

CHCNAV APACHE Series Unmanned Surface Vessel

Product User Manual

Make Your Work More Efficient © 2024

Pre-reading tips

Description of the symbol

Notes

Ø Warning

Software downloads

Log in to the official website of CTI Navigation or <u>https://www.huace.cn</u> through this website You can download EasySail Android software, AutoPlanner software and HydroSurvey software from [Service & Support] -[Download Center].



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1. Product Overview

1.1 Brief introduction

APACHE series unmanned surface vessel integrate control system, positioning system, bathymetry system, power system, 360° camera, millimeter wave obstacle avoidance module. Break the traditional underwater bathymetry operation mode and achieve high-efficiency and high-precision underwater topographic surveying and mapping.

1.2 Features:

With its advanced technology and innovative design, APACHE unmanned surface vessel of Shanghai Huace Navigation Technology Co., Ltd. has a leading position in the field of unmanned surface vessel, with the following significant product features:

- 1. **High-Precision Navigation System:** APACHE unmanned surface vessel is equipped with a highly accurate navigation system, including differential GPS, inertial navigation system and advanced navigation algorithms, to ensure that the vessel can accurately locate and navigate when performing tasks, and meet the navigation needs of various complex water environments.
- 2. Intelligent Perception Technology: The hull is equipped with advanced sensor technology, such as millimeter-wave obstacle avoidance radar and omnidirectional camera, to achieve multi-perception fusion. This enables unmanned vessels to perceive, analyze, and respond to surrounding conditions in real-time in a variety of environments, ensuring efficient and safe missions.
- 3. **Remote Monitoring And Control Platform:** APACHE's unmanned boat product suite is equipped with a powerful remote monitoring and control platform, and users can monitor the status of the vessel, navigation information and sensor data in real time through AutoPlanner and EasySail software. This convenient way to manage remotely provides users with full control.
- 4. **Modular Design:** The hull structure adopts a modular design, which allows users to freely match and replace various sensors, communication equipment and working loads according to different mission requirements. This flexible design improves the customizability of the system, making the APACHE unmanned surface vessel suitable for diverse application scenarios.
- 5. Low Energy Consumption And High Battery Life: The use of efficient energy management system and advanced electric power system enables APACHE unmanned surface vessel to achieve long-term endurance while maintaining excellent performance. This is particularly critical for long-cycle measurement tasks.

1.3 Unmanned surface vessel assembly

Equipment List: 1 unmanned surface vessel, 2 9S (red label) batteries, 2 RC&WIFI antennas, 1 4G antenna.

- 1. Open the hatch cover, install the connected battery, fix the battery, then close the hatch cover, and tighten the screw.
- 2. The antenna corresponds to the base tag one by one, and the external antenna (4G/RC) is screwed clockwise.
- 3. Turn on the switch of the unmanned surface vessel, and after the indicator light is on, the unmanned surface vessel will

8

be turned on.

- 4. Long press the remote control switch in the lower left corner, release the screen when it lights up, and wait for the remote control to turn on.
- 5. Before launching, push the longitudinal rod of the remote control to test whether the wind direction and power of the motor are normal, and log in to the EasySail software at the same time to check the status of the unmanned boat, and then you can launch the operation after checking that it is normal.

Scan the QR code below and click [User Guide] - [EasySail Video Tutorial] to view the relevant video teaching.



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2. Unmanned surface vessel







This section describes the systems in unmanned surface vessel and their functional characteristics

2.1 APACHE No. 3



Bottom view of APACHE No. 3

- 1) Directional antenna: provide real-time direction for unmanned surface vessel.
- 2) Positioning and satellite search antenna: provide real-time positioning for unmanned surface vessel.
- 3) Remote control antenna (rc&wifi): enhance the remote control signal of unmanned surface vessel.
- 4) 4G antenna: Enhance the 4G signal strength of unmanned surface vessel.
- 5) 4G mode is the most commonly used mode, which can transmit data through 4G and log in to CORS to obtain differential signals.

- 6) Radio antenna: enhance the radio signal of the unmanned surface vessel.
- 7) Receives differential signals from a GNSS reference station via a radio.
- 8) Semi-embedded motor: shallower draft, reduce scraping, and provide forward and backward power for unmanned surface vessel.
- Obstacle avoidance module: provide obstacle avoidance function and support semi-automatic/fully automatic measurement of unmanned surface vessel.
- 10) Camera: It can transmit the front picture of the camera in real time, and supports 360° rotation.
- 11) Switch: There is a lever switch on each side of the hull, which is toggled to ON to start the unmanned surface vessel.
- 12) Indicator light: There is an indicator light on each side of the hull.
- 13) The red indicator on the left is the star search light, the red light is always on to indicate that the initialization is completed, the number of red light flashes represents the number of star searches, and the red light should be always on for normal operations;
- 14) The green indicator on the right is a differential signal light, a solid green light indicates a fixed solution, a flashing green light indicates a floating solution, and a non-light light indicates that no differential data is received.
- 15) Transducer: The single-beam transducer is integrated in the unmanned surface vessel and is used to transmit and receive acoustic signals.



2.2 APACHE No. 4



- 1) Directional antenna: provide real-time direction for unmanned surface vessel.
- 2) Positioning and satellite search antenna: provide real-time positioning for unmanned surface vessel.
- 3) Remote control antenna (RC&WIFI): enhance the remote control signal of unmanned surface vessel.

- 4) 4G antenna: Enhance the 4G signal strength of unmanned surface vessel.
- 5) 4G mode is the most commonly used mode, which can transmit data through 4G and log in to CORS to obtain differential signals.
- 6) Radio antenna: enhance the radio signal of the unmanned surface vessel.
- 7) Receives differential signals from a GNSS reference station via a radio.
- Semi-embedded motor: shallower draft, reduce scraping, and provide forward and backward power for unmanned surface vessel.
- Obstacle avoidance module: provide obstacle avoidance function and support semi-automatic/fully automatic measurement of unmanned surface vessel.
- 10) Camera: It can transmit the front picture of the camera in real time, and supports 360° rotation.
- 11) Indicator light: There is an indicator light on each side of the hull.
- 12) The red indicator on the left is the star search light, the red light is always on to indicate that the initialization is completed, the number of red light flashes represents the number of star searches, and the red light should be always on for normal operations;
- 13) The green indicator on the right is a differential signal light, a solid green light indicates a fixed solution, a flashing green light indicates a floating solution, and a non-light light indicates that no differential data is received.
- 14) Single-beam transducer: The single-beam transducer is integrated on an unmanned surface vessel and is used to transmit and receive acoustic signals.
- 15) ADCP installation position: used to place and fix ADCP for hydrological testing.



2.3 The A4 is equipped with ADCP assembly

1. Open the rear hatch cover of the unmanned surface vessel, unscrew the 4 fastening screws on the black plate in the middle of the hull, remove the fixing plate, and remove the yellow protective cylinder in the middle of the hull, at this time the middle of the hull is connected up and down;



2. Remove the waterproof rubber plug from the inside of the aft cabin, and pass the cable through the reserved threading port from the cabin;



ADCP wiring

3. Find a water-blocking foam suitable for the size of the ADCP in the airbox of the unmanned surface vessel, install it on the ADCP, and pass the ADCP cable through the reserved opening from the cabin and connect it to the ADCP;





4. According to the ADCP model, find the mounting hole that is marked with the corresponding model on the mounting bracket, and connect the ADCP and the bracket tightly (the current bracket is a combined bracket, divided into three layers);



5. Assemble the bracket and fix the bracket to the boat, and at the same time, pay attention to the waterproof rubber plug after applying a certain amount of silicone grease;



Connection

6. Finally, connect the ADCP cable with the yellow XT60 power supply interface and RS232 interface inside the cabin.

2.4 GD100 main controller



Interface Definition:

GNSS1 connects to the rear antenna of the unmanned surface vessel;

GNSS2 connects to the antenna of the unmanned surface vessel;

POWER is the GD100 power supply line;

SIGNAL is used for data transmission and reception of unmanned surface vessel;

The SIM card slot can access the user's SIM card;

LAN1 network port is usually connected to the unmanned surface vessel camera to provide the network;

The RC interface is connected to the RC antenna base of the unmanned surface vessel;

4G interface is connected to the 4G antenna base;

RADIO interface is connected to the radio RADIO antenna base.

2.5 Unmanned surface vessel indicator

Description of unmanned surface vessel navigation indicator:

Solid red light: The initialization of the unmanned boat is complete, and the automatic mode can be switched for measurement. Flashing red light: The initialization of the unmanned surface vessel is not completed, and the number of flashes indicates the number of star searches, and the operation cannot be carried out at this time.

Red light off: The unmanned surface vessel is not turned on, and the power supply needs to be checked, and the actual GD100 status indicator shall prevail.

The green light is always on: the positioning state of the unmanned surface vessel - fixed solution (the software shows that there is a delay of 5-8s from the fixed to the light state).

The green light flashes: the positioning status of the unmanned surface vessel - the floating solution.

Green light off: Unmanned surface vessel positioning status - single point solution.

Traffic lights flashing alternately: During the firmware upgrade, do not power off, the unmanned surface vessel will be automatically restarted if the upgrade is successful.

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2.6 motor



2.6.1 Motor usage guide

Notes:

- 1. The use of motors in turbid waters will reduce the life of motors and propellers to a certain extent;
- 2. Please refer to the official configuration to use the motor of the corresponding ship model;
- The motor is a consumable product, and after the expiration of its service life, if necessary, please use the CTI Maintenance WeChat Mini Program to purchase it;
- 4. Always check the motor for foreign objects before each voyage;
- 5. Be sure to push the longitudinal lever of the remote control before each voyage to check the motor status. If there is any abnormality, check it before sailing;

2.6.2 Replace the motor or paddle

- 1. Please use the standard wrench in the unmanned surface vessel toolbox to unscrew the nut from the inside of the cabin, unplug the three-phase wiring between the motor and the ESC, and pull out the motor.
- 2. If there is a foreign object in the propeller, you can use an Allen wrench to remove the white spout at the tail of the motor, then remove the fixing screw on the propeller, and pull out the propeller to remove the foreign object.

2.7 Camera

A 360° rotatable camera can be used to assist in observing the surrounding environment of the vessel.

2.8 Millimeter wave obstacle avoidance module

When this obstacle avoidance function is activated, semi-automatic or fully automatic measurement modes can be used.

2.9 Battery box

2.9.1battery

The unmanned surface vessel battery is highly integrated, and the fuel monitoring is also encapsulated inside. The state-ofthe-art impedance tracking algorithm is used to achieve a capacitance error of less than 1%. At the same time, there are accurate calculation methods for the aging and self-discharge of the battery in the process of use, and the remaining time can be accurately predicted for the different usage modes of electrical equipment. The product has high-precision capacity calculation and high-stability security guarantee, which fully guarantees the safety and reliability of users.



2.9.2Battery usage guide

If there is an inaccurate capacity or capacity jump during use, please charge the battery to 100% and wait for two hours, then use the battery to discharge, put the battery into the system to shut down, and then take out the battery and leave it for 5 hours. The battery is then powered by an external power source and recharged, and after a full cycle, the capacity is displayed accurately and without jumping.

Notes:

For safety considerations, do not short-circuit the positive and negative poles of the battery during use, and do not disassemble the battery or throw the battery into the fire without permission.

2.9.3Battery preservation

The product should be stored at room temperature, and the battery should be kept in a semi-charged state of about 30%~50%. To prevent over-discharge of the battery, it is best to charge the battery every six months during storage. For long-term storage, charge the battery with a current of 0.5C for about 1h so that it has partial power storage.

When a battery works, it uses the energy released by an electrochemical reaction to provide electrical energy, and it is actually a chemical product. Because of this, if the battery is stored for a long time and is not used, the performance of the battery will slowly decay, so it is important to recharge and discharge the battery after a period of storage to restore the battery energy.

2.9.4Battery charger use



- Plug the AC plug of the charger into the power socket first, and the LED indicator of the charger is green, if the indicator light is not on, the traffic light is flashing, and the red light is always on, the charging should be stopped, and the charger output should be detected for short circuit, whether the input power plug is loose, etc.;
- 2. After the LED working indicator of the charger lights green, then insert the output plug of the charger into the jack of the battery device to be charged, and the indicator will turn red, indicating that the charger is charging the battery;
- 3. When the charging is completed (depending on the battery capacity and initial charge, this process may take 1~10 hours), the LED indicator will automatically turn green, indicating that the battery is fully charged and the charger enters the constant voltage charging state. Long-term constant voltage charging is safe and harmless to the battery pack;
- 4. When charging is finished, unplug the output plug of the charger and then the AC plug of the charger and place the charger in a safe place.

Notes:

- Before charging, please confirm whether the charger used and the battery to be charged are compatible (this charger is sold and used in conjunction with the equipment that uses the battery, and it is forbidden to use this product to charge non-supporting equipment or battery packs);
- 2. The charger is for indoor use only, no water or rain is allowed;
- 3. There is high voltage electricity inside, and it is forbidden to open the shell;
- 4. The charger is forbidden to be charged in a high-temperature, flammable and explosive environment;
- 5. It is forbidden to charge a non-rechargeable battery with the charger;
- 6. If there is any quality problem in use, please contact CTI after-sales service directly, and it is forbidden to repair it privately

2.9.5Charger performance

Input Characteristics:

AC voltage range: AC90~ 260V;

Rated working input AC voltage: AC100~240V;

Input working frequency: $50 \sim 60$ HZ;

Charger no-load input power: ≤20W

Rated input maximum power: ≤570W

Output Characteristics:

Charger no-load output voltage: DC37.4V-38.2V

Normal working output voltage) :D C27-37.8V;

Rated working output current (constant current): 5.4A-6.6A;

Charger Adaptation Battery Pack Specifications: 9 cells 8-40H; Rated output power: ≤227W*2 double group Charger working efficiency: ≥80%; A red light indicates that the charger is charging; The charging green light indicates that the charger is in the state of waiting to be charged or fully charged Charging conditions for turning red to green: 0.30A < I<0.90A or Vout>37.8V; Charging Red and Green Light Flashing Alternately Condition: Charger Abnormal Protection;

Protection features:

 Over-current protection: When the current of the charger and the supporting equipment exceeds the rated working current, the charger will stop working immediately, and the charger can re-enter the working state after the fault is lifted;
 Short-circuit protection: When the charger output positive and negative poles are short-circuited, the charger will

automatically protect no output voltage, and the charger will work again after the short-circuit protection is removed.

Environmental Characteristics:

Normal working temperature : $0 \sim +40^{\circ}$ C ; Storage ambient temperature: $-20 \sim +70^{\circ}$ C; Normal operating ambient humidity: < +95% RH

3. Remote Control



This section describes the remote control performance and its operation in detail

3.1 EC10 Remote Control Parameters



Display: 10.1 Industrial Touch Screen Resolution: 1920*1200 Memory: 4GB Storage Capacity: 64GB Network Interface: RJ45*2 Serial Port Interface: TCP socket*2 Charging Interface: Type-C Waterproof and Dustproof Rating: IP67 Operating Temperature: -10°C to 55°C Total Weight: 2kg Battery Life: 5 hours Battery Life: 5 hours Battery Capacity: 20000mAh Operating Frequency: 1.4GHz, 2.4GHz/800MHz Channels: 16 channels Total Dimensions: 361mm (L) * 393.2mm (W) * 102.4mm (H)

3.2 Introduction to remote control parts



(1) On/off key: remote control power on and off button, long press on/off.

(2) Forward/backward: Control the unmanned ship forward and backward. Only the front and back directions are valid, and the left and right directions are invalid.

(3) Left/right turn: control the steering of the unmanned ship. Only the left and right directions are valid, and the front and rear directions are not valid.

(4) Automatic/manual switching key: switch the mode of the unmanned ship.

Support manual and automatic modes.

(5) Hover button: control hovering.

(6) Remote control antenna: used for remote control of unmanned ships, note that unmanned ships need to be installed with two corresponding RC antennas.



- 1. The physical buttons are subject to actual factory delivery and are subject to change without notice
- 2. The joystick of the remote control is a sensitive device, and it is forbidden to bounce the lever, gravity press, etc.

3.3 Remote charging

THE EC10 REMOTE CONTROL HAS A BUILT-IN INTEGRATED RECHARGEABLE LITHIUM BATTERY, WHICH IS COMPATIBLE WITH THE MARKET'S STANDARD TYPE-C INTERFACE (SUCH AS USB CHARGERS FOR DIGITAL PRODUCTS SUCH AS MOBILE PHONES AND CAMERAS) FOR CHARGING. With the official standard Type-C charger, it takes 4 hours to fully charge in the normal shutdown state.



<u>Notes:</u>

- Use an official standard charger to charge the remote control. If you do not use the original charger, it is recommended to use a USB charger that complies with PSE standards and has a specification of 9V /4A
- 2. To keep the remote battery in tip-top condition, make sure the remote is fully charged every 3 months
- 3. If there is smoke, peculiar smell, or night leakage during charging at the ground terminal, please do not continue to charge the ground terminal, and please transfer it to the company for maintenance
- 4. Do not charge this product in the area touched by infants to avoid the risk of electric shock. Do not charge this product in an environment above 60°C.

3.4 Environmental conditions of use

- a) Environmental temperature: $-10 \circ C$ to $+45 \circ C$.
- b) Storage temperature: $-20 \circ C$ to $+50 \circ C$.
- c) Relative humidity: Not exceeded 85%.
- d) Atmospheric pressure: 86kPa~106kPa
- e) the place of use is not allowed to have the risk of explosion of the medium, the surrounding medium should not contain corrosive metal and damage insulation gas and conductive medium, not allowed to be filled with water vapor and serious mold.

f) The place of use should have facilities to protect against rain, snow, wind, sand and ash.

3.5 Remote control maintenance and repair

Maintenance and maintenance when parked for a long time Store the remote control in a dry and ventilated place to reduce direct sunlight to prevent the battery from overheating. If it needs to be stored for more than a month, the remote control battery must be charged to 70-80% regularly to avoid battery drainage.

The recommended storage temperature range is +22°C~+28°C

Never store the battery below -20 degrees Celsius or above 45 degrees Celsius.

3.6 Remote-controlled transportation and storage

Ø Warning:

To avoid possible injury and loss, it is important to observe the following: As cables and small parts can be dangerous to children, it is important to keep children away from parts of the remote control.



- 1. Do not immerse the remote control in water, if it enters the water, please wipe it with a soft dry cloth in time, and turn off the power immediately, and return to the company's after-sales service
- 2. It is forbidden to mechanically hit, crush, puncture the battery, and it is forbidden to drop the battery.

4. EasySail App



This section describes the functions of EasySail software in detail.

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4.1 EasySail Software Overview

EasySail is an unmanned ship industry application measurement and control software independently developed by CTI, which is designed to be used by all unmanned ships in Huawei series. Support topographic and hydrographic surveys. Topographic surveys support surveying mode, hydrological mode, semi-automatic, and fully automatic survey modes. Hydrographic surveys support mapping and hydrographic models. Enables unmanned ships to automate measurement operations to adapt to the complex needs of various scenarios. At the same time, it supports 4G and data transmission connection, Doppler flow profiler, ADCP current measurement, single beam sounder, video video transmission, route planning, virtual hoverstick, CORS login, GNSS registration, SI unit switching, etc.



4.2 EasySail software runtime environment

The software only supports Android system, supports EC10 remote control and some tablets and mobile phones, Android 9 or above system, resolution 1920x1080.

Support products: Huawei series unmanned boat, CTI D270 sounder.

Support locale: Chinese simplified, Chinese traditional, English, Russian, the software will automatically switch languages according to the current system locale, switch the system locale during the software operation, you need to restart the app.



- 1. At present, many functions of the software require a mobile network, and a network is also required for the use of unmanned ships to provide network RTK services.
- 2. The phone has not been adapted, and there will be problems with the use of some functions, such as flashbacks or location bugs.

4.3 EasySail Software install/uninstall/clear data

1. Download and install

To download the software installation package, please visit the official website of CTI - [Service and Support] - [Download Center]: <u>https://www.huace.cn</u>, after downloading the APK file, you can directly double-click to install it

2. Software Permissions

In order to ensure normal use, the current software requires customers to open some permissions, including location and storage permissions, and floating window permissions are also required to open the map interface.

3. Uninstall instructions

Uninstalling the software will synchronously delete all data (engineering data, record control parameters, sounder parameters, etc.) including satellite map tile data, device connection information, custom server, route engineering, etc.;

4. Clear the data description

Using Android to clear the history data will clear all cached application data of the software, including account login information, software engineering, CORS and SWAS information, permission acquisition, logs, etc., the software will be restored to the initial installation state, and you need to log in again, and SWAS and CORS also need to be actively connected.

<u>Notes:</u>

- 1. In order to ensure the normal access to the location of the remote control, be sure to turn on the positioning permission and function;
- 2. In order to ensure normal data storage and recording and shooting functions, you need to turn on the file storage permission;

4.4 Software file description

After the software is installed and used, the generated file storage address is as follows:

- 1. EC10 Android Remote: The EasySail folder in the root directory, including jobs and logs
- 2. Other Android devices: Android/data/com.huaceeasysail

奈 🖸 🛛 🗳 🗂			岩 🔌 📧 5:15
浏览	::	- 内部存储	Q
Q 搜索文件	内音	存储 >Android > data > com.huace.easysail	
	Ē	按时间排序 ▼	88
回片 视频 文档	0 音频	files 刚刚 - 8 项	>
位置		cache 2022/12/09 – 5 项	>
内部存储 46.5 GB 可用/	128 GB >		
4 我的云盘	>		
网络邻居	>		
面 最近删除	22 项 〉		
来源			
① 最近		🛅 浏览	2 我的

"Cache": mainly stores cached map tile data, including plane data and map label data; "files": Other data generated by the software during operation.



"easysail_res": software prototype and map configuration file;

"jobs": the directory of topographic survey projects, each route project is a folder, and the folder name is the route name;

"jobs_adcp": a directory of hydrographic survey projects, one folder for each test project;

"logs": software operation logs, which will be recorded in the log if there is an abnormality during the voyage; "boat_param": store the ship control parameter file (*.param);

"coordinate_system": the directory where the files related to the coordinate system are stored;
"default_format": stores user-defined files
"temp": the package that has been shared

<u>Notes:</u>

After the project is saved, the result file of shooting and video recording is stored at the following path: EC10 remote control: EasySail/jobs/project filename/fpv Other Android devices: Android/data/com.huaceeasysail/jobs/projectfilename/fpv

The default path of the data post-processing file export and the file downloaded by the share code is as follows: File export path: "1A CTI Export Folder" in the root directory Sharing code download path: "1A CTI sharing code folder" in the root directory

4.5 Account login

Under the premise that the network is available, you can directly use the mobile phone number verification code to register and log in, and click the "Settings" button on the right side of the main interface to enter the login interface.

Register				
М	OBILE REGISTRATION EMAIL	L REGISTRATION		
	+86 please input the p number Please input the verification co	Send		
	Please input the password	ø		
	Confirm the password	Ø		
	REGISTER			
	Already have an accou	int?		
Click regist	er button means you already agree <u>User a</u>	agreement And Privacy policy		
	• •			
	Register			
Login				
--				
PHONE NUMBER ACCOUNT				
+86 - please input the phone				
Please input the verification co Send				
LOGIN				
Register account				
Click the login button means you already agree User agreement And Privacy policy				
∢ ● ■				
Log in				

Note: If you have logged in for more than 30 days, you need to log in again.

4.6 Quick Start Guide

4.6.1 Topographic surveys are fast to work with

- 1 The unmanned boat is turned on, the remote control is turned on, and after waiting for 1-2 minutes, operate the remote control handle to check whether the motor is rotating;
- 2 After the connection is successful, the unmanned ship is launched, and the unmanned ship is manually controlled at full speed for 5 seconds to complete the initialization of the unmanned ship;
- 3 Then click "Topographic Survey" to enter the project list interface;
- 4 Create a new project or open an old project to enter the main interface of the satellite map;
- 5 View self-test information, connection status, etc.;
- 6 Plan the route and upload it;
- 7 Start Operation: Switch to automatic sailing mode and click [Start Recording Button] to officially start the measurement operation.

4.6.2Hydrographic surveys are carried out quickly

1 The unmanned boat is turned on, the remote control is turned on, and after waiting for 1-2 minutes, operate the remote control handle to check whether the motor is rotating;

- 2 After the connection is successful, the unmanned ship is launched, and the unmanned ship is manually controlled at full speed for 5 seconds to complete the initialization of the unmanned ship;
- 3 Then click "Hydrological Survey" to enter the project list interface;
- 4 Create a new project or open an old project to enter the main interface of the satellite map;
- 5 View self-test information, ADCP connection status, etc., and switch the flow velocity profile to full screen;
- 6 Click "Start Transmission" (1) to see if the flow velocity graph shows whether there is a data output, ;
- 7 Plan the route and upload it;
- 8 When the unmanned boat travels to the target point, click the "Data Record" button to start recording the measurement data, and set the starting shore type and shore margin. When driving to the next task point, click the "End Recording" button and set the end type and shore distance to end the information collection of the current measurement
- 9 After recording 2 measurements, click the "Traffic Summary" icon to view the summary table and export the excel file

4.7 Device connection

4.7.1Unmanned ship connection

	Device Cor	nnectior	ı
USV M	apping	D270 Ec	ho Sounder
Connect Methods	4G		Lan
Remote Server	Internationa	al server	•
Username	3560054		•
Password	•••••		ø
Video Acces	s 🔵 CHC C	loud 🧿	None
	CONN	ГОТ	
	CONN	EUT	
•	•		
τ	ISV conne	ection-4	G

4G Connection:

- 1. The remote control is connected to a 4G network, such as a mobile phone hotspot, to ensure that it can access the Internet normally;
- 2. Select the corresponding server, enter the SN number, password and other information, and click Connect.

<	Device Connection			
u	ISV Mapping		D270) Echo Sounder
Connec Method	ct Is	4G		Lan 🖌
Remote Control	•	EC10	0	M12
Video A	Access 🧿	Acces s	0	None
_				
		CONNE	ECT	
•		•		
USV	connect	ion - d	lata	ransmission

Data Transmission Connection:

- If the current device is an EC10 remote control for Android, select the EC10 remote control type.
 Otherwise, choose M12 (need to connect to the wifi of the unmanned ship);
- 2. The remote control turns on the Ethernet switch, and the network segment must be 144;
- 3. Unmanned ships must be equipped with 2 RC antennas;
- 4. The 2 antennas on the remote control, to be upward, help to receive the signal;
- 5. In the straight direction of the unmanned boat and the remote control, there can be no blocking.

4.8 D270 connection

<	Device Connection		
	USV M	apping	D270 Echo Sounder
IP		192.168.53	.27
Por	rt	10002	
		CONN	ECT

D270 sounder connection

- 1. Android device connected to D270 WIFI;
- 2. Just click the Connect button.

4.9 Hydrographic Survey-ADCP Connection

- 3. After connecting the unmanned ship, click "Hydrographic Survey", and the software will automatically connect to ADCP;
- 4. After entering the project, check the ADCP connection status, and if the connection is not successful, check whether the wiring is normal.
- After checking the wiring, you need to manually click the "Launch" button to check whether the connection is successful. Or return to the above interface, click on the "Hydrological Survey" module, and reconnect.

4.10project management

4.10.1 Basic engineering processing

The project management interface can display all the saved projects, click [Project Route] to enter the project management interface, the interface displays the list of all tasks that have been created, each route task label contains the name, route type, creation time, update time and operation location, click the label to open the route task, open the project to enter the map interface, you can enter the management mode through the [Manage] button, and multi-select/delete/copy/copy the project fileShare the action.

<	Project Management	Management
Q Proje	ect search	
	Area_20240124194138 Creation time: 2024/01/24 Update time: 2024/01/24 Hongshan, Wuhan, Hubei, China	Processin Coordinate
	测区_20240123163215 Creation time: 2024/01/23 L海市青浦区崧盈路 Update time: 2024/01/23 Path	Processin Coordinate
	Area_20240122174734Update time: 2024/01/22Creation time: 2024/01/22Update time: 2024/01/22Rue des Folies, Essonne, Ile-de-France, FrancePath	Processin Coordinate
11	Leeye Creation time: 2024/01/20 Update time: 2024/01/20 Path 滨湖路, Jiangxia, Wuhan, Hubei, China	Processin Coordinate
	+ New Project	
	< ● ■	

Search: When customers need to search for individual tasks, they can enter the name of the search box to search for the task, which supports fuzzy queries.

<	Project Management				
Q 1833					
	測区_20240325171833 Creation Time: 2024/03/25 Update Time: 2024/03/25 湖北省武汉市江夏区关东街道财富二路北方天鸟佳美电脑绣花机制造有限公司	Path	Processing	Coordinate	>
	+ New Project				

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Copy and delete: By clicking [Manage], the task management will enter the copy and delete mode, and the create and import buttons below will become copy and delete, after selecting the task, click copy or delete to copy or delete the task, which can support multiple selection. When you're done copying or deleting, click Done to exit copy and delete mode.

4.11Create a new project

4.11.1 Topographic survey of new construction

The steps of a new topographic survey project are as follows:

- Click New Project to set the coordinate system, you can select the commonly used coordinate system, and you can select the saved common coordinate file in the Common Coordinate System interface, or you can delete the file
- 2. Scan the QR code: Scan the generated QR code to read the coordinate system parameters of other devices;
- 3. Customization: Enter the coordinate system parameters interface and set the coordinate system parameters according to your needs.
- 4. Predefined: Enter the predefined coordinate system interface, and select the required coordinate system according to the continent and region;
- 5. Import from File: Import a CRD or DC file to import a coordinate system

<		New Project	
	Name	Area_20240323003538	
	Apply Project		\bigcirc
	Coordinate	WGS84	>
		CONFIRM	

<		Common C	Coordinate		
China CGCS 2000					Scan QR
Asia/China					Load from file
China Xian 80 Asia/China					Custom
China Beijing 54					Predefine
WGS84 Asia/China					0
	DELETE			NEXT	
		•	•		

Common coordinate system interfaces

In the Common Coordinate System interface, you can select the saved common coordinate files, or delete the files.

Scan the QR code: Scan the generated QR code to read the coordinate system parameters of other devices; Customization: Enter the coordinate system parameters interface and set the coordinate system parameters according to your needs.

Predefined: Enter the predefined coordinate system interface, and select the required coordinate system according to the continent and region;

<		Predefine Coordinate	
Groups	User		×
Region	Admin		×
List			
WGS84			
China CGCS 2000			0
DELETE		DETAILS	CONFIRM

Predefined coordinate system interface

<		Coordina	te Param		
	Name	China CGCS 20	000		
Ellipsoid	Projection	Datum trans	Horz. adjustment	Vert. adjustment	Adjust paramete
	Туре	China CGCS20	00	~	
	а	6378137.0000	000		
	1/f	298.25722210	10		
	Positive direction	North-East		~	



Custom settings for coordinate system parameters

The coordinate system parameter interface can be customized for the coordinate system, and the setting items are: ellipsoid, projection, datum conversion, plane correction, elevation fitting, and correction parameter setting, which can customize the coordinate system according to user needs;

Generate QR code: Generate a QR code for the currently set coordinate system;

Scan the QR code: Scan the generated QR code to read the coordinate system parameters;

Load from Common Coordinate System: Enter the Common Coordinate System module, and you can directly select the commonly used coordinate system;

Save to Common Coordinate System: Save the current coordinate system parameters to the common coordinate system;

Import from file: import coordinate file from local directory to read directly, support file search;

Share the coordinate system: You need to log in to the CTI cloud account to share the coordinate system, generate a 4-digit sharing code, and use the CTI sharing code tool on the PC to read the shared coordinate system parameter file, and the sharing code is valid for 30 minutes;

<	New Project	
	Name Area_20240129234305 Apply Project Coordinate EXA Hand-drawn Import File	
	CONFIRM	
	↓ ● ■	

New project: The new project supports two scenarios for route planning, namely, hand-drawn route and imported file.

Import file: The current software import file supports waypoint files (*.). waypoints), polygon files (*.poly, *.kml, *.kmz, *.dwg, *.dxf) to create a route mission or polygon shape.

<u>Notes:</u>

The import file does not support too many waypoints (up to 500 points), the area is too large, any 2 points, greater than 10km, and cannot be generated.

4.11.2 New hydrographic survey project

- 1. After connecting the unmanned ship, enter the hydrographic survey project management interface, and it will be automatically connected to ADCP.
- 2. Click the "New Project" button at the bottom. If the ADCP is not connected, the ADCP device parameter configuration page will be entered, and if it is connected, the site information page will be entered.
- 3. Connect to ADCP by setting the ADCP type, ADCP baud rate, GPS baud rate, and GPS network port parameters through the device parameter interface. If you select RiverStar as the ADCP model, click "Next" to enter the site information interface, and if you select other models, you will directly enter the topographic survey project.

<	Device Params						
	ADCP Model RiverStar TRDI RTI SonTek M9						
	ADCP Baud Rate 115200						
	GPS Baud Rate 115200						
	NEXT						

Device parameters interface

4. To enter the site information interface, you need to fill in the site name, station number, river name, water system, measurement unit, measurement location, operator, survey ship number and remarks information, after the information is filled, click "Next" to enter the working parameters interface.

<	Station Info
Station Info	
Station Name	Station Number
River Name	River System
Measurement Number	
Field Party Data	
Field Party	Location
Processed By	Boat
Remarks	

Site	informa	tion	interfac	e

5. Enter the working parameters interface to set the working parameters of the ADCP, including flow rate reference, transducer draft, external compass, external compass offset, and whether to use an external sounder. After the work parameters are set, click "OK" to enter the map interface. In addition, it should be noted that if the unmanned ship is not connected, only the flow velocity reference can be modified, and other parameters cannot be modified. When the sounder is abnormal or not connected, the external sounder option cannot be modified.

	Work Par	ams	
Water Velocity Refer	BT	GGA	VTG
ADCP Draft(m)			0.0
GPS Heading			
External Sounder			
Note: If the USV is not modified, and other pa abnormal or not conne	connected, only the w arameters cannot be m acted, unable to modif	vater velocity refer odified. when the y the external sou	ence can be sounder is nder option.
	CONFIR	М	

Working Parameters Interface

4.12Device self-test

1	CHCNAV	Connected	Manual	الله 😫	33	🕒 Single	91% 0% 36.4v 0.0v	@ 4.83km	🕲 37ms	
		Che	ck List		×		Route name	Area_20	240129234	430
	USV Signal			۵.	d			5		
	GNSS Status			Single / 3	13	Ale	Work mode	Surv	ey	•
	GNSS Registra	ation	2024/0	2/04 Norm	al		Generate po tracks	lygons by	STAF	RT
	Echo Sounder			Norma	al				REVERSE	WPS
	Motor			Abnorm	al	1			IMPORT	FILE
	Obstacle Mod	ule		Norma	al	Water 47.85 t Targe 0	 ✓ Waypoints I s 2r r 	lst		
			4		•	1985		_	_	



- Ship control 4G network signal: real-time display of unmanned ship ship ship control network quality, >=95%, full grid (5 grids) display, >=95%, full grid (5 grids) display, >=85%, 4 grid display, >=70%, 3 grid display, >=60%, 2 grid display, >=50%, 1 grid display, other, 0 grid display.
- **2. GNSS solution mode:** locate the solution state, including single point (red), floating (floating) and fixed (green) mode.
- **3. GNSS registration:** if the expiration time is greater than or equal to 48 hours, it will display [Expiration Date + Normal], which means green, if the expiration time is less than or equal to 48 hours, it will display [Expire in 2 days + Expiration Date], which means yellow, and if the expiration time is less than or equal

to 24, it will display [Expire in 1 day + Expiration Date], which means yellow, and if it expires, it will display [Expired], which means red.

- 4. Sounder : Green display when the connection is successful.
- **5. Motor:** green display when connected successfully, abnormal will be displayed for the first connection, push the longitudinal rod to check the wind direction and power of the motor, and then it will turn green.
- 6. Obstacle avoidance module: green display when the connection is successful.

4.13Route planning

4.13.1 Topographic survey, route planning

Hand drawn routes

At present, the operation steps of creating a new route are as follows: click the map once to generate a task point (generate a sample point during hydrological mode operation), click the map multiple times to generate the task point and confirm the navigation position and direction according to the order of clicking to generate, and you can add the mission point by dragging the [+] point on the route. You can also switch the task point properties [mission point (green), sampling point (purple), home point (red), hover point-unlimited (yellow), hover point-time (yellow), hover time can be set according to your needs] in the drop-down box of the route list point properties.



Point Properties



Click the left button of [Waypoint List^{>>>}] to minimize the right side of the waypoint list value interface, and click the right button of [Bell] again⁽⁽⁴⁾) to open the waypoint list again.

Polygon route drawing

The current logic of generating a route after creating a polygon is to click on the map once to generate a polygon boundary point, click three times in a row to generate a triangle, and click the map again to continue

to add polygon boundary points. When the edit polygon button on the left is selected, you can move it by dragging and dropping, or you can delete the selected point (click to select the polygon point to delete the point, and click the single-point delete button.).



Polygon planning

After confirming the polygon range, you can click the generate button on the right side to generate the default route. You can also modify the route by setting the route direction angle, route spacing, start point, and polygon expansion.

Tracks generate polygons

In the route editing mode, click the "Start" button on the right side of the trajectory generation polygon, and then manually control the unmanned boat to run a circle along the boundary of the survey area to automatically generate a closed polygon area.



Trajectory Generation Polygon - Start

CHCNAV	Connected	Manual	≜ .⊪	₹33)	💮 Single	91% 0% 36.4v 0.0v	@ 4.82km	🛞 30ms	•••
00	0		E-14		"Inchr	» Route name	Area_202 5	24012923	430
•			TREE		S	Work mode	Surv	еу	•
Ŧ			2.2		T	Generate po tracks	olygons by	FINIS	SH
\bigcirc	AE		e de					REVERSE	WPS
	青山民办幼	N.B.	11		ALC:			IMPORT	FILE
F良山社区	居動合	A BACK			E	Polygonal re	oute planning	GENER	ATE
1.0 2.0 3.0		10 Ear	rthing 345619 sting 898561.	95.7733n 1728m	n Water 47.26	s Route direct	tion angle(°)	177	
4.0 5.0 Gain :	9 -3.49	Roll De 0.28° 0.3	pth 5m	Target dis Om	st Targe 0	tr 0	360		
			(۲					

Trajectory Generate Polygon - End

Click the "End" button, then set the route direction angle and route spacing, and click the "Generate" button to generate a preset route within the polygon area.



Adjust the direction angle/spacing of the route

Import the file

When creating a new project for the first time, select Import File, the current software import file format supports waypoint files (*.waypoints), polygon files (*.poly, *.kml, *.kmz, *.dwg, *.dxf) to create route tasks or polygon graphics;

Note: The import file does not support too many waypoints, and the maximum number of waypoints is

500.

<	New I	Project	
N A C	ame Area_20240 pply Project coordinate Free 84 Hand-drawn	129234305 E Import File	
	CON	IFIRM	
	•	• •	

Freehand drawn routes/import files

In addition, in edit mode, in the waypoint list on the right, click the "Import File" button to import the file.

CHCNAV	Connected	Manual	الد 🜲	33 💦	Single	91% 0% 36.4v 0.0v	@ 4.8km	🛞 38ms	•••
00	⊗ ⊡				×	Route name	Area_20 5	24012923	3430
				100	met and the	Initializing, F Work mode	Please sail for Surv	5s at full sp <mark>ey</mark>	oeed ▼
Ŧ					T	Generate pol tracks	ygons by	STA	RT
	ÊE							REVERS	E WPS
	青山民办幼		11		F			IMPOR	TFILE
2 青山社区	居委会	1 Carlo			Start I	へ Waypoints Li	st		
0.0				11		Add jump po	int		
2.0 3.0 4.0	Bitch	For Eas	ting 898561.30 th Ta	.8122m)43m rget dist	47.336 Target				
5.0 Gain : 9	-3.51	° 0.25° 0.3	5m On	n	TOUC				
		•		۲					

Import files in edit mode

Route editing

1. Edit mode

E: Click to enter the edit mode, and you can draw waypoints.

2. Mark the Home point

• After entering the edit mode, click the button to switch to the selected state , and click the map again to generate the Home point.

3. Mark the point at the current position of the ship

S: If the unmanned ship is connected and the software is in edit mode, click the button to generate a task point at the current unmanned ship location.

4. Delete a point,

S: After selecting a waypoint on the map or selecting a polygon boundary point in polygon drawing mode, the selected point is surrounded by a circle of white, and click the button to delete the point.

5. Clear all points

D: Click to clarify all waypoints, polygon boundary points, home points, and jump points.

6. Add hop points

The hop point setting is located in the route list, and you can set its on-off state, and modify the starting point number and follow the number of rings.

	Disconnected			الد	×	0	••••	
	8 1		»			MPORT	FILE	
			∧ Way	points List				
Ŧ		•	Add ju	mp point				
\bigcirc			Jump	to target point	1			
0.0			Loop 7	Times	5			
10.0 20.0 30.0 40.0 50.0			• +	Iome Point				



4.13.2 Hydrographic survey route planning

The operation steps of the new route of hydrographic survey are as follows: click the map once to generate a hovering point, click twice to generate two hovering points, that is, a measurement, confirm the navigation position and direction according to the order of clicking to generate, and change the position by dragging the hovering point. The current operations on hover points include deleting one point and deleting all points, and you can also view the details of the points in the route list, and the waypoint properties are all hover points.



Hydrographic survey route planning interface

4.14Introduction to the use of interface tools

4.14.1 Topographic Survey Main Interface

Press and hold the icon to display the function information of the current icon.



The map is displayed in the sailing state

1. [Sailing to Home Point]: After clicking, the unmanned ship switches to the return state, and automatically sails to the set Home point;

- 2. [Sailing here]: After clicking the button, switch to the selected state, click on the map, and the G-point will be generated, and the unmanned ship will switch to the guided mode and drive towards the G-point, and click the map again to change the location of the target point. Click the [Sail Here] button again and switch to unselected to turn off the navigation guidance setting, but the unmanned ship will complete the last guidance task.
- 3. [Set Target Point]: Click this button to display the current task point list in a drop-down manner, select the corresponding mission point number, and the unmanned ship will sail to the numbered position (Note: you need to switch to automatic mode).
- 4. [Next Target Point]: Click this button to sail the unmanned boat to the next target point.
- 5. [Remission]: Click this button to return to point 1, start the mission again, and sail from point 1 to the last mission point.
- 6. [Start/End Record]: Click this button to start/end the recording data, and the [Record Number] information below will display the number of the recording point in real time.
- 7. [Edit/Save Route]: Create a new project, enter the map interface, and at this time, it is in the edit route mode, and the user can operate the route (draw waypoints, delete waypoints, upload, download, etc.). Then click the button to save the route. After the route is saved, the measurement operation can be started normally.
- 8. [Map Settings]: Click the Change button to set map tracking and map rotation
- 9. [Layer]: Click this button to display the layer options, including Route Route and Record Point, which can be manually checked and canceled. If you cancel it, you won't be able to see the corresponding layer information on the map.
- 10. [Ruler]: Click the button to select it. At this time, you can click any 2 points on the map to see the record and direction angle between the 2 points in real time. Click the button again to cancel the display.
- 11. [Bell]: The real-time message will automatically pop up and display. There are two kinds of real-time messages: one is long-standing, such as system initialization, full speed navigation 5s, this message must be processed to automatically disappear within 5s, if you ignore it all the time, the message will always exist. The other is a temporary prompt, which will automatically disappear within 5s after popping up, such as [Shoal alarm, please drive away from the area]. Disappearing messages will appear in the bell message list. The list of messages can pop up by clicking the bell button, and if you want to close the list, you can click the bell button again.
- 12. [Auto/Manual Switching]: Toggle between automatic and manual sailing modes.
- 13. [Hover/Dishover Switching]: Toggle the hover and unhover modes.
- 14. [Real-time message]: Real-time message will automatically pop up. See No. 10.
- 15. [Suspension Joystick]: Control the throttle and direction of the unmanned ship. In the general settings bar, you can set the display and shade. This stick can only be displayed after the route has been saved.

- 16. [Sounder Waveform View]: Real-time display of the sounder waveform chart.
- 17. [Millimeter-wave radar view]: Real-time display of the angle and distance of obstacles ahead. Below is the sailing attitude of the unmanned ship: pitch and roll.
- 18. [Common sensor information column]: latitude and longitude, earth height, speed, water depth, target point distance, target point, record number.
- 19. [Camera]: Real-time preview of camera image transmission.
- 20. [Connection Status]: Displays the connection status of the current device in real time.
- 21. [Sailing Mode]: Displays the navigation mode information of the current unmanned ship in real time.
- 22. [Unmanned ship 4G signal]: Real-time display of the current 4G network signal quality of the unmanned ship.
- 23. [Star Search]: Real-time display of the number of GPS star searches.
- 24. [GPS solution state]: single point, inertial navigation, floating, fixed.
- 25. Battery level: Remaining power and battery voltage.
- 26. [Mileage]: The remaining power of the current battery and the mileage that can be supported.
- 27. Latency: The quality of the network communication connected to the current device. Unit-millisecond. If the network is within 300 ms, the network is good. 300-600ms, indicating network fluctuations, communication quality is average. If the network quality is higher than 600 ms, the network quality is poor.
- 28. [Device Setup Module]: Click this button to pop up a device setup interface, including record control, sounder settings, ship control settings, system settings, CORS login, GNSS registration, and general settings.

4.14.2 Hydrographic Survey Main Interface

As you can see, some of the interface tools are the same as topographic surveys, and the different interface tool parts are marked out in the image below.



1. [Site Traffic Measurement Information]: Click this button to pop up the test task panel, where you can view the test task and the measurement information under the currently selected task, and you can create a new test task.

<u>Notes:</u>

a. Don't reuse the same quiz task. For example, if you go to test the stream today, create a new test task. If you go to test the stream again tomorrow, create a new task.

b. After creating a new task, you can open this panel to view the recorded measurements during the data recording process. Once you've reviewed it, you can click "Continue to quiz".

- 2. [Switch Flow Rate Reference]: Click this button, the flow rate reference will be switched between bottom tracking, VTG, and GGA, and the icon will be displayed as the current flow rate reference.
- 3. [Traffic Summary Table]: Click this button to enter the traffic summary interface, where you can view the traffic summary table, traffic results table, measurement test record table, and share and export. You can view and export the traffic summary information of historical test tasks.
- 4. [ADCP Transmit/Stop]: Transmit or stop ADCP, start and end flow velocity measurement.
- 5. [Data Recording/Stopping]: Record and save the test data.
- 6. [Flow velocity amplitude map]: Realize the display of depth information and flow velocity information of the river bottom during the navigation of unmanned boats.
- 7. [Common sensor information column]: speed, heading, flow speed, flow direction, water depth, current

level, total flow, starting shore.

8. [ADCP Connection Status]: displays the connection status of the current ADCP in real time.

4.15Parameter settings

4.15.1 Hydrology - working parameter settings

The working parameters of the ADCP can be set on the working parameter setting page to calculate the flow information. The working parameters can be manually set for flow rate reference, bottom tracking, GGA, VTG, transducer draft, whether to enable external compass, external compass offset, and whether to connect external sounder. The setting takes effect in real time, and after setting, you can view the corresponding flow velocity amplitude map change in the lower left corner of the map. In addition, during the data recording process, only the flow rate reference can be modified, and other parameters cannot be modified. When the sounder is abnormal or not connected, the external sounder option cannot be modified.

Flow rate reference: After the ADCP is successfully connected, you can manually switch between bottom tracking, GGA, and VTG.

Transducer draft: can be entered manually, in meters.

Outer Compass: When the outer compass is enabled, manually enter the offset of the outer compass.

External sounder: When the external sounder is activated, the bathymetric data measured by the sounder is obtained, and when it is turned off, the bathymetry data measured by the ADCP is obtained.



ADCP working parameter setting interface

4.15.2 Hydrology - Site Information Settings

The Site Information Settings screen is used to set the details of a hydrological test item. You need to manually enter the relevant information of the site, including the station name, station number, river name, and measurement unit information, including the measurement unit, measurement location, operator, survey ship number, water system, and remarks information.

	Disconnected		Stat	ion Info	\times
		Ċ.	Station Info		
		IŶ	Station Name		
		4	Station Number		
the second secon		-	River Name		
	V	4	Measurement Number		
0.00		Ċ\$	Field Party Data		
		0	Field Party		
		-			

Site information settings screen

4.15.3 Terrain - Record control

Set the recording control parameters, and the data recorded in real time is recorded according to the current settings.

For example, if you record 1m according to the distance, the data recorded in the DEP file is 1m to record a point.

Solution Status: Select Fixed - Only the fixed solution and inertial navigation solution data will be recorded; Select Float - only record fixed, floating and inertial navigation solution data;

Select Single Point - Record all data (fixed, floating, differential, inertial navigation, single point)

RMS Limit: Records RMS data that meets the set conditions.

CHCNAV Connected Manual			Record Control	×
000		Record control	By distance	By time
	i i i i i i i i i i i i i i i i i i i	Distance(m)		1.0 +
		Solution status	Fix Float	Single
	12	RMS limitation		
O FRANK	₽	HRMS(cm) ≤	0.00	
一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一一	0	VRMS(cm) ≤	0.00 +	
行山社区居委会	0			
Image: Constraint of the second sec	ing 34 ng 898 🏚			
•		•		

4.15.4 Terrain - sounder settings

Set the sounder parameters, and manually set the range, gain, sound velocity, and depth filtering.

The setting takes effect in real time, and after setting, you can view the corresponding waveform changes in the lower left corner of the map.

Draft: If it is connected to an unmanned ship, the draft is bound to the ship type and cannot be manually modified. If the D270 is connected, it can be manually modified.

Sound velocity: can be manually entered, and both temperature and salinity can be used to calculate the sound velocity value.

Salinity: Can be entered manually. Unit: thousandths

Temperature: Manual input or real-time acquisition of D270 sounder temperature sensor data.

Range: Support manual and automatic, and the current water depth range can be set.

Gain: Supports manual and automatic, and can set the sonic intensity of the current sounder transducer.

Depth Filtering: Filters clutter and noise data outside of range.

CHENAV Connected Manual		Sounder Settings	×
	<u>/</u> _	Work mode	High freq 🔹
	I	Rate(Hz)	Max -
	4	Draft(m)	0.083
	+	Sound Velocity(m/s)	1500.000
	Ŧ	Calculates the sound velocity	
■青山民办幼儿园	Ø	Temp(°C)	0.00
21日山社区居委会	0	Salinity	0
10 20 30 30	à	Range(m) 5 10 25	50 100 250
40 Pitch Roll Depth 50 Gain: 10 -3.46° 0.25° 0.35m		Automatic acquisition of range	
•		•	

4.16Generic - Ship Control Setup

a Write Parameters: The drop-down list displays the name of the ship type parameter file (*.param), select the corresponding ship type name, and click [Write].

b Save parameters: Click the save button to save the current ship control parameters in a custom file (*.param). c Ship control parameter setting: Click + or -, you can set the ship control parameters in real time, and support manual input. Takes effect immediately.

CHCNAV	Connected	Manual		Contr	ol Settings	\times
00	$\otimes \mathbf{\overline{U}}$		<u> </u>	Control parameters	APACHE-3 Pro	•
7	·/a		Î	WRITE	SAVE	
		一一唐家宅		Cruise		
÷	A second		٨	Cruise speed(m/s)	2.2	+
			₽	Turning radius(m)	— 5.0	+
	「山民办幼		٨	Wp radius(m)	— 5.0	+
行山社区。	話会合		0			
	Pitch	Roll Depth	٥			
50 ——Gain : 10	-3.42	• 0.30• 0.35m		• •		

4.17General - System settings

a Shoal retreat: Function switch, turn on this function, after the unmanned boat enters the shoal, it will automatically retreat and sail away.

b Automatic obstacle avoidance: function switch, turn on this function, the unmanned ship will automatically detour or stop when it finds an obstacle ahead.

c Lost contact return: function switch, turn on this function, once the remote control is disconnected (the distance between the remote control and the unmanned ship is far), after a period of time (lost contact time), it can automatically return home.

d Low battery return: function switch, turn on this function, if the battery power is low, the unmanned ship will automatically return home.

e Remote control pairing: After the remote control is turned on, if it is not paired with the boat. This button can be used to match the remote control.

CHENAV Connected Manual	System Settings	×
	Shoal backward	
	Shoal depth(m)	+
	Automatic obstacle avoidance	
	Obstacle avoidance distance(m) - 3.0	+
	Return when lose rc connection	
● 月山民が幼儿园 ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●	Time of losing rc connection(min)	+
	Return when low battery power	
20 Northing 3- 20 Easting 898	Remote control status Connected Start r	natch
so Gain: 10 -3.49° 0.17° 0.35m		
4	• •	

System Settings Interface

4.18Generic -CORS login

On this page, you can view the login status of the current CORS. You can also manually enter parameter information to log in to CORS

CHCNAV	Connected	Manual			CORS Logir	1	×
00	$\otimes \mathbf{\overline{0}}$	The Frank	<u>/_</u>	Protocol		NTRIP -	
			Î	IP		119.3.136.126	
		国家宅		Port		3103	
1 H				Mount points	GET	SH2000 -	
		Notion I	Ŧ	User name		q4680498	
	青山民办幼		Ø	Password		67010746	
	設合	Nothing 2	0				
	Pitch -3.46	Roll Depth 0.24° 0.35m	٥	DISCON	NECT	NNECTING	
		•		•			

CORS login interface

In the connection protocol section, you can drop down to select the SWAS built-in account, and click Connect directly.

CHCNAV 已连接 手动			CORS登录		×
	<u>/_</u>	连接协议		SWAS	•
	Î	注册状态		非SWAS设备	
· · · · · · · · · · · · · · · · · · ·					
	₽		断开	连接	
	0				
- Horsey Line	0				
100 2000 2000 4000 500 500 500 500 500 500 500 500	¢				

SWAS login interface

4.19Generic - GNSS registration

It can display the SN number, GNSS registration period, and registration code information of the current unmanned ship.

If GNSS expires, you can contact the technical application for a registration code, and then enter a new

registration code at the registration code position in the figure below, and click the registration button to complete the registration.



Registration code interface

4.20General - Map/Boom Settings

Map source: Support day map and ArcGIS and customization.

Virtual Stick: Set the display and hiding of the virtual joystick. It will only appear after the project is saved. Display: View switch between map and video perspectives. Whether each switch is full-screen or half-screen.



General settings interface



Virtual remote pole

4.21 Map/video switching

Click the view box in the lower right corner to switch between the map and video interfaces. Half-screen switching and full-screen switching are supported. Half-screen and full-screen settings can be set on the [General Settings] interface.

Video full-screen interface, with platform rotation, photo and video recording functions on the right side. The photo and video files are stored in the FPV folder of the current project.

In the video view interface, there are play and close buttons in the center of the gimbal in the upper right corner, which can turn the video stream on and off freely.



Semi-folding interface



Full-screen interface for the camera

4.22Extended functionality

The software provides additional extended features, allowing users to learn how to use the software through video tutorials, share software logs, share code downloads, and customize services. The collection of these modules provides users with more options and flexibility to meet individual needs and enhance the experience of using the software. Click on the upper right corner of the main interface, and you can enter the above interface in the pop-up menu.

4.23Custom servers

- 1. Click [Custom] in the upper right corner to add a server, including the server name, IP address, domain name, and port number;
- 2. The newly added server will be synchronously displayed in the server options of the [Device Connection] interface;
- 3. After customizing the server, the unmanned ship webpage should also be synchronized to add the same server (system settings-N2N settings).

<	Remote Server		Custom
Server Name	IP / Domain	Port	
huace	142.122.192.22	7777	

4.24Video tutorials

After entering the unmanned ship video tutorial interface, users can learn how to connect equipment, set the coordinate system, plan the route, set the equipment, and post-process the data. Video resources provide detailed demonstrations and instructions to help users quickly learn how to use the software.

You can view the tutorials of different functions by clicking on different titles, you can like and favorite the video below, and click the button at the top right to refresh, clear the cache and generate a QR code to share with others.



Click here to connect

<						
	请输	入关键字		٤)	
	设备连接	坐标系统	航线规划	设备设置	数据后处理	天
	PCA INCOME HIM HIS IN	电台连接2				>
	华放充人和临场	无人船连接				>
	RAKUR-WOLD	电台连接1				>
			没有更多数热	居啦		

4.25 Share projects/logs

On the project management interface, click the word "Manage" in the upper right corner to copy, share, and delete the project.

<		0 selected		Complete
Q Proje	ect search			
	Area_20240129234305 Creation time: 2024/01/30	Update time: 2024/01/30	Path Proces	essin Coordinate
	Area_20240124194138 Creation time: 2024/01/24 Hongshan, Wuhan, Hubei, Chin	Update time: 2024/01/24 na	Path Proces	ssin Coordinate
	测区_20240123163215 Creation time: 2024/01/23 上海市青浦区崧盈路	Update time: 2024/01/23	Path Proces	essin Coordinate
(AII)	Area_20240122174734 Creation time: 2024/01/22 Rue des Folies, Essonne, Ile-d	Update time: 2024/01/22 e-France, France	Path Proces	essin Coordinate
	🗇 Сору	↔ Share		Delete
		•		

Admin interface

<	1 selected						Comp	lete
Q Project search								
Area_20240129234305 Creation time: 2024/01/3		Share	e code		ath	Processin	Coordinate	0
Area_202401241941 Creation time: 2024/01/2 Hongshan, Wuhan, Hube	2 1 1 0 The share code will become invalid after 30 minutes				ath	Processin	Coordinate	\odot
测区_202401231632 Creation time: 2024/01/2 上海市青浦区崧盈路	File: Area_20240129234305.zip				ath	Processin	Coordinate	\odot
Area_20240122174734 Creation time: 2024/01/22 Rue des Folies, Essonne, II	Area_20240122174734 Creation time: 2024/01/22 Update time: 2024/01/22 Rue des Folies, Essonne, Ile-de-France, France					Processin	Coordinate	\odot
[] Сору								
	•		•					

Share code interface

Click the three bars in the upper right corner of the initial interface, click Share Log, or click Share Code to download. Get engineering data.



APACHE-3 Pro Connected successfully

•	٠		
	Main interface	2	

Select the software log of the corresponding date and share it with the technician for analysis.

CHENAV			User login 📃
Project Mission			
Carl Street	Shar	e Logs	
Japan Bar	Select Time 2024-	⁰¹⁻ ✓ nearly 3 days	
	CANCEL	SHARE	
APACHE-3 Pro Conne	ected successfu	lly	
	•	• •	

Log sharing page

CHCNAV					User login 📃
Project Mission					
		Share	e code		
	7	0	5	7	
	The share File: Logs_	e code will b mir 20240130	ecome inval nutes)000208.zi		
		CL	OSE		
APACHE-3 Pro Conne	ected suc	cessful	ly		
	•		•		
	S	hare cod	le interfac	ce	

Note: When using the sharing function, you must first log in to your CHCNAV account, download the

CHCNAV cloud sharing code tool from the official website, and use it together.

4.26Share code to obtain/download data

Open the official website of CTI, download the [Share Code Tool], and install it on your computer.

请选择	~	分享码工具 ——
■ 教学视频	>	分享码工具
■ 华测APP	>	说明:测绘+分享码工具+230728
□ 固件工具	>	
』 软件工具	\sim	支持机型:
三维智能产品	>	日期: 2023年07月28日 大小: 63MB
测绘RTK	~	卜载次数: 59次
测地通		点击下载
测放王		
CGO		
分享码工具		

When EasySail software shares the corresponding project/achievement/log, a pop-up window will generate a 4-digit sharing code. Turn on the computer, right-click on the desktop, select [CTI Sharing Code - File Download], enter the corresponding sharing code, and enter the corresponding sharing code, and the file will be downloaded to the desktop in the form of a compressed package by default.

0	新建文件夹(N) 查看(V) 排序方式(O) 刷新(F)	>		
	粘贴(P) 粘贴快捷方式(S) 在终端中打开(T) 华测分享码-文件下载 打开华测云		• 网络下载文件 文件名:	
	护眼卫士 捜索 Everything 撤消 重命名(U) 壁纸中心	Ctrl+Z	请输入分享码	
	新建(W)	>		
	显示设置(D) 个性化(R)		关闭	

Through the sharing code download function, users can easily obtain other task type files, and other users
can share the file through the sharing function After generating the sharing code, enter the corresponding four-digit sharing code number in the sharing code download interface to complete the fast download of the file.

			User Login 📃
Measure Topograph	с	Measure Discharge	
	From Sha	ring Code	
			prin Prificant
	CLOSE	DOWNLOAD	
Click here to conr	nect		

Share code download page



4.27Data output and processing

4.27.1 Hydrological data output and processing

After the hydrological survey task, the recorded data is saved in "PD0" format, while a map of the flow velocity amplitude and some key parameters are displayed in real time at the bottom of the main interface. By clicking the Map Tool Flow Summary Table button, you can view the measurement test loading table, flow result table, and flow summary table specified in the "Acoustic Doppler Flow Test Specification", and at the same time, you can also export the excel sheet and share the test data.

4.27.2 Flow rate file

The flow rate file records the ADCP flow rate measurements and is saved in "PD0" format. It is stored in the file directory of the quiz task. Flow rate files are stored in binary mode, and the data includes flow rate data, flow data, basic information, and depth data.

4.27.3 Traffic aggregation

The software supports real-time generation of traffic reports, and at the same time, the corresponding tables are generated in real time according to the selected measurements. Click the "Traffic Results" button of the map interface tool to pop up the traffic summary page. The traffic summary interface contains three tables, namely the traffic summary table, the traffic results table, and the measurement test loading table. The user views the recorded measurements according to the traffic summary table and selects the measurement data that meets the requirements. Open the measurement selection interface through the "Select Measurement" button in the upper right corner, select the required measurement data, regenerate the table data, switch the "Report Type" to select the export process result table or the measurement test loading table, and switch different "Flow Rate Reference" to generate the data under the corresponding flow rate reference, and finally export and share the data.

	Discharge	Summary	>
Summary	Result	Test Record	SELECT TRANSECT
BT	GGA	VTG	
		Measurement Numbe	er:
		Date:	2024/03/22 10:27:01
		Boat:	华微4号 V1.1
Average Di	rection	ADCP Draft:	0.000m
BT		Cell Size:	0.100m
0.00°		Blank:	0.100m
SHARE			EXPORT EXCEL
	Summary BT Average Di BT 0.00° SHARE	Summary Result BT GGA Average Direction BT 0.00° SHARE	Summary Result Test Record BT GGA VTG BT GGA VTG Measurement Number Date: Boat: Boat: Average Direction ADCP Draft: BT Cell Size: 0.00° Blank:

Traffic summary page

N AV Disconner	rted				A.I. 🗶 🖪
		Discharge	Summary		×
Report Forms Type	Summary	Result	Test Record	SE	LECT TRANSECT
Water Velocity Refer	BT	GGA	VTG		
	Station	n ADCP Measure	ment Test Record	Table	
Date:	2024-03-22	Weather:		Wind:	
Transect:	Station_20240322_10 2703	USV:	华微4号 V1.1	Device Name:	Xiaomi
Start Time:		End Time:		Avg. Time:	
ADCP Type:		Firmware Ver.:		Software Ver.:	1.3.0.20231229
	SHARE			EXPORT EXCEL	

Traffic results table interface

	MIN	Luscon	nected		Di	scharge	Summa	iry				×
	Report F	orms Ty	pe	Summar	у	Result	Т	est Recor	d	SELE	CT TRANS	SECT
C.	Water V	elocity F	Refer	BT		GGA VTG						
IM			Stat	ion AD		easure	ment T	est Re	cord Ta	able		
Ĵ	Da	te:	2024-	03-08	Wea	ther:	ner:		Wi	nd:		
	Tran	sect:	Station_ 08_10	202403 13453	02403 3453 US		华微4	号 V1.1	Device	e Name: viv		vo
	Start Time: 11:03		03	End 1	Fime:	11	:27	Avg.	Time:	11	:15	
J	ADCP	ADCP Type: RiverStar		Firmwa	re Ver.:			Softwa	ire Ver.:	1.3.0.20	240306	
ł	GPS ⁻	Туре:	Self	GPS	Headin	g Type:	Self Co	ompass	Sounde	er Type:	No	one
ب ب	Data	Path:	co files _202 Statio	Androi om.huac /jobs_ac 40308_ on_2024	d/data/ e.easysa dcp/流量 103455/c 0308_10	il/ 则验 Jata/ 3453	Confi	g File:	co files _202 Static	Androi om.huac s/jobs_ac 240308_ on_20240 easys	d/data/ e.easysa dcp/流量 103455/0 0308_10 ail.nav	iil/ 测验 data/ 3453/
	ADCP Draft(m): 0.15		0.15	Bla	ank:	Auto	Cell	Size:	Auto	Cell C	Count:	Auto
	Salir	nity:	0.00	Water	Pulses:	Auto	BT P	ulses:	Auto	Coeff	icient:	0.1667
Ĵ	Transec	Уаш	Distan	ce(m)		ile Nam	0	Dischar	$re(m^3/c)$	Av	/g.	Remark
	t	Taw	L	R		IIC Marrie	e			⁷ Discharge(m ³ /s)		S
	Firet	R→L	1.0	3.0	S001_20	240308 .PD0	_103610	12	22	50	11	
	1100	R→L	1.0	3.0	S002_2	0240308 4.PD0	3_10483	-2	2.3			
Ů	Second											
	Third											
^o												
	т	est Item	S	Fi	rst	Sec	ond	Th	ird		Result	
				Go	Back	Go	Back	Go	Back	Ave	rage	Apply
0	Disc	harge(n	n³/s)	122	-22.3					50	0.1	
J	,	Area(m ²))	931	937					93	34	
	Avg.	Velocity	(m/s)	0.11	0.03					0.	07	
	Max.	Velocity	(m/s)	0.61	1.56					1.	08	
Ĵ	Avç	g. Depth	(m)	4.62	4.51					4.	5/	
	Max. Depth(m)		5.0	5.1					5	.0		
	Width(m)		200	207		A	Noter		20	J4		
3ª	Leve	water el(m)	0.00	Leve	el(m)	0.00	Avg \ Leve	vater el(m)	0.00	Water L	evel(m)	0.00
	Drawd Drawd own own Start(m) End(m)			Drawdo wn(m)		10^-4	Drawdo wn Dist ance		(m)	Roughn ess		
	Remark s											
	Recorde	r:			Reviewe	r:			Checker	4		
			SHA	RE					EXPOR		Ĺ.	

Measurement test record sheet interface



Measurement selection screen

4.28Data export and sharing

The software provides tabular data export and sharing functions, after selecting the data that meets the requirements, the user selects the corresponding data table type and flow rate reference, and clicks the "Export Excel" button to pop up the corresponding data report to the Excel file, and there will be a "export successful" reminder after the export is completed, and the export file path is displayed at the bottom. After the export is successful, click the "Share" button to share the interface, select the Excel file to be shared, click the "OK" button, and share the Excel file through the generated four-digit sharing code.

		9		Dis	charge	Summ	ary			-		×
Report Forms	Туре	Sur	nmary		Result		Test Red	cord	5	SELECT	TRANSE	СТ
Water Velocity	y Refer		BT		GGA		VTG					
Station Num	iber:					Meas Numk	ureme ber:	ent				
Station Nam	ne:					Date:			20 10	24/03	/08	
Field Party:						Boat:			华	微4号)	V1.1	
Area Metho	d:	Av	verage	Direct	ion	ADCF	P Draft		0.1	15m		
Position Me	thod:	BT	-			Cell S	ize:		Au	ito		
Magnetic M	ethod:	0.0	00°			Blank	;		AL	ito		
Depth Source	ce:	Bo	ottom 1	rack		Shore	e Coun	t:	10			
Discharge N	Discharge Method: None					Botto	m Met	hod:	Po	wer		
Correction F	Percen	t: 0.0	00			Тор М	/lethoc	:	Po	wer		
3 Beam Solu BT:	ution F	or Ye	es.			3 Bea WT:	ım Solı	ution F	or Ye	S		
BT Error Vel	.:	2.0	00m/s			WT E	rror Ve	el.:	10	.00m/s	S	
BT Up Vel.:		10	.00m/s	6		WT U	p Vel.:		10	.00m/s	S	
Weighted Me	an Dep	th: N	0									
File:		Sta 03	ation_20240308_1 Location: 453									
Width:		20)4m			Area:			93	4m²		
Average Wa Velocitv:	ater	0.0	07m/s			Disch	arge:		50	1.1m³/s		
		Sh Distai	ore nce m	Pina N]	Dischar	ge m³/s	S			
Transect		Left	Right	umber	Тор	Middle	Bottom	Left	Right	Total	Width m	Area m ²
S001_202403 08_103610	左	1.0	3.0	773.0	15.8	99.8	6.70	0.111	0.000	122	200	931
S002_202403 08_104834	右	1.0	3.0	752.0	-2.85	-17.8	-1.22	-0.201	-0.301	-22.3	207	937
Average		1.0	3.0	762.0	6.50	41.0	2.74	-0.045	-0.151	50.1	204	934
Std Dev.		0.0	0.0	14.0	13.2	83.1	5.60	0.221	0.213	102	4.61	3.99
Average/Std Dev.		0.0	0.0	0.02	2.04	2.03	2.04	-4.90	-1.41	2.05	0.02	0.00
Remarks:												
1	S	HARE						EXF	PORTE	XCEL		

The export success page

	ed		<u>Aut X R</u>
œ	Discharge	Summary	×
Report Forms Type Water Velocity Ref	Select file share	e (1 files in total)	ECT TRANSECT
	Test Record_202403251	74836.xls 🛛 😒	2
Date: Transect: St	INVERSES	SELECT ALL	: vivo
Save path:1A_Chcr Record_202403251	CANCEL	CONFIRM	est
	SHARE	EXPORT EX	CEL cted

Export the data sharing page

Station ADCP Measurement Test Record Table

Da	te:	2024-	03-08	Wea	ther:			Wi	nd:		
Tran	sect:	Station_20	240308_1	US	SV:	华微4-	FV1.1 Device Name:		viv	/0	
Start	Time:	11:	:03	End T	Time:	11	:27	Avg.	Time:	11:	15
ADCP	Type:	Rive	rStar	Firmwa	Firmware Ver.: Software Ve		re Ver.:	1.3.0.20	240306		
GPS	Туре:	Self	GPS	Heading	g Type:	Self Co	ompass	Sounde	er Type:	No	ne
Data	Path:	Android/da	ata/com.hua _adcp/涉	ace.easysai 	il/files/jobs	Confi	g File:	Android/da	ata/com.hua _adcp/រៃ	ace.easysa 充量测验	il/files/jobs
ADCP D)raft(m):	0.15	Bla	nk:	Auto	Cell	Size:	Auto	Cell C	Count:	Auto
Sali	nity:	0.00	Water	Pulses:	Auto	BT P	ulses:	Auto	Coeff	ficient:	0.1667
Transect	Yaw	Distan L	nce(m) R		File Name		Dischar	ge(m³/s)	Avg. Disc	charge(m³ s)	Remarks
	R→L	1.0	3.0	S001 202	40308 10	3610.PD0	-3.	68		, 	
First	R→L	1.0	3.0	S002 202	40308 10	4834.PD0	13	5.0	4.	65	
0											
Second											
Third											
Third											
	Tost Itoms		Fi	rst Se		Second		ird		Result	
	rest items		Go	Back	Go	Back	Go	Back	Ave	rage	Apply
Dis	scharge(m ³	/s)	-3.68	13.0					4.	65	
	Area(m ²)		939	942					94	40	
Avg	. Velocity(r	n/s)	0.01	0.02					0.	01	
Max	. Velocity(I	m/s)	0.40	1.60					1.	00	
A	vg. Depth(r	n)	4.62	4.51					4.	57	
M	ax. Depth(i	m)	5.0	5.1					5	.0	
	Width(m)	_	202	208					2	05	
Start Wate	er Level(m)	0.00	End Wate	r Level(m)	0.00	Avg Wate	r Level(m)	0.00	Corres	ponding	0.00
Drawdow		Drawdow		Drawdow		10^_4	Drawdow		(m)	Roughnes	
n Start(m)		n End(m)		n(m)		10 -4	n		(11)	S	
Remarks											
Recorder:				Reviewer:				Checker:			

Export data to an Excel table

4.29Real-time output

The software provides the function of real-time display of flow velocity data, and the user can click on the flow velocity amplitude map window at the bottom left of the map interface to enlarge the window during the collection process, and the flow velocity amplitude map displays information in real time during the recording process, including water depth, flow velocity, surface depth, bottom depth, river bottom depth and other information, and randomly tests the task for dynamic changes. Click the parameters at the bottom of the map interface to enter the parameter detail interface, which displays data such as flow information, hydrological information, and ADCP information in real time.



Flow velocity amplitude graph interface

	Connected Manual		Connected 🚊 📶 🐹 39	Fix B 36.5v	84% 36.5v 64ms	•••
		Pa	arameters			×
смил	2.20011	Ň		Аптенна А	-0.324111	
VRMS	1.90cm	Pitch	0.77°	Antenna Y	0.000m	
		Roll	-0.43°	Water Surface H	0.169m	
Navigation	Information	Yaw	6.09°			
Cruising Mileage	8.31 km	-		Battery Info		
Total Mileage	8.68 km	Motor Spee	d	Battery 1 Voltage	36.5V	
Home Dist	305.69 km	Input Direction	1500	Battery 2 Voltage	36.5V	
RC Dist	20.21 m	Input Throttle	1500	Battery 1 Current	0.19Amps	
Target Point	0	Left Motor Output	1500	Battery 2 Current	0.63Amps	
Target Dist	0.00 m	Right Motor Output	1500	Battery 1 Temp.	17.00°C	
Power Box Temp.	43°C	4		Battery 2 Temp.	18.00°C	
Main Control Temp.	28°C	Obstacle Ave	oidance Information			
SIM Card Remaining	9.62GB	Distance	5.20m			
		Direction	0.0°			

Parameter details page

4.30Historical data backtracking

The software supports viewing the elapsed data of the last test, after entering the test project, select the test task, and then click the traffic summary button to view the last test data, note that you can only view the last recorded test data, for example, the first time two times recorded, the second time three times recorded, the third time after entering the test project to select the test task, you can only view the second test data, so it is generally recommended to create a new test task when starting a new test task.



4.31 Terrain data output and processing

On the project management interface, click the post-processing button of the corresponding project.

<		Project Managemen	nt	Management
Q Proj	ect search			
	Area_20240129234305 Creation time: 2024/01/30	Update time: 2024/01/30	Path Process	sin Coordinate
	Area_20240124194138 Creation time: 2024/01/24 Hongshan, Wuhan, Hubei, Chi	Update time: 2024/01/24 na	Path Process	sin Coordinate
	测区_20240123163215 Creation time: 2024/01/23 上海市青浦区崧盈路	Update time: 2024/01/23	Path Process	sin Coordinate
	Area_20240122174734 Creation time: 2024/01/22 Rue des Folies, Essonne, Ile-d	Update time: 2024/01/22 le-France, France	Path Process	sin Coordinate
		+ New Project		
		• •		

Click the line measurement button on the left list, select the test line to be processed, and click

"Next"/"Previous" to switch the test line processing.

<			Post Pr	ocessing_L	.0001_2024	I-01-20-10-3	0-00	• 1	More
/// Survey line				The first survey lin 8.0	survey line is ne, and so on	opened by defa	ault, click [Next]	to open the s	second
►> Next				6.0					
Verviou S				4.0		•			
Settings	<	C		1.0					•
E raser				3.0	1999) - 1990) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900) - 1900)	ar ran a fairige an	(1) Der 1: gl (D) (1) Sl	ANA MARINA DI ANG DA	n den anter sen fil
Revoke				4.0		Pan	a 1 of 22		
~	1.6	16		5.0L 10:30:00 10) 0:30:01 10:30:02 1):30:03 10:30:04 10:30:1	05 10:30:06 10:30:07	ı ı 10:30:08 10:30:09	ı ı 10:30:10 10:30:11
\sim	LEFT	RIGHT	AUTO LEFT	AUTO RIGHT	可 ватсн	ATTITUDE CORRECTION	THREE CORRECTIONS	SAMPLING	SAVE DATA
				•	•				

Click More in the upper right corner to check whether the "Coordinate System" and "Ship Type Information" are normal.

<			Post Pr	ocessing_L	.0001_202	4-01-20-10-3	0-00	• ①	More
Survey line Next Previou s				The first survey li 80 60 40 10	survey line i ne, and so or	s opened by defa	ault, click Co US Co Sa	oordinate SV Info onditional Fil Impling Setti	tering ngs
Settings				2.0 3.0 4.0		an ran waxay ku	10) Internet op 11.9	i taraku ja ka ji	(PERCENT)
(*	2.0			5.0L	0:30:01 10:30:02	Pag	e 1 of 22	10:30:08 10:30:09	10:30:10 10:30:1
~	LEFT	RIGHT	AUTO LEFT	AUTO RIGHT	ВАТСН	ATTITUDE	THREE	SAMPLING	SAVE DATA
				•	٠				

<			Post Pr	ocessing_L0001	USV Info	×
///		1986		The first survey survey line, and	Project name	Leeye
line				8.0	USV Type	APACHE-3 Pro
Next		4		6.0	Project Date	2024-01-20
K Previou				4.0	Antenna X(m)	0.363
s Ö	-			1.0	Antenna Y(m)	0.000
Settings	38			2.0	Antenna H(m)	0.158
Eraser				3.0	Antenna phase center(m)	0.015
S Revoke				4.0	Draft(m)	0.083
•				5.01 I 10:30:00 10:30:01 1		
\sim	LEFT	RIGHT	AUTO LEFT			
				• •		

In the water depth interface, you can remove noise by dragging the water depth point to the correct position or clicking "Eraser".

Click directly below to move the bathymetric data laterally, such as Move Left/Move Right/Auto Move Left/Auto Move Right.

<			Post Proc	cessing_	L0001_202	4-01-20-10-3	30-00	• ①	More
Survey line Next Previou s Settings				The firs survey 1 6.0 4.0 1.0 2.0	t survey line i ine, and so o	s opened by def n.	ault, click [Next]	to open the	second
Eraser	24			3.0					
Revoke				4.0		Pag	e 13 of 22		
C			1000	5.0L 10:32:00	10:32:01 10:32:02	10:32:03 10:32:04 10:32	:05 10:32:06 10:32:07	10:32:08 10:32:09	10:32:10 10:32:1
\sim	LEFT	RIGHT	AUTO LEFT	PAUSE	🗹 ватсн	ATTITUDE CORRECTION	THREE CORRECTIONS	SAMPLING	SAVE DATA
			•		•				

After deleting all the noise of the survey line in turn, click Batch, check the test line to be processed, and then click Attitude Correction or Three Corrections (Three Corrections include Attitude Correction, Sound Velocity Correction, and Delay Correction).

Click More in the upper right corner again, Sampling Settings, manually set the sampling interval, and click @2024 Shanghai Huace Navigation Technology Co., Ltd. All Rights Reserved Isometric sampling in the lower right corner.

<			Post Processing_L0001				Sampling Settings				
///		Non-	6.414	The	first surve vev line, an	Method	Distance	Deepest	Shallowes	Average	
line	-			8.0		Interval(m)	-	- 0.0	+	
Next		4		6.0		Sampling, the example, the	nat is, the data e sampling int	is thinned o erval is 5m.	ut at equal inte	rvals. For	
Previou				4.0 0.0		1. Distance: 5m).	collect a data	point every	5m (<mark>greater</mark> tha	an or equal to	
s	-			1.0		2. Deepest: (greater tha	within every 5 n or equal to 5	m range, coll im).	lect the deepes	t data point	
Settings				20		3. Shallowe point (great	st: within every er than or equi	y 5m range, o al to 5m).	collect the shal	lowest data	
e Eraser					n h <mark>an bij sa</mark> ka	4. Average: 5m), and the	collect a data e water depth :	point every 5 at this point i	in (greater that is the average v	n or equal to water depth	
•				3.0		within 5m.					
Revoke	100			4.0							
¢				5.0 10:3	, 3:24 10:33:25	1					
~	LEFT	RIGHT	AUTO LEFT	AUTO R	ібнт 🔽			CONFIRM			
				•		•					

After the sampling is successful, a purple sampling line is generated on the water depth interface, and click to save the data again.



Select the data format and type to be exported, click Save, and the result file will be saved in the single-beam folder under the current project by default. Click Share to share the data.

<	Save	
Format	Name,North coordinates,East coordinates,Water surface elevation	
Parameters		
Save the header		
Merge save		
Suffix	.dat	~
Latitude and longitude format	0°00'00.00000"	~

SHARE		SAVE			
•	•				





4.32Detailed explanation of post-processing functions

Post-processing operation interface

Introduction to Views:

1. Record point color: the points of the fixed solution are shown green, the points of the floating solution and the inertial navigation solution are shown yellow, and the other points are shown in red. Depth point green display: a point is selected, the color of the point changes, and the color of the selected point is orange. At the same time, the corresponding points on the map track view will also be marked synchronously (white circles are highlighted). Manually interpolated points are rendered as purple dots, and erased points erased by the eraser are grayed out and cannot be clicked again.

- 2. Map interface: You can drag and drop, zoom in, zoom in, and zoom out.
- 3. Map record point display: color rendering according to different water depths, and the grade degree is from light to dark: red, orange, yellow, green, blue, and purple.

Brief introduction of the function buttons on the left:

- 1. Open the tide test: import the tide test file (*.tid). The TID date and time are required to include the DEP date and time, and after importing, the water surface elevation is processed using the elevation data in the TID file.
- 2. Fixed Interpolation: Select this button to correct the elevation data of the non-fixed solution.
- 3. Eraser: Select this button, and then check or box select multiple depth points to delete the point.
- 4. Manual Interpolation: Manually interpolate data Select this button and click any time in the bathymetric view to insert a new recording point at the corresponding time and depth location.
- 5. Manual sampling: Manually sample feature point data after equidistant sampling. For non-equidistant sampling points only.

After equidistant sampling, manual sampling can be performed for unsampled point data, that is, feature point sampling.

Select this button, select a non-equidistant sampling point with the mouse, and a red sampling line will be automatically generated.

- 6. Undo: Go back to the previous step (drag the point/delete the point/add and delete the feature point sample line).
- 7. Restore: Resume the previous operation (drag the point/delete the point/add and delete the feature point sampling line).
- 8. Shrink button on the left side of the map: you can turn on/off the map interface display;
- 9. Survey line: display all survey line files recorded in the current project;
- 10. Settings:
 - 1) The water depth, time interval and time width multiples can be set, and the view interface can be modified;
 - 2) Selectable bathymetry editing mode: lock/single point up and down/multi-point continuous;
 - 3) fixed interpolation;
 - 4) Display data point information: After opening, click to select the measurement point/elevation point to display the point information;

A brief introduction to the following function buttons:

- 1. Shift Left/Right: Turn pages left and right on the water depth interface;
- 2. Automatic left/right shift: one-key page turning left and right, manual pause;
- 3. Batch: Support the selection of the test line. Select a few and process a few. Click the [Batch] button to pop up a list of test lines, and there is a checkbox on the right side of each test line. By default, all survey lines are selected. Click the [OK] button, and all the selected line data will be read;



Introduction to gesture operation:

- 1. Drag up and down on a single-point longitudinal axis: adjust the water depth.
- 2. The points in the water depth view can be edited, for example, if a single point is selected, you can move up and down to modify the water depth value, and you cannot move the current point left and right. However, when a point is selected, moving it left and right will modify all the points that its finger has passed.
- 3. The upper left side of the point slides the value to the lower right side: perform a point multi-selection operation, similar to the PC frame selection action.

<			Post Pr	ocessing_L00	01	Conditiona	I Filtering	×
Setunys			1995	The first sur	vey Solution statu	s Fix	Float	Single
Eraser				8.0	Fixed: only retain all other solution	n the fixed solu n status data	ution and IMU d	ata, and filter out
•				6.0	Float: only retain data, and filter o	n the fixed solu out all other sol	ition, floating so ution status dat	lution and IMU a.
Revoke				40	Single: keep all	data.		
~				0.0	RMS limitation			
Restore	1				HRMS(cm) ≤		1.0 +	
Tide				1.0	VRMS(cm) ≤		1.0 +	
Manual insert				3.0	RMS limit: after RMS limit thresh	selecting, all d hold will be filte	ata points that o ered out.	do not meet the
يلل	5000			6	Depth filter			
Manual	25 24			4.0	Depth filter(m)		
samplin g		C.		5.0 L L 10:30:00 10:30:0	1 Min depth		— 0.	.00 +
^	LEFT	RIGHT	AUTO LEFT		Max depth		- 0.	.00 +
				•	•			

Post-processing settings screen

Data processing operations:

- a) Depth Height: The depth interval in the longitudinal direction of the bathymetric view;
- b) Time Interval: The time interval between the view horizontal;
- c) Time Width: The time width of the horizontal axis of the view is enlarged so that the points are not too dense to be selected;
- d) Map: Double-click to open the location display of the DEP survey line;
- e) Conditional Filtering: Select the selection box and then select the DEP test line in the line list to filter and display it in the view.Or select the DEP test line first, then select the filter conditions, and click the [OK] button to display it in real time.
- f) Sampling Method & Sampling Interval X:
- 1. Distance sampling: Take a point every distance X (>=X);
- 2. Deepest (within equal spacing): Within the equal interval X distance, the deepest water depth point data is taken as the sampling point;
- 3. Shallowest (within equal spacing): Within the equal interval X distance, the shallowest water depth point data is taken as the sampling point;
- 4. Average value (within equal spacing): Within the equal interval X distance, the average value of all water depth data is taken as the water depth point, and the sampling point is determined according to the distance sampling;
- g) Three corrections: sound velocity correction/delayed correction/attitude correction;
- h) Posture correction: Posture correction only;
- i) Isometric sampling: After the data is corrected and corrected, the sampling is carried out according to the sampling interval;
- j) Retention of data:
- 5. You can choose the saving format, that is, save the header items;
- 88

 Parameter setting: save header: display header information characters; Merge and save: Merge and save multiple lines to a summary file; Suffix: File suffix selection (.txt/.csv/.dat)

Latitude and longitude format: Set the display of latitude and longitude of the saved file;

- k) Sound velocity correction/delay correction/attitude correction;
- "Sound velocity correction" can be based on three correction modes: "monosonic", "depth + sound velocity" and "depth + correction value". After the parameter input is completed, click "Sound Speed Correction" to complete the correction, or click "Skip" to enter "Delay Correction".
- "Delayed Correction" Enter the delay time between the water depth and position, the position lag is positive, the water depth lag is negative, click "Delay Correction" to complete the correction or click "Skip" to enter "Attitude Correction".
- 3. "Attitude Correction" input transducer opening angle, transducer installation error, select automatic filtering method (median filtering, weighted filtering, sliding filtering), click "Delay Correction" to complete the data correction or click "Skip" not to correct.

<		Custom
Separator	Comma(,)	~
Option Name		Selected
Code		
Time North coordinates		
East coordinates		✓
Water surface elevation		
Water surface geodetic heigh	nt	
		CONFIRM
	•	• •

Post-processing saves the formatting interface

4.33Software settings

In the software settings interface, you can log in to your CTI cloud account, switch SI units, view the version notes, upgrade the software, and other operations.

4.33.1 Common Settings - SI Unit Settings

Temperature and distance units can be switched in the general settings interface.

Distance units: meters, international feet, US feet.

Temperature unit: Celsius °C, Fahrenheit °F can be set.

Flow units: cubic meters per second, cubic international feet per second, cubic US feet per second. Units of area: square meters, square international feet, square US feet.

<		Settings	
Unlogged		Distance	Meter (m) 👻
		Temperature	• C
Common Settings	>		
Privacy settings	>		
(i) About	>		

4.33.2 Privacy settings

Displays the necessary permissions and information necessary for the operation of this software.

<		Settings	
Unlogged Common Settings		Distance	Meter (m) 🗸
		Temperature	°C -
🕀 Privacy settings	>		
(i) About	>		
		• •	

4.33.3 Check for updates

Check the update interface to check the app version number, sounder firmware version number, GD100 platform firmware version number, control firmware version number, check and update app version and firmware version.



4.33.4 Imprint

You can view the change notes for each version in the release notes.

>
>

User agreement And Privacy policy

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5. AutoPlanner



This section provides a detailed introduction to the AutoPlanner software functionality.

This software is designed for the Huawei series of unmanned ships and is used for ship control. It allows for navigation path planning and modification of basic ship parameters.

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Open the software, the default interface is shown in the figure below. It consists of four sections: Navigation Data, Navigation Plan, Parameters, and Help. Below, we will provide a detailed introduction to each section:



5.1 navigation Data

5.1.1Connect

The connection window offers two connection options: INTER (4G) and TCP (WiFi and network bridge). When using the 4G connection, the network in the area where the ship is located needs to be in good condition, and there are no restrictions on communication distance.

The TCP connection includes two options. One is to connect to the ship's WiFi, which has a shorter signal distance. This option is mainly used for debugging and is not suitable for operations. The other option is to connect through a bridge, which is suitable for areas with poor network signals. The distance is generally around 300-500 meters. Installing the bridge at a higher position will result in better signal reception.



Using 4G connection as an example: Choose the INTER connection. The server will select it based on the actual situation. There is no need to change the client port. The username is the SN code on the firmware of the unmanned ship control GD100, and the password is Admin1234 (the client IP under 4G is 192.168.0.254; the IP for WiFi and bridge is 192.168.53.254. You can open the browser to view the current network signal strength, satellite status, etc.)

Note:

If you are using a bridge connection, you need to change your computer's IP address to the 53 subnet. However, you cannot use the following IP addresses: 192.168.53.254, 192.168.53.64, 192.168.53.20, 192.168.53.19 as they are already being used.

个 🕎 > 控制叫饭 > 所有控制叫饭坝 > 网络连按	
🔋 以太网 属性	×
网络 共享 连接时使用: Intel(R) Ethernet Connection 1219-V	以太阿
配置(C) 此连接使用下列项目(O):	Internet 协议版本 4 (TCP/IPv4) 属性 X
 ✓ Microsoft 网络客户端 ✓ Microsoft 网络的文件和打印机共享 ✓ QoS 数据包计划程序 ✓ Internet 协议版本 4 (TCP/IPv4) ▲ Microsoft 网络适配器多路传送器协议 ✓ Microsoft LLDP 协议驱动程序 ✓ Internet 协议版本 6 (TCP/IPv6) ✓ ● 临路层柏补发现响应程序 	常规 如果网络支持此功能,则可以获取自动指派的 IP 没置。否则,你需要从网 络系统管理员处获得适当的 IP 没置。 ○ 自动获得 IP 地址① ● 使用下面的 IP 地址③: IP 地址①: 3
安装(N) 卸载(U) 席住(R) 描述 传载控制协议/Internet 协议。该协议是默认的广域网络协议, 于在不同的相互连接的网络上通信。	子阿拖码(山): 255.255.255.0 默认网关(D): 192.168.53.254
	 自动获得 DNS 服务器地址(B) ● 使用下面的 DNS 服务器地址(F):

After the connection is established, you can find the current basic information in the bottom right corner of the homepage. It includes the longitude, latitude, altitude, GPS status, number of satellites, speed, status of battery 1, and status of battery 2. The current signal status is displayed in the top left corner.



5.1.2Login Camera

Under 4G connection status (external network): Click on the Expand/Hide Attitude Display and Video in the upper left corner of the page, click on Intranet Network, enter the Username is admin, password is Admin1234, port is 8000, and the IP is 192.168.0.254 and then click on Start - Play to open the camera.

Under TCP connection status (internal network): Username is admin, password is Admin1234, port is 8000, and the IP is 192.168.53.64.

Spread/Shrink Hud and Video							
Extranet Intranet							
Username:	admin						
Password:	Admin1234						
IP:	192. 168. 53. 64	Login	Logout				
Port:	8000	Play	Clear				

5.1.3Parameters Display



- 1. Expand/Collapse Attitude Display and Video: Displays the vessel's attitude, expand to show the camera;
- 2. Expand/Collapse Remote Control: Check button control, control the unmanned vessel using WASD, control the camera using up, down, left, and right;
- 3. Open/Close Auto Button: After setting the route and sending it to GD100, open the automatic mode, and the unmanned vessel will start operating on the preset route.
- 4. Expand/Collapse Settings:

- 5. Set Waypoint: Sets the initial waypoint of the unmanned vessel, which is the first point when the unmanned vessel is in automatic mode;
- 6. Next Waypoint: The next waypoint of the unmanned vessel in automatic mode;
- 7. Clear Track: Clears the current planned route on the base map;
- 8. Auto/Manual/Standby/Return/Guide: Switches the current working mode of the unmanned vessel;
- 9. One-Click Hover: Select the corresponding waypoint to switch between manual mode, automatic return, and hover;
- 10. Parameter information column: The display area for regular parameters, double-click to switch to the corresponding real-time display parameters;
- Switch Map: Switches to different maps, such as Amap, Google Maps, Bing Maps, etc. Different image maps may have deviations in accuracy, choose the most suitable image map based on the field conditions. If the network is poor in the field measurement area, you can preload the satellite image indoors;
- 12. Auto Pan: When selected, the vessel remains centered;
- 13. Battery and Signal Strength Display: Displays the current battery level and network signal strength;
- 14. Hide: Shows or hides the current status information of the unmanned vessel;
- 15. Status Information Column: Displays the current status information of the unmanned vessel;
- 16. Zoom: Zooms the map display, scroll up to zoom in and scroll down to zoom out using the mouse wheel.



5.1.4Navigation Plan

Page Status Display

1. GEO, UTM, MGRS are different coordinate systems, which are respectively the geodetic coordinate system, the unified transverse Mercator projection system, and the UTM-based military grid reference

system (MGRS) latitude and longitude system. Generally, the default is latitude and longitude coordinates.

- 2. Check [Grid] to display grid lines.
- 3. Switch Map to switch to different maps, such as Amap, Google Maps, Bing Maps, etc. Different imagery maps may have deviations in accuracy. Choose the most suitable imagery map based on the field conditions. If the field survey area has poor network connectivity, pre-load satellite imagery indoors.
- 4. Load Task Point File to load previously saved task point files.
- 5. Save Task Point File to save the currently planned flight route.
- 6. Read Task Point to read the current task waypoints from the controller.
- 7. Write Task Point to transfer the planned waypoint data to the controller.

Note:

The file import does not support a large number of waypoints, with a maximum limit of 300.

- 8. Starting Position Coordinates Displays the coordinate information of the initial position;
- Operating Mode Includes four modes: surveying, hydrological, fully automatic, and semi-automatic. (Only unmanned boats equipped with millimeter wave obstacle avoidance radar can use the fully automatic and semi-automatic functions, and the obstacle recognition angle needs to be >45°)
- 10. Pre-set Route The top left corner displays the route mileage, bearing information from the previous point, and distance from home;
- 11. Waypoint List Allows modification of point coordinates, deletion, and sorting;
- 12. Mark Waypoint at Boat's Location Adds a waypoint at the boat's current location; [Clear Mission] Clears all waypoints added on the current interface; [Auto Pan] When selected, the boat remains centered;
- Polygon Expansion/Contraction Expands or contracts the polygon, clicking once expands internally or contracts externally by 0.5m;
- 14. Waypoint Left-click on the map to add waypoints, right-click on a selected waypoint to delete;



Right-Click Menu Bar Function

- 1. Insert/Delete Waypoints: Select the desired location to add a waypoint, and click the left mouse button to add the waypoint. To delete a selected waypoint, right-click on it.
- 2. Hover: Control the unmanned vessel to hover at a specific location.
- 3. Jump: After the unmanned vessel completes the preset route operation, it will continue to operate based on the preset jump points and repetition count. For example, if the operation includes waypoints 1-5 and the jump point is set to waypoint 2 with a repetition count of 3, the unmanned vessel will navigate from waypoint 5 to waypoint 2 after completing the normal preset route operation. It will then continue from waypoint 2 to waypoint 5. This process will repeat 3 times, and after that, the operation will end and the unmanned vessel will return to its home position.
- 4. Return: After the operation is complete, the unmanned vessel will return to its home position. To specify the return route, select the desired waypoint as the return point and right-click to add the return path that passes through this point.



5. Points of Interest: Add points of interest and name them, which can display the latitude and longitude

information of the point.



6. Measure Distance Between Two Points: Right-click on a selected location to measure the distance between two points. Right-click on the target location to measure the distance between two points and display the distance and bearing between the two points.



7. Reverse Task Points: Reverse the sequence of the starting point and the ending point, i.e., reverse the trajectory of the route.



Loading/Overlaying KML: Right-click with the mouse to load KML. Select an existing KML or KMZ file to open and check the survey lines. Adjust them as needed and write them into the task points.

Swap Docking Menu Bar: Switch the task point information display bar below to the right side of the software. Set Home Here: Set the position of home in a safe location to ensure the safe return of the unmanned vessel in case of disconnection.

Polygon - Navigation Path Planning: Automatically plan the route based on the size of the polygon range.

Polygon - Save Polygon: Save the current planned polygon to the computer.

Polygon - Import Polygon: Add a polygon from the computer to the base map.

Polygon - From SHP: Add an SHP file from the computer and automatically identify the polygon.

Polygon - Area: Calculate the area, acres, and other information of the current polygon.



[Polygon] - [Navigation Path Planning] :

【Add Polygon】: Add a polygon based on the survey area overview.

【Home Green Point】: Set the position of the home before each measurement to prevent the unmanned boat from losing connection.

[Navigation Path Parameters Setting] : Adjust the heading angle, track line spacing, waypoint spacing, starting point, and fine-tune the left and right waypoint positions during the navigation process.

【Navigation Path Display Setting】: Select the content to display during the navigation process, including whether to show borders, internal waypoints, markers, and track lines.

Note:

Satellite imagery is not updated in real-time, so when planning work areas, pay attention to the safety of the area. The role of the home point: (1) The home point seves as the return point. (2) The logic for generation automatic flight routes is to generate waypoint 1 near the home point, and the rest of the waypoints are generated in sequence



5.2 Parameter

5.2.1Basic Parameters

- 1 The parameters automatically configured by the AP software after connecting to the unmanned boat cannot be modified;
- 2 Cruise Speed should be written into the parameters according to the actual situation and can be modified in real-time;

NAVIGATION DATA NAVIGAT	ON PLAN PARAMETER	R HELP				
	🧶 🔍 🔍	-?				
	Ð 💦	L.				
Basic Tuning	Rover			Control-T	'urn Control -	_
RTK Client	Cruise	2.200 🚊	F	Period	4.500 📫	
System Tuning	Turn Speed	5.0		amping	0.750	
					•	
Full Parameter Tree	Turn Dist	5.0 ≑				
	WP Radius	5.0 📫				
	·					
			_			
				₩rite	Refresh	
				Params	Params	

5.2.2RTK Settings

[CORS Login] The new version of the AP software allows logging into the CORS account in the RTK settings.

NAVIGATION DATA NAVIGATIO	N PLAN PARAMETER HELP		
	ም 🔆 🗲		
Basic Tuning	_RTK Connect		
RTK Client	Connection Protocol :	NTRIP -	
System Tuning			
Full Parameter Tree	Server IP :		
	Port :		
	Mount Point :	SH2000 - Get	
	User Name :		
	Password :	zo	
	Connecting	DisConnect Refresh	

5.2.3System Setting

- 1 Shallow: The unmanned boat will automatically reverse when the water depth at its current location is lower than the set depth.
- 2 Automatic Obstacle Avoidance: When the unmanned boat approaches a preset distance from an obstacle, it will automatically avoid the obstacle and continue along the preset path after bypassing it.
- 3 Low Battery Return: When the battery level is below a certain threshold, the unmanned boat will stop operations and return automatically.
- 4 Lost Connection Return: If both the remote control and the AP software lose connection with the unmanned boat for a certain period of time, the boat will automatically return.
- 5 Bridge: Enabled by default.
- 6 Remote Controller: The default matched remote controller will automatically connect to the unmanned boat after it is turned on. If it is not the matched remote controller, first connect the AP software with the unmanned boat, then click "Enable Matching" and turn on the remote controller. Once you hear the boat's prompt sound, it means the matching is successful. Write/Refresh Parameters: After modifying the parameters, click "Write" and then refresh to apply the changes.

Note:

Shoal must be done under the condition that the depth sounder is working properly.

Basic Tuning	_Shoa1	-Avoiding Obstacles
RTK Client	Switch Status : 💿 Open 💿 Close	Switch Status : 💿 Open 💿 Close
System Tuning < Full Parameter Tree	Shoal Depth : 0.2 🗘 m	Distance : 3.0 💭 m
	Low Power And Return	Lost Contact And Return
	Switch Status : 🔍 Open 💿 Close	Switch Status : 🔍 Open 🔹 Close
		LC Time : 4 🗧 min
	_Network Bridge	Remote Control Pairing
	Switch Status : 💿 Open 🔍 Close	Control status : Connect
		Control pairing : Confirm
		Write Refresh

5.2.4Full Parameters

[Loading] In case of abnormal attitude of the hull, the corresponding hull parameters can be loaded to restore the factory parameter configuration. The parameter name is GD100-ship type, with a suffix of .param. The default storage path for parameters is in the main installation directory of the AP software. The parameter name for the new A3, A4 unmanned boats is GD100-ship type (V1.1).

[Saving] Save the current parameters to the computer.

AutoPlanner											- 0 ×
	VIGATION PLAN PARAMETER							l			
Basic Tuning	Come and	Value	Unit	Range	Description	▲ 打开				×	
RTK Client	ADCP					$\leftrightarrow \rightarrow \sim \uparrow$	📁 « C > Auto	v C	在 AutoPlanner 中搜索	0	Load from file
System Tuning	ANS										Save to file
Full Parameter Tree	ARMEING					组织 • 新建文件			≣ • 🗖	0	
	II AUTO					🚺 स्ट्राइड् 🦽	名称		修改日期	×.	Write Parans
	DIOVA D					🚞 多波東通用资料	🕴 🧰 data		2023/8/20 23:40	文	Refresh Farans
	BRANING				t apprint that to do use channel ng hitmak of FIDs to rec 15	Pro-231231-2	ç 🧰 de-DE		2023/8/20 23:40	文	Compare Parans
	BED					************************************	DLLs		2023/8/20 23:40	2	
	BTN_ENABLE					2 2 2 2 1 0 40	Privers		2023/8/20 23:40	2	All Units are in ray
	CAM			0:Nothing		- \$20K-11Q-40	ar.ES		2023/8/20.23-40		scaling
	CH7_OPTION			1:LearnWaypoint		1			2023/0/20 23:40	Û.	
	E CRUISE					→ 📮 此电脑	T		2023/8/20 23:40	×	Load Presaved
	FORMAT MEDICTOR					> 🏭 Windows-SS	[gmapcache		2023/8/24 10:37	X	Reset to Default
	PS PS					> 🛁 Download (D	HCNetSDKCom		2023/8/20 23:40	Ż	Search
	GCS PTD MASK			0:None		> 🛋 Data (E:)	id-ID		2023/8/20 23:40	Ż	
	GPS			1:Steering		> 🗽 网络	' 🚞 it-IT		2023/8/20 23:40	Ż	
	12C_MODE			O:Direct to			6				
	INITIAL_MODE			0 MARUAL 2:LEADNING 3:**		文件名(N):		~	Param List (*.param;*.parm	× 1	
	LEARS_CH								打开(0) 取消		
	NB_OVERSIDE					-				_	
	II MIS										
	MODE_CH				HC Channel to use for	driving mode control					
	MODEL			0 Menul 2:IISANING 5, Briving mode for switch position 1 (910 to 1230 and above 2049) 0 Menul 2:IISANING 5, Briving mode for switch position 2 (1231 to 1396)							
	MODE2										
	MODE3			2:LEARNING 3:***	Driving mode for swite	ch position 3 (1361 to 1	490)				
	MODE4			0:Manual 2:12ASMING 3 Driving mode for switch position 4 (1491 to 1620)							
	MODES			0:Manual 2:IZASSING 3: Driving mode for switch position 5 (1621 to 1749)							
	MODIEG	0		2 : LEARNING 3:***	Driving mode for swite	ch position 6 (1750 to 2	049)				

5.3 Help

5.3.1Software Update

Checking the firmware synchronization upgrade will update the AutoPlanner software and GD100 firmware to the latest version;



5.3.2GD100 Registration

If the GD100 registration has expired (as shown in the image), please provide the machine code to the salesperson to complete the GD100 registration using the registration code. You can find the registration code by going to "Help" > "GD100 Registration" to view the machine code and registration code. Software update information

Each version update will have a corresponding update log to explain the changes made.



Software version information

5.3.3 Version Description

Explanation of update logs for each version update;



5.3.4Software version

Display the current version number of the AP software. If there are any issues with the software, please provide the corresponding version number for targeted troubleshooting.
AutoPlanner				_	o ×
			ii	INTER ~	DISCONNECT
Firmware Upgrade	_Software Version-				
Software Upgrade	Nerrot Auto-Discours 0.0.10				
GD100 Register	Name: Autorianner 2.0.12				
SoftWare Readme	Version: 9358.20230627				
Software Version					
Select Language	Copyright ©2017 Huace. All Rights Reserved				

1.1.1 Language

The current version supports Chinese/English/Russian languages. After switching, restarting the software will take effect

Firmware Upgrade	_Select Languag	ge	
Software Upgrade			
GD100 Register	Language:	Chinese	•
SoftWare Readme		Chinese English	
Software Version		Russian UK	-
Select Language <			

6. USV Web Management System

After establishing a connection with the unmanned vessel, you can access the USV web management system to view its status and control data output. There are two types of access methods:

Method 1: After connecting to AutoPlanner software through 4G (INTER), open a browser and enter 192.168.0.254 in the address bar to access it.

Method 2: Through TCP, the mobile device connects to the GD100 LAN1 network port or WIFI through a network cable, opens a browser, and enters 192.168.53.254 or 192.168.144.254 in the address bar to access it.

Note:

To connect via TCP, it is necessary to modify the device network segment to be consistent with GD100.



User name (default): admin Password (default): Admin1234

6.1 USV Status

6.1.1System State

In the system status bar, you can check network status, GNSS information, battery status, activity status, control status, depth sounder status, and other information.

4G connection requires checking the network status bar, network signal strength, dialing status, and remaining ESIM traffic.

Status Postion State : • system • system • postion nood • yoution nood • water Quality Data Recording Status • Water Quality Data Recording Status • Water Quality Data Recording Status Singuis Connection Protoco: CHINA MOBLE Signal Status: Sin Cara OK Dialing Status: Connected IME:: 86/stropEss4383 PhoneNumber: ICOD:: 86000453002140116004 ESIM Main maining: 5.650B1/00B Battery Status Battery Status </th <th>CHCNA</th> <th></th> <th>SN:3551654 English \sim</th>	CHCNA		SN:3551654 English \sim
 System Pustion State: Pustion State: Pustion Text Pustion Text Pustion Text Pustion Text Pustion Text Pustion Text State: 	🤠 Status	Position State ×	
 Poster Statis: ON poster Torcid Power Statis: ON Connection Protoco: CHIMA MOBILE Signal Sharget: -Sig(Bm) 86% Sim Statis: SM Cetal OK Diange Statis: Connection Diange Statis: Connection	▶ System	NetWorkState	Gnss Info
Settings SM Status: SM Card Ok Dialing Status: Connected Mctit Status: Connected Heading Status: Connected ESIM data remaining: 5.850B1100B @dkb/s Recharge Recharge: Control State Keeveer Configuration EXF. Abnormal EXF. Abnormal Range: 5.000	Position state position record Water Quality Data Recording	Power Status: ON Connection Protocol: CHINA MOBILE Signal Strength: -59(dBm) 88%	Solution State: Single Search Status: 34 / 38 DDP: HDDP-0.608200 VDDP-1.111021
ICCID: 80800453092180118004 ESIM resi-trains ESIM resi-trains ESIM data remaining: 5.650811008 Battery: 0% Disconnected	Settings	SIM Status: SIM Card Ok Dialing Status: Connected IMEI: 8617065845183 PhoneNimber	RTK Mode: Mobile Station CORS Differential Delay, No Difference Received Heading Solution Type: Fix Heading Saarch Status: 38 / 42
Battery Status Activity Status Battery Status Current Time: 2024/01-29 08:59:23 (UTC) Battery Vottage: 0 (v) Use Minage: 212.783(m) Bastery Vottage: 0 (v) Use Minage: 212.783(m) Range: 5.336(km) External Storage: 0% Disconnected Disconnected		ICCID: 89800453092180116004 ESIM real-name authentication ESIM data remaining: 5.65GB10CB 69kb/s Recharge	Heading: 347,00083
Satellites Control State Ker: Abnormal EKF: Abnormal Range: 5.000		Battery Status Battery: 0% Battery Voltage: 0 (v) Use Mileage: 212.763(km) Range: 5.336(km)	Activity Status Current Time: 2024-01-29 08:59/23 (UTC) Operation Duration: 00-00-00 00:04:32 Internal Storage: 23:14% 0730MB/29113MB External Storage: 0% Disconnected
★ Receiver Configuration EKF: Abnormal Range: 5.000	Satellites	Control State	Sounder
Data Recording Mode: Manual The Depth of The Water: 0.353 Ship Type: APACHE-3 Pro If Automatic Detection If the Depth of The Water: 0.353	X Receiver Configuration	EKF: Abnormal Mode: Manual Ship Type: APACHE-3 Pro	Range: 5.000 The Depth of The Water: 0.353
 I/O Settings System settings Firmware 	 I/O Settings System settings Firmware 		

6.1.2Position Status

This interface is used to view relevant information such as the position of the antenna behind the USV GNSS.

CHCNA		SN:3551654 English \vee Qui
🧊 Status	Position State ×	
System Position State	Position	DOP
position record Water Quality Data Recording	Latitude: 31'934.63330030'(North) Longitude: 121'10'42.5323335'(East) Heigit: Type: Single	POOP: 1.266933 HDOP: 0.608139 VOOP: 1.13714 TDOP: 1.881779
	Satellite Used: 34Total GPS(0): 2.3.7.8.14.17.21.22.30 GLONASS(0): 14.15.16.17.18.19 BDS(19): 12.3.4.6.7.8.9.10.11.16.23.24.25.34.38.40.43 GALLEO(1): 20 GZSS(0):	Satellites Tracked: 3870tal GPS(9): 2.3.7.8.14,17.21.22.30 GLONASS(9): 14.15.16,17.18.10 BDS(19): 1.2.3.4.8.7.8.8.10,11,16.23.24.25.34.38,40,43 GALIEO(5): 13.21.26.31,33 QZSS(0):
Satellites		
X Receiver Configuration		
Data Recording		
I/O Settings		
System settings		
🔶 Firmware		
Cloud Service Setting		

6.1.3Position Record

Enter the name and click on the measurement point to record the current position.

CHCNA	N	SN:3551654	English ∨	Quit
🗊 Status	position record ×			
 System 	Position			
Position State	Latitude: 31'9'34.59054901'(North)			
▶ position record	Longitude: 121°10'42.52604394*(East)			
Water Quality Data Recording	g Height: 42,940 Type: Single			
Settings	position name:			
	Record Info			
	ID position name Latitude Longitude Height Delete			
Satellites				
🔀 Receiver Configuration				
III Data Recording				
I/O Settings				
System settings				
Firmware				
Cloud Service Setting				

6.1.4Water Quality Data

This interface is used for data transmission of water quality meters. Currently, water quality meter models support(AP2000, AP5000, AP7000, Y4000). Select the corresponding parameter output based on the hardware sensor of the water quality meter.

CHCNA		
🗊 Status	Water Quality Data Recording Settings ×	
 System 		
Position State	Water Quality Set	
 position record 	Water Quality Select: AP2000	
 Water Quality Data Recording Settings 	Common Temperature PH ORP Electrical Electrical Salinity Dissolved Depth Total pro Param 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	"he proportion of eawater
	AUX Choose:	
	AUX1: dose V AUX2: dose V	
	🖾 Savo	
	Data	
	Temperature: 0(°C)	
	PH: 0(pH)	
	ORP: 0(mv)	
	Electrical Conductivity: 0(us/cm)	
	Electrical Resistivity: U(L7cm)	
Satellites	satinity: 0(PSU)	
M. Develop Configuration	Dissolved oxygen: 0(mg/L)	
X Receiver Configuration	Depth: 0(m)	
Data Recording	Total Dissolved Solid: 0(mg/L) The proportion of segwater: 0(8t)	
I/O Settings	the preparation or administry of any	
System settings		
Firmware		
Cloud Service Setting		

6.2 Satellite

6.2.1 Tracking Table

Satellite tracking map: This interface displays the information of the currently tracked satellites in the form of a table.

								SN:3551654 English 🗸
Status	Tracking Table ×							
Satellites	All 💿 GPS 🔿 🛛		GALILEO Q	zss 🔾				
Tracking Table								
Tracking Info.Table	SV	Туре	Elevation Angle	Azimuth Angle	L1 SNR	L2 SNR	L5 SNR	Enabled
Tracking Skyplot	2	GPS	66	40	47.770	43.850	0.000	Yes
Satellite Activation	3	GPS	23	141	37.300	37.350	0.000	Yes
	7	GPS	43	216	45.360	40.710	0.000	Yes
	8	GPS	30	59	40.650	38.670	0.000	Yes
	14	GPS	42	320	44.320	43.410	0.000	Yes
	17	GPS	30	280	41.210	38.080	0.000	Yes
	21	GPS	49	41	45.910	41.230	0.000	Yes
	22	GPS	23	314	37.810	29.680	0.000	Yes
	30	GPS	46	264	45.180	43.300	0.000	Yes
	14	GLONASS	23	149	40.680	40.980	0.000	Yes
	15	GLONASS	77	146	50.450	50.840	0.000	Yes
	16	GLONASS	43	330	47.650	47.840	0.000	Yes
	17	GLONASS	46	15	49.220	46.780	0.000	Yes
	18	GLONASS	61	278	48.660	49.270	0.000	Yes
Receiver Configuration	19	GLONASS	25	236	30.610	38.770	0.000	Yes
Data Recording	1	BDS	45	140	44.630	44.740	0.000	Yes
I/O Settings	2	BDS	34	233	38.960	43.140	0.000	Yes
System settings	3	BDS	50	199	45.510	46.210	0.000	Yes
Simware	4	BDS	34	122	40.440	42 240	0.000	Vas
claud Constan California	4	BDS	34	205	20.000	44.840	0.000	Vec

6.2.2Tracking Info. Table

This interface displays the information of the currently tracked satellites in the form of a histogram.



6.2.3Tracking Skyplot

This interface displays the satellite zenith map.



6.2.4Satellite Activation

This interface can disable or enable tracked satellites.



6.3 Receiver Configuration

6.3.1Description

CHCNA	V	SN:3551654 English 🗸 _{Quit}
🗑 Status	Description ×	
Satellites	Receiver Info	ce Station Info
Reciver Configuration Description defamation defamation defamation defamation defamation defamation defamation defamation	Antenna Type: CHCHXCA7007A Antenna SN: 3551654 Measure Way: Antenna Phase Center Antenna Height: 0.0000(Meter) Elevation Masi: 15 PDOP Masi: 0	see Station Mode: Auto Rover
Data Recording		
I/O Settings		
System settings		
Firmware		
Cloud Service Setting		

6.3.2Antenna Configuration

This interface is used for antenna parameter settings, measurement method (phase center/vertical height/oblique height), antenna manufacturer (supporting mainstream domestic and international), antenna type (adapted according to antenna manufacturer, if not available, can be customized), antenna number (default GD100 SN, do not modify)

CHCNA			
🤠 Status	Antenna Configuration ×		
Satellites	Antenna Configuration		
🔆 Receiver Configuration			
Description	Antenna Measurement Method:	Antenna Phase Center	~
Antenna Configuration	Antenna manufacturer:	CHCNav	~
Reference Station Settings	Antenna Type:	CHCHXCA7607A	~
Receiver Reset	Antenna SN:	3551654	
 User Management. 	Antenna Height:	0.0000	(Meter)
	Elevation Mask:	15	
	PDOP Mask:	6	
		Save	
Data Recording			
🏠 I/O Settings			
System settings			
🝵 Firmware			
Cloud Service Setting			

6.3.3Reference Station Settings

The reference station mode only supports [self starting mobile station]

CHCNA			SN:3551654	English ∨	Quit
🗊 Status	Reference Station Settings ×				
Satellites					
🔀 Receiver Configuration	Reference Station Mode:	Auto Rover 🗸			
 Description 		C Save			
 Antenna Configuration 					
Reference Station Settings					
 Receiver Reset 					
 User Management 					
Data Recording					
I/O Settings					
System settings					
Firmware					
Cloud Service Setting					

6.3.4 Receiver Reset

Restart receiver: Restart GD100

Restore factory settings: Restore the configuration parameters of GD100 to the default state

Clear satellite data: Clear board ephemeris data

CHCNA				SN:3551654	English ∨	
🤠 Status	Receiver Reset ×					
み Satellites	Reboot Receiver:	Confirm				
🔀 Receiver Configuration	Return to Factory Defaults:	Confirm				
 Description 	Clear Satellite Data: 🧭	Confirm				
 Antenna Configuration 						
Reference Station Settings						
Receiver Reset						
 User Management 						
Data Recording						
I/O Settings						
System settings						
🔅 Firmware						
Cloud Service Setting						

6.4 Account Management

No modification required by default





6.5 Data Recording

6.5.1Log Settings

The default internal storage space of the USV GD100 is 28GB, divided into 8 record storage folders, record1 folder, which automatically records data when powered on by default, and record2 folder synchronizes with HydroSurvey and EasySave software for data recording.

HLNA							SN:3551654	English ∨
Status	Log Settings ×							
Satellites	Store Info							
Receiver Configuration		Position		Total Storage		Storage Availa	ble	
Data Recording	1	Internal Storage		29113MB		22357MB		
Log Settings	2	External Storage		OMB		OMB		
	Attention: Total as Record Info	ssigned storage size of	8 threads should be le	ss than 27GB. It will	stop recording when the	storage is full.	— C	lear All
	Recording Number	File Name	Activated	Log Status	Setting Parameter	Switch	Clear Data	
	1	record1	Yes	Recording	Modify Detail	ON OFF	Clear	
	2	record2	No	Not Recording	Modify Detail	ON OFF	Clear	
	3	record3	Yes	Not Recording	Modify Detail	ON OFF	Clear	
	4	record4	No	Not Recording	Modify Detail	ON OFF	Clear	
	5	record5	No	Not Recording	Modify Detail	ON OFF	Clear	
	6	record6	No	Not Recording	Modify Detail	ON OFF	Clear	
	7	record7	No	Not Recording	Modify Detail	ON OFF	Clear	
	8	record8	No	Not Recording	Modify Detail	ON OFF	Clear	

When the corresponding record folder is closed, you can click the modify button in the parameter settings bar to modify the settings of the corresponding record folder.

									SN:3551654	English
	Log Settings ×									
es	Store Info									
er Configuration		Position			Total Storage			Storage Available		
cording	1 Ir	nternal Storag	e		29113MB			22353MB		
ttings	2 E	xternal Storag	je		OMB			OMB		
	Record Info	51.	Recording Edit					8	Class Data	Clear All
	Recording Number	File	Auto Record:	Ves No		Time Zone:	UTC+8 🗸		Clear Data	
	1	rex	Record Mode:	Frequency V		Fixed Difference X(m):	0		Clear	
	2	rec	Record Frq:	6Hz 🗸		Fixed Difference Y(m): Fixed Difference	0		Clear	
	3	rex	Record Limit:	Fixed ~		H(m):	0.03 (m)		Clear	
	5	res	Waveform data storage:	Yes 🗸		VRMS <=	0.02 (m)		Clear	
	6	rex	Auto Switch:	Switch Per 3500					Clear	
	7	rex			⊗ Yes	⊗ No			Clear	
	8	rec							Clear	
ings										
tings settings										

In the parameter settings column, click the details button to view the settings of the corresponding record folder.

CHCNA		//					SN:3551654	English 💛 🛛 Qu	uit
🌍 Status	Log Settings ×								
Satellites	Store Info								
🔆 Receiver Configuration		Position		Total Storage		Stor	age Available		
Data Recording	1 Inte	ernal Storage		29113MB			22353MB		
Log Settings	2 Ext	ernal Storage		OMB			OMB		
	Attention: Total assi Record Info	gned storage size (of 8 threads should be less that	an 27GB. It will st	op recording when the s	torage is full.			
	Recording Number	File Name	Auto Record: Yes SN Number: 3551	654	Time Zone: UTC Fixed Difference X(m): 0	+8	Glear Data	E Clear All	
	1	record1	Record Frq: 5Hz	: 5Hz	Fixed Difference 0 Y(m):		Chear		
	2	record2	Record Limit: A Sir Waveform data	igle Point	Fixed Difference 0 H(m):		Clear		
	3	record3	storage: Yes	ab Bor 2500	Select RMS: No	Time Zone: UTC-8 ted Difference tyme: Clear Data tyme: C			
	4	record4	Auto Switch, Swit	Sirrer 3300	VRMS(m): 0.02		Clear		
	5	record5					Clear		
	6	record6					Clear		
	7	record7					Clear		
	8	record8	No	Not Recording	Modily Detail	ON OFF	Clear		
I/O Settings									
System settings									
🔹 Firmware									
Cloud Service Setting									

Click the clear button to clear the data in the current folder. Click clear all recorded data to clear the data.

6.5.2Data Download

The USV GD100 stores data internally to avoid data loss.

CHCNA	SN:3551654 English ∨ _{Quit}
👩 Status	Data Bownload ×
Satellites	Data Dewnload
🔀 Receiver Configuration	
Data Recording	د Download
 Log Settings 	
► Data Download	
I/O Settings	
System settings	
Firmware	
Cloud Service Setting	

After clicking the download button, the browser will automatically open and enter this interface.

Index of /mnt/

Name	Last Modified	Size	Туре
Parent Directory/	2024-Ian-20 08:55:16	-	Directory
repo_3551654/	1980-Jan-01 00:00:00	-	Directory
lighttpd/1.4.35			

After clicking on the Parent Directory, return to the directory one level above the current directory. Click on gilc data to enter the following interface.

ame	Last Modified	Size	Туре
Parent Directory/		-	Directory
20221117/	2022-Nov-17 01:47:34	-	Directory
20230105/	2023-Jan-05 09:25:16	-	Directory
20230106/	2023-Jan-06 03:36:56	-	Directory
20230208/	2023-Feb-08 10:16:02	-	Directory
20230222/	2023-Feb-22 03:01:16	-	Directory
20230404/	2023-Apr-04 05:40:46	-	Directory
20230526/	2023-May-26 07:23:16	-	Directory
20230529/	2023-May-29 04:28:04	-	Directory
20230608/	2023-Jun-08 08:26:04	-	Directory
20230609/	2023-Jun-09 06:02:06	-	Directory
20230610/	2023-Jun-10 02:28:26	-	Directory
20230615/	2023-Jun-15 06:14:04	-	Directory
20230805/	2023-Aug-05 02:22:04	-	Directory
20231024/	2023-Oct-24 05:23:52	-	Directory
20231025/	2023-Oct-25 07:07:16	-	Directory
20240109/	2024-Jan-09 04:48:26	-	Directory
20240122/	2024-Jan-22 07:25:56	-	Directory
20240123/	2024-Jan-23 08:37:34	-	Directory
20240125/	2024-Jan-25 02:05:26	-	Directory
20240126/	2024-Jan-26 08:39:04	-	Directory
20240127/	2024-Jan-27 07:19:56	-	Directory
20240129/	2024-Jan-29 08:55:17	-	Directory

Click on any folder, taking the 20230105 folder as an example.

The following file is the data processed by the combination navigation algorithm, used by the R&D personnel to analyze the problem.

Index of /mnt/gilc-data/20230105/

Name	Last Modified	Size	Туре
Parent Directory/		-	Directory
085755_com. txt	2023-Jan-05 09:06:00	962.9K	text/plain
085755_fifo.txt	2023-Jan-05 09:06:00	3.7M	text/plain
085756_ant_pos.nmea	2023-Jan-05 08:57:54	0. OK	application/octet-stream
085756_gps_pos.txt	2023-Jan-05 09:06:00	237.2K	text/plain
085756_ins_pos.txt	2023-Jan-05 08:57:54	0. OK	text/plain
085756_log.txt	2023-Jan-05 09:05:34	2.3K	text/plain
090854_com.txt	2023-Jan-05 09:21:44	1.5M	text/plain
090854_fifo.txt	2023-Jan-05 09:21:44	5.9M	text/plain
090855_ant_pos.nmea	2023-Jan-05 09:08:54	0. OK	application/octet-stream
090855_gps_pos.txt	2023-Jan-05 09:21:44	375.4K	text/plain
090855_ins_pos.txt	2023-Jan-05 09:08:54	0. OK	text/plain
090855_log.txt	2023-Jan-05 09:21:18	4.2K	text/plain
092246_com.txt	2023-Jan-05 09:23:18	61.7K	text/plain
092246_fifo.txt	2023-Jan-05 09:23:18	247.6K	text/plain
092247_ant_pos.nmea	2023-Jan-05 09:22:46	0. OK	application/octet-stream
092247_gps_pos.txt	2023-Jan-05 09:23:18	15.7K	text/plain
092247_ins_pos.txt	2023-Jan-05 09:22:46	0. OK	text/plain
092247_log.txt	2023-Jan-05 09:22:52	1.9K	text/plain
092516_com.txt	2023-Jan-05 09:38:22	1.5M	text/plain
092516_fifo.txt	2023-Jan-05 09:38:22	6.1M	text/plain
092517_ant_pos.nmea	2023-Jan-05 09:25:16	0. OK	application/octet-stream
092517_gps_pos.txt	2023-Jan-05 09:38:26	386.6K	text/plain
092517_ins_pos.txt	2023-Jan-05 09:25:16	0. OK	text/plain
092517_log.txt	2023-Jan-05 09:37:42	3.4K	text/plain
lighttpd/1.4.35			

Click repo ******* to enter the following interface

Index of /mnt/repo_3551654/

Name	Last Modified	Size	Туре
Parent Directory/		_	Directory
ppk/	1970-Jan-01 00:00:15	-	Directory
push_log/	1980-Jan-01 00:00:00	-	Directory
record_1/	2024-Jan-29 09:06:57	-	Directory
record_2/	2024-Jan-27 07:31:28	-	Directory
record_3/	1980-Jan-01 00:00:00	-	Directory
record_4/	1980-Jan-01 00:00:00	-	Directory
record_5/	1980-Jan-01 00:00:00	-	Directory
record_6/	1980-Jan-01 00:00:00	-	Directory
record_7/	1980-Jan-01 00:00:00	-	Directory
record_8/	1980-Jan-01 00:00:00	-	Directory

lighttpd/1.4.35

Each date named file contains both raw and HCN files.

Index of /mnt/repo_3551654/ppk/20231227/

Name	Last Modified	Size	Туре
Parent Directory/		-	Directory
041816_raw.txt	2023-Dec-27 07:48:16	164.3M	text/plain
075139_raw.txt	2023-Dec-27 09:25:10	73.OM	text/plain
Moving_041802.HCN	2023-Dec-27 07:48:10	105.6M	application/octet-stream
Moving_075132.HCN	2023-Dec-27 09:25:00	49. OM	application/octet-stream
lighttpd/1.4.35			

Redord_* The folder, where record1 and record2 are commonly used,

Taking record1 as an example, the folder contains. dep and. sd files, the dep file records coordinates and water depth information, and the sd file records waveform information.



6.6 I/O Settings

This interface is used for receiving and outputting data.

.HLNA	V					SN:3551654 English 🗸
itatus	I/O Set	tings ×				
atellites		Туре	Description	Output	Connection Status	Modify
ceiver Configuration	1	RTK Client	119.3.136.126:3103	-	Connecting	Connect Disconnected Detail
ta Recording	2	TCP/UDP_Client1/NTRIP Server1	192.168.3.18:9900		Unconnected	Connect Disconnected Detail
Settings	3	TCP/UDP_Client2/NTRIP Server2	192.168.3.18:9901		Unconnected	Connect Disconnected Detail
D Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168.3.18:9902		Unconnected	Connect Disconnected Detail
	5	TCP/UDP_Client4/NTRIP Server4	192.168.3.18:9903	***	Unconnected	Connect Disconnected Detail
	6	TCP/UDP_Client5/NTRIP Server5	192.168.3.18:9904	-	Unconnected	Connect Disconnected Detail
	7	TCP/UDP_Client6/NTRIP Server6	192.168.3.18:9905		Unconnected	Connect Disconnected Detail
	8	TCP Server/NTRIP Caster1	9901	GPGGA:5Hz,GPZDA:5Hz,	OFF	Connect Disconnected Detail
	9	TCP Server/NTRIP Caster2	9902		OFF	Connect Disconnected Detail
	10	TCP Server/NTRIP Caster3	9903	-	OFF	Connect Disconnected Detai
	11	TCP Server/NTRIP Caster4	9904	-	OFF	Connect Disconnected Detai
	12	Serial Port	115200	-	-	Settings
	13	Radio	432.0500MHz	-	-	Settings
	14	Sounder	normal	SDDPT:Max		Settings
	15	External Equipment	ADCP	115200,Custom	-	Settings

6.6.1RTK Client (CORS Login)

This item column can be used for CORS login.

The connection protocol includes ntrip (CORS mode), APIs_Rover (network 1+1), TCP and SWAs modes. SWAs is a one button fixed account exclusively owned by chinatest, which can only be used by USVs bound with chinatest SWAs account.

Status Satellites Receiver Configuration Data Recording I/O Settings	/O Settin	ngs × Type RTK Gilent	Description	Output		Connection Status	Modify	
Satellites Receiver Configuration Data Recording T/O Settings	1	Type RTK Client	Description	Output		Connection Status	Modify	
Receiver Configuration Data Recording J/0 Settings	1	RTK Client	119.3.136.126.3103					
 Data Recording I/O Settings 	2					Unconnected	Connect Disconnected Detail	
I/O Settings		TCP/UDP_Client1/NTRIP Server1	192.168.3.18.9900	-		Unconnected	Connect Disconnected Detail	
	3	TCP/UDP_Client2/NTRIP Server2	192.168.3.18.9901	-		Unconnected	Connect Disconnected Detail	
I/O Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168.3.18:9902	-		Unconnected	Connect Disconnected Detail	
	5	TCP/UDP_Client4/NTRIP Server4	192.168.3.18.9903	-		Unconnected	Connect Disconnected Datail	
	6	TCP/UDP_Client5/NTRIP Server5	192.168.3.18:9904	RTK Client	8	Unconnected	Connect Disconnected Dateil	
	7	TCP/UDP_Client6/NTRIP Server6	192.168.3.18.9905	Connection Protocol: NTRIP	~	Unconnected	Connect Disconnected Detail	
	8	TCP Server/NTRIP Caster1	9901	Server IP: 119.3.136.126		OFF	Connect Disconnected Octail	
	9	TCP Server/NTRIP Caster2	9902	Port: 3103		OFF	Connect Disconnected Detail	
	10	TCP Server/NTRIP Caster3	9903	Mount Point: SH2000 🥪 🖌	/ Get	OFF	Connect Disconnected Detail	
	11	TCP Server/NTRIP Caster4	9904	User Name: qwer0498		OFF	Connect Disconnected Deteil	
	12	Serial Port	115200	Password: 67813746			Settings	
	13	Radio	432.0500MHz	Confirm & Back		277	Settings	
	14	Sounder	normal				Rettings	
	15	External Equipment	ADCP	115200,Custom			Bettings	

6.6.2Tcp/Udp_Client/Ntrip Server

 This interface is used to set the TCP client to forward NMEA data, differential data, positioning data, water

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depth data, etc. of the USV to the server.

HLNA	V									SN:3551654 English 🗸	
itatus	I/O Sett	ings ×									
atellites		Туре	Descri	ption		Output		Connectio	n Status	Modify	
eceiver Configuration	1	RTK Client	119.3.13	TCP/UDP Client				×	ting	Connect Disconnected Detail	
ta Recording	2	TCP/UDP_Client1/NTRIP Server1	192.168	Auto connect:		Connection Protocol:	TCP	~	cted	Connect Disconnected Detail	
) Settings	3	TCP/UDP_Client2/NTRIP Server2	192.168	Server IP:	192.168.3.18				cted	Connect Disconnected Detail	
'O Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168	Port:	9900				cted	Connect Disconnected Detail	
	5	TCP/UDP_Client4/NTRIP Server4	192.168	Differential Data:	OFF 🗸				cted	Connect Disconnected Detail	
	6	TCP/UDP_Client5/NTRIP Server5	192.168	Raw Data:	OFF 🗸	HCPPP Data:	OFF	~	cted	Connect Disconnected Detail	
	7	TCP/UDP_Client6/NTRIP Server6	192.168	HRC Data:	OFF 🗸				cted	Connect Disconnected Detail	
	8	TCP Server/NTRIP Caster1	ę	GPGGA:	OFF 🗸	GPGSV:	OFF	•		Connect Disconnected Detail	
	9	TCP Server/NTRIP Caster2	ę	GPRMC:	OFF V	GPVTG:	OFF			Connect Disconnected Detail	
	10	TCP Server/NTRIP Caster3	ę	GPGST:	OFF V	GPHDT:	OFF	/		Connect Disconnected Detail	
	11	TCP Server/NTRIP Caster4	ę	GPGSA:	OFF 🗸	ADCP_GGA:	OFF	-		Connect Disconnected Detail	
	12	Serial Port	11	GPZDA:	OFF 🗸	USV_INFO:	OFF	•		Settings	
	13	Radio	432.0	ADCP_HDT:	OFF 🗸					Settings	
	14	Sounder	n	Retransmit:	RTK V OFF V					Settings	
	15	External Equipment	A		Ø	Confirm 🛞 Back				Settings	

6.6.3Tcp Server/Ntrip Caster

This interface is used to open a server to broadcast NMEA data, differential data, positioning data, water depth data, etc. of the USV for user client connection.

Status	I/O Sett	ings ×										
Satellites		Туре	Desc	cription		Output			Connecti	on Status	Modify	
Receiver Configuration	1	RTK Client	119.3.13	TCP Server/NTRIP	Caster				8	ting	Connect Disconnected Detai	1
Data Recording	2	TCP/UDP_Client1/NTRIP Server1	192.168	Auto connect:	0	Conne	ction Protocol:	TCP	~	cted	Connect Disconnected Detail	i
I/O Settings	3	TCP/UDP_Client2/NTRIP Server2	192.168	Port:	9901					cted	Connect Disconnected Detai	i
I/O Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168	Differential Date:	OFF		Paur Data:	OFF		cted	Connect Disconnected Detai	i.
	5	TCP/UDP_Client4/NTRIP Server4	192.168	HCPPP Data:	OFF		HRC Data:	OFF	~	cted	Connect Disconnected Detail	1
	6	TCP/UDP_Client5/NTRIP Server5	192.168	GPGGA:	5Hz	~	GPGSV	OFF	~	cted	Connect Disconnected Detail	1
	7	TCP/UDP_Client6/NTRIP Server6	192.168	GPRMC:	OFF	~	GPVTG	OFF	~	cted	Connect Disconnected Detail	I.
	8	TCP Server/NTRIP Caster1	(GPGST:	OFF	~	GPHDT:	OFF	~		Connect Disconnected Detail	1
	9	TCP Server/NTRIP Caster2	ş	GPGSA:	OFF	~	ADCP GGA:	OFF	~		Connect Disconnected Detail	1
	10	TCP Server/NTRIP Caster3	ę	GPZDA:	5Hz	~	USV_INFO:	OFF	~		Connect Disconnected Detai	I.
	11	TCP Server/NTRIP Caster4	ę	ADCP_HDT:	OFF	~					Connect Disconnected Detai	I.
	12	Serial Port	11	Retransmit:	RTK V OFF	~					Settings	
	13	Radio	432.0	2							Settings	
	14	Sounder	n	c .		Confirm 🛞 Ba	ick				Settings	
	15	External Equipment	A								Settings	

6.6.4Serial Port

This interface is used to set gd100 debug serial port to forward NMEA data, differential data, positioning data, water depth data, etc.

CHCNA			- -						SN:3551654 English \checkmark	Quit
Status	I/O Sett	ings ×								
Satellites		Туре	Desc	ription		Output		Connection Status	Modify	
🔀 Receiver Configuration	1	RTK Client	119.3.13	6.126:3103				Connecting	Connect Disconnected Detail	
Data Recording	2	TCP/UDP_Client1/NTRIP Server1	192.168	Serial Port Set	10			cted	Connect Disconnected Detail	
I/0 Settings	3	TCP/UDP_Client2/NTRIP Server2	192.168	Mode Selection:	Data Output			cted	Connect Disconnected Detail	
► I/O Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168	Baud Rate:	115200	Differential Data:	OFF V	scted	Connect Disconnected Detail	
	5	TCP/UDP_Client4/NTRIP Server4	192.168					oted	Connect Disconnected Detail	
	6	TCP/UDP_Client5/NTRIP Server5	192.168	HCPPP Data:	OFF 🗸	HRC Data:	OFF V	oted	Connect Disconnected Detail	
	7	TCP/UDP_Client6/NTRIP Server6	192.168	GPGGA:	OFF V	GPGSV:	OFF V	scted	Connect Disconnected Detail	
	8	TCP Server/NTRIP Caster1	Ę	GPRMC:	OFF V	GPVTG:	OFF V	2	Connect Disconnected Detail	
	9	TCP Server/NTRIP Caster2	ę	GPGST:	OFF V	GPHDT:	OFF V	1	Connect Disconnected Detail	
	10	TCP Server/NTRIP Caster3	ę	GPGSA:	OFF V	ADCP_GGA:	OFF V		Connect Disconnected Detail	
	11	TCP Server/NTRIP Caster4	ę	GPZDA:	OFF V	USV_INFO:	UFF V	7	Connect Disconnected Detail	
	12	Serial Port	11	ADCP_HD1:	OFF V				Settings	
	13	Radio	432.0	Retransmit:	RTK 🗸 OFF 🗸				Settings	
	14	Sounder	n	Raw Data:	OFF 🗸				Settings	
	15	External Equipment	A			Confirm Back			Settings	
 System settings 										
Firmware										
Cloud Service Setting										

6.6.5 Radio Station

This interface is used to configure the receiving station differential data

Status	I/O Sett	ings ×						
Satellites		Туре	Description	Output		Connection Status	Modify	
Receiver Configuration	1	RTK Client	119.3.136.126:3103	-		Connecting	Connect Disconnected Detail	
Data Recording	2	TCP/UDP_Client1/NTRIP Server1	192.168.3.18:9900	-		Unconnected	Connect Disconnected Detail	
/O Settings	3	TCP/UDP_Client2/NTRIP Server2	192.168.3.18:9901	_		Unconnected	Connect Disconnected Detail	
I/O Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168.3.18:9902			Unconnected	Connect Disconnected Detail	
	5	TCP/UDP_Client4/NTRIP Server4	192.168.3.18:9903			Unconnected	Connect Disconnected Detail	
	6	TCP/UDP_Client5/NTRIP Server5	192.168.3.18:9904			Unconnected	Connect Disconnected Detail	
	7	TCP/UDP_Client6/NTRIP Server6	192.168.3.18:9905	Padio Setting	•	Unconnected	Connect Disconnected Detail	
	8	TCP Server/NTRIP Caster1	9901	- naulo ostung		OFF	Connect Disconnected Detail	
	9	TCP Server/NTRIP Caster2	9902	Differential Data: OFF 🗸		OFF	Connect Disconnected Detail	
	10	TCP Server/NTRIP Caster3	9903	Retransmit: RTK 🗸 OFF 🗸		OFF	Connect Disconnected Detail	
	11	TCP Server/NTRIP Caster4	9904			OFF	Connect Disconnected Detail	
	12	Serial Port	115200			-	Settings	
	13	Radio	432.0500MHz	Confirm Back		-	Settings	
	14	Sounder	normal				Settings	
	15	External Equipment	ADCP	115200,Custom		-	Settings	

6.6.6Sounder

This interface is used to set the parameters of the depth sounder.

CHCNA	V	////									SN:3551654 English \searrow	Quit
🤠 Status	I/O Setting	ps ×										
Satellites		Туре	Descr	iption		0	utput		Connectio	n Status	Modify	
🔀 Receiver Configuration	1	RTK Client	119.3.136	Sounder set					×	ng	Connect Disconnected Detail	
Data Recording	2	TCP/UDP_Client1/NTRIP Server1	192.168.3							ted	Connect Disconnected Detail	
I/O Settings	3	TCP/UDP_Client2/NTRIP Server2	192.168.3	Erome Date:	Max					ted	Connect Disconnected Detail	
► I/O Settings	4	TCP/UDP_Client3/NTRIP Server3	192.168.	Frame Rate.	max					ted	Connect Disconnected Detail	
	5	TCP/UDP_Client4/NTRIP Server4	192.168.	Working Mode:	normal 🗸					ted	Connect Disconnected Detail	
	6	TCP/UDP_Client5/NTRIP Server5	192.168.	Sound Velocity				(1997)		ted	Connect Disconnected Detail	
	7	TCP/UDP_Client6/NTRIP Server6	192.168.	Mode:	Manual V	1	Sound Velocity:	1500.00	(m/s)	ted	Connect Disconnected Detail	
	8	TCP Server/NTRIP Caster1	99	Salinity:	0.000	(a¢°)	lemperature:	0.0	(a,f)		Connect Disconnected Detail	
	9	TCP Server/NTRIP Caster2	99	Increment Mode:	Auto						Connect Disconnected Detail	
	10	TCP Server/NTRIP Caster3	99								Connect Disconnected Detail	
	11	TCP Server/NTRIP Caster4	99	Range Mode:	Auto 🗸		Data Format:	SDDPT			Connect Disconnected Detail	
	12	Serial Port	115	Anti.lamming:	Track						Settings	
	13	Radio	432.05								Settings	
	14	Sounder	nor	Waveform Output:	Yes 🗸		Original Depth:	No			Settings	
	15	External Equipment	AD								Settings	
						🕑 Sav	e 🛞 Back					
System settings												
🐡 Firmware												
Cloud Service Setting												

6.6.7External Devices

At present, external devices only support ADCP/water quality indicators. After connecting the external devices to the R232 serial port of the USV, the corresponding device type can be selected here.

4	I/O Set	ings ×				
lites		Туре	Description	Output	Connection Status	Modify
ver Configuration	1	RTK Client	119.3.136.126:3103		Connecting	Connect Disconnected Detai
tecording	2	TCP/UDP_Client1/NTRIP Server1	192.168.3.18:9900		Unconnected	Connect Disconnected Detai
ttings	3	TCP/UDP_Client2/NTRIP Server2	192.168.3.18:9901		Unconnected	Connect Disconnected Detai
ettings	4	TCP/UDP_Client3/NTRIP Server3	192.168.3.18:9902	-	Unconnected	Connect Disconnected Detai
	5	TCP/UDP_Client4/NTRIP Server4	192.168.3.18:9903		Unconnected	Connect Disconnected Detail
	6	TCP/UDP_Client5/NTRIP Server5	192.168.3.18:9904	-	Unconnected	Connect Disconnected Detail
	7	TCP/UDP_Client6/NTRIP Server6	192.168.3.18:9905	External Equipment Settings	Unconnected	Connect Disconnected Detai
	8	TCP Server/NTRIP Caster1	9901	External Equipment	OFF	Connect Disconnected Detail
	9	TCP Server/NTRIP Caster2	9902	ADCP Type: Custom	OFF	Connect Disconnected Detai
	10	TCP Server/NTRIP Caster3	9903	Baud Rate: 115200 V	OFF	Connect Disconnected Detail
	11	TCP Server/NTRIP Caster4	9904		OFF	Connect Disconnected Detail
	12	Serial Port	115200		-	Settings
	13	Radio	432.0500MHz		-	Settings
	14	Sounder	normal		-	Settings
	15	External Equipment	ADCP	115200,Custom		Settings

6.7 System Settings

6.7.1Network Settings

After inserting their SIM card into the GD100 card slot, the user needs to log in to the interface, switch the card type to SIM, and dial successfully. The USV defaults to using the E-SIM card. Other parameters remain unchanged by default.

LHCNA	V	SN:3551654	Englis
tatus	Network Setting ×		
lites	Network Settings		
ceiver Configuration			
ata Recording	GPRS Model Status: ON COFF		
0 Settings	Auto Start: Yes No		
stem settings			
Network Setting	O 2G Only		
tadio Setting	3G Only		
Indge Setting	Network Mode: O 2G/3G Auto		
leturn To Launch Setting	4G Only		
in the latence setting	2G/3G/4G Auto		
N2N Setting	Telecom cards only support 4G1		
TW mode setting	reaction targe only apport 40.		
Remote Control Setting	Child Tuno: E SIM		
hip Type Setting			
Function Setting	Disting Statust Connected Street (OBreak		
sta Unicad	Dialing Status, Connected		
	Auto Connect:		
	APN: 3gnet		
	Dialing String: 199W		
	User Name: card		
	Password: ····		
firmware	P Save		
Cloud Service Setting			

6.7.2Radio Settings

When using radio mode, the USV needs to connect an external radio antenna, turn on the switch, set the corresponding radio protocol, baud rate, and radio channel, and wait for the differential signal light of the USV to remain green to start operation.

CHCNA	V	SN:3551654	English 💛	Quit
Status	Radio Setting ×			
Satellites	Radio Setting			
🔆 Receiver Configuration				
Data Recording	Radio Status: OFF			
I/O Settings	Auto Start: Ves No			
System settings				
 Network Setting 	Radio Protocol: CHC 🖌			
Radio Setting	Channel Bandwidth : 25 v(kHz)			
 Bridge Setting 	OTA Baud Rate: 9600			
 Return To Launch Setting 	Radio Power: 1W			
 N2N Setting 	Redio Frequency: 0 432.0500 (410MHz470MHz)			
 ZTW mode setting 	Save.			
 Remote Control Setting 				
 Ship Type Setting 				
 Function Setting 				
 Data Upload 				
Firmware				
Cloud Service Setting				

6.7.3Network Bridge Settings

No modification is required by default. Before closing the bridge, ensure that the 4G network is normal, otherwise it cannot be closed.

	SN:355165	
tus	Bridge Setting ×	ĺ
Satellites	Bridge switch	
Receiver Configuration		
Data Recording	Bridge Status: ON C'ON COFF	
I/O Settings		
System settings		
Network Setting		
Radio Setting		
Bridge Setting		
Return To Launch Setting		
N2N Setting		
ZTW mode setting		
Remote Control Setting		
 Ship Type Setting 		
Function Setting		
 Data Upload 		
Firmware		
Cloud Service Setting		

6.7.4 Return To Launch Setting

No signal return: When the remote control and hull control software (AutoPlanner or EasySail) of the USV are disconnected for a preset time, the USV will automatically return to the Home point.

Shallow control: Under normal working conditions of the depth sounder, when the measured water depth is lower than the preset shallow depth, it will reverse by 3 seconds, with a default shallow depth of 0.5m.

CHCNA		SN:3551654	English 🗸	Quit
Status	Return To Launch Setting X			
Satellites	Return To Launch Without Signal			
🔀 Receiver Configuration				
Data Recording	Enable: 🖲 Yes 🔿 No			
I/O Settings	Return time without signal : 5 (min)			
System settings				
 Network Setting 	Shallow Control			
 Radio Setting 				
 Bridge Setting 	Shallow Status: 💿 Yes 🔿 No			
Return To Launch Setting	The Depth Of Shallow Threshold : 0.4 (m) Confirm			
 N2N Setting 				
 ZTW mode setting 				
Remote Control Setting				
Snip type Setting				
Pata United				
 Loss opend 				
🔹 Firmware				
Cloud Service Setting				

6.7.5N2N Settings

No modification is required by default, as the server types are different both domestically and internationally.

CHCNA		SN:3551654	1
o Status	N2N Setting ×		
Satellites	N2N Setting		
🔆 Receiver Configuration			
Data Recording	usemame: 3551654		
I/0 Settings	password: Admin1234		
System settings	Client IP: 192.168.0.254 Server IP: 122.112.158.140		
 Network Setting 	Server Port: 7777		
 Radio Setting 			
 Bridge Setting 			
Return To Launch Setting			
► N2N Setting			
 ZTW mode setting 			
Remote Control Setting			
 Ship Type Setting 			
 Function Setting 			
 Data Upload 			
🔅 Firmware			
Cloud Service Setting			

6.7.6Ztw Mode Setting

By default, there is no need to modify the configuration of the power box for USVs. If you need to adjust the electrical adjustment parameters, turn on this switch first, modify the electrical adjustment parameters, and restart the USV.

HCNA	SN:3531654 English ~
Status	ZTW mode setting ×
Satellites	Parameter adjustment mode switch
Receiver Configuration	
Data Recording	
I/O Settings	
System settings	
Network Setting	
Radio Setting	
Bridge Setting	
Return To Launch Setting	
N2N Setting	
 ZTW mode setting 	
Remote Control Setting	
Ship Type Setting	
Function Setting	
Data Upload	
Firmware	
Cloud Service Setting	
cross dervice detung	a

6.7.7Remote Control Settings

CHCNA	
😨 Status	Remote Control Setting ×
Satellites	Remote Control Setting
X Receiver Configuration	
Data Recording	Remote Control Status : Disconnected
I/O Settings	Remote Control Pairing : 🛄 Confirm
System settings	
 Network Setting 	Remote control switching
Reideo Setting	Demoke explori externe (1440
Beturn To Launch Setting	remote control category : M12
 N2N Setting 	Remote control selection: M12 ~
 ZTW mode setting 	🖾 Save
▶ Remote Control Setting	
 Ship Type Setting 	
 Function Setting 	
 Data Upload 	
Firmware	
Cloud Service Setting	

6.7.8Ship Type Setting

After the USV starts up and self checks, it will automatically recognize the current USV model and apply relative deviation in open and unobstructed conditions. If the ship type recognition is incorrect, the ship type can be manually selected.

Status Status	
Status Phip Type Setting × Status Phip Type Setting × Status Parameter Setting Data Recording Subje Setting × Data Recording Subje Setting × V 100 Setting Subje Setting × Status Subje Setting × Network Setting Issae Network Setting Issae Network Setting Issae Network Setting Issae	CHCNA
Satellites Sectiver Configuration Data Recording Data Recording Ship type selection: AMACHE-3 Pro Watturk:::::::::::::::::::::::::::::::::::	🗊 Status
Receiver Configuration Data Recording Ship type selection: APACHES Pro Waterin: Obsit System satting: Network Setting Radio Setting Bridge Setting Bridge Setting Bridge Setting Network Setting Bridge Setting Bridge Setting Radio Setting Bridge Setting Bridge Setting Bridge Setting Bridge Setting	Satellites
Data Recording Shi py Batelliciti: Avet-12-3 Hig Watellicitii: O.83 Moler) Transducer -0.3628 Moler) Transd	* Receiver Configuration
1/0 Settings 0.328 System settings 0.328 Network Setting 0.328 Network Setting 0.368 Radio Setting 0.562 Bekery 0.562 Metery 0.562 Store 0.562 Metery 0.562 Store 0.562 Store 0.562 Store 0.562 Store 0.562 Store 0.562 Store 0.562	Data Recording
System settings Transducer Network Setting 0 Radio Setting 0.562 Bridge Setting Stave Nc2Nachdard Setting Stave	I/O Settings
Network Setting Radio Setting Bridge Setting Radio Setting Notice Setting Notice Setting Notice Setting ZiTV mode setting	System settings
Rado Setting Bridge Setting Return To Laurch Setting Return To Kaunch Setting You Setting Zit Win of setting	 Network Setting
Bridge Setting Return To Laurch Setting N2N Setting ZTW mode setting	 Radio Setting
Return To Launch Setting N2N Setting ZTW mode setting	 Bridge Setting
N2N Setting ZTW mode setting	 Return To Launch Setting
ZTW mode setting	 N2N Setting
	 ZTW mode setting
Remote Control Setting	 Remote Control Setting
> Ship Type Setting	▶ Ship Type Setting
Function Setting	Function Setting
Data Upload	 Data Upload
Firmura	Firmware
Cloud Service Setting	Cloud Service Setting

6.7.9Function Settings

No modification is required by default, and can be used by R&D personnel for debugging.

CHC				/	
👩 Status		Funct	ion Setting ×		
Satellites			USB upgrade setting		
🔀 Receiver Configu	uration				
Data Recording			USB setting status: U	JSB upgrade host firmware	Switch
I/0 Settings			Battery reading setting		
System settings					
 Network Setting 			Battery read status: Battery read status:	alanced power supply mode cluding power box)	Switch
Radio Setting			MCU REBOOT		
Return To Launch	h Setting				
N2N Setting				⊘ REBOOT	
 ZTW mode setting 	ng				
 Remote Control S 	Setting				
 Ship Type Setting 	g				
Function Settin	ng				
 Data Upload 					
Firmware					
Cloud Service Se	etting				

6.8 Firmware

6.8.1Firmware Information

This interface allows you to view firmware version information.

(SN:3551654	English ∨	Quit
ø	Status	Firmware Info. ×						
÷	Satellites	Firmware Version:	1.7.2.1					
×	Receiver Configuration	Firmware Release Time:	20230420_df9367b					
≣	Data Recording	Ar too version.						
¢	I/O Settings							
Ŧ	System settings							
۲	Firmware							
	Firmware Info.							
'	Hardware Version							
'	Config File							
'	System Log							
'	User Log							
'	Firmware Update							
'	Radio Upgrade							
'	 GNSS Registration 							
-	Cloud Service Setting							

6.8.2Hardware Version

This interface allows you to view hardware version information.

(HCNA			SN:3551654	English 💛	Quit
Ģ	Status	Hardware Version ×				
÷	Satellites	Main Board:	1.2.0			
*	Receiver Configuration	Core Board:	1.2.0 231010121200040004			
⊞	Data Recording	Board Firmware Version	21877			
¢	I/O Settings	Imu Type:	ADIS16507			
Ŷ	System settings					
۲	Firmware					
	 Firmware Info. 					
	 Hardware Version 					
	 Config File 					
	 System Log 					
	 User Log 					
	 Firmware Update 					
	 Radio Upgrade 					
	 GNSS Registration 					
-	Cloud Service Setting					

6.8.3Config File

This interface is used for downloading and updating configuration files, and no modification is required by default.

Control Control <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>							
o static i static i kancionatica i kancionatica i lostanta i lostanta i reare i reare i statica i statica <th>CHCNA</th> <th></th> <th></th> <th></th> <th>SN:3551654</th> <th>English ∨</th> <th>Quit</th>	CHCNA				SN:3551654	English ∨	Quit
 Anderde Configuration File: Configuration File: Configuratio	🎯 Status	Config File ×					
 Rever Configuration File: Data Recording Data Recording Data Recording Partice <li< th=""><th>Satellites</th><th>Download Configuration File : Download</th><th>d</th><th></th><th></th><th></th><th></th></li<>	Satellites	Download Configuration File : Download	d				
i Da Racendag I Jo Satting i Alos Satting i Roma Chait i Roma C	🔀 Receiver Configuration						
 ŷ Yû Setingu ŷ Srian stingu ŷ Famaci ŷ Famaci Brâka ŷ Anamaci Brâka 	Data Recording	Update Configuration File: 📙 Browse					
 ♥ System setting: ♥ France: ♥ France: ♥ France: ♥ France: ♥ System Setting: 	I/0 Settings	🛄 Confirm					
 Rmane Rmane status Resource status Gardina La Sectiona Sect	System settings						
 Forware Irds. Hardware Vardsa Gental System Light Hardware Vardsa Rado Upgade Rado Upgade GetS Ragatration 	🌻 Firmware						
 kadvaru varusa kadvaru varusa Gasta Babb kadvaru varusa Kadvarusa Kadvaru varusa Kadvaru varusa Kadva	 Firmware Info. 						
 Conditional period Conditional peri	Hardware Version						
 System Log User Log Rado Upgrade GetS Rugistration 	 Config File 						
 Und Log Finnware Update Kadio Update Cadio Skajufatton 	 System Log 						
Ceded Service Setting	 User Log 						
• Radio Upgrade • Grés Registration • Grés Registration • Cleud Service Setting	 Firmware Update 						
Cloud Service Setting	 Radio Upgrade 						
Cloud Service Setting	 GNSS Registration 						
Cloud Service Setting							
Cloud Service Setting							
Cloud Service Setting							
Cloud Service Setting							
Cloud Service Setting							
Cloud Service Setting							
	Cloud Service Setting						

6.8.4System Log

This interface is used to download system logs for analysis by R&D personnel.

CHCNA	SN:3551654 En	nglish 🗸	Q
👩 Status	System Log ×		
Satellites	System Log Type: Firmware Log V		
🔀 Receiver Configuration	ر Download		
Data Recording			
I/0 Settings			
System settings			
Firmware			
 Firmware Info. 			
Hardware Version			
Config File			
▶ System Log			
 User Log 			
 Firmware Update 			
 Radio Upgrade 			
 GNSS Registration 			
Cloud Service Setting			

6.8.5User Log

This interface is used to download user logs for analysis by R&D personnel.

CHCNA	
👩 Status	User Log ×
Satellites	Download User Log: 📩 Download
× Receiver Configuration	
Data Recording	User Log settings
I/O Settings	System Starting Time CORS and APIS states
System settings	External Power Removed If the Channel Schelling Teaching Status
Firmware	Satemines Hacking Status Changed TCP Client Connection
 Firmware Info. 	TCP Client Disconnect
Hardware Version	Observation Recording Start and End FTP file nucled
 Config File 	Z Email alert time
 System Log 	6: Confirm
► User Log	
 Firmware Update 	
 Radio Upgrade 	
 GNSS Registration 	
Cloud Service Setting	

6.8.6Firmware Upgrade

This interface is used for firmware upgrade. Please refer to the appendix for details of firmware upgrade operations.

		SN:3551654	English \checkmark	
Status	Firmware Update ×			
Satellites	Manual Upgrade			
Receiver Configuration				
Data Recording	Tip:It is not supported to upgrade three firmwares at the same time.			
I/O Settings	GD100 Host Ungrade			
System settings	File(.bin):			
Firmware	🖽 Confirm			
 Firmware Info. 	GD100 Control Liporade			
Hardware Version	File(.px4):			
Config File	🖽 Confirm			
 System Log 				
 User Log 				
 Firmware Update 	Online Upgrade			
 Radio Upgrade 				
 GNSS Registration 	Tip:Both GD100 host firmware and control firmware will be upgraded at the same time.			
	🖾 Online Upgrade			

6.8.7Radio Upgrade

This interface is used for radio station upgrades and does not require modification by default.



6.8.8Receiver Registration

This interface is used for receiver registration. If the receiver expires and the device cannot be used normally, please contact Huace after-sales service to obtain the registration code.

	_		
CNA			SN:3551654
tus	GNSS Registration ×		
Satellites	Serial Number:	3551654	
Receiver Configuration	Registration Limit:	2024-2-7	
Data Recording	Registration Code:	518YS9cGeVt	
I/O Settings			
System settings		P Registration	
Firmware			
Firmware Info.			
Hardware Version			
Config File			
System Log			
User Log			
Firmware Update			
Radio Upgrade			
GNSS Registration			

CHCNAV 华烈

7. HydroSurvey Software



Provide a detailed introduction to the features of HydroSurvey software

his software is used for Huawei series USVs and depth sounders, for single beam data recording and postprocessing, and also has positioning and navigation functions.

CHCNAV 华烈

7.1 Quick-access

7.1.1New project

Click "project - new project" in the navigation bar, or click the "new project" icon in the shortcut bar to create a new project.



Enter the project information and set the coordinate system parameters. Click OK after checking to complete the new project.

Project Name:	Pro-240129-17	2622		
Date:	2024/ 1/29			
Time Zone:	(UTC+08:00)			
Project Templa	ate	Coo	rdinate System	
Pro-230824-0927 Pro-230824-1101 Pro-230825-1635 Pro-230829-1001 Pro-230831-1549 Pro-230901-1043 Pro-230906-1645 Pro-230908-11311 Pro-230912-1456	46 40 42 24 26黄墩湖 55 2 2 21 43 04			

7.1.2Device connection

APACHE Series USV

After successfully connecting the USV using the autoplaner software, click the "one click connection" icon of the Hydrosurvey software.



After the connection is successful, the real-time status of positioning data and water depth data is displayed.

Depth Sounder And Construction Vessel

When a single beam bathymeter or construction ship uses the Hydrosurvey software, it is necessary to

manually set parameters for communication connection.

Click "Settings - system settings" (or click the "system settings" icon in the shortcut bar) to enter the system settings interface.



Double click "GPS 1" to enter the parameter setting interface of GPS device. Select the corresponding connection mode in "communication settings", enter "antenna coordinates", check "connection" in the lower left corner after setting, and click "OK" to complete GPS setting.

🐺 GPS Settin	gs ×
Communication	Data Monitor Position
Antenna Type	APACHE-3 Pro 🗸
Data Format	CHCGD V
Туре	TCP Client 🗸
IP	192.168.0.254
Port	30001
🗹 Start	ОК

Double click "sounder 1" to enter the parameter setting interface of the bathymeter, select the connection mode in "communication setting" and change the draft in "parameter setting", check "connection" in the lower left corner after setting, and click "OK" in the lower right corner to complete the bathymeter setting.

mmunication	Darameters	Data Monitor	Desition	Desition Transmit		
nmunication	Parameters	Data Monitor	Position	Position Transmit		_
Туре	TCP Client			``````````````````````````````````````	~	
IP	192.168.0.2	54				
Port	30001					
Format	CHCGD			``````````````````````````````````````	🖌 🔽 Wave Output	:
Name	CHCGD				🔽 Wave Save	
					🛃 Raw Data	
					Add	
					Remove	
_			_			_
Start					Ok	

7.1.3Record control

Set data collection parameters. Click "setting - record control" to enter the record control setting interface.

- 1. Recording mode
- 1) Record by distance: record data once every few meters;
- 2) Record by time: record data once in a few seconds;
- 3) Record by space: manually record data by pressing space once.
- 2. Solution state limit
- 1) ① Single point solution: record "single point solution" and higher accuracy;
- 2) ② Differential resolution: record "differential resolution" and higher accuracy;
- 3) ③ Fixed solution: only "fixed solution" is recorded.
- 3. Record options

Select the device to record data.

🐹 Recording Control	×
Method Limit	State Limit
• By Distance 0.5 m	Single
● By Time 1 ✓ c	Float
	 Fixed
Recording Options	RMS Limit
Data ▼ 船体 1	■ HRMS <= <mark>0.1</mark> m
Sounder1	□ VRMS <= 0.2 m
	OK Cancel

7.1.4Measure

Start measurement

Click "measurement - start" (or click the "start" button in the shortcut bar) to set the parameters. After setting the parameters, click "OK" to start recording the measurement data.

Line name: prefix of DEP line name;

Line number: dep line number, with a step of 1, automatically added;

Automatic line change: each time a certain number of point data is recorded, a new dep line will be automatically regenerated. Line change modes include: no automatic line change, 1000 point automatic line change, 2000 point automatic line change, 3000 point automatic line change, 3500 point automatic line change (default), 4000 point automatic line change, 5000 point automatic line change, 6000 point automatic line change;



Pause measurement

Click "measurement - pause" (or click the "pause" button in the shortcut bar 1) to pause the measurement.

End measurement

139 Reserved Click "measurement - end" (or click the "end" button in the shortcut bar) to end the measurement.

7.1.5Data processing

Click "data processing - water depth sampling" (or click the "water depth sampling" button in the shortcut bar

(G) (Check/correct each survey line of field survey. Double click to open the line dep file, and then display the base map, water depth, waveform and other views.



The main process of data processing (the steps in brackets are selected according to requirements): noise processing \rightarrow (data interpolation) \rightarrow data correction \rightarrow equidistant sampling \rightarrow (manual sampling) \rightarrow htt generation.

Each survey line of field survey shall be inspected, de noised and thinned. According to the principle of terrain consistency, use an eraser to delete false water depth points that do not conform to the waveform, or drag the water depth points with the mouse until they are consistent with the waveform, as well as fixed interpolation operation and manual interpolation operation.



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For attitude correction or three corrections, select one of the operations, and do not repeat the operation, so as to prevent the previously processed data from being overwritten. (for the three corrections, click "skip" directly for the content that does not need to be corrected.)

Select the sampling method and sampling interval as required, and click "equidistant sampling". If some areas are not sampled, you can click "manual sampling" to manually sample some feature points. If this function is not required, skip the manual sampling step.



Click the "generate htt" button to save to the *.htt file.

7.1.6Data export

Click "data processing - Data Export" (or click "data export" in the shortcut bar button)

open the saved htt file, select the exported file type, select the format, and select the format from the dropdown list. Click "export" to export the selected format data.



The data format supports customization. At the same time, the separator and angle format can be selected for customization;

Check "file merge" to merge and export multiple htt data into one file;

If export header is checked, the result file of data export supports header export;



7.2 Project

7.2.1New project

Click "project - new project" in the navigation bar, or click the "new project" icon in the shortcut bar to create a new project.



Enter the project information and set the coordinate system parameters. Click OK after checking to complete the new project operation.

New Project				
Project Coordinate System				
	_	_		
Project Name:	Pro-240129-174218			
Date:	2024/ 1/29			
Time Zone:	(UTC+08:00)			
Project Templa	te	Coordinate S	ystem	
Pro-231030-14314	49			
Pro-231103-131546				_
Pro-231114-151636				_
Pro-231205-1922	32			_
Pro-231206-1335	53			_
Pro-231208-15294	49			_
Pro-231222-0910	17			_
Pro-231230-08512	24			_
Pro-231231-2033	07			_
			OK	Cancel
				Cancer

Project

Project Name: the default is pro computer system date computer system time, which can be customized as required.

Date: the default computer system date. You can click the drop-down menu to select.

Time zone: the software automatically identifies the time zone of the current computer system.

Apply project: all settings in a project can be applied. Including coordinate system settings/gps settings/sounder settings/record control settings/coordinate library information. Check "apply project" and select the project to be applied in the project list (blue check mark) to open the "coordinate system " in the

upper left Project Coordinate System, check the applied coordinate system parameter information, and click OK.

Apply coordinate system template: you can apply the selected coordinate system parameters. Check "Project

Template" Project Template , select the template name applied in the template list, view the coordinate system parameter information in coordinate system settings, and click OK.

Coordinate System Settings

Save coordinate system: fill in the name of the coordinate system and click "save coordinate system" to save the current coordinate system parameters to the coordinate system template directory (\template), with the file suffix *.crd.
New Project				
Project Coordinat	te System			
Coor System			Save	Coor Manager
Direction Ellipsoid Projection	🐹 Info	 Ellipsoid Source Ellipsoid rmation 		
Datum Transfo Horizontal Adju Height Fitting Adjustment Par Geoid Plane	The co	oordinate system name is	i necessary 确定	. 10
		Source Ellipsoid		
			ОК	Cancel

Coordinate system manager: you can select a more standardized coordinate system template in the coordinate manager, or you can customize coordinate system parameters, select and export them.

	🔝 Coor System Manag				_ = ×	
Cŀ	Africa Africa Africa Africa Africa Africa Africa Africa Compe Mexico Middle East North America Oceania South America World Custom	Coor List UAE NAHRWAN 1967 UTM zone 40 UK ED50 TM 0 N UPS WGS 84 UPS North UPS WGS 84 UPS South UTM WGS 84 UTM zone 015 UTM WGS 84 UTM zone 015 UTM WGS 84 UTM zone 025 UTM WGS 84 UTM zone 03N UTM WGS 84 UTM zone 03S UTM WGS 84 UTM zone 05S UTM WGS 84 UTM zone 05S UTM WGS 84 UTM zone 05S UTM WGS 84 UTM zone 06N UTM WGS 84 UTM zone 07S UTM WGS 84 UTM zone 08S UTM WGS 84 UTM zone 08S	Direction Elipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane			<u>Я</u>
		Delete Import Export		Select	Cancel	

Import: externally import *.crd coordinate system parameter files, which are displayed in the user defined node list.

Export: export the selected coordinate system parameter information, the same as the "save coordinate system"

function, and the export file format is *.crd.

Delete: deletes the coordinate system of the custom node list.

Select: after selecting a coordinate system, click the "select" button to determine a coordinate system template for the new project.

Cancel: cancel the operation and close the current interface.

Coordinate System Parameters

【direction】 North East is the positive direction by default. Click the content bar (the red area in the following figure) to pop up the drop-down list button, and select from the drop-down list, the same below.

Project Coordinate System	1		
Coor System		Save	Coor Manager
Direction Ellipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane	CRS Direction Vertical Axis Positive Horizontal Axis Positive	North East	
		ОК	Cancel

[ellipsoid] The source ellipsoid defaults to WGS84. (Generally, no changes are required. In special cases, other ellipsoids can be selected from the drop-down list.). Select the appropriate ellipsoid name from the drop-down list based on the engineering requirements for the target ellipsoid.

Coor System		Save	Coor Mana	ger
Direction Ellipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane	 Ellipsoid Source Ellipsoid Target Ellipsoid Ellipsoid Name Ser WGS84 Inv. Beijing54(China) Xian80(China) China CGCS2000 WGS72 INTERNATIONAL GRS80 AIRY 1830 AIRY 1849 AUSTRALIAN NAT 	China CGC	52000	

【projection】 Select the projection method from the dropdown list as needed, change the central meridian, dimension origin, average latitude, length ratio, eastward constant, northward constant, and projection surface height.

Project Coordinate System		
Coor System		Save Coor Manager
Direction	 Projection 	
Ellipsoid	Model	Transverse Mercator Projectic
Projection	Central Meridian	118°30'00.000000000"E
Datum Transformation	Original Latitude	00°00'00.0000000000"N
Horizontal Adjustment	Average/Local Latitude	00°00'00.0000000000"N
Height Eitting	Scale	1
	False Easting[m]	500000
Adjustment Params	Flase Northing[m]	0
Geoid	Projection Height[m]	0
Plane		
	Model	
		OK Cancel
		Cancel

【 Datum transformation 】 In the conversion model, you can choose Bursa-Wolf sevenparameter/three parameters/rigorous seven parameters/grid.

Direction Datum Transformation Ellipsoid Model Seven Parameters Projection DX[m] 0 Datum Transformation O DY[m] Datum Transformation DY[m] 0 Datum Transformation DY[m] 0 Horizontal Adjustment RX[s] 0 Adjustment Params RZ[s] 0 Geoid Scale[ppm] 0	Coor System		Save Coor M	Vanager
Plane	Ellipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane	Model DX[m] DY[m] DZ[m] RX[s] RY[s] RZ[s] Scale[ppm]	Seven Parameters 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	

【Horizontal correction】 The conversion model for horizontal adjustment can choose between ordinary four parameters and TGO horizontal adjustment.

New Project			
Project Coordinate System	1		
Coor System		Save	Coor Manager
Direction	Horizontal Adjustment	2	
Ellipsoid	Model	Four Param	neters 🖂
Projection	DX[m]		
Datum Transformation	DY[m]		
Horizontal Adjustment	Rotation	000:00:00.0	000000000
Height Fitting	Scale[ppm]	1	
Adjustment Params			
Geoid			
Plane			
Thuric .			
	Model		
		OK	Cancel

[height fitting] The fitting model can choose from fixed difference, plane fitting, surface fitting, and TGO vertical adjustment.

New Project Project Coordinate System	n			
Coor System		Save Coor	Manager	
Direction Ellipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane	Height Fitting Model	None None Fixed Difference Plane Surface Curve Surface TGO Vertical Adjustr	nent	
	L	ОК	Cancel	

[Adjustment parameters] You can set offset values such as north offset, east offset, and elevation.

New Project		
Project Coordinate System	n <u></u>	
Coor System		Save Coor Manager
Direction Ellipsoid	 Adjustment Parameter North 	ers O
Projection Datum Transformation	East Height	0 0
Horizontal Adjustment Height Fitting		
Adjustment Params		
Geoid Plane		
	North	
		OK Cancel

[Geoid **]** Select the corresponding format of the geoid model and process the elevation data.

Coor System		Save	Coor Manager
Direction Ellipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane	 Geoid Model Geoid Format 	None GGF File GGD File GRD File NGS File GSF File GRI File ASC File STG File GBL File	
	Geoid Format		

[planar grid] Select the corresponding format of the flat grid and process the planar data.

New Project			
Project Coordinate System			
Coor System		Save	Coor Manager
Direction	 Plane Grid Adjustment 		
Ellipsoid	Grid Format	None	\sim
Projection			
Datum Transformation			
Horizontal Adjustment			
Height Fitting			
Adjustment Params			
Geoid			
Plane			
	Grid Format		
		ОК	Cancel

7.2.2Open project

Click on "Project - Open Project" (or click on the "Open Project" icon in the shortcut bar), select the project. nav file you want to open, and click "Open".



Explanation:

- Engineering files are saved by default in the HydroSurvey \ projects folder of the software installation directory.
- 2. If project A is opened from an external directory, it will be automatically copied as project B in the \ projects directory, so the actual opened or saved project is project B in the \ projects directory.
- 3. If there is already a project named A in the \ projects directory, if you open the same named A project from outside, the original A project will be backed up in the \ Backup directory, and external project A will overwrite the original A project in the \ projects directory.

黎 打开						×
← → × ↑ 📙 « Chonav	> HydroSurvey > pr	rojects > Pro-2	30726-143402	ٽ ~	在 Pro-230726-143402 中	9
						?
升华培训 ^	_					
🔷 WPS云盘		-				
📥 OneDrive - Persona		**				
💻 此电脑	DepthPoints	Depths	RawData	Pro-230726-14		
🧊 3D 对象				3402.nav		
📕 视频						
▶ 图片						
🔮 文档						
➡ 下载						
▶ 音乐						
三 桌面						
🎬 Windows-SSD (C:)						
🚔 本地磁盘 (D:)						
🚔 本地磁盘 (学习/工作						
🚔 本地磁盘 (娱乐/下舞						
• • •						_
文件名(<u>N</u>):				~	HydroSurvey Project File(*.n	e ~
					打开(O) 取消	

7.2.3Project parameters

Click "Projects – project parameters" to change the parameters of the current project, and click "OK" to complete the change.

Projects



Project name: Change as needed.

Date: Read the current system date and do not recommend any changes.

Time zone: Automatically recognizes system time zone information and cannot be changed.

Import coordinate system: Select the coordinate system parameter file. crd and click "Open". (The coordinate

system parameter file of Geodetic Software LS8 can be directly imported and used)

Coordinate System

Vertical Axis Positive North Projection Horizontal Axis Positive East Datum Transformation Horizontal Axis Positive East Height Fitting Horizontal Adjustment Horizontal Adjustment Height Fitting Horizontal Adjustment Horizontal Adjustment Plane Vertical Axis Positive Vertical Axis Positive	Direction	 CRS Direction 	
Vertical Axis Positive	Ellipsoid Projection Datum Transformation Horizontal Adjustment Height Fitting Adjustment Params Geoid Plane	Vertical Axis Positive Horizontal Axis Positive	North East
		Vertical Axis Positive	
Import OK Cancel		Import	OK Cancel

The coordinate system settings can be modified according to steps 1- (2).

Base Station Translation

Enter the coordinates of the control points for a known point. (If the fixed difference above has been entered correctly, there is no need to fill in the coordinates)

Place the RTK at a known point, click "Start" to collect the required time, and then click "Stop" to calculate the offset.

😻 Proje						×
Project	Coordinate System	Base Stat	ion Transla	ition		
Know	n Point:					
x:		m				
y:		m		Measure Tir	nes: 0 s	
h:		m		Start	Stop	
			Import	OK	Ca	ncel

7.2.4Save project

Click "Project - Save Project" (or click on the "Save Project" icon in the shortcut bar) to save the current project.



After clicking to save the project, the message "Save Successfully" will pop up to complete the save.



7.2.5Sounder Wizard

APACHE series USVs can be directly connected by clicking the "one click connection" icon, without the need for this function;



Click on "Engineering - Sounder Wizard" to automatically enter "System Settings". After completing the settings, close "System Settings";

Subsequently, it will automatically enter "Record Control". After turning off "Record Control", it will automatically enter "Measurement Start" and click "OK" to start the measurement. (Specific settings will be explained in detail later)



7.3 Settings

7.3.1Working mode

Click on "Settings - Working Mode" and select the software working mode from the drop-down list.

Setting(S) View(V) Painting(P) Measure(<u>M</u>) Tools(<u>T</u>)
Work Mode(<u>₩</u>) ►	Presentation Mode
System Settings(<u>S</u>)	Measure Mode
✓ Heading Control(<u>H</u>)	 Painting Mode
Recording Control(<u>R</u>)	

 Demonstration mode: Simulate field measurement and learn and operate the software. (Click on the "Demonstration Mode" icon in the shortcut bar to enter this mode)



 Measurement mode: Select this mode to perform measurements. (Click on the "Measurement Mode" icon in the shortcut bar to enter this mode)



 Drawing mode: Editing operations such as adding or deleting points and lines on the graph. (Click on the "Drawing Mode" icon in the shortcut bar to enter this mode)



7.3.2System settings

Click "Settings - System Settings" (or click on the "System Settings" icon in the shortcut bar) to enter the system settings interface.

Setting(S) Work N System Heading Record	View(V) Paintir Mode(W) Settings(S) g Control(H) ing Control(R)	^{sg(} rw(V) Pa E ☆	iinting(P)	
	 System Setti Device ■ 船体 1 ■ GPS GPS1 ■ Sounder Sounder 	ngs :		

Device

The ship and the measuring equipment carried on board will retain one ordinary hull by default, including two or more hulls. Any one of the hulls can be removed (the same below). Right click on "Equipment" to add "Ordinary Ship" or "USV".

Ordinary ships include GPS, depth sensors, and attitude sensors.

USVs include unmanned hulls.

hull

Right click on "Hull 1" and a dropdown list will pop up, which includes settings, renaming, folding (the 154 @2024 Shanghai Huace Navigation Technology Co., Ltd. All Rights Reserved "unfold button" in the folding state, the same below), and removal.

1) Settings: Double click on "Hull 1" to enter the Hull Settings interface. The list of ship types includes APACHE 3/4/5/6, ordinary ships, and cutter suction boats.

Check "Fixed Ship Type" to show that the size of the ship remains fixed and unchanged.

Check "Main Ship Tracking" to always display the position of the main ship.

"New" can draw ship types based on the size of the hull;

"Edit" the selected existing ship size;

"Delete" the selected ship type;

Apply all settings.



Click "New" or "Edit" to enter the ship type editing interface. Check "Drawing Mode" to draw the feature points of the ship with the left mouse button and end with the right mouse button. Check "Edit Mode" to select the drawn points and drag them. Enter the name of the ship type. Describe the introduction of the ship type. Enter numerical values in X and Y and click "Add" to add a point; Insert inserts a point after the selected point in the list; Delete the selected point. The coordinates of the first and last points entered are consistent (with the hull closed).

Enter numerical values in X, Y, and radius R, click "Add" to add a circle, and "Delete" the selected circle in the list.

Click "Save" to exit the ship type editing interface, and a new ship type will be added to the ship type list; Click "Cancel" to exit editing.



2) Renaming: Renaming the hull name, the same below.

3) Folding: Hide the device name (you can click on the "+" or "-" before the name to open and collapse).

4) Remove: Delete the hull, the same below.

GPS

Double click on "GPS1" to enter the parameter setting interface of the GPS device, which includes "Communication Settings", "Port Monitoring", and "Antenna Coordinates". After setting up, check "Connect" in the bottom left corner and click "OK" in the bottom right corner to complete the GPS setup.

1) Communication settings

"Antenna Type" Select the "Antenna Model - USV Model (including corresponding antenna coordinate parameters)" (RTK model) to be used in the drop-down list, and select NONE for those not in the list.

Select the GPS format for parsing processing in the drop-down list.

Select from the "Communication Method" dropdown list:

- a) Serial port (select communication port and baud rate);
- b) TCP and UDP (the server sets the listening port, and the client needs to input the IP address and port of the connecting device);

				×	
Commu	nication D	Pata Monitor Position			
Anter	ina Type	APACHE-3 Pro	\sim		
Data	Format	CHCGD	\sim		
Туре		Serial Port	\sim		
Local	Port		\sim		
Baud		115200	\sim		
Lengt	h	8	\sim		
Check	k	Noparity	\sim		
Stop	Bit	1	~		
∎ St	art			ОК	
■ St	art		Туре	ОК TCP Client	
∎ St	art TCP Ser	ver	Type Ƴ IP	ОК <u>TCP Client</u> 192.168.53.254	

2) Port monitoring:

Click "Start" to display the port receiving data; Click the "Stop" button to stop displaying the data received by the port. Enter the command in the "Command Input" column and click the "Send" button to send the command to the device connected to the port.

Check "Data Forwarding" to forward the received data to other devices. Communication methods include serial port, TCP, and UDP, as set above.

🧱 GPS Settin	igs			×
Communication	Data Monitor Position			
Input:				
Transmit D	lata	Start	Send	Stop
Туре	Serial Port	~		
Local Port	Serial Port TCP Server			
Baud	TCP Client			
	UDP Server			
Length	ODP Client			
Check	Noparity	\sim		
Stop Bit	1	~		
Start				ОК

3) Antenna coordinates: Input the position of the positioning antenna relative to the transducer (measurement point) in the ship's coordinate system; Input the distance from the bottom of the positioning antenna to the water surface as "base to water surface height".

When selecting NONE as the antenna type in the communication settings, the phase center height needs to be added.



Sounder

Double click on "Sounder1" to enter the parameter setting interface of the depth finder, which includes 158 @2024 Shanghai Huace Navigation Technology Co., Ltd. All Rights Reserved

"Communication Settings", "Parameter Settings", "Port Monitoring", "Instrument Coordinates", and "Position Forwarding"; After setting up, check the "Connect" button in the bottom left corner and click "OK" in the bottom right corner to complete the sounder setup.

1) Communication settings

① Select from the "Communication Method" dropdown list:

Serial port (select communication port and baud rate);

TCP and UDP (the server sets the listening port, and the client needs to input the IP address and port of the connecting device);

HydroSound (receiving data directly from the Sound software);

AutoPlanner (receiving data directly from AutoPlanner software).

⁽²⁾ "Data Format": Select commonly used formats such as CHCSF, CHCGD (GD version for USVs), and SDDPT according to different depth measuring instrument models. Different formats will have corresponding format setting parameters, and default parameters can be used.

After selecting "Custom" to set the relevant parameters, click the "Add" button to add a new format, and "Remove" to delete the selected data format.

③ Waveform recording:

Check "Waveform Output" to display real-time waveforms on the main interface;

Check "Waveform Storage" to store real-time waveform data simultaneously. During data processing, it can be overlaid with water depth data to facilitate noise processing;

Check "Raw Data" to store the raw data of the depth sounder.



2) Parameter settings: Set the parameters of the depth finder in different measurement environments.

① Draft: The distance from the bottom of the transducer to the water surface;

② Working mode: includes three modes: normal (sonar operation), pause (sonar stop), and status (reading the sounder firmware);

③ Sound Speed: Enter the actual sound speed of the water at that time or check "Temperature and Salinity Calculation" to calculate the sound speed by modifying the temperature and salinity;

④ Gain: The energy gain of the transmitted beam, which can be adjusted in real time according to the actual measurement environment through "automatic" or manually inputted as a fixed value;

⑤ Frame rate: Sound wave emission frequency;

(6) Range: The maximum water depth that the depth sounder can measure; When the maximum range is close to the actual water depth, the data accuracy is higher. "Automatic" will adjust in real-time based on water depth, and "manual" will select a fixed range;

⑦ Anti interference: Select "normal" or "tracking";

(8) Water depth filtering: You can choose to collect data within the minimum and maximum water depth ranges;

(9) Default: Click "Default" to restore the software default settings;

(II) Self check: Clicking on the "Self check" software will check whether the depth sounder is functioning properly.



3) Port monitoring

Click the "Start" button to display the received data in real-time;

Click the "Stop" button to stop receiving;

Click the "Send" button to send the commands in the "Command Input" area;

Check the "Data Forwarding" box to send the corresponding format of data to other devices at the set frequency. The communication method is the same as above (GPS port monitoring), and the single beam data forwarding format is SDDPT/SDDBT.

Input:		 				- 1
			Start	Send	Pause	
Transmit	Data					
Туре	Serial Port	~	Format	SDDBT	~	
Local Port		~	Frequency	1Hz	~	
Baud	115200	~				
Length	8	\sim				
Check	Noparity	\sim				
Stop Bit	1	~				

Instrument coordinates:

The installation position coordinates of the depth sounder (measuring point) cannot be modified. When drawing a boat, the installation position of the depth sounder (measuring point) should be taken as the origin, with coordinates (0,0).



5) Location forwarding: customized development of piling function

In point navigation mode, the plane coordinates of the measurement point are output \$CHCDZ data at a frequency of 1Hz. The ship navigates to the pile point, with a distance of less than 0.02m (coordinate library interface, can be set by oneself). The measurement point turns green, indicating that the current measurement point has completed pile driving.

Data format: \$CHCDZ, No, N, E, H, MN, ME, MH \ r \ n; 1Hz 8-bit;

N. E, H, MN, ME, MH: 12 digits do not include positive and negative signs, if not enough, fill in 0, unit: millimeters;

N. E, H: The position of the imported pile points;

MN, ME, MH: the position of the ship at points 0,0;

🐹 Sounder		×
Communication	Parameters Data Monitor Position Position Transmit	
Туре	Serial Port 🗸	
Port	~	
Baud	115200 ~	
Length	8 ~	
Check	Noparity ~	
Stop Bit	1 ~	
	Transmit	
🔲 Start	Ok	:

Motion

Set the relevant parameters of the attitude meter by double clicking on "Motion1" to enter the parameter setting interface of the attitude meter, which includes "Communication Settings", "Port Monitoring", and "Antenna Coordinates". After setting, check "Connect" in the bottom left corner and click "OK" in the bottom right corner to complete the attitude meter setting.

The settings for "communication settings" and "port monitoring" are the same as above, and the "antenna coordinates" need to select "ship type" and "arm length" of the working arm.



Heading Control

Control the bow direction of the ship's hull. Click "Settings - Bow Control" to select the control method based on the actual device used. Usually, the default settings are sufficient for heading control.

Intelligent selection: Automatically adjust according to GPS motion direction;

Calculate according to trajectory: Calculate according to the trajectory of the path;

Dual GPS: calculated based on the baseline direction of two GPS installations;

Dual antenna: calculated based on the azimuth angle output by the dual antenna device;

Manual input: Enter a fixed angle;

Bow correction: Correct the difference between the installation of the input device and the actual direction.

😹 Heading Control 🛛 🗙 🗙							
Heading Con	trol						
 Auto 							
Track							
Double GNSS							
Double Ante	enna						
🔵 Manual	0°00'00.0	00000"					
Correction	0°00'00.0	00000"					
	ОК	Cancel					

Record Control

Set data collection parameters. Click "Settings - Record Control" to enter the record control settings interface. Recording method:

Record by distance: Record data every few meters;

Record by time: Record data every few seconds;

Record by Space: Manually record data by pressing a space once.

Unstate restrictions:

Single point solution: Record "single point solution" and higher accuracy;

Differential decomposition: Record "differential decomposition" and higher accuracy; 164 @2024 Shanghai Huace Navigation Technology Co., Ltd. All Rights Reserved "Fixed solution": Record the "fixed solution".

Recording options:

Select the device that needs to record data;

7.4 View



7.4.1Full image display

Click on "View - Full Image Display" (or click on the shortcut bar's "Full Image Display" icon) to fully display all graphics.



7.4.2Zoom in

Click "View - Zoom In" (or click the "Zoom In" icon on the shortcut bar) to zoom in on the graphic once.



7.4.3Zoom out

Click "View - Zoom Out" (or click the "Zoom Out" icon on the shortcut bar) to zoom out the graphic once.



7.4.4Drag the base map

Click on "View - Drag Bottom" (or click on the "Move" icon in the shortcut bar), hold down the left mouse button to drag the bottom.



7.4.5Show grid

Clicking on the "View - Show Grid" checkbox will display the coordinate grid, allowing you to view the current scale bar.



7.4.6Color profile

Click "View - Color Settings" to open the color settings interface. Select colors corresponding to different elevation and depth ranges separately;

Select the color of the selected line from the dropdown list of "Pick Line Segment with Mouse"; Select "background color" as black or white, click "settings" to save the changes, and click "default settings" to restore the software's default parameters.



7.4.7View of sounder

Directly display the default common view settings of the depth sounder in the bottom left corner of the main view.

Left-Bias	
To-Start	
To-End	
Left-Ang	
	Swith S-E

7.4.8Small window options

Check the small window that needs to be displayed on the main interface.

- 1) Hull switching: switching display information between multiple hulls;
- 2) System: Display time, line name, point number, speed, and heading;
- Coordinates: Display the current WGS84 longitude and latitude, water surface geodetic height, plane coordinates, and water surface elevation;
- 4) Data quality: HDOP value, number of satellites, and calculation status;
- 5) Water depth value window: displays real-time water depth figures;
- 6) Compass: Real time display of ship's bow direction;
- 7) Line navigation window: displays whether the ship is currently on the left or right side of the trajectory line (based on the direction from the starting point to the endpoint of the line segment), the distance from the starting point, and the distance from the endpoint (can be opened by clicking the "Line Navigation" button on the shortcut bar);
- Point navigation window: displays information such as heading north, east, right, forward, and distance from the ship's hull to the target point (can be opened by clicking the "Point Navigation" button on the shortcut bar);
- 9) Attitude instrument coordinate window: displays the northeast elevation information of the attitude instrument;
- 10) Raw data: Display real-time water depth waveform of the depth sounder;
- 11) Yaw view: displays a yaw scale bar;
- Hydrological view: displays hydrological information such as flow velocity, flow direction, and straightline distance.



7.4.9 Accessing AIS

Clicking on "View - Access AIS" will redirect you to the AIS website to view the distribution of surrounding ships.

7.5 Draw

7.5.1Layer management

Click on "Drawing - Layer Management" or click on the "Layer Management" icon in the shortcut bar to enter the layer management interface.



Check the layer to display it, otherwise it will not be displayed. Click the "+" button to open the dropdown list, and click the "-" button to close the dropdown list.

🔣 Layer Mana	ge		×	
Current Layer				
Base Map				
🖪 裙 Lines				
🖬 😪 Record Poir	nts			
🖪 裙 Tracks				
🖬 🕑 Points				
Comment 🕑				
Others				
CAD		Export Layers		

7.5.2Base layer

Right click on "Bottom Layer" and click "Import" to select a. dxf or. dwg format bottom file. Right clicking on the imported base image file will pop up a drop-down list:

Click "Edit" to reselect the base image file;

Click "Delete" to delete the imported base map;

Click "hide" to not display the base image;

Click "Draw Bottom Map" to draw the bottom map;

Click "Export WayPoints" to export the. waypoints waypoint file from AutoPlanner software;

Click "Export Polygons" to export the. poly polygon file from AutoPlanner software.



7.5.3Line layer

Right click on "Line Layer" to display the line name. The drop-down list includes "Line", "Polyline", "Closed Line", and "Plan Line".

Right click on "Line" and click "Delete" to delete all lines. Click "Hide" to not display all lines;

Right click on the selected line in the drop-down list, click "Delete" to delete the selected line, click "Hide" to not display the selected line, click "Properties" to display the attribute information of the selected line.

The operations for "Polyline", "Closed Line", "Plan Line", and "Line" are the same. (Right click on "Plan Line", click "Export WayPoints", and export the route file of AutoPlanner software)



7.5.4Trajectory line

Display the trajectory of data collection. Right click on "Trajectory Line", click "Import", select the. dep file to import existing trajectories, click "Enter Path", and enter the trajectory line storage path. Right click on the file in the dropdown list, and the "delete" and "hide" functions are the same as above.

7.5.5Record point

Display the collected points. Right click on "Trajectory Line" and click "Import" to select the. dep file to import the collected points;

Click on "Water Depth Display" to display the water depth of the collection point.

Click "Record Point Name Display" to display the name of the collection point. Right click on the file in the dropdown list, and the "delete" and "hide" functions are the same as above.



7.5.6Point layer

Display manually added points. Right click on "Point Layer". Click "Open" to enter the coordinate library of the point. (Operation method, refer to the coordinate library in Section 2 of this chapter);

Click "Show Point Names" to display the name of the point. Right click on the file in the dropdown list, and the "delete" and "hide" functions are the same as above.

7.5.7Annotation Layer

Display annotated text and other information. Right click on the file in the dropdown list, and the "delete" and "hide" functions are the same as above.

7.5.8Display layer export

Manually drawn graphics can be exported to CAD files in dxf/dwg base format.

Coordinate Library

Click on "Draw Coordinate Library" and enter the coordinates and other information of the points to draw the points.



- Coordinate type: Select projection coordinate XYH or geodetic coordinate BLH, enter point name, X (B),
 Y (L), H (H), radius (point symbol), and color. Simply enter the numerical value in BL, and it will automatically recognize the accuracy in minutes and seconds, selecting the corresponding hemisphere.
- 2) Pile driving parameters: Enter the pile driving tolerance.
- 3) Select All: Select all points in the list.
- 4) Display: Display the selected points in the list on the main interface.
- 5) Hide: Hides the selected points from the list on the main interface.
- 6) Point navigation: navigate to the selected point in the list, and the main interface will display a point navigation view.
- 7) Edit: Edits the selected points in the list.
- 8) Delete: Delete the selected point in the list.
- 9) Add: Add the edited points in "Coordinate Type".
- 10) Import: Import and edit a fixed format point file. The supported import formats are:

Format:No.,X,Y,H,Radius,Color-R/G/B Text File (*.txt) Format:No.,B,Hemisphere,L,Hemisphere,H,Radius,Color-R/G/B Text File (*.txt)

👯 Co						×
ID	x	Y	н	Radius	Stat	Coordinate Type
P00001	4342705.53447	551007.35476	0.00000		Vis	💿 хүн 🕒 він
P00002	4342705.53447	551007.35476	0.00000	1	Vis	
P00003	4342631.98532	551064.28100	0.00000	1	Vis	Name P00004
						x
						v
						H
						Radius 1
						Color
						Piling Parameter
						Limit Diff 0 m
	alect All					
	iew Hide		PointNay	dit	Delete	Add
V	Hide		Pointina	un	Delete	Add

7.6 Line library

Click "Draw - Line Library" to display line information and draw lines based on the points in the coordinate library.

😹 Co	oordinates Lib					×	
ID	х	Y	н	Radius	State	Coordinate Type	
						💿 XYH 🛛 BLH	
						Name P00004	
						x	
						Y	
						н	
						Radius 1	
						Color 🗸 🗸	
						- Piling Parameter	
						Limit Diff 0 m	
S S	elect All						
N	/iew Hide		PointNav	Edit	Delete	Add Import	

Click "Draw - Line Library" to display line information and draw lines based on the points in the coordinate library.

- 1) Select All: Select all lines in the list.
- 2) Display: Display the selected lines in the list on the main interface.
- 3) Hide: Hides the selected lines from the list on the main interface.
- 4) Delete: Delete the selected line from the list.
- 5) Coordinate library drawing lines:

"Linear", select a straight line, polyline, or closed line from the drop-down list;

Select a numerical value from the dropdown list of "line weight";

Select from the "Color" dropdown list;

Select points in the point list in order from the starting point to the ending point. The order of selecting points is displayed on the right side. Click "OK" to connect them into a line based on the order of the points. Select 2 points for a straight line, and select more than 3 points for a polyline and a closed line. Click "undo" to undo the selected point; Click "Back" to return to the line list.

😻 Co	ordinates Lib					×
ID	х	Y	н	Radius	Stat	Coordinate Type
P00004	11111111111111100	11111111111111100	222.00000			💿 XYH 🌑 BLH
						Name P00005
						x
						Y
						н
						Radius 1.00
						Color 🗸 🗸
						Piling Parameter
						Limit Diff <mark>0 m</mark>
۰				-	Þ	
🔽 Se	elect All					
V	iew Hide		PointNav	idit 🛛	Remov	e Add Import

7.7 Manual drawing

Click on "Draw - Manual Drawing" and select "Draw Points", "Draw Lines", "Draw Plan Lines", "Capture Lines" from the drop-down list

Painting(P) Measure(M) T	ools(<u>T</u>) Data Process(<u>D</u>) Help(<u>H</u>)
Layer Management(<u>I</u>) Coordinates Lib(<u>C</u>) Lines Lib(<u>L</u>)	● Q ♥ 📐 🍾 🗹 🗹
Draw(<u>P</u>)	Draw Points
	Draw Lines
4022205.000	Draw Plan Lines
	Draw Line By Capturing

Draw dots

(Click on the "Draw Point" button in the shortcut bar manually draw points.

Draw lines



) Left click on the main interface to

Ð

) Left click on the node for manual (Click on the "Draw Line" button in the shortcut bar drawing on the main interface, right-click and select "End" (End drawing), "Close" (Closed line), "Cancel previous point" (Redraw previous point), "Previous line" (End drawing previous line, start drawing next line).



Draw plan line

(Click on the "Draw Line" button in the shortcut bar

Before drawing the plan line, draw

a closed line in the measurement area. Select the closed line and the plan line parameter interface will pop up. Rotate the measuring line clockwise in the north direction;

θI

The width of the interval between the "line distance" lines;

Prefix is the prefix of the planned line name;

The number in the name of the "number" plan line;

Select "Increment", "Decrement", and "Fixed" from the drop-down list, and then enter the step value; The suffix for the planned line name.



7.8 Measure

The measurement function can only be used by selecting "Demonstration Mode" or "Measurement Mode" in "Settings - Working Mode".



7.8.1Start

Click on "Measurement - Start" (or click on the shortcut "Start" button) (attended)) afterwards, settings will be made for "Line Name" (prefix), "Line Number" (automatically increasing with a number step of 1), and "Automatic Line Change Method" (no automatic line change, 500 point automatic line change, 1000 point automatic line change).

📰 Start Measuring					
Name	0		Number	0012	
Auto Switch	Switch Per 3500	\sim			
			ОК		Cancel

7.8.2Pause

Click on "Measurement - Pause" (or click on the "Pause" button in the shortcut bar)

7.8.3End

Click on "Measurement - End" (or click on the "End" button in the shortcut bar (or click on the measurement.

7.8.4Quick Line Change

Click on "Measurement - Quick Line Change" (or click on the "Quick Line Change" button in the shortcut

bar) In measurement mode, the current measurement line stops recording data and directly starts the measurement of the next measurement line.

7.8.5Click navigation

Click "Measurement - Point Navigation" (or click the "Point Navigation" button on the shortcut bar) to pop up a point navigation window, where the navigation point is highlighted in blue and the green dashed line represents the navigation line.

Point data and line data can be added by importing or manually drawing.

	North	0.000 m		
	East	0.000 m		
Δ	Right	0.000 m		
	Forward	0.000 m		
ALA	Distance	0.000 m		

7.8.6Line navigation

Click on "Measurement - Line Navigation" (or click on the "Line Navigation" button in the shortcut bar) to pop up a line navigation window. The navigation line is highlighted in blue, and the green dashed line represents the navigation line;

Click the "Navigation Previous Line" or "Navigation Next Line" button to switch navigation lines.



7.9 Tools

7.9.1Query point coordinates

Click on "Tools - Query Point Coordinates" to query the manually added point coordinates. Select the point and highlight it in blue, with the value displayed in the bottom right corner of the software.



7.9.2Query the distance between two points

Click on "Tools - Query Two Point Distance" (or click on the "Two Point Distance" button in the shortcut bar)

Query the distance and azimuth of any two points on the base map, and display the values in the bottom right corner of the software.



7.9.3Query Line Length

Click on "Tools - Query Line Length" to check the length of the manually added line. Select the line and highlight it in blue, with the value displayed in the bottom right corner of the software.



7.9.4Query area

Click "Tools - Query Area" to query the manually added closed line area, and the numerical value is displayed in the bottom right corner of the software.



7.9.5Calculate coordinate conversion parameters

Click on "Tools - Calculate Coordinate Conversion Parameters" to input WGS 84 coordinates and local coordinates to calculate the conversion parameters. The horizontal transformation model includes TGO horizontal adjustment and ordinary four parameters; The vertical transformation model includes fixed difference, surface fitting, and TGO vertical adjustment.

Click the "Add" button, the GNSS point is the WGS 84 coordinate, and the known point is the local plane coordinate.

Click the "List" button to select the corresponding point pairs in the coordinate library.

Click the "Delete" button to delete the selected point pairs from the list.

Click "Calculate" and then click "Apply" to remind whether to apply to the engineering coordinate system.




7.10Data processing

7.10.1 Tidal level editing

Click on "Data Processing - Tide Level Editing" to edit the tide level file, making it easier to correct the tide level during data processing.



File

Select "File", the dropdown list includes "New", "Open Tidal Sounder", "Import Water Depth", and "Save As".



- 1) Click "New" to create a blank tide level editing table. After editing, a reminder will be given to save the edited tide level file;
- 2) Click "Open Tide Sounder" to open the edited tide level file;
- 3) Click "Import Water Depth", select the file type as dep, enter the sampling interval, select the file path, and extract the ground height of the water surface inside as the tide level;



4) Click "Save As" to save the edited tide level file.

Chart style

 Tide Level Editing
 ×

 File
 View

 1.2
 Level(m)

 1
 (hhmm)

 0.8
 10.00

Select "Chart Style", the dropdown list includes "Chart Style" and "Table Style".

Tide measurement parameter settings

You can enter the site name, coordinates X and Y, select the date and step, and enter the tide level to record the time and tide level.

After completing the input, click "Add" to add a tidal level and start inputting the tidal level for the next time period. Repeat the above steps;

Click "Delete" to delete the selected data in the tide level information table;

Click "Clear" to clear all data in the tide level information table.

Interpolation settings

In the tide level information table, interpolate one tide level data at every interval (linear interpolation algorithm).

Fit site/coordinate input

Fit the data from multiple tidal stations into a curved surface, and based on the input coordinate positions, fit the tidal information for the corresponding positions.

Note:

1 At least 3 tidal stations are required for data fitting.

⁽²⁾ The date and time of tidal level information from multiple tidal stations need to be consistent in order to perform the fitting function;

7.10.2 Water depth sampling

Fast Data Processing

1) Click on "Data Processing - Water Depth Sampling", or click on the "Water Depth Sampling" button in the



The main process of data processing (select the steps in parentheses as needed): noise processing \rightarrow (data interpolation) \rightarrow data correction \rightarrow equidistant sampling \rightarrow (manual sampling) \rightarrow generate htt.

2) Inspect and denoise each measuring line for external measurement, and dilute it. According to the principle of terrain consistency, use an eraser to delete false water depth points that do not match the waveform, or drag the water depth points with the mouse until they match the waveform, as well as perform fixed interpolation and manual insertion operations.



3) Posture correction or three corrections, choose one of the operations and do not repeat the operation to

avoid overwriting the previously processed data. (When making three corrections, simply click "skip" for the content that does not need to be corrected.)

4) Select the sampling method and sampling interval as needed, and click "Isometric Sampling".

If some areas are not sampled, you can click "Manual Sampling" to manually sample some feature points. If this function is not needed, skip the manual sampling step.



Click the "Generate htt" button to save to .htt file.

Top Toolbar Functions

On the top toolbar, you can view the data collection date, antenna type, antenna deviation, and calibration parameters.

Measurement date: The date when the opened DEP file was collected.

Antenna type: The antenna type or USV type used in the opened DEP file.

Antenna deviation: The deviation between the antenna coordinates of the opened DEP file and the transducer coordinates.

Correction parameter: The northeast high offset of the coordinate parameters in the opened DEP file.



Note:

Before processing the data, it is necessary to check whether the ship type above corresponds to the USV model during measurement. If there is no corresponding model, the original dep file header needs to be manually modified before data processing.

1) Coordinate parameters:

View the coordinate system parameters of the current open project, but cannot make parameter modifications.



2) Open tide sounder:

Import tide sounder files (*. tid). First, open the dep survey line, and then import the tid. The tid date and time should include the dep date and time. After importing, the water surface elevation will be processed using the elevation data in the tid file.



3) Fixed interpolation:

Automatically correct water surface elevation data for non fixed solutions. Double click to open the dep survey line and select this button.

4) Eraser:

After selecting this button, select or drag the water depth point with the mouse to delete the water depth data.

5) Waveform centered:

The red waveform is displayed in the center.

6) Manual insertion:

Manually insert custom record points before data correction operations. Within the depth view range, click on the waveform with the mouse to insert a new recording point at the corresponding time and water depth. After inserting multiple points, post-processing can continue in order (data correction - isometric sampling - generating Htt).

7) Manual sampling:

After the equidistant sampling operation, for the point data that has not been sampled, manual sampling can be performed, that is, feature point sampling.

Select this button, select any non equidistant sampling point with the mouse, and a red sampling line will be automatically generated. After multiple operations, click "Generate Htt" finally.



8) Revoke:

Return to the previous step (drag point/delete point/add/delete feature point sampling line).

9) Restore:

Restore the previous operation (drag point/delete point/add/delete feature point sampling line).

10) Tidal view:

displays the elevation view of the water surface.



11) Display waveform:

Display the waveform of the same time recorded in the opened DEP file (waveform file is. sd, stored in the project folder - RawData folder).



Show/hide filter criteria.



13) High frequency:

Single frequency sounder data (USV dep, D230, D270).

14) Low frequency:

Dual frequency depth sounder data (D580).

Right Parameter Bar Function



1) Parameter settings

(1) Tidal height measurement: the vertical elevation interval of the tidal view;

2 Water depth vertical height: the water depth interval in the longitudinal direction of the water depth view;

③ Horizontal width: The horizontal time interval of the view. For dense data, the horizontal width can be reduced to make it easier to handle.

2) Conditional filtering

Set filtering parameters (solution status/RMS accuracy), then double-click on the dep line in the line list to

filter and display it in the view;

Alternatively, double-click on the dep line, select the filtering criteria, and click the "OK" button to display it in real-time.

3) Sampling settings



① Distance sampling: Take a point every X distance (>=X, unit: meters);

② Deepest (within equidistant intervals): Within equidistant distances X, take the deepest water depth point data as the sampling point;

③ Shallow (within equal spacing): within equal spacing X distance, take the shallowest water depth point data as the sampling point;

④ Average value (within equal intervals): Within an equal interval of X distance, take the average of all water depth data as the water depth point, and the sampling point is determined by distance sampling;

4) Attitude correction: only perform attitude compensation correction;

5) Three corrections: speed correction/delay correction/attitude correction;

Sound speed correction: Three correction modes can be used: "single sound speed", "depth+sound speed", and "depth+correction value". After completing the parameter input, click "Sound Speed Correction" to complete the correction or click "Skip" to enter "Delay Correction".

Data Correct			-	■ ×
ound Velocity Corre	ct Delay Correct Att	itude Correct		
-Correct Parameter	s Input			
Single Sound\	/el 💿 Depth+Soun	dVel 🔵 De	epth+Corr	ection
Raw Velocity:	1500.000	Calcul	ate	
Depth(m)	Sound Velocity(m/s)	Correcti	an(m)	
Add	Delete	Clear	Import	
Sound Valacity File	List		pert	
√ File Name				
HS L0006	2023-12-30-12-20-16E	U		
🗹 All 📃 Reve	erse	Correct	Ski	p
lip: Items that don'	t need to be corrected	d, click [Skip]	button.	

Delay correction: Enter the delay time for water depth and position. The position lag is positive and the water depth lag is negative. Click "Delay Correction" to complete the correction or "Skip" to enter "Attitude Correction".

🖁 Data Correct	-		×
Sound Velocity Correct Delay Correct Attitude Correct			
Delay Files List			
√ File Name			
☐ All			
Delay Time Setting		_	
Delay Time: 0.000 🔮 s			
Note: Position lag is positive, and water depth lag is nega	itive.		
Correct	Ski	р	
Tip: Items that don't need to be corrected, click [Skip] but	ton.		

Attitude correction: Input the opening angle of the transducer, the installation error of the transducer, select the automatic filtering method (median filtering, weighted filtering, sliding filtering), click "delay correction" to complete the data correction, or click "skip" to not make the correction.

Data Correct			-		×
ound Velocity Cor	rect Delay Correct	Attitude Correct			
Attitude File List					
√ File Nar	ne				
	everse				
Transducer para	meter setting ———				
Sounder Angle:	6.0	÷			
Sounder Error:	3.0	•			
🗸 Auto Smooth:	Median Filtering (Lo	ow) 🗸 Corre	ct	Skip	
ip: Items that do	Median Filtering (Lo Weighted Filtering)	ow) (Middle) ck [Skip] I	outton.		
	Moving Filtering (H	igh)			

Equidistant sampling: After data correction and correction, sparse sampling is performed according to the sampling interval (the points on the pink line are equidistant sampling points);

– Sample Settings –		
Sample Ways:	Distance	\sim
Sample Interval:	5	m

7) Generate htt: Dilute the sampled data and record it in the HTT file (the data export function will automatically open this directory);

8) Line List: Display the line (DEP) files included in the task, as well as the line processing status. Double click to open the line.

After opening the survey line, the water depth data and elevation data will be displayed. Moving the mouse over the water depth point or elevation point will display detailed information.



Precautions

1) Data post-processing must be executed in order. If it is found that noise needs to be reprocessed after isometric sampling is completed, it needs to be executed in order to take effect after the noise processing is completed. The main process of data processing is as follows (select the steps in parentheses):

Noise processing \rightarrow (Data interpolation) \rightarrow Data correction \rightarrow Isometric sampling \rightarrow (Manual sampling) \rightarrow Generate htt.

2) When using tidal data, the time range of the measuring line data should be within the time range of the tid tide level. After importing the tide level file of tid, it is applicable to each measuring line. Secondly, after importing tid, the horizontal time range of its view is within the time range of tid.

7.11Data export

Click on "Data Processing - Data Export", or click on the "Export" button in the shortcut bar open the saved HTT file,

Check "File Merge" to merge and export multiple HTT data into one file;

Check "Export Header" to export the result file of the data, supporting header export;

You can choose the file type to export, including dat, txt, CSV, and dxf types;

Format selection: Select a format from the drop-down list, and select the custom option to create a new format yourself;

Click "Export" to export the selected format data;

Click "Delete" to delete the selected format (only supports custom added data formats);





7.11.1 UAV cross-section export

Click "Data Processing - Drone Section Export", open the HTT file, fill in the relevant parameter information, and click "Table Export" to generate an xls file; Click "one click upload" to automatically upload to the drone flow measurement platform server, and generate flow measurement routes at the same time.

193 Reserved

7.12Support

7.12.1 Software registration

The CHCNAV series USV do not require registration. If using depth sounders and other positioning and navigation equipment, a software dog or machine code registration activation is required.

🕺 Software Register 🛛 🗙 🗙	
Mode 🗸 🗸 🗸	
Application Code	
Expiration	
Register Code	
Information	
Tips: The Apache series USV don't need to registered. click the button [one-click connect] on the main interface to operate normally. Ignore the expired info in this interface. Sounder D230 can only be used after being registered.	
Register Cancel	

7.12.2 Online upgrade

Click on online upgrade to automatically detect the latest version of the software. Release note



7.12.3 User's manual



7.12.4 Understanding Huawei

Click to learn about CHCNAV APCHE series USV, follow the [Huawei Tour World] official account by scanning the WeChat code, and check the operation manual/video/FAQ/technical bulletin online.



7.12.5 Language selection

Supports switching between Chinese, English, and Russian languages, effective after restarting the software.

Unit selection

Supports switching between distance and temperature unit displays,

Distance: meters/US feet/International feet.

Temperature: Celsius/Fahrenheit.



7.12.6 About Software

View the current version of HydroSurvey software. When the depth sounder is turned on, the corresponding firmware version of the depth sounder can be displayed.



7.13Other functions

7.13.1 Waveform printing

This function requires connecting the printer (real-time printing and playback printing), installing the driver, and setting printer configuration parameters in order to print normally. When setting up PDF saving, it can be directly saved to a PDF file without the need for a connection.

Printer model: Brother PJ-763MFi

Printer driver: can be obtained by contacting technical personnel;

"Waveform Printing": Click on the "Waveform Printing" button in the shortcut bar



Printing methods: real-time printing, playback printing, PDF saving;

Engineering information: print head information;

Horizontal width: printing horizontal time intervals;

Real Time Printing

After setting the parameters, click the "Start Printing" button and "Start" recording to achieve real-time waveform printing while measuring and recording data;

Real time printing, waveform renderings cannot be previewed;



Playback Printing

In the waveform file list, select the corresponding file and click the "Start Printing" button. Double click on the file to preview the waveform effect in the left view;

Attention: When the file is large, wait for a moment as uploading the data to the printer takes time;



PDF Save

In the waveform file list, select the corresponding file and click "Start Printing". Below the file list, you can view the current progress of file processing.



The file is automatically stored in the Result directory under the current project, and the PDF file content is displayed:

≔ ∀ ∨ ∀ 绘制 ∨		- + 🕶 1 /28 🖓 🖽	< ⊖ ≥ ≥ ≥ ◎
	THE PART AND		

End Printing

Click on the shortcut bar and click on the "End Printing" button 2 2 2 2 2 2 2 3, end current real-time printing, invalid for playback printing function.



8. Navigation

Please install and operate the equipment under the guidance of Huace professional technicians after completing the training and teaching of Huace unmanned ships. When operating unmanned ships, please plan the path reasonably based on the on-site working environment and adopt appropriate methods for accurate and efficient measurement.

8.1 Navigation environment requirements

1. In extremely bad weather, to ensure the safety of work equipment and personnel, please do not conduct measurements.

2. Please avoid operating near high-voltage power lines, communication base stations, and signal towers, as the remote control may be affected by interference in this environment.

3. Please use with caution in complex aquatic environments such as turbulent water flow and navigation channels.

8.2 Pre homework check

1. Unmanned ships and remote control batteries are fully charged.

2. The unmanned ship antenna, hatch cover, etc. are all tightened in place

3. The motor rotates normally without any abnormal noise and the wind direction is correct.

4. The unmanned ship (4G/data transmission) has stable communication, and the depth sounder and positioning equipment are working properly.

5. If automatic navigation is required, check if the route is within the water area and if the Home point is reasonable.

9. APPENDIX



10.1Product Parameters



技术参数

	船体尺寸	1000mm*650 mm *300 mm	100	控制模式	手动&半自动&免规划全自动
	材质	高分子聚酯碳纤维、凯夫拉布	圮	主控防水防尘	IP67
	船体自重	7kg	制	数据储存	木地條存 (可多通道储存) 和远程储存
	最大载重	25kg		SAMINIT	
	抗风浪等级	3级风, 2级浪		控制功能	利余里程提醒、多角度视频、支持物理&虚拟摇杆、电池温度显示
ற்க	船型	三体船		底图加载	支持在线天地图、MapBox、ArcGis卫星影像加载
乃口	防水防尘	IP67	软	新史立在市台的	支持坐标转换、轨迹、水深、波形实时显示,
14	吃水	10cm	件	蚁焰木柴 刈肥	支持软件与无人船本地8通道存储
	指示灯	双色灯,可指示定位信号状态和差分源	3	数据后处理功能	支持单波束数据后处理,支持波形图叠加显示,支持姿态改正
	视频	360°全向视频	45	PPK解算	支持定位+水深数据PPK后差分解算
	安全	浅滩自动倒车、毫米波自动避障和视频视察	玑	自检	开机系统自检,异常提醒;巡航速度异常语音提醒; 流景监控与提醒
	返航	低电量自动返航、失联自动返航(择近路径返航)		工1473	支持如因性左绊绊洋升级
	防护措施	船身配备防撞条,安全可靠		近航海堤	低中量白动运输 生联白动运输 (塔近路经运输)
	动力类型	电动		成用导电方式	11000里白4012011、入水白4012011(14月18日1日2011)
	电机类型	无刷电机		成未守山力式	
	转向类型	无舵机转向		卫星系统	Galileo E1/E5a/E5b、GLONASS L1/L2、QZSS L1/L2/L5
	马达功率	单马达最大700W		通道	1408通道
≂n	马达转速	最大7000转每分钟	. 1	冷启动	< 30s
+	马达安装方式	插拔设计、易拆换	-	初始化时间	< 5s (典型值)
73	防水草方式	半嵌入式涵道式设计、防水草罩、无外挂防剐蹭	た	单点定位精度	平面1.5m、垂直2.5m
	电池规格	32.4V 23.1Ah*4可充电锂电池、18650电芯	11	DGNSS定位精度	平面40cm+1ppm、垂直80cm+1ppm
	续航时间	标配2组电池on@2m/s, IIn@1.5m/s 洗配可は12b@2m/s 22b@15m/s	系	RTK定位精度	平面±8mm+1ppm、垂直±15mm+1ppm
	续航里程	经济结合甲程40km (以1:1000 10m航线间隔计管约0.4km ²)	统	CORS差分源	支持网络CORS,赠送3年内置账号
	最大船速	7m/s		电台差分	支持华测协议/TT450协议/透明传输协议/南方协议、
	显示屏	10.1寸工业触摸屏+阳光可视屏		中向結府	O 1º (1m H4t)
	分辨率	1920*1200		信号结度	6° h · 20(精度高減1m 支持核下持续自主已給及测量
	安卓系统	Android 9.1		MU IMU ImU ImU Imu 王 新家	200日7
	内存	运存 4GB,存储容量64GB	-	新日本田	とのHZ 化測格式 NIMEA CODDIT/CODDITIOTE分支形
	通讯频率	800MHz/1.4GHz/2.4GHz			11kg
1777	通讯距离	数传电台常规2km,最大3km,4G无限制		工作単単	0.15-300m
進	电池容量	20000mAh	्यत्तात	测示结束	+1cm+0.1%h (h节水浴)
控	工作续航	5小时	网	/则/不相反 公翰家	
	充电功率	36W快充,充电时长4小时	涂	月州平	30Hz
	接口	USB口、Nano SIM卡槽、LAN网口、音频接口、	系	斯家	200kHz
	100 March 100	HDMI接山、II-卞最天文持I28GB、Iype-C	统	波束开角	6 5°+1°
	按键	土摇杆~2, 次摇杆~2、旋钮~2、按键~8		供由电压	10-30V DC或220V AC话配器
	船体控制	物理按键控制于/自动,总导控制,一体化软件控制船体、 规划航线、水下地形数据采集		最大发射功率	300W
	操作系统	Linux		功耗	10W
	基站通讯	电台&网络&CORS		接口	RS232
	数据通讯	标配4G(支持LTE-FDD、LTE-TDD、 UMTS、GSM全球网络制式)&电台	本3	文件所列出的各项参数数值	均为理论值或华测导航测试人员在特定受控测试环境下测得值(请见名
控	视频通讯	4G&电台	项	具体说明),实际使用中可	能因产品个体差异、固件版本、使用条件、使用方式和使用环境等不同
制	SIM卡槽	eSIM (赠送10G*36月网络流量) 和Nano卡槽	使得	导结果或有不同程度的差异	,请以实际使用的情况为准。
	接口	2*RI45网口、3*RS232串口、1*RS485串口、1*PPS、2*指示水丁、1*蜂鸣器、1*WIF	为执	是供尽可能准确的产品信息	、参数数值,华测导航可能实时对本文件的文字表述、参数数值等内容
	内存	主控内置存储32GB	进行	 行调整和修正,以求与实际	产品性能、规格等信息相匹配。由于产品批次和生产供应因素等实时变
	船型识别	支持船型自动识别,并将各传感器安装偏差值 自动写入记录文件中	化,如却有必要进行前述修改和调整的,恕不专门通知,请以官网实时信息为准。 版		

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技术参数

	船体尺寸	1050 mm *550 mm *390 mm		+outure-etc	任务规划、可实现自主导航、船体参数控制、总航行里程统计、		
	材质	高分子聚酯碳纤维、凯夫拉布		112市J-VJHE	剩余里程提醒、多角度视频、支持物理&虚拟摇杆、电池温度显示		
	船体自重	6kg	±/17	底图加载	支持在线天地图、MapBox、ArcGis卫星影像加载		
	最大载重	30kg	秋	彩旗亦在市台	支持坐标转换、轨迹、水深、波形实时显示,		
	抗风浪等级	3级风,2级浪	件	刘佑木果切能	支持软件与无人船本地8通道存储		
	船型	三体船	系	数据后处理功能	支持单波束数据后处理,支持波形图叠加显示,支持姿态改正		
船	GNSS	船体内置GNSS双天线,无需外接RTK	统	PPK解算	支持定位+水深数据PPK后差分解算		
休	防水防尘	IP67		自检	开机系统自检,异常提醒;巡航速度异常语音提醒;流量监控与提醒		
Pres.	吃水	9cm		升级	支持软固件在线推送升级		
	指示灯	双色灯,可指示定位信号状态和差分源		返航逻辑	低电量自动返航、失联自动返航 (择近路径返航)		
	视频	360°全向视频	_	成果导出方式	U盘、Type-C线、分享码远程数据共享		
	安全	浅滩自动倒车、毫米波避障自动避障和视频视察,支持半自动和全自动测量		刀目刃体	BDS B11/B21 /B31、GPS L1C/A/L2P(Y)/L2C/L5、Galileo E1/E5a/E5b		
	避障距离	0.2-40m		卫星系统	GLONASS L1/L2、QZSS L1/L2/L5		
	避障范围	俯仰*方位: 14°*112°, 最多支持64个目标同时探测跟踪		通道	1408通道		
	防护措施	船身配备防撞条,安全可靠,双层船壳防沉没		冷启动tt	< 30s		
	动力类型	电动	÷	初始化时间	< 5s (典型值)		
	电机类型	无刷电机	た	单点定位精度	平面1.5m、垂直2.5m		
	转向类型	无舵机转向,支持倒车	11	DGNSS定位精度	平面40cm+1ppm、垂直80cm+1ppm		
	马达功率	单马达最大800W	系	RTK定位精度	平面±8mm+1ppm、垂直±15mm+1ppm		
	马达转速	最大7200转每分钟	统	CORS差分源	支持网络CORS,赠送3年内置账号		
动	马达安装方式	插拔设计、易拆换		电台差分	支持华测协议/TT450协议/透明传输协议/南方协议、Satel 3AS协议		
t	防水草方式	半嵌入式涵道式设计、防水草罩、无外挂防剐蹭		定向精度	0.1°(1m基线)		
15	电池规格	32.4V 23.1Ah*4可充电锂电池、18650电芯		惯导精度	6°/h; 20S精度衰减1m, 支持桥下持续自主导航及测量		
	供电方式	支持单电池独立供电,双电池均衡供电	_	IMU更新率	200Hz		
	电池更换	支持不关机热插拔更换		数据类型	华测格式、NMEA SDDPT/SDDBT和原始波形		
	续航时间	标配2组电池6h@2m/s, 11h@1.5m/s;选配可达12h@2m/s, 22h@1.5m/s		操作系统	Linux		
	续航里程	经济续航里程40km (以1:1000 10m航线间隔计算约0.4km²)		液晶屏	1.46英寸,分辨率128 x 128		
	最大船速	8m/s,支持安全穿越4m/s流速断面		WiFi	802.11n-2.4G		
	显示屏	10.1寸工业触摸屏+阳光可视屏		蓝牙	BT5.0, 向下兼容BT2.x		
	分辨率	1920*1200		主机重量	840g		
	安卓系统	Android 9.1	测	测深范围	0.15-300m		
	内存	运存 4GB,存储容量64GB	377	测深精度	±1cm+0.1%h (h为水深)		
1997	通讯频率	800MHz/1.4GHz/2.4GHz	1本	分辨率	1cm		
進	通讯距离	数传电台常规2km,极限3km,4G无限制	杀	最大采样率	30Hz		
羟	电池容量	20000mAh	统	频率	200kHz		
	工作续航	5小时		水温传感器	-55℃~+100℃,实时修正声速		
	充电功率	36W快充,充电时长4小时		波束开角	6.5°±1°		
	接口	USB口,Nano SIM卡槽、LAN网口、音频接口、HDMI接口、TF卡最大支持128GB、Type-C		声速调整范围	0m/s~1700m/s		
	按键	主摇杆*2,次摇杆*2、旋钮*2、按键*8		供电电压	10-36V DC或100-240V AC适配器		
	船体控制	物理按键控制手/自动,悬停控制,一体化软件控制船体、规划航线、水下地形数据采集		防尘防水	IP67		
	操作系统	Linux		最大发射功率	300W		
	基站通讯	电台&网络&CORS	_	功耗	10W		
	数据通讯	标配4G(支持LTE-FDD、LTE-TDD、UMTS、GSM全球网络制式)&电台	本3	文件所列出的各项参数数	值均为理论值或华测导航测试人员在特定受控测试环境下测得值(请见各		
垴	视频通讯	4G&电台	项	具体说明),实际使用中	可能因产品个体差异、固件版本、使用条件、使用方式和使用环境等不同		
)工 牛II	SIM卡槽	eSIM (赗送10G*36月网络流量) 和Nano卡槽	使得	导结果或有不同程度的差	异,请以实际使用的情况为准。		
ψIJ	送口	2*K145网山、3*K5232串山、7*K5485串山、7*P+5、2*指示水」、7*蜂鸣器、1*WiFi	为技	是供尽可能准确的产品信	息、参数数值,华测导航可能实时对本文件的文字表述、参数数值等内容		
	内仔	王控内直存储32GB	进行	行调整和修正,以求与实	际产品性能、规格等信息相匹配。由于产品批次和生产供应因素等实时变		
	相望识别	又持船空目动识别,并将各传感器安装偏差值目动写入记录又件中 天法8以内法8条相制人内法	化,如却有必要进行前述修改和调整的,恕不专门通知,请以官网实时信息为准。				
	控制 模式	于动&中目动&免规划至目动			版本: 23.11		
	土拴防水防尘	120/					
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技术参数

	NEL MAY C 2	120011111 75011111 40011111	小又採毛					
	材质	高分子聚酯碳纤维、凯夫拉布	控 主控防水防尘	IP67				
	船体自重	13kg	数据储存	本地储存 (可多通道储存) 和远程储存				
- 1	最大载重	40kg	teleste i mite dats	任务规划、可实现自主导航、船体参数控制、总航行里程统计、				
	抗风浪等级	3级风,2级浪	控制切肥	剩余里程提醒、多角度视频、支持水文模式、ADCP一键配置、电池温度显示				
	船型	三体船	底图加载	支持在线天地图、MapBox、ArcGis卫星影像加载				
	GNSS	船体内置GNSS双天线,无需外接RTK	米市田立在市市台に	支持坐标转换、轨迹、水深、波形实时显示,				
- 1	ADCP安装孔径	24cm	软的水果切肥	支持软件与无人船本地8通道存储				
船	ADCP兼容性	兼容搭载RCP、M9、RiverPro、RiverRay、RioGrande等走航式ADCP	性 数据后处理功能	支持单波束数据后处理,支持波形图叠加显示,支持姿态改正				
体	挂载设备	同时搭载ADCP和测深仪;可扩展取样、水质仪、侧扫	统 PPK解算	支持定位+水深数据PPK后差分解算				
- 1	防水防尘	IP67	自检	开机系统自检,异常提醒;巡航速度异常语音提醒;流量监控与提醒				
- 1	吃水	10cm	升级	支持软固件在线推送升级				
- 1	指示灯	双色灯,可指示定位信号状态和差分源	返航逻辑	低电量自动返航、失联自动返航 (择近路径返航)				
- 1	视频	360°全向视频	成果导出方式	U盘、Type-C线、分享码远程数据共享				
- 1	安全	浅滩自动倒车、毫米波雷达自动避障和视频观察	五月五位	BDS B1I/B2I /B3I、GPS L1C/A/L2P(Y)/L2C/L5、Galileo E1/E5a/E5b、				
	避障距离	0.2-40m	卫星系统	GLONASS L1/L2, QZSS L1/L2/L5				
1	避障范围	俯仰*方位: 14°*112°, 最多支持64个目标同时探测跟踪	通道	1408通道				
- 1	防护措施	船身配备防撞条,安全可靠,双层船壳防沉没	冷启动	< 30s				
	动力类型	电动	初始化时间	< 5s (典型值)				
- 1	电机类型	无刷电机	定 单点定位精度	平面1.5m、垂直2.5m				
- 1	转向类型	无舵机转向,支持倒车	DGNSS定位精度	平面40cm+1ppm、垂直80cm+1ppm				
- 1	马达功率	单马达最大1000W	统RTK定位精度	平面±8mm+1ppm、垂直±15mm+1ppm				
	马达转速	最大7200转每分钟	CORS差分源	支持网络CORS,赠送3年内置账号				
≂th	马达安装方式	插拔设计、易拆换	电台差分	支持华测协议/TT450协议/透明传输协议/南方协议、Satel 3AS协议				
ЭŢ	防水草方式	半嵌入式涵道式设计、防水草罩、无外挂防剐蹭	定向精度	0.1°(1m基线)				
- 1	电池规格	32.4V 23.1Ah*2可充电锂电池、18650电芯	惯导精度	6°/h; 20s精度衰减1m, 支持桥下持续自主导航及测量				
	供电方式	支持单电池独立供电,双电池均衡供电	IMU更新率	200Hz				
- 1	电池更换	支持不关机热插拔更换	数据类型	华测格式、NMEA SDDPT/SDDBT和原始波形				
- 1	续航时间	8h@1.5m/s,选配可达12h@2m/s	操作系统	Linux				
- 1	最大船速	7.5m/s	液晶屏	1.46英寸, 分辨率128 x 128				
	显示屏	10.1寸工业触摸屏+阳光可视屏	WiFi	802.11n-2.4G				
- 1	分辨率	1920*1200	蓝牙	BT5.0, 向下兼容BT2.x				
- 1	安卓系統	Android 9.1	主机重量	840g				
- 1	内存	运存 4GB,存储容量64GB	测深范围	0.15-300m				
- 1	通讯频率	800MHz/1.4GHz/2.4GHz	测深精度	±1cm+0.1%h (h为水深)				
谣	通讯距离	数传电台常规2km,极限3km,4G无限制	分辨率	1cm				
控	电池容量	20000mAh	最大采样率	30Hz				
- 1	工作续航	5小时	频率	200kHz/25kHz双频				
- 1	充电功率	36W快充,充电时长4小时	水温传感器	-55℃~+100℃,实时修正声速				
- 1	***	USB口、Nano SIM卡槽、LAN网口、音频接口、HDMI接口、	波束开角	6.5°±1°/28°±1° (25kHz)				
	按凵	TF卡最大支持128GB、Type-C	声速调整范围	0m/s~1700m/s				
	按键	主摇杆*2,次摇杆*2、旋钮*2、按键*8	供电电压	10-36V DC或100-240V AC适配器				
		物理按键控制手/自动,悬停控制,一体化软件控制船体、规划航线、	防尘防水	IP67				
	船体控制	水下地形数据采集	最大发射功率	300W				
	操作系统	Linux	功耗	10W				
- 1	基站通讯	电台&网络&CORS						
	数据通讯	标配4G (支持LTE-FDD、LTE-TDD、UMTS、GSM全球网络制式) &电台	本文件所列出的各项参数	双数值均为埋论值或华测导航测试人员在特定受控测试环境下测得值(请见各				
	视频通讯	4G&电台	坝具体说明) , 实际使F	书中可能因产品个体差异、固件版本、使用条件、使用万式和使用环境等不同 ****				
控制	SIM卡槽	eSIM (赠送10G*36月网络流量) 和Nano卡槽	使得结果或有个问程度的	9差异,请以头际1史用的情况为准。				
199	接口	2*RJ45网口、3*RS232串口、1*RS485串口、1*PPS、2*指示灯、1*蜂鸣器、1*WiFi	为提供尽可能准确的产品	品信息、参数数值,华测导航可能实时对本文件的文字表述、参数数值等内容				
. 1	内存	主控内置存储32GB	进行调整和修正,以求与实际产品性能、规格等信息相匹配。由于产品批次和生产供应因素等实时3 化,如却有必要进行前述修改和调整的,怨不专门通知,请以官网实时信息为准。					
	船型识别	支持船型自动识别,并将各传感器安装偏差值自动写入记录文件中						
		王动见半自动见免抑制全自动		版本: 23.11				

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技术参数

	船体尺寸	1800 mm *500 mm *250 mm		口見玄体	BDS B11/B21 /B31、GPS	
	材质	高分子聚酯碳纤维、凯夫拉布		上生示机	E1/E5a/E5b、GLONAS	
	船体自重	15kg		通道	1408通道	
	最大载重	60kg		冷启动	< 30s	
	抗风浪等级	6级风, 4级浪		初始化时间	< 5s (典型值)	
船	船型	可拆卸式三体船	定位	单点定位精度	平面1.5m、垂直2.5m	
体	防水防尘	IP65	系	DGNSS定位精度	平面40cm+1ppm、垂	
	吃水	15cm	统	RTK定位精度	平面±8mm+1ppm、	
	指示灯	双色灯,可指示定位信号状态和差分源		CORS差分源	支持网络CORS,赠送	
	视频	360°全向视频,可实时回传		中心关入	支持华测协议/TT450协	
	安全	浅滩自动倒车、超声波避障和视频视察		电音差分	Satel 3AS协议	
	返航	低电量自动返航、失联自动返航 (择近路径返航)		定向精度	0.1°(1m基线)	
	动力类型	电动		惯导精度	6°/h; 20S精度衰减1m	
	电机类型	无刷电机		IMU更新率	200Hz	
	转向类型	无舵机转向		数据类型	华测格式、NMEA SD	
	马达功率	单马达最大700W		主机重量	1.1kg	
动	马达转速	最大7000转每分钟		测深范围	0.15-300m	
Ъ	马达安装方式	插拔设计、易拆换		测深精度	±1cm+0.1%h (h为水)	
	防水草方式	涵道式设计、防水草罩	测	分辨率	1cm	
	电池规格	32.4V 23.1Ah*9、可充电锂电池、18650电芯	深	频率	200kHz	
	续航时间	6h@2m/s,选配可达12h@2m/s	系	供电电压	10-30V DC或220V AC	
	最大船速	6m/s	鈗	波束开角	6.5°±1°	
	基站通讯	电台&网络&CORS		功耗	10W	
	数据通讯	标配4G&网桥&电台		脉冲功率	300W	
通	遥控通讯	2.4GHz电台&4G&网桥		最大采样率	30Hz	
讯	视频通讯	4G&网桥		接口	RS232串口	
控	遥控距离	智能遥控2公里、4G无限制(视网络情况)和网桥2公里	本文作	牛所列出的各项参数	收数值均为理论值或华测	
制	SIM卡槽	eSIM (赠送10G*36月网络流量) 和Nano卡槽	得值	得值(请见各项具体说明),实际使用中可能		
	控制模式	手动&自动	使用死	5式和使用环境等2	下同使得结果或有不同程!	
	主控防水防尘	IP67	为提供	供尽可能准确的产品	品信息、参数数值,华测	
	数据存储	本地存储(可多通道存储)和远程存储	数数位	11等内容进行调整和 11字供应用表等实际	1修正,以求与实际产品 [。] t亦化,加却有必要进行;	
	软件	任务规划、数据采集和数据后处理等功能,可实现自主导航、 船体参数控制、多角度视频显示和坐标转换等功能,支持卫 星底图导入,方便规划测区。	 次和生产供应因素等实时变化,如却有必要 以官网实时信息为准。 			

卫星系统	BDS B11/B21 /B31、GPS L1C/A/L2P(Y)/L2C/L5、Galileo E1/E5a/E5b、GLONASS L1/L2、QZSS L1/L2/L5
通道	1408通道
冷启动	< 30s
初始化时间	< 5s (典型值)
单点定位精度	平面1.5m、垂直2.5m
DGNSS定位精度	平面40cm+1ppm、垂直80cm+1ppm
RTK定位精度	平面±8mm+1ppm、垂直±15mm+1ppm
CORS差分源	支持网络CORS,赠送3年内置账号
电台差分	支持华测协议/TT450协议/透明传输协议/南方协议、 Satel 3AS协议
定向精度	0.1°(1m基线)
惯导精度	6°/h; 20S精度衰减1m, 支持桥下持续自主导航及测量
IMU更新率	200Hz
数据类型	华测格式、NMEA SDDPT/SDDBT和原始波形
主机重量	1.1kg
测深范围	0.15-300m
测深精度	±1cm+0.1%h (h为水深)
分辨率	1cm
频率	200kHz
供电电压	10-30V DC或220V AC适配器
波束开角	6.5°±1°
功耗	10W
脉冲功率	300W
最大采样率	30Hz
接口	RS232串口

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则导航可能实时对本文件的文字表述、参 2性能、规格等信息相匹配。由于产品批 5前述修改和调整的,恕不专门通知,请

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10.2Detailed Explanation of USV Operation Mode

Surveying mode: Conventional operation mode. After switching to automatic mode, the USV executes commands according to the preset route. After reaching the target task point, it automatically navigates towards the next task point.

Hydrological mode: mainly used for hydrological testing. On the map, there are two points on the left and right banks of the river section. After the USV switches to automatic mode, it will travel back and forth along the line between the two points. When it reaches the task point, it will automatically hover and continue to travel after the hover is released.



10.2.1 Semi automatic mode: (manual rough route planning)

Cover the measuring water area, islands, and other obstacles with the polygonal range.

After the USV is launched, switch to automatic mode. For example, when the ship is launched from the Home position, the USV is sailing towards 1 o'clock, millimeter wave detects obstacles, and the USV is turning towards the rear route direction to try to bypass obstacles (in this case, turning right to try to bypass). When the ship continuously encounters obstacles and reaches the next survey line, it is judged as shore and abandoned waypoint 1 to waypoint 2.



Encounter continuous obstacles at waypoint 2, and waypoint 3 is also under obstacle detection. Abandon waypoints 2 and 3 and go to waypoint 4 (as shown in the above picture).

The logic behind the waypoint is the same as above. The USV follows the route shown in Figure 3, because the USV cannot know the blank waters of the two survey lines behind the island. The blank waters near the two survey lines of waypoint 10 and route 11 need to be measured separately by setting up a route. (As shown in the figure below)



If the obstacle does not cover the next survey line, bypass the obstacle and continue the route (as shown in the figure below).



10.2.2 Full automatic mode:

After the USV is launched, it travels along the direction of the desired measurement route (as shown in the blue trajectory line in Figure 5), automatically enters the fully automatic measurement mode, and the software prompts "Please move the left and right joysticks to determine the direction of the next route" for voice synchronization broadcasting. The operator moves the remote control left joystick to determine the direction of the route (as shown in the blue arrow in Figure 5, the route will move to the left);



USVs automatically plan their routes in parallel directions, with millimeter wave and obstacle logic consistent with semi-automatic logic.

Note:

Semi automatic and fully automatic measurement modes are only available for USVs equipped with millimeter wave obstacle avoidance modules.

Cooperating with low battery automatic return logic, millimeter wave obstacle avoidance, and shallow beach recognition to avoid obstacles on the water surface and underwater, achieving automated measurement of large areas of water for USVs.

10.3Firmware Upgrade

Firmware (*.hex;*.px4;*.vrx;*.bin) The firmware has two formats: bin and px4, which can be upgraded separately.

There are two ways to upgrade the firmware of USV GD100, each of which includes manual upgrade and online upgrade.

Method 1: Upgrade through GD100 web page.

In the GD100 webpage backend, go to [Firmware] - [Firmware Information] to view the current firmware version

CHCNA	V	SN:3551654	English 💛	Quit
🗑 Status	Firmware Info. ×			
Satellites	Firmware Version: 1.7.2.1			
🔆 Receiver Configuration	Firmware Release Time: 20230420_df9367b			
Data Recording	AF100 Vetsion, V+.0.3_0+21			
I/O Settings				
System settings				
Firmware				
 Firmware Info. 				
 Hardware Version 				
 Config File 				
 System Log 				
 User Log 				
 Firmware Update 				
 Radio Upgrade 				
 GNSS Registration 				
Cloud Service Setting				

Manual upgrade: Click browse, select the local firmware, and then click OK to upgrade the GD100 host firmware (bin) and control firmware (px4) in sequence.

Online upgrade: When the network environment of the USV is stable, clicking on online upgrade will automatically upgrade the firmware to the server and upload the latest version.

CHCNA		SN:3551654	English 💛	Quit
🗊 Status	Firmware Update ×			
Satellites	Manual Upprade			
X Receiver Configuration				
Data Recording	Tip: It is not supported to upgrade three firmwares at the same time.			
I/O Settings	GD100 Host Upgrade			
System settings	File(.bin):			
Firmware	Confirm			
 Firmware Info. 	OD100 Central Llagrade			
 Hardware Version 	File(.px4):			
 Config File 	E Confirm			
 System Log 				
 User Log 				
Firmware Update	Online Ungrade			
 Radio Upgrade 				
 GNSS Registration 	Tip:Both GD100 host firmware and control firmware will be upgraded at the same time.			
	🖾 Online Upgrade			

Method 2: Upgrade the software and firmware with just one click using AutoPlanner software. Manual upgrade: After connecting to the USV, in the help interface, select [Firmware Upgrade]. This interface allows you to view the current firmware version and select [Upgrade Firmware (USB only)]

固件升级	
软件升级	AP100固件版本号: 4.6.9_0427
GD100注册	│
版本说明	
软件版本	升级固件(仅限USB)
选择语言	升级Bootloader

Online Upgrade: In the help interface, select [Software Upgrade], check [Firmware Sync Upgrade], click Upgrade to upgrade the AutoPlanner software and firmware to the server and upload the latest version.





Upgrading using a 4G network is relatively slow. It is recommended to connect to the GD100 lan1 port through a network cable in data transmission mode. At this time, the upgrade time will be shortened to about 5 minutes.

10.4Camera debugging

To replace the camera, the following methods can be used for debugging: connect the computer and camera through a network cable, modify the IPV4 protocol to the network segment 1

太网 属性	\times	Internet 协议版本 4 (TCP/IPv4) 属性		
网络 共享		常规		
连接时使用: 🚽 Realtek PCIe GbE Family Controller		如果网络支持此功能,则可以获取自动指 络系统管理员处获得适当的 IP 设置。	派的 IP 设置。否则,你需要从网	
配置(C) 此连接使用下列项目(O):		○ 自动获得 IP 地址(O)		
 ✓ Microsoft 网络客户端 ✓ ✓ Microsoft 网络的文件和打印机共享 ✓ ✓ ♀ QoS 数据包计划程序 	1	● (U): IP 地址(I): 子网撞码(I):	192.168.1.123 255.255.255.0	
 ☑ _ Internet 协议版本 4 (TCP/IPv4) □ _ Microsoft 网络适配器多路传送器协议 ☑ _ Microsoft LLDP 协议驱动程序 		默认网关(D):	192.168.1.1	
☑ _ Internet 协议版本 6 (TCP/IPv6) ☑ _ 链路层柘扑发现廊应程序		○ 自动获得 DNS 服务器地址(B) ○ 使用下面的 DNS 服务器地址(E):		
安装(N) 卸载(U) 属性(R)		首选 DNS 服务器(P):	· · ·	
		备用 DNS 服务器(A):		
1998/12790/22/internet 1971、16/1972/22/22/2017 域网络协议,用于在不同的相互连接的网络上通信。		□ 退出时验证设置(L)	高级(V)	
确定 取消			确定 取消	Á

Open the Internet Explorer, enter 192.168.1.64 in the address bar, and enter the camera webpage management platform



Enter the username: admin. and password: Admin1234

HIKVISION®	125		
	用户名 密码	使用产品时, 请尊重他人隐私等权利 admin Admin1234 ● 8-10位, 只服用数字、小写字母、大 写字母、特殊字符 (ms545(1)*+.た, <=>>@[1]_①-空物) 两种及以上组 合	 ▲ 用户名 ■ 素祭 ▲記念報2 公录
	密码确认	【】 ◎ 不服553 机定	

Click on the configuration interface, and in the [System] - [System Settings] interface, record the last 9 digits of the device serial number (mixed with letters and numbers)

➡ 系統	基本信息 时间配置	夏令时 RS-485 关于设备
系统设置	设备名称	IP DOME
系统维护	设备编号	88
安全管理	设备型号	DS-2PT2D20IW-D3
田户管理	设备序列号	DS-2PT2D20IW-D320230901CCCHS6AF9495291
网络	主控版本	V5.7.11 build 230612
	编码版本	V7.3 build 220830
兴 视音频	Web版本	V4.0.1.0 build 220706
▶ 图像	Plugin版本	3.0.8.7
PTZ PTZ	通道个数	1
一 事件	硬盘个数	0
音 存储	报警输入个数	0
	报警输出个数	0
	主控版本属性	B-R-E7-0
	冒 保存	

Click on [Image] - [Display Settings] - Right side list [Video Adjustment], and change the image to [Center].



Click on the "Focus" option in the list, select "Auto" as the focus mode, and select "Compatible" as the minimum focus distance.



[Image] - [OSD Settings], uncheck display date, add character overlay 1 [CHCNAV]



Configuration interface, [Advanced Configuration] - [Platform Access], select [Firestone Cloud] as the platform access method, and input the verification code into "CHCNAV",

HIKVISION®			
 ■ SAA ● 200 ■ SAA 	SNMP FTP Email 平台線入 HTTPS QoS 平台線入方式 電石云	802.1x 期间的时候 副帕瑟特 用服服装箱 TCP100度 用量相称 9	SRIP.
加强能器	IEAESABIP Medewys7.com 程示	×	
 ● ●<th></th><th>相策石法、構成変重能行動証明。 部に初 ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・</th><th></th>		相策石法、構成変重能行動証明。 部に初 ・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・・	
	田 (a),	(Roiz) TOTA	

Configuration interface, [Basic Configuration], modify the IPV4 address of the device to 192.168.53.64, subnet mask 255.255.255.0, default gateway 192.168.53.254 for IPV4, click the save button, restart the device, and connect the network cable to the USV GD100 LAN1 network port.
HIK	VISION®	预览	配置
—	系统	TCP/IP DDNS	PPPoE 端口 端口映射 多播配置
Ð	网络	网卡类型	自适应
	基本配置		
	高级配置	设备IPv4地址	192.168.53.64
<u>.</u> 20.	视音频	IPv4子网掩码	255.255.255.0
1	图像	IPv4默认网关	192.168.53.254
<u> </u>	PTZ	IPv6 模式	路由公告
Ë	事件	设备IPv6地址	
H	存储	IPv6子网掩码	
		IPv6默认网关	::
		物理地址	08:54:11:fd:a4:8d
		MTU	1500
			☑ 启用多播搜索
		DNS服务器配置	ž.
		首选DNS服务器	223.5.5.5
		备用DNS服务器	8.8.8
		域名配置	
		□ 启用动态域名	i de la constante de la constan
		注册域名	
		日、日本	存在一

10.5Electrical debugging

Replace with a new electrical regulator, power on the USV, and follow this step to configure the electrical regulator parameters:

USVs equipped with a PowerBox need to enter the USV web management system and turn on the electrical dispatch parameter switch. USVs without a PowerBox can skip step 1.

CHCNA	
〕 无人船状态	■
▶ 卫星	调参模式开关
🔀 接收机配置	
数据记录	□ 打开 □ 关闭
✿ I/O设置	
중 系统设置	
▶ 网络设置	
▶ 电台设置	
▶ 网桥设置	
▶ 返航设置	
▶ N2N设置	
▶ 电调模式设置	
▶ 遥控器设置	
▶ 船型设置	
▶ 功能设置	

For USVs equipped with a PowerBox, adjust the left side electrical adjustment, connect the electrical adjustment parameter line to the PWM3 interface, and adjust the right side electrical adjustment to connect to the PWM4 interface.

USVs that are not equipped with a PowerBox can directly connect the electrical adjustment parameter line to the electrical adjustment.



Open the Brushless software.

🚱 Brushless_USB_Link_V3.00.exe

When the device is connected normally, the two status indicator lights in the device connection status bar display green. If they display red, please check if the connection interface and direction are correct.

	 文 软件版本 调速器 ▼3.00_200 	设备连接状态 0722 US	B设备
: Tes	二合一 [12.00_200	0417 语	速器设备
1.马达进角	3.运行模式	12.启动力度	
正常(*) ~	双向(*) ~	37 (*) 🗸	
2.步进加速度	4. 停机电机抱死	9.马达旋转方向	14.最小油门值
中速(*) ~	关闭(*) ~	顺时针运行(*) ∨	1004
.退磁补偿	7.前进油门力度	10.温度保护	15.最大油门值
低(*) ~	100% (*) 🗸 🗸	关闭 ~	2004
6.电池低压保护阀值	8.倒车油门力度	11.频率选择	16.油门中位值
不保护 ~	100%(*) \checkmark	高(*) ~	1504
制者命令			

Click on "File Identification", select "9S Electric Adjustment Parameters", click on "Save", and the motor will "beep" prompt, indicating successful writing (the left and right electric adjustment settings are the same). After

successful parameter writing, the USV needs to be restarted.

L

1	9s电调参数.cfg	
---	------------	--

Check if the wind direction is correct, and remotely control the motor to turn left and right (forward, blow air backward from the left and right motors; backward, blow air forward from the left and right motors; left turn, blow air backward from the right motor, blow air forward from the left motor; right turn, blow air backward from the left motor, blow air forward from the right motor).

If the direction of blowing on one side is opposite, simply brush the motor on that side again to rotate in the correct direction.

- 3- 6 S	● 调速器 ♥3.00_2	设备注接状态 200722 U	33设备
1. 马达进角	3.运行模式	12.启动力度	速器设备
正常(*) ~	双向(*) ~	37(*)	
2.步进加速度	4. 停机电机抱死	9.马达旋转方向	14.最小油门值
中速(*) ~	关闭(*) ~	逆时针运行 ~	1004
5.退磁补偿	7.前进油门力度	10.温度保护	15.最大油门值
低(*) ~	100% (*) ~	关闭 ~	2004
6.电池低压保护阀值	8. 倒车油门力度	11.频率选择	16.油门中位值
不保护 ~	100% (*) ~	高(*) ~	1504
金金を			

10.6 Wiring diagram

10.6.1 APACHE 3 USV Wiring Diagram



APACHE 3 USV Wiring Diagram



















10.6.3 APACHE 6 V2.0 USV Wiring Diagram



APACHE 6 V2.0 USV Wiring Main Line Diagram



無人船主體线路 USV MAIN LINE





APACHE 6 V2.0 USV Device Signal Transmission Diagram



APACHE 6 V2.0 USV Antenna Signal Transmission Diagram



10.6.4 Wiring diagram of voltage reduction module

10.6.5 ADCP wiring specification diagram for APACHE USV

Wiring D	efini	tion '	Table	e	Wire Harness Description Table					
Signal Description	CN1	CN2	CN3	CN4	Wire specifications	Color/Wire Number	on- resistance	Maximum current	notes	
RXD(ADCP reception)			3			/				
TXD (ADCP sending)	2		2		CN1-8-core sheathed wire	/		CN1- fork:		
POWER+	3	+			at the fork (8C * 0.5mm2) CN1 comes with its own cable	/	<20m0	8A Fork CN2: 8A	Unused wires are wrapped in heat	
RXD (ADCP reception)	5			2	Fork CN2: 16AWG double parallel line Fork CN3: 28AWG	/	<20ms2	Fork CN3:0.5A Fork	prevent short circuits	
TXD(ADCP sending)	6			3	Fork CN4: 28AWG	/	4	CN4:0.5A		
POWER- /SIGNAL-	7		5	5				= i)		

7.1.1.1 River Star Series Wiring Specification Diagram





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Wiring	g Defii	nition	Table		Wire Harness Description Table					
Signal Description	CN1	CN2	CN3	CN4	Wire harness specifications	Color	Contact impedance	Maximum current	notes	
RXD	_		3			/		CN1- fork		
TXD	2		2		CN1-8-core sheathed wire at the	/		8A		
POWER+	3	+			fork (8C * 0.5mm2) CN1 comes	/		Fork CN2:		
SGND	4		5		Fork CN2: 20AWG	Black	$<2m\Omega$	5A Fork		
RS485+	5			2	PORK CIN3: 22A WG TORK CIN4:	Red		Eork		
RS485-	6			3	22/1110	Blue		CN4:1A		
POWER-	7					/				

7.1.1.2 RCP Series Wiring Specification Diagram







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W	Viring l	Definit	ion Tał	ole			Wire H	Harness Desci	ription Table	
Signal Description	CN1	CN2	CN3	CN4	CN5	Wire harness specifications	Color	Contact impedance	Maximum current	notes
RXD	1		3							
TXD	2		2			24AWG			1.7A	
SGND	3		5	5						
POWER+	4	1				20AWG			4A	
RXD_GPS	5			2		24 AWC			174	
TXD_GPS	6			3		24AWG			1./A	
POWER-	8	2				20AWG	Not Making	m()</td <td>4A</td> <td></td>	4A	
RXD	1				1		Comand	≥2mQ		
TXD	2				7					
SGND	3				5					
POWER+	4				8	22AWG			2.5A	
RXD_GPS	5				4			4	2.1	
TXD_GPS	6				3				三沢	
POWER-	8				2					

7.1.1.3 RDI Series (Riverpro/Riverray) Wiring Specification Diagram

Note:

1. The outer layer of the cable must meet the flame retardant grade VW-1, be resistant to high and low temperatures of -40C-85C, and have a black color. External materials that meet the above requirements are acceptable, and specific grades are not specified.

2. If there is a requirement for twisted wire, there is no special requirement for the length of the twisted wire, only the appearance of the finished product line should be smooth and unobstructed without obvious deformation, bulging, scratches, and other defects.

3. If there is a wire harness woven mesh, there is no specific grade requirement, only it needs to meet the flame retardant grade VW-1, high and low temperature resistance -40C-85C, black color, smooth and unobstructed appearance of the wire without obvious deformation, bulging, scratches, and other defects.
4. All injection molded joints in the diagram do not specify specific structural shapes, and injection molds that meet the marked dimensions are acceptable.





7.1.1.4 SONTEK M9 wiring specification diagram

A DA CLIE I MINTANNIED	CIDEACE VECCEI	TICED MANILAT
AFAURE UNWANNED	SURFACE VESSEL	USER MANUAL

Wiring	g Defin	ition Ta	ıble		Wire Harness Description Table				
Signal Description	CN1	CN2	CN3	CN4	Wire harness specifications	Color	Contact impedance	Maximum current	notes
VCC	1	+				/	$\leq 2m \Omega$	2.5A	
TXD	2		2			/	$\leq 2m \Omega$	2.5A	
RXD	3		3		22 AWC	/	$\leq 2m \Omega$	2.5A	
TXD_GPS	4			3	ZZAWG	/	$\leq 2m \Omega$	2.5A	
RXD_GPS	6			2		/	$\leq 2m \Omega$	2.5A	
GND	8		5	5		/	$\leq 2m \Omega$	2.5A	

Note:

1. The outer layer of the cable needs to meet the following requirements: flame retardant grade VW-1, high and low temperature resistance -40C-85C, color: black. External materials that meet the above requirements are acceptable, and specific grades are not specified.

2. If there is a requirement for twisted wire, there is no special requirement for the length of the twisted wire, only the appearance of the finished product line should be smooth and unobstructed without obvious deformation, bulging, scratches, and other defects.

3. If there is a wire harness woven mesh, there is no specific grade requirement, only it needs to meet the flame retardant grade VW-1, high and low temperature resistance -40C-85C, black color, smooth and unobstructed appearance of the wire without obvious deformation, bulging, scratches, and other defects.

4. All injection molded joints in the diagram do not specify specific structural shapes, and injection molds that meet the marked dimensions are acceptable.





10.7Dimensional specification drawing

10.7.1 GD100 Dimensional Drawing



GD100 vertical view

unit mm



unit mm





PB100 top view



PB100 side view

unit mm

CHCNAV Technology Support

Tel: 400 620 6818 to Line 5

S



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APACHE USV Official Account

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