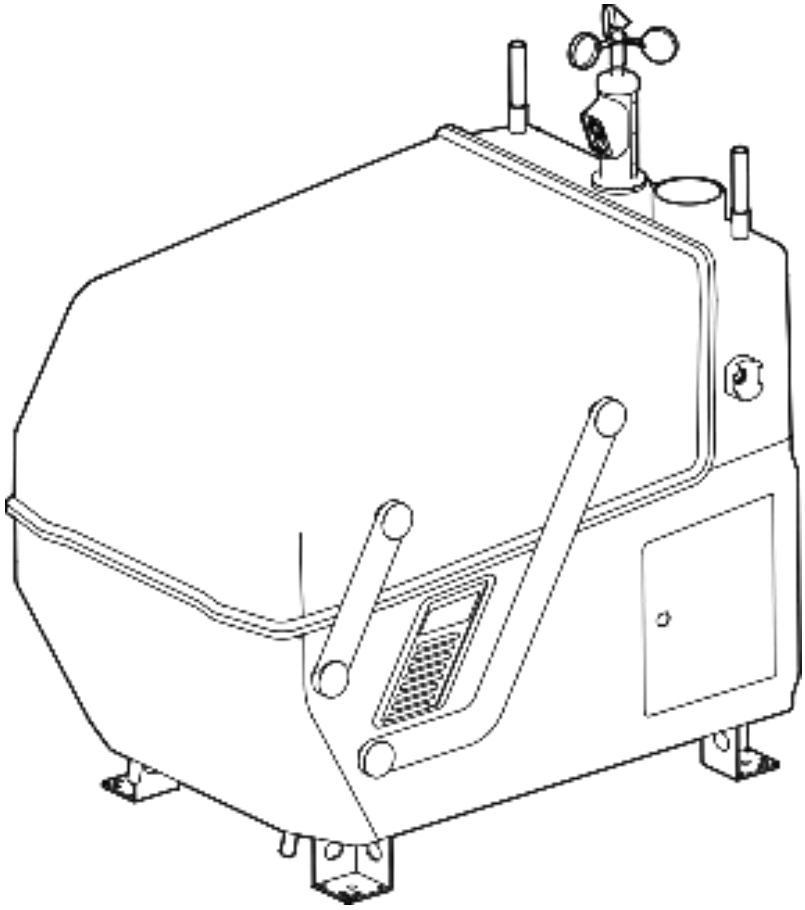


Docking Station

User manual v1.2 2024.06

Contents

Instructions

Warning

Thank you for using this product. This is a specialized electronic product. Incorrect operation may cause damage to items, personal injury or even death. The legal consequences caused by this shall be borne by the user. Minors under the age of 18 shall not use this product. To ensure user experience and your personal safety, please read the following documents carefully before using this product:

Docking Station User Manual

Item List

This manual is subject to update without further notice.

Disclaimer

Before using this product, please carefully read and follow this document and all safety instructions provided by GDU-TECH, otherwise it may cause harm to you and the people around you, as well as the product and its surrounding items. Once you use this product, it will be deemed that you have carefully read, understood, recognized and accepted all the terms and contents of this document and all related documents of this product.

The user promises to bear full responsibility for the use of this product and the possible consequences. The user promises to use this product only for legitimate purposes and agree to the relevant rules of this clause.

GDU-TECH is not responsible for any damage, injury or any legal liability caused by the direct or indirect use of this product.

For issues not covered in this statement, please refer to the relevant laws and regulations of the local country. If this statement conflicts with the relevant laws and regulations of the local country, the latter shall prevail.

Product Introduction

The docking station is a fully automatic unattended operation platform supporting battery replacement and quick response to operations. The fuselage has been miniaturized and integrated to include a wide-angle monitoring camera, anemometer, rain gauge, communication antenna, RTK module, UPS power supply, etc. The docking station boasts strong environmental adaptability, with an operating environment temperature of -20℃ to +50℃. It has a built-in lightning protection function, with the protection level up to IP55. Equipped with a battery replacement module, the drone can automatically replace the battery to resume operation. In addition, the built-in air conditioning system can quickly cool the battery. The operation coverage radius is up to 8km. It weighs about 115kg and occupies less than $1m^2$, supporting quick installation and deployment. The Low-Altitude Flight Management Center is a UAV mission management platform that supports route planning, flight mission settings, flight information synchronizing, media files uploading and downloading for live viewing, and remote debugging. The S200 series docking station kit can make flight operation management efficient and visualized, realizing unattended operation.

Highlights

Lightweight deployment and convenient operation and maintenance

The docking station has been optimized for miniaturization and high integration, and it weighs about 115kg and occupies an area of no more than $1m^2$. It can enter the elevator and be easily deployed to the roof.

Industrial protection, wind and rain-proof

The docking station supports all-weather safe operation, resistant to wind and rain erosion. It reaches IP55 protection level when closed.

Autonomous battery replacement, rapid response

The docking station has an automatic battery replacement module, supporting continuous operation without interruption. In case of emergency, it can quickly replace the battery and take off.

Remote control, easy replacement

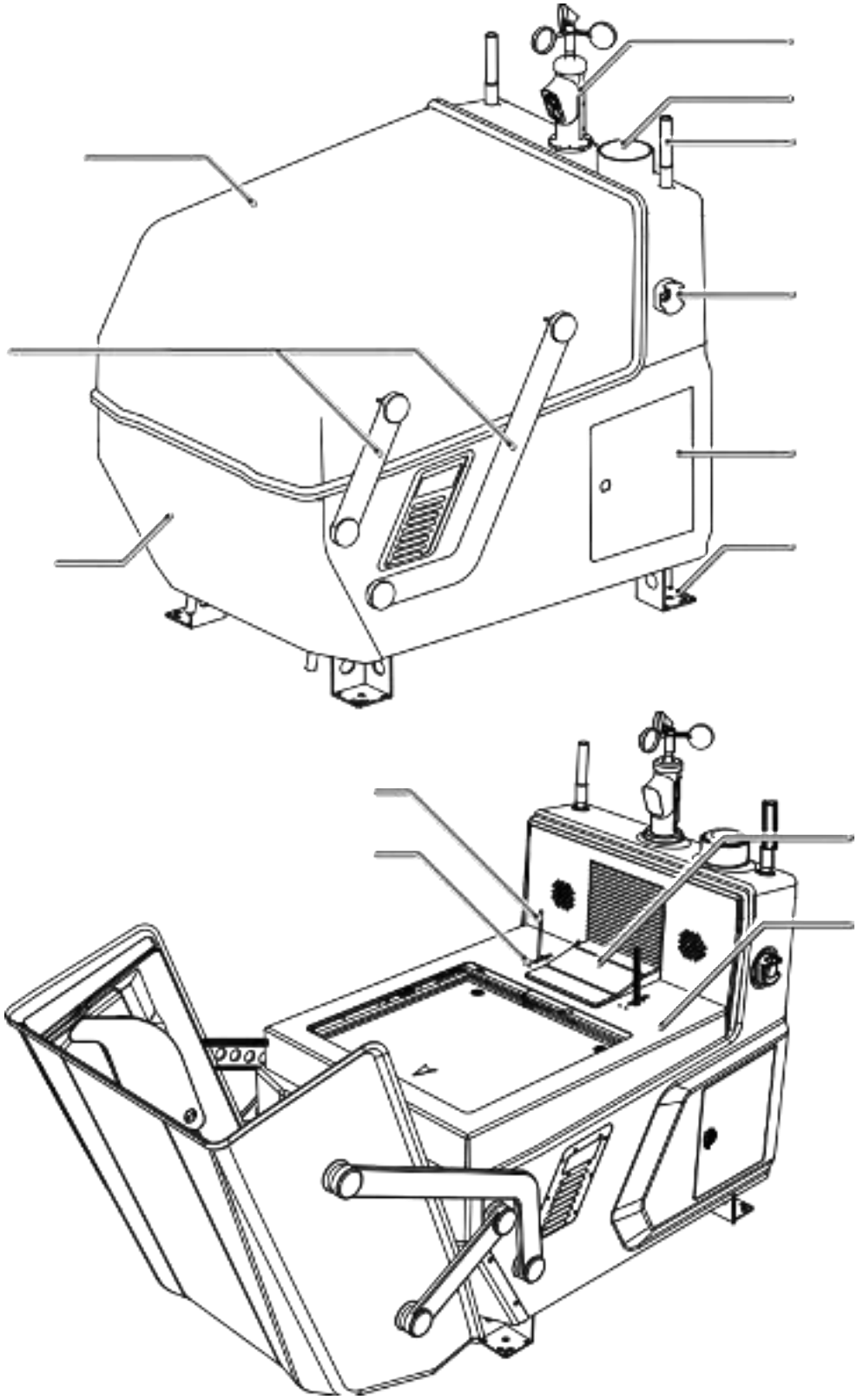
During the autonomous flight operation, users can switch to manual flight mode in the low-altitude flight management center, or Tapfly, and Point of Interest, Quickfly.

Empower the industry with open API

The docking station system supports open Cloud API, which can be called by developers, greatly empowering application scenarios in various industries.

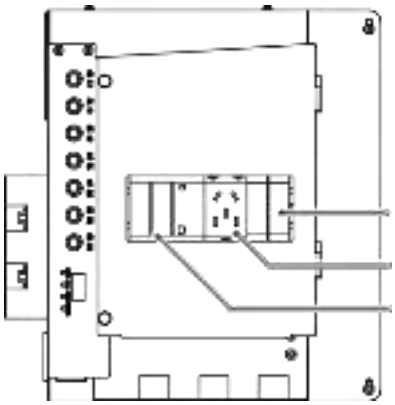
Docking Station

List of items



Debug box

Debug box’s component names and functions

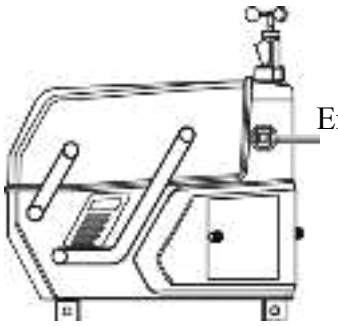


Debug box button name	Component function
Door	Button to control the door switch
Return to center	Button to control the position
Battery installation	Short press once, the robot arm rises; short press again, put the battery into the battery compartment
Reset	The robot arm returns to the initial zero position
Power supply	Button to control the docking station power switch
Forced start	The docking station can be started only with UPS power supply when there is no mains power supply
Release	When the release button is pressed, the hatch can be opened manually

Emergency stop

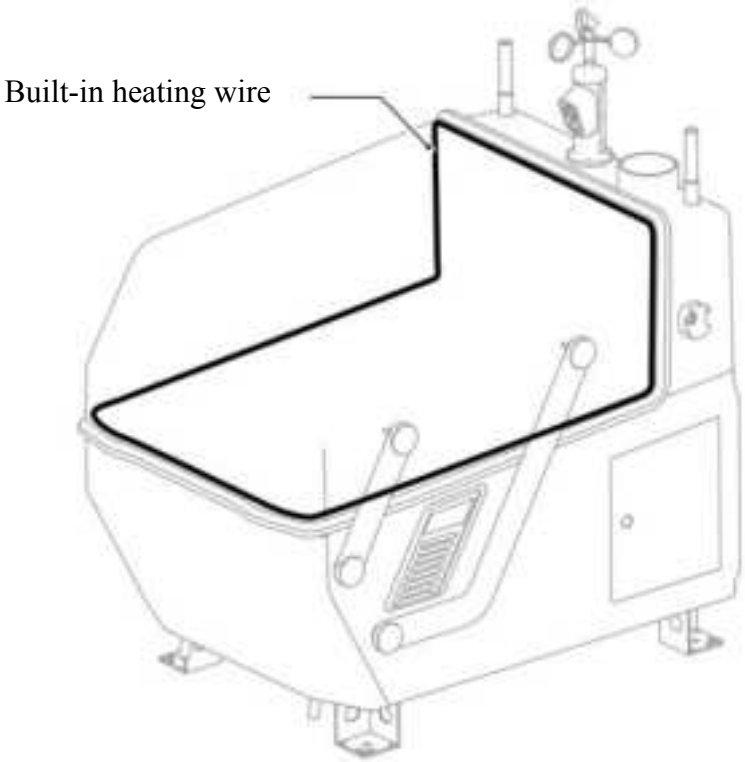
The docking station has an emergency stop button. When performing equipment maintenance and debugging, in case of emergency, press the emergency stop button to stop the docking station movement mechanism from running to ensure personal safety. If the aircraft motor is not started and the emergency stop button is pressed, the aircraft in the docking station will not be able to perform the flight mission. After the aircraft takes off, press the emergency stop button, the aircraft will complete the flight operation and then land at the alternate landing point.

⚠ • When the emergency stop button is pressed, you need to pull it out or rotate it clockwise to release the emergency stop button before continuing other operations (such as controlling the hatch, etc.).



Hatch cover

The hatch cover joint has a built-in heating wire, which automatically starts heating at low temperatures to assist in deicing the hatch cover joints.



Docking station LED indicator

LED indicator	Description
Green light solid on	Docking station status normal
Red light solid on	Docking station status abnormal
Red light flashes	Aircraft abnormal alarm
Green light flashes	Aircraft is performing a mission
Red, blue and green lights flash alternately	During the takeoff mission, prompt the user to stay away
Red, blue and green lights flash alternately	During the precise landing, prompt the user to stay away
Blue light flashes	Aircraft battery is charging

Docking station environment perception

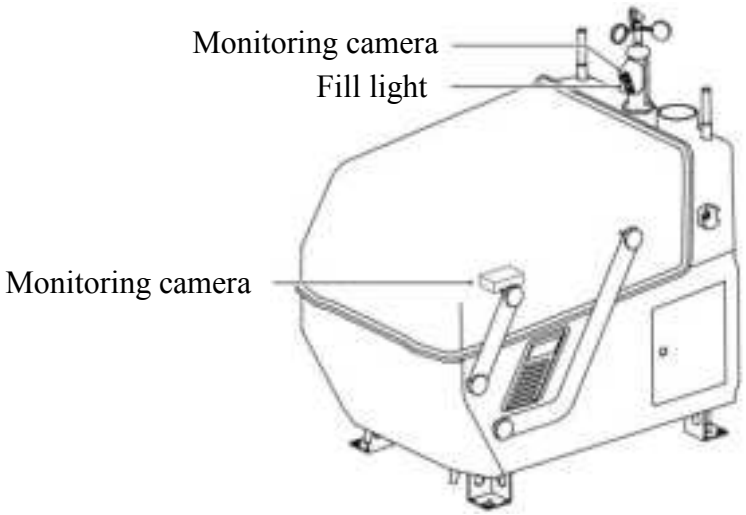
The docking station integrates a variety of environmental sensors to obtain environmental information such as wind speed, rainfall, temperature and humidity, light, and water immersion to ensure safe operation.

Monitoring camera and fill light

The docking station is equipped with 2 monitoring cameras and 1 fill light

1. Monitoring camera: it is used to monitor the docking station site conditions in real time. Users can view the environment inside and outside the docking station in real time on the UVER interface, and it can assist operators to remotely observe weather conditions, site environment and aircraft take-off and landing performance, etc.

2. Camera fill light: it automatically turns on at night or in low light to assist the aircraft in visual identification.



Anemometer

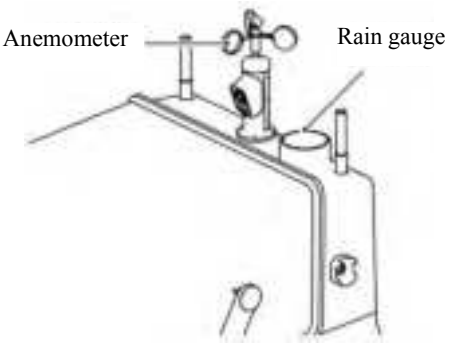
The anemometer is used to monitor the wind conditions around the docking station, with a heating function to adapt to low temperature environments. Users can view real-time wind speed on UVER. To ensure flight safety, flight operations are forbidden when the wind speed exceeds the threshold.

- The anemometer can only measure the environmental wind conditions at the docking station installation location, which is different from the information of the local meteorological department. The wind speed and direction may change suddenly after the aircraft flies to high altitude. Be careful when flying in strong winds.

Rain gauge

The rain gauge is used to monitor the rainfall information at the docking station location. Users can view the rainfall information on the UVER interface. To ensure flight safety, flight operations are forbidden when the rainfall is too heavy.

⚠
- The rain gauge has a built-in pressure sensor. Do not hit the surface of the rain gauge hard to avoid damaging the pressure sensor.
- Clean and maintain the surface of the rain gauge regularly. If there are pits or deformations, repair them in time.
- If there is a vibration source near the docking station (such as near the railway, it may cause the rain gauge to falsely report rainfall. When selecting a site, avoid strong vibration sources and noisy areas.)



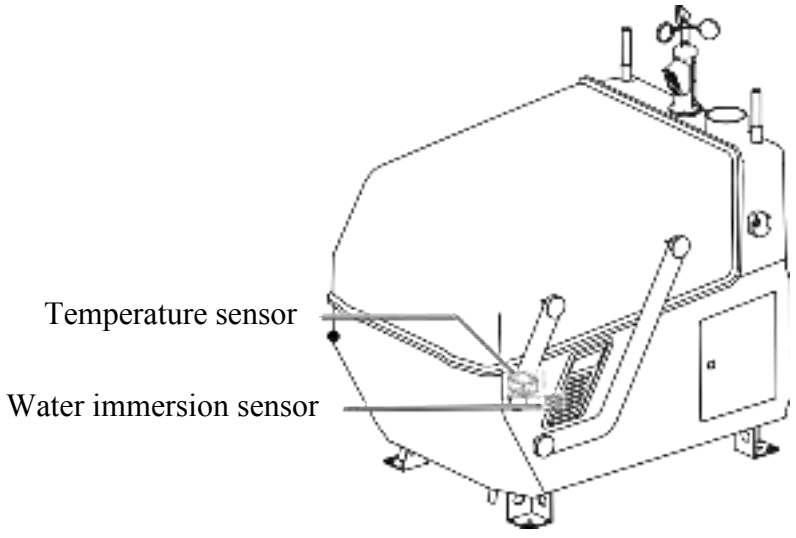
Temperature and humidity sensor

The docking station is equipped with an ambient temperature sensor to detect the air temperature and humidity of the docking station environment; the cabin has a built-in temperature and humidity sensor, and the location is shown in the figure below. The temperature and humidity information can be viewed on the UVER interface.

To ensure flight safety, flight operations are forbidden when the ambient temperature outside the cabin is below -20°C. The aircraft can resume operation after the ambient temperature outside the cabin restores.

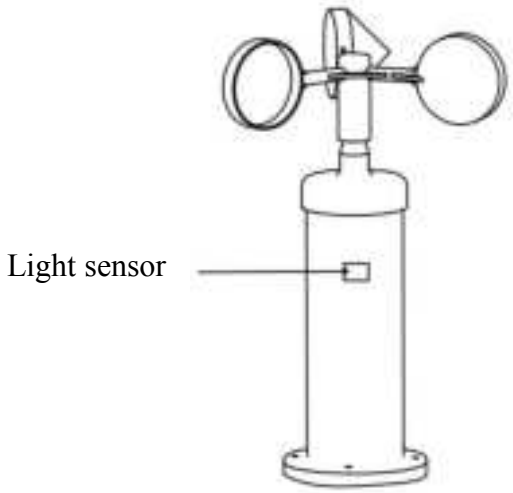
Water immersion sensor

The docking station is equipped with a water immersion sensor to detect whether the docking station is flooded. If the UVER interface shows a water immersion alarm, the docking station will be prohibited from performing tasks. In addition, a professional needs to go to the site to disconnect the docking station power supply, clean up the water, and then close the power supply after checking that it is normal. If there is still a problem at the docking station, make sure to disconnect the power switch and contact technical support.



Light sensor

The docking station is equipped with a light sensor to detect the lighting environment of the docking station site. In a low-light environment, the fill light will be turned on to assist in precise landing.

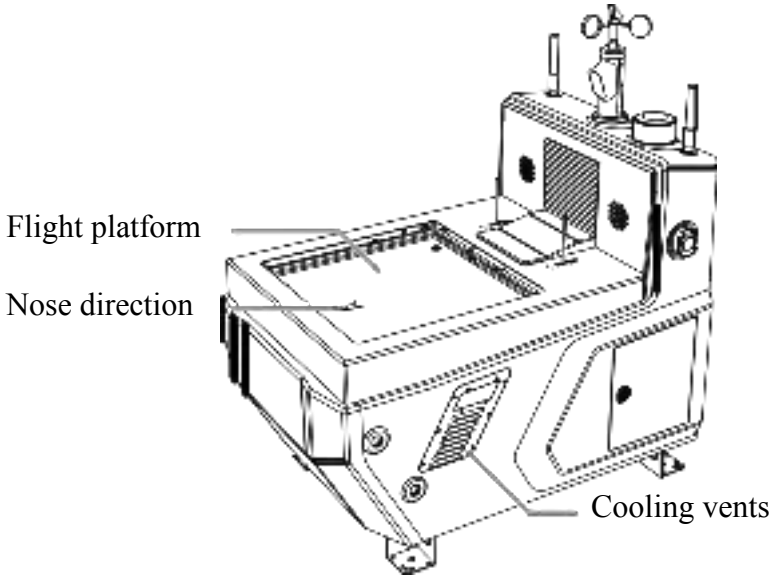


Landing platform

1. Air conditioning inlet and outlet: Wipe and clean the air conditioning outlet and inlet regularly to avoid dust blockage.

2. Nose direction mark: When placing the aircraft on the apron, the nose direction must be consistent with the arrow on the apron, otherwise the aircraft will be damaged.

3. Visual identification mark: There is a visual identification mark on the apron, which can help the aircraft identify the docking station location for landing. Please ensure that the identification mark is not blocked or dirty.



Air conditioning system

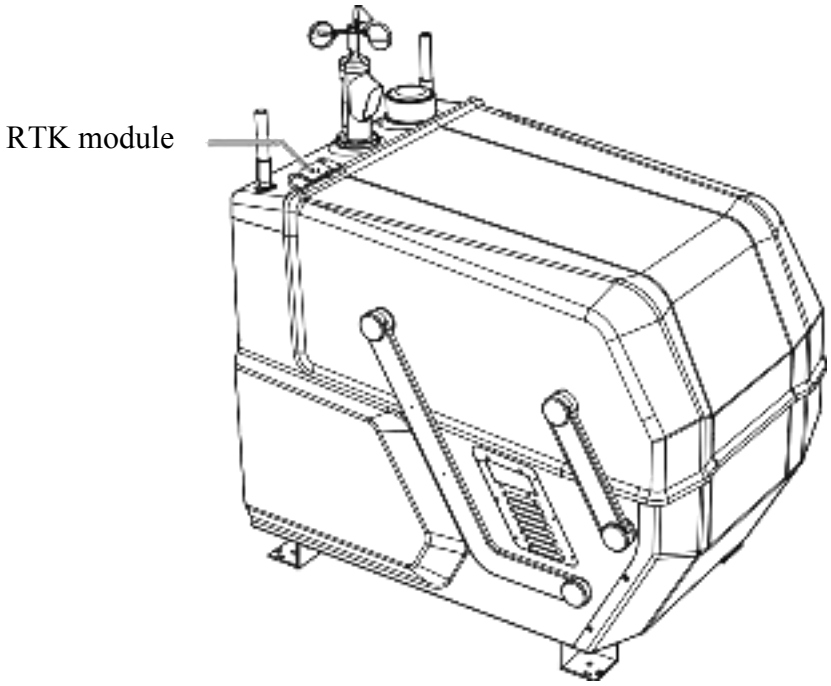
The docking station has a built-in air conditioning system that can automatically adjust the temperature and humidity inside to provide a suitable storage environment for the aircraft and batteries. When the highest temperature in the battery compartment is higher than 40°C, the cooling system will be turned on, and when the highest battery temperature is lower than 35°C, it will be

turned off. When the lowest battery temperature is lower than 8°C, the heating system will be turned on until the lowest temperature is higher than 15°C. Users can Check and turn on/off the air conditioner through the UVER interface.

Docking station RTK

The docking station RTK base station can achieve centimeter-level positioning accuracy. To ensure accurate flight along the set route, make sure that the docking station RTK has been calibrated before performing flight missions. When installing and configuring the docking station, calibrate the docking station RTK parameters through the embedded web page. After successful calibration, there is no need to re-calibrate again unless the docking station position changes.

- During the operation of docking station RTK (such as setting an alternate landing point or the aircraft performing a high-precision RTK mission), do not move the docking station position, restart the docking station, or recalibrate the docking station position.
- During the active or flickering ionosphere, the RTK positioning accuracy may be affected. It is not recommended to calibrate the docking station position.



Docking station protection level

1. The docking station is used with the aircraft and tested under controlled laboratory conditions to achieve the IP55 protection level under the IEC60529 standard. The protection level is not permanent and may decrease due to wear and tear after long-term use. Please perform regular maintenance.

2. The following conditions may compromise the IP55 protection level:

The power distribution cabinet door is not closed;

The anemometer fixing screws are not tightened, the hatch is not closed;

Other possible damage to the fuselage, such as cracked shell.

1. Professional installation must be justified in the filing, and grant condition must state "This device must be professionally installed."
   Description: Device is DOCKING STATION and must need special trained professional in configurating and installing the product. More details please refer to user manual exhibits.
2. Professional installation does not permit use of any antenna with the transmitter; the permitted types of antenna must be specified.
   Description: Below listed of Antennas has been compliance FCC Rules Part 15 requirement, more details please refer to test reports.

Antenna Type	Connector	Antenna Gain (dBi)	
		2400-2500MHz	5700-5850MHz
Dipole	R-N Type	2.68	3.14

3. The applicant should address the following items when justifying professional installation.
   i) To qualify for professional installation, the applicant must explain why the hardware
   Description: Due to this product will not be sold directly to the general public through retail store therefore the hardware is not readily available to average customer.
   ii) Marketing—Device cannot be sold via retail to the general public or by mail order; it must be sold to authorized dealers or installers only
   Description: Due to this product will not be sold directly to the general public through retail store. It will be sold to authorized declarers or install only.
   iii) Filing must show that intended use is not for consumers and general public; rather device is generally for industrial/commercial use.
   Description: Device is for industrial/commercial use.
   iv) Explain what is unique, sophisticated, complex, or specialized about the equipment that REQUIRES it to be installed by a professional installer?
   Description: Please be advised that due to the unique Market and function targeted by this product. this product will need special trained professional in selecting the proper location, adjusting the antenna anele on the outside pole or on the wall to satisfy the relevant rule requirements, We hereby declare that the product will be distributed through controlled distribution channel which has special trained professional to install this product and will not be sold directly to the general public through retail store.
4. Other professional installation requirements
   (1) Installation must be controlled.
   Description: The product will be distributed through controlled distribution channel which has special trained professional to install this product.
   (2) Installed by licensed professionals (*e.g.*, device sold to dealer who hire installers).
   Description: Device sold to dealer who hires installers and need special trained professional in configuring and installing the product.
   (3) Installation requires special training (*e.g.*, special programming, access to keypad,

field strength measurements made).
Description: The product needs special programming. access to keypad. field strength measurements made, so must need special trained professional in configuring and installing the product.

System login

Users should use a browser to access the docking station management system, enter the assigned account password and enterprise number, and then enter the verification code to log in.

Docking station control

The docking station control interface is the homepage of the UAV automatic airport management system. The main functions include docking station viewing and control, aircraft viewing and control, mission execution status and operation, etc.

Docking station list

Click the “Docking Station List” button and the docking station list will pop up. Users can click on the docking station they want to view and enter the docking station details page to view the docking station operation status, docking station monitoring screen or control the docking station.

Aircraft list

Click the “Aircraft List” button and the docking station list will pop up. Users can click on the aircraft they want to view to view the aircraft’s current operating status, flight parameters and real-time video.

Task list

The task list contains all route tasks. When you need to manually execute a route, you can go to the manual task to execute it. When you need to check the execution status of a regular task, you can go to the regular task to check it.

Aircraft control

When a docking station (aircraft online) or online aircraft is selected, the user can control the current aircraft. The platform supports the following functions: one-key takeoff, emergency hovering, Tapfly, precise return, and control authorization.

Route management

The route management module supports functions of planning, managing, storing, importing and exporting routes. The platform provides users with a variety of route types to meet different flight operation scenarios. And control, mission execution status and operation, etc.

Add a new route

Click the “New Route” button to enter the page for adding a new route.

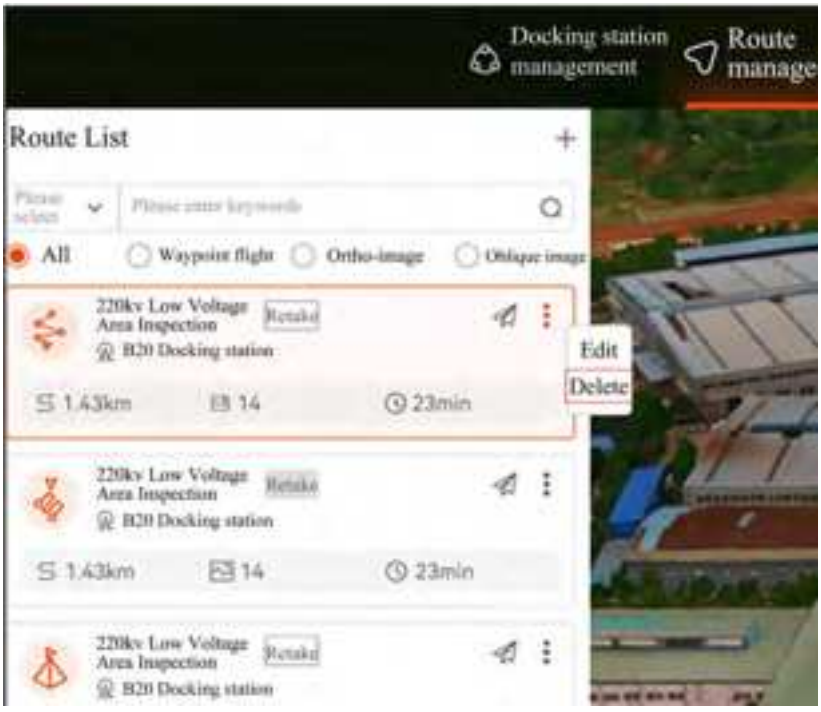
When adding a new route, first draw the route on the map, then configure the route information and waypoint information on the left, and click OK after completion.

View route

Click the route card to view the route planning and route information on the right map and the information bar below.

Delete route

Click the route card expansion button and the expansion menu will pop up, and then click the “Delete” button to delete the route.



Task management

Create a new task

a) Click the “Create a new task” button in the task management interface to enter the task planning module.

b) In the new mission interface, fill in the mission name, execution docking station, execution route, execution method, etc. After all are filled in, you can select the execution time and add the execution date to the mission calendar.

View tasks

The task list supports docking station and route filtering. Click on the task card to display the route and task execution information of the task execution on the map.

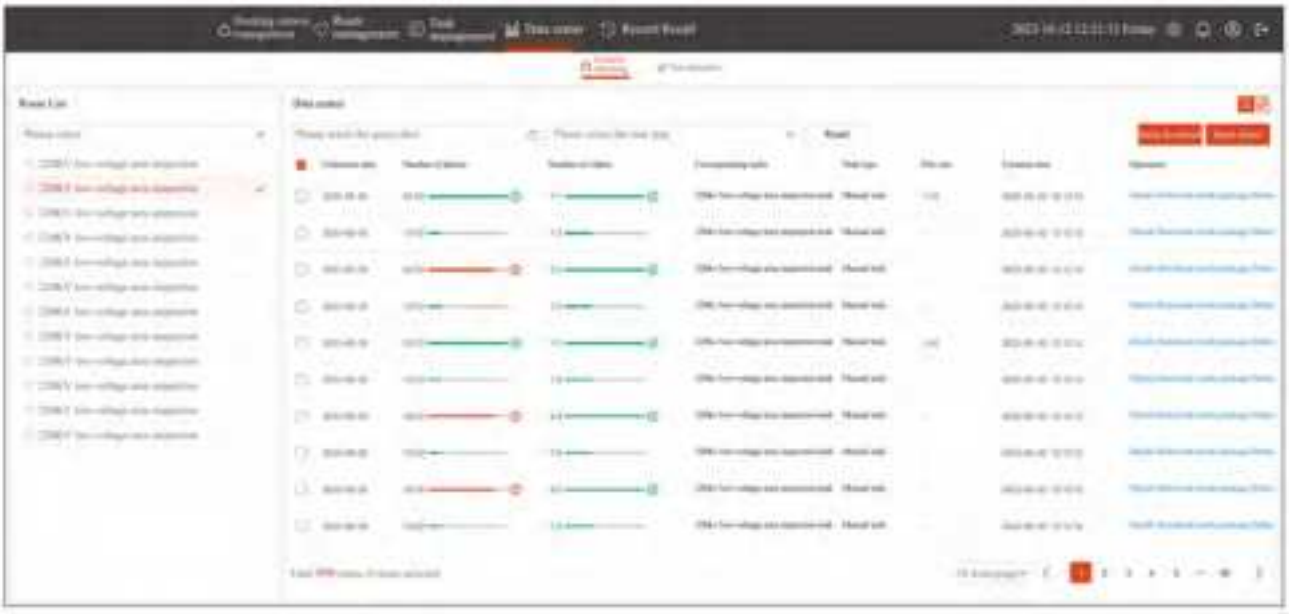
Delete task

Enter the details page and delete all flights to delete the task.

Data center

View task results package

The collected results are packaged according to the mission sorties, supporting the screening of docking station and routes. Click to enter the next level to view the photos of the mission results package.



Under the results list, click on the details to view the large picture.

Delete mission results package

Users can click “Delete” in the list or in large image mode

Appendix

Main parameters of docking station

Appearance	
Size	Hatch closed: ≤ 1030mm×710mm×860mm (excluding rain gauge, weather station, antenna) Hatch open: ≤ 1600mm×710mm×860mm (excluding rain gauge, weather station, antenna)
Weight	115kg ± 1kg
Number of controllable drones	1
External fill light	Support
Docking station status indicator	Support
Operation capability	
Mains power supply	100VAC - 240VAC, 50/60HZ
Power consumption	Peak power consumption ≤1500W
Deployment scenario	Ground, roof, tower
Emergency battery	≥ 5h
Battery replacement time	≤ 2min
Operation interval time	≤ 3min
Maximum number of battery packs allowed	4 groups (3 groups as standard)
Battery compartment charging function	Support
Precise landing at night	Support
Data storage	Support
RTK Base station	Support
Maximum inspection range	8km under unobstructed and interference-free conditions
Wind resistance	Inspection process: Level 6 (12m/s) Precise landing process: Level 5 (8m/s)
Cloud manual takeover	The cloud of the drone docking station can be manually taken over, so that users can remotely control the drone through the docking station. You can control the drone in the following actions: upward, downward, left rotation, right rotation, forward, backward, left flight, right flight, load control, shooting, start recording, end recording.

Power failure protection	After the docking station power supply is cut off, the drone cannot take off. If the drone has taken off, the mission will be interrupted and it will return.
Precise landing	Support
Automatic alternate landing	Support
Jump fly function	The drone can be operated between two or more docking stations
Breakpoint resume	During the inspection process, if the mission is interrupted due to abnormal conditions and the drone returns, it can take off again and continue the inspection mission from the breakpoint.
Precise positioning	Support
Remote upgrade	Support remote upgrade of docking station, drone, and drone battery firmware
Industrial protection	
Working environment temperature range	-20℃ - +50℃
Maximum working altitude	5000m
External environment relative humidity	<95%, it can work normally
Antifreeze	Support hatch heating
Dust and waterproof level	IP55
Lightning protection	Support
Salt spray protection	Support
Drainage	Support
Vibration protection	Support
Proof against small animals and insects	Support
Environmental perception	
Outside temperature	Support
Outside humidity	Support
Outside rain monitoring	Support
Outside wind monitoring	Support
Inside temperature monitoring	Support
Inside humidity monitoring	Support

Light sensor	Support
Smoke monitoring	Support
Vibration sensor	Support
Water immersion monitoring	Support
External camera	Support (1080P, night vision)
Internal camera	Support
Communication method	
Network port	Support 10/100 Mbps adaptive Ethernet port access
4G	Router Support (SIM card required)
Open interface	
API	Support

FCC Warning

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any inte rference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interferenceto radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

•Increase the separation between the equipment and receiver.

•Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

•Consult the dealer or an experienced radio/TV technician for help.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.