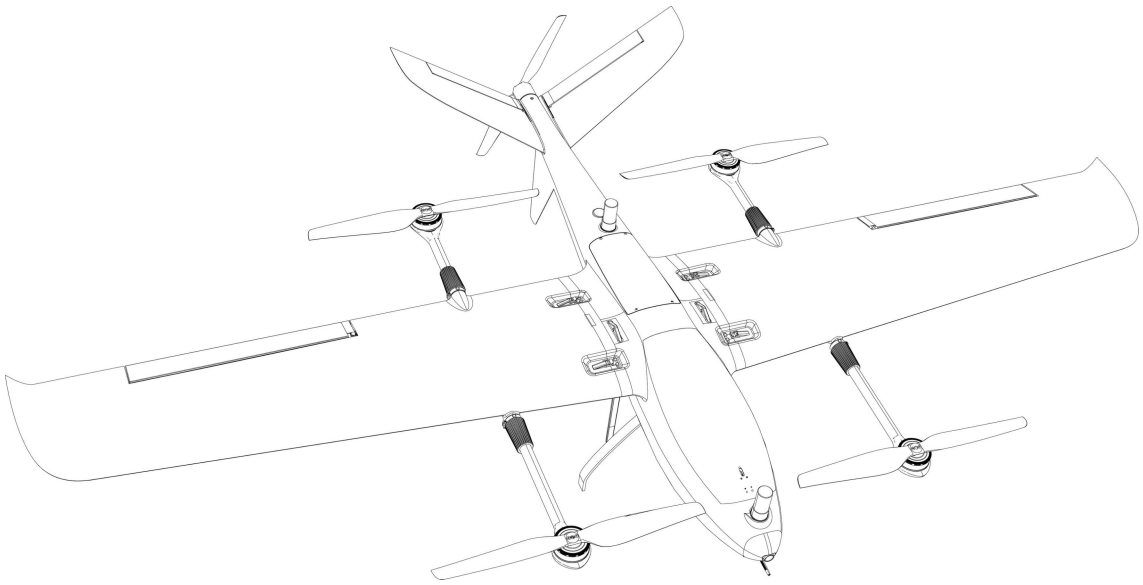
UniVTOL V2200
VTOL Fixed-Wing UAV
User Manual



Reebot Robotics (Shenzhen) Co., Ltd.

https://reebot.com/en/

Thank you for purchasing Reebot Robotics products.

UniVTOL V2200 is a versatile, industrial-grade vertical takeoff and landing (VTOL) fixed-wing UAV, combining long endurance, efficient operations, and multi-task adaptability. (Hereinafter referred to as "V2200").

Designed specifically for the B2B market, UniVTOL V2200 is widely used in applications such as surveying and monitoring. It can be equipped with orthophoto or oblique cameras to perform high-precision large-scale mapping tasks, or carry an electro-optical pod for industrial monitoring, inspection, and various other professional applications.

Considering flight safety and to ensure a positive user experience, please carefully read the user manual before assembling the product. This manual will help you resolve most usage-related questions. You can also visit Reebot Robotics' official website (www.reebot.com) to access product-related pages, call Reebot Robotics' official customer service center (400-097-0971), or email info@reebot.com for direct consultation with Reebot engineers regarding product information and to provide feedback on any product issues.

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Manual Version Update Record

Version Number	Update Date	Update Content
1.0	2025.01	Initial version

Contents

Reading Instructions

Logo, icon

When reading the user manual, please pay special attention to the relevant contents marked as follows.

 **Hazard Operations that are likely to cause personal injury**

 **Warning Operation warning that may cause personal injury**

 **Be careful not to cause unnecessary property damage due to illegal operations.**

 **Prohibitions**  **must implement**  **precautions**

Security

UniVTOL V2200 is designed and manufactured for professional applications, and necessary adjustments have been completed before leaving the factory. Please do not disassemble or modify its structure. The UniVTOL V2200 has a precise structure, and operators are required to have basic skills. Please adhere to the relevant laws and regulations to ensure safe operation. Reebot Robotics is not responsible for any unnecessary product damage, economic loss, or personal injury caused by improper, unreasonable, or irresponsible operation of this product. If minors are using this product, they must be supervised and guided by a professional. Reebot Robotics' products are designed for commercial applications and are prohibited from being used for military purposes. Unauthorized disassembly or modification of this product is strictly prohibited without permission from Reebot Robotics.

To ensure flight safety and to make the most of the product's features, please pay special attention to the following matters:

 The use of Reebot Robotics products to control UAVs, vehicles, or models is prohibited in densely populated areas (such as plazas, parks, etc.), areas with numerous obstacles (such as streets, parking lots, etc.), areas with strong magnetic fields or signal interference (such as high-voltage power lines, railway tracks, radar stations, etc.), or any other areas where unnecessary economic loss or personal injury could occur.

 During operation, do not cover the ground unit antenna or block the signal transmission in any other way.

 The top of the ground unit's standard omnidirectional antenna is the weakest part for signal transmission. During operation, avoid pointing it towards your UAV, vehicle, or model.

 Do not operate Reebot Robotics products to control UAVs, vehicles, or models when fatigued, intoxicated, or feeling unwell.

 Unless authorized for special operations, do not operate Reebot Robotics products to control UAVs, vehicles, or models in rainy, nighttime, or strong wind conditions.

 Never disconnect the ground unit power supply while the engines or motors on your UAV, vehicle, or model are still running.

 To ensure flight safety, before takeoff, please check the propellers, motor direction, the stability of component connections, and ensure effective connection with the communication link.

For flight safety, please ensure that the UAV remains within your line of sight during takeoff. Additionally, make sure that there are no pedestrians, animals, obstacles, or other hazards around the drone during flight and landing.

During operation, please make sure to return to the main page from the system settings page.

Before starting the operation, please make sure to check the remote controller's battery level and the drone's power supply voltage.

At the end of the operation, first power off the drone, then power off the remote controller.

Before setting the ground station parameters, please ensure that the engines and motors are powered off to prevent accidental startup.

Before starting the operation, please ensure that the fail-safe protection function is properly configured on the UAV.

Before starting the operation, turn on the remote controller and keep the throttle at the lowest position or within the throttle dead zone, then power on the UAV.

During installation, avoid placing the air unit and the GPS module too close to each other to prevent interference. It is recommended that the distance between the air unit and the GPS module be greater than 20 cm.

Equipment idle, carrying, recycling

When you have Reebot products idle, or to carry Reebot products out of work, or the product has reached the service life, please pay special attention to the following matters:

 **Danger**

Reebot products should be kept away from areas easily touched by children when they are idle.

Please avoid Reebot products placed in hot (60 degrees Celsius), cold (minus 20 degrees Celsius) environment.

 **Attention**

Please avoid placing Reebot products in a humid or dusty environment.

When carrying and transporting Reebot products, please avoid operations that may damage components such as vibration or impact.

Chapter 1 : Product Overview

1.1Product Overview

UniVTOL V2200 (hereinafter referred to as "V2200") is a multifunctional vertical take-off and landing (VTOL) fixed-wing flight platform featuring modular functionality, horizontal folding wings, quick-release wings and tail wings without screws, and compatibility with various modular equipment.

V2200 is equipped with dual IMU redundancy flight control, a 4K HD FPV flight camera, and supports a variety of gimbal cameras (MAVLINK·SBUS·UART·Network serial port) with multiple interfaces to meet different protocol expansion needs. V2200 uses a soft-pack battery, providing an empty load flight time of up to 125 minutes.

UniVTOL V2200 handheld ground station (hereinafter referred to as "handheld ground station") features a 7-inch 1080P HD high-brightness touch display. Based on an Android system with deep development, it integrates 2.4G/5G dual-band communication, a 35KM control range, data transmission rates up to 65Mbps, AES encryption, 1600 nits brightness, quick-release belly support, and a quick-release battery. The handheld ground station offers up to 8 hours of battery life, supports 30W fast charging, and features Wi-Fi and Bluetooth functionality.

1.2 Function Highlights

V2200 adopts a high-reliability dual IMU redundancy design and

multi-frequency link system. The fuselage is made of fiberglass, carbon fiber, engineering plastics, and aerospace-grade aluminum alloys to maximize structural strength. The 4K HD FPV flight camera ensures safer flight for users, while the fuselage is rated IP53 waterproof, allowing efficient task execution even in light rain. The built-in RTK positioning and orientation module enables centimeter-level positioning for enhanced flight safety.

Intelligent Features: The embedded AI algorithm enables object tracking and following, achieving intelligent follow-me functionality (when using corresponding SIYI gimbal equipment).

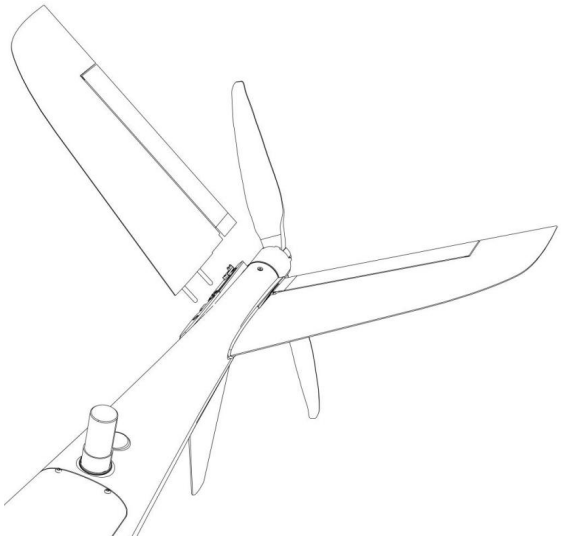
Multi-Payload Capacity: Supports multi-payload switching to meet different application scenarios. The gimbal adapter plate is equipped with serial ports, network ports, SBUS, and XT30 12V output ports to satisfy various expansion needs.

1.3 System Assembly

1.3.1 Installing the Tail Wing

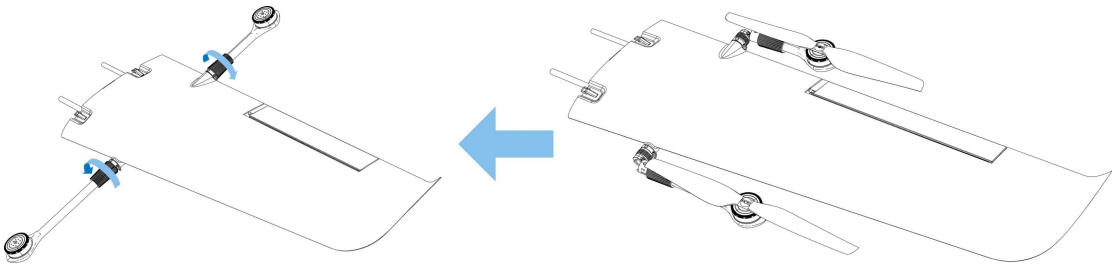
Align the tail wing with the tail wing mounting seat and insert it into the fuselage. Note: The tail wing lock catch should face down.

Place the fuselage on a flat surface, insert the tail wing, and align the tail wing servo arm with the tail wing aileron mounting hole. Lock the tail wing lock catch securely.



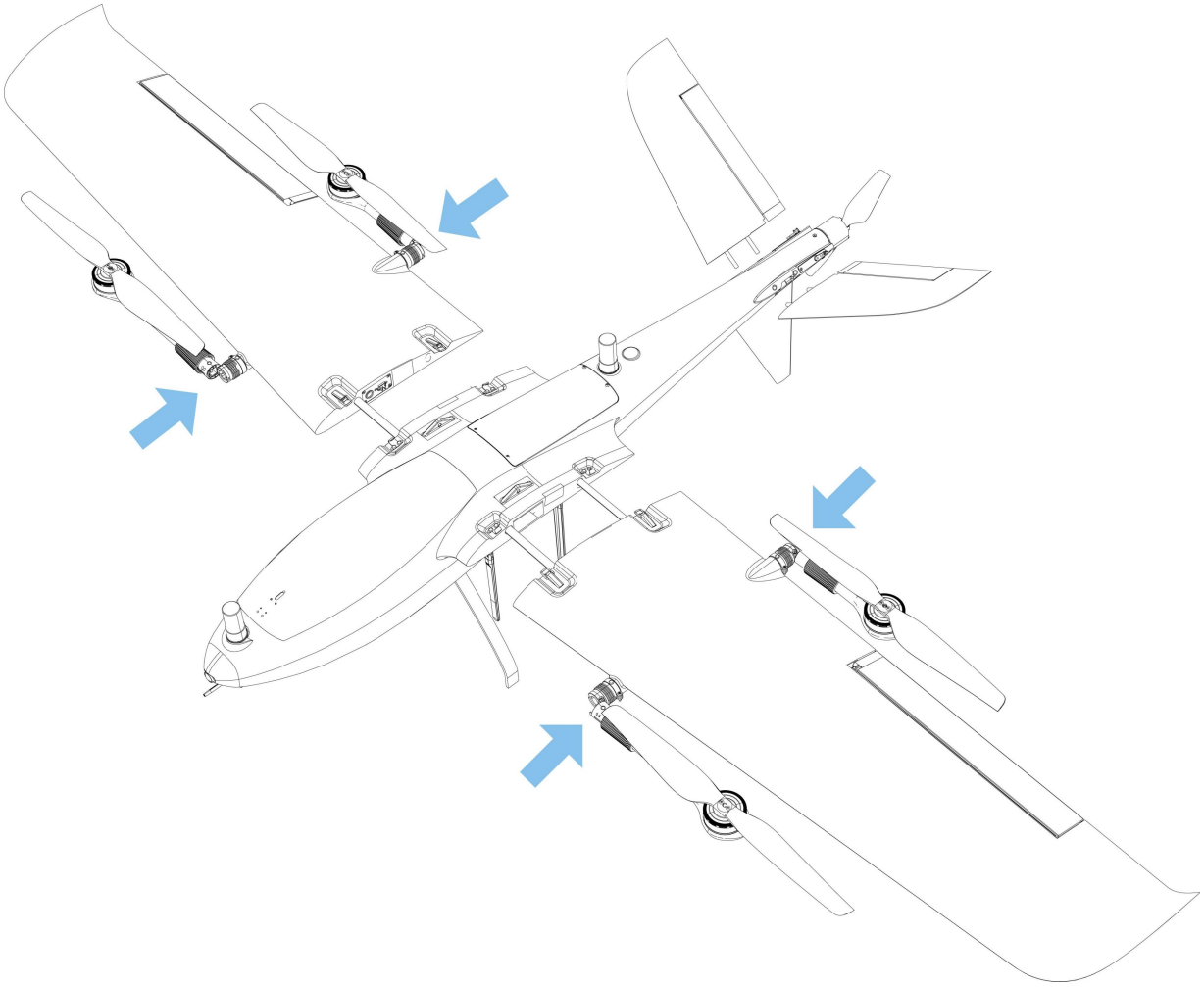
1.3.2 Tightening the Rotor Arm Sleeves and Installing the Wings

1.Unfold the four rotor arms on the wings and tighten the rotor arm sleeves.

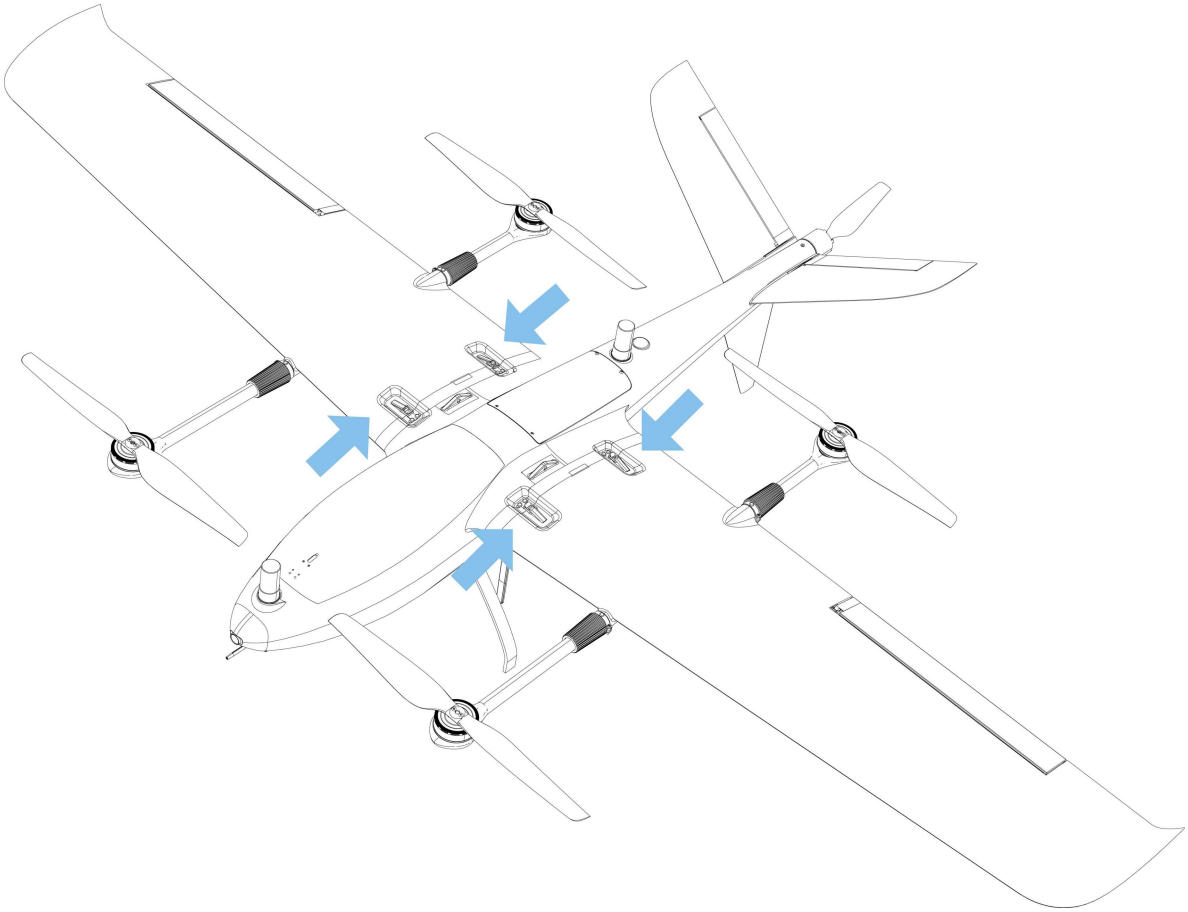


2.Insert the wings horizontally into the fuselage and connect the rotor motor power supply wire and signal control wire.

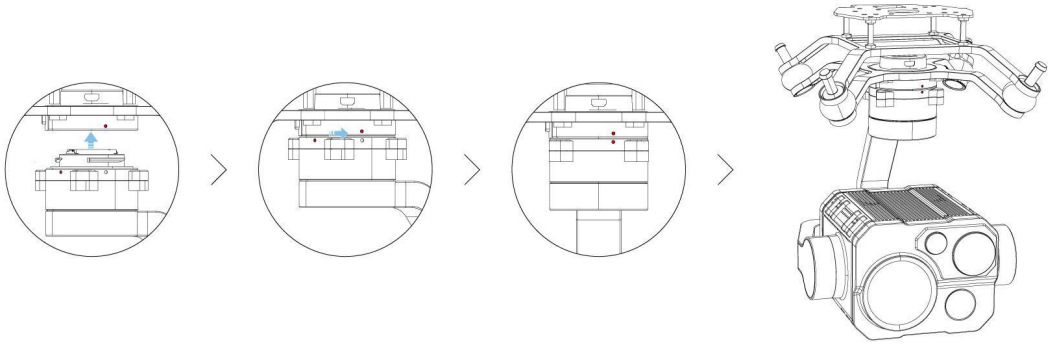
Note: Do not excessively pull the rotor power and signal wires.



3. Tighten the wing lock.



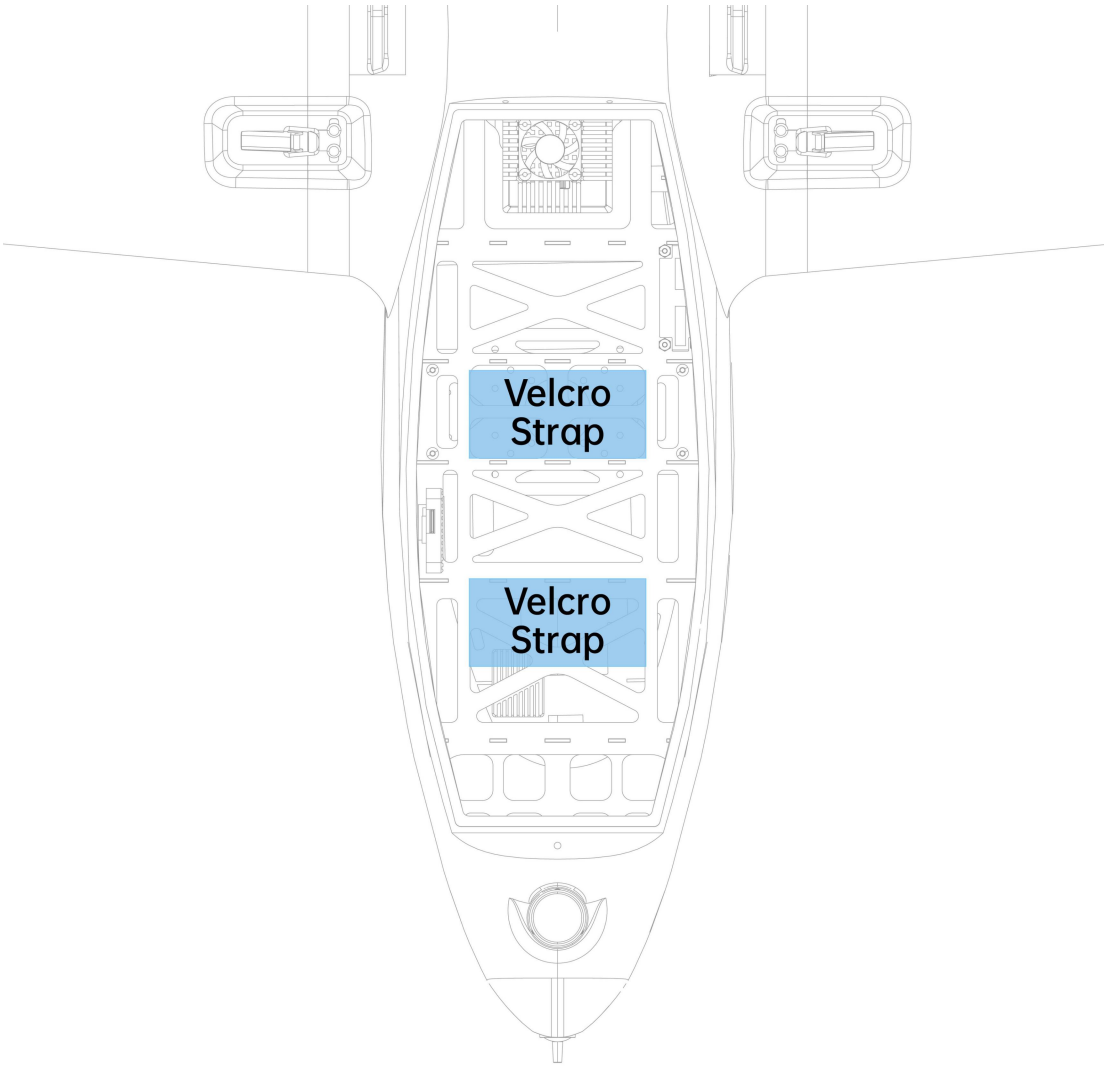
1.3.3 Install the gimbal camera



1.3.4 Installing the flight battery

1. Insert the flight battery as shown in the diagram. The V2200 does not come with a battery; it is recommended to use a Tattu 6S LiHv 22000mAh 25C XT90-S anti-spark connector battery.

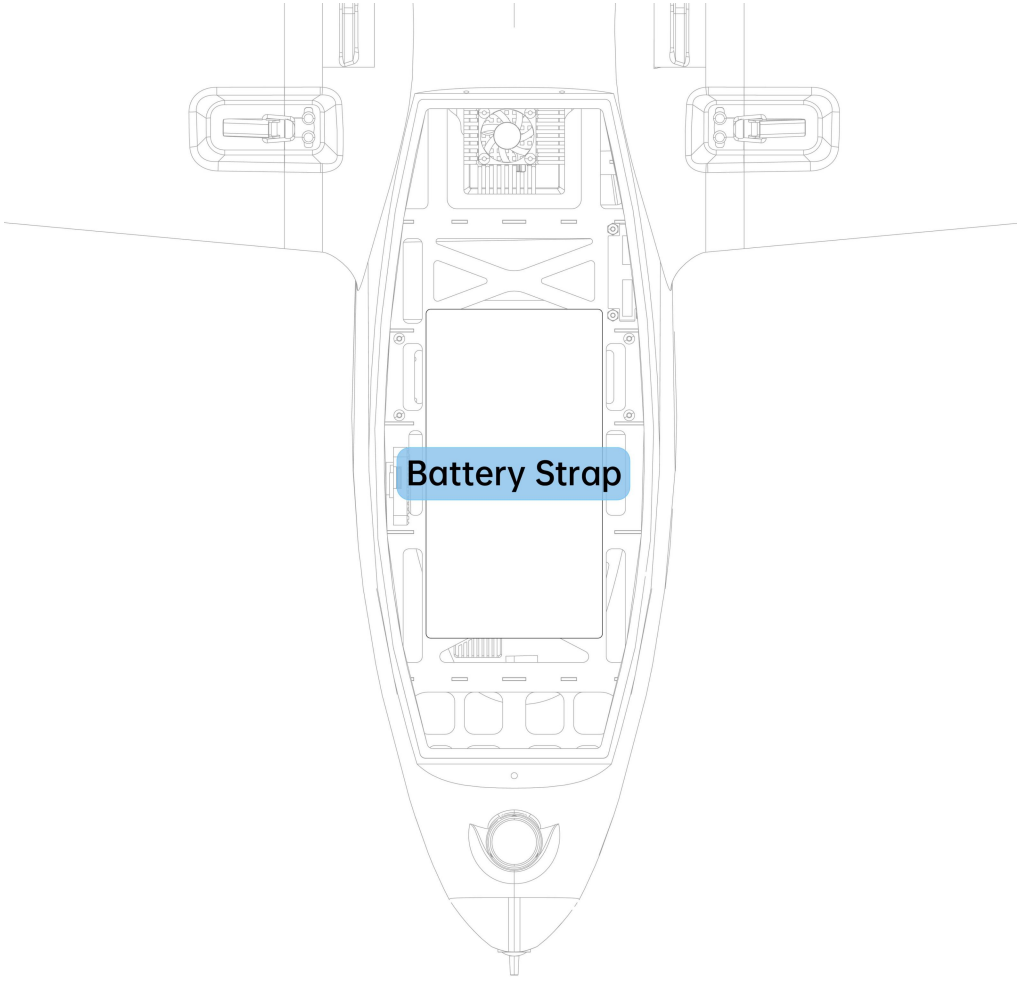
Note: The bottom of the flight battery must be affixed with hook-and-loop tape to secure the battery in place.



Note: The battery installation position should be referenced according to

Chapter 6: Center of Gravity Balancing.

2. After measuring the center of gravity, determine the battery installation position and secure the battery with the tightening cable tie.



Note: The center of gravity must be balanced before takeoff!!! Takeoff is prohibited otherwise!!!

Chapter 2 : Aircraft

2.1Technical Specifications

Aircraft Body Specifications

Airframe Material	Fiberglass, Carbon Fiber, Engineering Plastic, Aircraft Aluminum Alloy
Disassembly Method	Tool-free Quick Disassembly
Dimensions (With Propellers)	2200mm (Wingspan) * 1280mm (Length) * 460mm (Height)
Rotor Motor Diagonal Distance	1020mm
Packaging Type	Aviation Aluminum Case

Propulsion Parameters

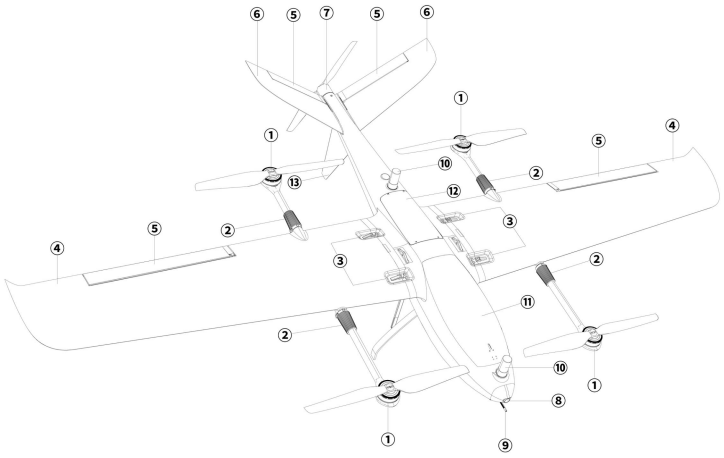
Multirotor Motor Model	5008 400kv
Multirotor Propeller Size	18x6.5
Multirotor ESC Model	2in1 60A
Fixed-Wing Motor Model	3530/445kv
Fixed-Wing Propeller Model	15x10
Fixed-Wing ESC Model	100A

Flight Technical Parameters

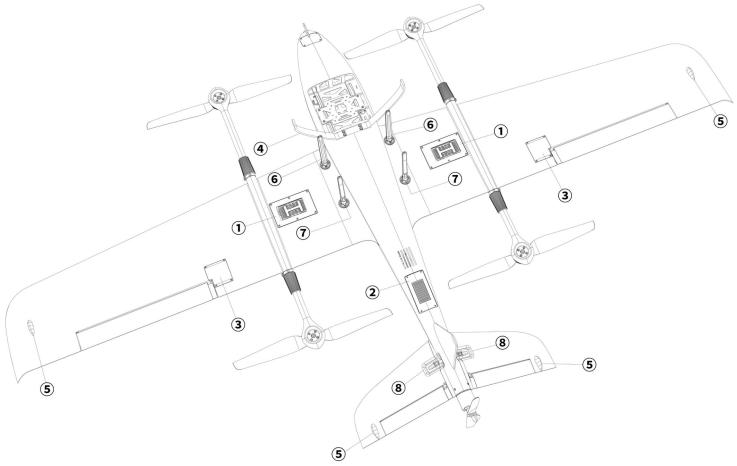
Parameter	Value
Empty Weight (excluding battery)	5.1 kg
Weight with Battery (empty)	7.4 kg
Maximum Takeoff Weight	8.4 kg
Maximum Payload	1 kg
Max Ascent Speed (Multirotor)	2.5 m/s
Max Descent Speed (Multirotor)	2.0 m/s
Return-to-Home Height (Multirotor, Mode Transition)	50 m
Max Ascent Speed (Fixed-wing)	3 m/s
Max Descent Speed (Fixed-wing)	4 m/s
Fixed-wing Hovering Radius	200 m
Return-to-Home Height (Fixed-wing)	110 m
Max Flight Altitude	3000 m
Service Ceiling	3500 m
Stall Airspeed	14 m/s
Transition Airspeed	15 m/s
Cruise Airspeed	18 m/s

Max Airspeed	25 m/s
IP Protection Rating	IP53
Wind Resistance Level	Multirotor: Level 4, Fixed-wing: Level 5
Operating Voltage	22-26.2 V
FPV Camera Field of View	Vertical: 122°, Horizontal: 113°
FPV Camera Recording Specifications	4K
Battery Power Input	Amass XT90H-M (Male)

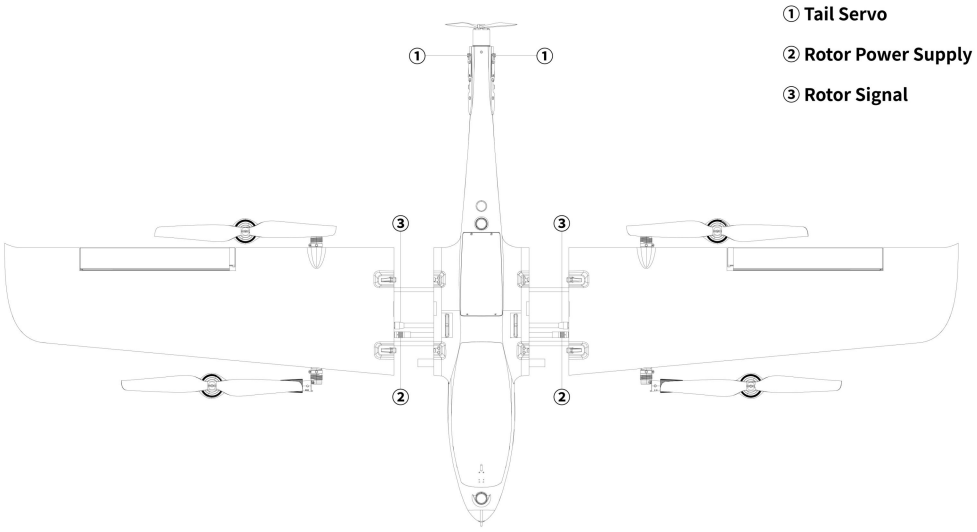
2.2Understanding the Aircraft



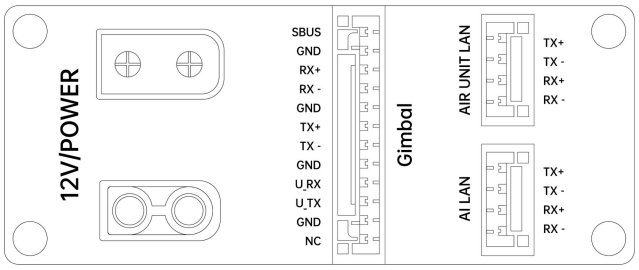
① Rotor Propulsion System
② Arm Folding Mechanism
③ Wing Locking Mechanism
④ Wing
⑤ Aileron
⑥ Tail Wing
⑦ Fixed-Wing Propulsion System
⑧ FPV Camera (First-Person View Camera)
⑨ Airspeed Sensor
⑩ RTK Antenna
⑪ Battery Compartment Cover
⑫ Flight Control Compartment Cover
⑬ Vertical Tail Fin

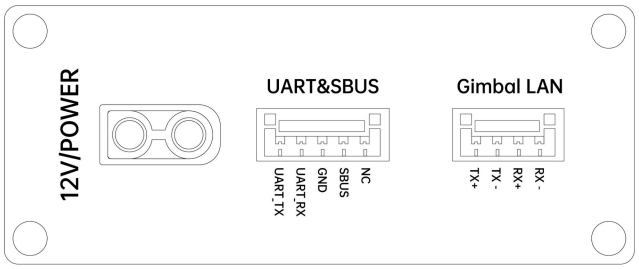


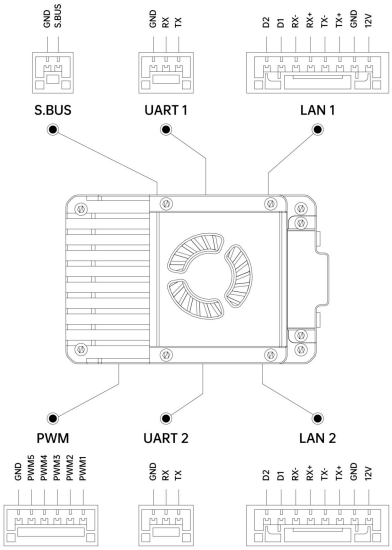
① Rotor ESC (Electronic Speed Controller)
② Tail ESC (Electronic Speed Controller)
③ Wing Aileron
④ Landing Gear
⑤ Navigation Light
⑥ 2.4G Image Transmission Antenna
⑦ 5G Image Transmission Antenna
⑧ Tail Wing Quick-Release Lock

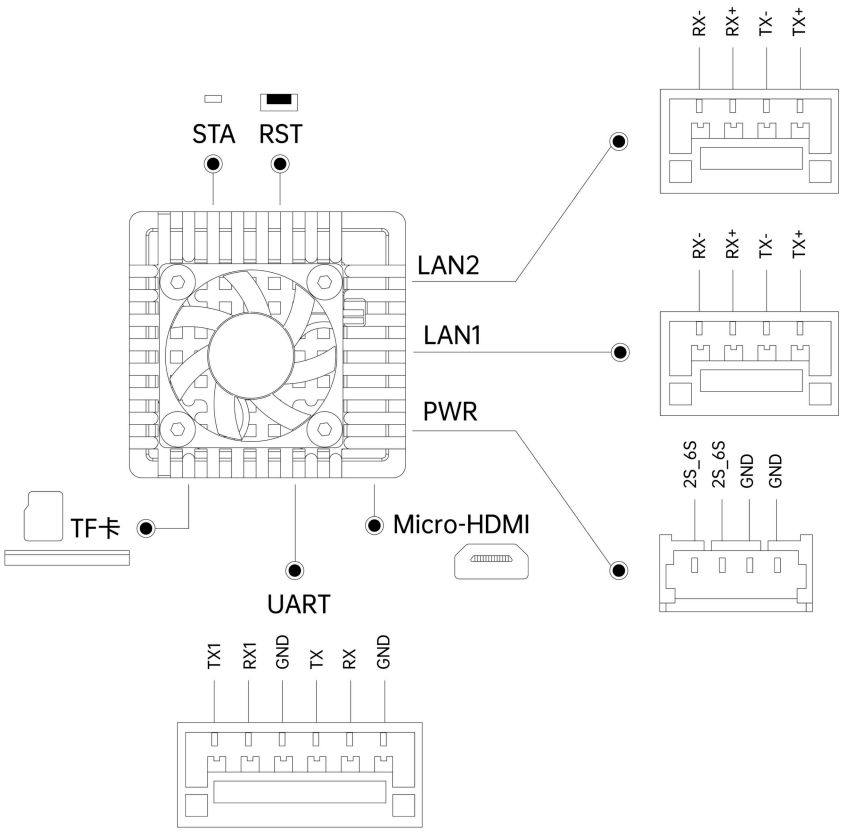


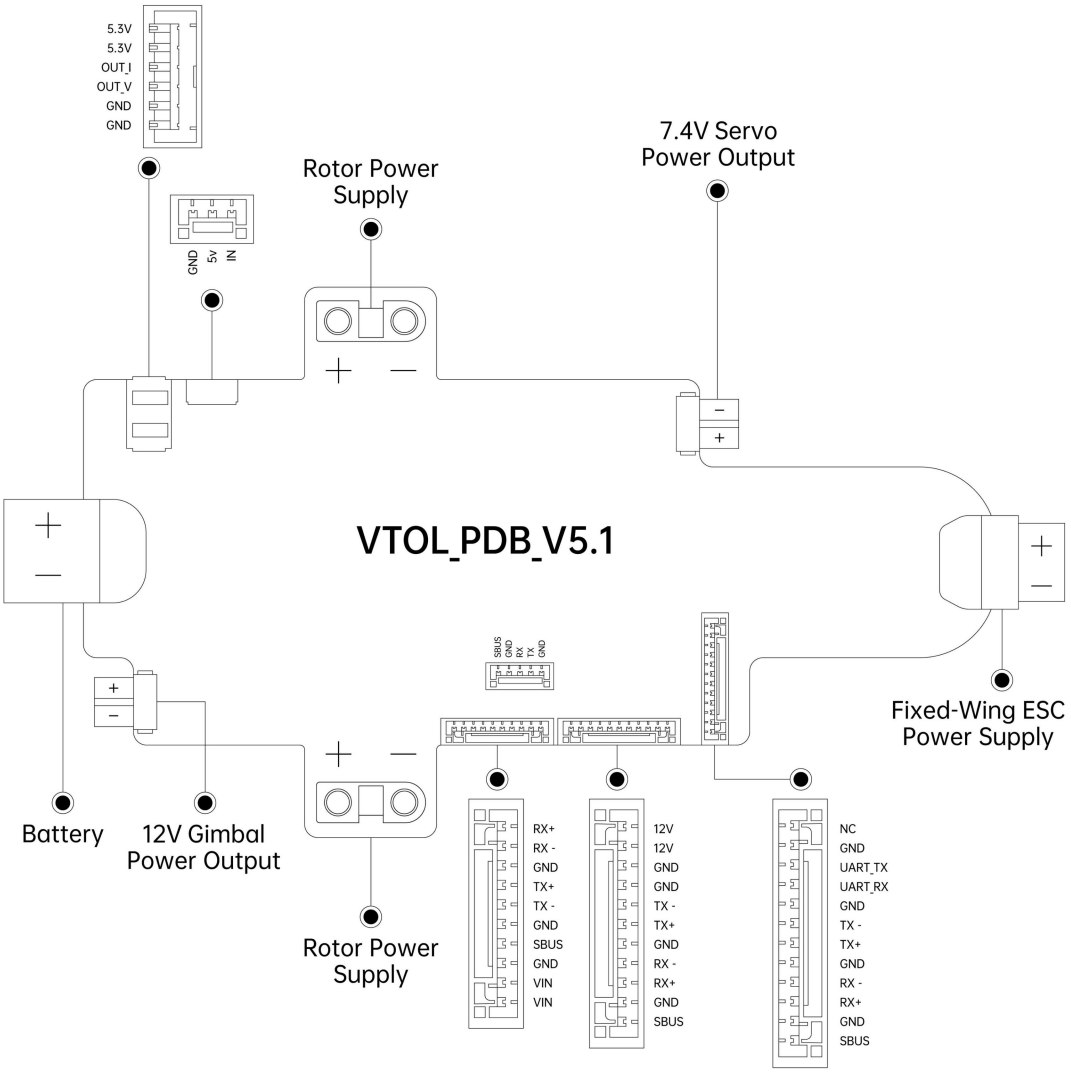
2.3Interface Definition

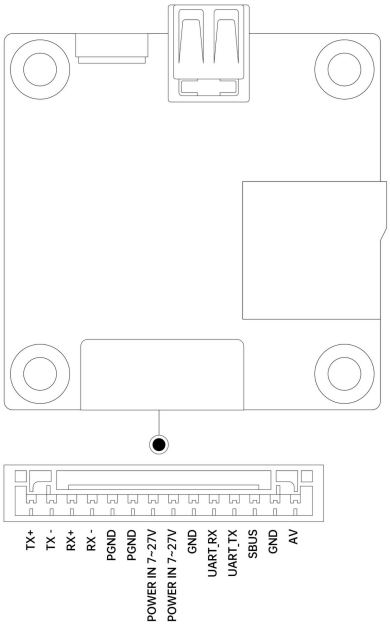




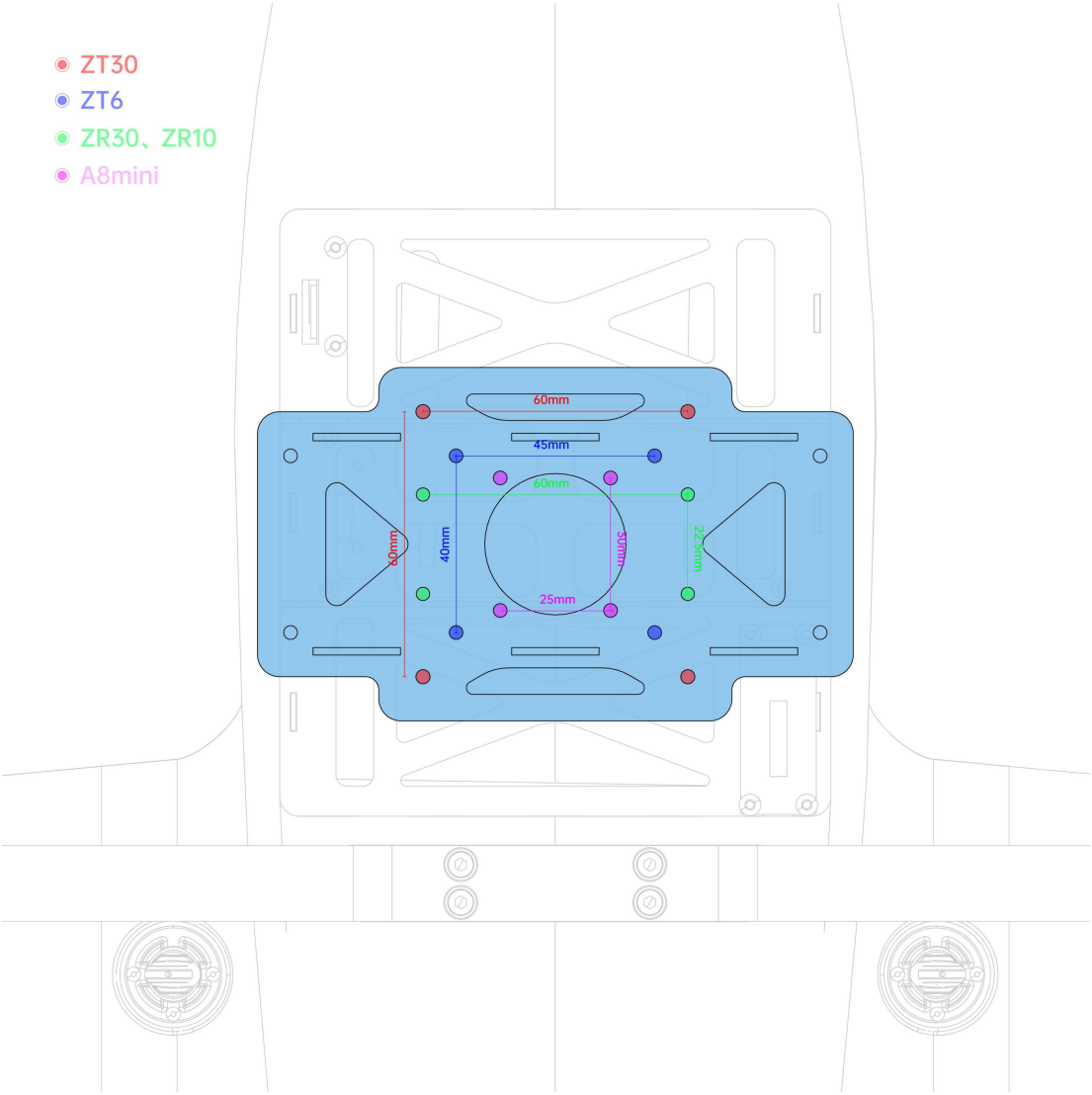




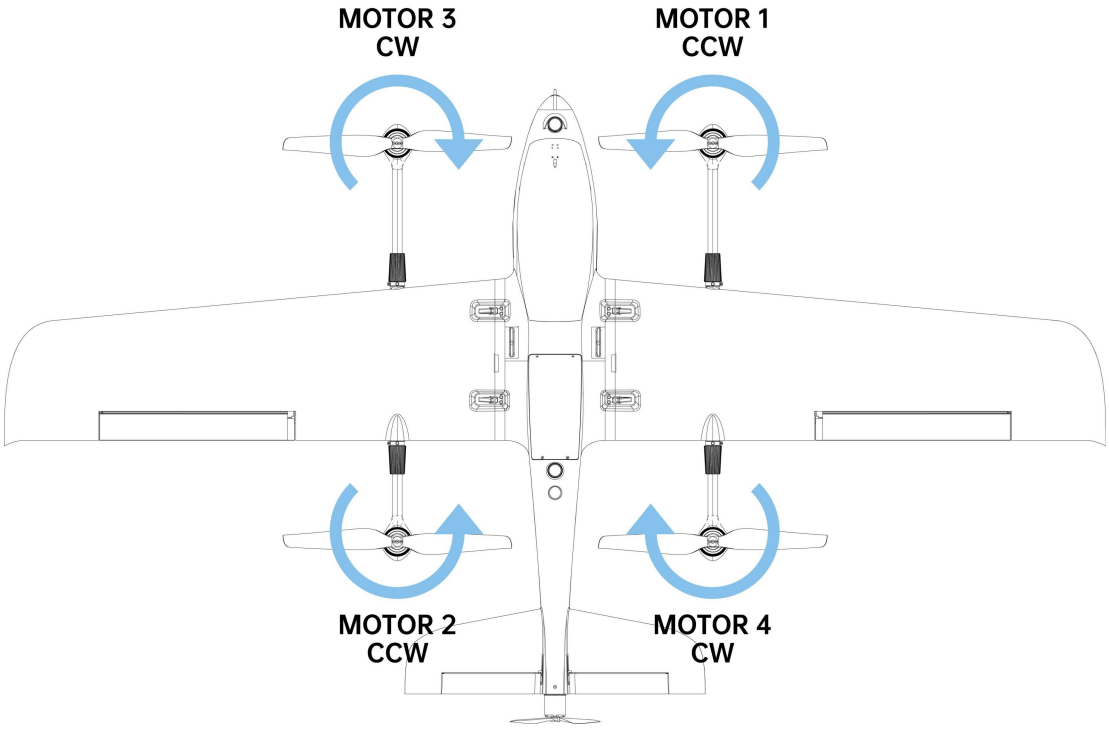


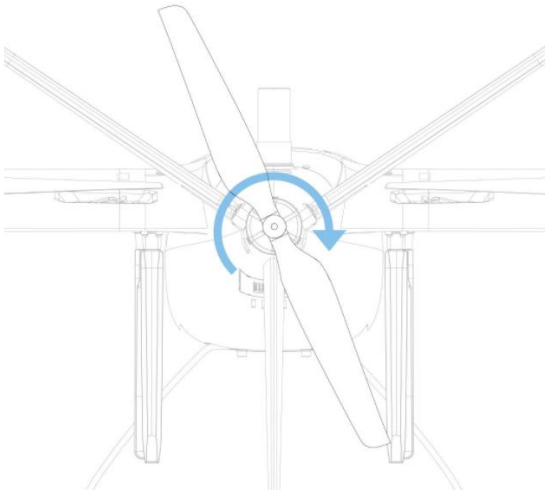


2.4 Payload Mounting Bracket Mounting Holes



2.5 Motor and Propeller Direction



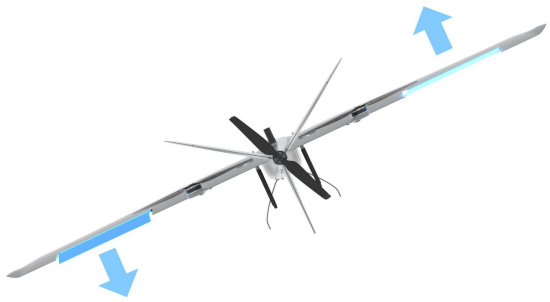


2.6 Aileron Deflection

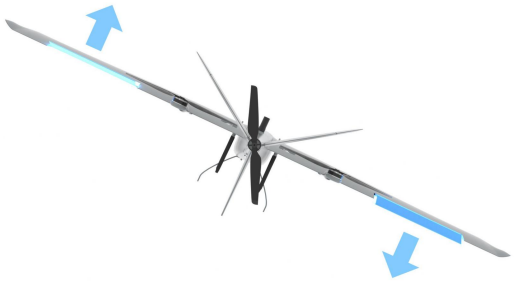
The aileron is an essential control component in fixed-wing mode. Understanding the deflection of the aileron is necessary.

When the aircraft's attitude changes in the FBWA mode, the aileron feedback is shown in the diagram below.

When the aircraft tilts to the left, the aileron deflection feedback is as follows:

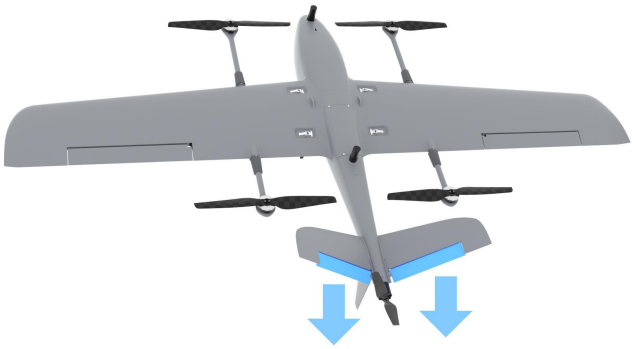


When the aircraft tilts to the right, the aileron deflection feedback is as follows:



When the nose of the aircraft tilts downward, the aileron deflection feedback is as follows:

When the nose of the aircraft tilts upward, the aileron deflection feedback is as follows:



2.7 FPV Camera

UniVTOL V2200 is equipped with a 4K ultra-wide FPV camera, with the gimbal/pods view angle and flight angle freely switchable, providing enhanced flight

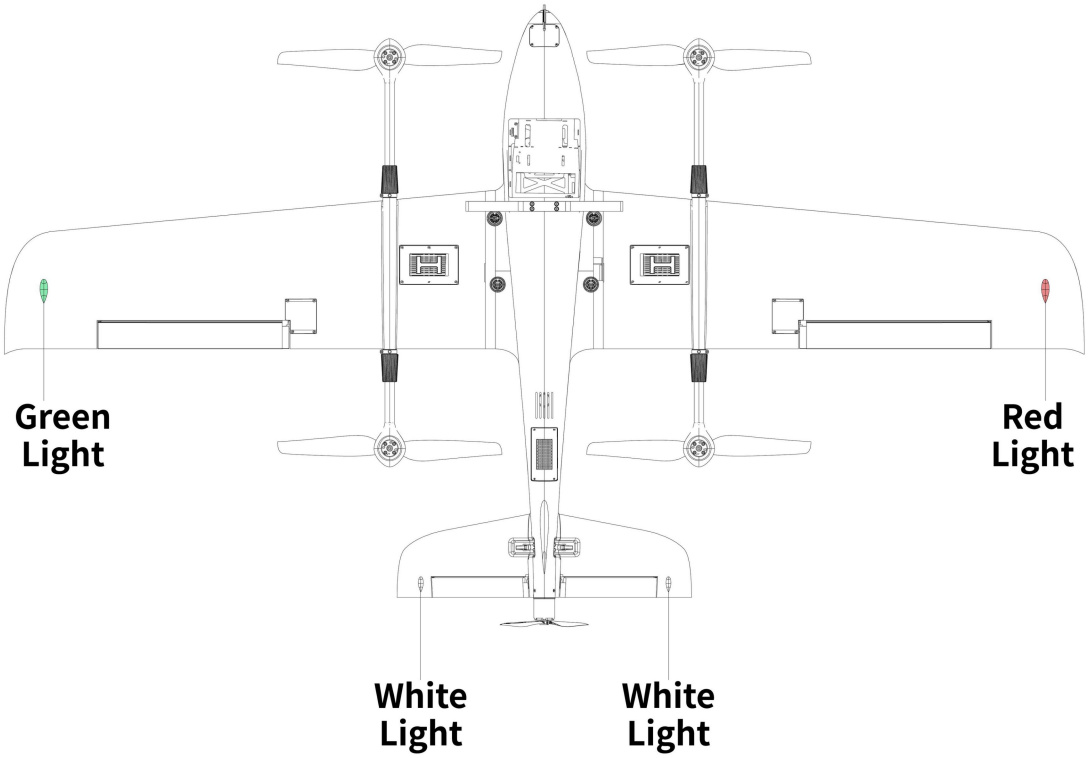
safety.

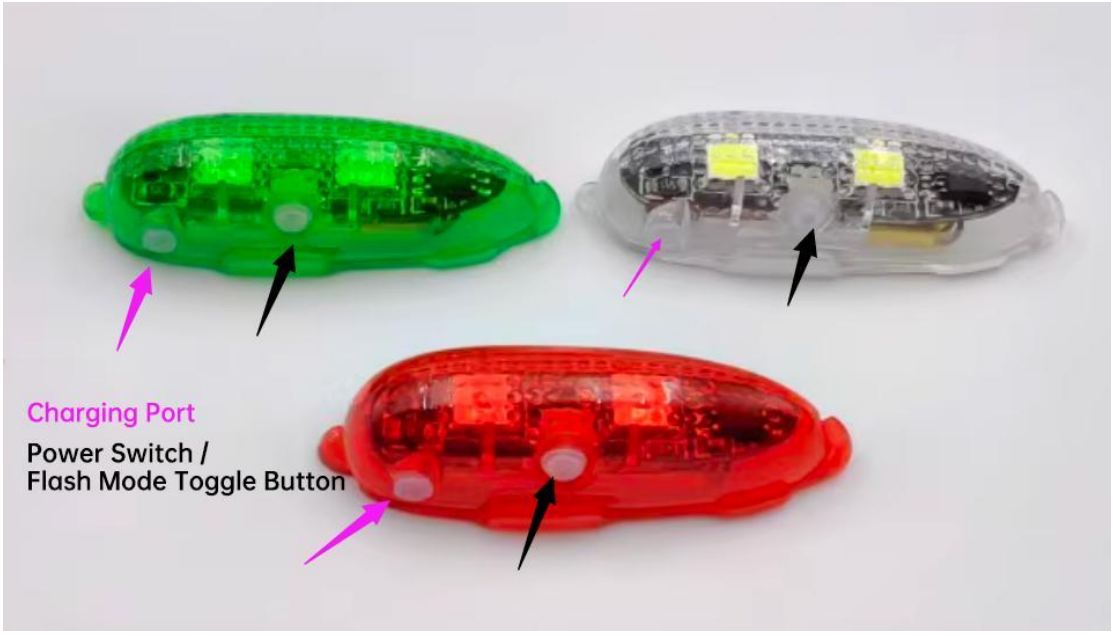
FPV Wide-Angle View: Vertical: 122°, Horizontal: 113°

It supports 4K recording and can take photos and record videos via SBUS control. The photo function is mapped to the 5th SBUS channel, and video recording is mapped to the 6th SBUS channel. The shipping controller for the V2200 does not have physical buttons mapped to the 5th and 6th channels. To enable the SBUS photo and video functions, you need to map physical buttons on the remote controller.

2.8 Navigation Lights

The UniVTOL V2200 accessory package includes navigation lights, which can be used as needed. The positions and colors for affixing the navigation lights are as follows.





Usage Instructions:

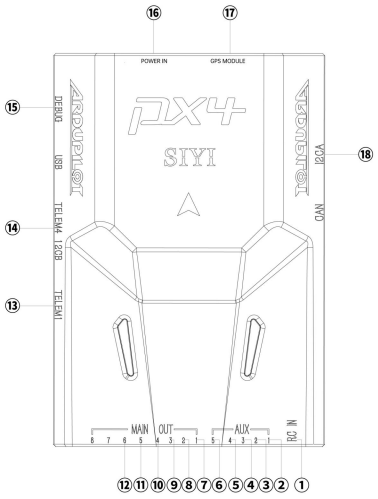
1．Attach the navigation light module to the positions shown in the image above. The left wing should have a red light, the right wing should have a green light, and the tail wing should have a white light. This configuration allows easy observation of the aircraft's posture and position during flight.

2．Before flight, press the power button once to turn on the navigation lights, and switch the mode to the flashing mode.

3．After flight, press the power button three times to turn off the navigation light module.

2.9 Autopilot System Output Definition

The output definition of the V2200 flight controller is as follows.



① SBUS Input	⑩ Left V-Tail
② MOTOR1	⑪ Right V-Tail
③ MOTOR2	⑫ Servo Power Supply
④ MOTOR3	⑬ Data Transmission 1 (Remote Controller Data Link)
⑤ MOTOR4	⑭ Data Transmission 2 (Computer Data Link)
⑥ Servo Power Supply	⑮ Gimbal Communication
⑦ Right Aileron	⑯ Flight Controller Power Supply
⑧ Left Aileron	⑰ RTK Positioning and Orientation
⑨ Fixed-Wing Throttle	⑱ Airspeed Sensor

2.10 Aircraft RTK

The aircraft is equipped with a built-in RTK module and an RM3100 industrial-grade magnetometer, enabling single-module dual-antenna direction finding. It supports full-system and full-frequency high-precision positioning with BeiDou, GPS, GLONASS, Galileo, and QZSS, significantly improving positioning accuracy and reliability. In complex electromagnetic environments, it still demonstrates excellent anti-interference performance, providing the UAV system with high-precision control responses for precise operations.

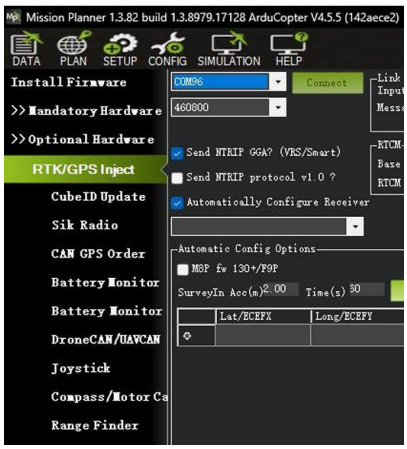
Base Station Description:

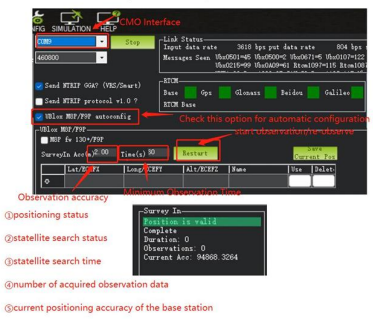
Refer to the above image, fix the RTK base station and the mushroom antenna onto the tripod, and properly connect the antenna cables.

Note: The RTK base station is optional. The tripod should be provided by the user. Please ensure that there are no obstacles or sources of interference around the RTK antenna to avoid affecting convergence time and positioning accuracy.

Ground Station Parameter Settings:

Run the Mission Planner ground station software, and navigate to "Initial Setup → Optional Hardware → RTK".

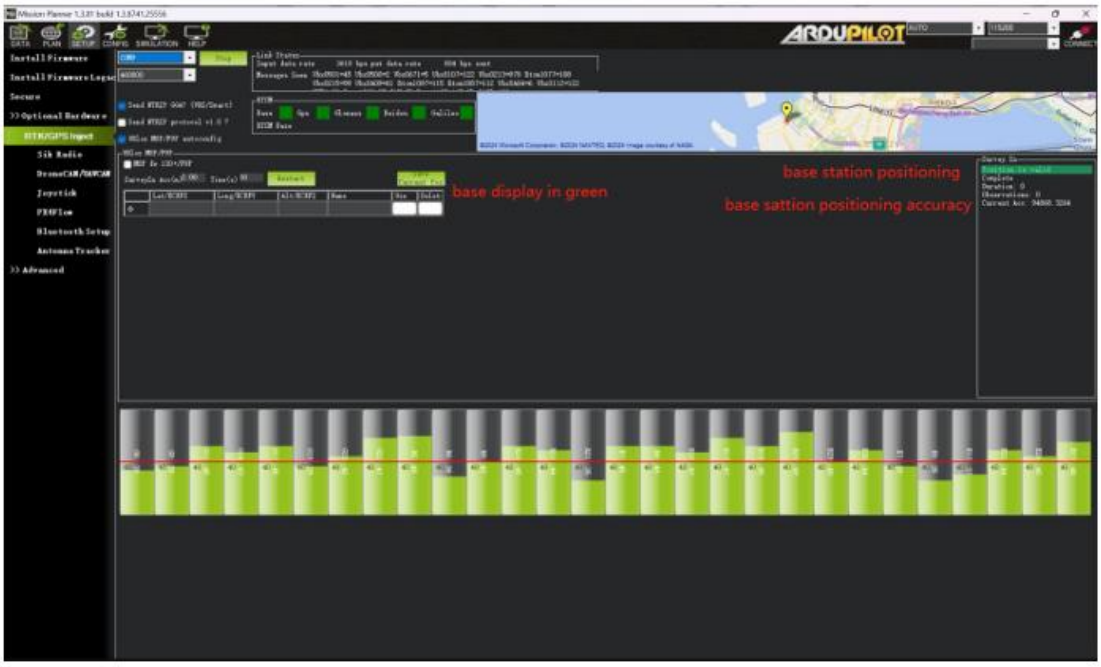




It is recommended to check the option for automatic configuration of F9P, set the observation accuracy to 2.5, and set the minimum observation time to 60 seconds.

Once the settings are complete, click Restart to begin observation.

Note: After the base station successfully completes the positioning, do not move the base station! Once the base station is working properly and the convergence is finished, the ground station interface will be displayed as shown below.



The GPS status will display as "RTK Fixed," indicating that the RTK positioning mode has been entered.

Using Network RTK with Handheld Ground Station

The handheld ground station, in conjunction with the RTK mobile terminal and network RTK base station, can enable Network RTK functionality.

Use Network RTK in conjunction with the handheld ground station and network RTK base station.

To use Network RTK with the handheld ground station, run the Mission Planner

ground station software and connect the handheld ground station to the mobile internet. Then, go to "Initial Setup > RTK > NTRIP".

The protocol address format is as follows (using Qianxun RTK as an example):

http://USER:PASSWORD@rtk.ntrip.qxwz.com:8002/RTCM32_GGB

In this format, "USER" refers to the username of the FindCM service account you have applied for, and "PASSWORD" is the corresponding password. "rtk.ntrip.qxwz.com" is the FindCM service address of the Qianxun positioning server, with port 8002 broadcasting WGS84 coordinate system data. "RTCM32_GGB" is the data source broadcasting RTCM 3.2 format data externally.

Note:

For more detailed information, you can consult the Qianxun Network RTK official documentation:

Qianxun Knowledge FindCM_Frequently Asked Questions - Qianxun Position Help Center (qxwz.com).

After successfully obtaining the base station data, you can observe information such as protocol number, data rate, base station coordinates, satellite numbers, and

signal-to-noise ratio on the RTK/GPS Inject page.

Chapter 3 : Introduction to Common Flight Modes

3.1 QHOVER Multi-Rotor Altitude Hold Mode

Corresponding to the M1 button on the remote controller.

The throttle joystick on the remote controller is used to control altitude, either ascending or descending. When the throttle joystick is in the middle position, the current flight altitude will be maintained. In this mode, the aircraft will not maintain a fixed position and the aircraft's position must be manually controlled.

Note: In this mode, the flight controller limits the attitude angle to 15 degrees. There is no speed or position control.

3.2 QLOITER Multi-Rotor Loiter Mode

Corresponding to the M2 button on the remote controller.

In QLOITER Multi-Rotor Loiter Mode, the aircraft will automatically attempt to maintain its current position, heading, and altitude. However, when the remote controller joysticks are released, the aircraft will decelerate to a stop and hold its position.

Note: In this mode, the maximum flight speed is limited to 5 m/s.

3.3 FBWA Fixed-Wing Stabilized Mode

Corresponding to the M3 button on the remote controller.

In FBWA Fixed-Wing Stabilized Mode, the remote controller's throttle joystick directly controls the output of the fixed-wing motor's throttle. During flight, when the remote controller's ROLL is applied, the fixed-wing ROLL is limited to 30 degrees.

When the remote controller's PITCH is applied, the fixed-wing PITCH is limited to +20° to -25°. In this mode, manual flight requires attention to airspeed to avoid stalling.

Note: In this mode, there is no speed or position control.

3.4 Loiter Fixed-Wing Hold Mode

Corresponding to the M4 button on the remote controller.

When the M4 button on the remote controller is pressed, the aircraft will switch to Loiter mode, maintaining the current altitude while circling the selected flight point with a 200-meter radius in a clockwise direction.

This mode automatically controls airspeed and altitude, and the aircraft will circle with a 200-meter radius in a clockwise direction.

3.5 AUTO Mode

Corresponding to the M5 button on the remote controller.

In AUTO mode, the aircraft will follow the flight plan set by the ground control station to execute the mission.

3.6 RTL (Return to Launch) Mode

Corresponding to Remote Controller M6 Button

In Return to Launch mode, if the drone is in a multirotor flight mode and the straight-line distance from the drone to the return point is less than 300 meters, the multirotor will ascend to 30 meters and then return in multirotor mode, landing afterward. If the distance from the return point exceeds 300 meters, the drone will ascend to 50 meters and return in multirotor mode, landing afterward. During the multirotor return, the aircraft cannot be controlled using the joystick, but horizontal

position can be controlled during the landing. If the throttle stick is pushed above 70% for 1 second, the landing can be paused.

When triggering the return, if the drone is in fixed-wing mode, it will climb to 110 meters in fixed-wing mode to return. Upon reaching the return point, it will circle with a 200-meter radius around the return point, descending to 50 meters, then make a crosswind approach and land in multirotor mode.

Note: Pay attention to any obstacles along the return path. When exiting return mode, if the drone is in fixed-wing mode, it must be switched back to fixed-wing mode to exit return. If the drone is in multirotor mode, it should be switched back to multirotor mode to exit return, avoiding unnecessary mode transitions.

3.7 Prohibited Flight Modes

Prohibited Actions

Due to the diversification of open-source flight control (ArduPilot), the following flight modes are prohibited during the use of the V2200:

ACRO (Fixed-Wing Pure Manual)

AUTOTUNE (Fixed-Wing Automatic Tuning)

MANUAL (Fixed-Wing Pure Manual)

STABILIZE (Fixed-Wing Angle-Limited Stabilization)

TRAINING (Training Mode)

THERMAL (Thermal Airflow Mode)

QSTABILIZE (Multirotor Stabilization Mode)

QAUTOTUNE (Multirotor Automatic Tuning)

QACRO (Multirotor Pure Manual Mode)

AIRMODE (Multirotor AIRMODE)

QUICKTUNE (Multirotor Quick Tuning)

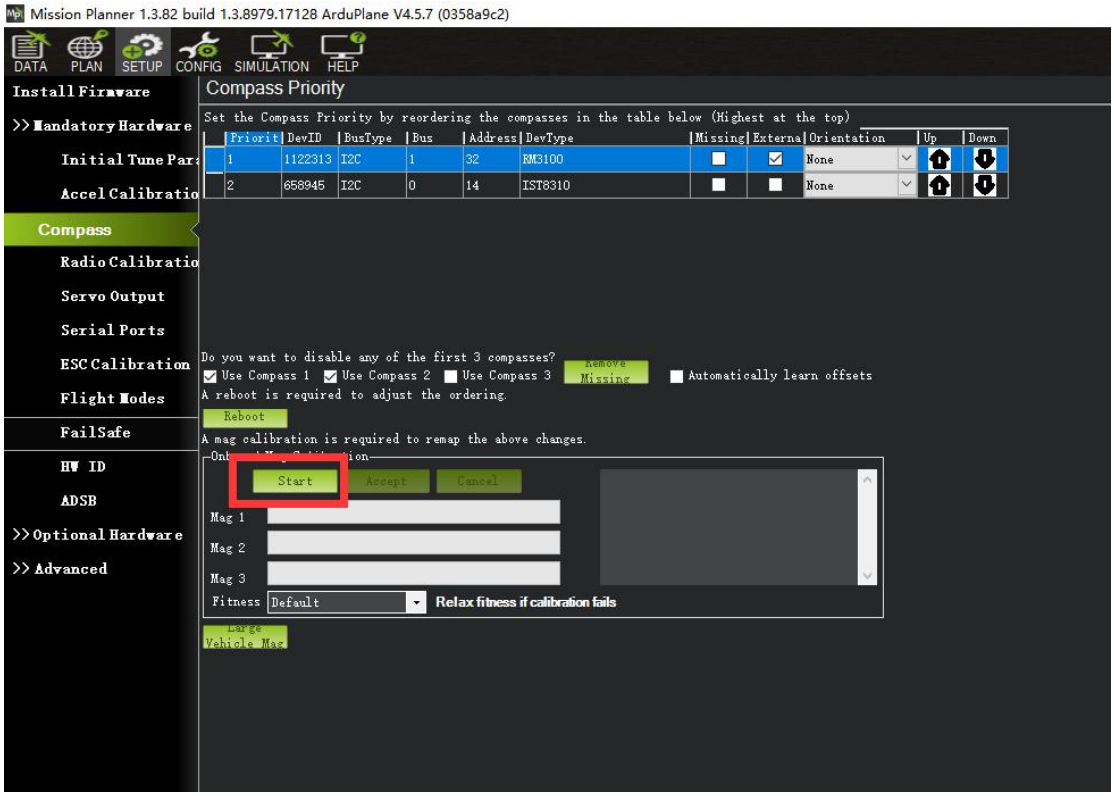
Chapter 4 : Compass Calibration

V2200 Default Supports RTK Dual-Antenna Heading

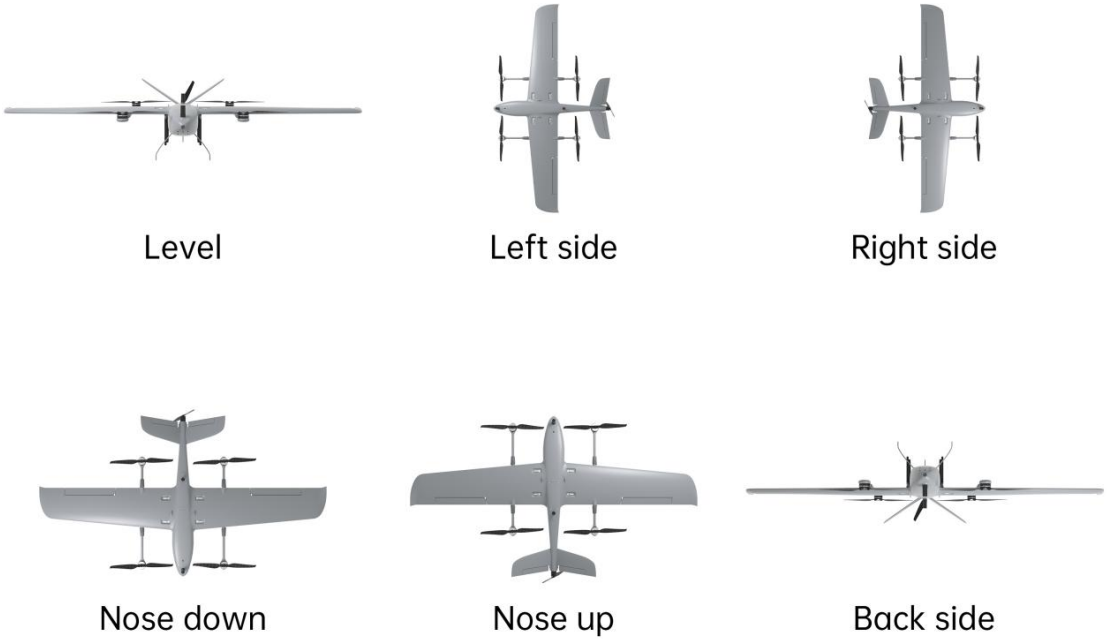
During flight, if the RTK dual-antenna heading fails, the system will switch to using the compass.

Note:

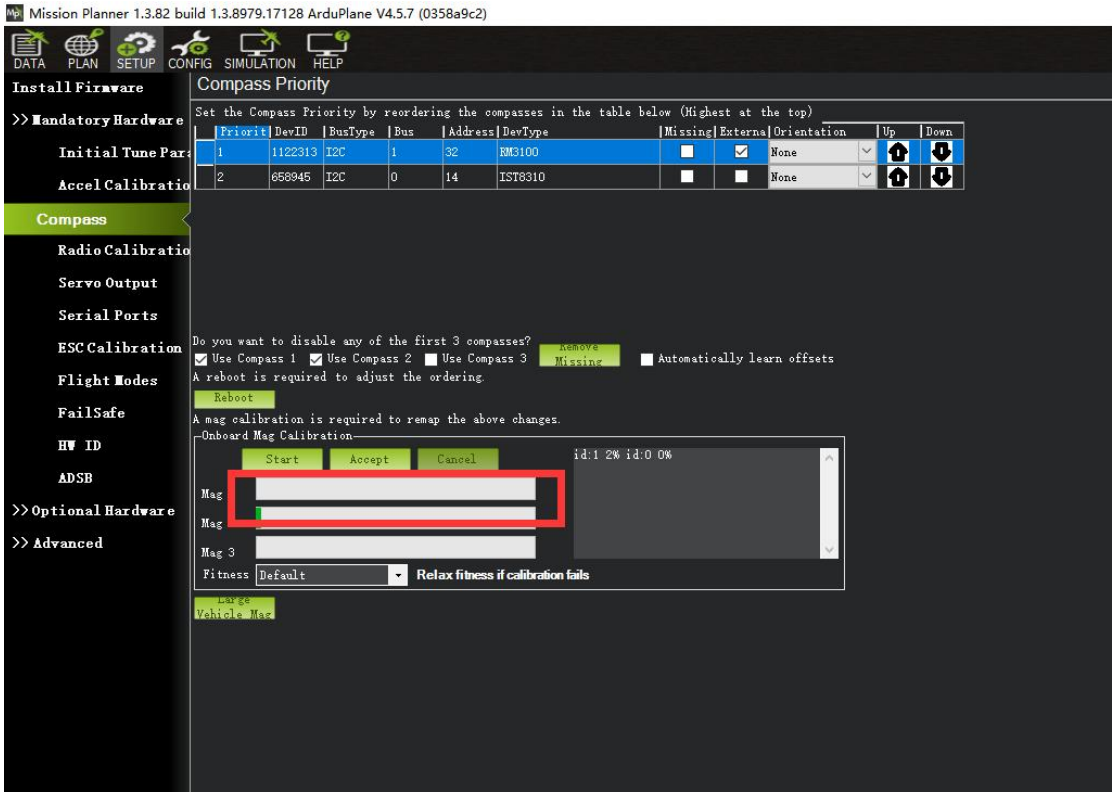
- Do not calibrate near strong magnetic fields or large metal objects, such as magnetic ore, parking lots, or areas with underground rebar in buildings.
- When calibrating, avoid carrying ferromagnetic objects, such as smartphones, with you.
- Click the "Start" Button



- Lift the drone and rotate it in different directions, making sure each side (front, back, left, right, top, and bottom) completes a full rotation.



- As the drone rotates, the green indicator bar should extend further to the right until the calibration is complete.
- Once successful, a "Please restart the autopilot" window will appear on the ground station. Click OK to restart the flight controller, and the calibration will be complete.



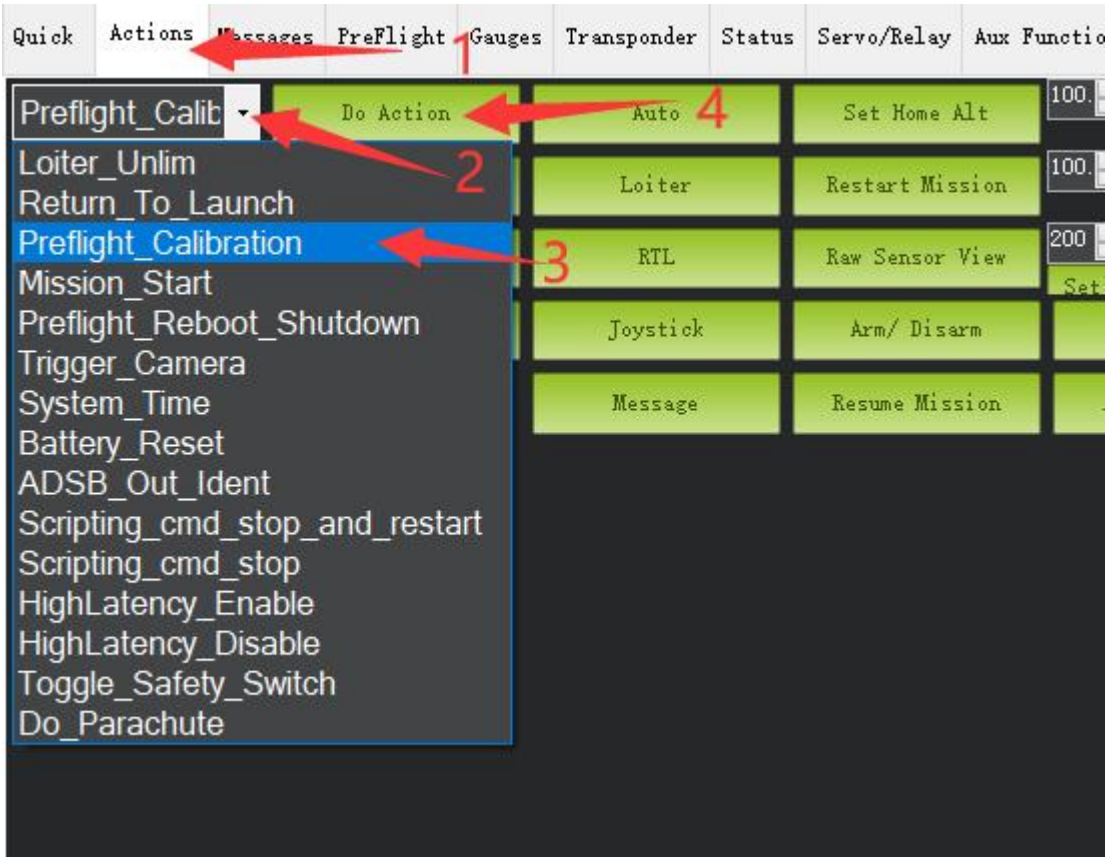
- Once the calibration is complete, you need to restart the autopilot.

Chapter 5 : Airspeed Sensor Static Calibration Before Takeoff

V2200 is equipped with an airspeed sensor, which is an important sensor for detecting airspeed in fixed-wing mode.

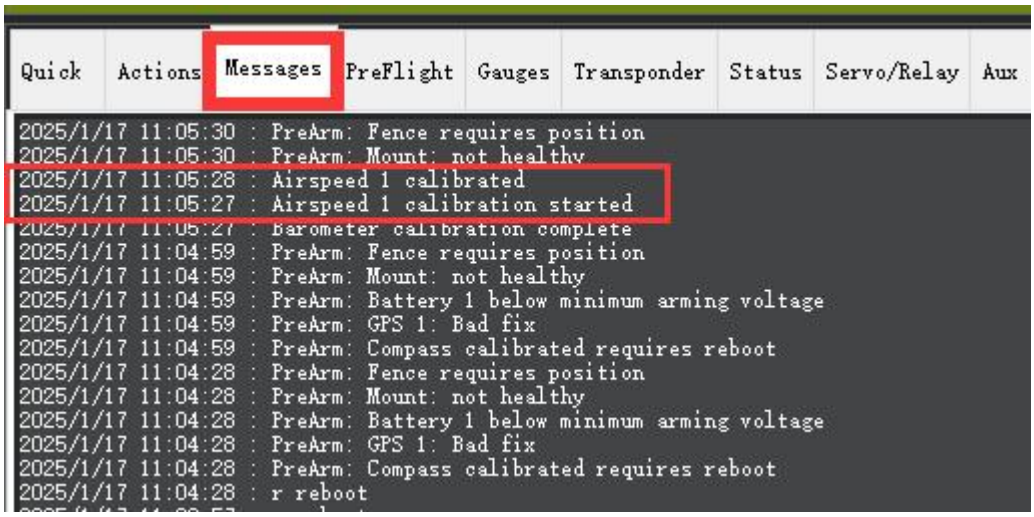
The airspeed static calibration step must be performed before each flight.

1. Open MissionPlanner ground station and connect it to the flight controller.
2. Use your hand to cover the airspeed tube, blocking the natural wind's effect on the airspeed sensor, but do not completely block the sensor.
3. In MissionPlanner, select "PREFLIGHT CALIBRATE" and click "Execute Action" to start the calibration.



4. After calibration is complete, a message will appear in the "Messages" section indicating that the calibration is finished. This means the airspeed sensor has

been statically calibrated.

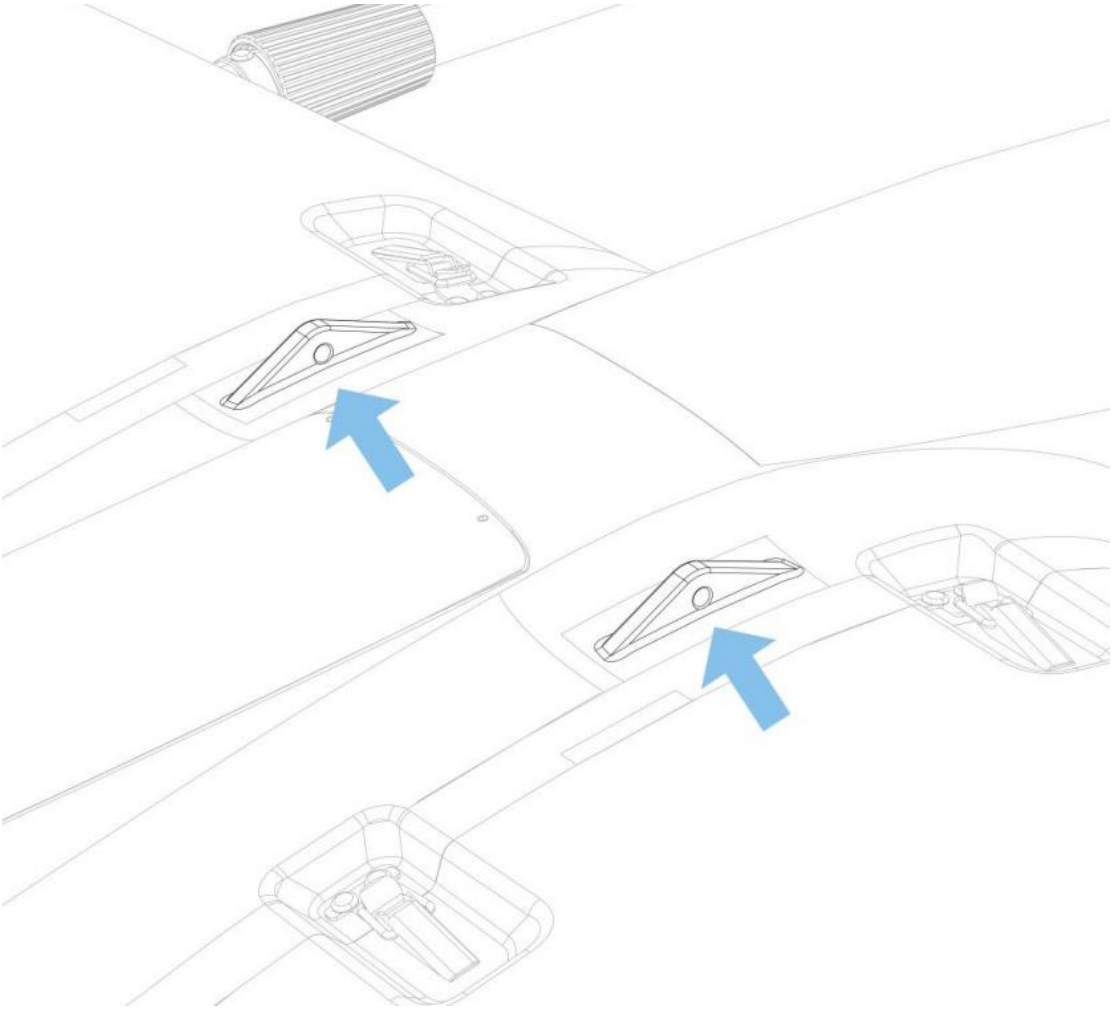


5.After the airspeed static calibration, leave the device in a windless environment and check if the airspeed value is below 3 m/s. Then, blow air into the airspeed sensor to check if the airspeed is functioning normally.

Chapter 6 : Center of Gravity (CG) Balance Before Takeoff

The center of gravity balancing must be performed before each flight! Otherwise, takeoff is prohibited!

1. Assemble the V2200 wings and tail.
2. Install the payload.
3. Install the battery.
4. Use a rope or zip tie to pass through the center of gravity measurement hole.



5. Lift V2200 using the center measurement hole, approximately 20 cm off the ground. If the nose tilts downward severely when lifted, move the battery backward. If the nose tilts upward severely, move the battery forward. Continue adjusting until the aircraft is completely level when lifted.

Chapter 7 :Drone Fault Resolution Instructions

7.1 Battery Low Voltage Failure Protection Logic

V2200 supports low battery failure protection. The logic for low battery failure protection is as follows:

If the battery voltage drops below 22V (BATT_LOW_VOLT=22) during flight, the voltage indicator on UniGCS will flash yellow continuously as a warning. If the battery voltage stays below 22V for more than 10 seconds, UniGCS will display the message: "Battery 1 is low 21.50V used xxx mAh" and trigger a low battery return-to-launch. At this point, the aircraft will return to launch mode.

Note: During fixed-wing mode flight, if the battery voltage drops below 21.8V, a multirotor landing must be performed.

For return-to-launch logic, please refer to Section 3.6.

7.2 Remote Control and GPS Signal Loss Failure Protection Logic

Remote signal loss failure protection logic:

In fixed-wing flight mode, if the remote control signal is lost for more than 1.5 seconds (FS_SHORT_TIMEOUT=1.5), the aircraft will enter short-term loss of control protection. During short-term loss of control protection, no actions will be taken, and the aircraft will remain in the current mode (FS_SHORT_ACTN=0). If the remote control signal is restored within 1.5 seconds, the aircraft will exit short-term loss of control protection. If the remote control signal is lost for more than 3 seconds (FS_LONG_TIMEOUT=3), the aircraft will enter return-to-launch mode (FS_LONG_ACTN=1).

For return-to-launch logic, please refer to Section 3.6.

GPS signal loss failure protection logic:

If the GPS signal is suddenly lost during flight, the Mission Planner ground station will display the message: "Unhealthy GPS Signal," and the GPS status will show as "No Fix," indicating a lost GPS signal.

In automatic mode, after GPS signal loss, the aircraft will automatically switch to inertial navigation mode to estimate its position. At this point, you should switch to a flight mode that does not rely on GPS signal for landing, such as FBAW or QHOVER mode.

Note: In inertial navigation mode, position deviation will increase over time.

Note: In multirotor mode, loss of control will immediately trigger a multirotor landing.

Chapter 8 : Battery

Recommended Battery Specifications: 6S22000mAh 25C. It is recommended that users choose an intelligent battery. The selected intelligent battery should meet the requirements specified in the "GB42590-2023 Civil Unmanned Aircraft System Safety Requirements" for power energy systems, including labeling, warning instructions, and battery pack safety requirements as follows:

Labeling:

(1) Product name and model;

(2) Rated capacity, rated power, charging voltage limit, nominal voltage;

(3) Polarity indication, using terms such as "positive, negative," the symbols " + , - ," or different colors (e.g., red, black);

(4) Manufacturer information;

The labeled value for rated energy should conform to the definition of rated energy.

All of the above labels must be clearly marked on the battery pack. For products designed to ensure that users cannot incorrectly insert the battery under any usage conditions, polarity labeling may not be necessary.

Warning Instructions: The battery pack or its smallest packaging must feature Chinese warning instructions.

Battery Pack Safety Requirements:

The battery pack’s protection circuit should be capable of detecting abnormal voltage, temperature, and current conditions. It should follow the drone's protection strategy by taking control actions or sending signals to the drone. In special cases, safety protection actions for electrical safety should be taken only after the drone has landed and stopped operating. The following safety requirements apply to the battery pack:

(1) Electrostatic Discharge: The battery pack should not catch fire, explode, or leak;

(2) Overvoltage, Overcurrent, and Reverse Charging Protection: The battery pack should not catch fire, explode, or leak, and must initiate protection actions;

(3) External Short Circuit Protection: The battery pack should not catch fire, explode, or leak, and must initiate protection actions;

(4) Overtemperature Protection: The battery pack should not catch fire, explode, or leak, and must initiate protection actions;

(5) Overload: The battery pack should not catch fire, explode, or leak;

(6) Temperature Cycling: The battery pack should not catch fire, explode, or leak.

Chapter 9 : Pre-Flight Checklist

9.1 Pre-flight Check List

1. Ensure that the aircraft propellers are properly installed and secured, with no damage or deformation. The motors and propellers should be clean and free of debris. The arms should be fully extended, and the arm sleeves, wings, and tail wing latches should be tightly secured.
2. Ensure that the remote controller and aircraft batteries are sufficiently charged. The aircraft's center of gravity should be balanced, and the airspeed should be statically calibrated.
3. Ensure all equipment firmware is updated to the latest version from the official website.
4. Ensure that the lenses of the FPV flight camera and gimbal camera are free of debris, dirt, or fingerprints, and not obstructed by the aircraft's load or external accessories.
5. Ensure that the remote controller antenna is extended.
6. Power on the remote controller and the aircraft, ensuring the flight mode switch is set to Qloiter mode. Confirm that the aircraft and remote controller are properly bound and that you have control over the aircraft.
7. Check that the aileron and tail aileron surfaces respond correctly.
8. Place the aircraft on a flat, open outdoor area, ensuring there are no obstacles, buildings, trees, etc., in the vicinity. The pilot should stand 8 meters away from the aircraft, facing the tail.
9. If multiple aircraft are operating simultaneously, ensure airspace is divided to avoid mid-air collisions.

9.2 Safe Operation

- The airspeed sensor static calibration in Chapter 5 must be performed before takeoff.
- The pre-flight center of gravity balancing in Chapter 6 must be performed before takeoff.
- The aircraft must be unlocked, take off, and land in multi-rotor mode.
- For multi-rotor mode takeoff and landing, the aircraft's nose must face into the wind. Do not allow the nose to face crosswinds or tailwinds during takeoff and landing.
- During fixed-wing mode flight, if the battery voltage drops below 21.8V, the aircraft must remain in fixed-wing mode until it reaches an altitude of 50m, then switch to multi-rotor mode for landing.
- It is prohibited to switch to multi-rotor mode when the fixed-wing flight altitude exceeds 100m.
- It is prohibited to land in multi-rotor mode if the fixed-wing flight altitude exceeds 100m to avoid battery depletion.
- Do not perform prolonged multi-rotor flight. The maximum single multi-rotor flight time should not exceed 5 minutes.
- Do not modify flight controller parameters casually.
- Before takeoff, check the aileron deflection, wing arm locks, and arm sleeves to ensure they are functioning correctly.
- During fixed-wing FBWA flight, do not allow airspeed to drop below 15m/s. If the airspeed drops below 15m/s, multi-rotor protection will be triggered. If the airspeed exceeds 15m/s, multi-rotor protection will be disabled.
- During fixed-wing FBWA flight, keep the airspeed consistently above 18m/s.
- The takeoff weight must not exceed 8.4kg.
- Do not use the flight modes outlined in Chapter 3.7.
- Do not approach rotating propellers and motors. Ensure the motors are locked before approaching.

- Ensure the power battery and remote controller are fully charged before takeoff, and ensure sufficient power for return-to-home during flight.
- Fly away from crowds and take necessary safety precautions.
- Non-professional technicians should not disassemble or modify the aircraft design, firmware, or parameter settings. Doing so may lead to severe damage.

Chapter 10 : Flight Safety

10.1 Flight Environment Requirements

1. Do not fly in harsh weather conditions, such as strong winds (ground wind speed greater than 6 m/s). For flight in rain, ensure that the flight follows the IP53 protection level requirements.
2. Ensure that the aircraft takes off from an open, unobstructed, and flat ground, and is kept away from surrounding buildings, trees, crowds, bodies of water, etc. Always maintain visual line of sight (VLOS) during flight. For beyond visual line of sight (BVLOS) flight, ensure the aircraft is in good condition, the operator is properly qualified, and check local regulations regarding BVLOS flight before the flight.
3. Do not take off from the surface of moving objects, such as a moving car or boat.
4. Avoid taking off or landing on dusty or sandy surfaces as it may affect the motor’s lifespan.

10.2 Wireless Communication Requirements

1. Ensure the aircraft’s antennas are intact and not damaged or detached.
2. Ensure that the aircraft is operated in open, unobstructed areas or on high ground. Tall steel-reinforced buildings, mountains, rocks, and trees may obstruct the GNSS and image transmission signals of the aircraft.
3. Since other wireless devices can interfere with the remote control, it is recommended to turn off nearby high-power wireless devices and keep away from base stations or strong interference sources while controlling the aircraft.
4. When flying near electromagnetic interference sources, always remain cautious, continuously monitor the UniGCS app for any lag or weak image transmission signal strength. Electromagnetic interference sources include, but are not limited

to, high-voltage power lines, high-voltage substations, mobile phone base stations, and TV broadcast towers.

Chapter 11: Obstacle Avoidance

V2200 is equipped with an obstacle avoidance module. Effective obstacle avoidance distance: 12m, maximum obstacle avoidance speed: 3m/s.

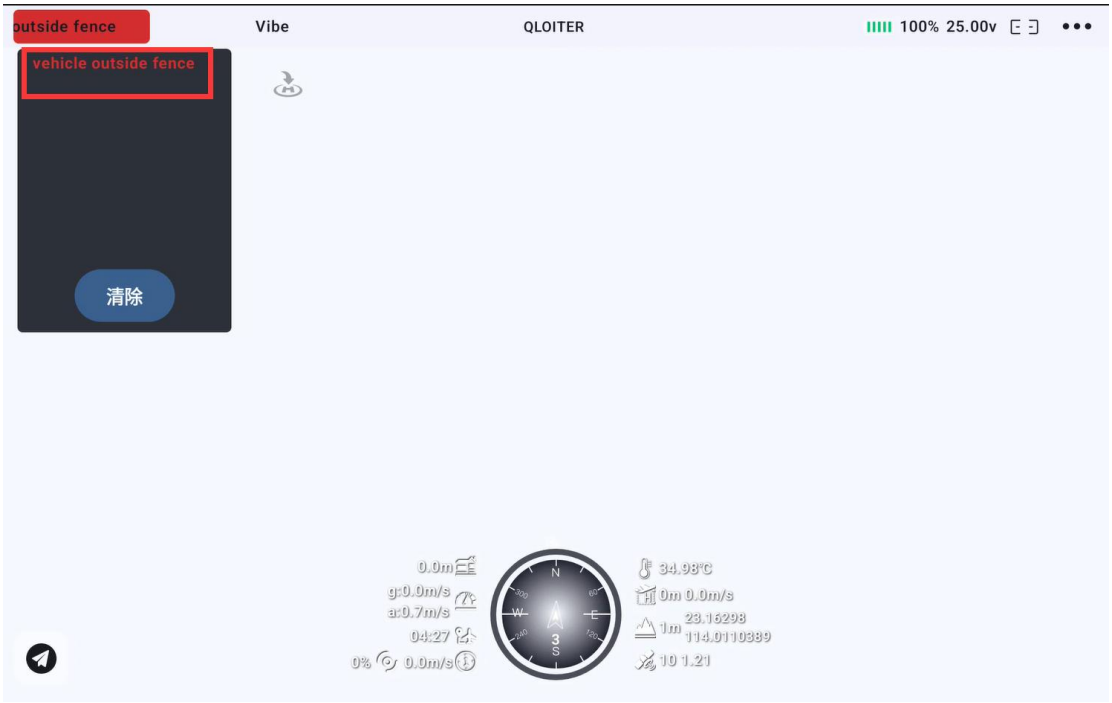
When an obstacle is detected in QLoiter mode, the V2200 will hover in place.

Chapter 12: No-Fly Zones

V2200 supports the geofencing feature (FENCE_ENABLE = 1).

When using the UniGCS ground station software, the aircraft will automatically acquire the surrounding geofencing information. If the aircraft enters a restricted zone, UniGCS will prompt: "vehicle outside fence" and prohibit takeoff.

At this point, the aircraft can take off once it has moved outside the restricted area.



When the aircraft touches the boundary of the geofencing zone during flight, UniGCS will display the message: "Fence Breached."

Once the boundary is breached, the aircraft will immediately initiate a forced return-to-home (RTH) procedure, and flight mode changes will be prohibited.

The flight mode can only be manually switched once the aircraft is at least 20 meters away from the geofencing boundary.

When the aircraft exceeds an altitude of 120 meters during flight (FENCE_ALT_MAX = 120), UniGCS will display the message: "Fence Breached."

Once the aircraft reaches the maximum flight altitude, it will immediately initiate a forced return-to-home (RTH) and the flight mode cannot be changed. The flight mode can only be manually switched after the aircraft descends to 20 meters below the maximum altitude.

Note: When the aircraft touches the restricted flight zone boundary or exceeds the maximum flight altitude of 120m, it will initiate a forced return-to-home (RTH) and the flight mode cannot be switched. The flight mode can only be changed after the aircraft is 20m away from the restricted flight zone boundary or 20m below the maximum altitude. Switching the flight mode within 20m of the restricted flight zone boundary or 20m below the maximum altitude will not be effective!

During flight, please adhere to the relevant laws and regulations, including but not limited to:

1.Compliance with restricted and no-fly zones: Before flying, please check the latest no-fly and restricted flight information through the local official unmanned aerial vehicle (UAV) management platform and comply with the relevant regulations.
2.Compliance with real-name registration and flight information reporting: According to laws and regulations, you are required to register your UAV on the Unmanned Aerial Vehicle Integrated Supervision Service Platform (UOM) under your real name, and report flight data online. The reporting function must not be turned off during operation.
3.Compliance with other legal requirements: Before flying, be sure to fully understand and comply with local UAV flight laws and regulations.

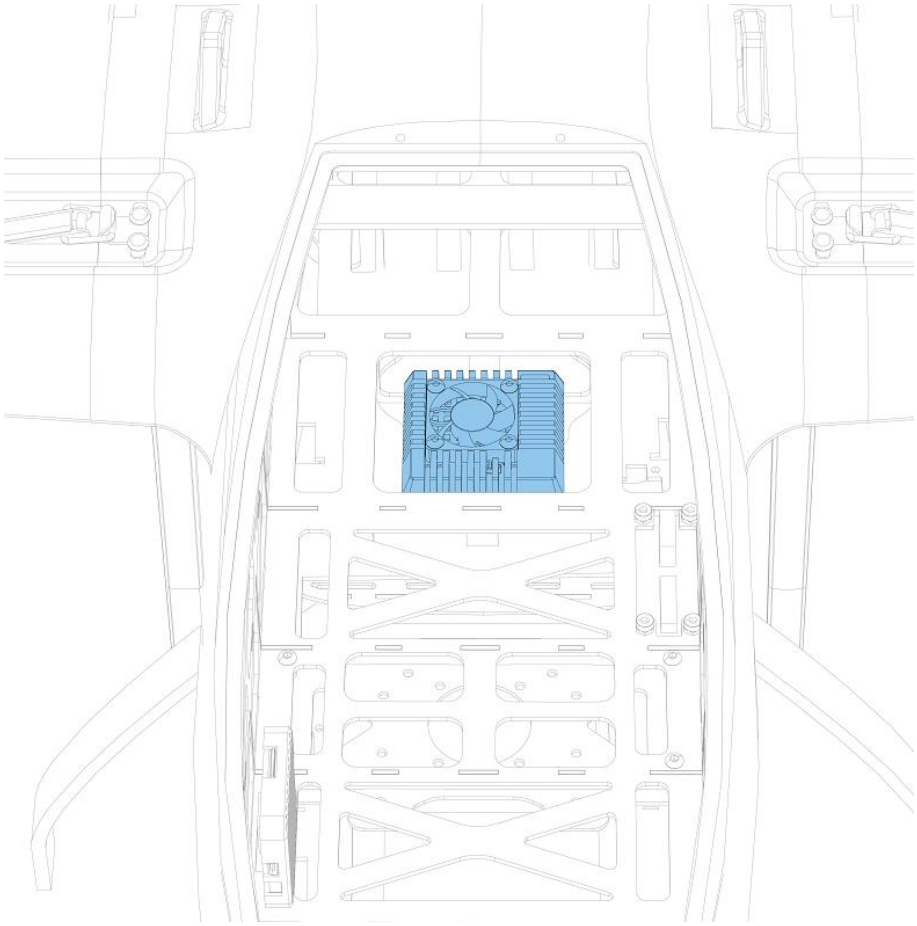
Chapter 13: Gimbal Camera

UniVTOL V2200 supports the full range of SIYI gimbal payload combinations, as detailed in the table below.

Optical Pod	ZT30	ZT6	ZR30	ZR10
Gimbal Camera	A8 mini			

The gimbal control, serial port, network port, and power interfaces are all located on the payload adapter board.

The installation position of the second-generation AI tracking module is as follows:



If the second-generation AI tracking module is used, the two LAN ports of the module should be connected to the AIR UNIT LAN and AI LAN, respectively. The camera's network port should be connected to the Gimbal LAN interface. The camera should be powered with 12V, and UART & SBUS will be used to integrate the flight control for gimbal control.

If the second-generation AI tracking module is not used, the camera's network port should be connected to the AIR UNIT LAN interface, powered with 12V, and UART & SBUS will also be used to integrate the flight control for gimbal control.

To enable flight control integration functionality, configure the flight controller as follows:

1.SERIAL6_PROTOCOL = 2

2.SERIAL6_BAUD = 115

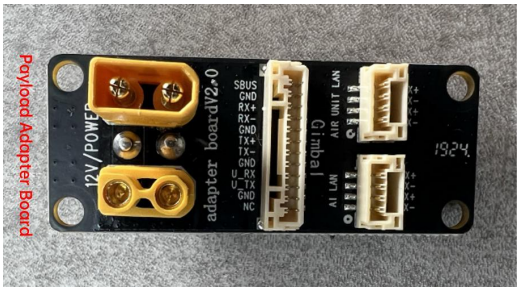
3.MNT1_TYPE = 8

4.Restart the flight controller

5.MNT1_RC_RATE = 90

6.CAM1_TYPE = 4

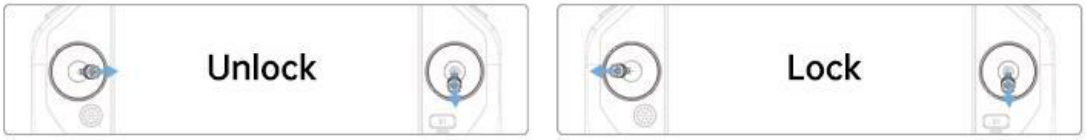
7.Restart the flight controller



Chapter 14: Manual Motor Start/Stop

14.1 American Hand (Mode 2)

14.2 Japanese Hand (Mode 1)



14.3 Chinese Hand (Mode 3 or Mode 4)

Note: You must follow the steps outlined above to start/stop the motors!!

After starting the motors, the multirotor propellers will spin, please stay away from the drone!!

It is strictly prohibited to unlock the drone in fixed-wing mode!!

Chapter 15: Typical Takeoff and Landing Procedures

15.1 Typical Takeoff Steps

1. Place the aircraft on a flat, open surface with the tail of the drone facing the operator.
2. Turn on the remote controller and the aircraft power.
3. Run the UniGCS App and enter the flight interface.
4. Confirm that the flight mode is set to QLOITER. Ensure the arm sleeves, wing locks, and tail lock are securely fastened. Confirm that the airspeed sensor is calibrated and the values are normal. Check that the center of gravity is balanced. Verify that the flight battery is fully charged.
5. Align the aircraft nose into the wind.
6. Use the QLOITER mode and apply the necessary control stick movements to start the motors. Slowly push the throttle stick upward to smoothly lift off the aircraft to a height clear of obstacles (recommended altitude: 50m).
7. After takeoff, switch to FBWA mode and push the throttle to full. Once the airspeed reaches 18m/s, return the throttle to the middle position. Proceed with fixed-wing flight.

15.2 Typical Landing Steps

1. Keep the airspeed at 18m/s and fly in fixed-wing mode against the wind at an altitude of 50m.

2.Switch to QLOITER mode.

3.Begin descending in multirotor mode.

4.Once on the ground, pull the throttle stick to its lowest position to enter idle, and lock the throttle in place until the motors stop.

5.After the motors stop, turn off the aircraft and remote controller power in sequence.

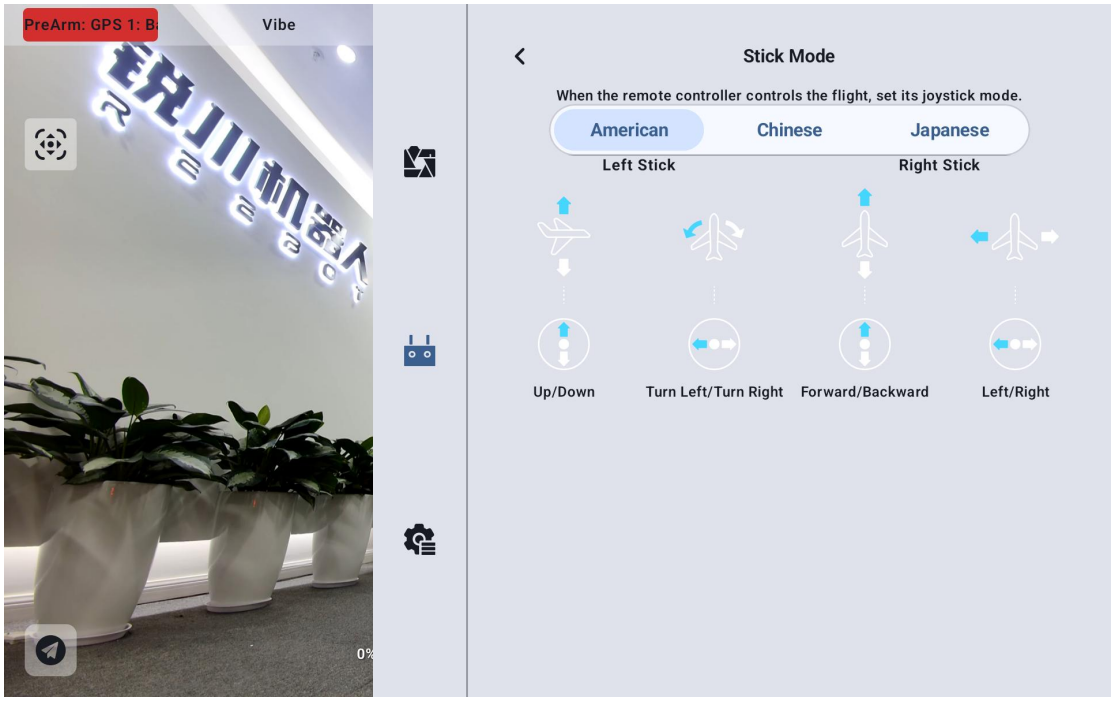
Chapter 16: Remote Controller

16.1 Understanding the Remote Controller

① Large Joystick
② Gimbal Roll, Pitch, and Small Joystick
③ Custom Button
④ Custom Button
⑤ QHOVER
⑥ QLOITER
⑦ FBWA
⑧ LOITER
⑨ AUTO
⑩ RTL
⑪ Large Joystick
⑫ Custom Button
⑬ Custom Button
⑭ Custom Button
⑮ Custom Button
⑯ Video Recording
⑰ Zoom
⑱ Custom Button
⑲ Custom Button
⑳ Take Photo
㉑ Custom Button
㉒ Custom Button

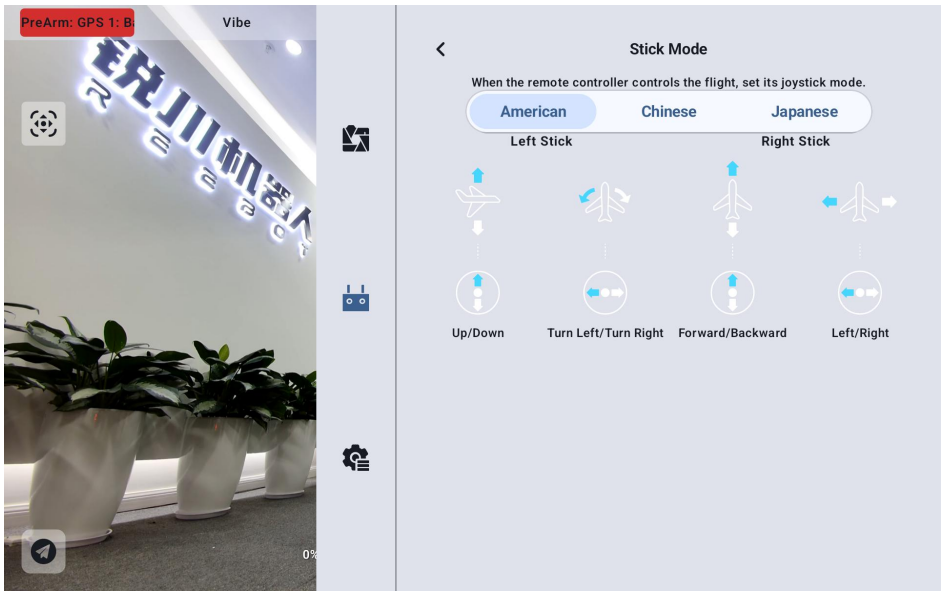
16.2 Joystick Mode

UniRC 7 supports users in switching between "Japan Hand," "US Hand," and "China Hand."



16.3 Remote Controller Calibration

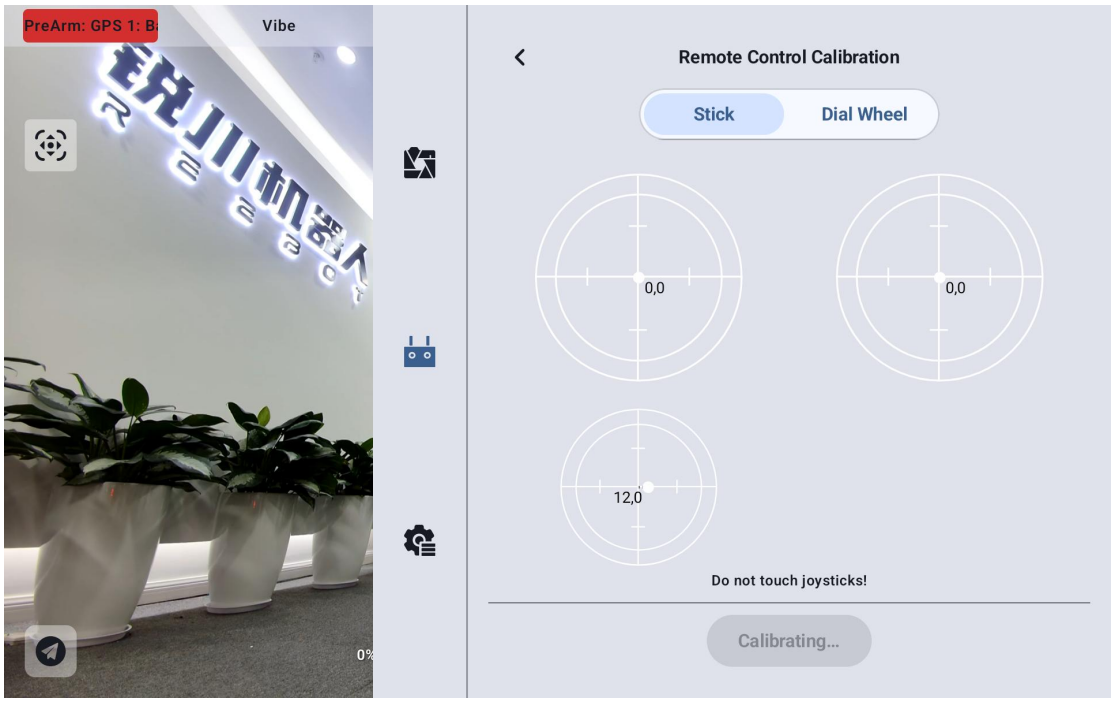
The remote controller calibration function helps users calibrate the joystick and dial wheel on the handheld ground station to their neutral positions and maximum limits. Regular calibration of the joystick helps maintain the precision of the joystick channel outputs.



16.4 Joystick Calibration Steps

1.Before starting the joystick calibration, ensure that both the left and right joysticks of the handheld ground station are naturally at rest and have not been displaced by external forces.

2.In the "Joystick Calibration" menu, click "Start Calibration" to enter the following interface:



3.Follow the prompts. If the joysticks are at rest but the joystick channel output values are not zero, it indicates that the joystick neutral point has shifted. At this point, do not touch the joysticks and wait for the neutral point calibration to complete.

4.When the following prompt appears, it indicates that the neutral point calibration has been completed. Next, proceed to calibrate the maximum limits.

Follow the on-screen instructions and push each joystick to the maximum limit in all directions:

Up: 0, 100

Down: 0, -100

Left: -100, 0

Right:100,0

Then click "Finish Calibration."

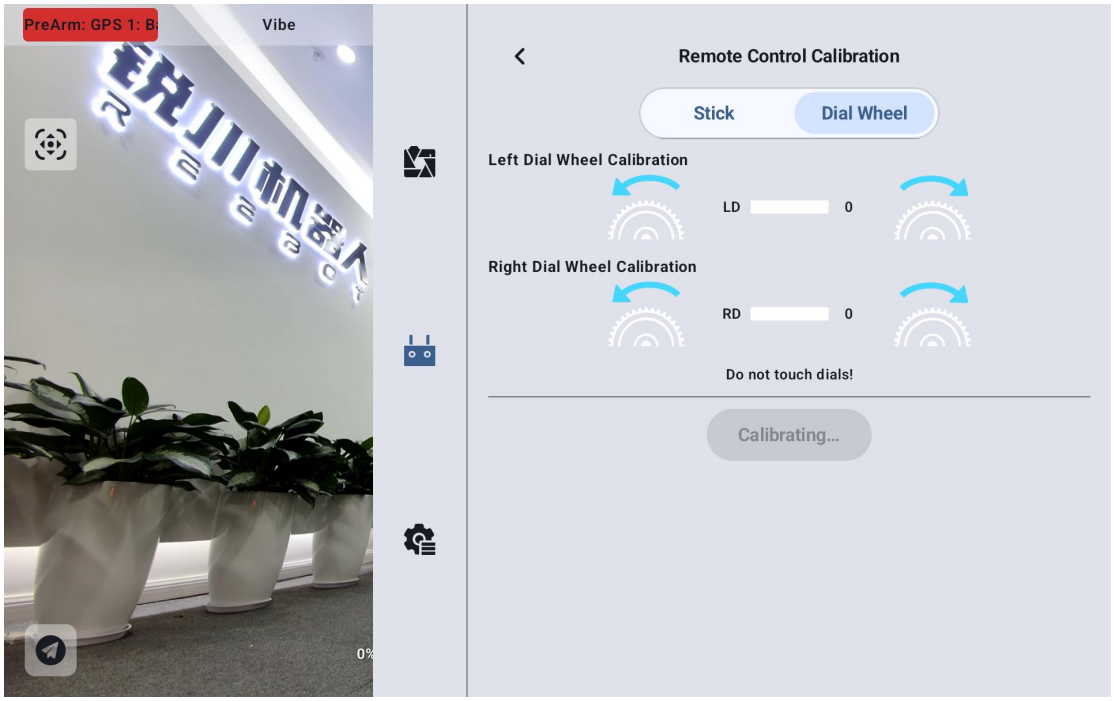
The "Joystick Calibration" menu will display the calibration success message.

Note:

If the joystick does not return to the neutral position (channel output value is not 0) when at rest, or if it does not reach the maximum or minimum values (-100, 100) when pushed to the limit, joystick calibration should be performed immediately.

16.5 Dial Wheel Calibration Steps

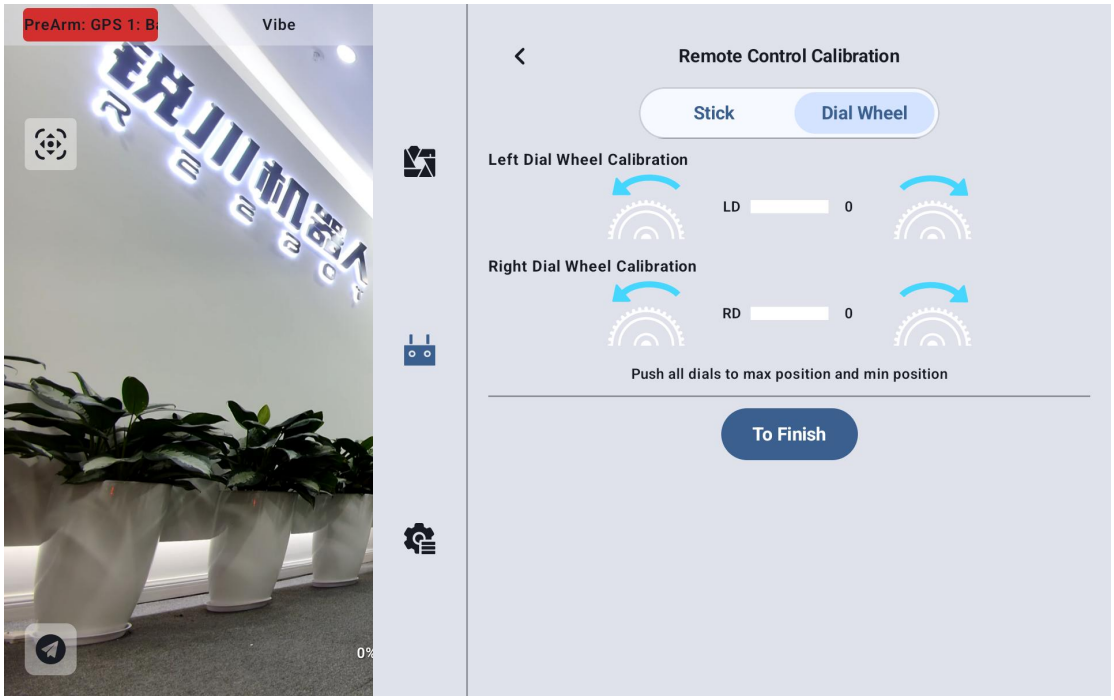
1. Before performing dial wheel calibration, ensure that the left and right dial wheels of the handheld ground station are naturally at rest, with no displacement caused by external forces.
2.In the "Dial Wheel Calibration" menu, click "Start Calibration" to enter the following interface:



3.Follow the instructions. If the dial wheel is naturally at rest but the dial wheel channel output value is not 0, it indicates that the neutral point of the dial wheel has shifted. Do not touch the dial wheel, and wait for the neutral point calibration to complete.

4.When the following prompt appears, it indicates that the neutral point calibration is complete. Next, proceed to calibrate the maximum limit.

Follow the on-screen instructions and push each dial wheel to its maximum limit in each direction.



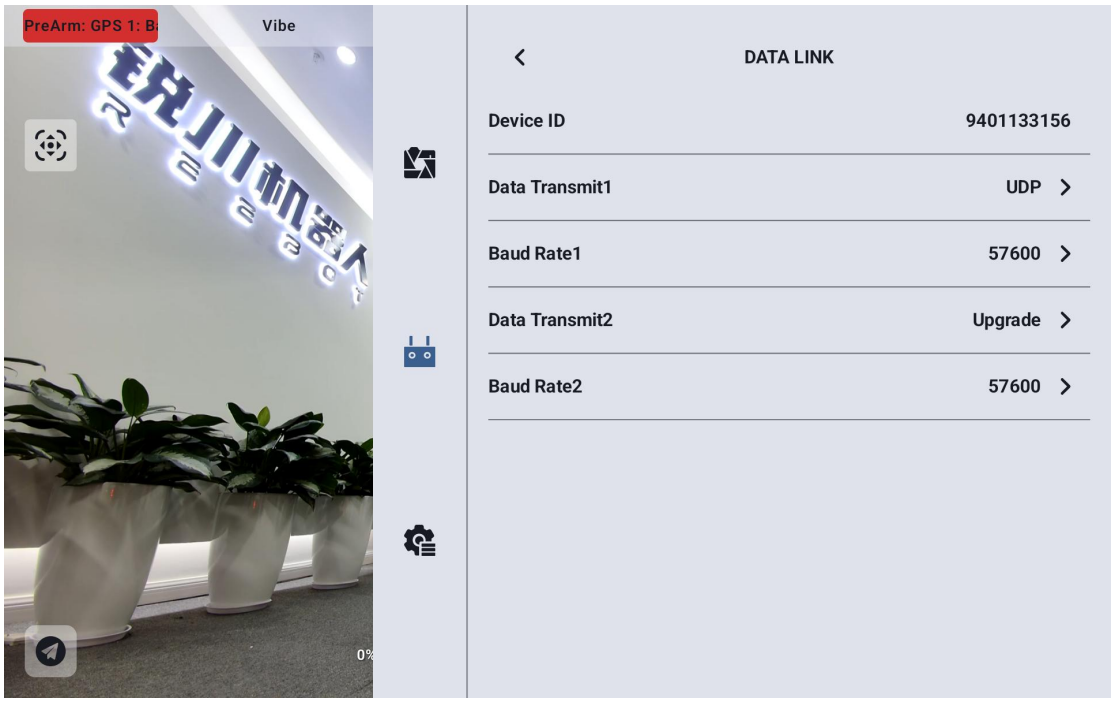
Left: -100

Right: 100

5.The "Dial Wheel Calibration" menu will return to the initial interface, indicating that the calibration is complete.

16.6 Data Transmission Settings

The data transmission settings menu allows users to identify the handheld ground station device number, set the data transmission connection method, and configure specific serial port baud
rates.



16.6.1 About Data Transmission Settings

Device: Displays the Bluetooth module serial number integrated into the handheld ground station. When paired via Bluetooth, it will be recognized by the corresponding Bluetooth name. This serial number is unique to each ground station.

Data Transmission 1: The sky unit's UART1 is connected to the flight controller's TELEM1 port. The remote controller should be set to UDP. This data transmission link is used to connect to the UniGCS ground station.

Serial Port Baud Rate 1: The baud rate for UART1 on the sky unit, connected to the flight controller's TELEM1 port. The default is 57600.

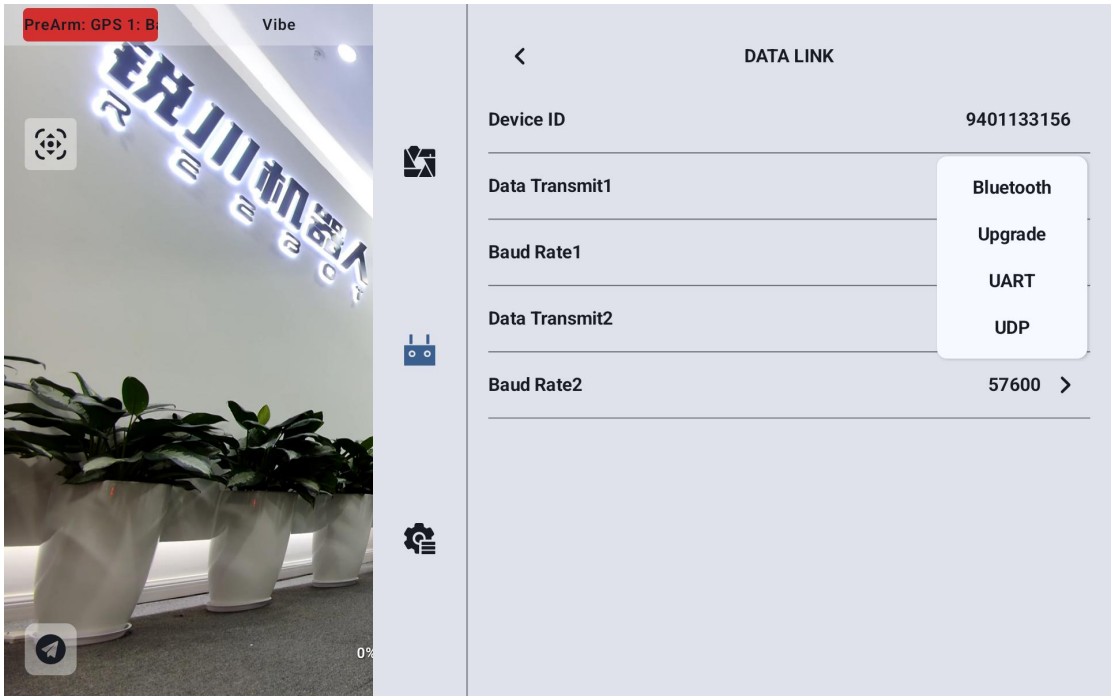
Data Transmission 2: The sky unit's UART2 is connected to the flight controller's

TELEM4 port. The remote controller should be set to "Upgrade." This data transmission link is used to connect to the Mission Planner ground station.

Serial Port Baud Rate 2: The baud rate for UART2 on the sky unit, connected to the flight controller's TELEM4 port. The default is 57600.

16.6.2 Connection

The UniRC 7 handheld ground station supports the following data transmission connection methods: Bluetooth, Upgrade, UART serial port, and UDP.



UART Serial Port: Data transmission communication through the built-in UART serial port on the ground station.

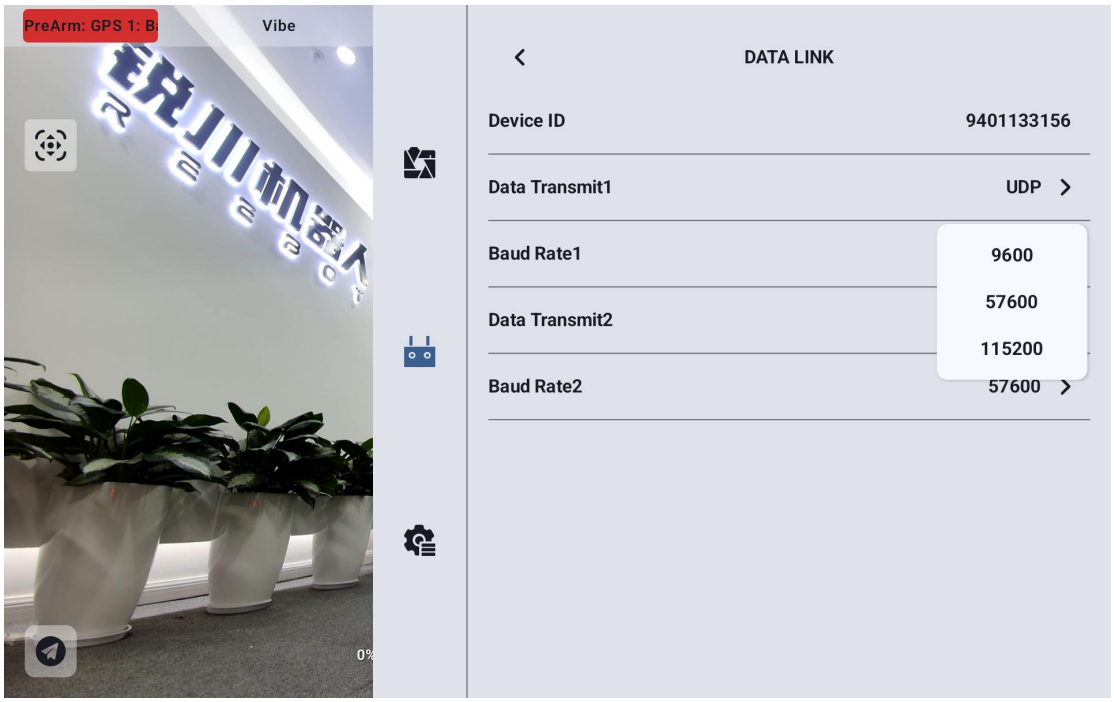
Bluetooth: Data transmission communication through the built-in Bluetooth wireless connection on the ground station (supports most ground station software and also supports data transmission with external devices like Windows ground station software).

Upgrade: Data transmission communication via the Type-C interface at the bottom of the handheld ground station, connecting to external devices like Windows ground station software.

UDP: Data transmission communication using the UDP network protocol.

16.6.3 Serial Port Baud Rate

Please manually select the appropriate serial port baud rate setting.

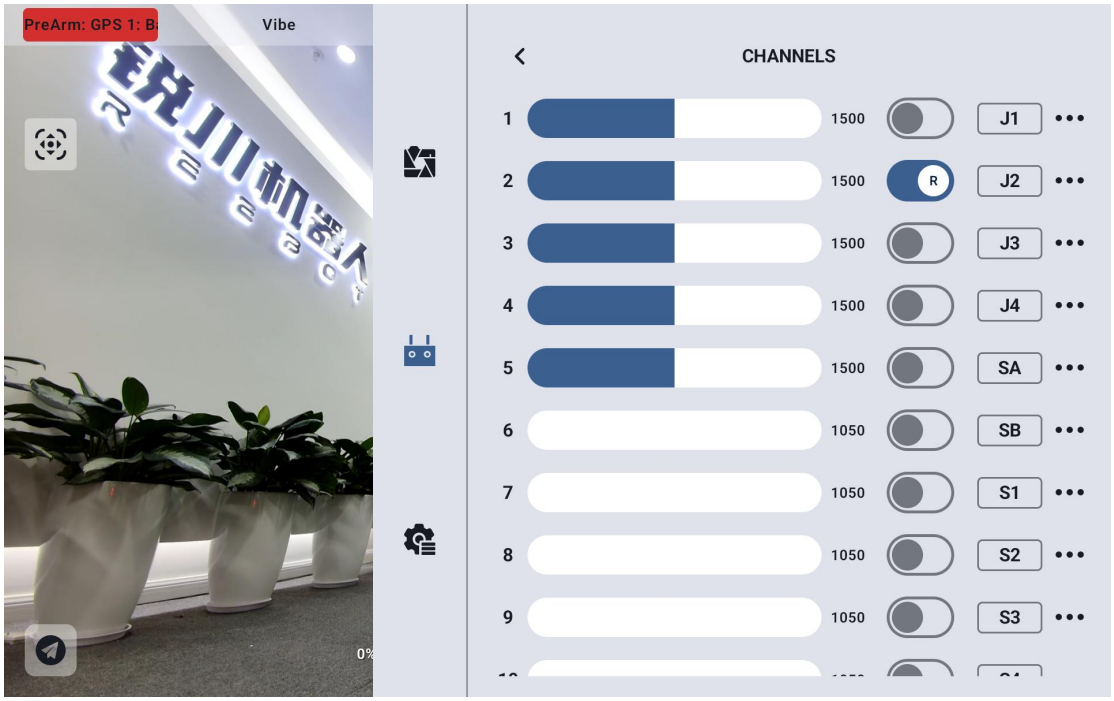


Note:

Before changing the serial port baud rate, please ensure that the ground station and air unit have successfully established a frequency link, otherwise the settings will not take effect.

16.7 Channel Settings

Through the channel settings feature, users can adjust the servo travel, neutral point, servo reversal, and channel mapping for each channel on the handheld ground station.



V2200 remote control channel mapping is as follows:

Channel 1, 2, 3, 4: Control sticks

Channel 5: Disabled

Channel 6: Disabled

Channel 7: Disabled

Channel 8: Flight mode corresponding to six-position switch

Channel 9: Disabled

Channel 10: Gimbal horizontal control (J6 small joystick)

Channel 11: Gimbal pitch control (J5 small joystick)

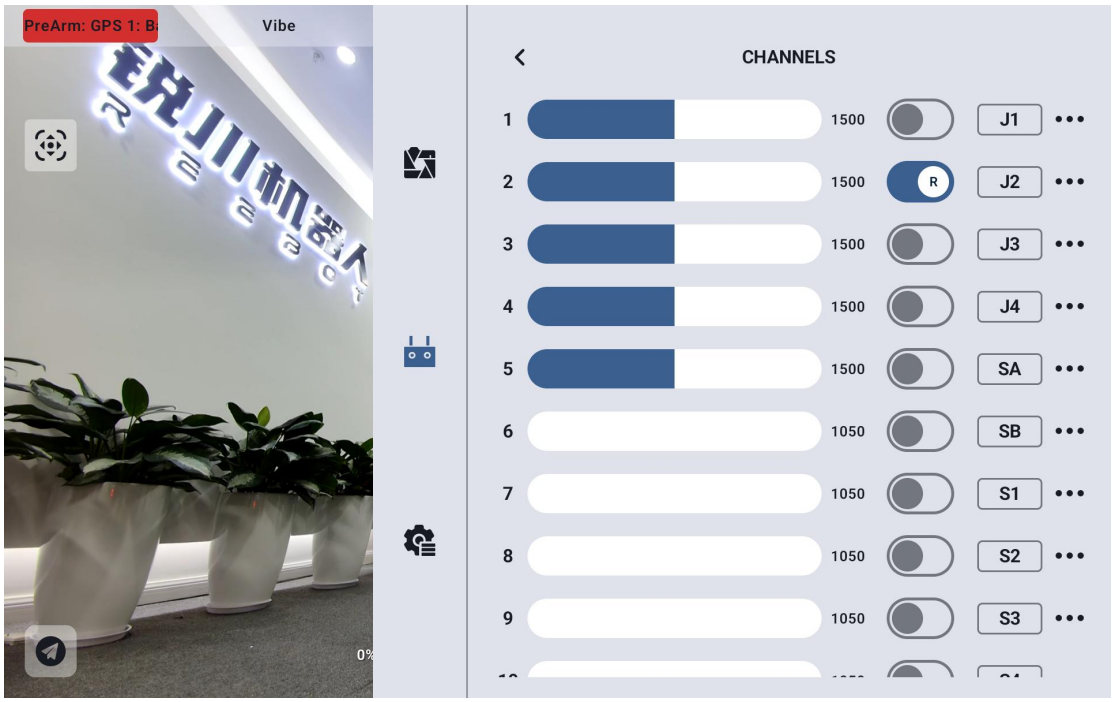
Channel 12: Gimbal zoom (RD, reverse enabled)

Channel 13: Gimbal photo (S1, configured as non-latching)

Channel 14: Gimbal video recording (S2, configured as non-latching)

16.7.1 Servo Travel Range

The default travel range for the UniRC 7 handheld ground station is from 1050 to 1950.



Select the target channel and enter the desired travel range value to successfully change it.

The default neutral point for the travel range is 1500.

Select the target channel and enter the desired neutral point value to successfully change it.

Note:

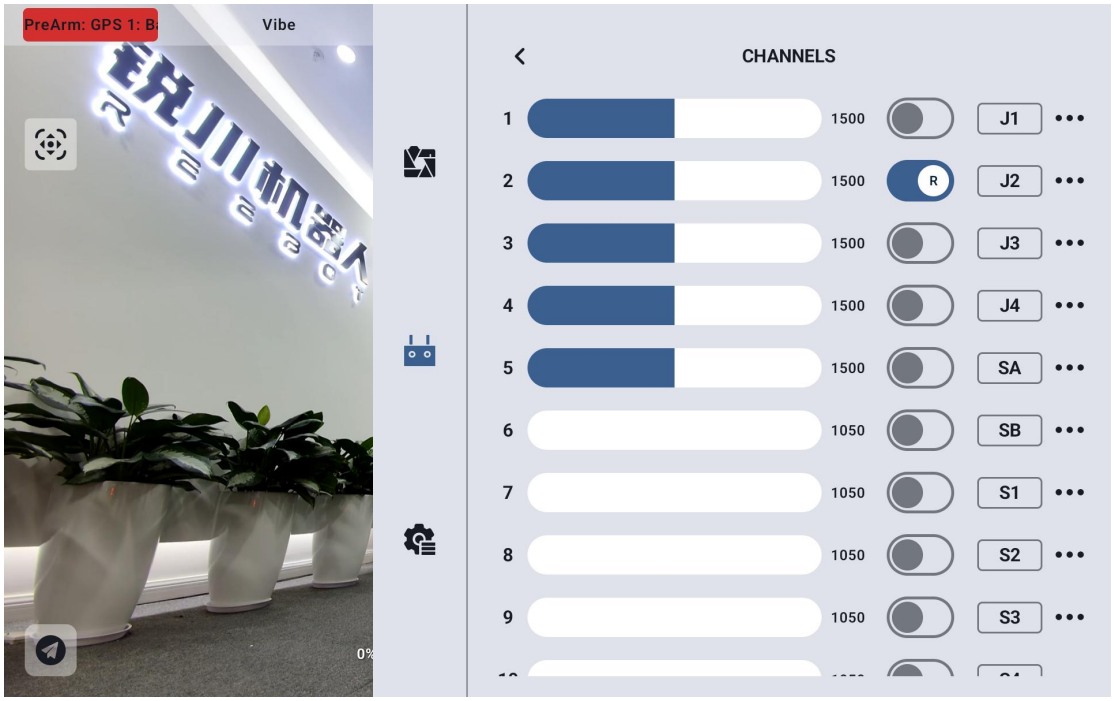
The range for the travel range neutral point is ±500.

For example, if you want to set the neutral point to 1700, set the travel range neutral point to +200.

If you want to set the neutral point to 1300, set the travel range neutral point to -200.

16.7.2 Channel Reversal

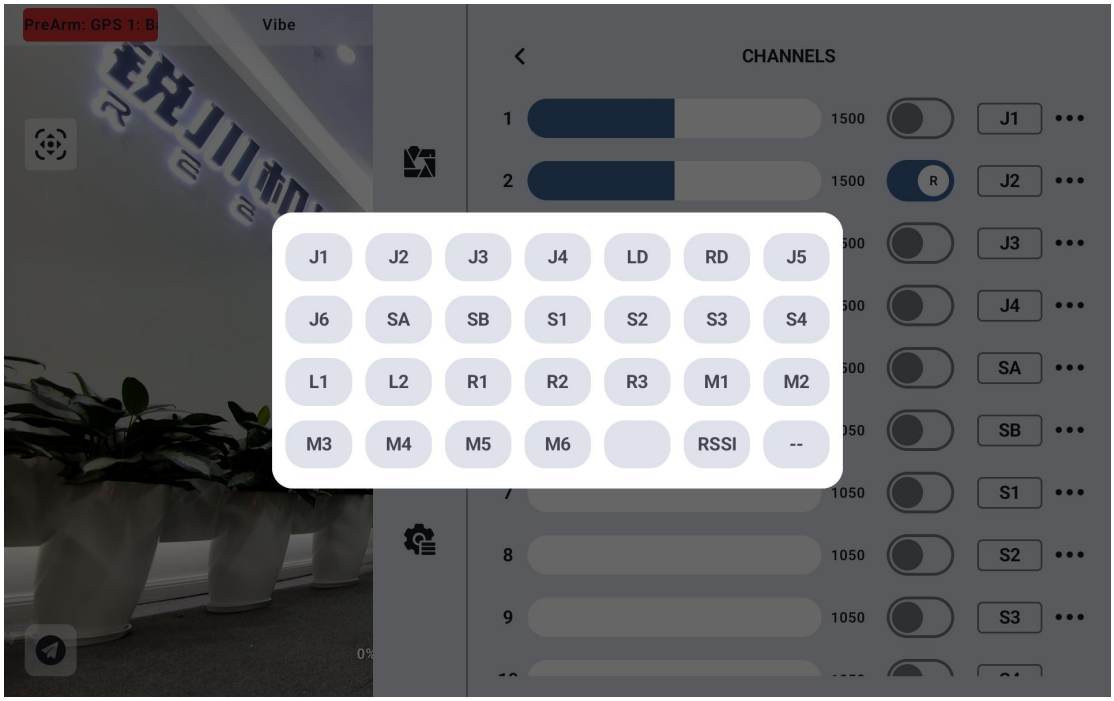
The servo reversal function is used to change the output direction of the channel travel.



Select the target channel and click the corresponding switch for servo forward/reverse to successfully set the servo direction.

16.7.3 Channel Mapping

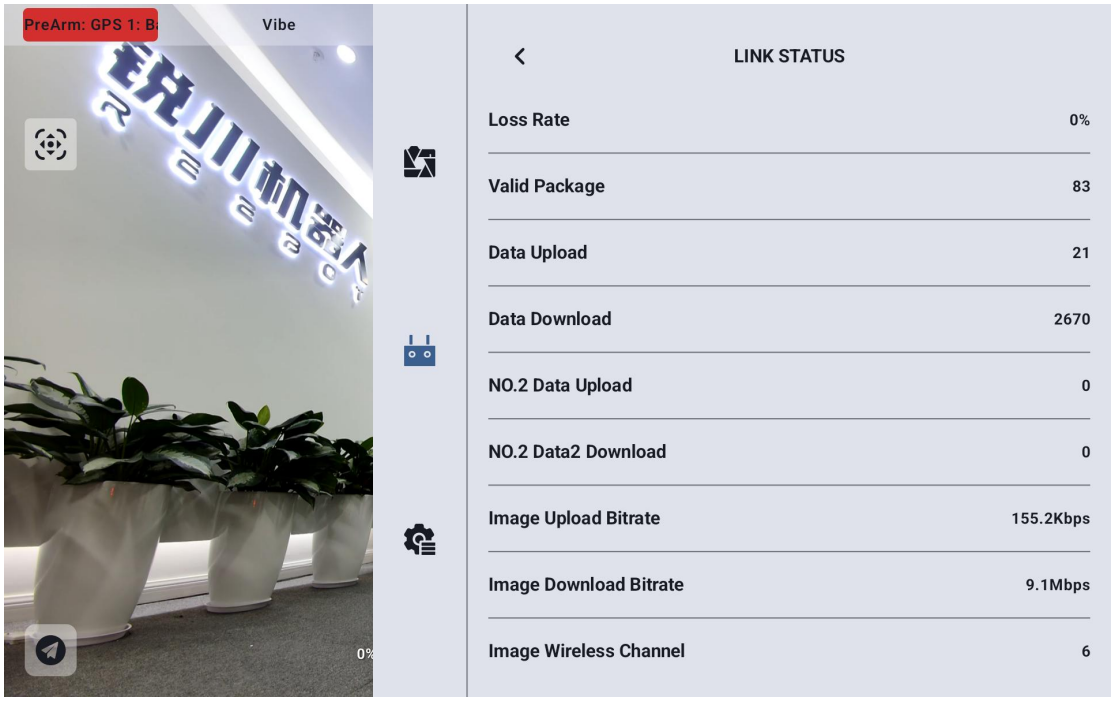
The UniRC 7 handheld ground station supports a total of 26 physical channels and 16 communication channels, allowing users to freely define the mapping relationship between physical buttons, switches, joysticks, and communication channels through the channel mapping function.



Select the target channel, click the "Channel Mapping" button, a switch list will pop up. Choose the desired switch to successfully complete the mapping.

16.8 Link Information

Real-time display of the link's working status to visually show the wireless communication quality.



Link Information

Packet Loss Rate: The number of data packets that failed to return to the ground station per second.

Valid Packets: The number of data packets successfully transmitted back to the ground station per second.

Upstream Data: The amount of data uploaded to the sky unit per second (in bytes).

Downstream Data: The amount of data downloaded from the sky unit per second (in bytes).

Video Transmission Upstream Rate: The amount of data sent per second over the video transmission upstream link.

Video Transmission Downstream Rate: The amount of data received per second over the video transmission downstream link.

Video Transmission Wireless Channel: The operating frequency point of the link under the current working frequency.

Signal Strength: The strength of the radio waves used for communication between the ground station and the sky unit.

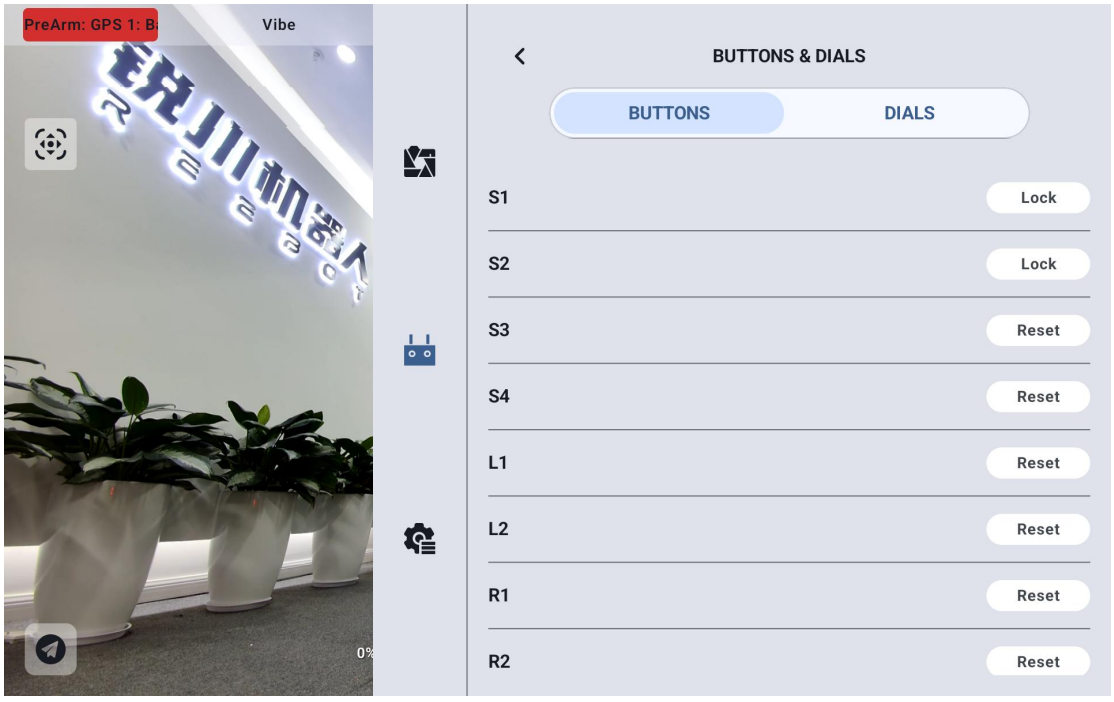
Signal Quality: The reliability and stability of the transmission signal between the ground station and the sky unit.

16.9 Button and Dial Settings

UniRC 7 handheld ground station supports the configuration of the working modes for buttons and dials.

16.9.1 Button Settings

This function allows you to **configure** the working modes of the buttons.



Button Working Modes

Self-locking: After pressing the self-locking button, the button will rebound, but the corresponding channel will continue to output, with an output value of 1950. Pressing it again will change the channel output to 1050.

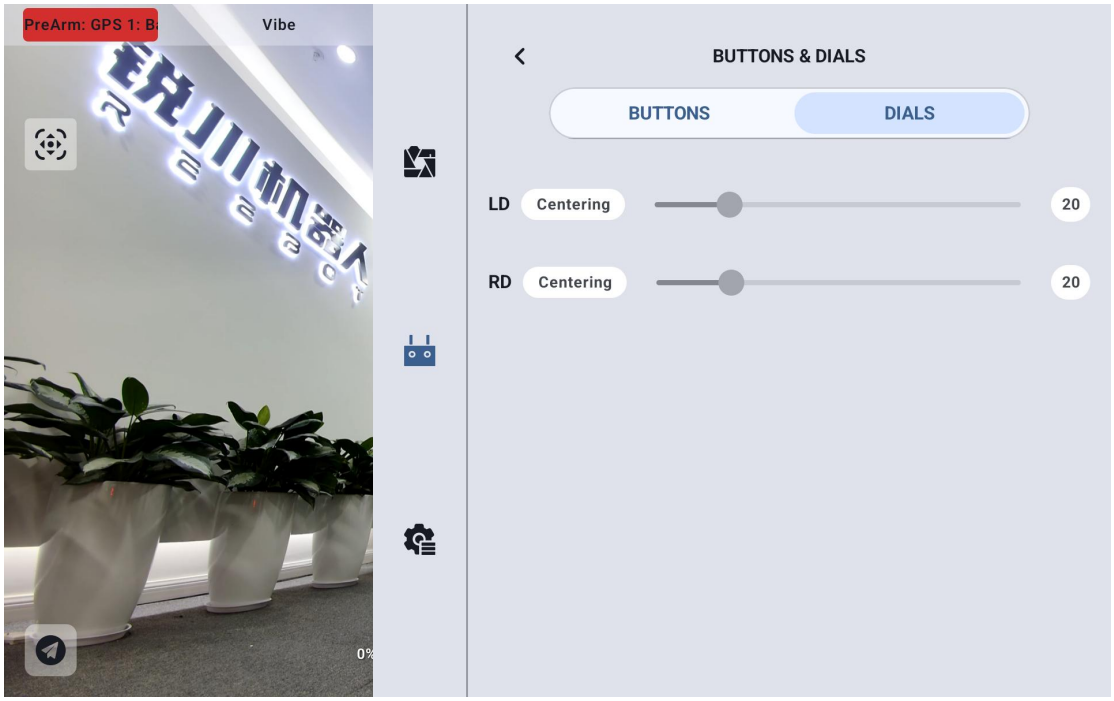
Three-position switch: In this mode, the button will have three positions, similar to a three-position switch. A short press will toggle the output between 1950 and 1050,

while a long press will set the output value to 1500.

Non-self-locking: When the self-locking button is pressed, the channel will output; when released, the channel output will return to

16.9.2 Dial Wheel Settings

This function allows you to configure the working modes of the left (LD) and right (RD) dial wheels.



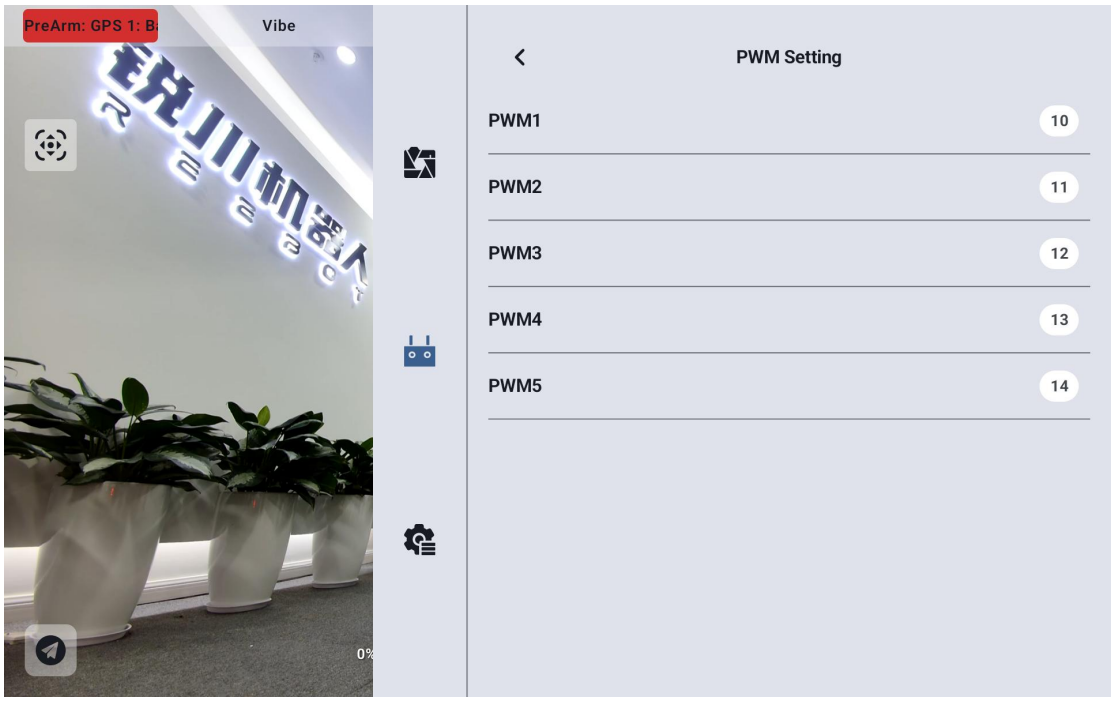
Dial Wheel Working Modes

Automatic Return to Center: In the "Automatic Return to Center" mode, when you push the dial wheel and release it, the output value of the dial wheel will return to the initial value (channel midpoint).

Non-Automatic Return to Center: In the "Non-Automatic Return to Center" mode, when you push the dial wheel and release it, the output value will stay at the current channel output and will not return to the midpoint.

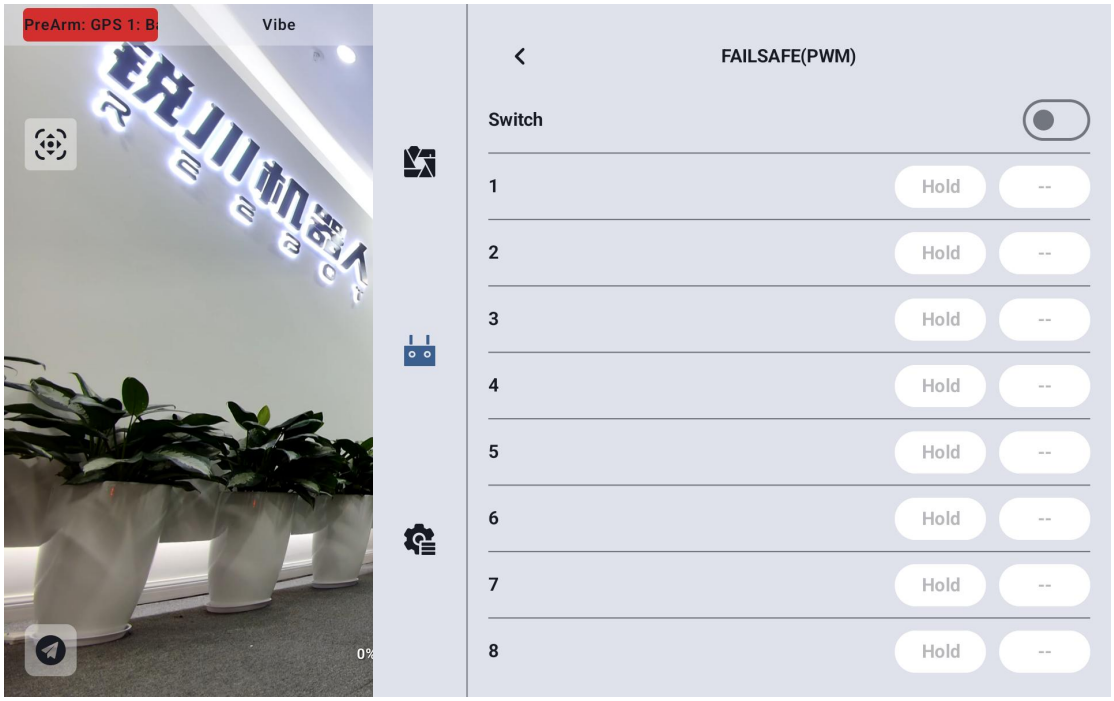
16.10 Receiver Settings

Match the corresponding link communication channels to the five PWM interface channels on the sky-end receiver.



16.11 Fail-Safe Protection

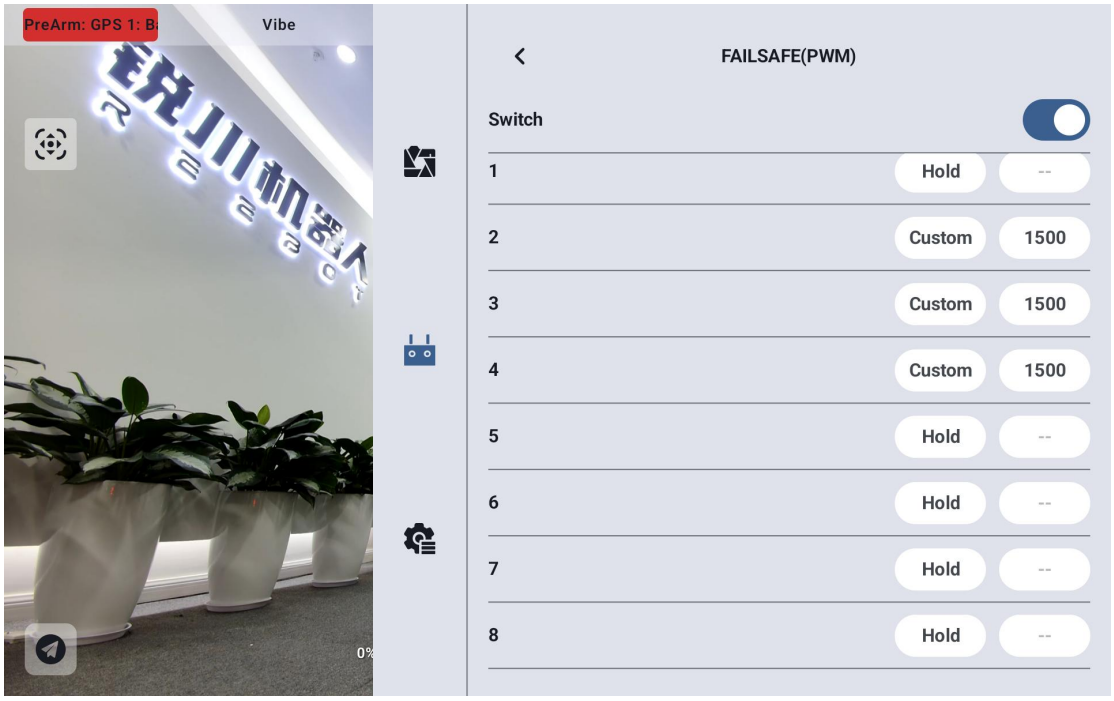
Fail-safe protection refers to the continued output of preset channel values on the sky-end PWM when the connection between the ground station and sky-end is lost, in order to minimize the risk of a crash.



Steps to Set PWM Fail-Safe Protection for Your Handheld Ground Station:

1.Ensure that the ground station and sky-end are successfully paired.

2.Enter the "Fail-Safe Protection" menu, which displays the following interface:



3.The fail-safe protection function is disabled by default. The number on the left represents the communication channels. If a fail-safe output channel value is not set, the channel output will default to "Hold."

4.To set a specific value for a channel, first enable the fail-safe protection switch, then click the "Hold" button after the corresponding channel to enter "Custom" mode. Then, input the desired travel amount.

5.After completing the setup, when the link is lost, the channel will output the preset travel value.

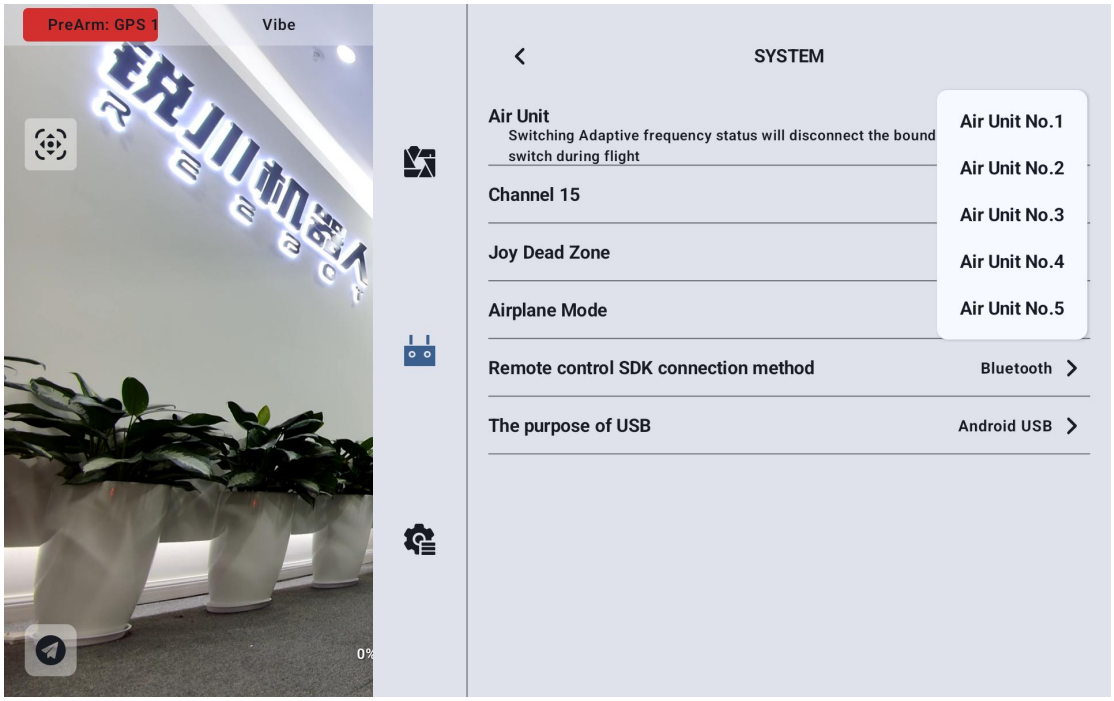
 **Note: For the V2200, it is not necessary to enable fail-safe protection on the remote controller.**

If the flight controller used with your handheld ground station communicates via the S.Bus protocol, you do not need to set fail-safe protection on the ground station (unless the flight controller requires a specific channel to maintain a value during a loss of control to trigger fail-safe protection and initiate return-to-home). You only need to set the corresponding protection measures in the flight control ground station software. The S.Bus communication protocol includes a fail-safe flag to inform the flight controller of the loss of control conditions.

16.12 System Settings

16.12.1 Multi Sky End

The multi-sky-end feature allows the ground station to save multiple sets of sky-end pairing information and corresponding channel settings. After the first pairing between each sky-end and the ground station, users no longer need to re-pair when switching between sky-ends.

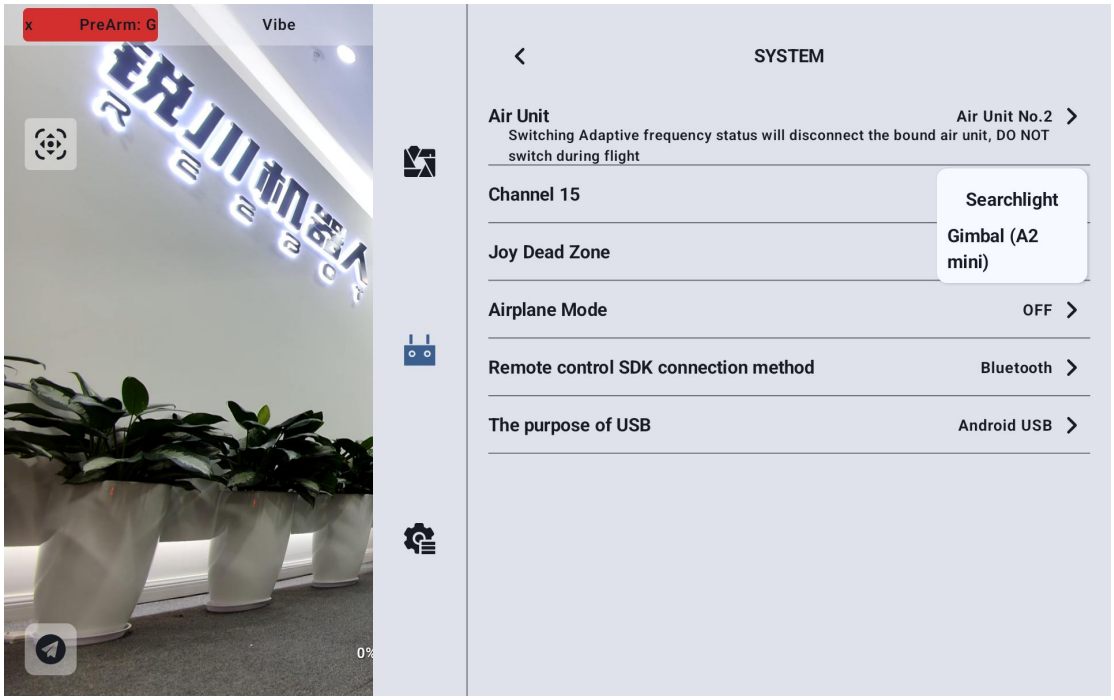


Warning:

Do not switch sky-ends during flight. Switching sky-ends during flight may result in a loss of control of the link!

16.12.2 Channel 15

Switch the control of the 15th communication channel to the spotlight switch of the rugged camera or the pitch movement of the A2 mini gimbal.

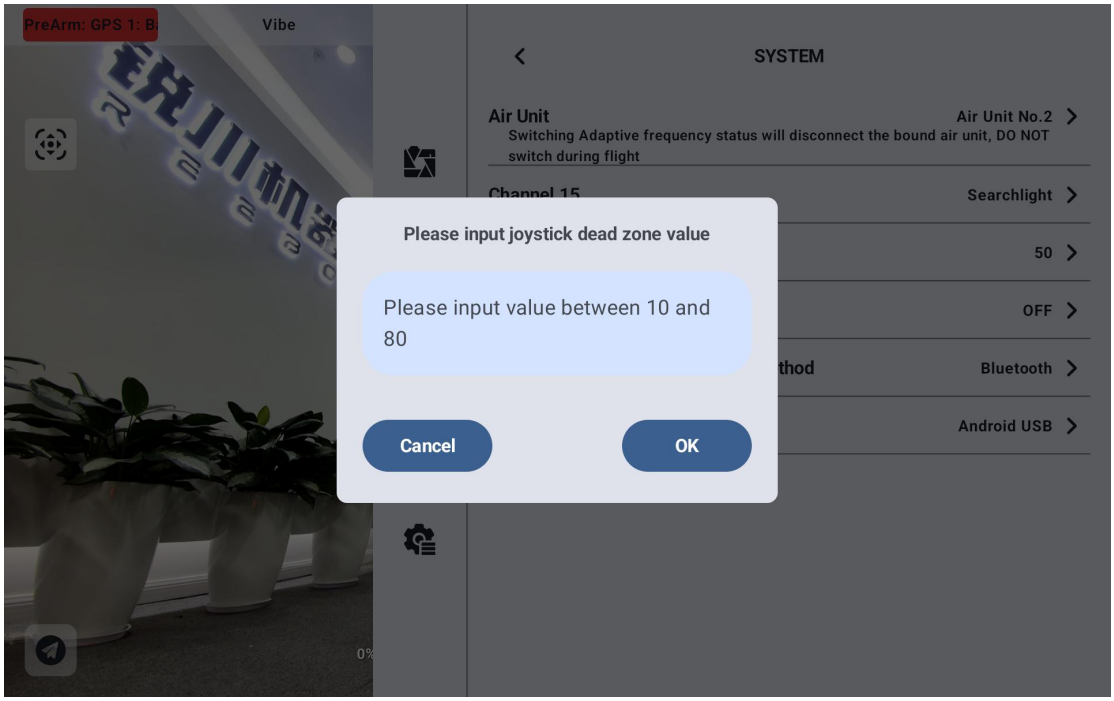


Note:

Channel 15 corresponds to the device connected to the LAN 1 interface of the sky-end, and Channel 16 corresponds to the device connected to the LAN 2 interface of the sky-end. Channel 16 is by default assigned to the spotlight.

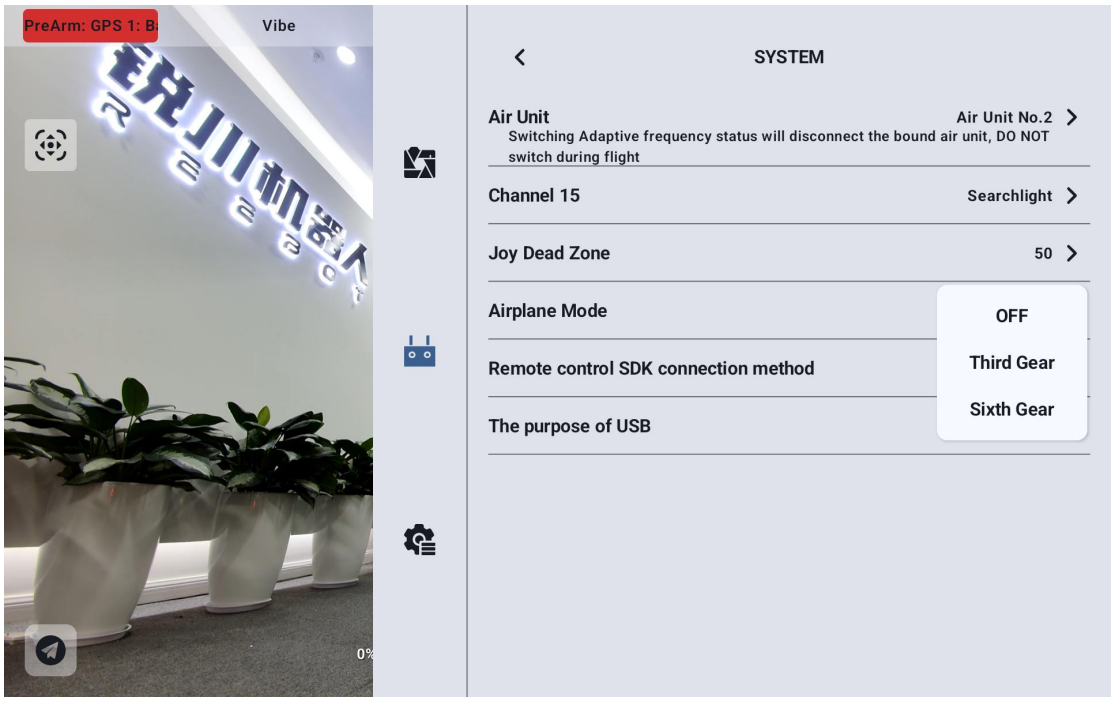
16.12.3 Joystick Dead Zone

Adjust the joystick dead zone to accommodate various handling preferences.



16.12.4 Flight Channels

The flight channel can be set to 3-mode, 6-mode, or disabled.



Disabled: Disables the flight mode functionality.

3-mode: Buttons M1-M3 are mapped to a single channel.

Press M1: Channel output is 1050.

Press M2: Channel output is 1500.

Press M3: Channel output is 1950.

6-mode: Buttons M1-M6 are mapped to a single channel.

Press M1: Channel output is 1000.

Press M2: Channel output is 1250.

Press M3: Channel output is 1425.

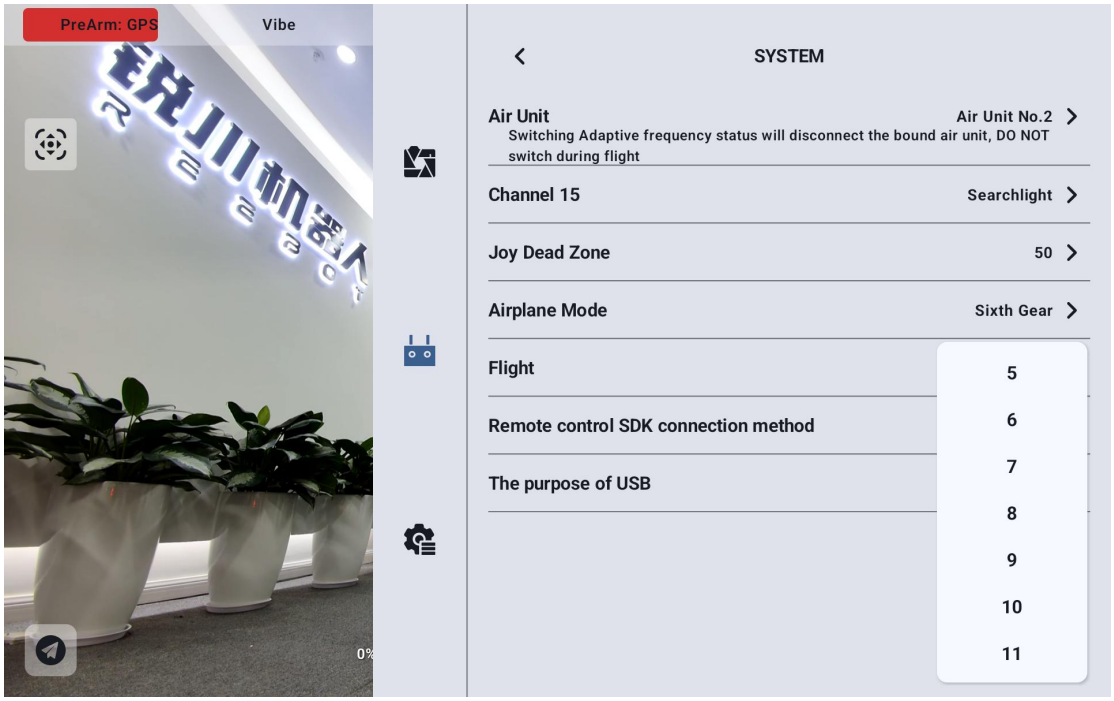
Press M4: Channel output is 1575.

Press M5: Channel output is 1700.

Press M6: Channel output is 2000.

16.12.5 Flight Channel

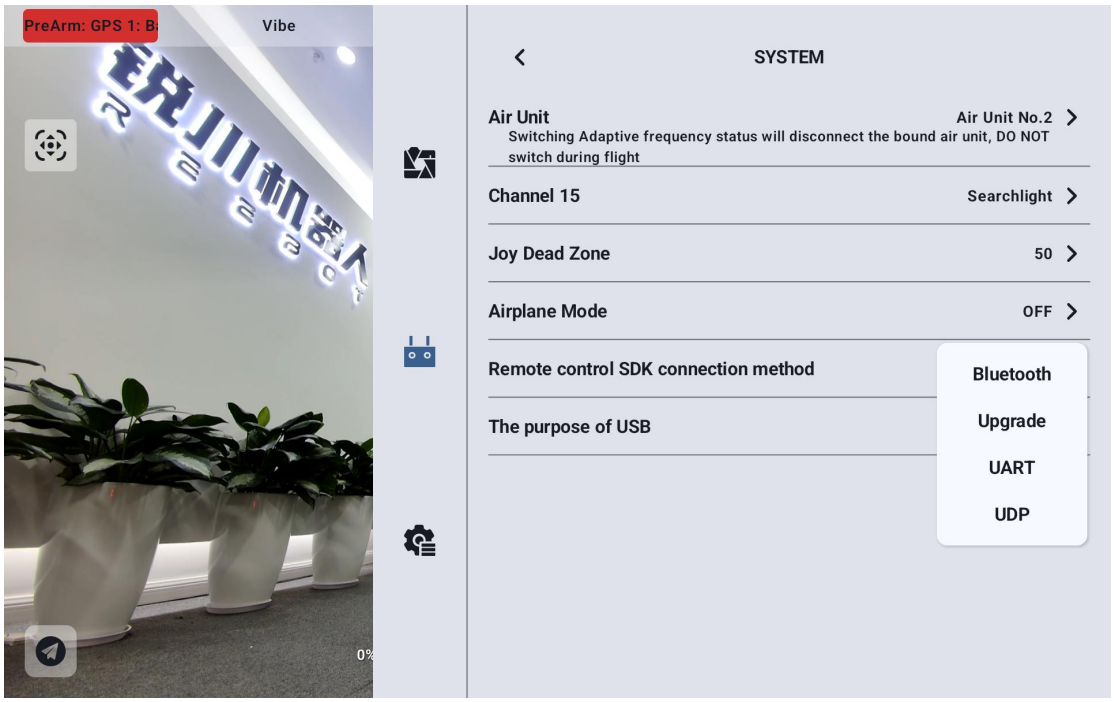
The communication channel mapped to the flight mode.



Note: V2200 flight channel is the 8th channel.

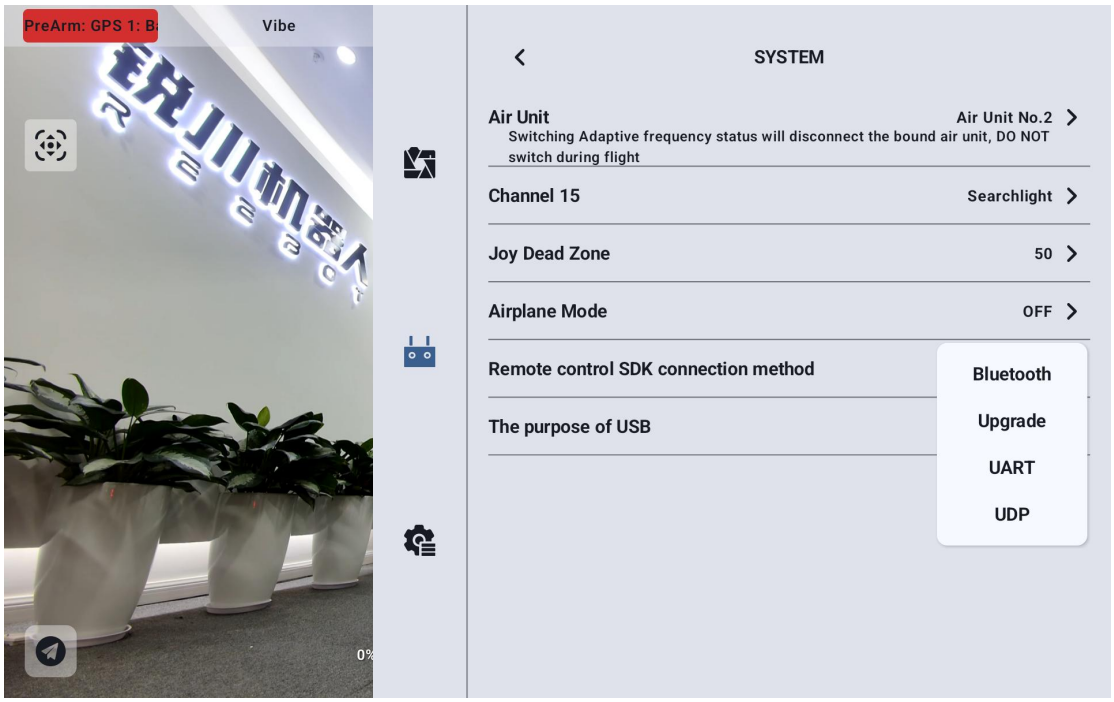
16.12.6 Remote Control SDK Connection Method

Users can connect the link to their network and ground station through the SDK.



16.12.7 Remote Control USB Functionality

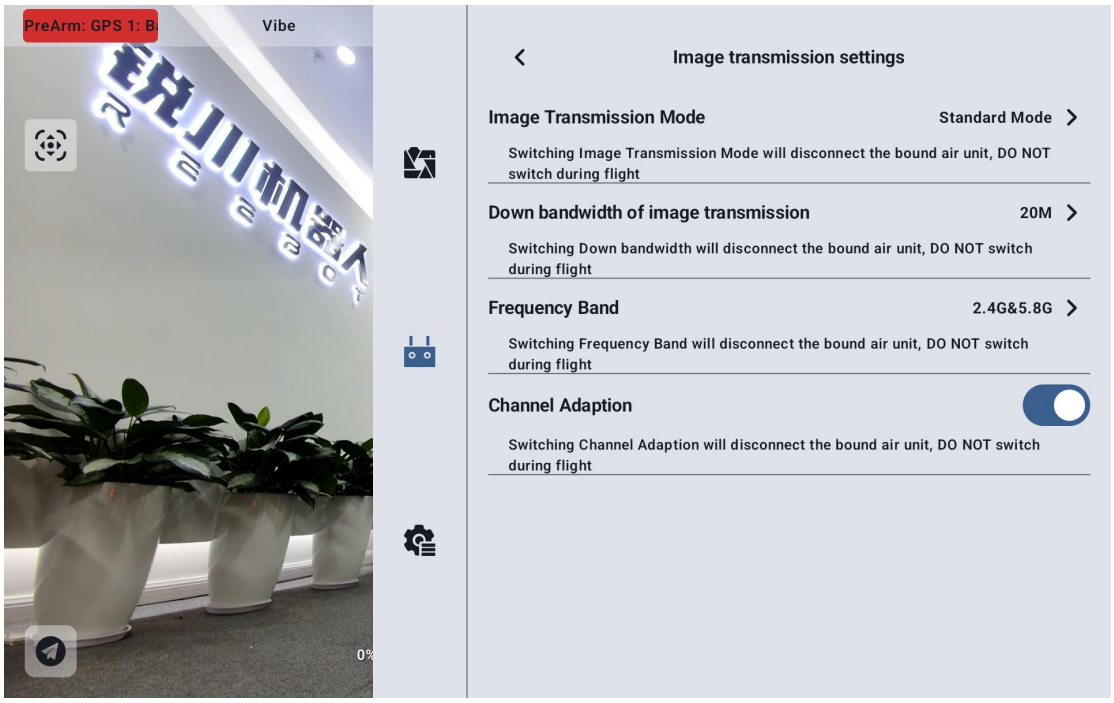
Users can manually switch the internal USB working mode of the remote controller.



16.12.8 Multi-Drone Interconnection

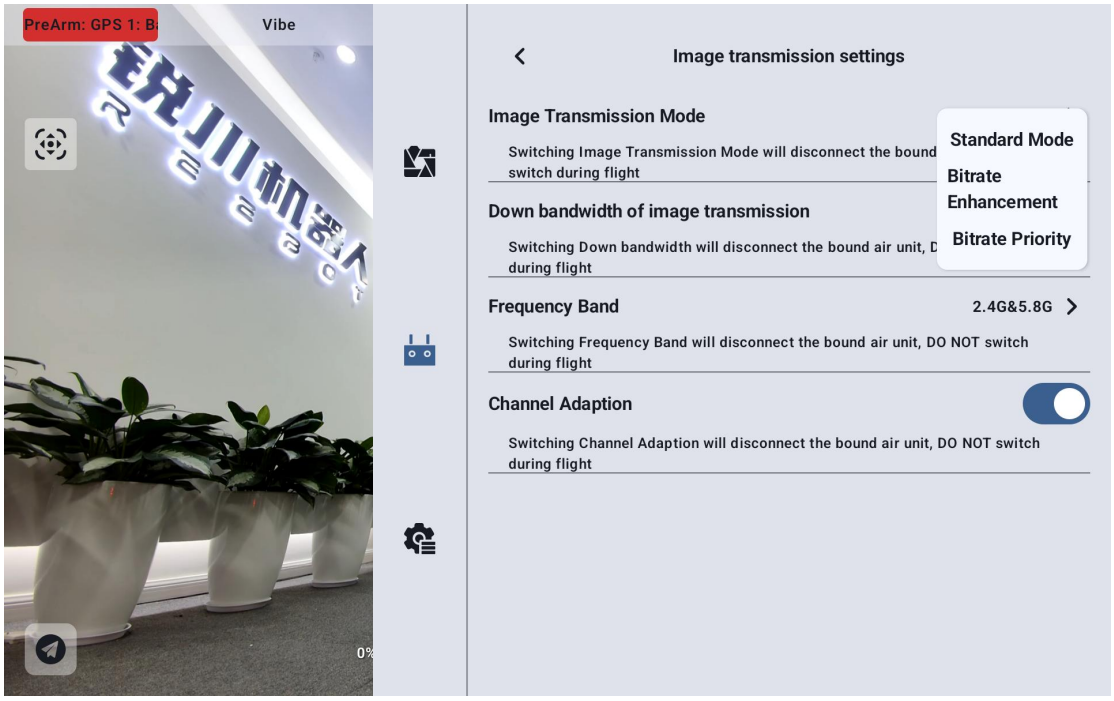
This feature is under development. Stay tuned!

16.13 Image Transmission Settings



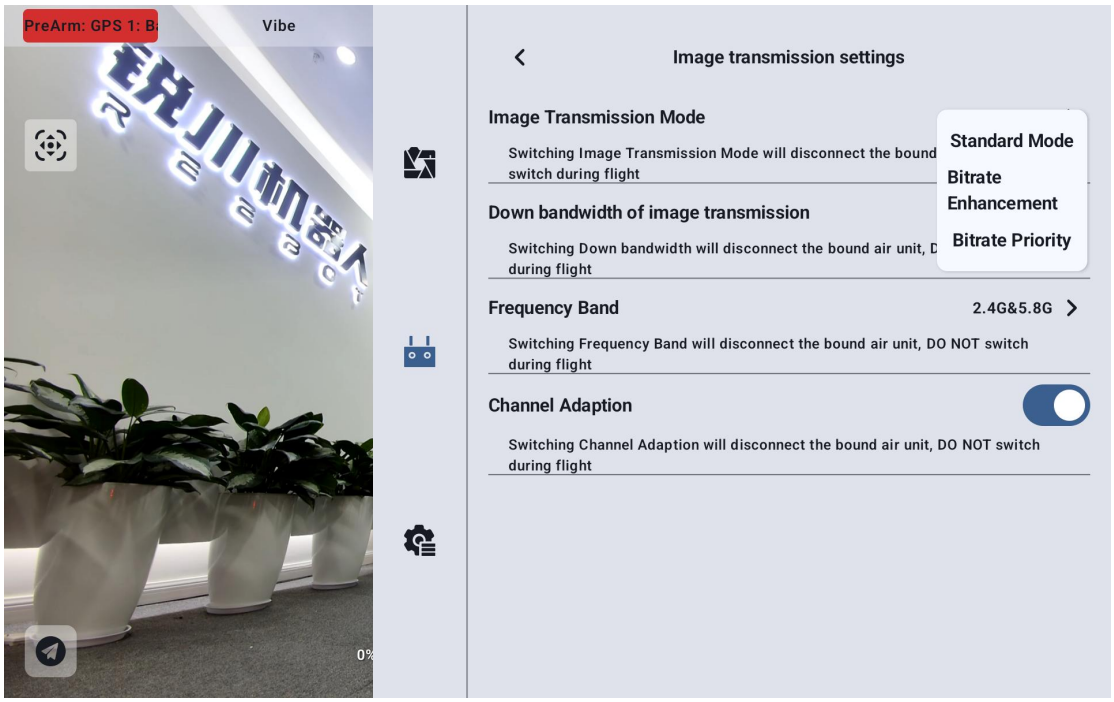
16.13.1 Video Transmission Settings

Change the Transmission Bitrate Mode



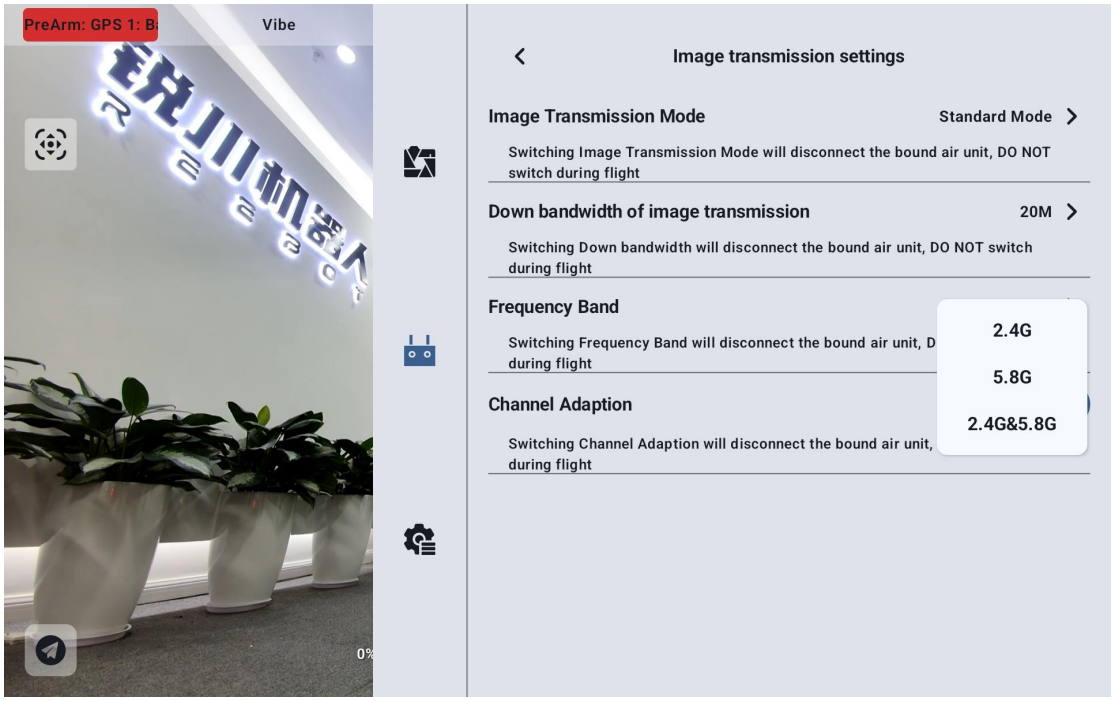
16.13.2 Video Transmission Downlink Bandwidth

The maximum downlink bandwidth for video transmission can be switched.



16.13.3 Operating Frequency Band

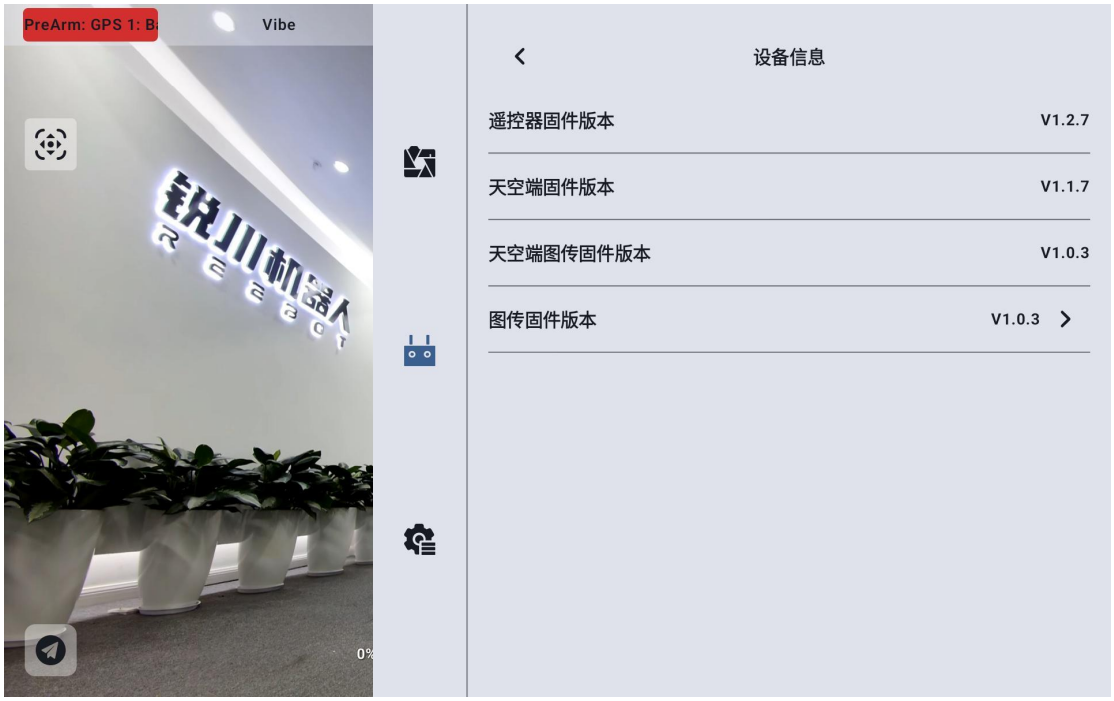
Manually switch the frequency band of the remote controller.



16.13.4 Adaptive Wireless Channel

In environments with complex electromagnetic interference or noisy wireless signals, enable this feature to allow the link to automatically search for the wireless channel with the least interference when establishing a connection, optimizing conditions for wireless communication. When the adaptive wireless channel is disabled, you can manually select a wireless channel between 1 and 32.

16.13.5 Device Information



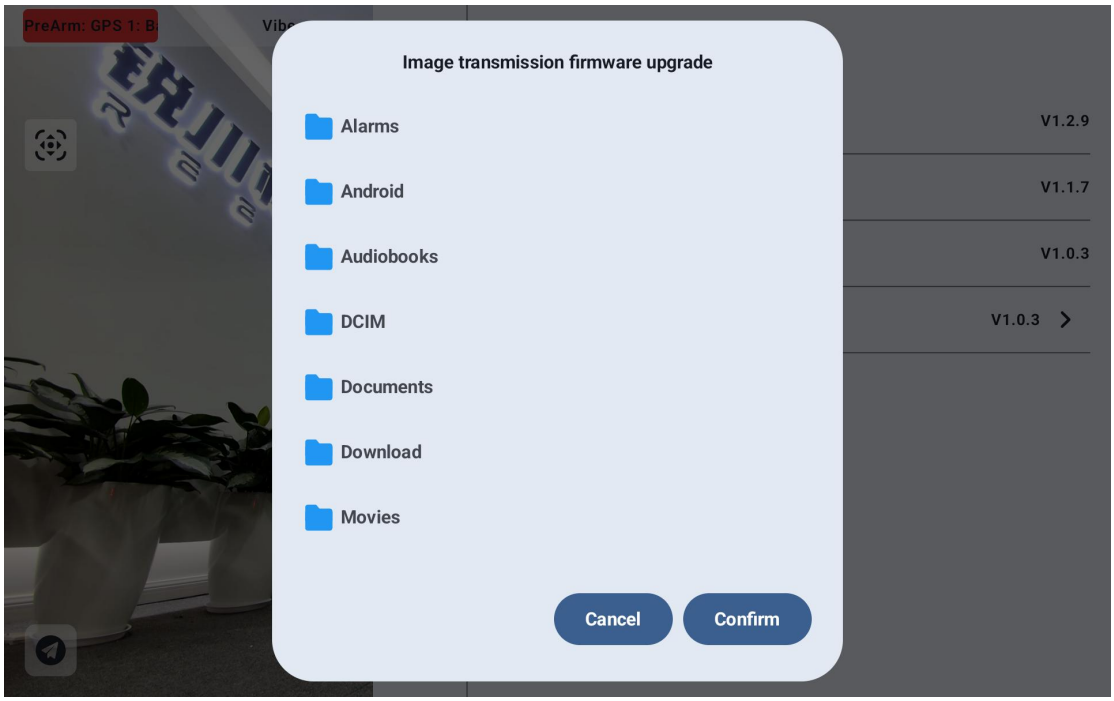
Remote Controller Firmware Version: The current firmware version of the remote controller's mainboard.

Sky Unit Firmware Version: The current firmware version of the sky unit.

Sky Unit Video Transmission Firmware Version: The current firmware version of the sky unit's video transmission module.

Video Transmission Firmware Version: The current firmware version of the remote controller's video transmission module.

Clicking on the video transmission firmware version allows you to manually select a local video transmission firmware version to upgrade the firmware versions of both the sky unit and remote controller's video transmission modules.



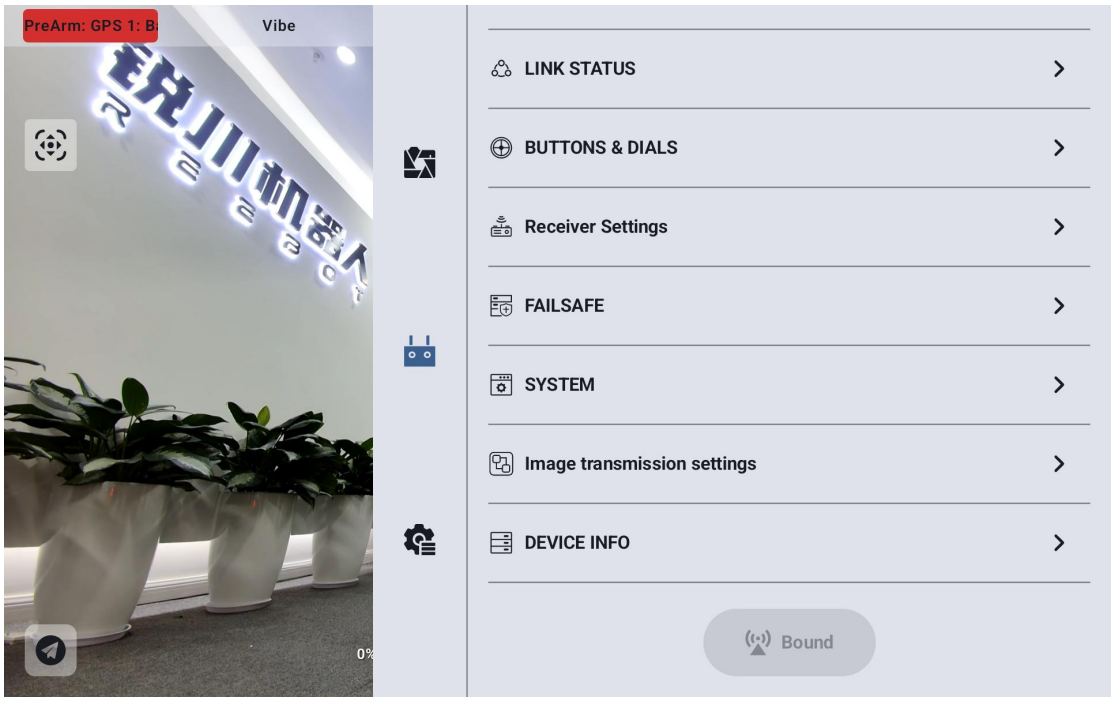
Note:

The video transmission module firmware versions of the sky unit and ground station must be the same for communication to be established.

16.13.6 Frequency Pairing

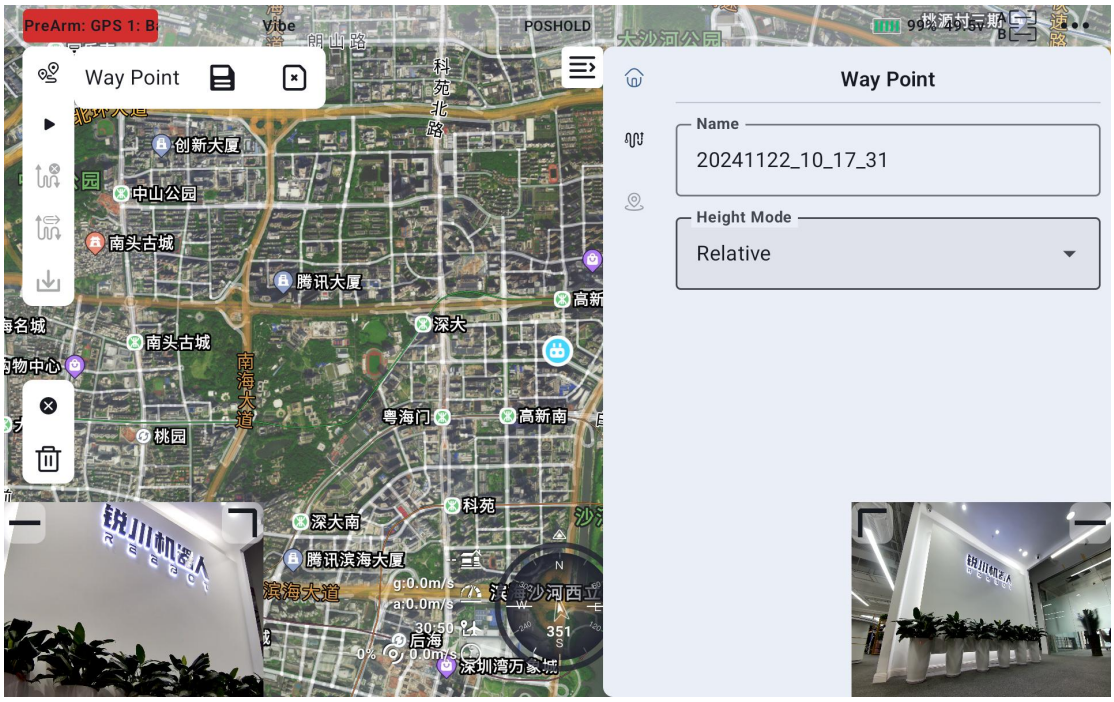
Please follow the steps below to pair the ground station and sky unit:

Open the remote controller settings menu in "UniGCS" and click "Remote Controller Pairing."
The ground station status indicator will flash red quickly, and the "Pairing" menu will show "Pairing in progress." The handheld ground station will begin to beep.
Then, press and hold the sky unit pairing button for 2 seconds. The sky unit status indicator will also flash red quickly.
Wait for about 5 to 10 seconds. When both the ground station and sky unit status indicators turn solid green, pairing is complete.



Chapter 17: UniGCS App

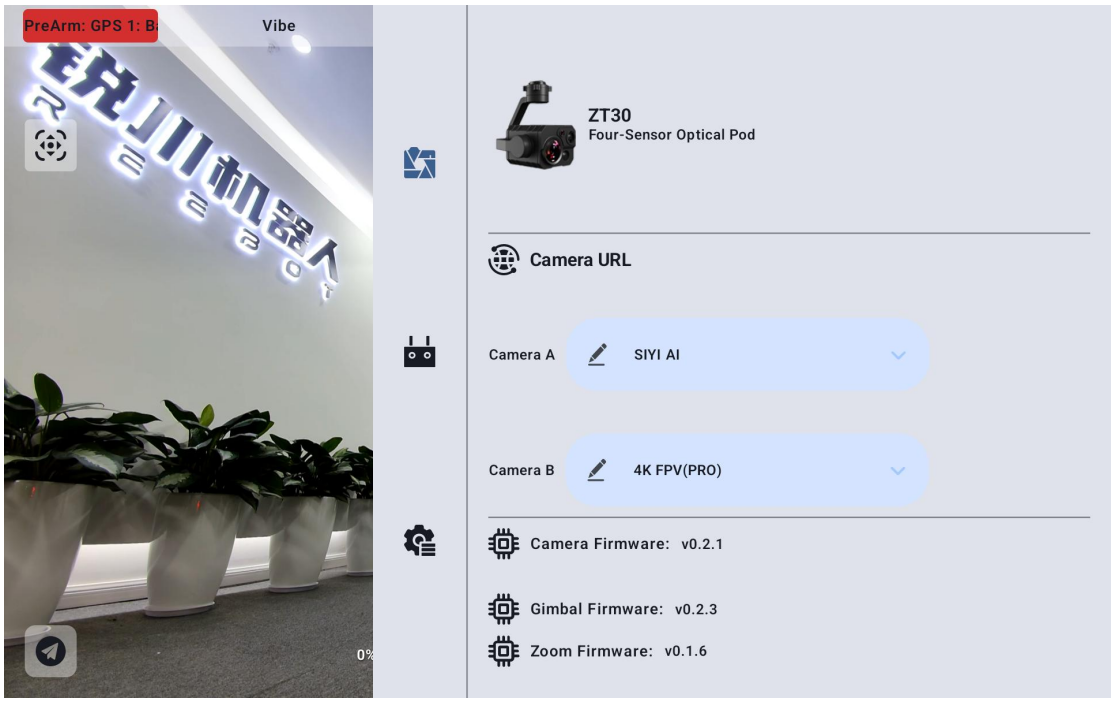
17.1 Flight Interface and Map Interface

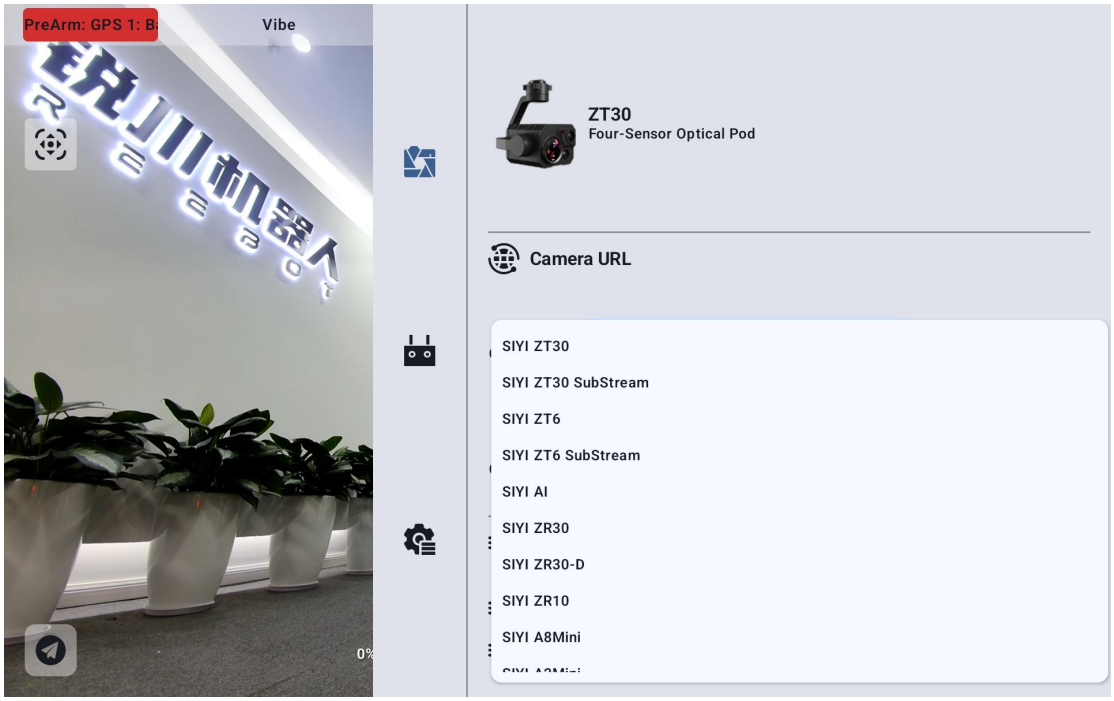


17.2 Gimbal Settings

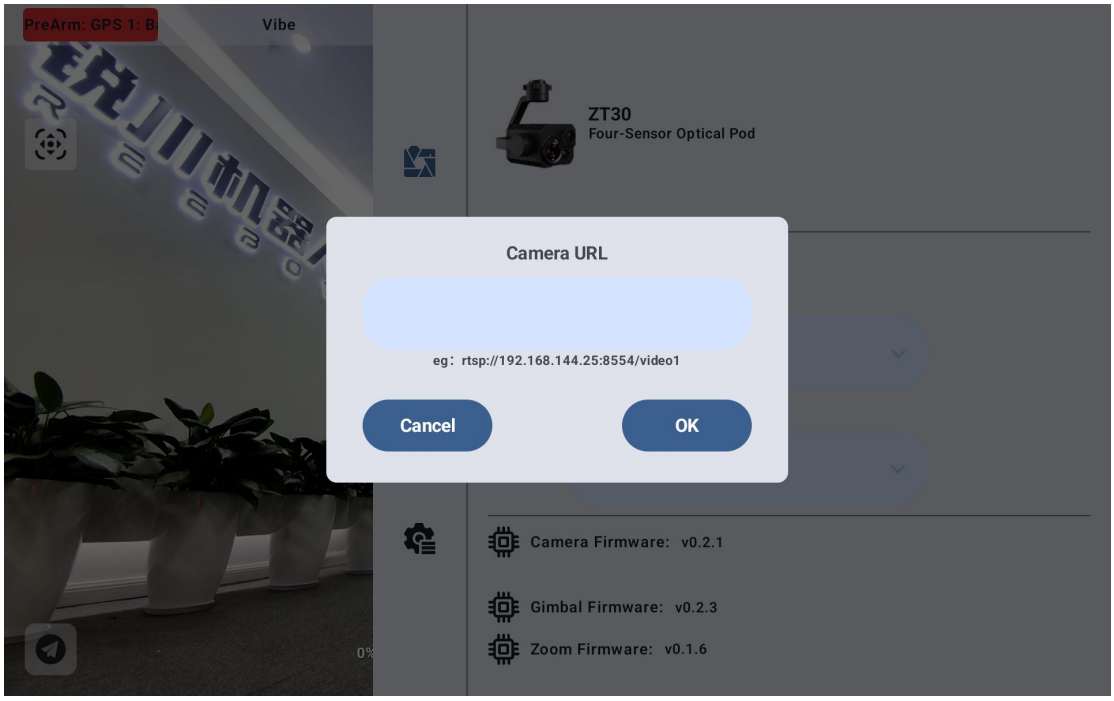
17.2.1 Gimbal Connection

After connecting the gimbal to the sky-end network port, select the gimbal to be used in Camera A or Camera B.





You can also choose to manually enter the RTSP address to establish the connection.



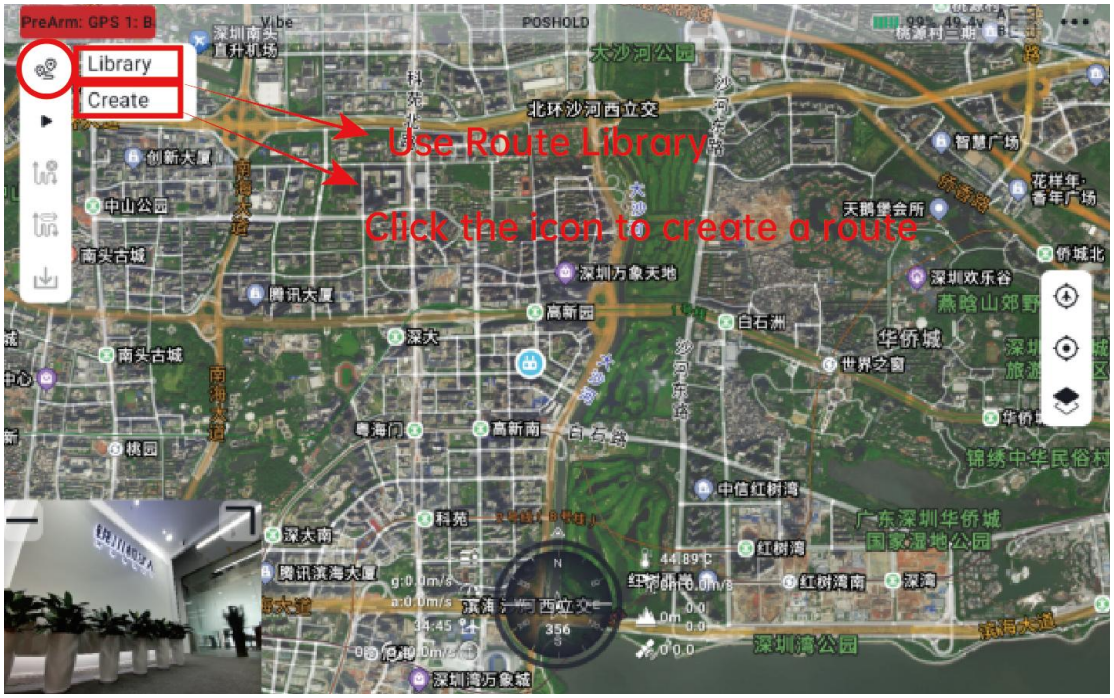
Note: When connecting two gimbals simultaneously, you need to change the IP address of one gimbal to a non-25 ending address. During the connection process, select the option to manually enter the RTSP address for connection.

17.3 Flight Route Planning

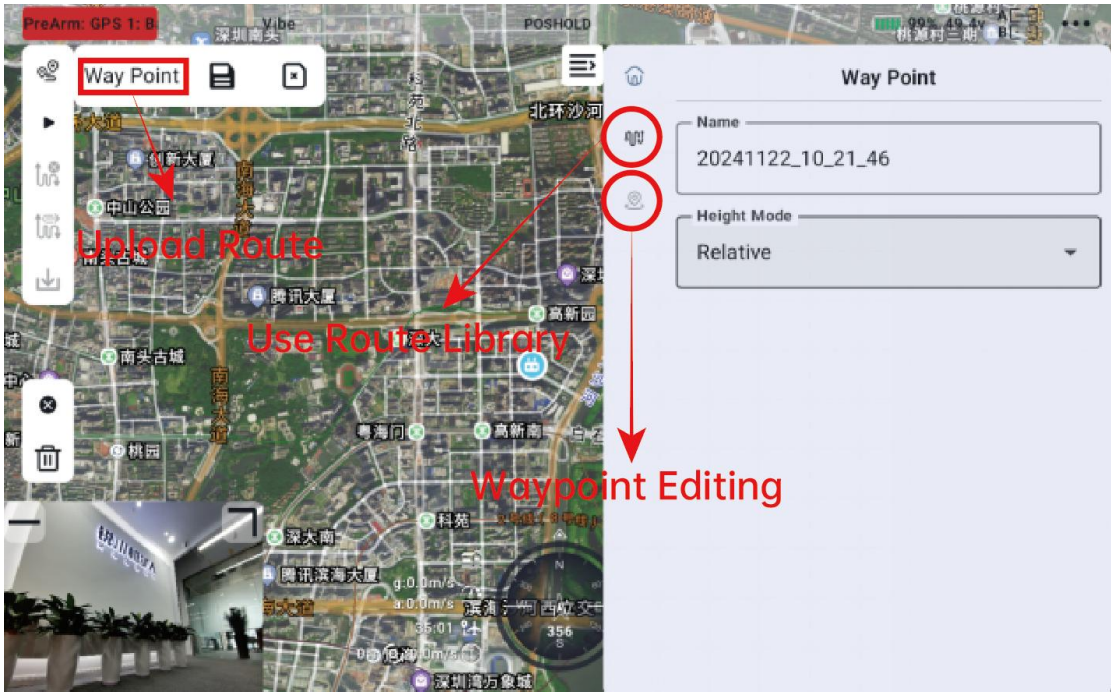
- Click the icon to enter the flight route planning interface.

- Choose to create a new flight route or select a route from the route library and upload

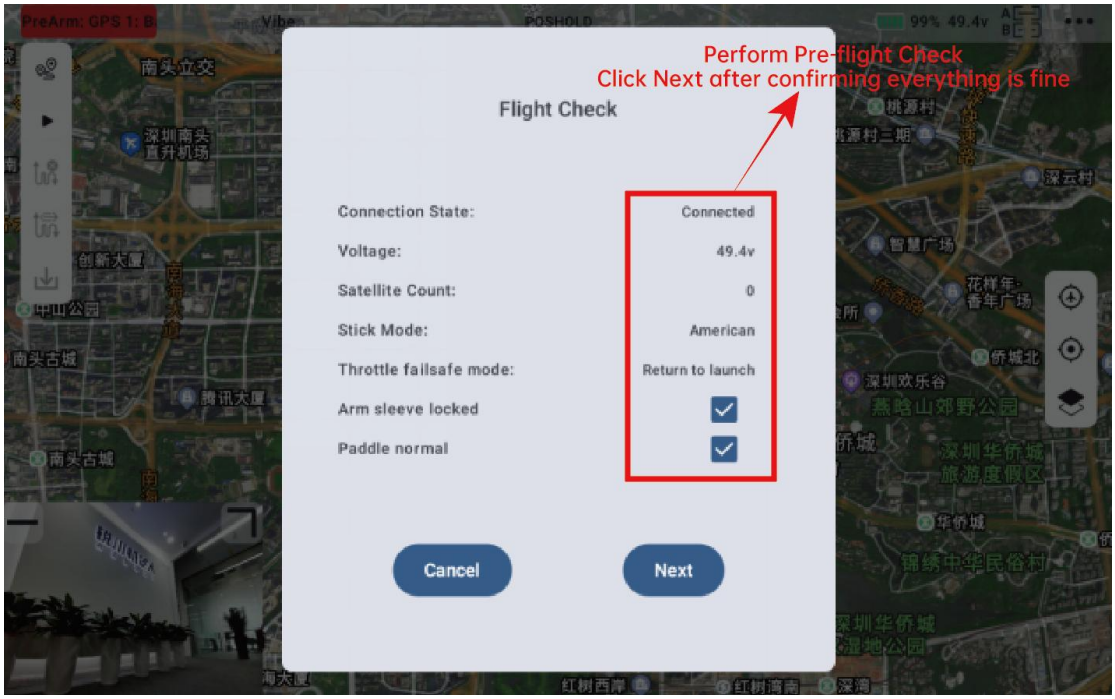
.



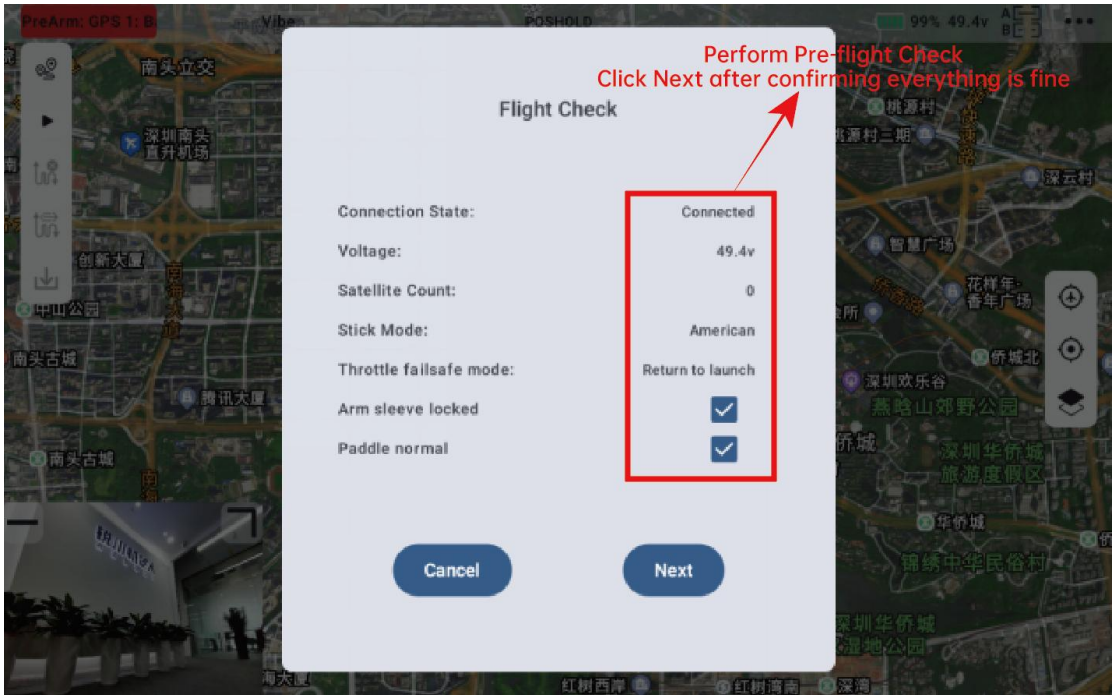
- After drawing the route, save the route information.



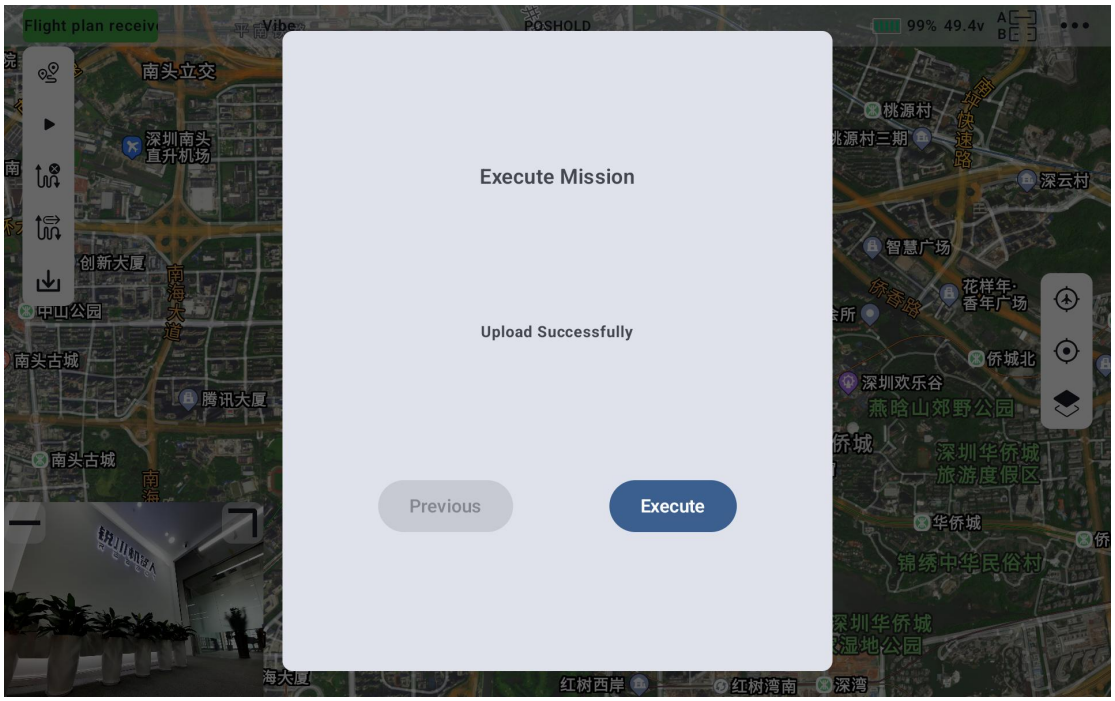
- Enter the flight check interface, review the relevant content carefully, and select the items to check.



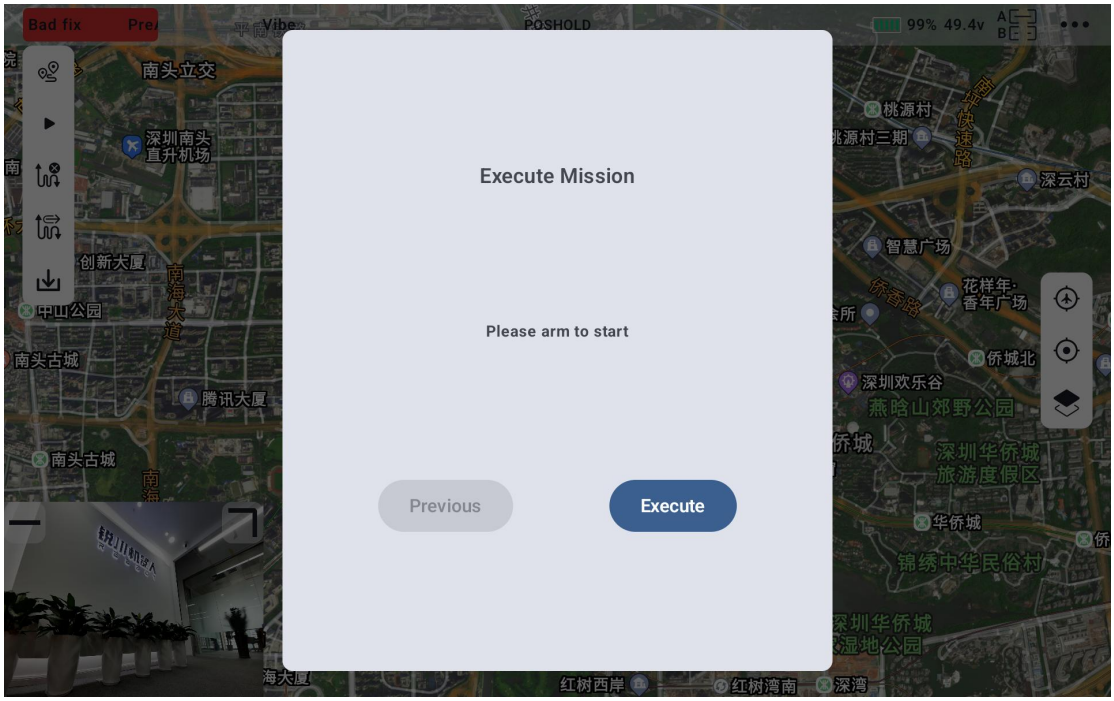
- Verify the route information and upload the route.



- Wait for the route to finish uploading, then click "Execute Task.



- Manually unlock the aircraft; the drone will automatically execute the route task.



- After the task waypoints are completed, add appropriate waypoints to guide the aircraft back to the landing point along a safe path.

Note:

Pay attention to the return altitude relative to the height of the environment or buildings along the return route. If the altitude cannot be increased, add waypoints to avoid obstacles.

Chapter 18: After-Sales Service and Warranty

18.1 Scope of Application

1. This after-sales policy is applicable only to products related to Reebot Robotics (Shenzhen) Co., Ltd. (hereinafter referred to as "Reebot Robotics") purchased through authorized official channels.
2. Effective Date: This after-sales policy is effective from December 4, 2024. All products purchased after this date are subject to this policy, and any previous after-sales policies will be automatically nullified.
3. Additional Applicability: The after-sales policy is subject to the information published on the official website.

18.2 Return Service

18.2.1 Timeframe and Conditions

Returns can be requested within 7 calendar days from 00:00 the day after receipt of goods, if the product is found to have performance issues that are not caused by human damage.

18.2.2 Situations Not Eligible for Return

(1)Customized or personalized products (e.g., products made according to customer specifications), once produced or shipped, are not eligible for return.

(2)Return requests made after 7 calendar days from the day after receipt of goods.

(3)Products returned with missing parts or damages caused by human factors.

(4)Returns without valid proof of purchase or invoices, or if invoices are tampered with or forged.

(5)Product damage caused by issues not related to product quality (e.g., collision, burning, improper modifications, exposure to foreign materials such as water, oil, sand, incorrect installation, or failure to follow the manual).

(6)Removal or alteration of labels, machine serial numbers, waterproof marks, anti-counterfeit labels, etc.

(7)Damage caused by unavoidable factors such as fire, water, lightning, or traffic accidents.

(8)Failure to send back the item within 7 calendar days after confirming the return with Reebot Robotics.

(9)Any other conditions not meeting the return criteria.

18.3 Exchange Service

18.3.1 Timeframe and Conditions

Exchanges can be requested within 15 calendar days from 00:00 the day after receipt of goods, if the product is damaged during shipping (with valid shipping damage proof), does not match the original description, or has performance issues that are not caused by human damage.

18.3.2 Situations Not Eligible for Exchange

(1)Exchange requests made after 15 calendar days from the day after receipt of goods.

(2)Exchange products missing parts or damaged by human factors.

(3)Failure to provide valid proof of purchase or invoices for exchange.

(4)Product does not have quality issues upon inspection by Reebot Robotics' technical support department.

(5)Product issues caused by human factors, such as improper modifications, exposure to foreign materials, incorrect installation, or failure to follow the manual.

(6)Removal or alteration of labels, serial numbers, waterproof marks, anti-counterfeit labels, etc.

(7)Damage caused by unavoidable factors such as fire, water, lightning, or traffic accidents.

(8)Failure to send back the item within 7 calendar days after confirming the exchange with Reebot Robotics.

(9)Failure to provide valid shipping damage proof for claims related to transportation damage.

(10)Any other conditions not meeting the exchange criteria.

18.4 Warranty Service

18.4.1 Warranty Period and Conditions

If the product malfunctions due to non-human causes during the warranty period, and there are no unauthorized repairs, modifications, or installation of non-official parts, and you can provide valid proof of purchase, the product will be eligible for warranty service.

18.4.2 Warranty Start Date

If valid proof of purchase (e.g., invoice) cannot be provided, the warranty start date will be 60 days after the production date shown on the product (unless otherwise specified by Reebot Robotics).

18.4.3 Warranty Period

(1)Main products such as gimbals, cameras, link products, propulsion systems, flight control systems: 12 months.

(2)Smart batteries (less than 200 charge cycles): 12 months.

(3)Consumables such as lens protection caps: 3 months.

(4)Propellers and other consumables: No warranty service provided.

18.4.4 Situations Not Covered by Warranty

(1)Damage caused by human factors such as collision, burning, or flying loss.

(2)Damage caused by unauthorized modifications, disassembly, or repairs.

(3)Damage caused by improper installation, use, or operation according to the manual.

(4)Damage caused by unauthorized repairs or assembling parts.

(5)Damage caused by improper usage of batteries, chargers, or circuit modifications not recommended by Reebot Robotics.

(6)Damage from improper flying or photography techniques as per the product

manual.

(7)Damage from operating in harsh environments (e.g., high winds, rain, sandstorms).

(8)Damage from operating in areas with strong electromagnetic interference (e.g., mining areas, transmission towers, high-voltage lines, substations).

(9)Damage caused by interference from other wireless devices (e.g., transmitters, video transmission signals, WiFi interference).

(10)Damage caused by exceeding the safe takeoff weight.

(11)Damage caused by flying with aged or damaged components.

(12)Damage caused by using non-Reebot Robotics certified third-party components.

(13)Damage due to low battery levels or using faulty batteries.

(14)Altered or tampered product labels, serial numbers, or factory tags.

(15)Failure to send the product back within 7 calendar days after confirming the warranty service with Reebot Robotics.

(16)Any other situations not covered by the warranty.

18.5 General After-Sales Terms

18.5.1 Repair Locations and Methods

Customers can find repair center information on our official website or by contacting customer service. We also offer mail-in repair services.

18.5.2 Software Services

We provide software updates for product performance optimization and bug fixes.

However, software issues may affect warranty eligibility (e.g., software failures caused by non-official software).

18.5.3 Data Privacy and Security

We are committed to ensuring data privacy and security during after-sales services. However, users are responsible for backing up their data in advance, as repairs may result in data loss.

18.5.4 Shipping Costs

(1)Mainland China: For products under warranty, the customer will pay for the shipping cost to send the product to Reebot Robotics, and Reebot Robotics will cover the return shipping cost after repairs. For products not covered by warranty, the customer is responsible for both shipping costs.

(2)Outside Mainland China: Shipping costs for both directions are the customer's responsibility, regardless of warranty status. Please contact local dealers for consolidated returns to save on shipping and banking fees.

(3)Customers are responsible for shipping costs related to software upgrades.

(4)When returning items for repair, please choose reputable courier services (e.g., DHL, FedEx, UPS for international customers), and contact our after-sales department once the item has been shipped for timely processing.

18.5.5 Other Fees

(1)If a product needs to be sent back for repair, Reebot Robotics will cover testing, material, and labor fees if the issue is covered under warranty.

(2)If the product is not covered under warranty, customers can choose to pay for repairs or have the original product returned.

(3)For products outside warranty, we may charge fees for testing, parts replacement, and labor.

(4)If we cannot contact you for an extended period, or if the product is returned undelivered or refused by the recipient, Reebot Robotics will store the product for 60 days from the last contact date. A storage fee of 150 RMB per day will be charged after the storage period, and the product will be disposed of if the storage fee exceeds the product's residual value.

(5)Any customs duties or fees for international returns must be paid by the customer.

18.5.6 Other After-Sales Notes

(1)Please do not send back batteries with severe damage, swelling, or leakage. If such items are sent, they will be disposed of.

(2)If the customer provides an incorrect shipping address or refuses to accept delivery, they will be responsible for any resulting losses.

(3)Water damage significantly impacts product performance, and such products are not repairable. We will offer a replacement product instead.

(4)Before sending a product for repair, please remove any personalized items or decorations (e.g., stickers, paint). Reebot Robotics will not be responsible for the loss or damage of such items.

(5)Please inspect the product for damage upon receipt. If there is any damage, notify us within 7 days of receipt. For damages caused during shipping, notify us within 24 hours for claims.

This after-sales policy is effective from the date of release. The interpretation rights belong to Reebot Robotics, and all matters are subject to this policy.