

# HydroBoat 990/1200 USV

Swift and intelligent surveying  
unmanned surface vehicle



# HydroBoat 990 USV

## Android-powered USV system for bathymetric surveys

Truly convenient, truly powerful, and truly reliable HydroBoat 990 is an Android-powered USV system for bathymetric surveys. With only one man, one boat, and one controller to get the bathymetric surveys done. With easy-to-use Android software and an integrated and practical boat structure, the HydroBoat 990 sails fast and measures accurately with excellent technical performance.

## Functionality

Built-in high-precision positioning and heading GNSS receiver and INS sensors for correct direction, and real-time display of echo information for determining the topography of the seafloor. The hovering function keeps the boat in place while in flowing water, and the overall structure of the boat stabilizes the boat and reduces bow rise.

## Reliability

Millimeter wave radar accurately detects obstacles to ensure the safe sailing of the vessel. The IP67 waterproof and double hull design keeps the HydroBoat 990 from abrading and sinking, and staying intact from the unexpected impact. Reliability matters in the field!



# HydroBoat 1200 USV

## One Platform, Infinite Surveys

Multi-Purpose USV Platform for Hydrographic Surveys and Monitoring

HydroBoat 1200—an embodiment of compactness and ease, tailored for seamless operation across a spectrum of equipment. Enhanced by professional CFD technology, its stability finds new heights. Melded with high-precision single-beam echo sounder, GNSS directional positioning receiver, and an advanced intelligent boat-control system, it deftly serves varied water operational demands. Augmented safety through embedded IMU, 360° pan-tilt camera, and millimeter-wave radar fortifies its attributes comprehensively. This autonomous vessel, which can be mounted with leading ADCP, side-scan sonar, dual-frequency sounder, multi-parameter water quality meter, image sonar, and more, stands poised as the quintessential partner for tasks encompassing current measurement, bathymetry, underwater survey, and water quality assessment.

## Unmatched Versatility and Portability

A comprehensive platform that is designed especially for integrating with varied water measurement devices for hydrographic surveys and environmental monitoring. Its lightweight design and enhanced maneuverability facilitate operational flexibility in different instrument deployments and transportation for surveys between different sites.

## Adaptive Water Flow

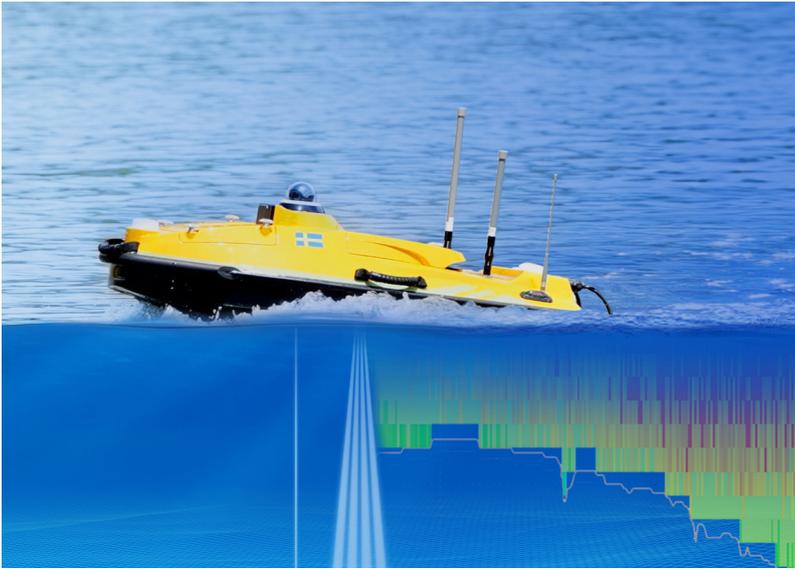
Precise hovering and efficient trajectory tracking. No fear of waves and wind. Follow predefined path with accuracy even in challenging environment. Hydrodynamically efficient design for the USV's intended operations, guided by CFD simulation, enhances hull stability and noise reduction under varied water conditions and loads.

## New GNSS+IMU Combination Algorithm

With millisecond-level dynamic response, the high-performance CAD engine simplifies stakeout point and line selection, making the process incredibly intuitive and efficient with just one click.

## Comprehensive Safety Enhancement

360° security and precision. Built-in SBES, GNSS, IMU, 360° PTZ camera, millimeter-wave radar, and dual-color navigation lights ensure accurate water depth and positioning data and provide all-around protection against boat grounding and collisions.



## Technical features / HydroBoat 990:

Hull dimension (L x P x A)	1035mm, 560mm, 345mm
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 5-30 meters
Propeller type	Brushless DC
Direction control	Veering without steering engine
Maximum speed	6 m/s
Battery endurance	10 hours@1.5m/s(two batteries)

## Controller

System	Android 7.0, storage 5GB; SD Card supported
Software	SLHydro USV, an Android software for bathymetric surveys
Display	7 inches
Waterproof	IP67
Comunication R/C	2,4 GHz
Transmission range	Bridge Mode: 1.3 km(RF point-to-point in real-time)
4G Mode	Unlimited Distance (4G network transmission)
Navigation mode	Manual or Auto-Pilot

## GNSS Performance

Satellite system	BDS B1/B2/B3, GPS L1/L2/L5, GLONASS L1/L2, Galileo E1/E5
Channel	432
Single point position (RMS)	$\pm 0,5\text{m} + 1 \text{ ppm}$
DGNSS positioning accuracy	$\pm 0,25\text{m} + 1 \text{ ppm}$
RTK Positioning accuracy	H: $\pm 8\text{mm} + 1 \text{ ppm RMS}$ ; V: $\pm 15\text{mm} + 1 \text{ ppm RMS}$
Heading accuracy	$0,2^\circ @ 1 \text{ m baseline}$
Data formats	RTCM V3.0/3.2 input NMEA 0183 output NTRIP, TCP/IP

## Single Beam Echo Sounder

Depth range	0,15m – 200m
Accuracy	$\pm 0,01\text{m} + 0,1\% \times D$ (D is the depth of water)
Frequency	200 kHz
Beam angle	$5 \pm 0,5^\circ$

## Software SLHydro USV

Project management	Support project creation, application etc.
Coordinate system	Built-in coordinate system worldwide, support coordinate transformation and grid
Mission planning	Planning waypoints/lines, setting boat speed etc.
Auto-pilot	Auto course and auto return
Echogram	Automatic tracking depth, echo real-time display
Data acquisition	Real-time acquisition of positioning and bathymetry data

### SLHydro Sounder:

Data post-processing software. Support import SLHydro USV project, analog signal superimposed digital bathymetry, feature point sampling, data correction, and output various of data formats.

## Technical features / HydroBoat 1200:

Dimension	1185 mm, 593 mm, 397 mm
Work Weight	30 ~ 45 kg
Material	Carbon Fiber, Rubber Bumper
Waterproof	IP67
Anti-wave & Wind	3rd Wind Level & 2nd Wave Level
Anticollision Sensor	10-30 Meters Detection Distance
Camera	360° Omnidirectional Video

### Power and Electrical Parameters

Propeller Type	Quick Release Culvert Propellers
Power	1000W Brushless DC
Speed	0,1 ~ 6 m/s
Battery Capacity	29,04 V/34,3 Ah (Typical)/29,04 V/33,27 Ah(Rated)
Battery Endurance	40 km a 1,5 m/s
Battery Safety	Power Display, High-temperature/Over-current/ Short-circuit Protection

### Communication Control

Type	2.4 GHz Wireless Technology (1.7 km); 4G Network
GNSS Differential Types	Radio; Network; Controller Differential
Navigation Mode	Manual, Auto-Pilot, Auto-Return
Data Storage Methods	Simultaneous Support for Ship-side Storage and Controller Broadcast

## GNSS

Channel	1408
Position Accuracy	
RTK	H: $\pm 8$ mm+1 ppm ;V: $\pm 15$ mm+1 ppm
DGNSS	$\pm 0,4$ m+1 ppm;V: $\pm 0,8$ m+1 ppm
Single	H: 1,5 m ;V: 2,5 m
Directional Accuracy	$\leq 0,2^\circ$
Timing Accuracy	$\leq 20$ ns

## Single Beam Echo Sounder

Frequency	200 KHz
Beam Angle	$\leq 5^\circ \pm 0,5^\circ$
Accuracy	$\pm 0,01$ m + 0,1% x D (D is the Depth of Water)
Depth Range	0,15m~200 m
Data Formats	Standard NMEA, DESO 25, ODOM, Knudsen, Bathy, EchoTrac

## IMU

Refresh Rate	200 KHz
Position Accuracy	<1 m/30 s
Directional Accuracy	$\leq 2,1^\circ/h$

## Applications:

- Bathymetric survey
- Flow measurement
- Geomorphological survey
- Emergency rescue
- Underwater salvage
- Water quality survey