



## HydroBoat 990

## User Manual



# HydroBoat 990

## Manual Revision

### HydroBoat 990

Revision Date	Revision Level	Description
Mar. 2023	1	HydroBoat 990 User Manual
Apr. 2023	2	HydroBoat 990 User Manual
May. 2024	3	HydroBoat 990 User Manual

## Introduction

Welcome to the Satlab HydroBoat 990. This introduction describes how to use this product.

### Experience Requirement

In order to help you use Satlab series' products better, we suggest you carefully read the instructions. If you are unfamiliar with the products, please refer to <http://www.Satlab.com.cn/>

### Tips for Safe Uses

---



**Notice:** The contents here are special operations and need your special attention. Please read them carefully.

---



**Warning:** The contents here are very important. Wrong operation may damage the machine, lose data, break the system and endanger your safety.

---

### Exclusions

Before using the product, please read these operating instructions carefully: they will help you to use it better. Satlab Surveying Instrument Co., Ltd assumes no responsibility if you fail to operate the product according to the instructions, or operate it wrongly due to misunderstanding the instructions. Satlab is committed to constantly perfecting product functions and performance, improving service quality and we reserve the right to change these operating instructions without notice.

We have checked the contents of the instructions the software and hardware, without eliminating the possibility of error. The pictures in the operating instructions are for reference only. In case of non-conformity with products, the products shall prevail.

### Technology and Service

If you have any technical issues, please call Satlab's technology department for help.

### Relevant Information

You can obtain this introduction by:

1. Purchasing Satlab products: you will find this manual in the instrument container to guide you on operating the instrument.
2. Logging onto the Satlab official website, downloading the electronic version introduction at "Download center" "Partners" "Partner center".

### Advice

If you have any comments and suggestions for this product, please email [info@Satlab.com.se](mailto:info@Satlab.com.se). Your feedback will help us to improve the product and service.

Introduction	4
1 Background	7
2 Hardware Introduction	9
2.1 Front of the Boat	9
2.2 Bottom of the Boat	10
2.3 Remote Controller	11
3 Features of HydroBoat 990	13
3.1 Usability	13
3.2 Functionality	13
3.3 Reliability	13
4 Specifications of HydroBoat 990	15
Table 4-1 Vehicle Specifications	15
Table 4-2 Controller	15
Table 4-3 GNSS Performance	15
Table 4-4 Built-in Single Beam Echo Sounder	16
Table 4-5 Software	16

# Chapter 1

## Background

### **This chapter contains:**

- Background of HydroBoat 990

## 1 Background

USVs (Unmanned Surface Vehicles) are widely used in hydrographic surveys, environmental monitoring, and water search and rescue. Among them, hydrographic surveying is the most used and developed field. When a hydrological survey is facing many unknown waters, it usually takes a long-time navigation and requires high accuracy, which poses great challenges to the safety and health of surveyors.

The hydrographic survey USV combines various complex systems to offer users the simple and efficient operation mode. With double hull design, HydroBoat 990 USV integrates the GNSS system, bathymetry system, communication system and autonomous navigation system, which ensures both efficient surveying and safe navigation.



Figure 1-1 HydroBoat 990

The working principle of the HydroBoat 990 is that while the GNSS receiver receives the signals from the satellite transferred from base station, the depth sounder sends ultrasonic waves downward for echo sounding, which will get a set of accurate data with east coordinate, north coordinate, elevation and water depth, and then through the controller software to plan the route, the boat will be sailing into the area to be measured to carry out the automatic survey.

# Chapter 2

## Hardware Introduction

**This chapter contains:**

- Front of the Boat
- Bottom of the Boat
- Remote Controller

## 2 Hardware Introduction

### 2.1 Front of the Boat

Front of the boat is shown in Figure 2-1.



Figure 2-1 Front

1. Millimeter wave radar
2. GNSS directional antenna
3. Camera
4. Cabin cover
5. GNSS position antenna
6. Radio antenna
7. 4G network antenna
8. 2.4G remote antenna
9. Hull switch button
10. Indicator light

## 2.2 Bottom of the Boat

Bottom of the boat is shown in Figure 2-2.



Figure 2-2 Bottom

- 11. Propeller 1
- 12. Propeller 2
- 13. Transducer

## 2.3 Remote Controller

As shown in Figure 2-3, the structure of the remote controller has many switches, here are descriptions of the functions of the different buttons:



Figure 2-3 Remote Controller

# Chapter 3

## Features of HydroBoat 990

**This chapter contains:**

- Usability
- Functionality
- Reliability

## 3 Features of HydroBoat 990

### 3.1 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.

### 3.2 Functionality

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

### 3.3 Reliability

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

# Chapter 4

## Specifications of HydroBoat 990

**This chapter contains:**

- Table 4-1 Vehicle Specifications
- Table 4-2 Controller
- Table 4-3 GNSS Performance
- Table 4-4 Built-in Single Beam Echo Sounder
- Table 4-5 Software

## 4 Specifications of HydroBoat 990

**Table 4-1 Vehicle Specifications**

Hull Dimension (L*W*H)	1035mm*560mm*345mm
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

**Table 4-2 Controller**

System	Android System
Software	SLHydro USV
Control range	1.3km on 2.4GHz; Unlimited on 4G

**Table 4-3 GNSS Performance**

Satellite system	GPS, BDS, GLONASS, Galileo
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°@1m baseline
INS accuracy	2.1°/h, <1m/20s
Refresh Rate	200Hz

**Table 4-4 Built-in 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	$5 \pm 0.5^\circ$

**Table 4-5 Software**

SLHydro USV	Mission planning
	Vessel Monitoring
	Coordinate conversion
	Bathymetric data acquisition
SLHydro Sounder	Bathymetric data download
	Bathymetric data processing
	Bathymetric data export



**Headquarter:**

Järnbrotts Prästväg, 2  
421 47 Vastra Frolunda  
Goteborg, Sweden  
info@satlab.com.se

**Regional Offices:**

Warsaw, Poland  
Ji ́n, Czech Republic  
Ankara, Turkey  
Scottsdale, USA  
Singapore  
Hong Kong  
Dubai, UAE

[www.satlab.com.se](http://www.satlab.com.se)