBoat 1500

Multibeam USV for three dimensional measurement

Applications



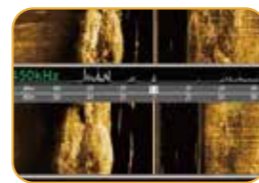
Bathymetric Surveys



Hydrographic Surveys



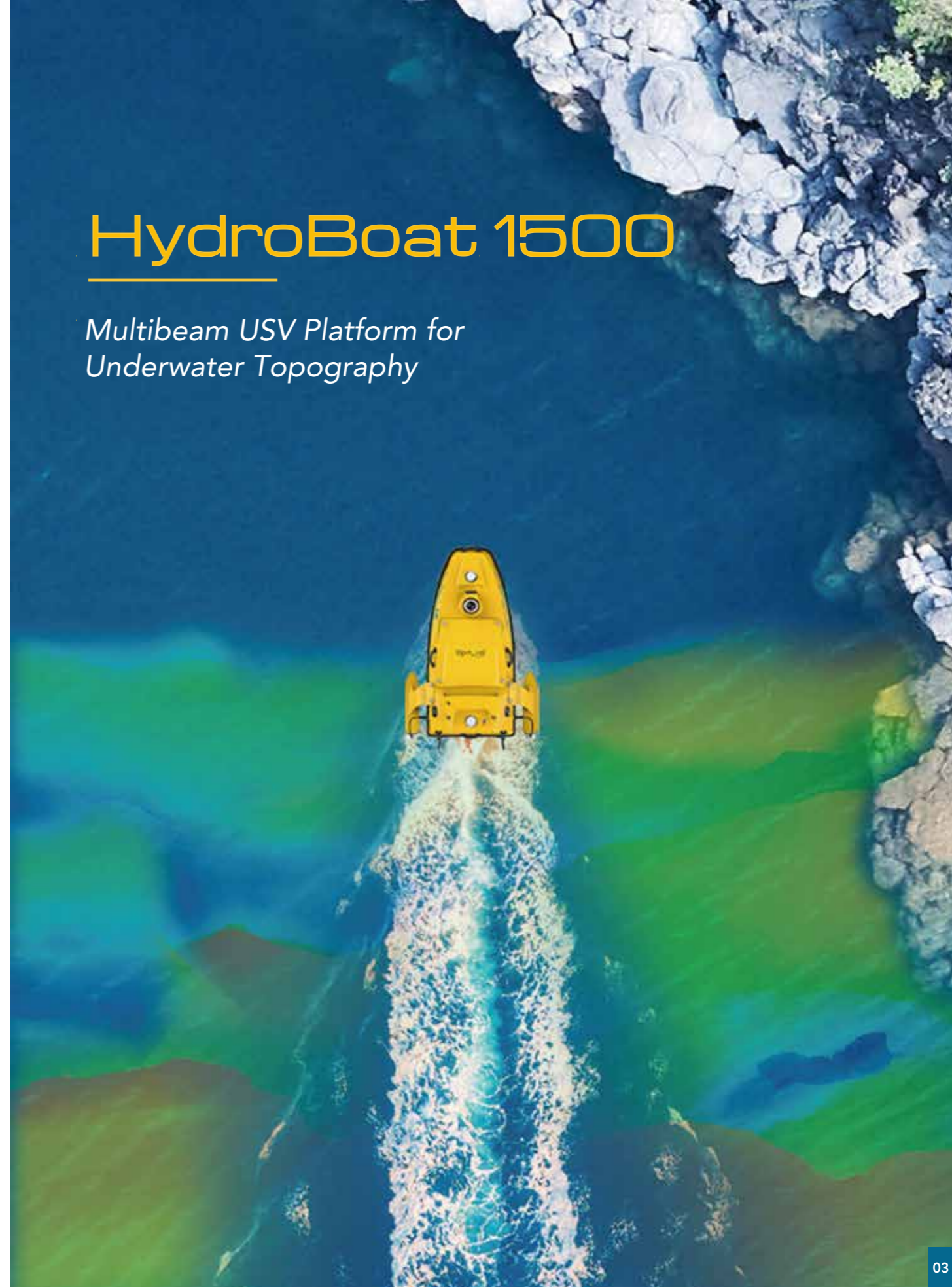
Underwater Terrain Surveys



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.

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.



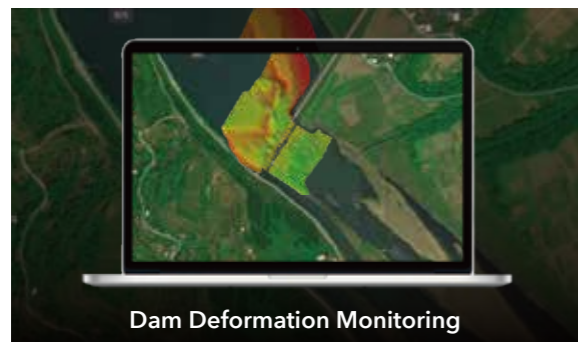
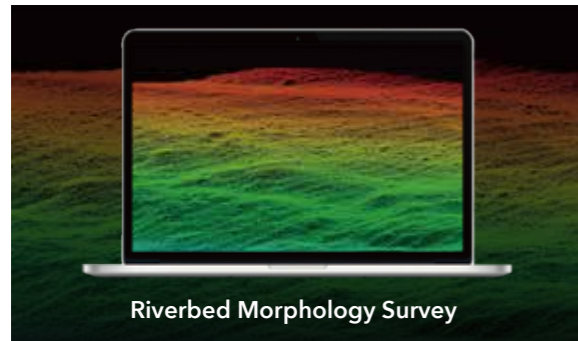
Intuitive Android Control

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

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



Specifications

Vehicle Specifications	Hull dimension (L × W × H)	Monohull: 1528*694*494 mm, Trimaran: 1528*1034*494 mm
	Weight	40kg(No Battery)
	Max Load	60kg
	Material	Carbon ber, Rubber Bumper
	Anti-wave & Wind	4rd wind level & 3nd wave level
	Waterproof	IP67
	Indicator light	Two-color light
	Camera	360° omnidirectional video
	Anticollision sensor	Detection distance 10-30 meters
	Propeller	4*Brushless Propeller
Controller	Direction control	Veering without steering engine
	Maximum speed	5.7m/s
	Battery endurance	Two batteries 4.5h with 1.5m/s, total 6 batteries
GNSS Performance	System	Android System
	Software	SLHydro USV
	Control range	1.3km on 2.4GHz; Unlimited on 4G
	Satellite system	GPS, BDS, GLONASS, Galileo
	RTK Positioning accuracy	H: ±8mm + 1 ppm RMS V: ±15mm + 1 ppm RMS
Software	Heading accuracy	0.2° @1 m baseline
	INS accuracy	2.1°/h, <1m/20s
	Refresh Rate	200Hz
	SLHydro USV	Mission planning Vessel Monitoring Coordinate conversion Bathymetric data acquisition Bathymetric data download
Expandable Sensors	Multi Beam Echo Sounder	
	Acoustic Doppler Current Profiler	
	Single Beam Echo Sounder	
	Side-scan Sonar	
	Multi-parameter Water Quality Meter	

HydroBoat 1200

Multi-Purpose USV Platform for Hydrographic Surveys and Monitoring



HydroBoat 1200

Multi-Purpose USV

Features

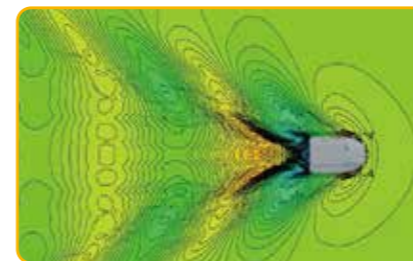


Adaptive Water Flow

Precise hovering and efficient trajectory tracking. No fear of waves and wind. Follow predefined path with accuracy even in challenging environment.

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 ber, 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
Software		SLHydro USV
Control range		1.3km on 2.4GHz; Unlimited on 4G
GNSS Performance	Satellite system	GPS, BDS, GLONASS, Galileo
	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
Built-in Single Beam Echo Sounder	Refresh Rate	200Hz
	Depth range	0.15m - 200m
	Accuracy	±0.01m + 0.1% × D (D is the depth of water)
	Frequency	200 kHz
Software	Beam angle	5±0.5°
	SLHydro USV	Mission plannin, Vessel Monitoring, Coordinate conversion Bathymetric data acquisition, Bathymetric data download Bathymetric data processing, Bathymetric data correction Bathymetric data export
Expandable Sensors	SLHydro Sounder	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 x W x H)	1035 mm*560 mm*345 mm
	weight	20kg(No Battery)
	Material	Carbon ber, 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
Controller	Maximum speed	6m/s
	Battery endurance	One battery 5h with 1.5m/s, total 2 batteries
	System	Android System
	Software	SLHydro USV
GNSS Performance	Control range	1.3km on 2.4GHz; Unlimited on 4G
	Satellite system	GPS, BDS, GLONASS, Galileo
	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
Built-in Single Beam Echo Sounder	Refresh Rate	200Hz
	Depth range	0.15 m - 200 m
	Accuracy	±0.01 m + 0.1% x D (D is the depth of water)
	Frequency	200 kHz
Software	Beam angle	5±0.5°
	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

Intelligent USV system

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
- ✓ 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.

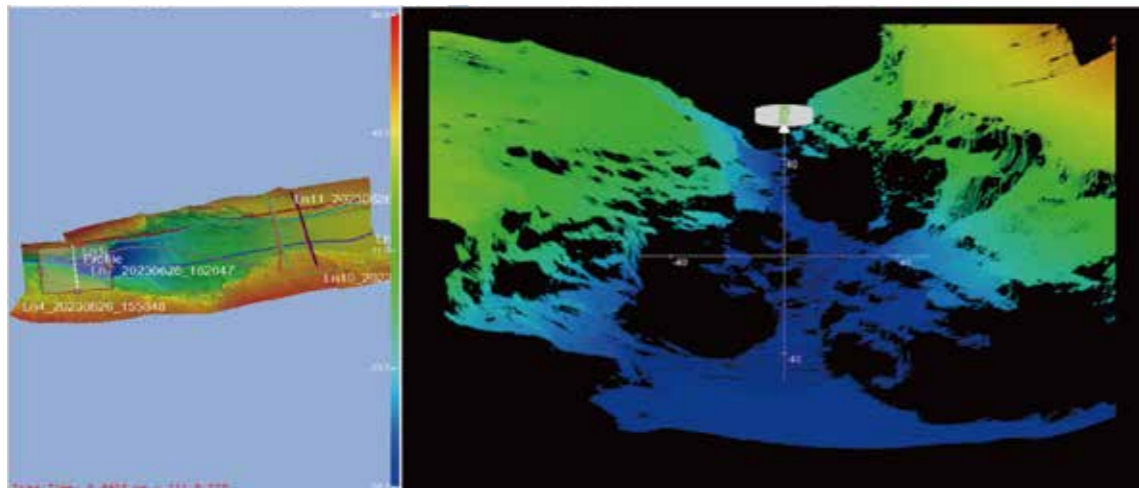
Wide coverage: Maps a wide swath of the seabed with each ping, making surveys more efficient.

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
- Harbor Survey
- Dredging Project
- Reservoir Storage Survey
- Hydrographic Survey
- Environmental Research
- Underwater Archeology
- 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

About Echo Sounder

For many small waters and shallow waters, the single beam echo sounder (SBES) survey method is still the best choice. From fish finders to bathymetric instruments, SBES uses the simplest principle - by calculating the sounder velocity and the interval between pings and echoes to get the depth of water, the simplest installation method, the most affordable price, and occupies a place in the hydrographic survey.

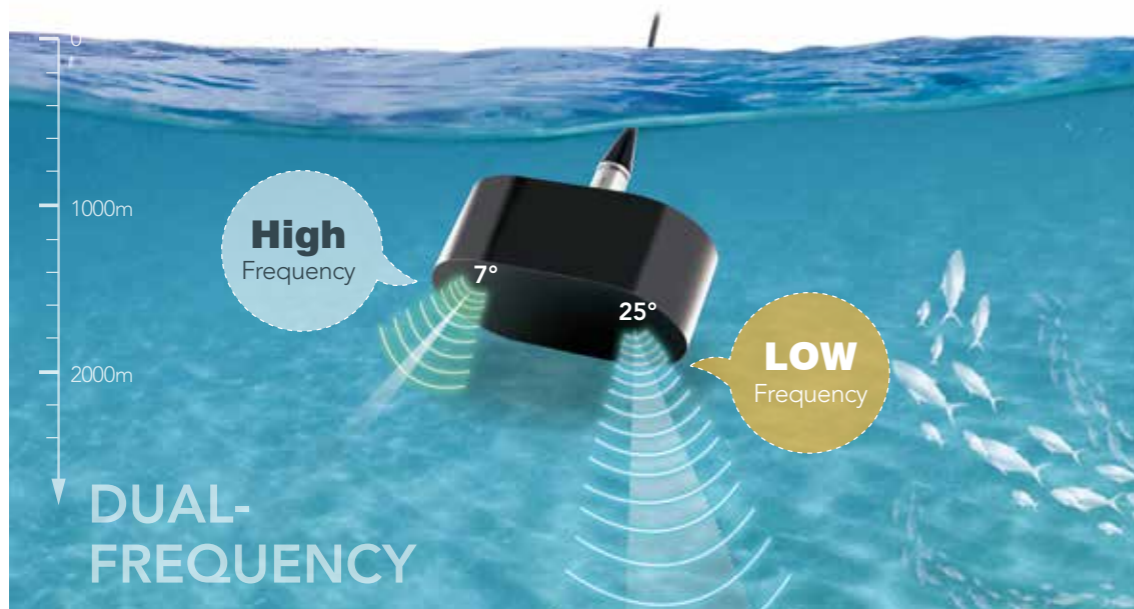
Why Dual-frequency?

SBES has a single frequency and dual frequency. Most echo sounders have a high frequency of about 200kHz with a small beam angle and high accuracy to meet the water area between 100 and 200 meters. The ES-224 is equipped with a larger 24kHz&200kHz dual-frequency transducer. The 20kHz low-frequency signal is more penetrating and can penetrate further through the sediment and detect a harder bottom surface, with a maximum depth of up to 2000 meters.

The ES-224 transmits both high-frequency and low-frequency signals to meet all inland river and lake bathymetry as well as marine measurements up to 2000 meters.

Applications

- Tracking of the Seabed
- Turbid Water with High Sand Content
- Sediment Measurement for Dredging
- Measurement at High Speed



Features

- Dual-frequency
- Rugged Industrial Platform
- Windows OS
- Multiple I/O Interfaces
- 17-inch Large Tempered Glass Screen
- CE and EN 60945 Certification
- The Full-featured SLHydro Sounder Software
- Frequency Span Available for Special Projects
- 128 GB Internal Data Storage



ES-224+SLHydro Sounder



Transducer

Specifications

Frequency	High: 200kHz	Low: 24kHz
Maximum Transmitting Power	400W@200kHz	1200W@24kHz
Depth Range	0.15~300m/1.0~900 ft.@200kHz 0.8~2000m/2.4~6000 ft.@24kHz	
Depth Range	0.01m/0.10 ft @200kHz 0.10m/0.30 ft @24kHz	
Ping Rate	Maximum 30Hz	
Storage	128GB SSD	
Interfaces	RS-232*3, USB*4, Power Port*1, Transducer Port*1, VGA*1	
Operating Temperature	-20°C ~70°C	
Weight	9.5 kg(20lbs)	

SatLab 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.

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
- Fisheries Studies
- Irrigation Monitoring
- Flood Warning
- Environmental Impact Studies
- 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
Transducer Type	Piston	
Beam	4 Beams Janus, 20°	5 Beams Janus, 20°
Profiling Range (Distance)	0.4~80m	0.15~35m
Depth Range	0.7~120m	0.15~50m
Velocity Range	±5m/s typical, ±20m/s maximum	
Accuracy	+ 0.25%±0.2cm/s	
Resolution	1 mm/s	
Cell Size	0.25~4m	0.06~2m
Quantity	1~260	
Internal Sensors Temperature: Range/Accuracy/Resolution	-10°C ~ +60°C / ±0.1°C / 0.001°C	
Compass: Range/Accuracy/Resolution	0°~360° / ±0.5° / 0.001°	
Motion Sensor: Range/Accuracy/Resolution	±30° / ±0.2° / 0.001°	
Communication Protocol	RS232, RS422, wifi, Bluetooth	
Power Input	9~18VDC (standard 12V)	
Power Consumption	3.5W (average), 0.5W (sleep), 30W (peak)	
Working Temperature	-5°C~+45°C	
Storage Temperature	-20°C~+60°C	
Float Configuration	Unpowered Trimaran, HydroBoat 1200, hydroBoat1500	
Material	Polyethylene	

SatLab Software



SLHydroFlow

SLHydroFlow, data acquisition and post-processing software for ADCP. Main functions of the software: instrument parameter setting, data acquisition setting, measurement plot display, post-processing and other functions.

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.

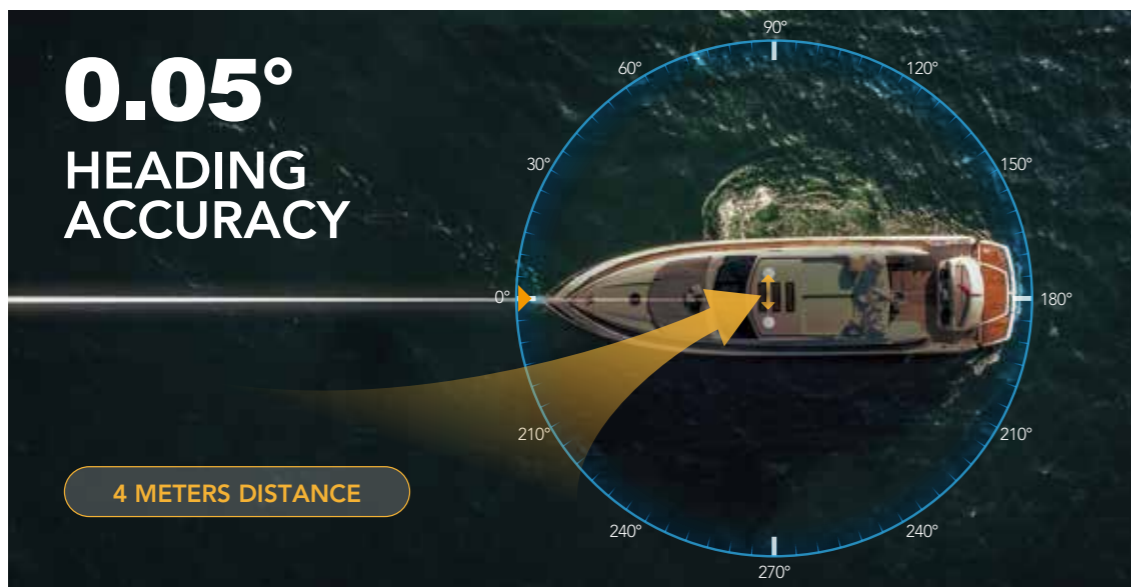
The Njord is a SatLab next-generation multi-GNSS, multi-frequency, position and heading receiver designed specifically for marine and construction applications with the capability of L-Band correction and multiple I/O interfaces for versatile data communication.

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/O 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
GNSS Performance	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
	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
		Protocols
Radio UHF	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



UNLOCK YOUR SUBSEA INSIGHT

