SIYI

SIYI UniGCS Software
（Android version）
User Manual

SIYI Technology (Shenzhen) Co., Ltd.

SIYI.biz/en

Thank you for choosing a product from SIYI Technology.

The UniGCS is designed and manufactured for professional applications. Operators are expected to possess fundamental technical skills. Please handle this product with care.

SIYI Technology shall not be held liable for any economic loss or personal injury resulting from improper or unsafe operation of this product.

Minors must be supervised and guided by a qualified professional when using this product.

SIYI products are intended for commercial use only and must not be used for military purposes.

Unauthorized disassembly or modification is strictly prohibited without prior consent from SIYI Technology.

This manual addresses most common usage questions. For additional assistance, please visit the official SIYI Technology website at www.siyi.biz, call our support hotline at 400-838-2918, or email our engineering support team at support@siyi.biz for product inquiries or technical support.

SIYI

CONTENT

1. Product Overview 6
    1.1 Product Description 7
    1.2 User Guide Structure 8
2. Installation and Configuration 9
    2.1 System Requirements 9
    2.2 Installation Steps 9
    2.3 Initial Configuration 10
3. Quick Start 13
    3.1 Main Interface Overview 13
    3.2 Quick Start Example 14
4. Core Function Instructions 19
    4.1 Camera Module 19
    4.2 Remote Controller Module 61
    4.3 Flight Controller Module 97
    4.4 Waypoint Module 129
    4.5 Customized Geofence 186
    4.6 RTK Module 190
5. Settings and Preferences 196
    5.1 Software Version Information 197
6. Maintenance and Updates 198
7. Troubleshooting 199
    7.1 Common Errors 199
    7.2 Contact the Support Team 202
8. Appendix 203
    8.1 Glossary 203
    8.2 Version Update Log 203
9. After-Sales and Warranty 205

Contact Us: **SIYI Official Website** *(https://SIYI.biz/en)*

SIYI User Group - Facebook	
Facebook	
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YouTube	

User Manual Update Log

Version	Date	Updates
1.0	2025.04	Original version
1.1	2025.06	Added new features: 1. Gripper. 2. Customized geofence. 3. Quick flight mode switching. 4. Camera manufacturer and model selection. 5. Third-party camera grid lines and flip.
2.0	2025.08	Added new features: 1. Oblique photography route. 2. Bevel route. 3. Corridor route. 4. Terrain following. 5. ESC & CAN device information display. 6. Coventional RTK & Network RTK. 7. Import / Export route. 8. Cloud flight route. 9. Added some other features.

1. Product Overview

Functions：

The UniGCS App provides functionalities including flight control, aircraft configuration, UAV data monitoring, mission planning, camera operation, video transmission, and remote controller settings.

Applications：

Flight control and operation

Mission planning and execution

Data exchange and processing

System monitoring and maintenance

Supported UAV Types：

Multirotor UAVs

Fixed-wing UAVs

VTOL Fixed-wing UAVs

Ground vehicles

Watercraft

1.1 Product Description

Purpose of the Software：

Flight control and mission execution

Data visualization and decision support

Core Features：

Flight control

Mission management and payload control

Data exchange and processing

System maintenance and diagnostics

Supported Platform：

Android

1.2 User Guide Structure

Introduction

This user manual provides detailed instructions and descriptions of each functional module of the software.

Intended Audience

The UniGCS system is designed for professional use. Operators are expected to possess basic technical skills and should exercise caution during operation.

SIYI Technology shall not be held responsible for any economic loss or personal injury resulting from improper or unsafe use of this product.

Minors must be supervised and guided by a qualified professional when using this product.

SIYI products are intended solely for commercial use and must not be used for military purposes.

Unauthorized disassembly or modification of the product is strictly prohibited without prior written permission from SIYI Technology.

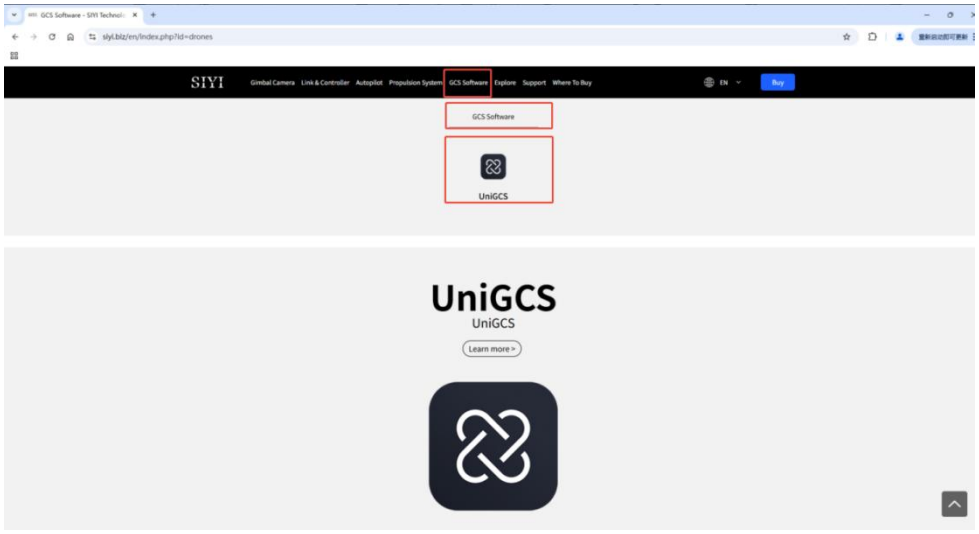
2. Installation and Configuration

2.1 System Requirements

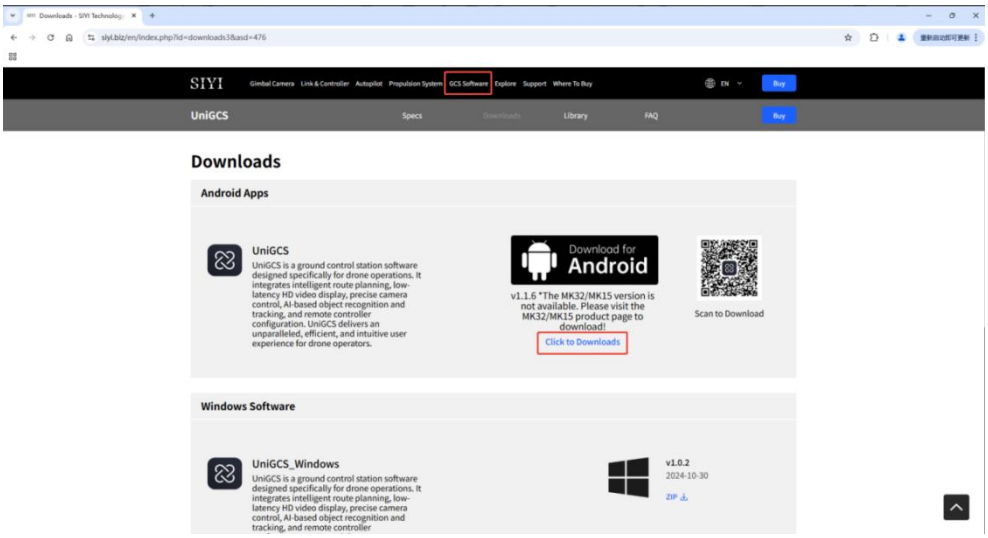
Minimum system configuration: Android 7.0, 2 GB RAM, 16 GB storage.

2.2 Installation Steps

1. Log in to the official SIYI website and select the ground control software.



2. Select UniGCS and click Download to obtain the Android version.

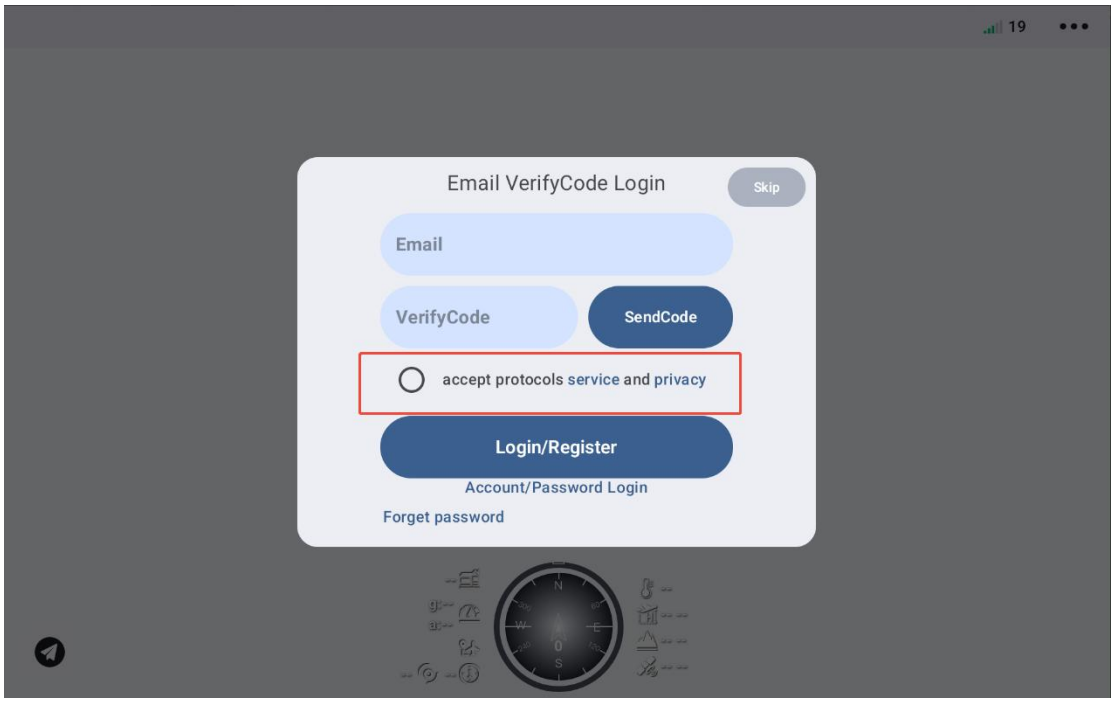


2.3 Initial Configuration

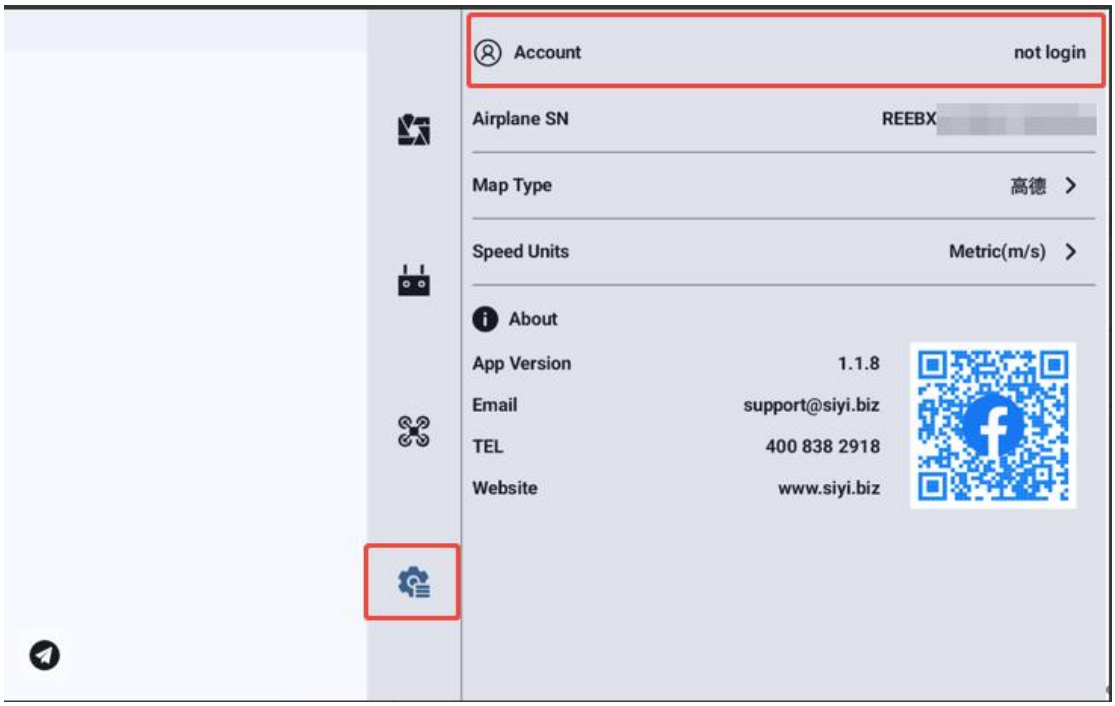
When launching the software for the first time, a login window will appear. You can log in using your account and password, mobile number, or email address.

If the mobile number or email address has not been registered, the system will redirect you to the registration page.

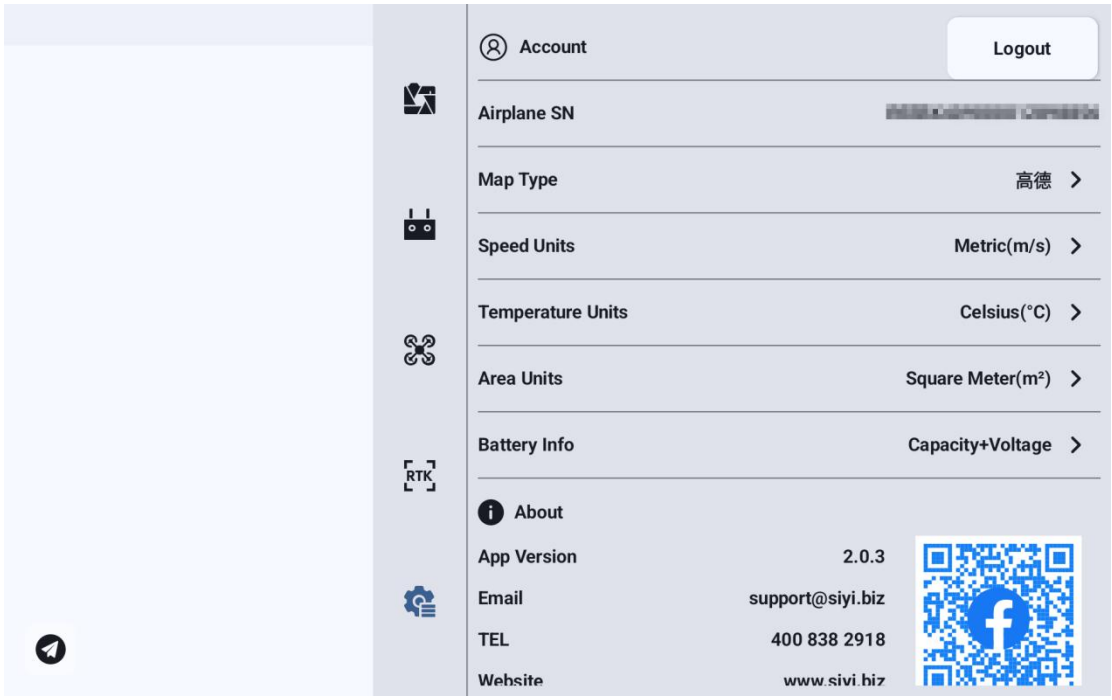
During login, please make sure to check the box for “I have read and agree to the Terms of Service and Privacy Policy.”



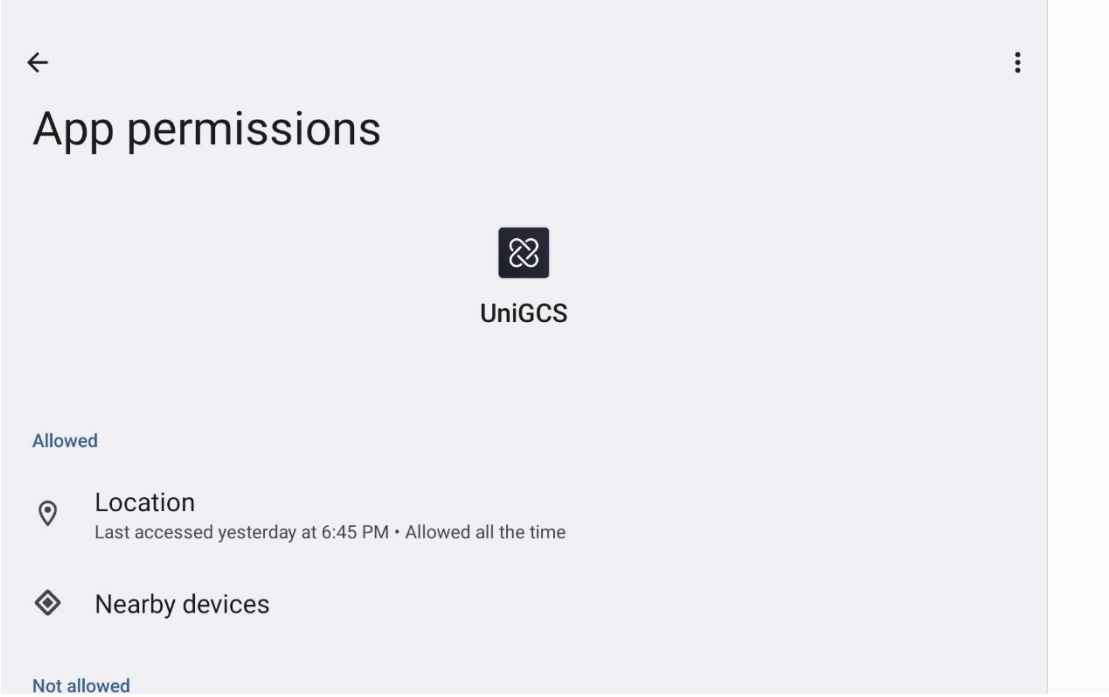
After a successful login, you can view your account information in System Settings.



Cloud flight route and terrain following features are only available after login.



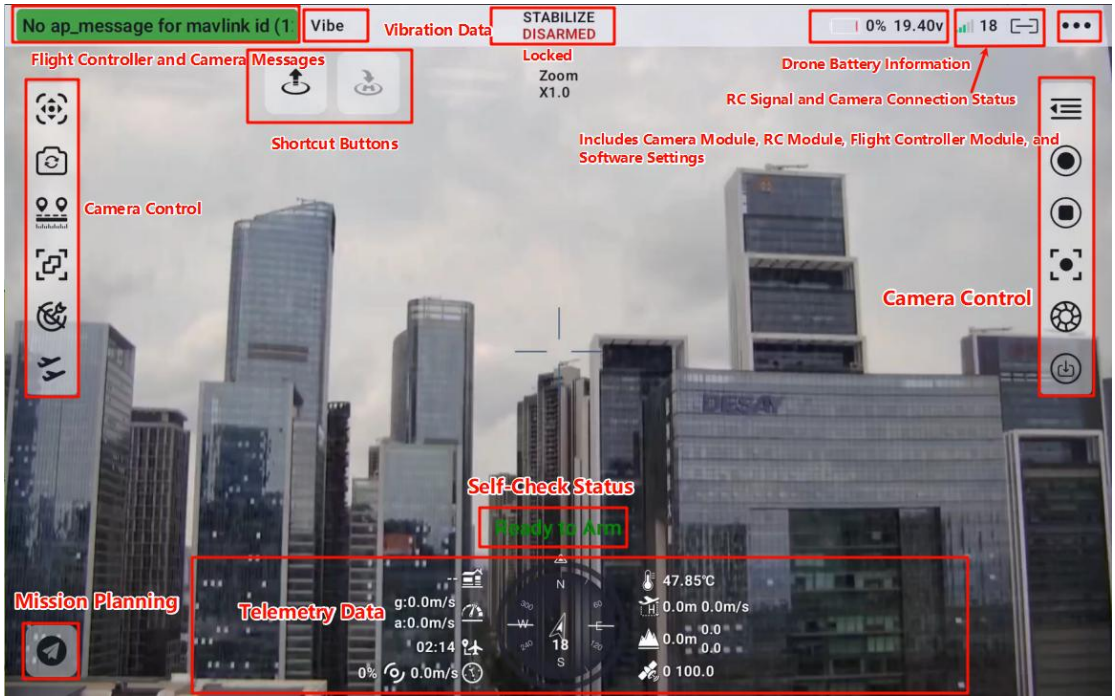
Click the acount again and then you can logout.



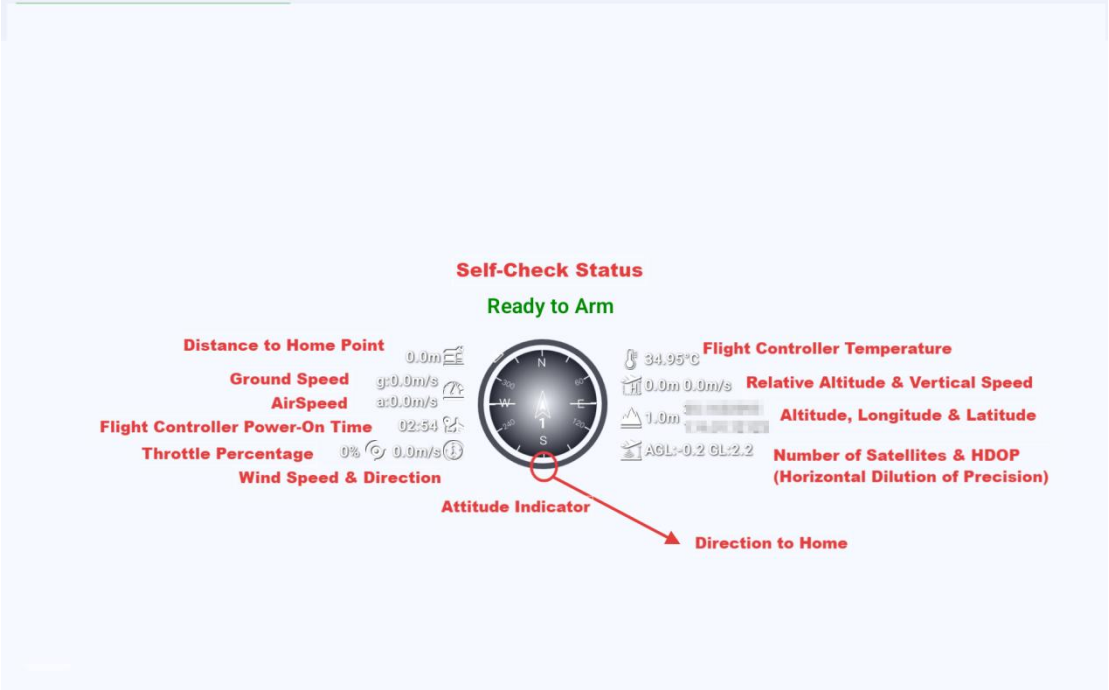
To ensure proper operation of the software, please enable all required permissions when prompted.

3. Quick Start

3.1 Main Interface Overview



3.1.1 Flight Information

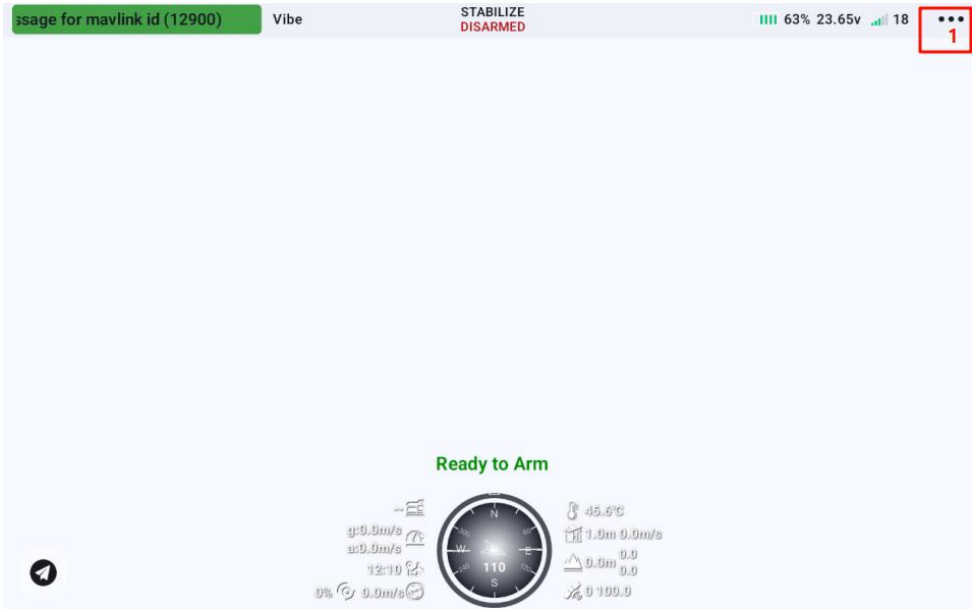


3.2 Quick Start Example

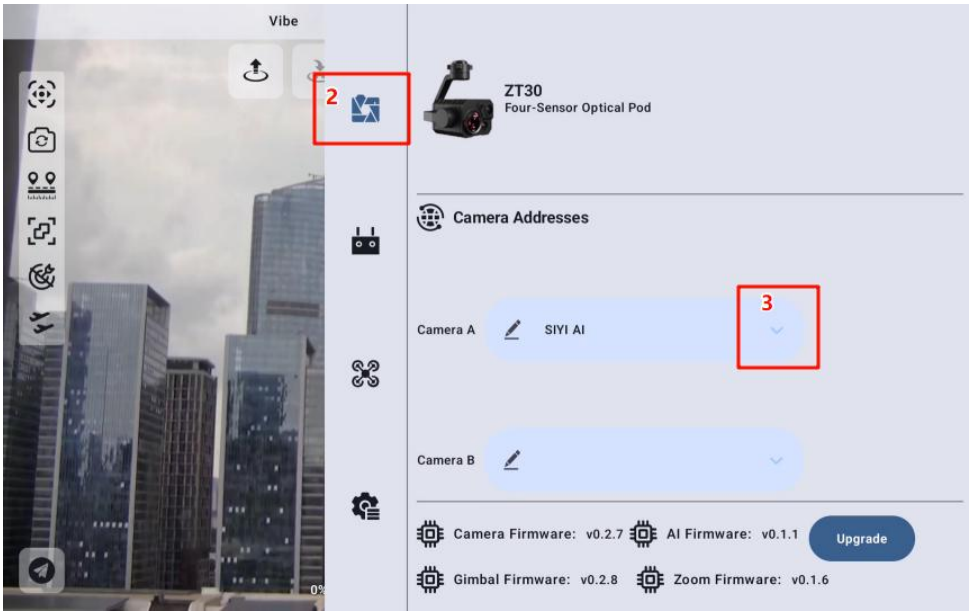
The following is an example of camera output, drone connection, and quick takeoff.

3.2.1 Camera Output

Step 1: Tap the three dots in the top-right corner.



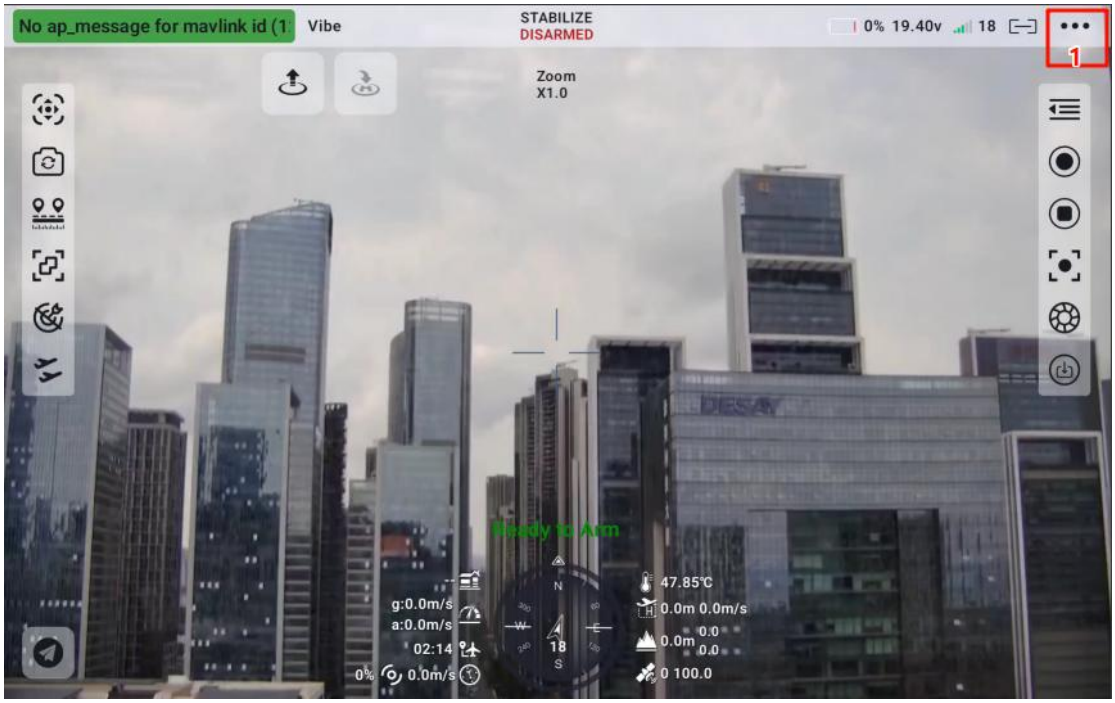
Step 2: Select the Camera Module.



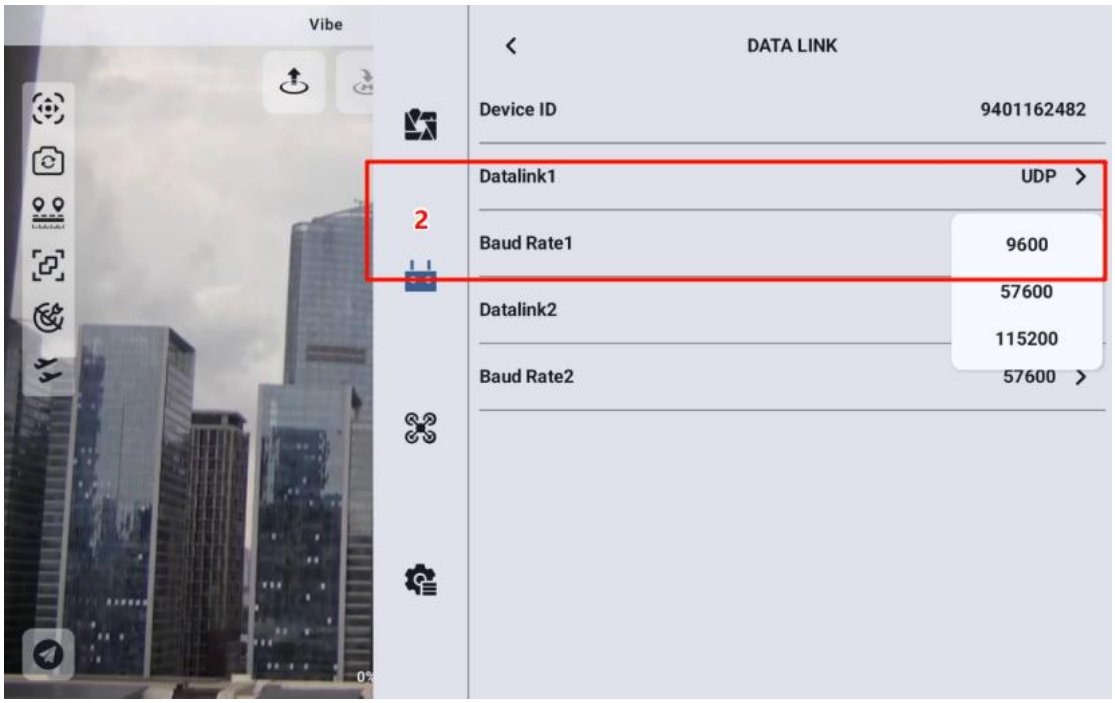
Step 3: Tap the downward triangle in the camera address bar and select the correct camera address. Alternatively, tap the pencil icon to manually enter the camera address as prompted.

3.2.2 Data Link Connection

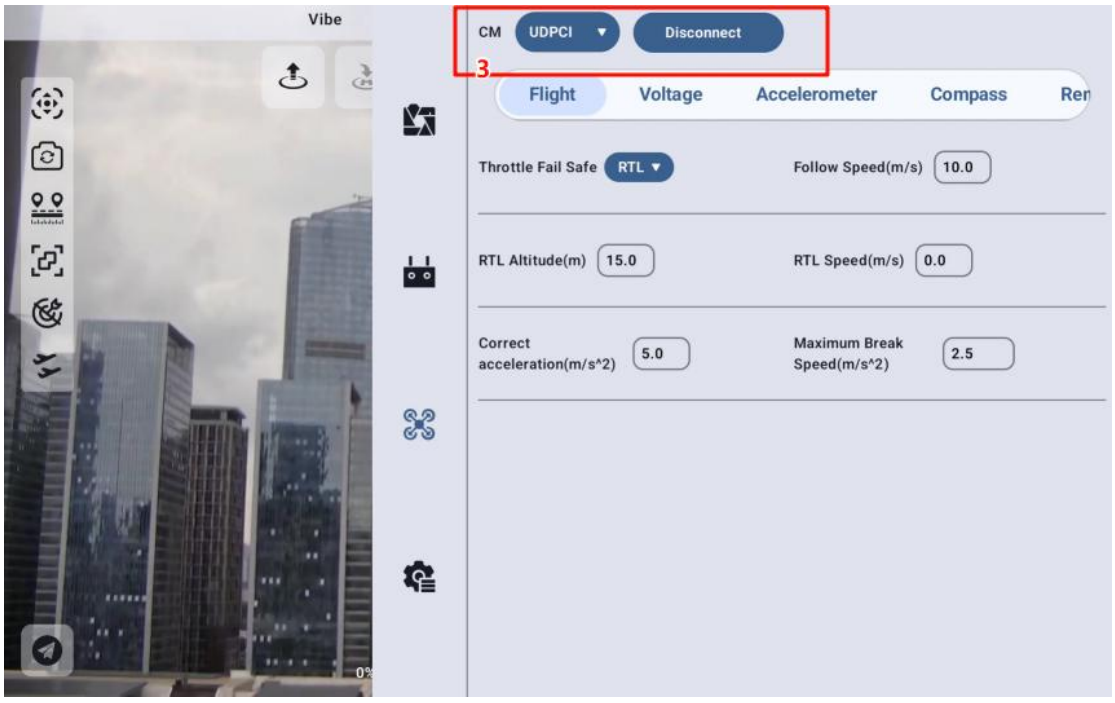
Step 1: Tap the three dots in the top-right corner.



Step 2: Set Data Link 1 to UDP, and set the baud rate to 57600 (ensure it matches the baud rate set in the flight controller, default is 57600).

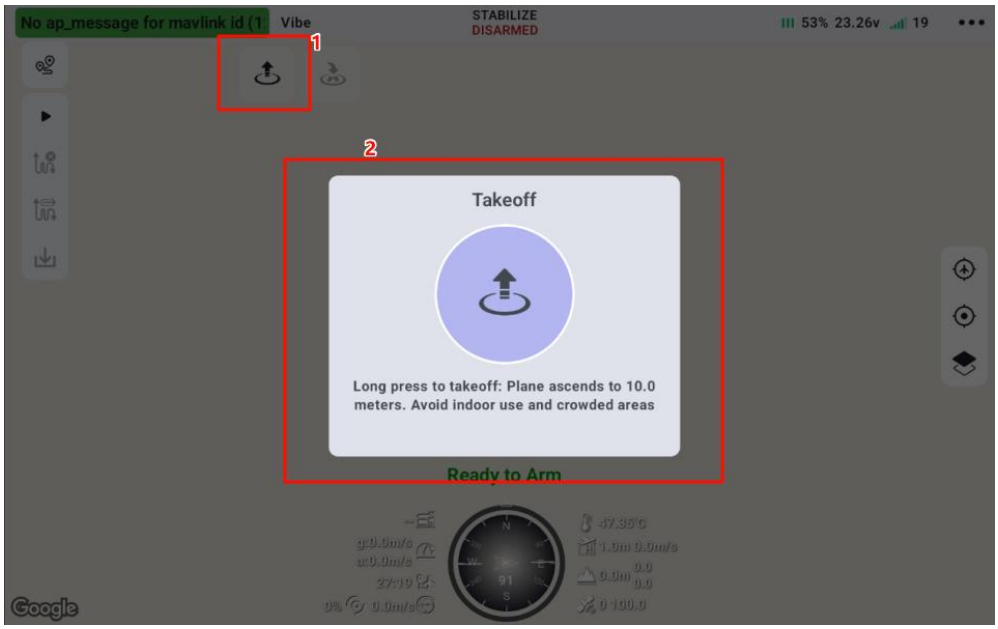


Step 3: Set the connection type to UDPCL, then click Connect. Enter the address as prompted and click Confirm to establish the connection.

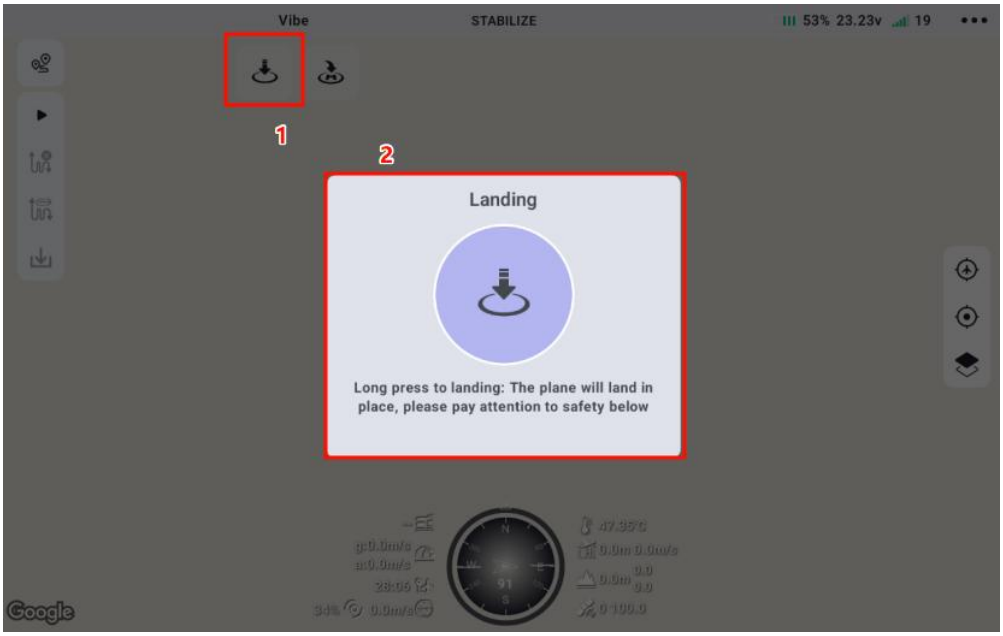


3.2.3 Shortcut Buttons

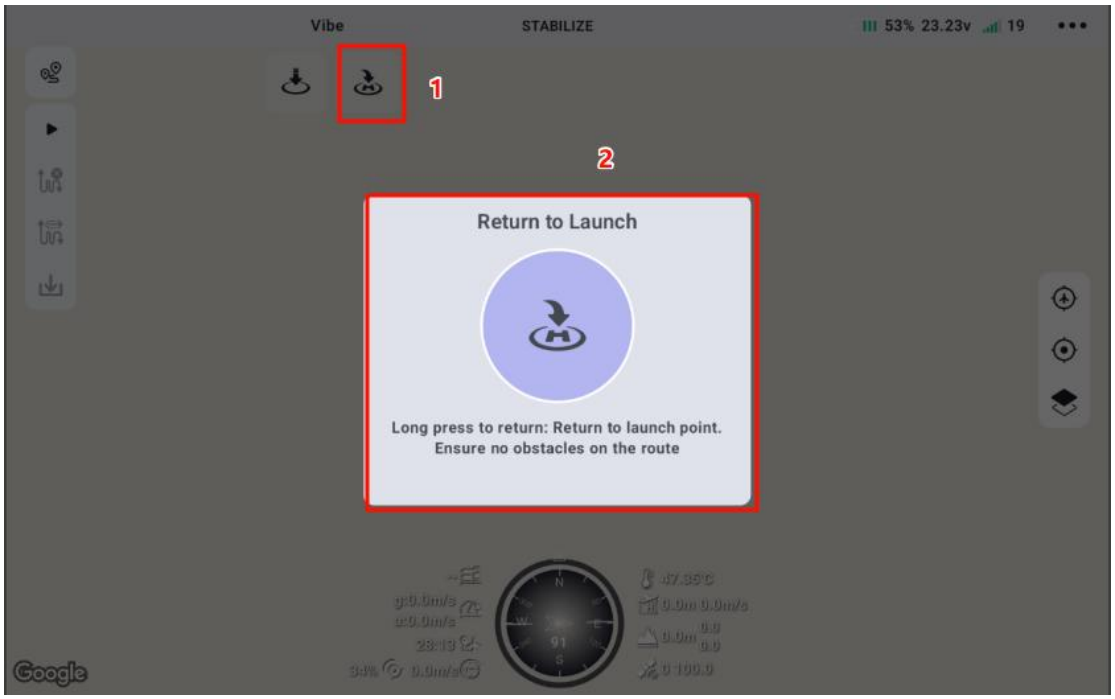
One-Touch Takeoff: Tap the one-touch takeoff button, then press and hold the button as prompted. The drone will climb to 10 meters and hover in place.



One-Touch Landing: Tap the one-touch landing button, and the drone will land at its current position.



One-Touch Return: Tap the one-touch return button, and the drone will climb to the return altitude and fly back to the takeoff point.



4. Core Function Instructions

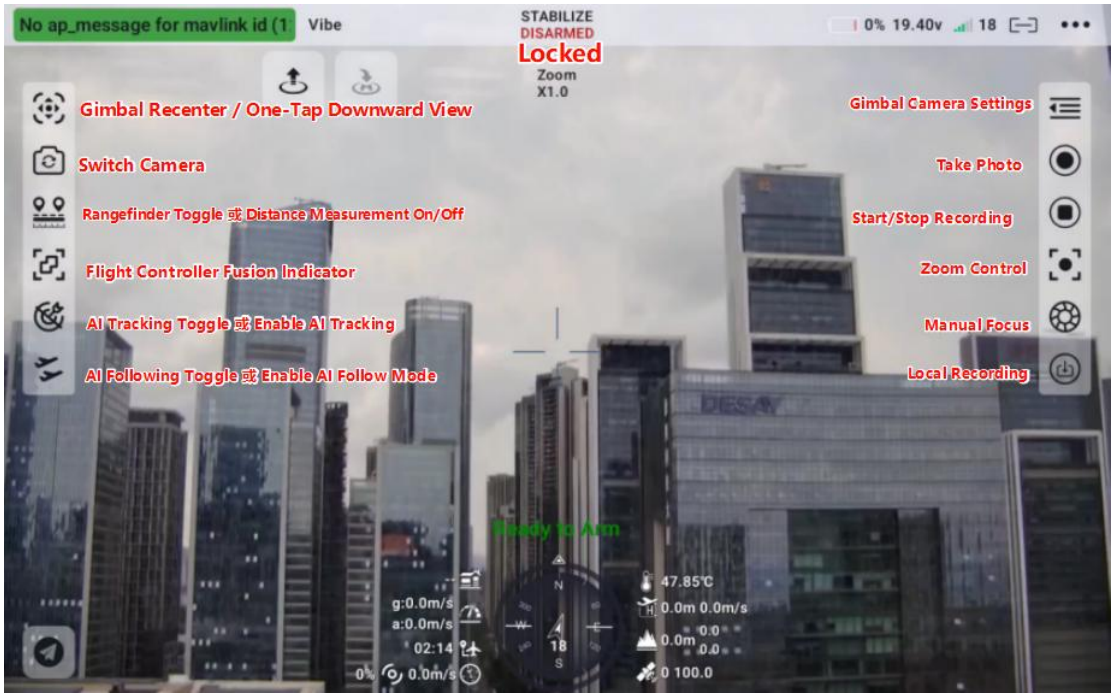
The core functions include: Camera Module, Remote Control Module, Flight Control Module, Flight Route Module and RTK Module.

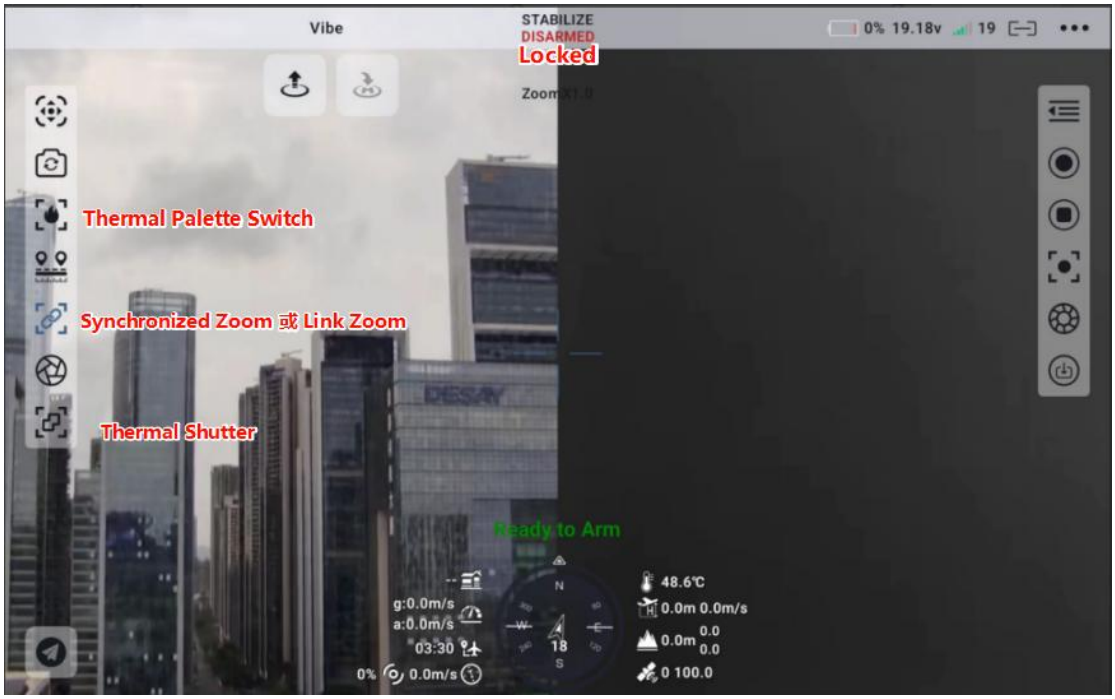
4.1 Camera Module

Mainly includes camera stream address selection, camera version information, and various control buttons.

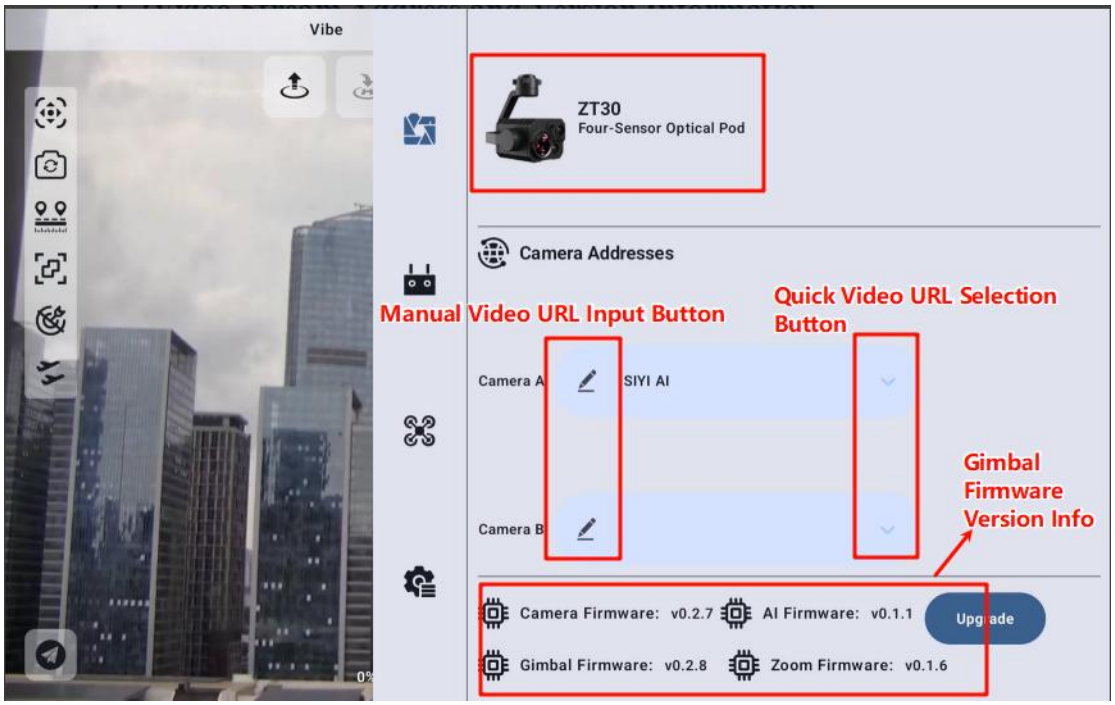
4.1.1 Camera Main Menu

Preview of the functions of each button in the Camera Main Menu.





4.1.2 Video Stream Address and Version Information



Main Stream / Sub Stream: Set the camera source and parameters for the main and sub streams respectively.

Address Settings: Configure the SIYI series cameras, main or sub stream,

select the default camera address or manually input the RTSP address, disable image display, etc.

Click the “Manual Video URL Input Button”, select the camera brand and model, then enter the correct video stream address to control the camera and generate images.

Note:

When manually entering the address, ensure that punctuation marks are in English mode. If the manufacturer and the model are “——”, after entering the correct video stream address, only the video will be displayed, and the camera can not be controlled. At present, the manufacturers and models only support SIYI series products.

Version Information:

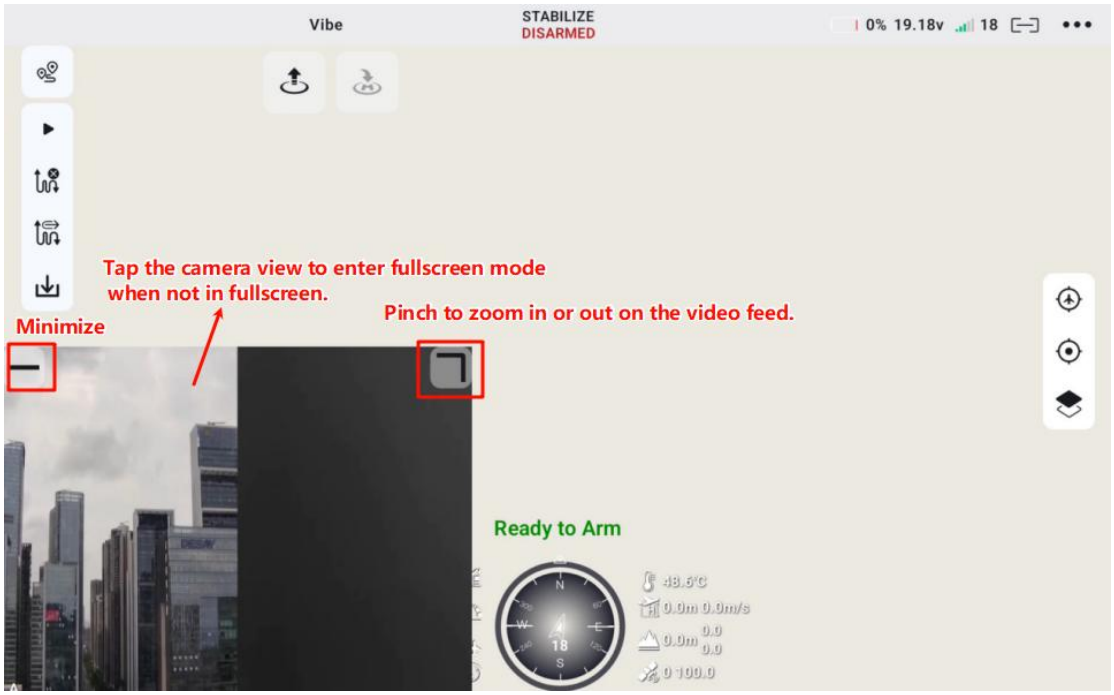
Camera Firmware Version: Displays the current camera firmware version.

Gimbal Firmware Version: Displays the current gimbal firmware version.

Zoom Firmware Version: Displays the current zoom firmware version (only supported for optical zoom cameras).

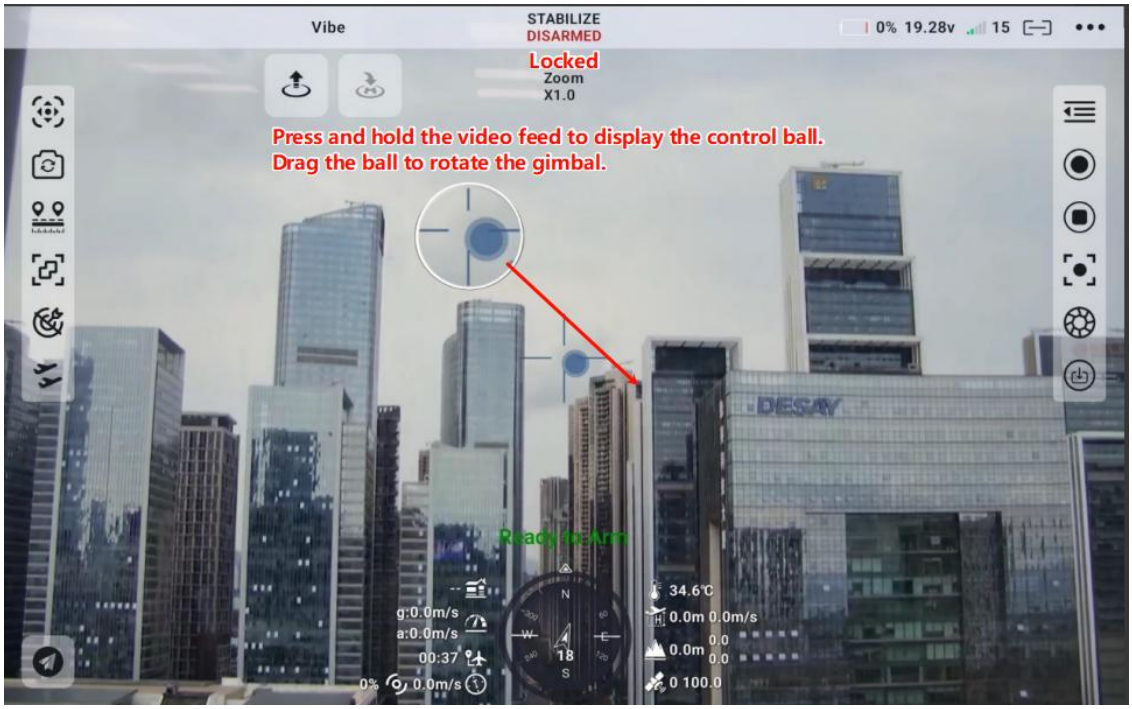
4.1.3 Camera Display Operations

When the camera display is not in full screen, click the minimize button to hide the display. You can also drag the arrow at the top of the display to zoom in or out. Single-click the small window display to expand it to full screen.

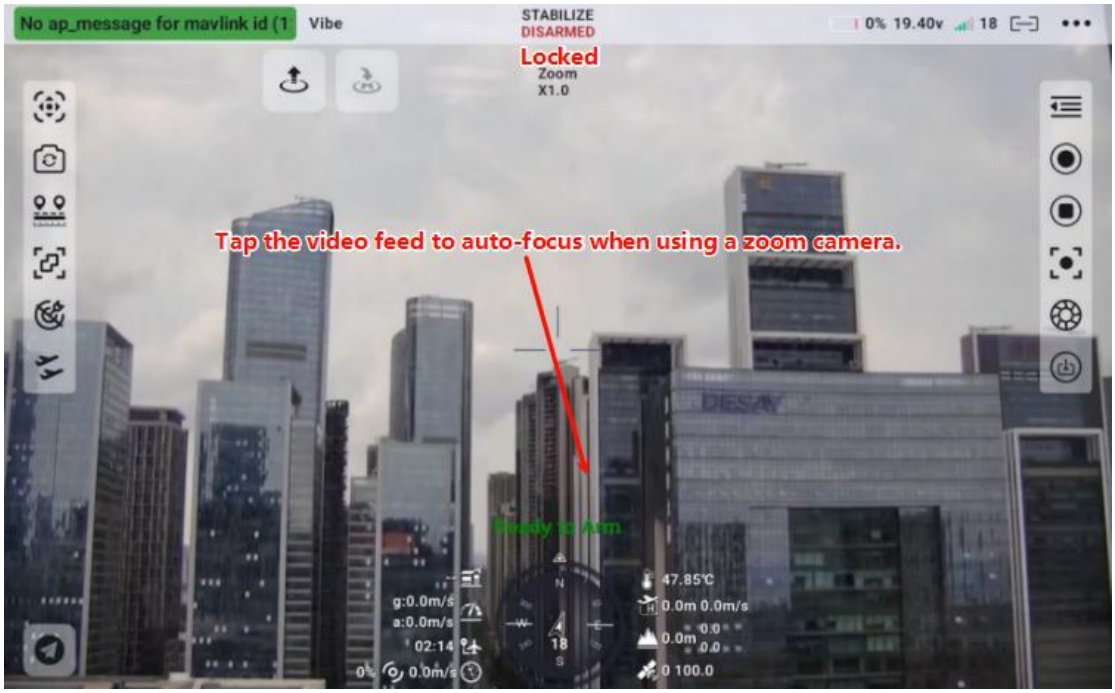


After minimizing the display, click the camera button to bring the display back up.

Long press anywhere on the screen, and when a small ball appears at the pressed location, drag the ball to rotate the camera.



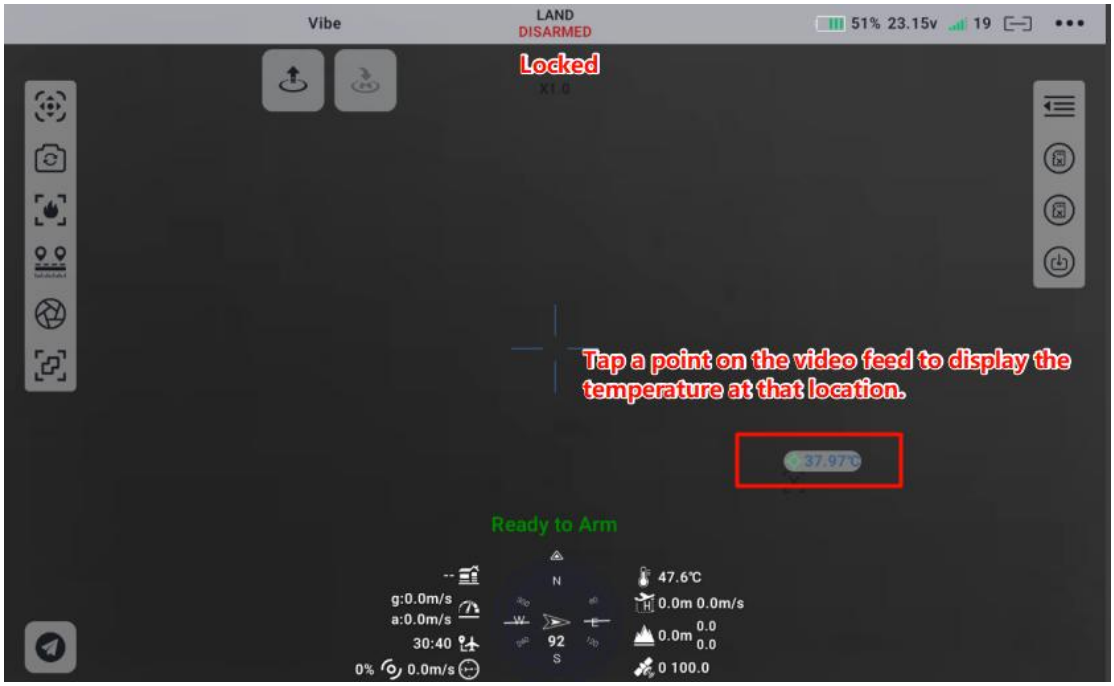
When the display shows a zoom camera, single-click anywhere on the screen to auto-focus on that location.



4.1.4 Thermal Imaging Temperature Measurement

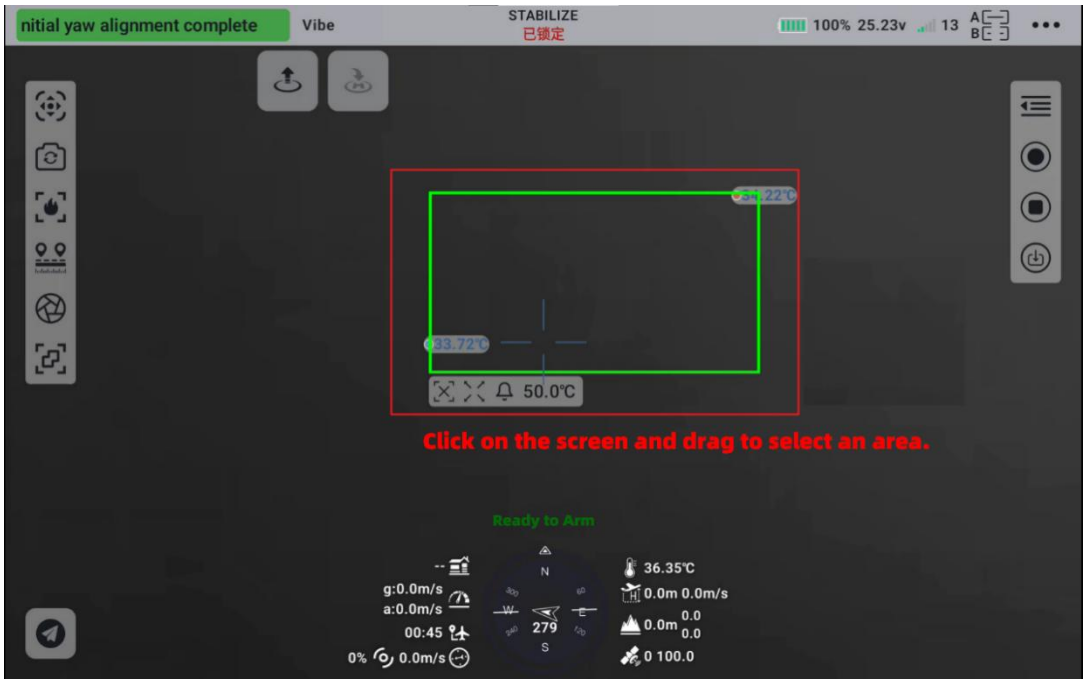
4.1.4.1 Spot Temperature Measurement

Measure the temperature of a single point within the display. Simply click on a point in the display to show the current temperature information for that point.



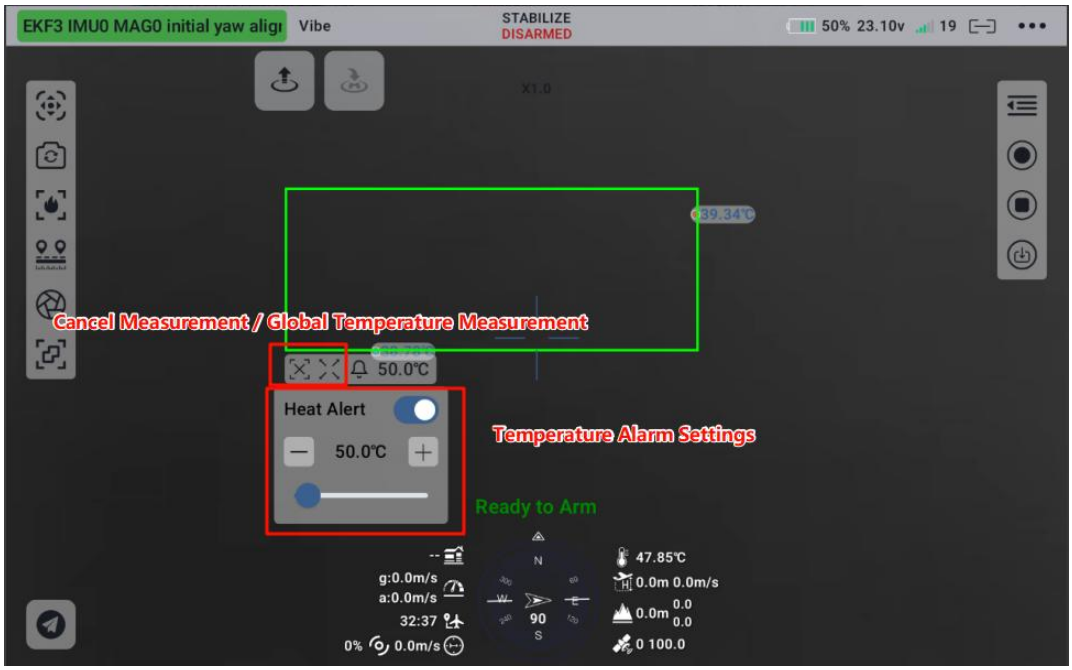
4.1.4.2 Area Temperature Measurement

Measure the temperature of a specific area within the display. Press and drag to select an area on the screen, and the maximum and minimum temperatures within the selected range will be displayed. It also supports spot temperature measurement by single-clicking. Click the "Cancel Measurement" button to disable the temperature measurement function.



4.1.4.3 Over-Temperature Alarm

By clicking on the alarm temperature, you can set the over-temperature alarm threshold. Use the plus and minus buttons or drag the slider to adjust the alarm threshold. An alarm will be triggered when the temperature within the selected area reaches the set threshold.

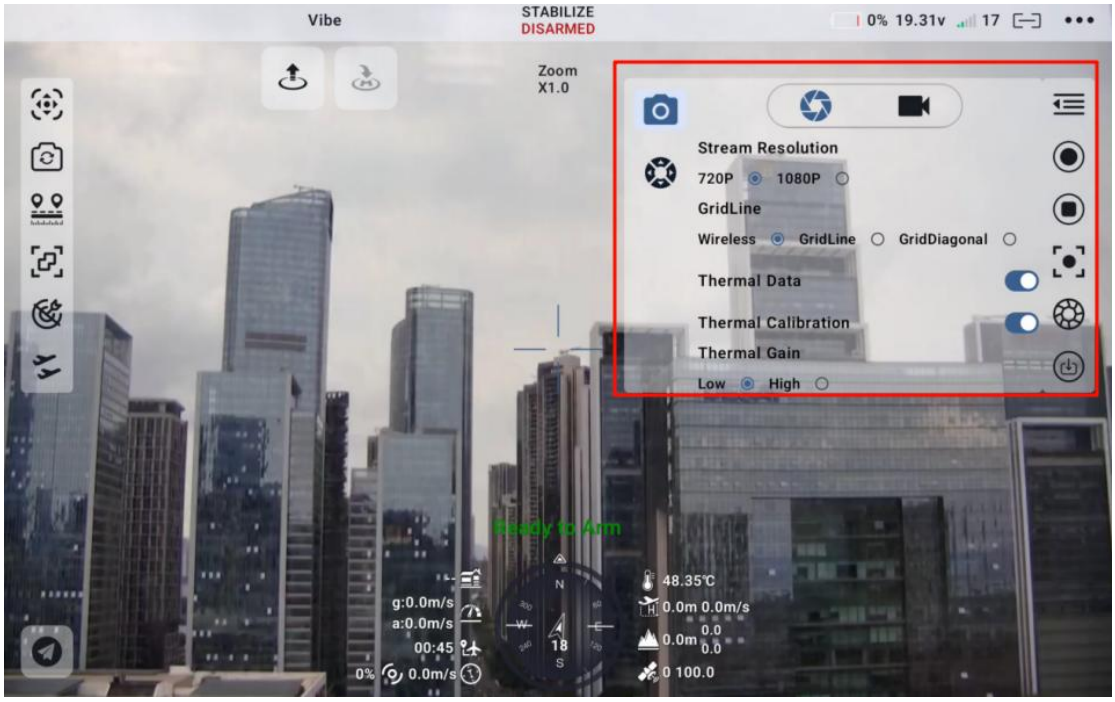


4.1.4.4 Global Temperature Measurement:

By clicking the Global Temperature Measurement button below the area temperature measurement box, you can measure the temperature across the entire display. The maximum and minimum temperatures within the selected range will be displayed. It supports setting over-temperature alarms and also allows spot temperature measurement by single-clicking. Click the "Cancel Measurement" button to disable the temperature measurement function.

4.1.5 Gimbal Camera Settings

Set the relevant parameters for the gimbal and camera.



4.1.5.1 Stream Resolution

Determine whether to switch the current video stream resolution based on the source. Supports HD (720p) and Ultra-HD (1080p) stream resolutions.

Auto Record on Startup: Enable/disable automatic video recording to the TF card upon startup.

4.1.5.2 Grid Lines

Overlay grid lines and diagonals on the camera screen for compositional assistance.

4.1.5.3 Thermal Imaging Raw Data

Some thermal imaging cameras support saving photos and outputting raw data (i.e., a complete 640x512 resolution temperature frame).

- Imaging Only: Only outputs thermal imaging video stream.
- With Raw Data: Saving a photo will also save the thermal imaging raw data.

4.1.5.4 Thermal Imaging Environmental Correction

- The thermal imaging camera's temperature measurement results are influenced by factors such as surrounding reflective temperatures, atmospheric temperature, target temperature, target emissivity, atmospheric transmittance, and target distance. To obtain accurate temperature measurements, environmental variable calibration is required for the thermal imaging camera.

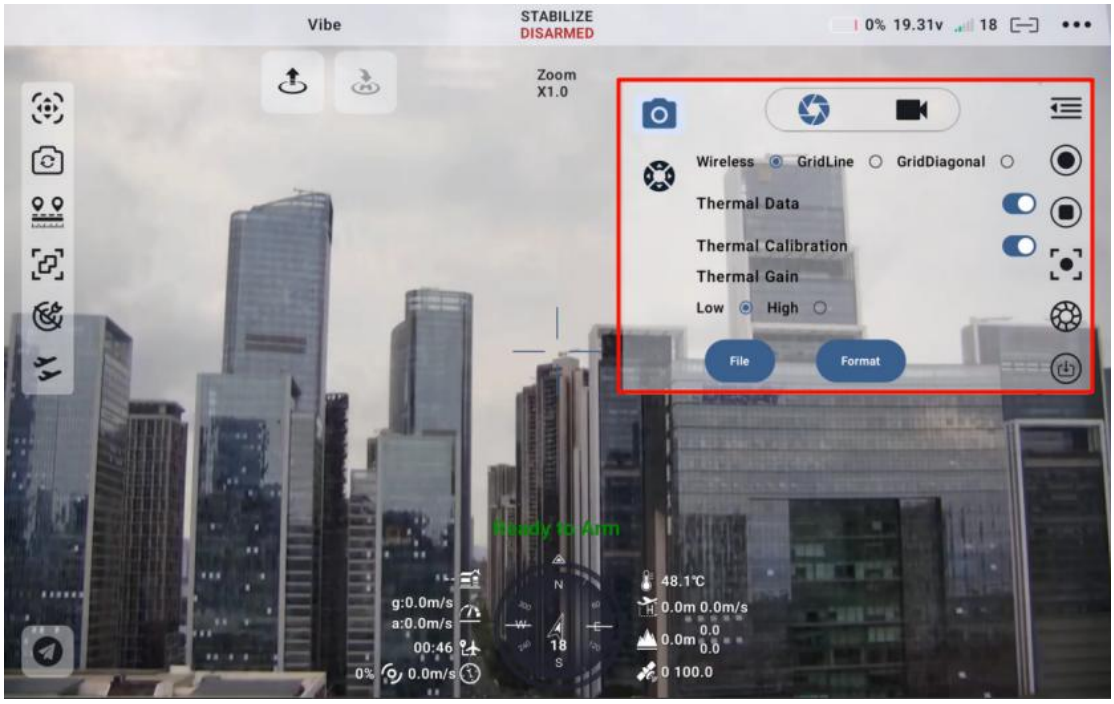
4.1.5.5 Thermal Imaging Gain:

The thermal imaging camera supports switching between high gain and low gain to meet different temperature measurement range requirements.

- High Gain Measurement Range: -20 ~ +150°C (±2°C)
- Low Gain Measurement Range: 0 ~ +550°C (±5°C)

4.1.5.6 File Management

Preview photos and videos stored on the TF card, and format the TF card.



- File: Click the file button to delete the storaged photos and videos, also can check or download the storaged photos.
- Format: Click the format button to format the TF card according to the prompt.

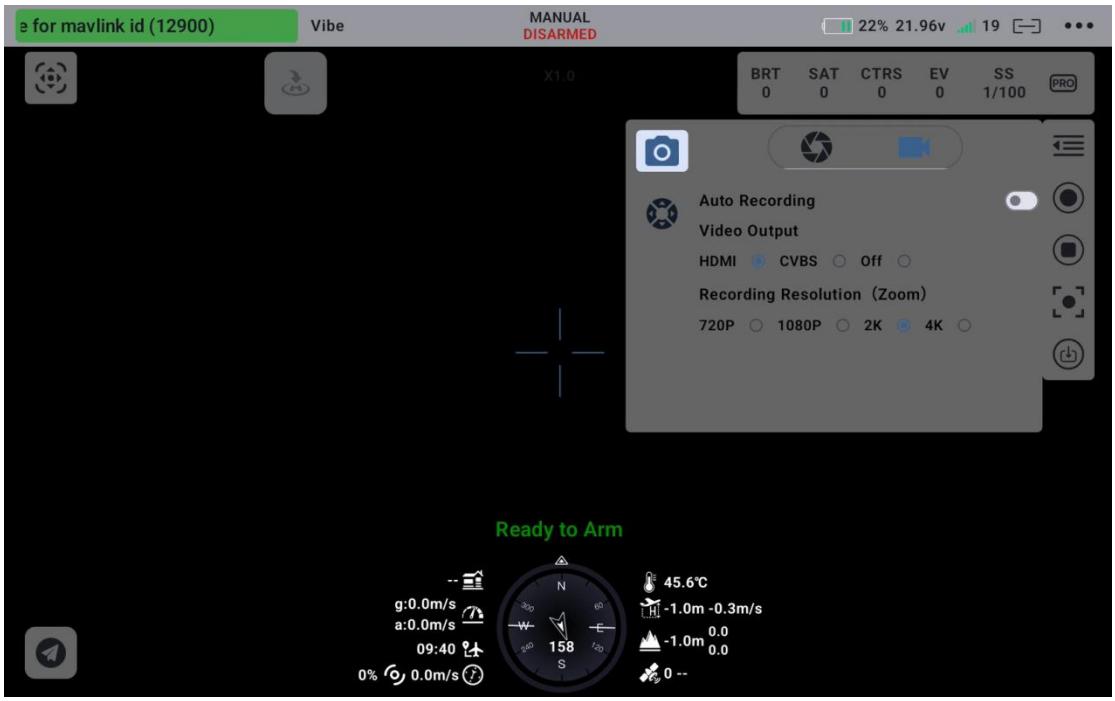
4.1.5.7 Video Recording Resolution

Switch the camera's recording resolution based on the current video source. Supports HD (720p), Ultra-HD (1080p), 2K, and 4K resolutions. (Supported switchable resolutions depend on the connected camera.)

4.1.5.8 Video Output Interface

Switch the video output interface of the camera.

- HDMI: Output video via the Micro-HDMI interface on the gimbal camera (only supported by ZT6, ZR30, A8 mini).
- CVBS: Output video via the CVBS pin on the gimbal camera's network port as an analog signal (only supported by ZT6, A8 mini).
- Off: Only output video via the gimbal camera's network port.



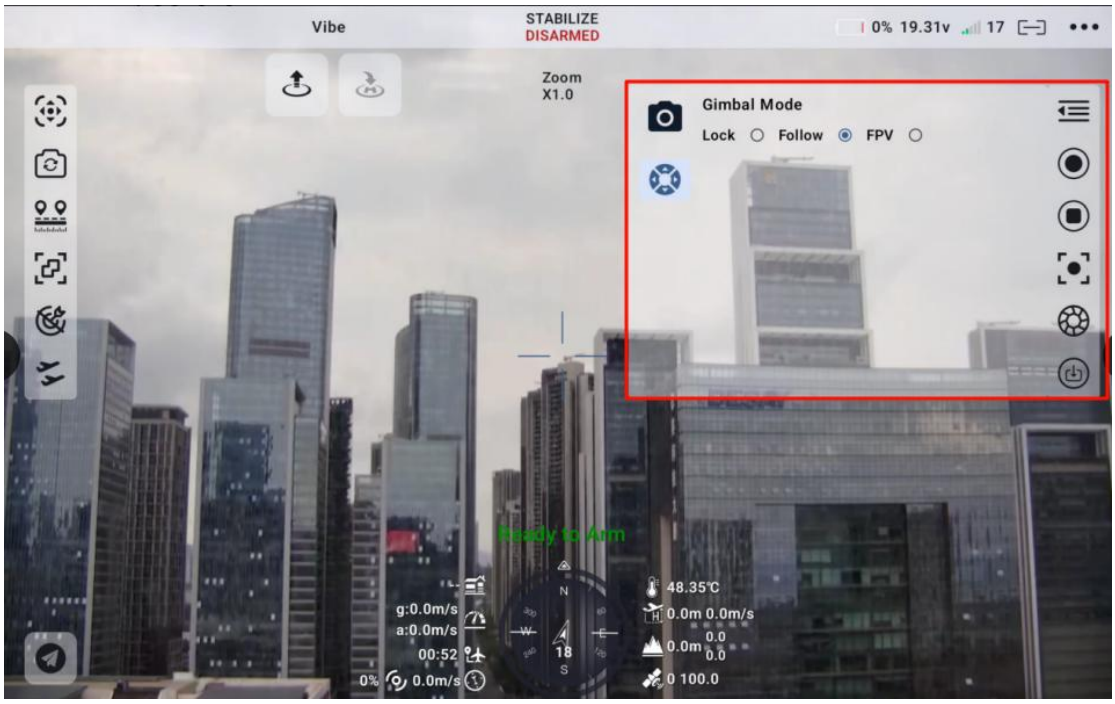
4.1.5.9 Gimbal Work Modes

Switch between different gimbal work modes:

- Lock Mode: The gimbal does not follow the drone's movement in the horizontal direction. It remains locked in place as the drone rotates.
- Follow Mode: The gimbal automatically follows the drone's

horizontal rotation, keeping the camera aligned with the flight direction.

- FPV Mode: The gimbal follows the drone's roll direction, providing a first-person view with enhanced stabilization for a smooth flying experience.
- AI Tracking Mode: When the gimbal camera is connected to the AI tracking module and the feature is activated, the system will operate exclusively in AI tracking mode.

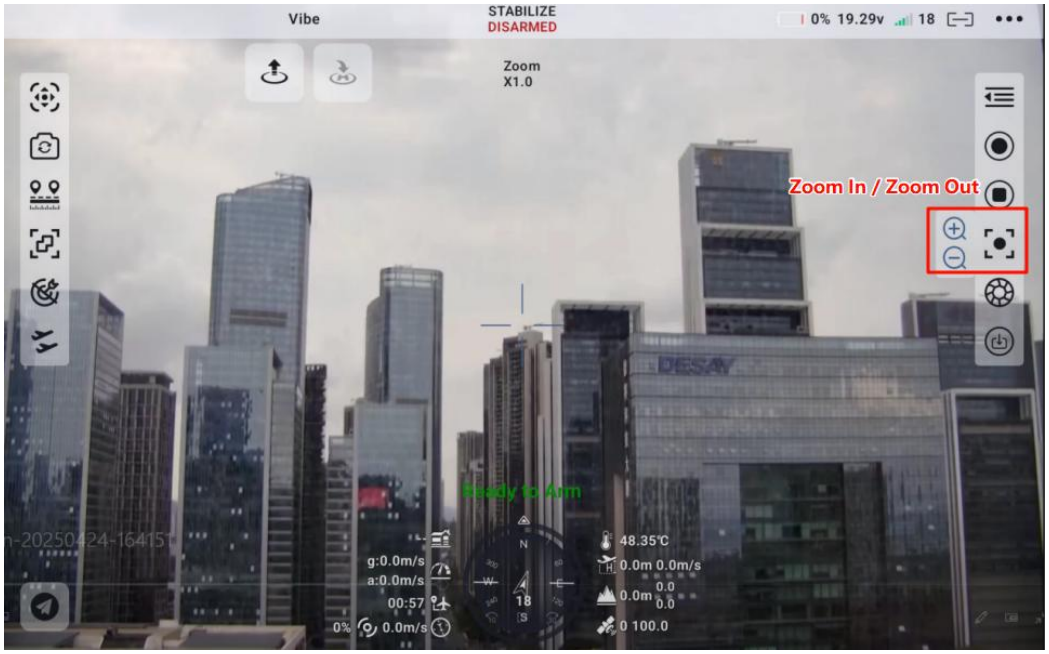


4.1.6 Camera Control

4.1.6.1 Camera Zoom

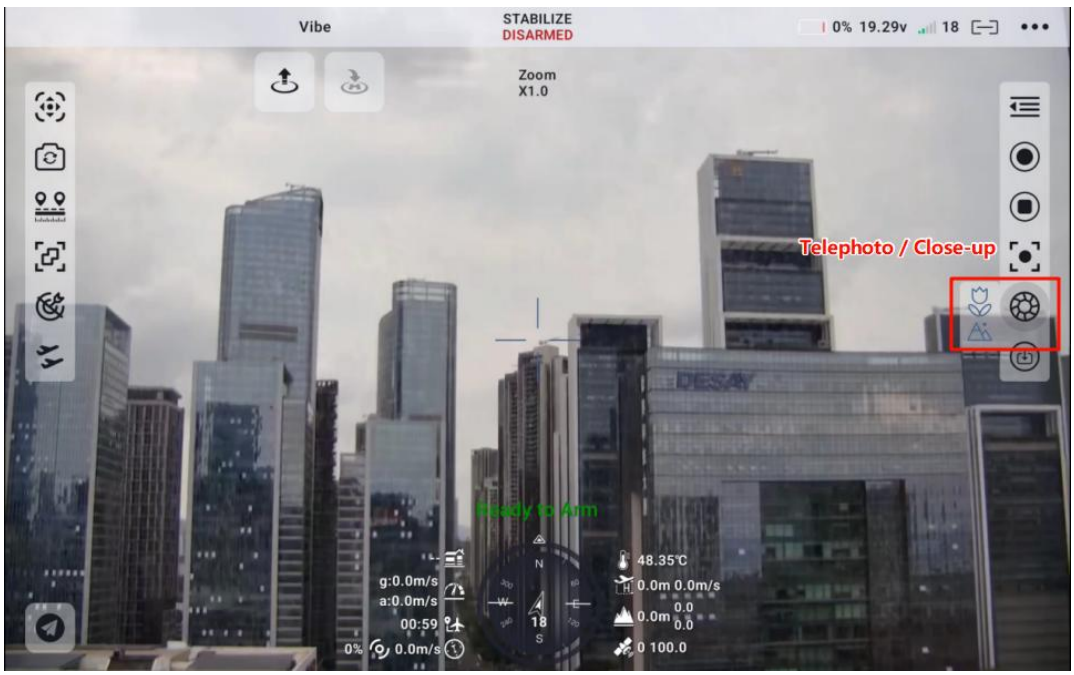
Control the zoom camera to zoom in and out. A single click corresponds to a one-time operation, while a long press corresponds to a continuous

operation.



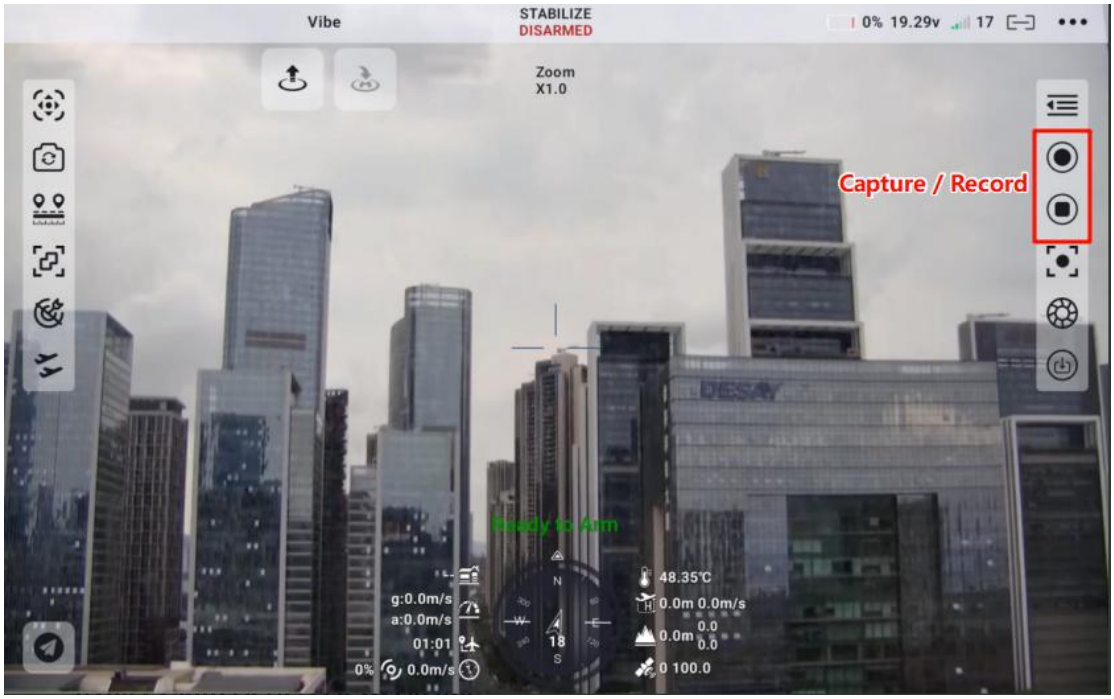
4.1.6.2 Manual Focus

Manually adjust the focus of the camera. A single click corresponds to a one-time operation, while a long press corresponds to a continuous operation.



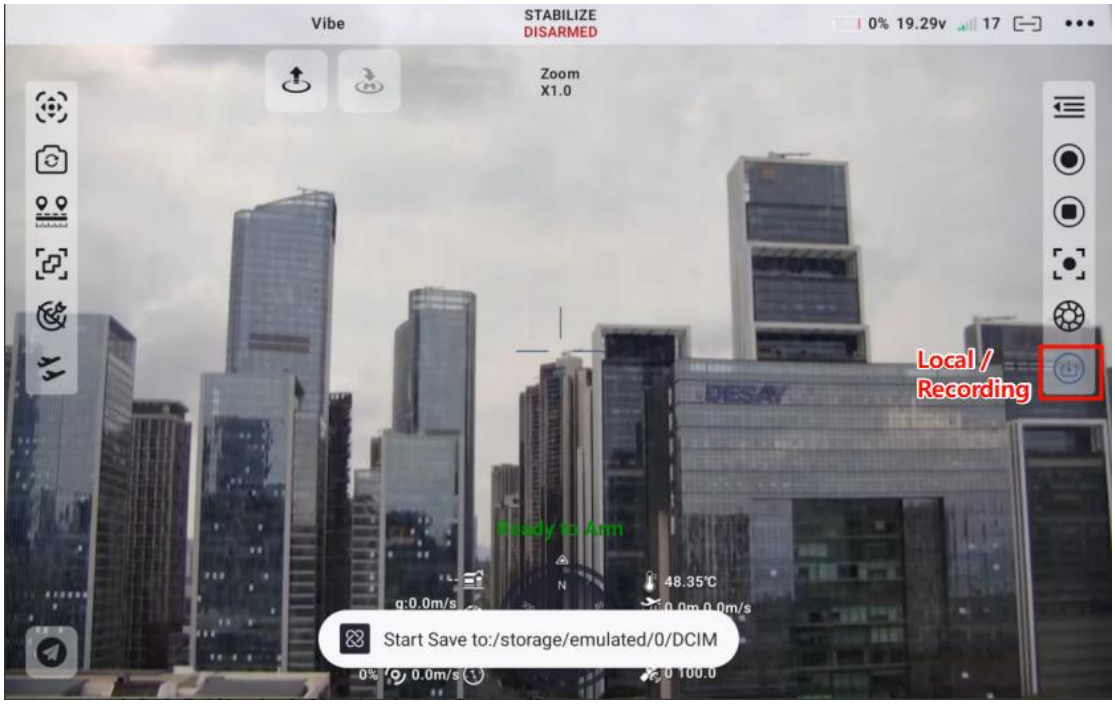
4.1.6.3 Photo and Video Recording

Control the camera to take photos and start or stop video recording. A single click on the photo button captures a photo, and a success message will appear on the screen. When the video button is square, click it to start recording, and the button will turn into a red circle. At this point, the recording time and resolution will appear in the top title bar. Clicking the button again will stop the recording, and the recording time and resolution will disappear from the title bar.



4.1.6.4 Camera Screen Recording

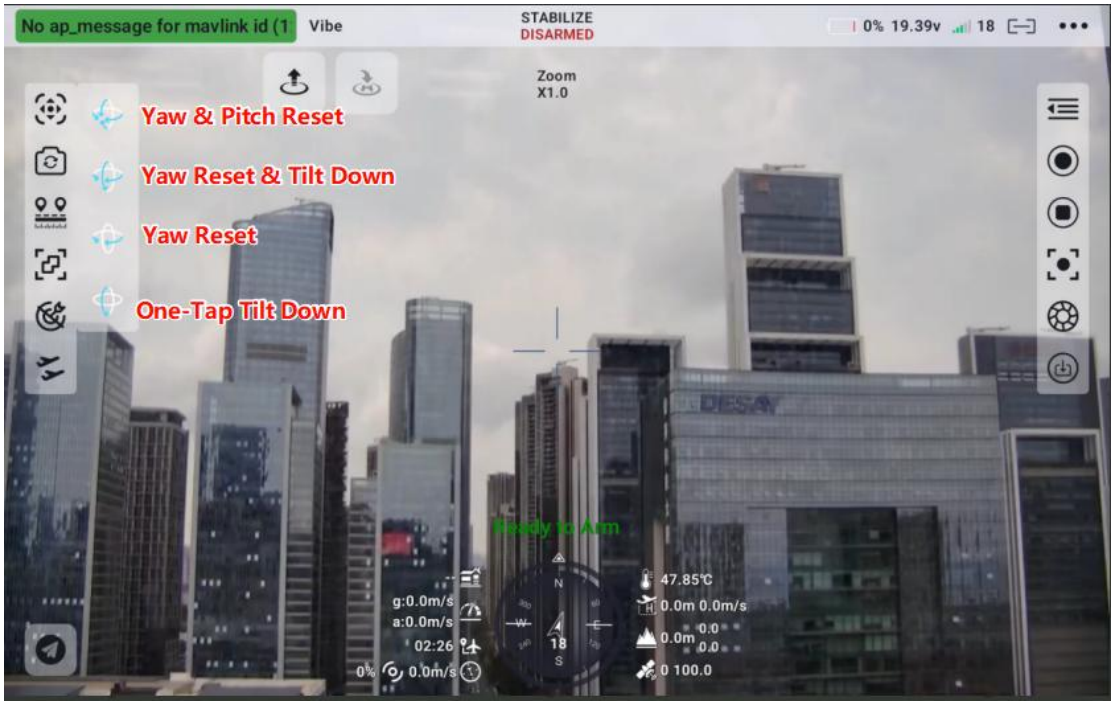
Record the camera screen on the remote controller and save it locally. Click the local recording button, which will highlight to indicate that recording has started, and a reminder will appear to confirm the save location. Clicking the button again will stop the recording.



4.1.6.5 Gimbal Centering / Lens Down

Center the gimbal's single-axis and multi-axis, and perform one-touch lens down when the gimbal is mounted upright.

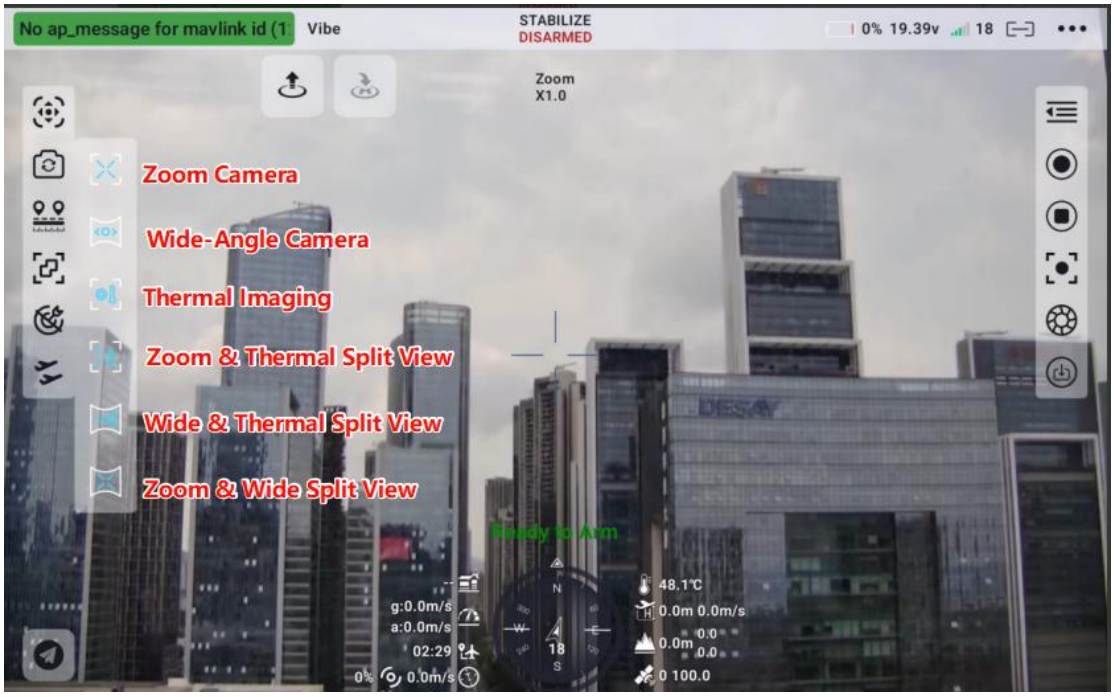
- Clicking the yaw and pitch centering button will automatically center the yaw and pitch axes.
- Clicking the yaw centering and one-touch lens down button will automatically center the yaw axis and tilt the pitch axis down.
- Clicking the yaw centering button will automatically center the yaw axis.
- Clicking the one-touch lens down button will automatically center the pitch axis.



4.1.6.6 Lens Switching

Taking the ZT30 as an example, the ZT30 supports zoom, wide-angle, thermal infrared, zoom wide-angle dual-display, zoom thermal imaging dual-display, and wide-angle thermal imaging dual-display. Other cameras will vary based on actual conditions.

- Clicking the zoom button will switch the display to the zoom lens view.
- Clicking the wide-angle button will switch the display to the wide-angle lens view.
- Clicking the thermal imaging button will switch the display to the thermal imaging lens view.
- Clicking the zoom thermal imaging dual-display button will switch the display to show both zoom and thermal imaging lenses.
- Clicking the wide-angle thermal imaging dual-display button will switch the display to show both wide-angle and thermal imaging lenses.
- Clicking the zoom wide-angle dual-display button will switch the display to show both zoom and wide-angle lenses.



4.1.6.7 Thermal Imaging Pseudocolor:

Switching between different thermal imaging colors to meet the needs of various scenarios.

1. White Hot

- **Characteristics:** High-temperature areas appear white, low-temperature areas appear black, with a grayscale transition in between.
- **Application Scenarios：**
    - **General Inspection:** Default mode, suitable for most industrial inspection scenarios (such as temperature detection of electrical equipment and mechanical components).
    - **Security Surveillance:** Nighttime personnel or animal

detection, with strong human eye adaptability, making it ideal for long-term observation.

  - **Building Thermal Bridge Detection:** Quickly identifies insulation defects or heat leakage spots through high contrast.

- **Advantage:** High contrast, visually intuitive, and not prone to fatigue.

2. Golden

- **Features:** Primarily golden tones, with high-temperature areas in bright gold and low-temperature areas in deep brown.
- **Application Scenarios:**
  - **Low-light Environment Observation:** Such as nighttime military or law enforcement operations, offering better concealment than rainbow colors and reducing visual stimulation.
  - **Industrial Equipment Monitoring:** Temperature analysis of metal surfaces, with a soft color tone that is suitable for extended use.
- **Advantages:** Soft tones that reduce visual fatigue and meet concealment needs.

3. Iron/Red Hot

- **Features:** Deep blue (low temperature) → red → white (high

temperature), with strong contrast.

- **Application Scenarios:**
    - **High-temperature Industrial Inspection:** Metallurgy, welding, boilers, etc., highlighting high-temperature danger zones.
    - **Electrical Equipment Hotspot Detection:** Temperature anomaly detection in areas such as transformers and cable joints.
- **Advantages:** High-temperature areas are prominent, making it suitable for quickly locating thermal faults.

4. Low Light/Night Vision

- **Features:** Primarily green tones, similar to night vision displays, with low temperatures in dark green and high temperatures in bright green/yellow.
- **Application Scenarios:**
    - **Nighttime Military/Security:** Compatible with night vision equipment, reducing glare interference.
    - **Wildlife Observation:** Minimizes disturbance to animals in low-light environments.
    - **Industrial Low-Light Inspection:** Such as monitoring equipment in mines or factories at night.
- **Advantages:** Adapts to dark environments and protects human eye

dark vision.

5. Arctic

- **Features:** Cool tones (deep blue → cyan → white), highlighting low-temperature areas.
- **Application Scenarios:**
  - **Refrigeration System Inspection:** Locating low-temperature leak points in air conditioning pipelines and cold chain logistics.
  - **Polar Scientific Research:** Analyzing temperature distribution of ice layers or snow in low-temperature environments.
- **Advantages:** Optimizes visualization of low-temperature ranges, enhancing the recognition of low-temperature details.

6. Red Hot

- **Features:** Predominantly red tones, with high temperatures displayed in bright red/white and low temperatures in dark red/black.
- **Application Scenarios:**
  - **Firefighting and Rescue:** Monitoring temperature distribution in fire scenes, quickly locating the core of the flames.
  - **Industrial High-Temperature Processing:** Monitoring

processes such as furnaces or glass manufacturing.

- **Advantages:** High-temperature targets are highly visible, making it suitable for quick responses in hazardous environments.

7. Medical

- **Features:** High-contrast rainbow color palette, optimized for human body temperature range (30°C–42°C).
- **Application Scenarios:**
  - Body temperature screening: Rapid identification of individuals with fever.
  - Medical diagnostics: Detection of inflamed areas and analysis of blood circulation.
- **Advantages:** Fine-tuned display for human body temperature, enhancing sensitivity to subtle temperature differences.

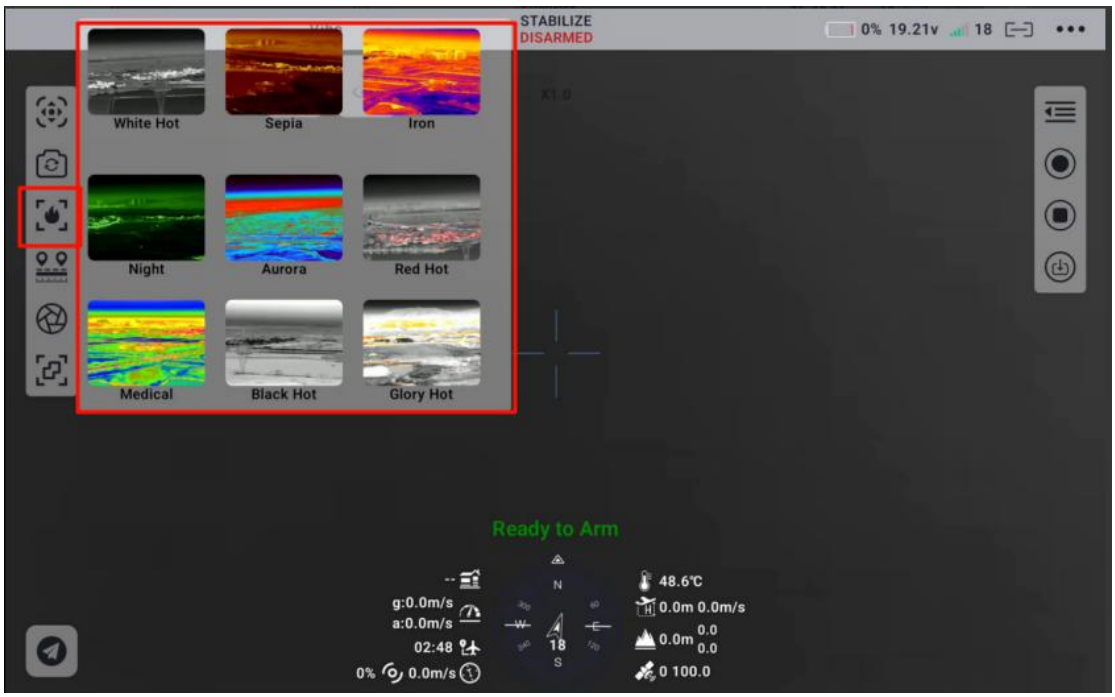
8. Black Hot

- **Features:** High-contrast rainbow colors, optimized for the human body temperature range (30°C–42°C).
- **Application Scenarios:**
  - **Temperature Screening:** Rapid identification of feverish patients.
  - **Medical Diagnosis:** Detection of inflammation areas and blood circulation analysis.
- **Advantages:** Refined display of body temperature, enhancing

sensitivity to small temperature differences.

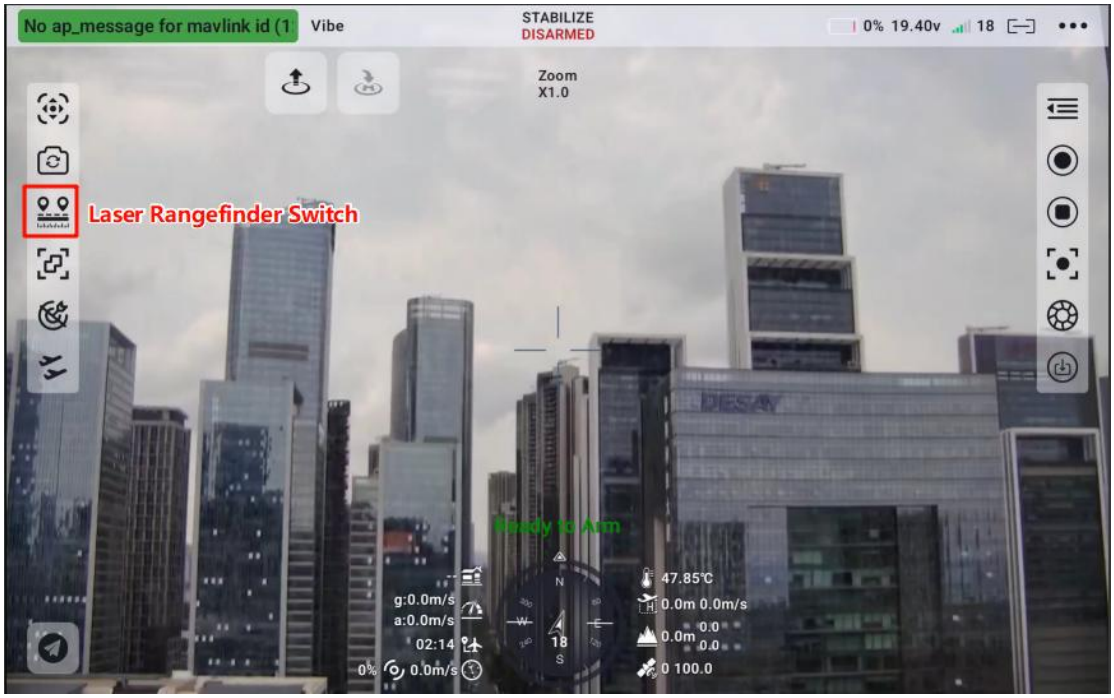
9. Gold/Red Fusion

- **Features:** A blend of gold and red, with high-temperature areas in golden red and low-temperature areas in deep blue.
- **Application Scenarios:**
    - **High-temperature Industrial Inspection:** Such as steelmaking and glass manufacturing, offering both high contrast and aesthetic appeal.
    - **Scientific Experiments:** Visualization of high-temperature chemical reactions or material phase transitions.
- **Advantages:** Dynamic color transitions enhance the ability to analyze complex scenarios.



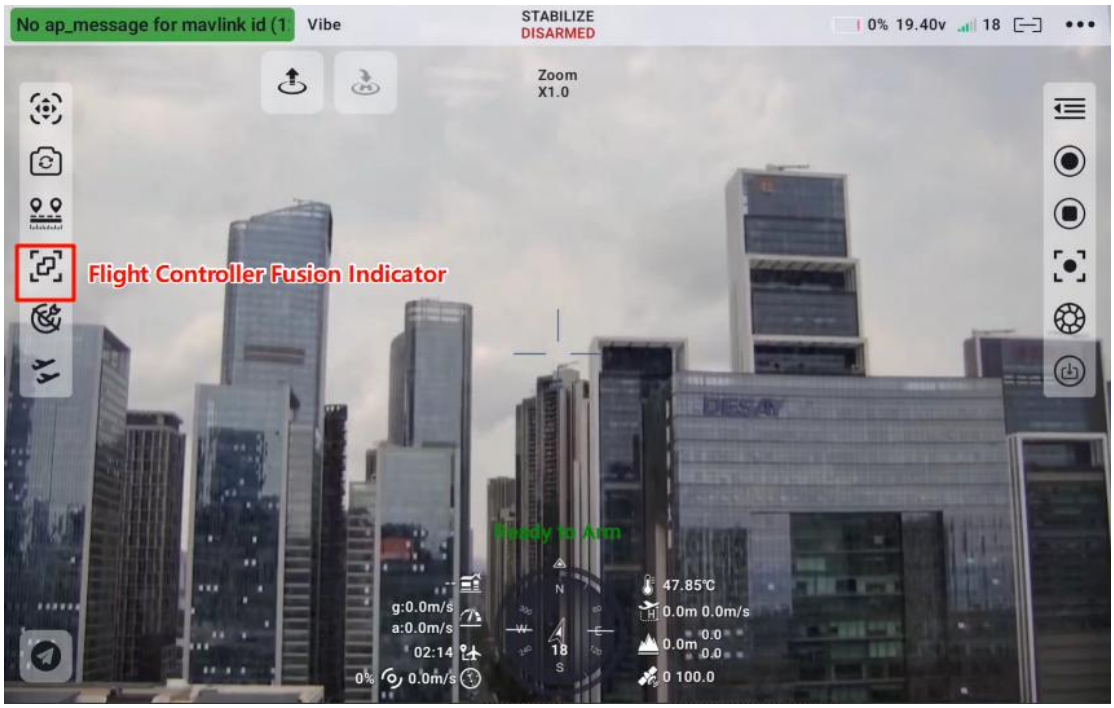
4.1.6.8 Range Finder Switch

Turn the laser rangefinding function on or off by clicking the range finder switch. When activated, the button changes color. Point the lens center at the desired measurement location, and the distance from the lens to the target will be displayed on the screen. Click the color-changing button again to turn off the rangefinding function.

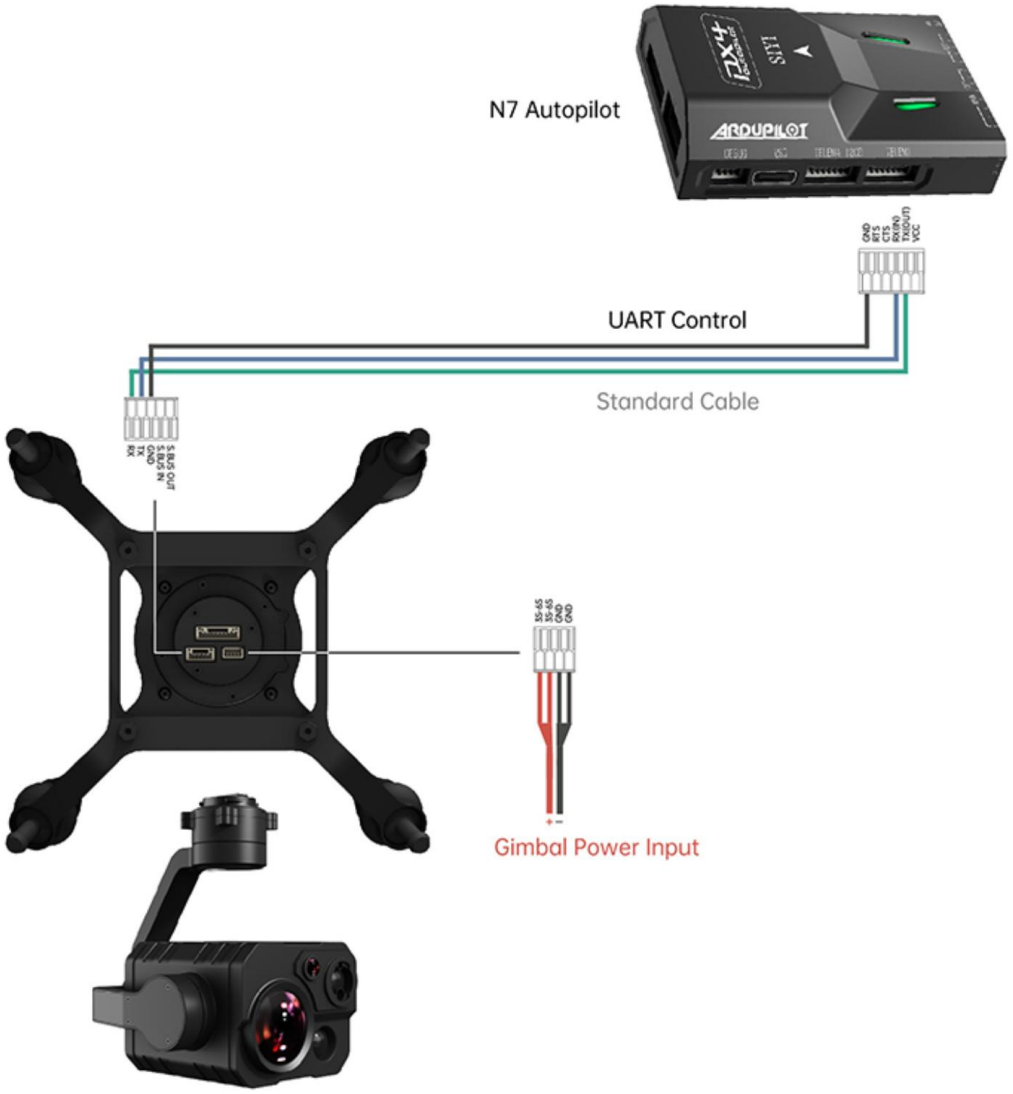


4.1.6.9 Flight Control Fusion Indicator

This indicator appears when the gimbal is fused with the flight control system. The integration of flight control attitude data enhances the gimbal's performance during the aircraft's high-maneuverability flight states.



Through the UART serial port, the SIYI gimbal camera (electro-optical pod) can be controlled by the ArduPilot driver and fused with the flight control attitude data. The SIYI gimbal camera (electro-optical pod). UART serial port can be directly connected to the ArduPilot flight control serial port for communication with the flight control system, allowing the ArduPilot commands to control the gimbal's attitude and camera functions.



Preparation Work

Before use, it is necessary to prepare the following tools, firmware, and software:

- ArduPilot flight controller (firmware version 4.4.4 or above)
- SIYI optical pod (gimbal camera)

Note:

The above products can be purchased from SIYI Technology and its authorized distributors.

- SIYI gimbal to PX4 / ArduPilot flight controller UART connection cable

Note:

The above tools are included as standard accessories with the product packaging.

- UniGCS Android or UniGCS PC

Usage Steps:

1. Power up both the SIYI gimbal and ArduPilot flight controller separately.
2. Connect the gimbal serial port to the ArduPilot flight controller serial port to establish communication between the devices.
3. Run the ground station software and set the following parameters:

   Gimbal Camera Control

   Taking the use of the TELEM 2 interface and Camera 1 control with the flight controller as an example:

- Set SERIAL2_PROTOCOL to 8 ("SToRM32 Gimbal Serial")
- Set SERIAL2_BAUD to 115 (115200 baud rate)
- Set MNT1_TYPE to 8 ("SIYI") and reboot the flight controller
- Set MNT1_PITCH_MIN to -90

- Set MNT1_PITCH_MAX to 25
- Set MNT1_YAW_MIN to -160
- Set MNT1_YAW_MAX to 160
- Set MNT1_RC_RATE to 90 (deg/s) to control the gimbal speed when using the remote control
- Set CAM1_TYPE to 4 ("Mount / SIYI") to enable camera control
- Set RC6_OPTION to 213 ("Mount Pitch") to control the gimbal pitch via channel 6
- Set RC7_OPTION to 214 ("Mount Yaw") to control the gimbal yaw via channel 7
- Set RC8_OPTION to 163 ("Mount Lock") to switch between "Lock" and "Follow" modes via channel 8

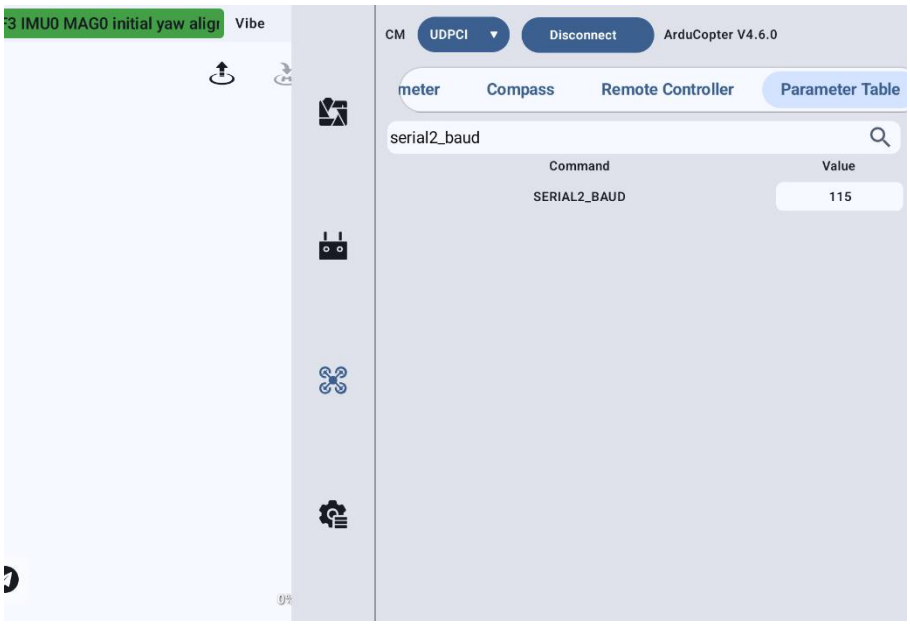
The following auxiliary functions are also available:

- Set RC9_OPTION to 166 ("Camera Record Video") to start or stop video recording
- Set RC9_OPTION to 167 ("Camera Zoom") to control zoom
- Set RC9_OPTION to 168 ("Camera Manual Focus") to manually focus
- Set RC9_OPTION to 169 ("Camera Auto Focus") to automatically focus

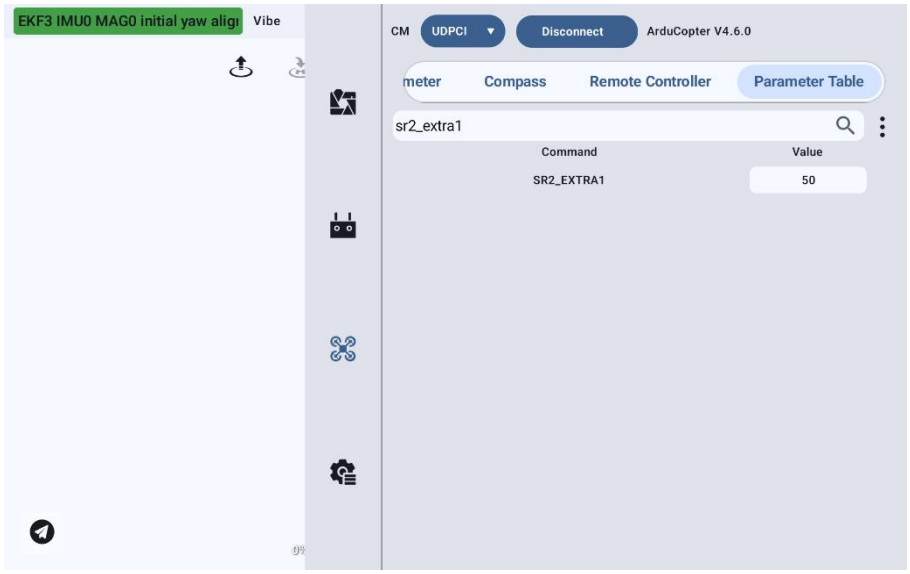
Fusion with Flight Controller Attitude Data

Using the TELEM 2 interface of the flight controller as an example:

- Set SERIAL2_BAUD to 115 (i.e., 115200 baud rate)



- Set SR2_EXTRA1 to 50 (the rate at which the flight controller sends attitude data via MAVLink)



After completing the settings, write the parameters and reboot the flight controller for the changes to take effect.

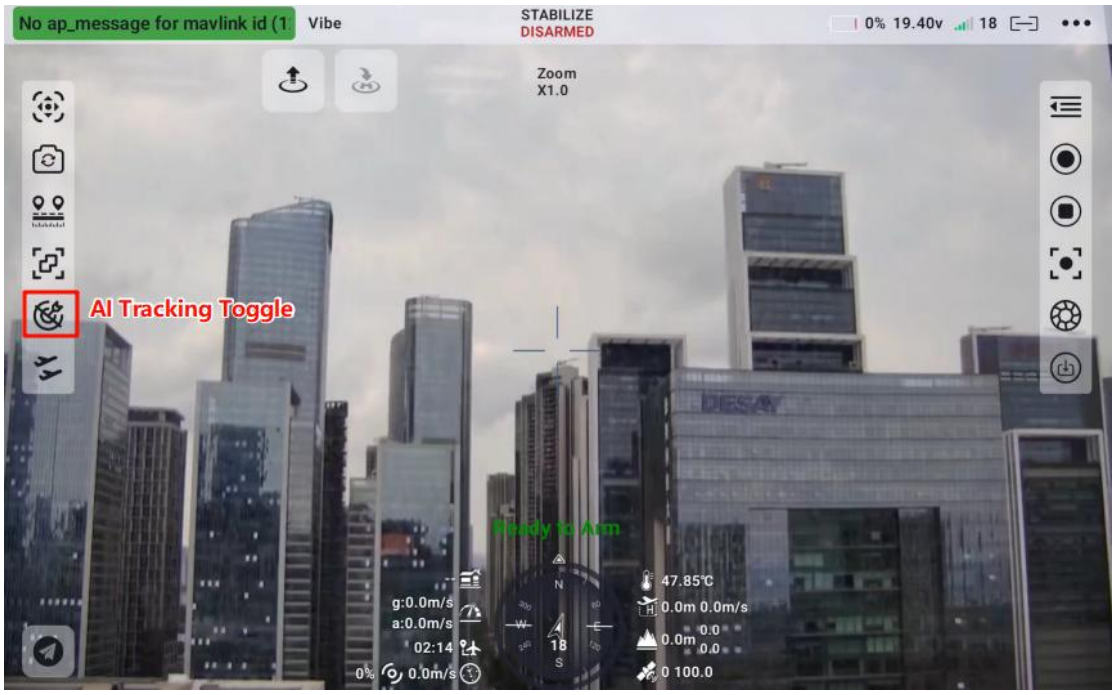
Note:

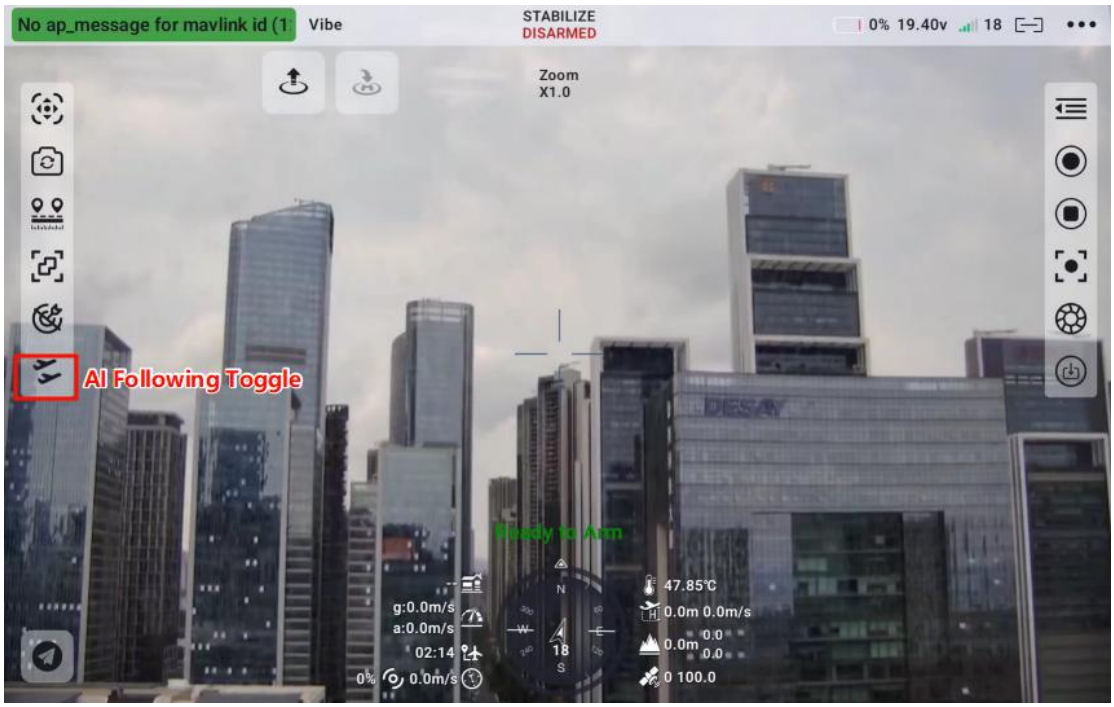
Fusing flight controller attitude data can enhance gimbal performance during aggressive or high-dynamic maneuvers.

4.1.6.10 AI Tracking

The SIYI gimbal camera (optical pod) connects to the SIYI link via the SIYI AI tracking module to enable AI recognition, tracking, and follow-me functions.

Clicking the button will activate the feature with a highlighted prompt; clicking it again will disable the function.





The SIYI optical pod (gimbal camera) can be connected to the airborne unit via the SIYI AI tracking module. When the airborne unit is in communication with the ground station, this application enables AI recognition, tracking, and follow-me functionality.

Before use, it is necessary to prepare the following tools, firmware, and software:

- SIYI link product (for use with SIYI gimbal cameras, the UniRC7 series, MK32 standard kit, HM30, or MK15 industrial standard kit are recommended)
- SIYI optical pod (gimbal camera)
- Flight controller
- SIYI AI tracking module

Note:

The above products can be purchased from SIYI Technology and its authorized distributors.

- SIYI AI tracking module to SIYI link Ethernet communication cable
- SIYI AI tracking module to SIYI gimbal Ethernet communication cable
- SIYI gimbal to PX4 / ArduPilot flight controller UART connection cable

Note:

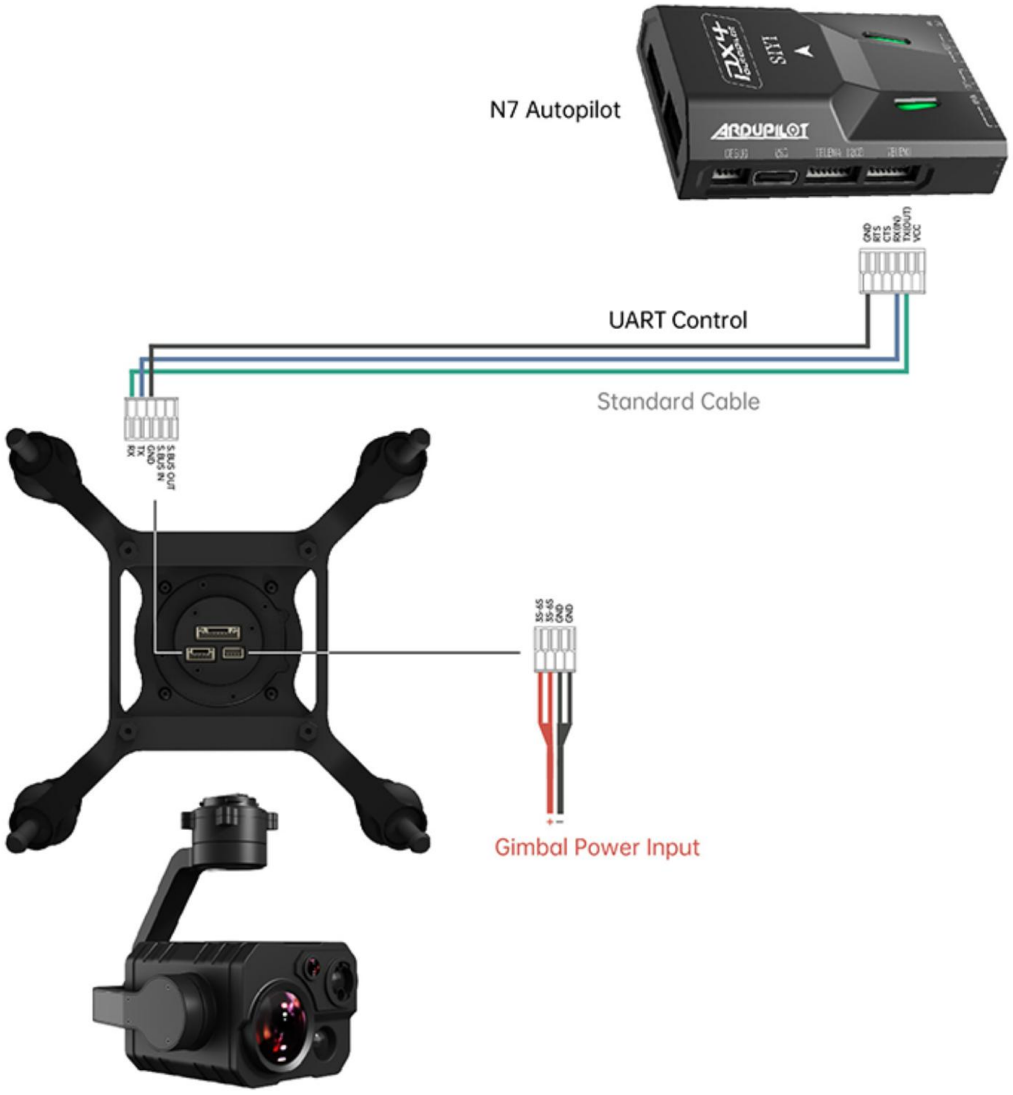
The above tools are included as standard accessories with the product shipment.

Setup Steps

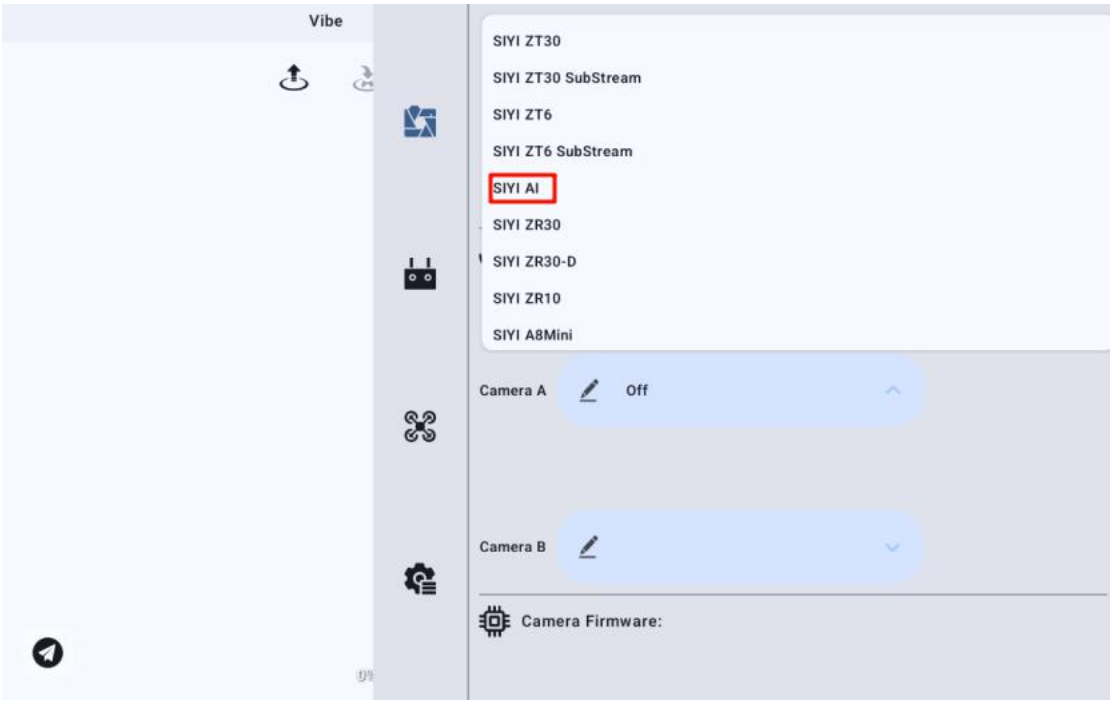
1. Ensure that the gimbal camera firmware has been upgraded to a version that supports the SIYI AI tracking module's follow-me functionality.
2. Ensure that this application has been upgraded to a version that supports the SIYI AI tracking module's follow-me functionality.

3. Refer to the diagram below to connect the SIYI AI tracking module to the SIYI gimbal camera (optical pod) and the SIYI link.

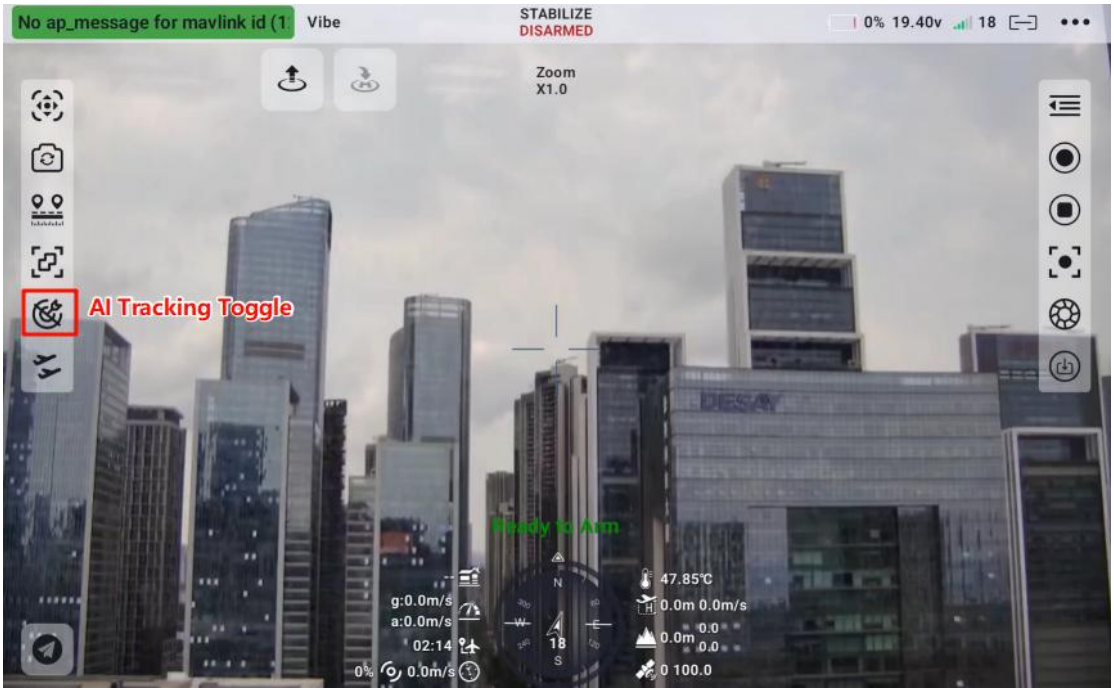
4. Refer to the diagram below to connect the SIYI gimbal camera (optical pod) to the flight controller and fuse flight controller attitude data.



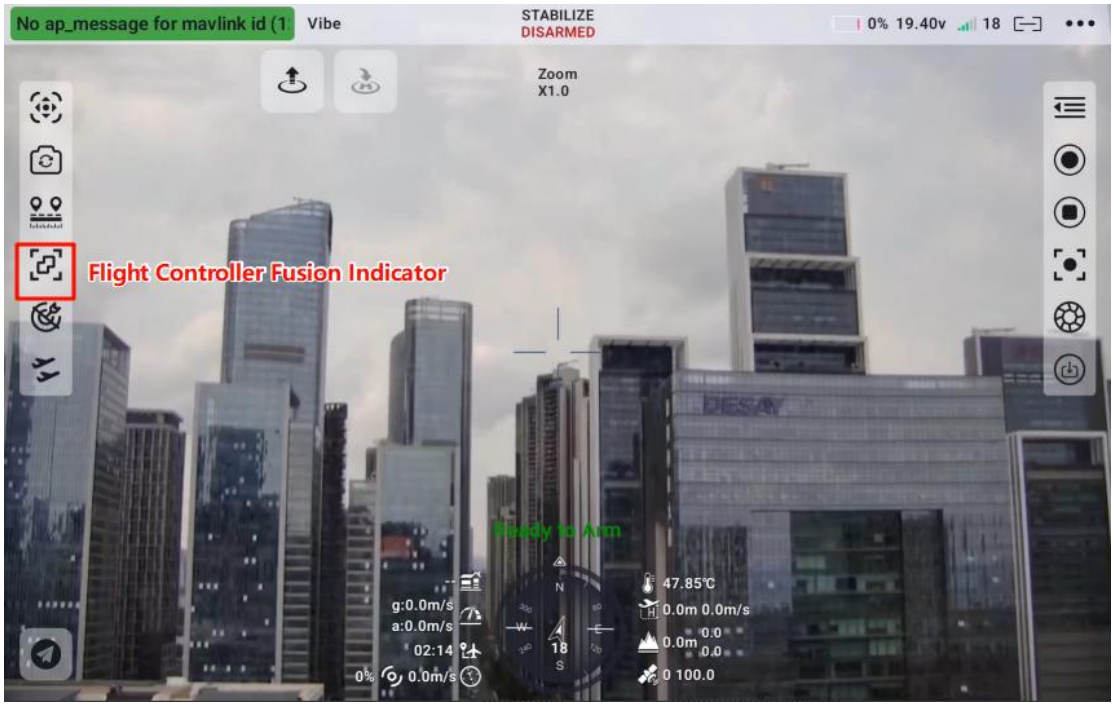
5. Run the application, go to "Address Settings," and select "SIYI AI."



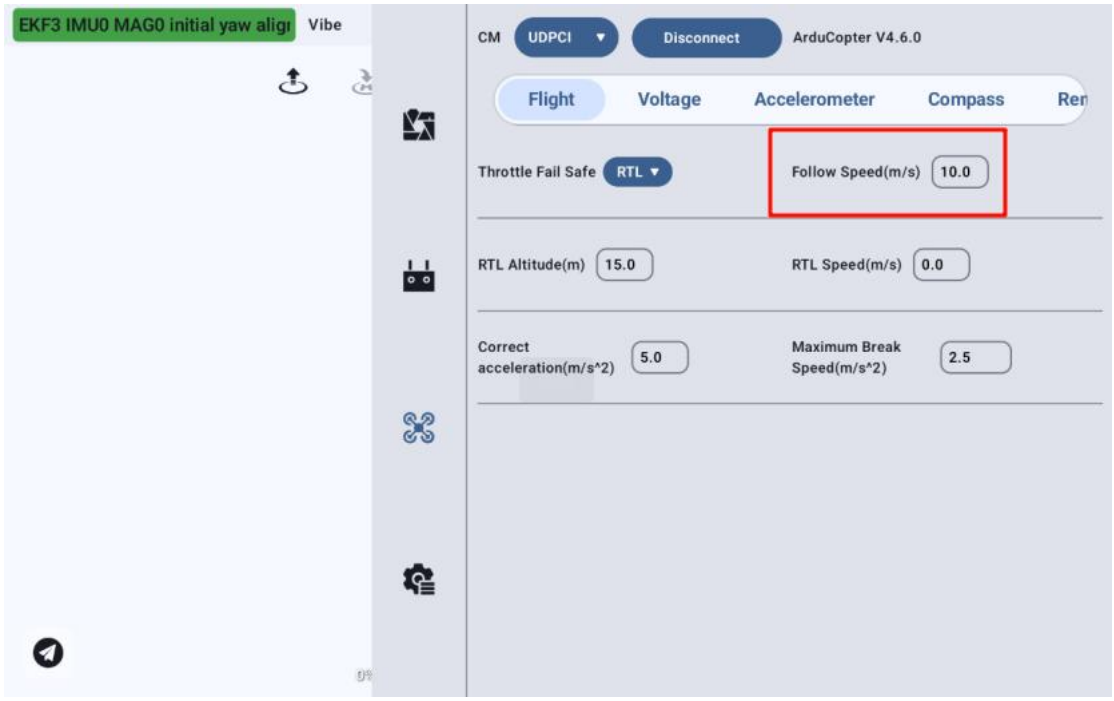
6. Return to the main screen and click the AI tracking recognition button to activate the feature.



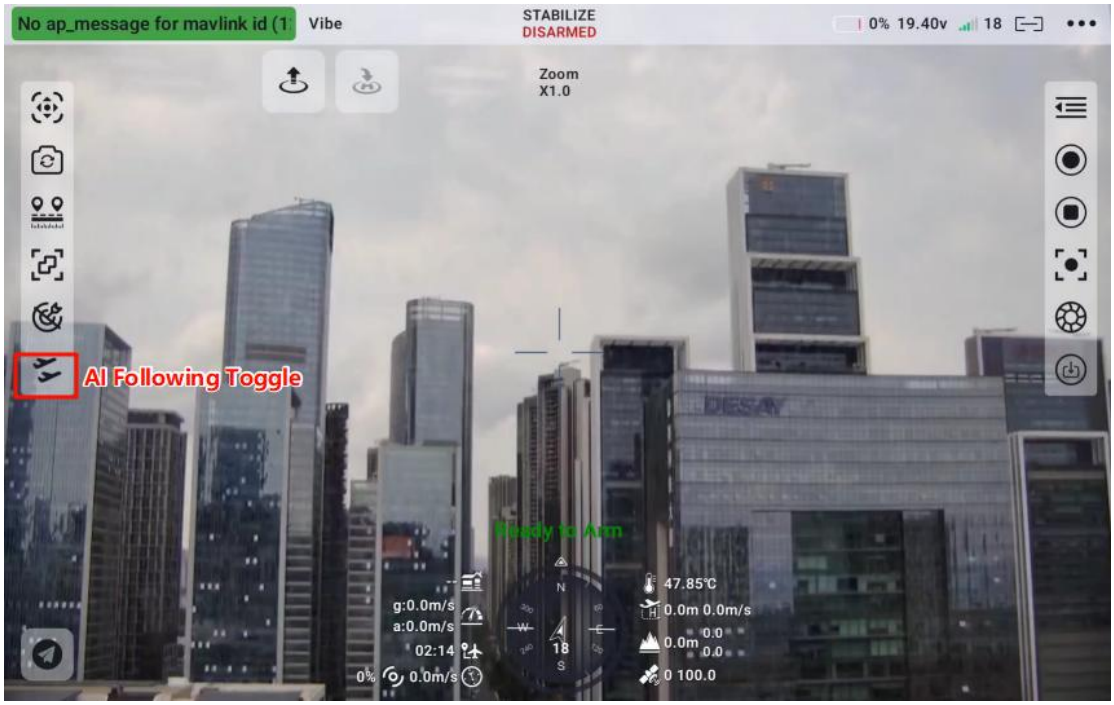
7. Check if the flight controller fusion indicator appears (indicating that the flight controller attitude data fusion is functioning properly).



8. Switch the flight controller mode to "Guided Mode" and set the follow-me speed.



9. Click the AI tracking/follow-me function button again to disable the corresponding feature.



Danger

For flight safety, it is recommended to use the AI follow-me function in conjunction with the obstacle avoidance function.

When the AI follow-me function is activated, the operator will not be able to manually control the flight, and the ground station will be unable to control the aircraft using Guided Mode. Switching the flight controller flight mode will restore manual control.

When the AI follow-me function is activated, ensure that the flight path is clear of obstacles and the visibility is unobstructed. Always pay attention to flight safety. If an obstacle is encountered, immediately take manual

control of the flight and re-plan the flight path.

If the tracking target is lost, the aircraft will hover.

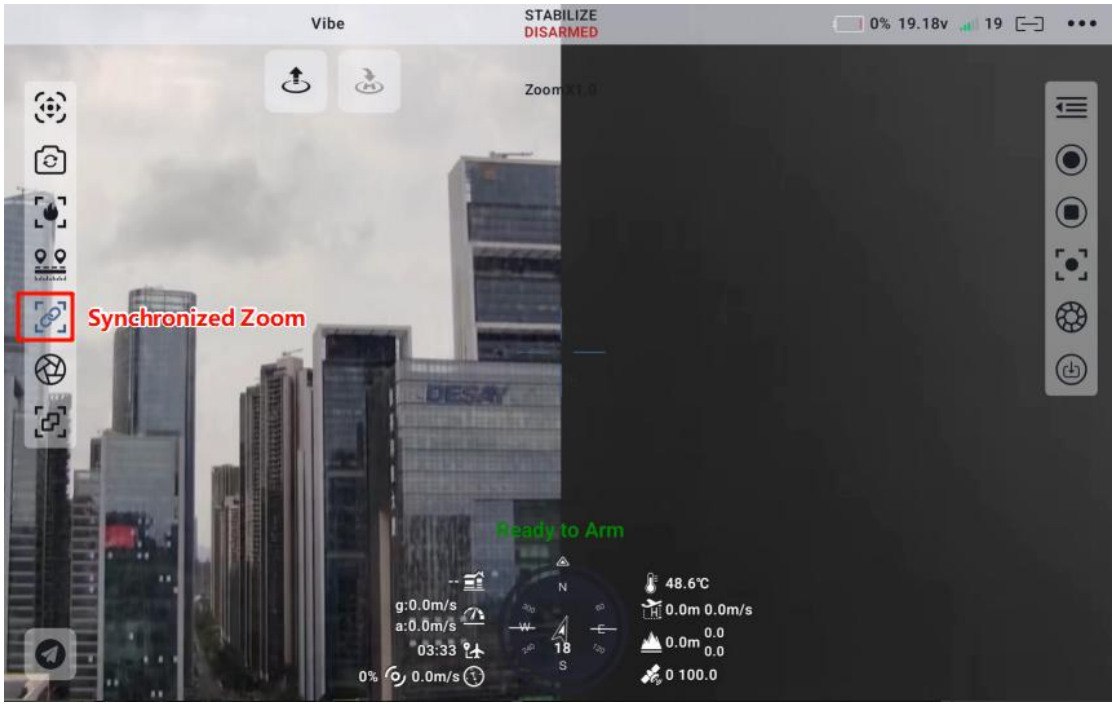
Note:

When the SIYI AI tracking module is used with a multi-sensor pod, the main video stream of the pod must be set to "Zoom Camera" in this application.

If the tracked object is higher than the multirotor UAV in the horizontal plane, the follow-me function will not be effective. The best performance of the follow-me function occurs when the tracked object and the multirotor UAV are on the same horizontal plane.

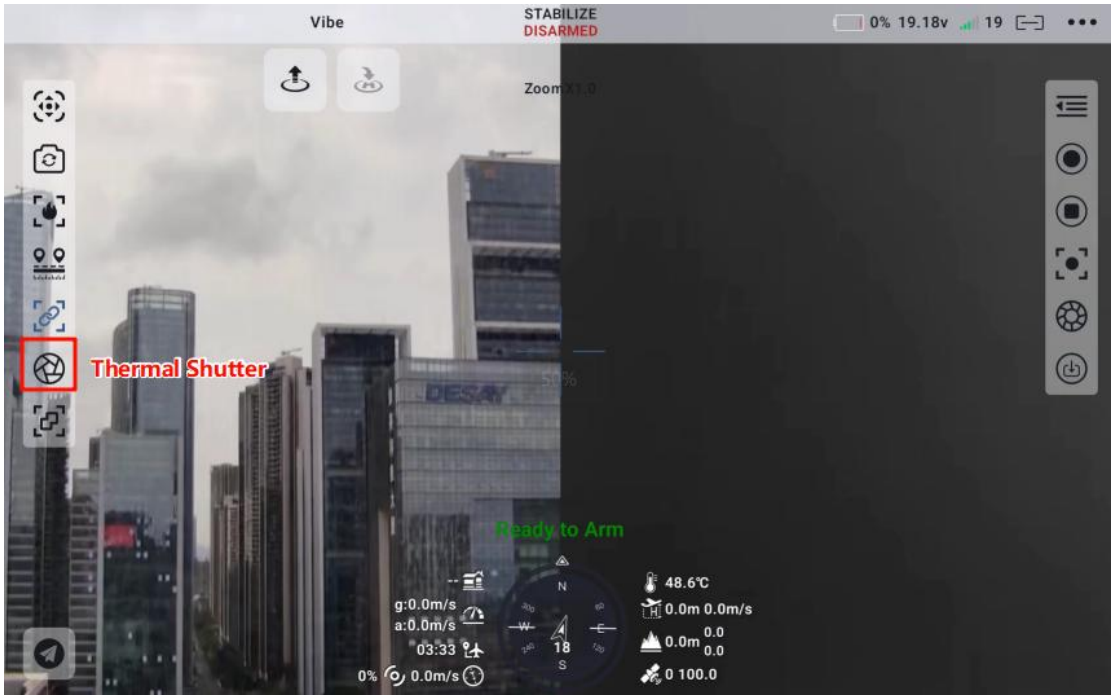
4.1.6.11 Synchronized Zoom

Taking the ZT30 as an example, when the ZT30 switches the lens to display a dual-image view of zoom and thermal imaging, the synchronized zoom function can be activated. Click the button to enable this feature, and the button will highlight. The zoom function can be controlled through the zoom button to scale the thermal imaging view. Click the button again to disable the feature.



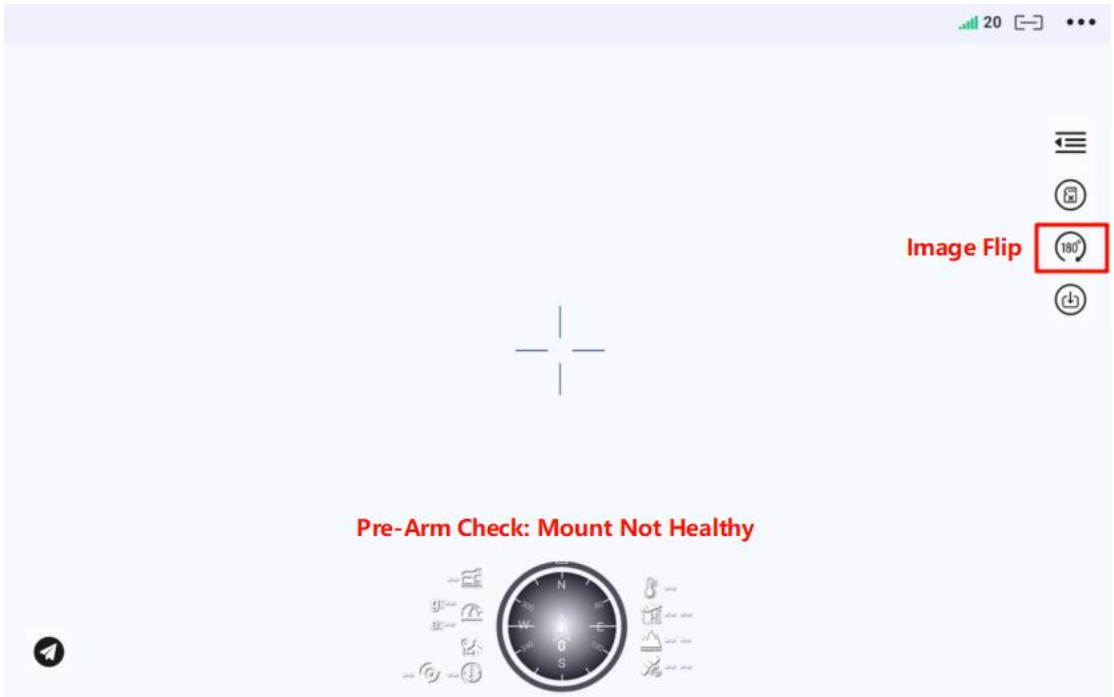
4.1.6.12 Thermal Imaging Shutter

This function is mainly used for calibration and maintaining temperature measurement accuracy. Each click triggers the thermal imaging shutter once.



4.1.6.13 Image Flip

When using the A2mini, R1M or third-party cameras, the image can be rotated 180° horizontally. An icon will appear on the right side to indicate this feature.



Note:

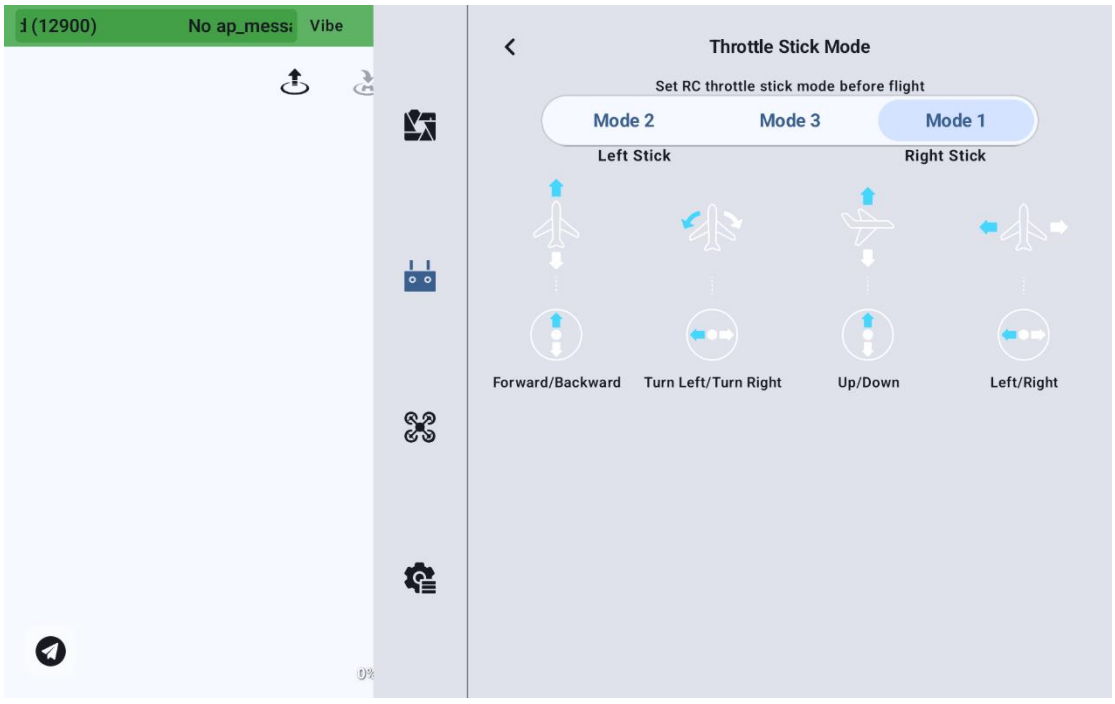
UniGCS V1.1.11 and above version supports camera grid lines and flip function.

4.2 Remote Controller Module

Compatible with the SIYI series remote controllers, this module allows users to configure various controller functions.

4.2.1 Stick Mode

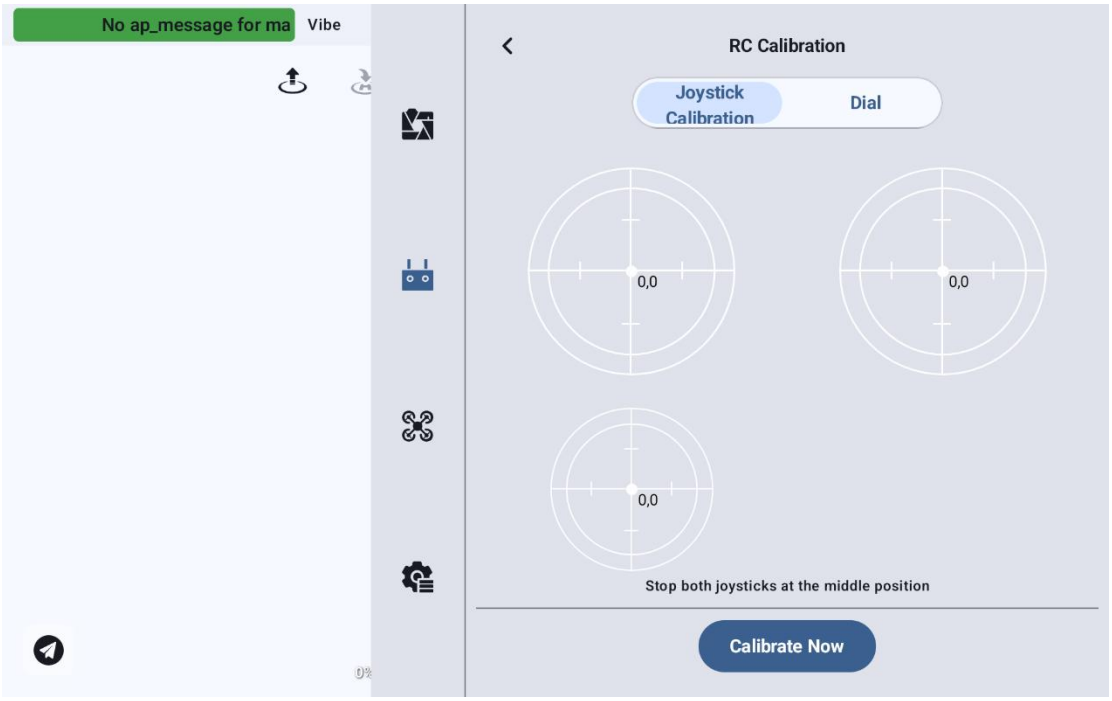
SIYI remote controllers support switching between Mode 1 (Japanese layout), Mode 2 (American layout), and Mode 3 (Chinese layout) via the UniGCS software. Users can easily change the stick mode by selecting the desired option with a single click.



4.2.2 Remote Controller Calibration

The calibration function allows users to calibrate the joystick and dial on the handheld ground station, ensuring accurate neutral positions and maximum range limits.

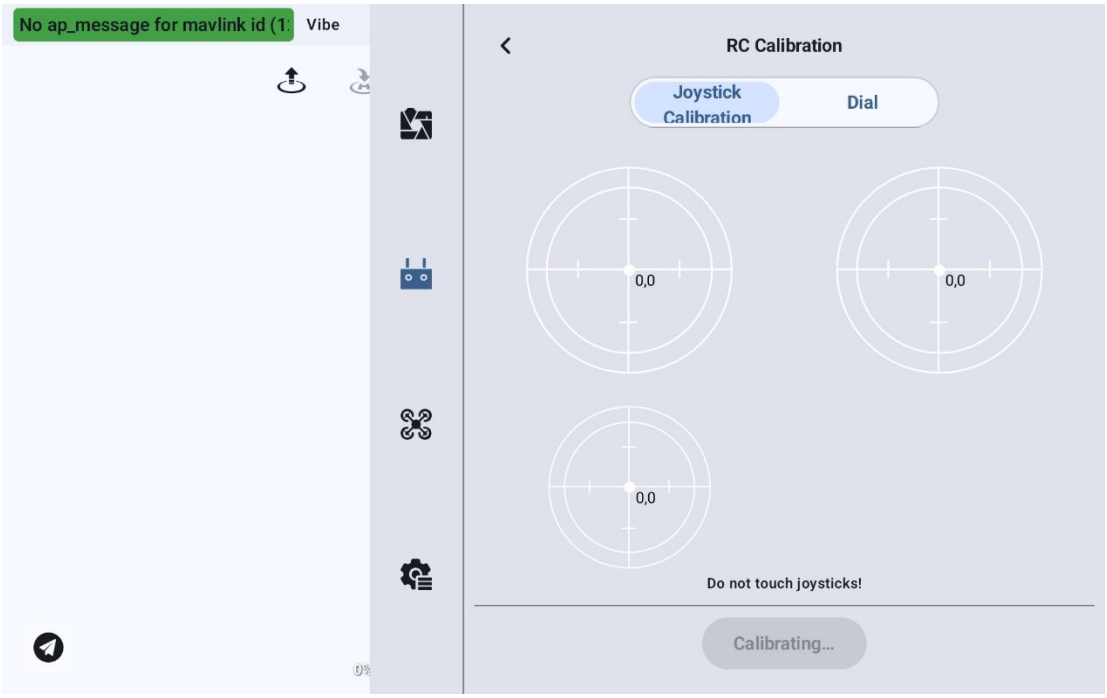
Regular calibration helps maintain the precision of channel output for optimal control performance.



4.2.2.1 Joystick Calibration Procedure

1. Before starting calibration, ensure that both joysticks on the handheld ground station are in their natural resting position, with no external force causing displacement.

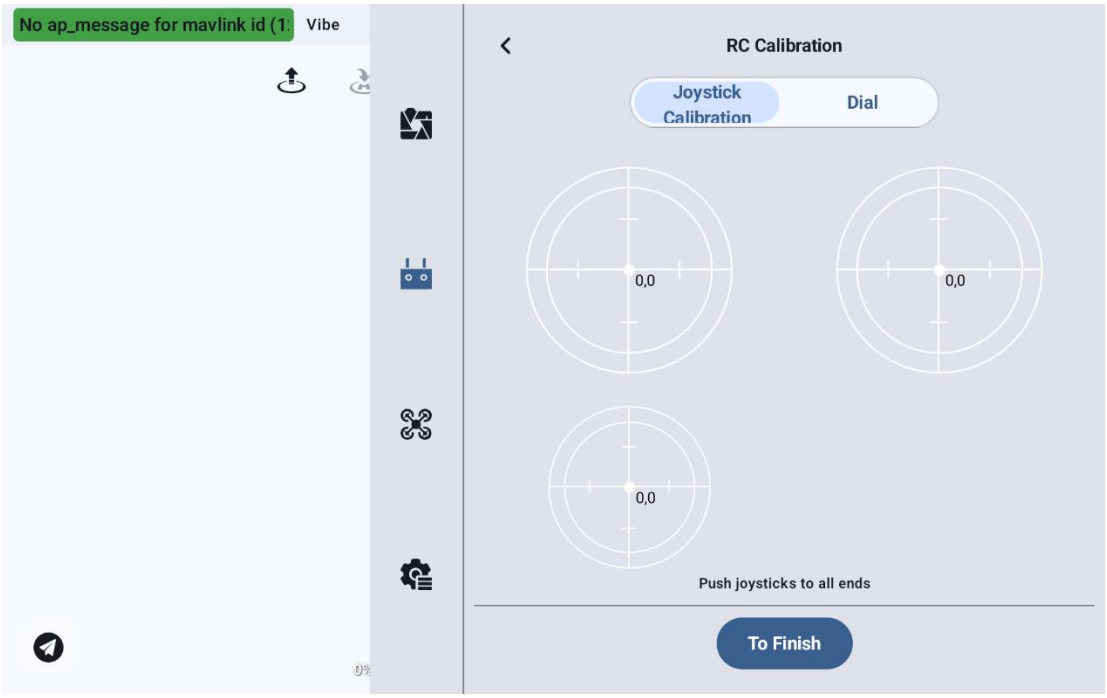
2. In the "Joystick Calibration" menu, click "Start Calibration" to enter the following interface:



3. If the joysticks are in their natural resting position but the channel output values are not zero, it indicates that the neutral point has drifted. At this stage, do not touch the joysticks, and wait for the system to complete the neutral point calibration automatically.

4. When the following prompt appears, the neutral point calibration is complete, and the system will proceed to maximum range calibration.

Follow the on-screen instructions to move each joystick to its maximum deflection in all directions one by one.



Up: (0, 100)

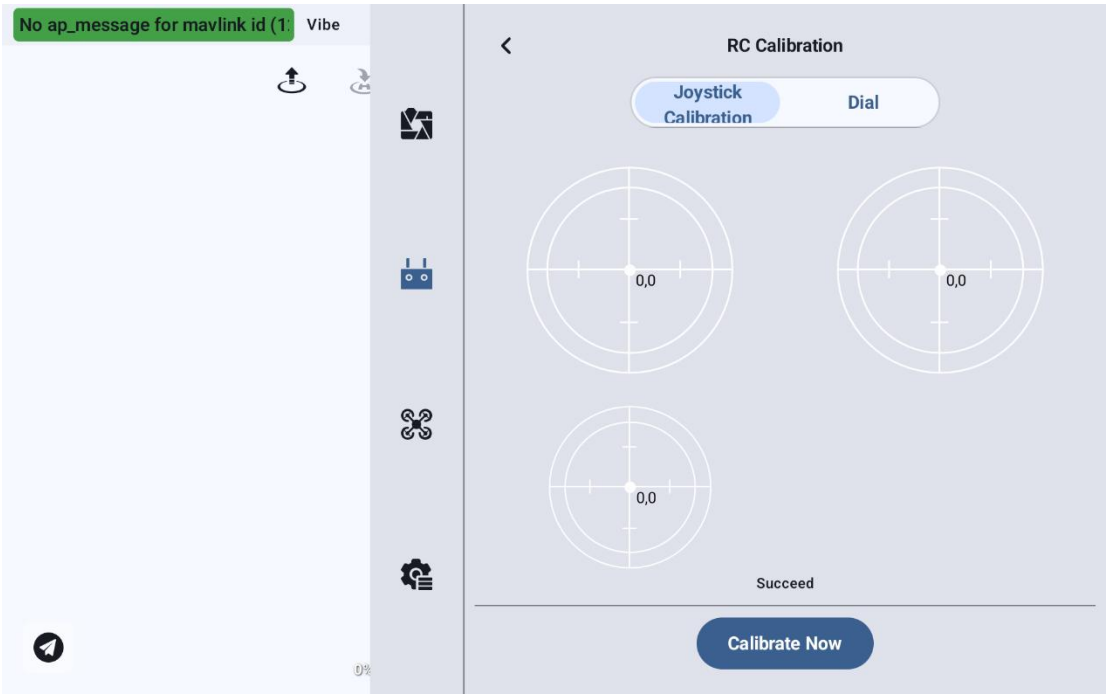
Down: (0, -100)

Left: (-100, 0)

Right: (100, 0)

Then click “Finish Calibration” to complete the process.

5. The "Joystick Calibration" menu will display a calibration successful message upon completion.

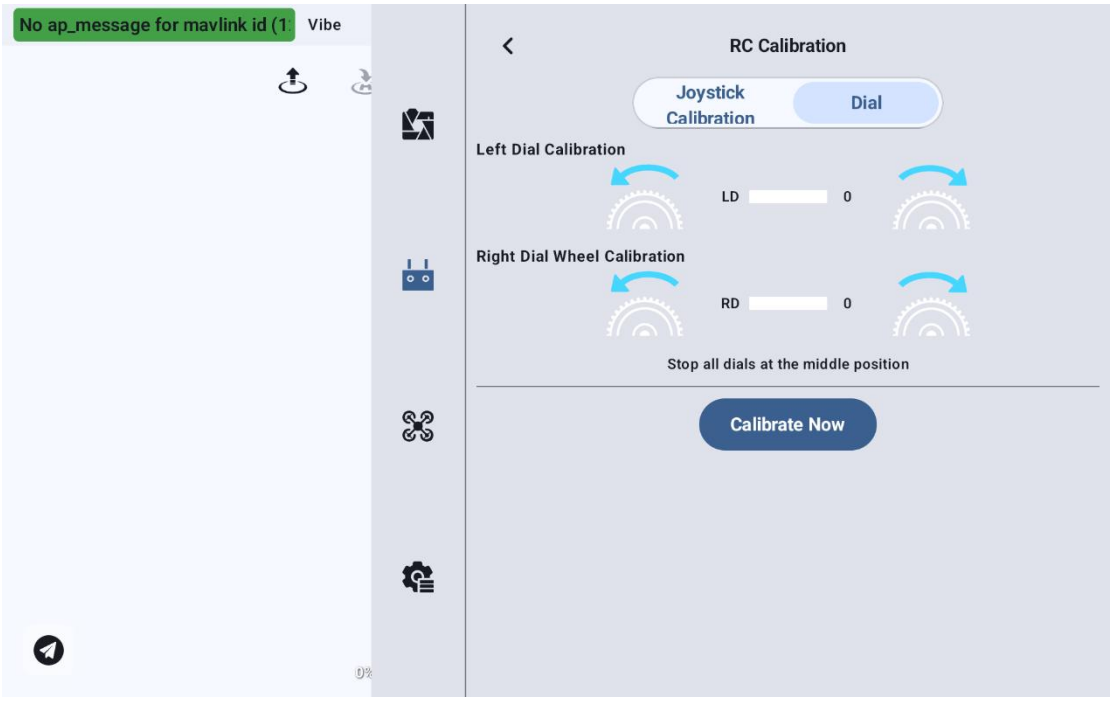


Note:

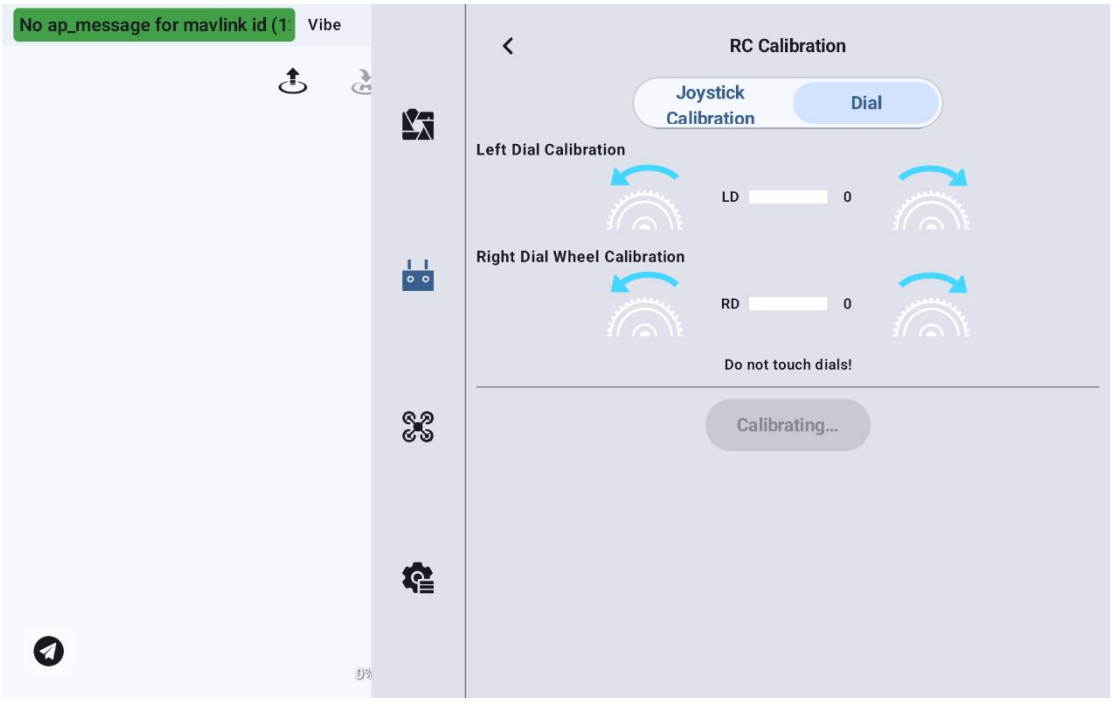
If the joystick does not return to the center position when at rest (i.e., the channel output value is not zero), or if it cannot reach the maximum or minimum values (-100, 100) when pushed to its limits, joystick calibration should be performed immediately.

4.2.2.2 Dial Calibration Procedure

1. Before starting calibration, ensure that both dials on the handheld ground station are in their natural resting position, with no external force causing displacement.

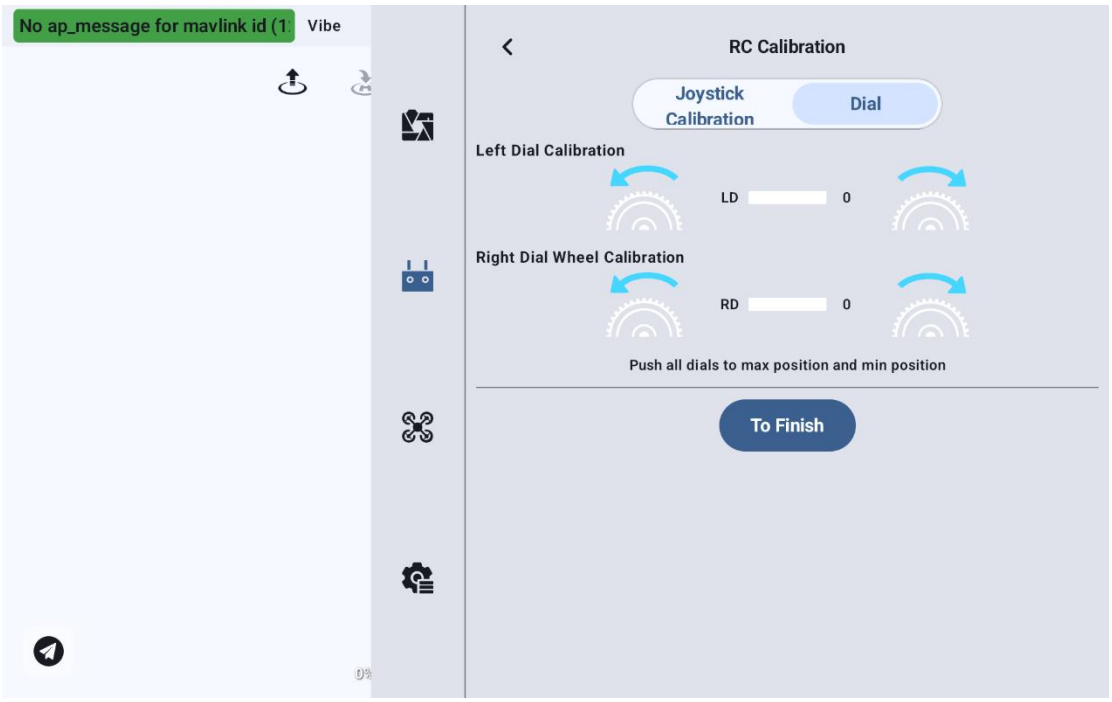


2. In the "Dial Calibration" menu, click "Start Calibration" to enter the following interface:



3. Follow the on-screen instructions. If the dials are at rest but the channel output value is not zero, it indicates that the neutral point has drifted. At this stage, do not touch the dials, and wait for the system to complete neutral point calibration.

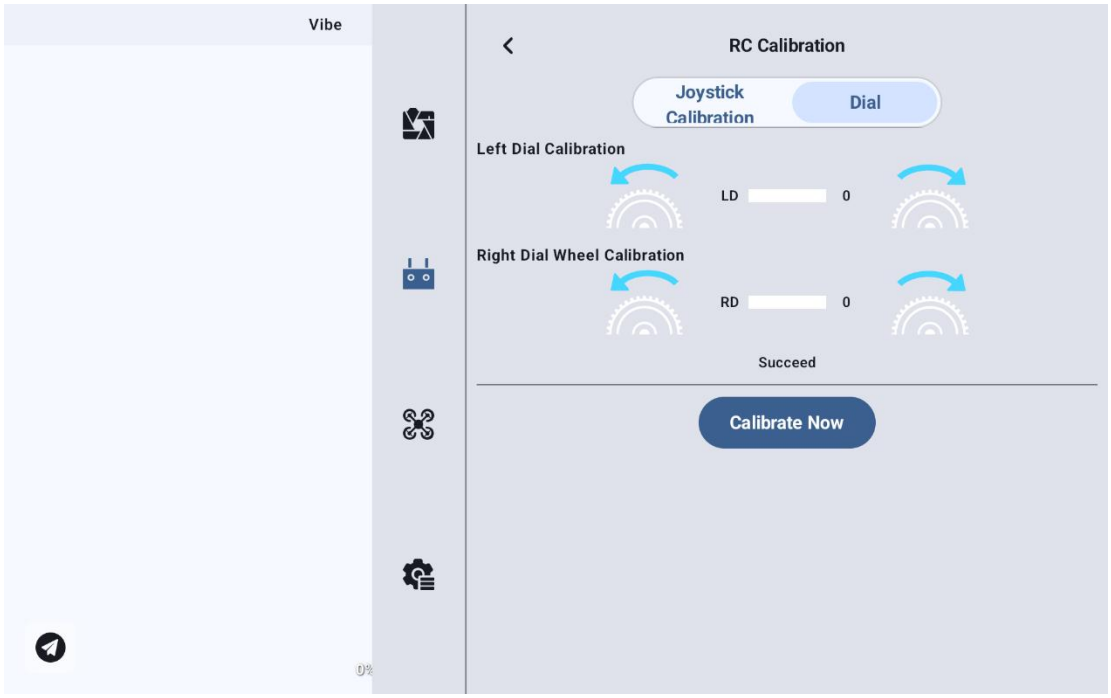
4. When the following prompt appears, it indicates that neutral point calibration is complete. The system will then proceed to maximum range calibration. As instructed, rotate each dial to its maximum range in both directions one at a time.



Left: -100

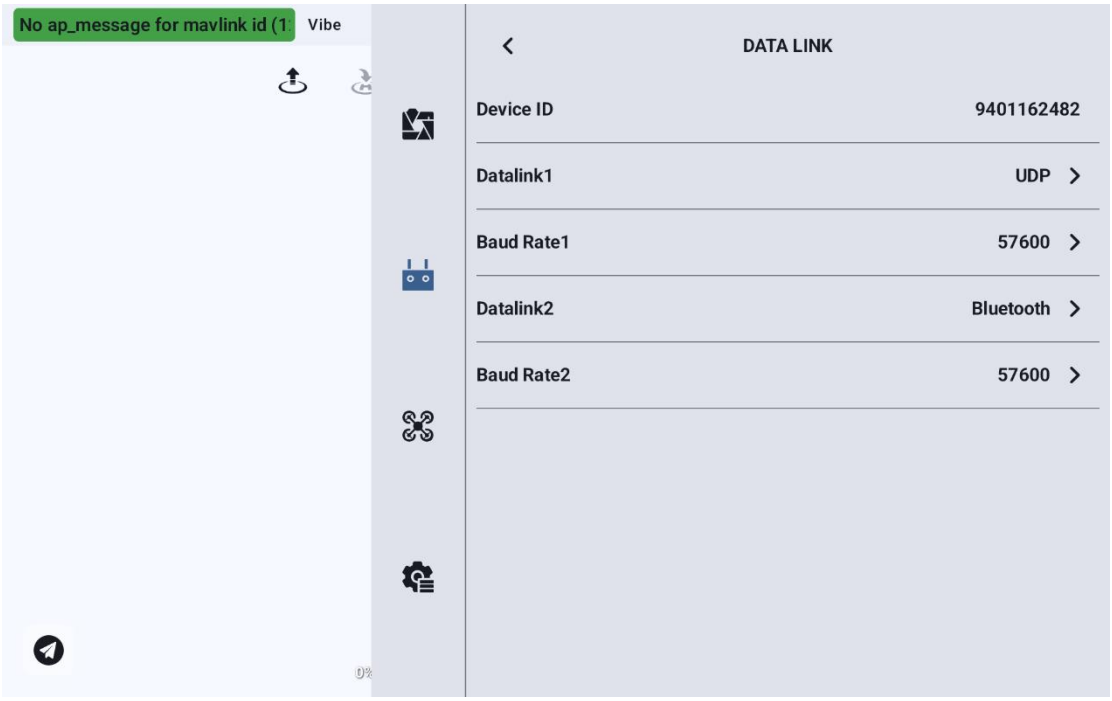
Right: 100

5. Click the "Finish Calibration" button. A message "Calibration Completed" will appear below.



4.2.3 Data Link Settings

The Data Link Settings menu allows users to identify the device ID of the handheld ground station, configure the data link connection method, and set specific serial port baud rates.



4.2.3.1 About Data Link Settings

Device: Displays the serial number of the built-in Bluetooth module in the handheld ground station. This serial number serves as the Bluetooth name when pairing and is unique to each ground station.

Data Link 1: The data link connection method for the device connected to the UART 1 port of the air unit.

Baud Rate 1: Should be set to match the serial port baud rate of the device connected to the UART 1 port of the air unit.

Data Link 2: The data link connection method for another device connected to the UART 2 port of the air unit.

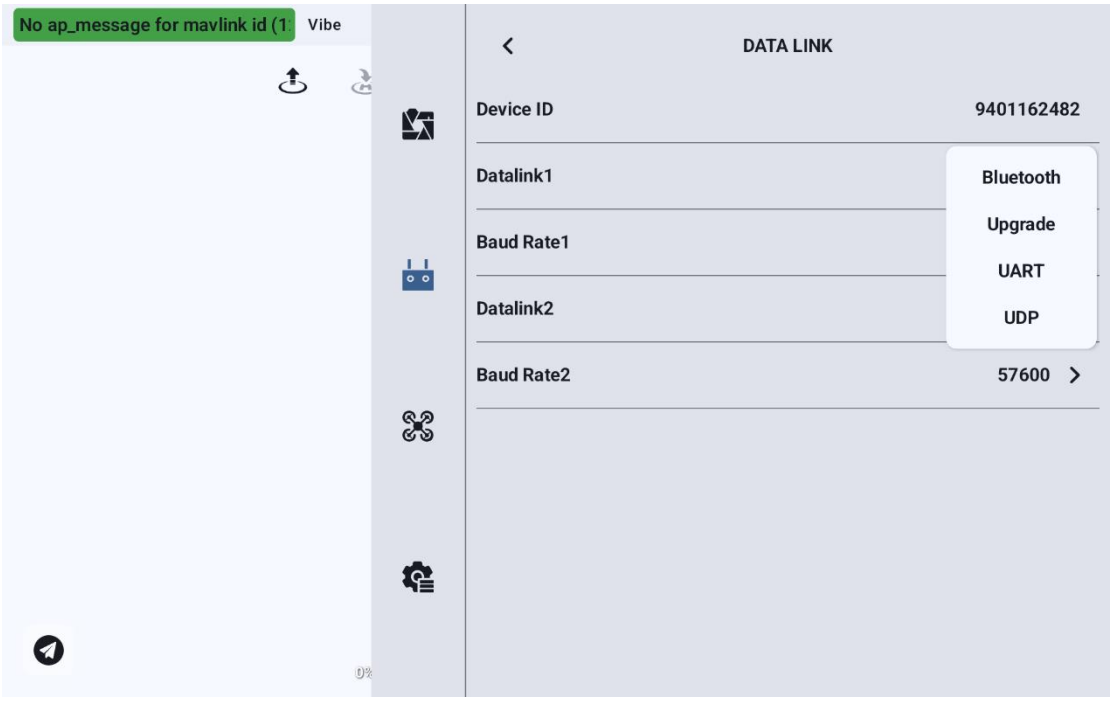
Baud Rate 2: Should be set to match the serial port baud rate of the device connected to the UART 2 port of the air unit.

Note:

Currently, only the UniRC7 series supports dual data links, while the MK15 and MK32 models only feature a single data link.

4.2.3.2 Connection

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



UART Serial Port: Data link communication is established via the built-in UART serial port of the ground station.

Bluetooth: Data link communication is established via the built-in Bluetooth wireless connection of the ground station. This method supports most ground station software and also enables communication with external devices, such as Windows-based ground station software.

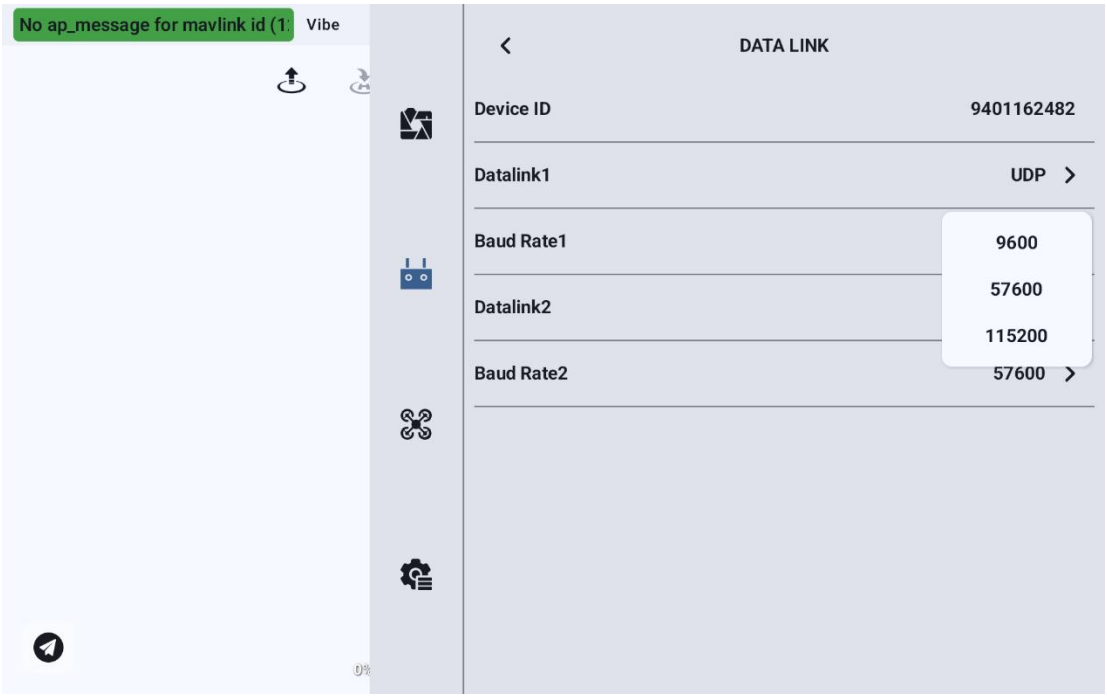
Upgrade: Data link communication is established through the Type-C

interface at the bottom of the handheld ground station, enabling communication with external devices like Windows-based ground station software.

UDP: Data link communication via UDP network protocol connection.

4.2.3.3 Serial Port Baud Rate

Please manually select the appropriate serial port baud rate setting.



Note:

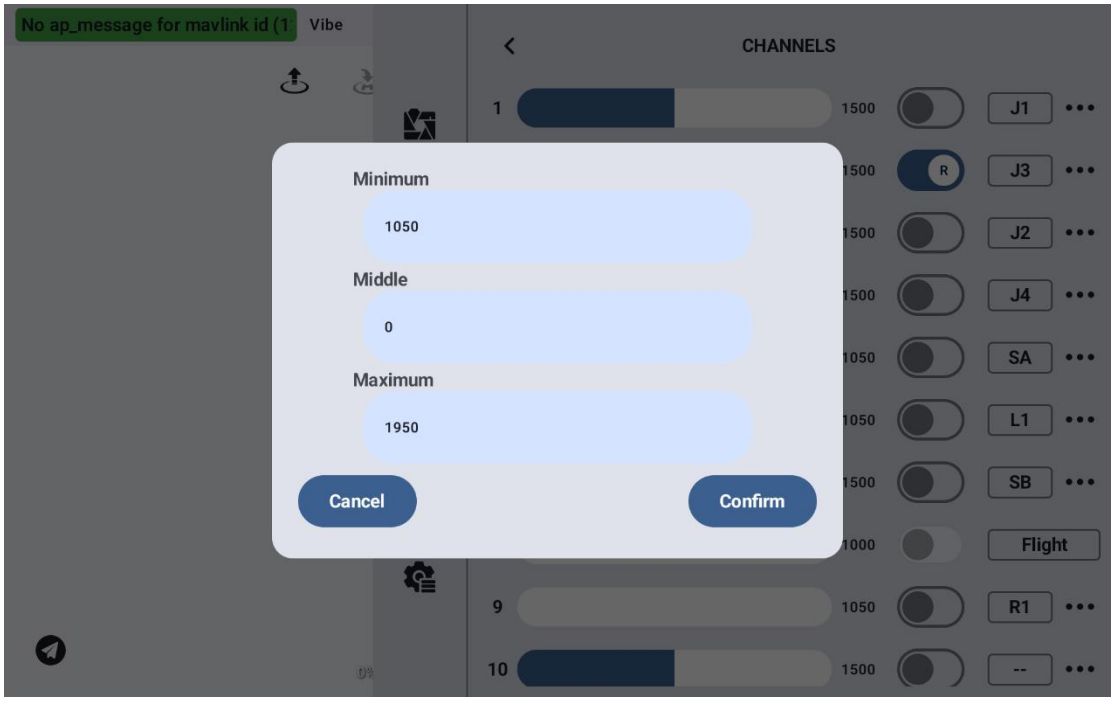
Before changing the serial port baud rate, please ensure that the ground station and air unit have successfully paired, otherwise the settings will not take effect.

4.2.4 Channel Settings

Through the channel settings function, users can configure the servo travel range, neutral point, servo reversal, and channel mapping for each channel of the handheld ground station.

4.2.4.1 Servo Travel Range

The default servo 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 modify it.

The default neutral point for the travel range is 1500.

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

Note:

The range for the travel range neutral point is ±500. To set the neutral point to 1700, the travel range neutral point should be set to +200. To set the neutral point to 1300, the travel range neutral point should be set to -200.

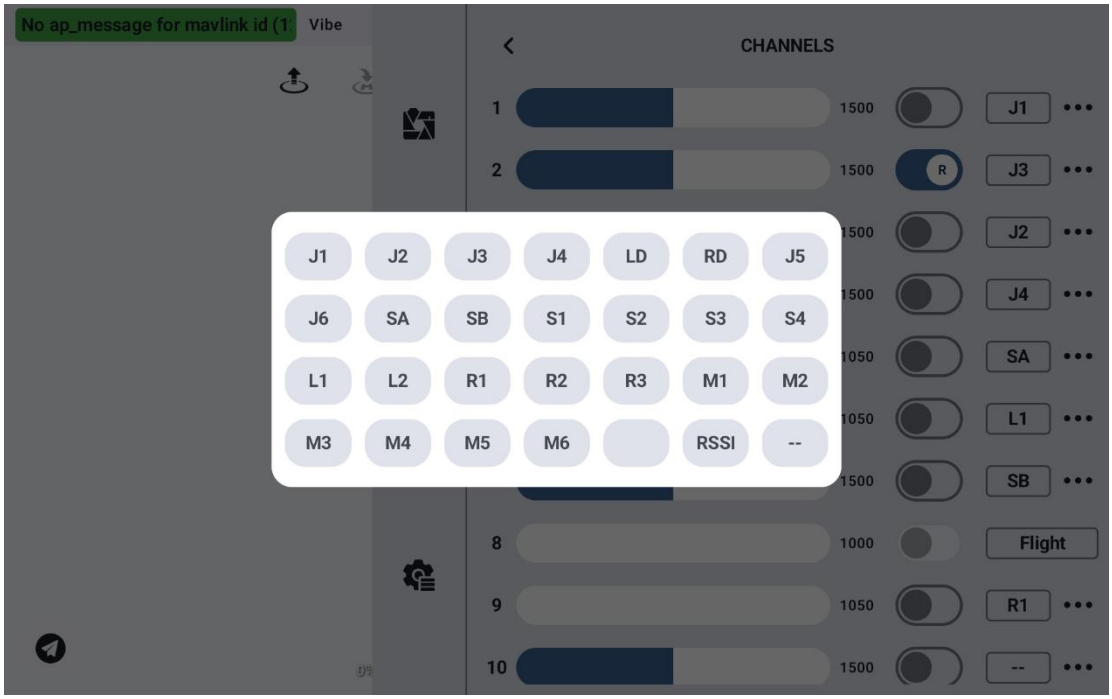
4.2.4.2 Servo Reversal

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

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

4.2.4.3 Channel Mapping

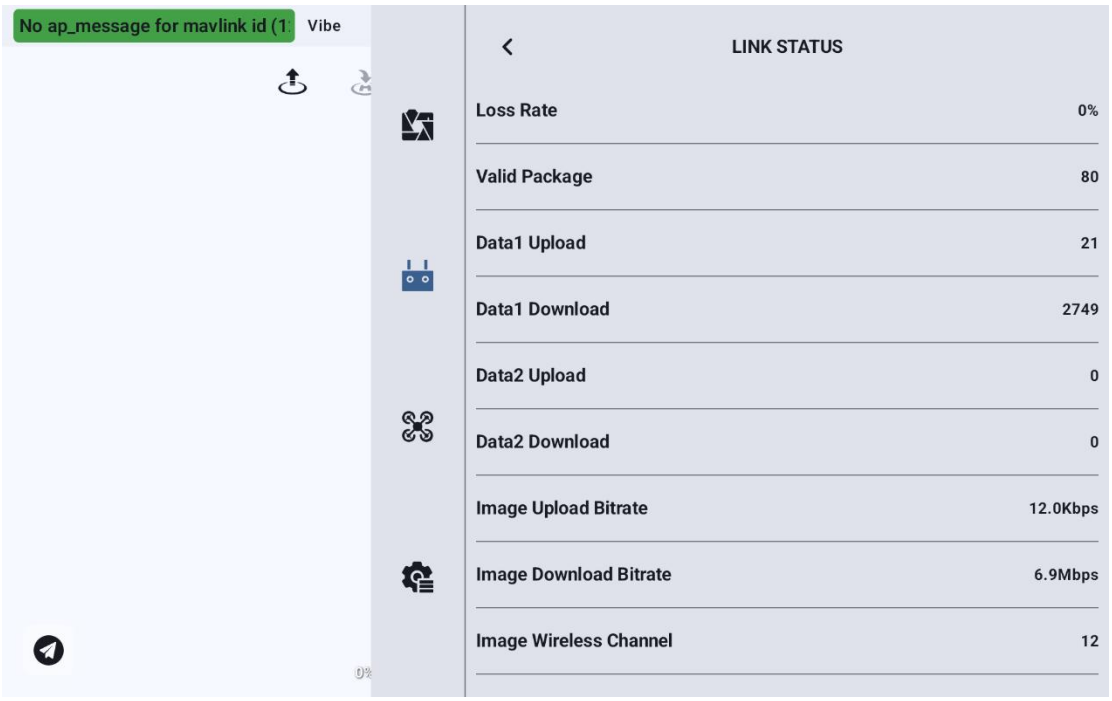
Taking the UniRC 7 handheld ground station as an example, the UniRC 7 supports 26 physical channels and 16 communication channels, and allows users to freely define the mapping between physical buttons, switches, joysticks, and communication channels through the channel mapping function.



Select the target channel, click the channel mapping button, and a switch list will appear. Choose the desired switch to successfully establish the connection.

4.2.5 Link Information

Displays real-time link status information to visually show the quality of wireless communication.



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.

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

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

Uplink Bitrate: The amount of data transmitted per second over the

uplink video transmission.

Downlink Bitrate: The amount of data received per second over the uplink video transmission.

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

Signal Strength: The strength of the radio wave communication between the ground station and the air unit.

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

4.2.6 Button and Dial Settings

The UniRC 7 handheld ground station supports customization of button and dial functionalities.

4.2.6.1 Button Settings

This function allows users to configure the working mode of each button.

Button Operation Modes

Latching Mode:

In this mode, when the latching button is pressed, the physical button will spring back, but the corresponding channel continues to output a value of 1950. Pressing the button again toggles the channel output to 1050.

Three-Position Switch:

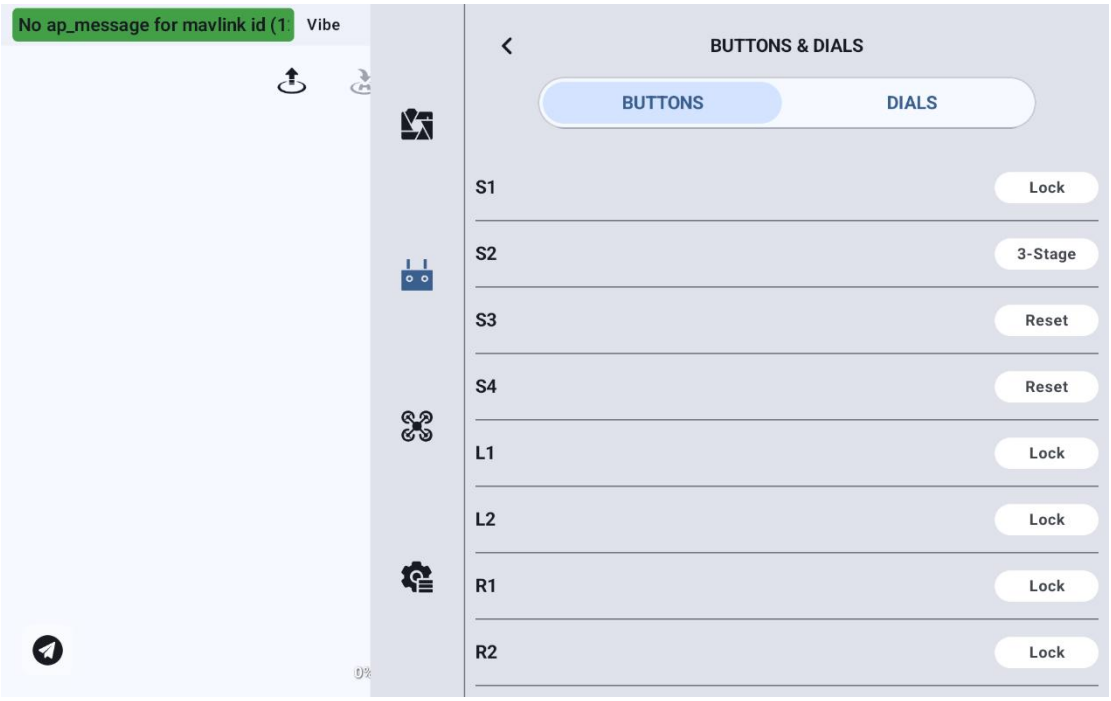
This mode simulates a 3-way switch. A short press toggles the channel output between 1950 and 1050. A long press sets the channel output to 1500.

Momentary Mode:

In momentary mode, the channel outputs a signal only while the button is being pressed. Releasing the button returns the channel output to zero.

4.2.6.2 Dial Wheel Settings

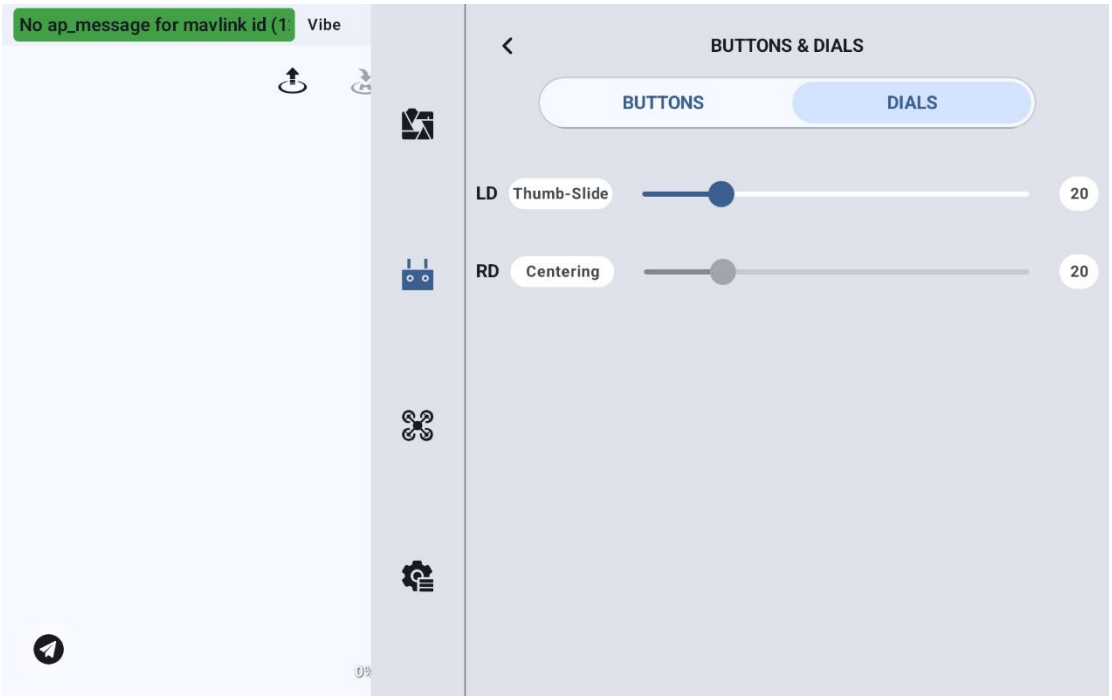
This function allows users to configure the operation modes of the left (LD) and right (RD) dial wheels.



Dial Wheel Operation Modes

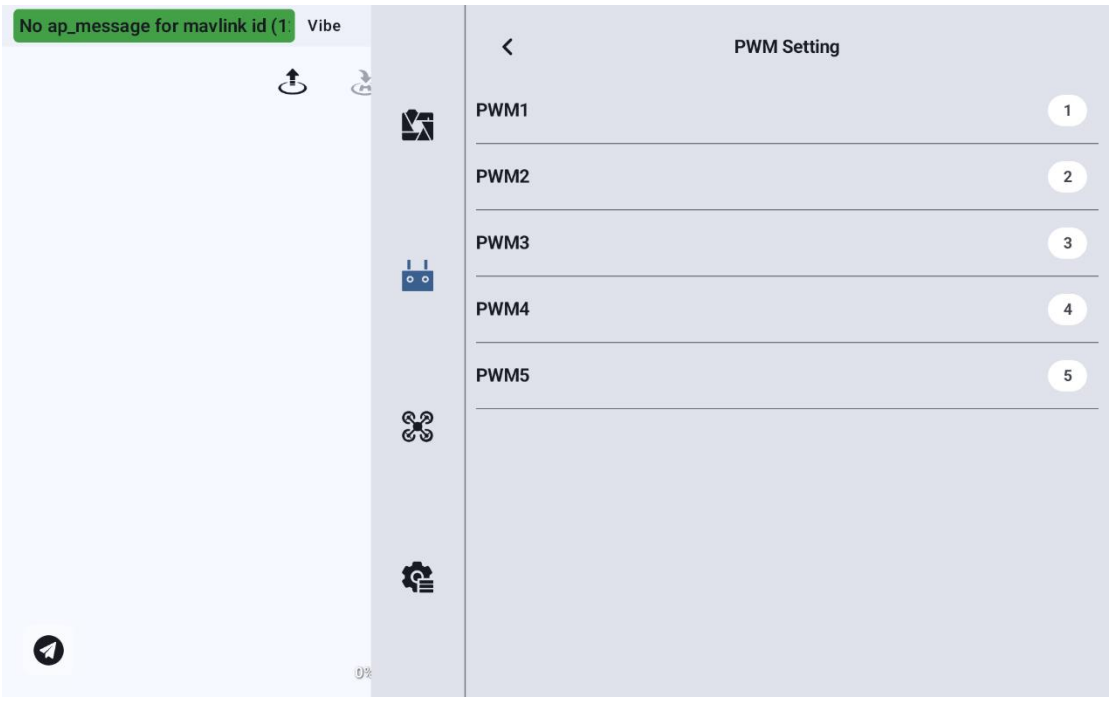
Auto-Centering: In this mode, when the dial wheel is turned and released, the output value will automatically return to its initial position (channel midpoint).

Non-Auto-Centering: In this mode, when the dial wheel is turned and released, the output value remains at the current channel output and does not return to the midpoint.



4.2.7 Receiver Settings

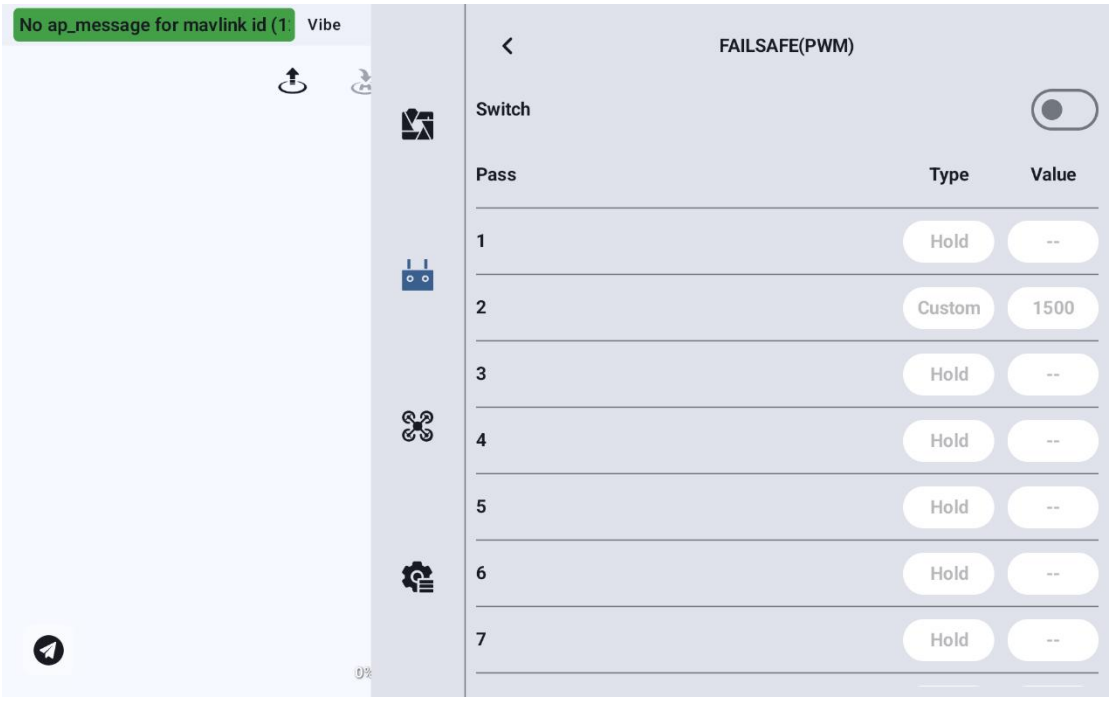
This function allows users to match the five PWM channels of the air unit (sky unit) to their corresponding communication channels.



4.2.8 Failsafe Protection

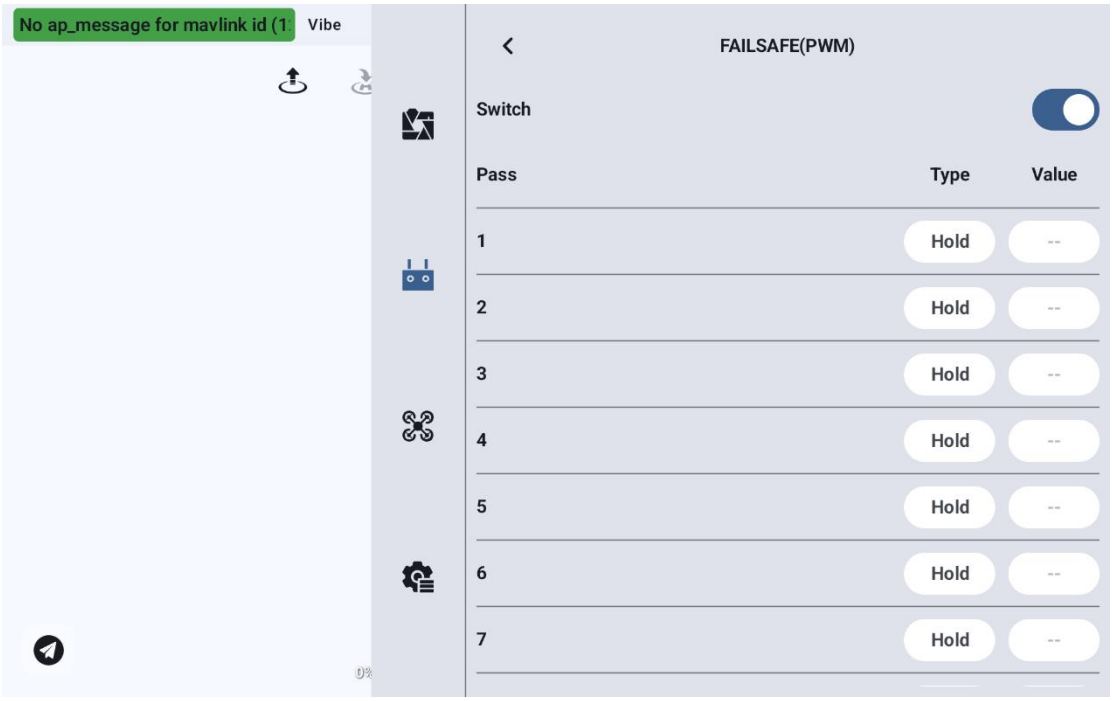
After the initial frequency pairing between the ground unit and air unit, it is essential to configure the failsafe protection feature.

Failsafe protection refers to the functionality that, in the event of a lost connection between the ground unit and air unit, the air unit's PWM will continue to output preset channel values, minimizing the risk of a crash.



Please follow the steps below to set up the failsafe protection for your handheld ground station:

1. Ensure that the ground unit has been successfully paired with the air unit.
2. Enter the "Failsafe Protection" menu, which will display the following interface:



3. The failsafe protection feature is turned off by default. The number on the left represents the communication channel. If the failsafe output value for a channel has not been set, the channel's output value will default to "Hold."
4. If you need a specific value to be output for a channel, first enable the failsafe protection switch. Then, click the "Hold" button next to the corresponding channel to enter "Custom" mode, and enter the desired range value.
5. Once the settings are complete, if the link is lost, the channel will output the configured range value.

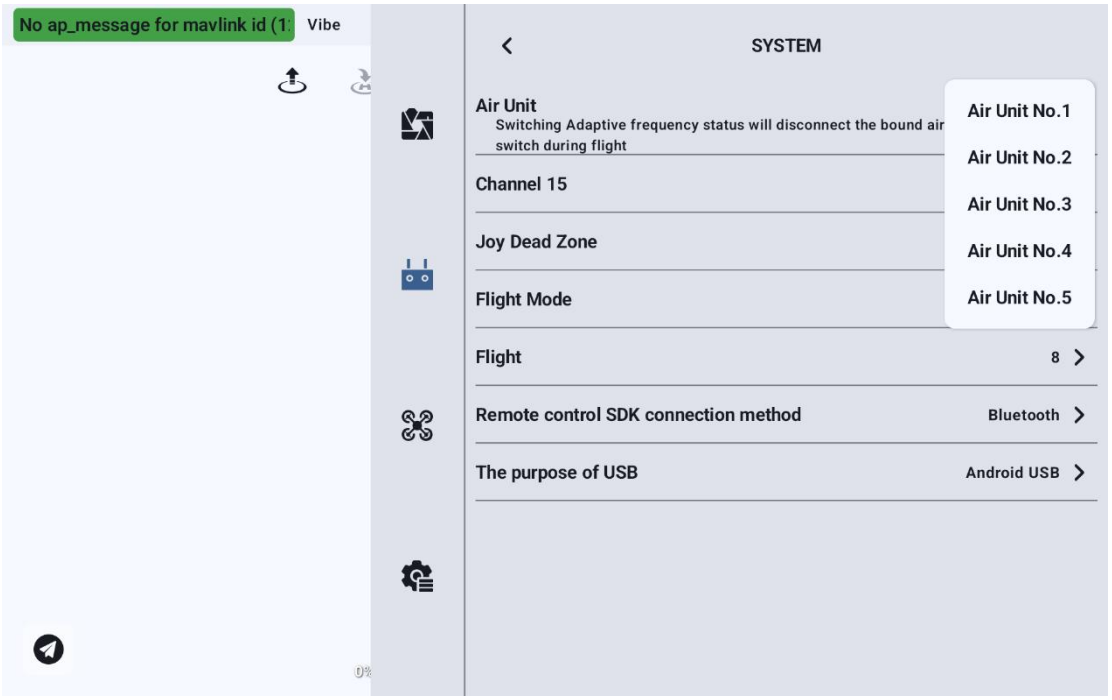
Note:

If the flight controller used with your handheld ground station communicates via the S.Bus protocol, you do not need to set up failsafe protection on the ground station (unless the flight controller specifically requires a certain channel to maintain a value during loss of control in order to trigger the failsafe and initiate return-to-home). You only need to set the corresponding protection measures in the flight controller's ground station software. The S.Bus communication protocol includes a failsafe flag to inform the flight controller of situations that should be considered as loss of control.

4.2.9 System Settings

4.2.9.1 Multiple Air Unit Support

The Multiple Air Unit feature allows the ground station to save frequency pairing information and corresponding channel settings for multiple air units. After the first frequency pairing between each air unit and the ground station, users can switch between them without needing to re-pair each time.

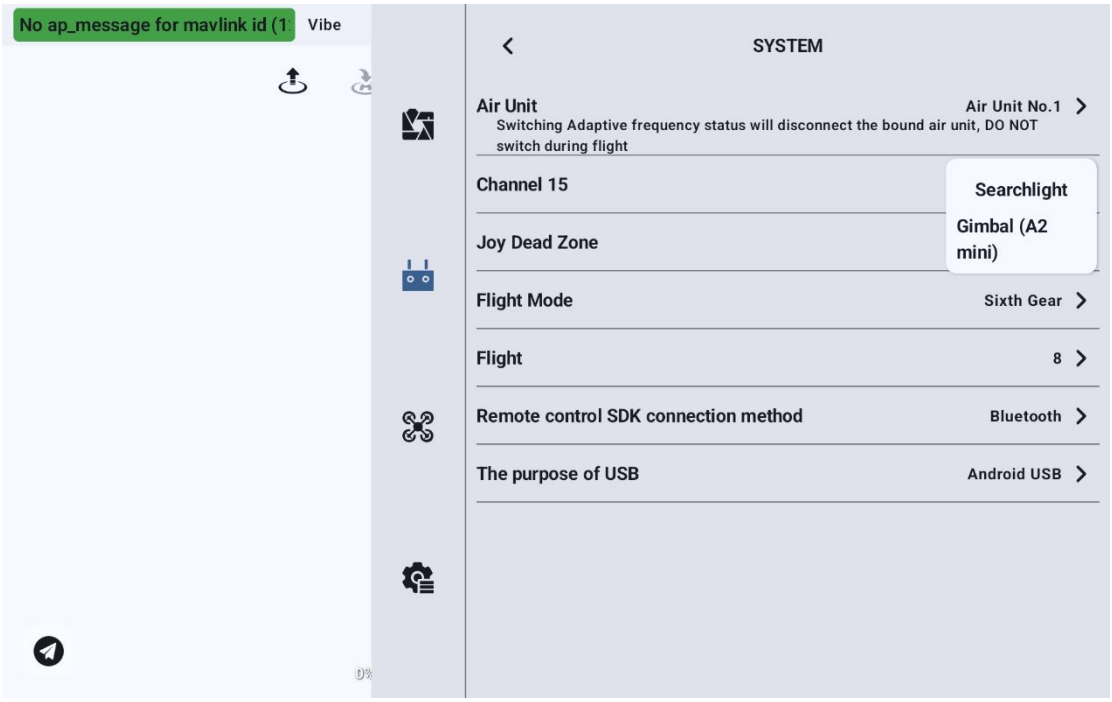


Danger

It is prohibited to switch sky ends during flight. Switching air units during flight may result in a loss of control of the communication link!

4.2.9.2 Channel 15

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

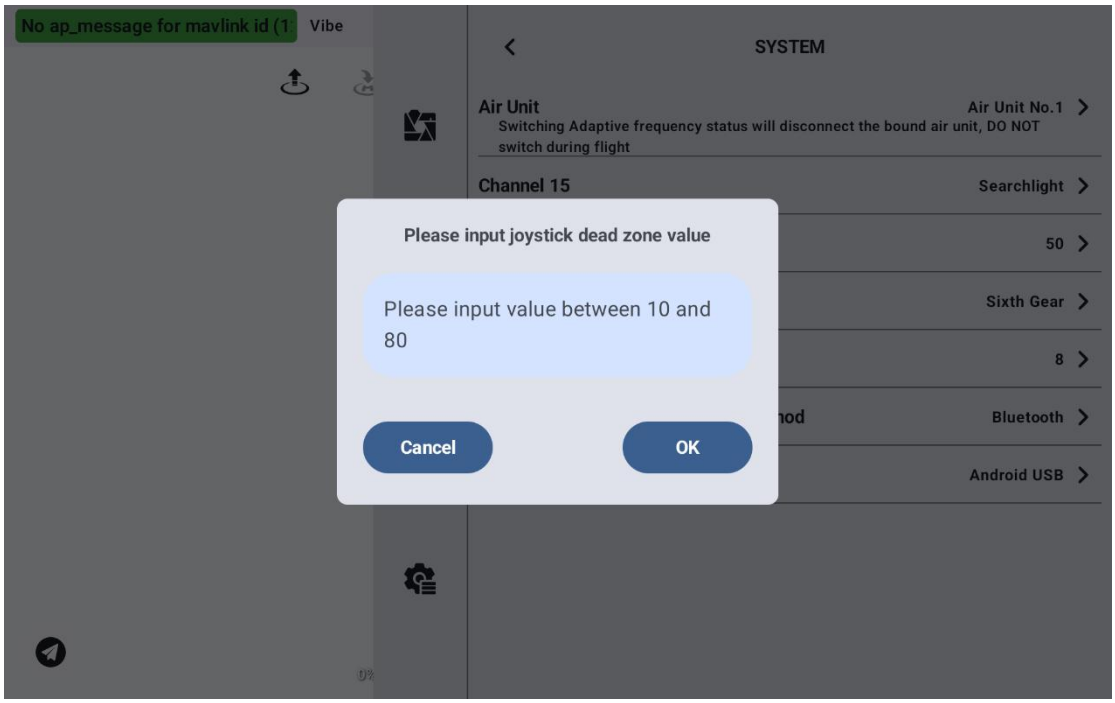


Note:

The 15th channel corresponds to the device connected to the LAN 1 interface of the air unit, while the 16th channel corresponds to the device connected to the LAN 2 interface of the air unit. By default, the 16th channel is assigned to the searchlight.

4.2.9.3 Stick Dead Zone

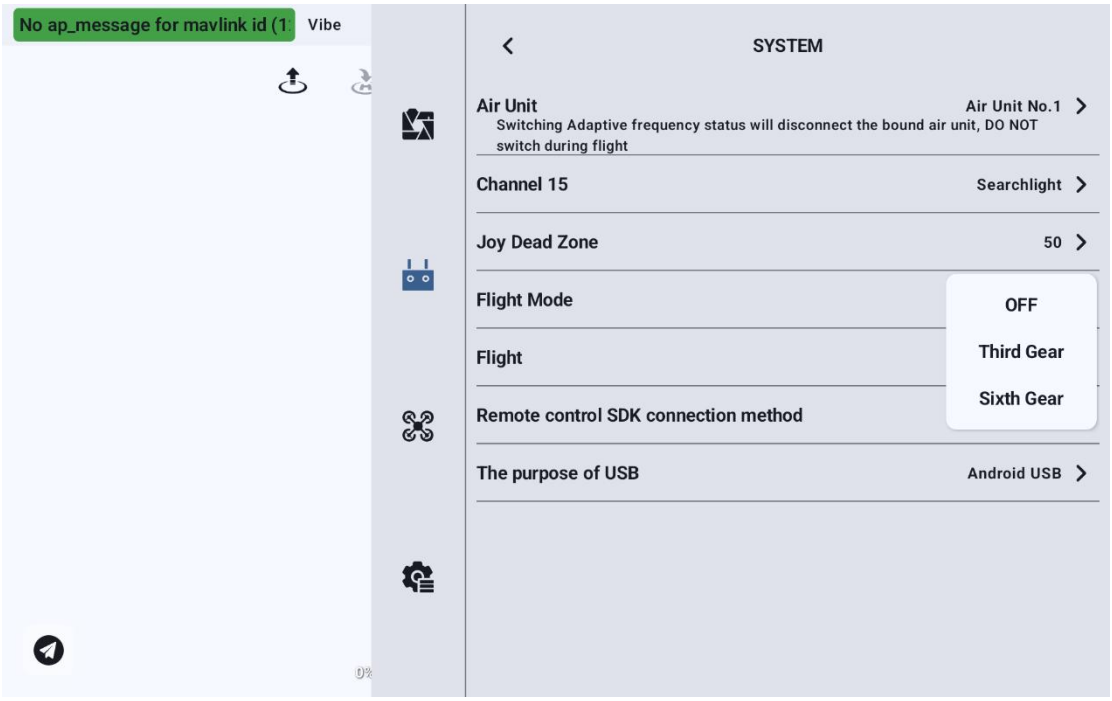
Adjust the stick dead zone to accommodate a variety of control sensitivities.



4.2.9.4 Flight Mode

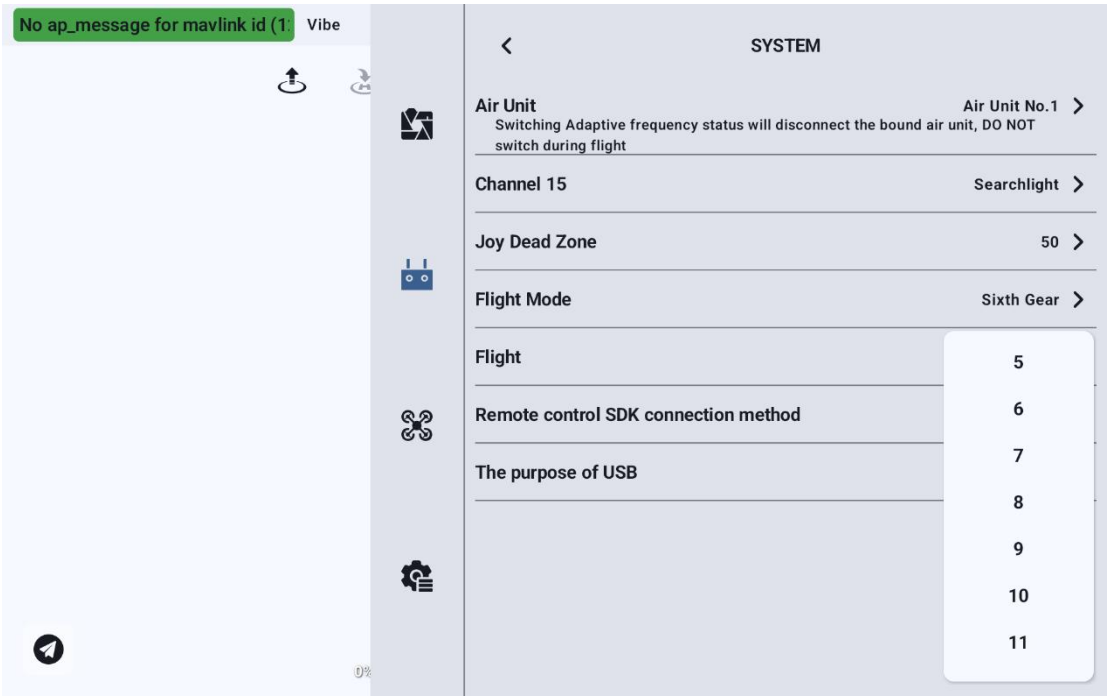
The flight mode can be set to 3-position mode, 6-position mode, or off.

- Off: Disables the flight mode function.
- 3-position mode: M1-M3 buttons are mapped to a single channel. Pressing M1 sets the channel output to 1050, M2 sets it to 1500, and M3 sets it to 1950.
- 6-position mode: M1-M6 buttons are mapped to a single channel. Pressing M1 sets the channel output to 1000, M2 to 1250, M3 to 1425, M4 to 1575, M5 to 1700, and M6 to 2000.



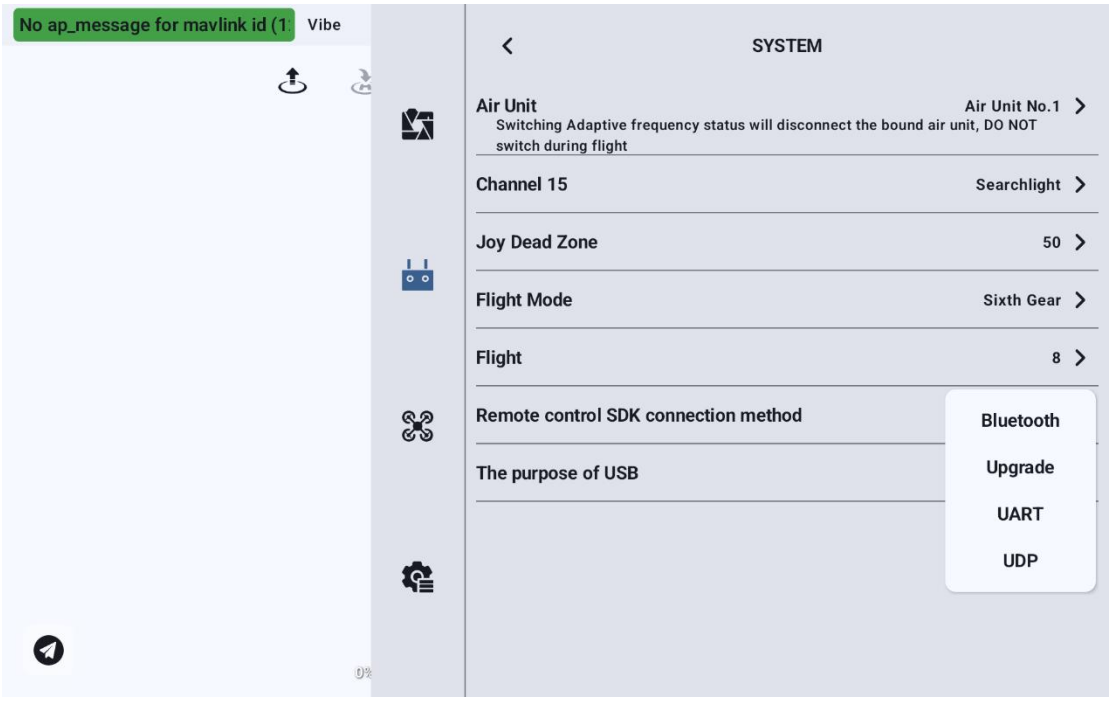
4.2.9.5 Flight Channels

The communication channels mapped to the flight mode, with M1-M6 mapped to the selected channels.



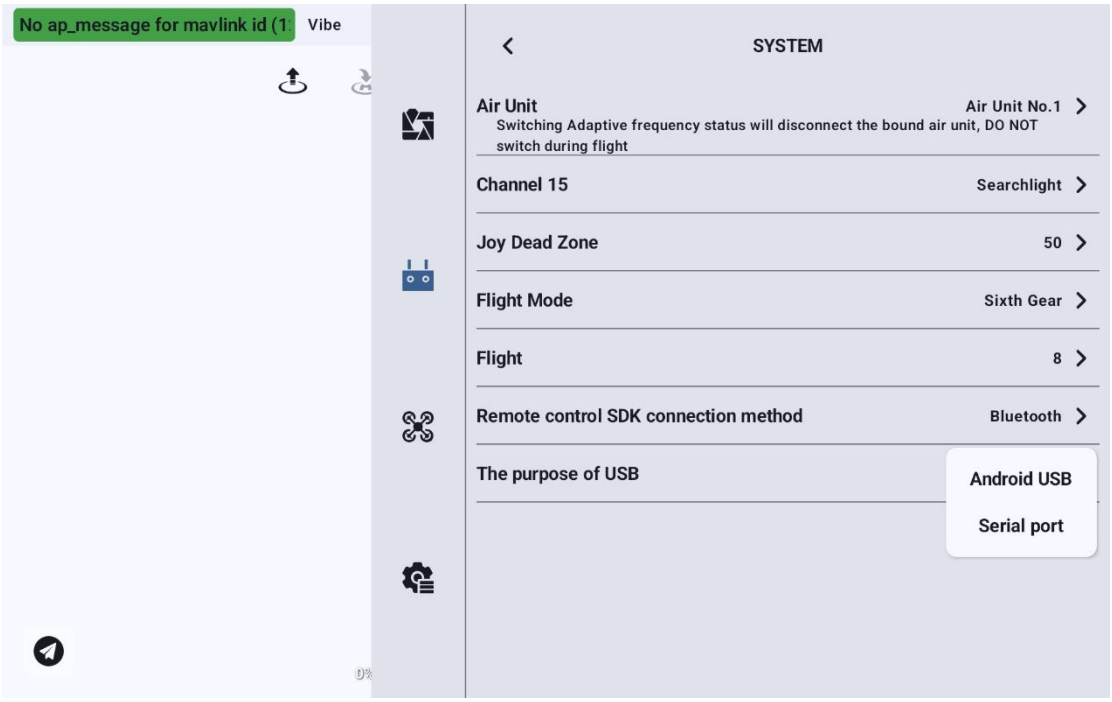
4.2.9.6 Remote Control SDK Connection Method

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



4.2.9.7 USB Function of the Remote Controller

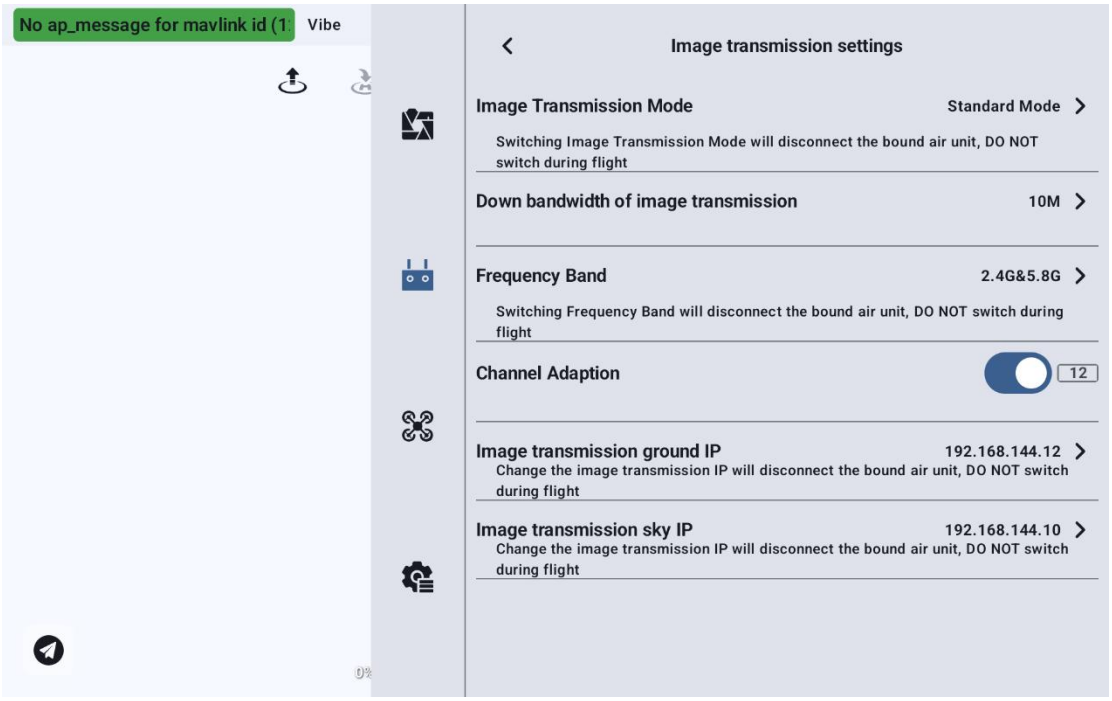
UniRC7 Professional Edition users can manually switch the working mode of the remote controller's internal USB.



4.2.10 Multi-Drone Interconnection

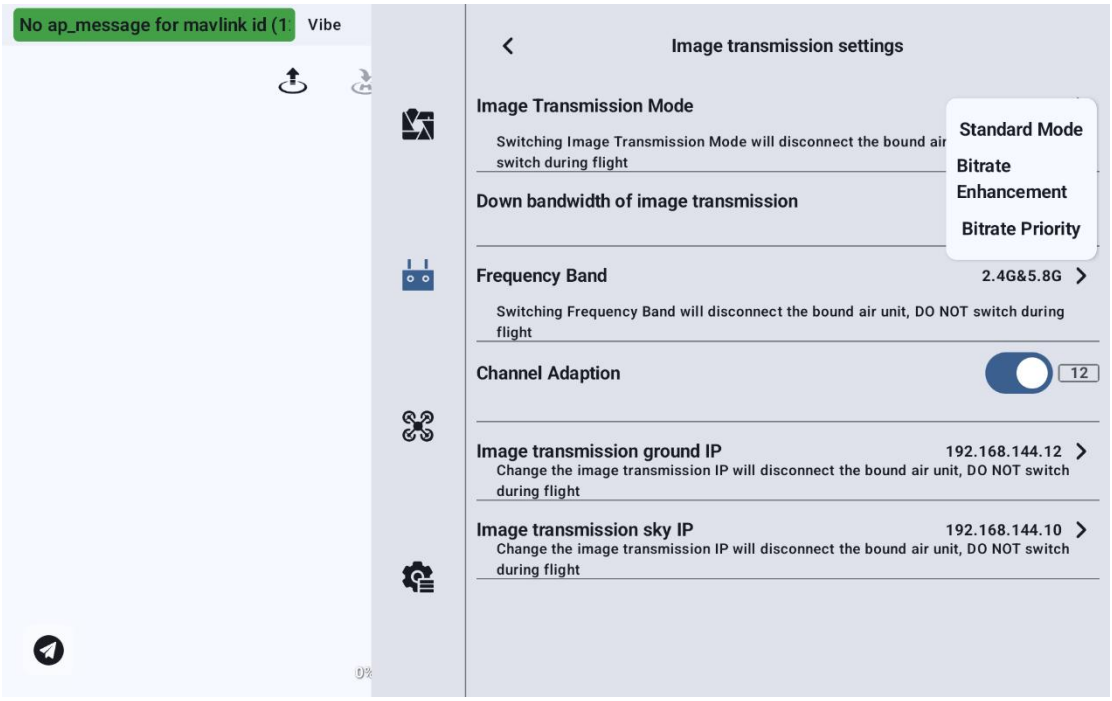
Feature under development, please stay tuned.

4.2.11 Video Transmission Settings



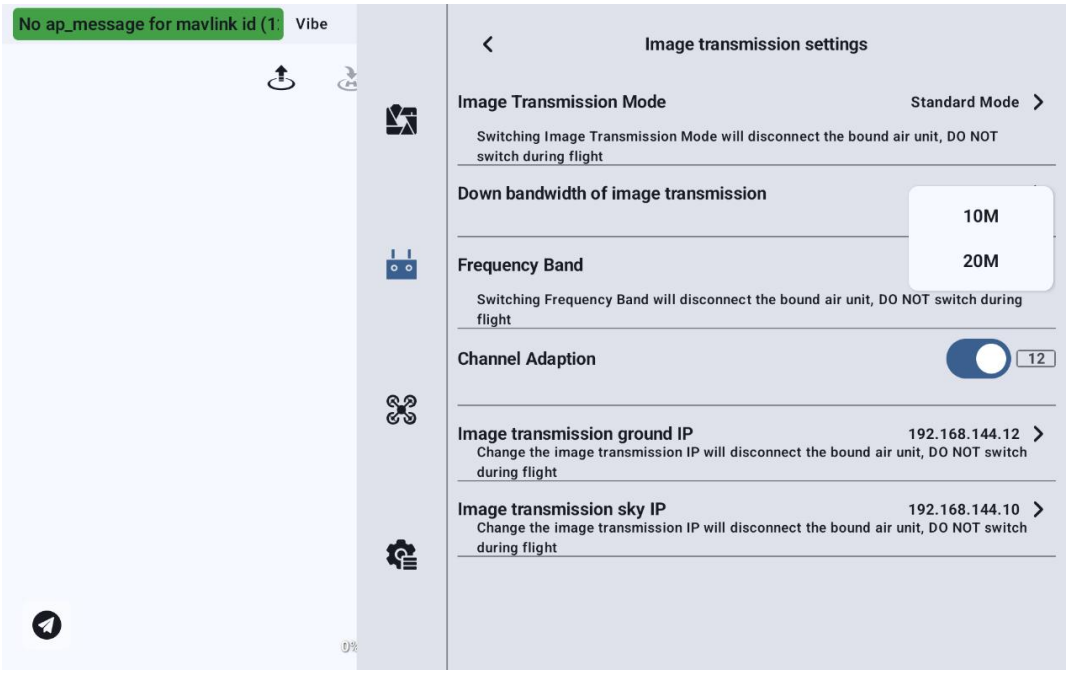
4.2.11.1 Video Transmission Mode

Change the video transmission bitrate mode.



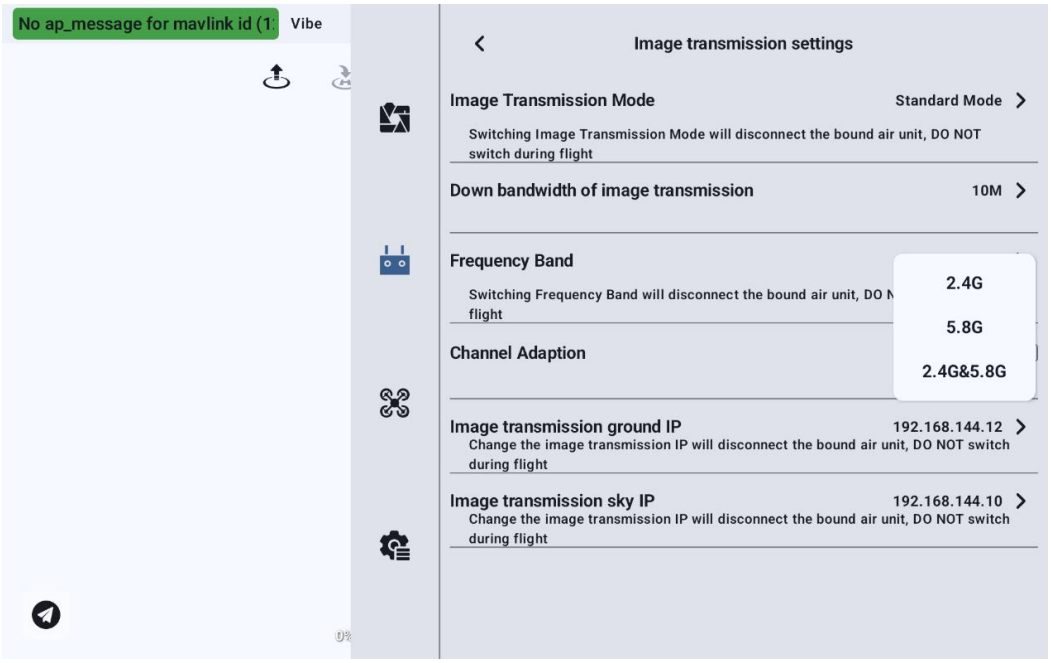
4.2.11.2 Video Transmission Downlink Bandwidth

You can switch the maximum bandwidth for the video transmission downlink.



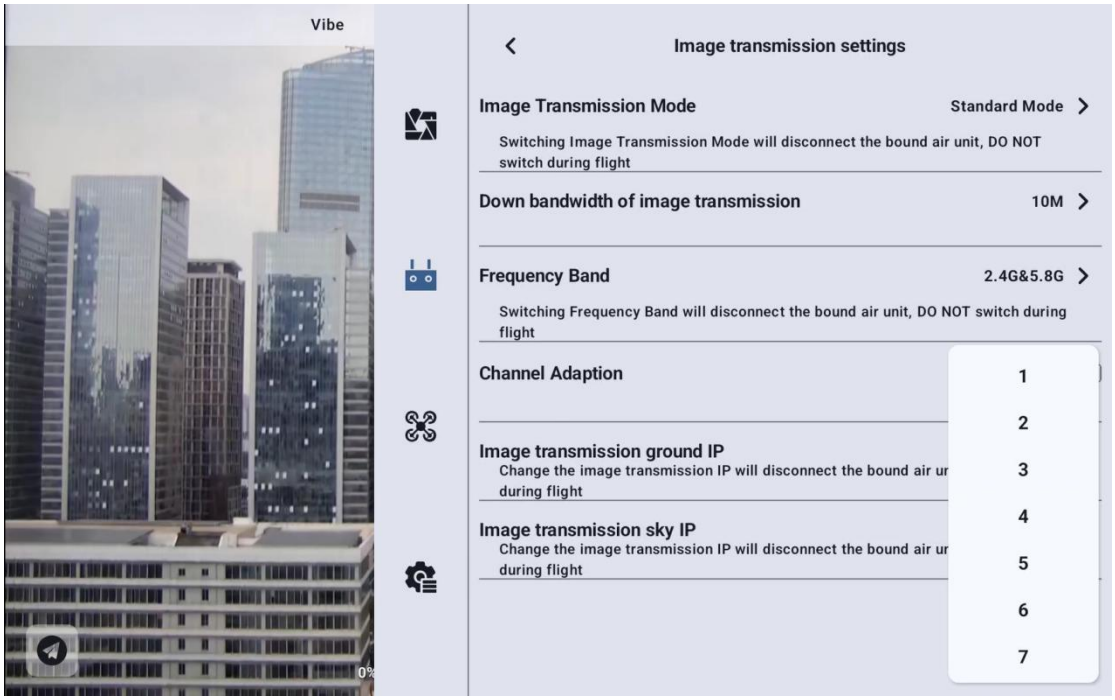
4.2.11.3 Operating Frequency Band

Manually switch the frequency band of the remote controller.



4.2.11.4 Adaptive Wireless Channel

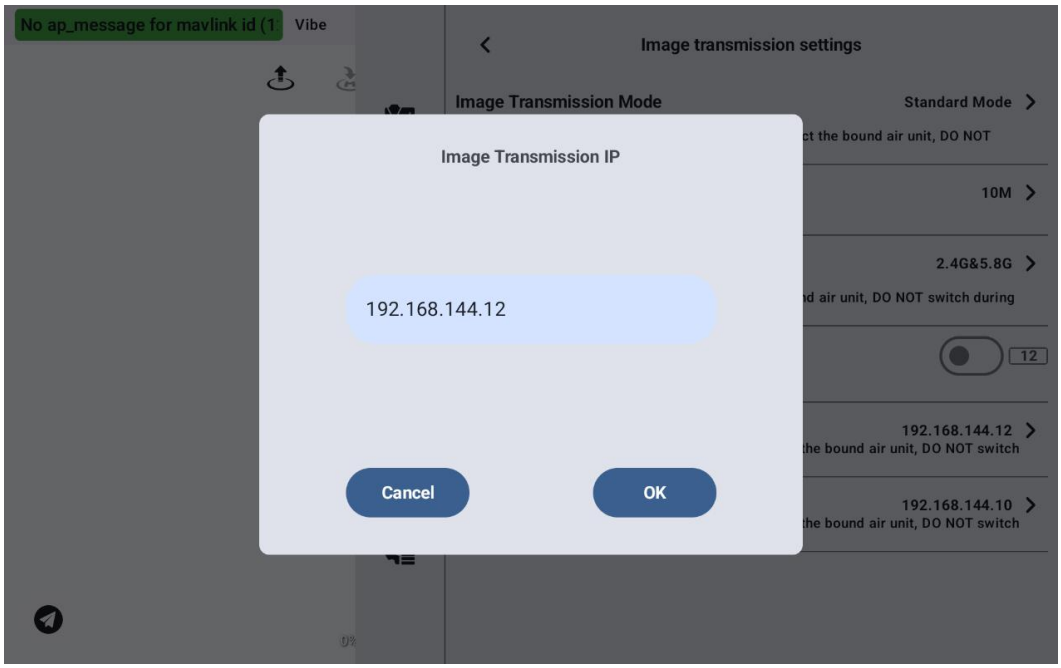
In environments with complex electromagnetic interference or noisy wireless signals, enable this feature, and the SIYI link will automatically search for the least-interfered wireless channel to establish the best conditions for wireless communication. When the adaptive wireless channel is disabled, you can manually select a wireless channel from 1 to 32.



4.2.11.5 Video Transmission IP

Supports users in setting different IP addresses to adapt to other products.

Currently, only the UniRC 7 series supports this feature.



4.2.12 Device Information

Displays the version information of the current remote controller device.

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

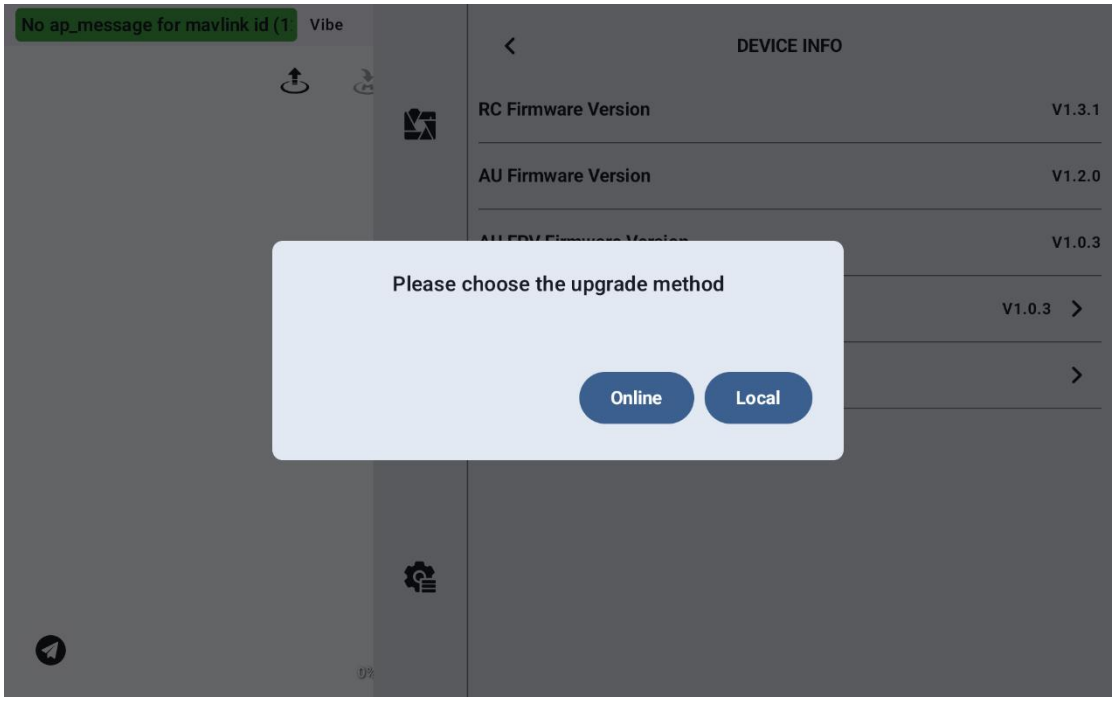
Air Unit Firmware Version: The current firmware version of the air unit.

Air Unit Video Transmission Firmware Version: The current firmware version of the video transmission module on the air unit.

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

4.2.12.1 Video Transmission Firmware Upgrade

Click on the video transmission firmware version to manually select a local firmware version to upgrade the video transmission firmware on both the air unit and remote controller.

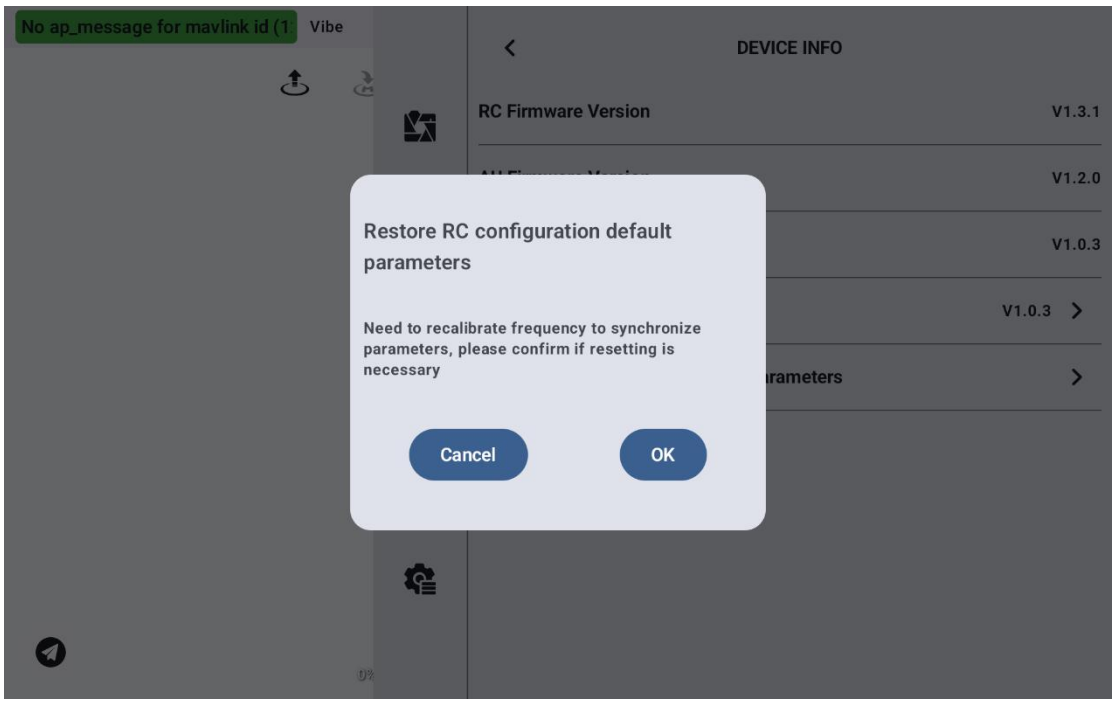


Note:

The firmware versions of the video transmission modules on both the air unit and ground control station must be consistent in order to enable communication.

4.2.12.2 Reset Remote Controller Parameters

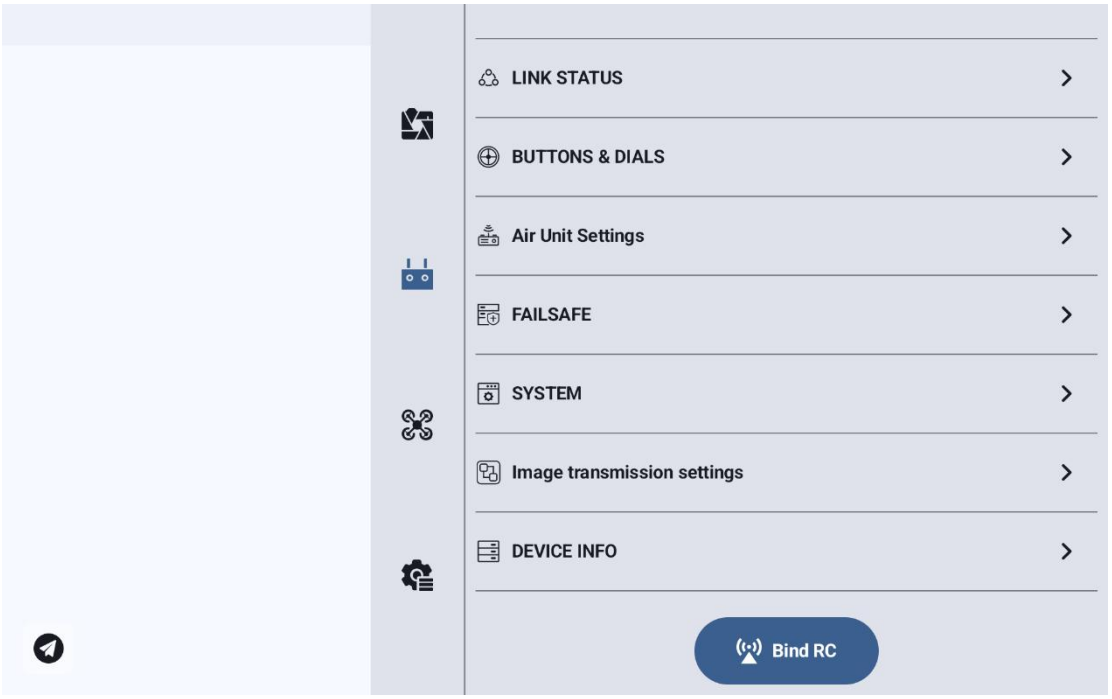
Reset to Default Parameters: This will restore the settings in the remote controller module to the factory default.



4.2.13 Binding

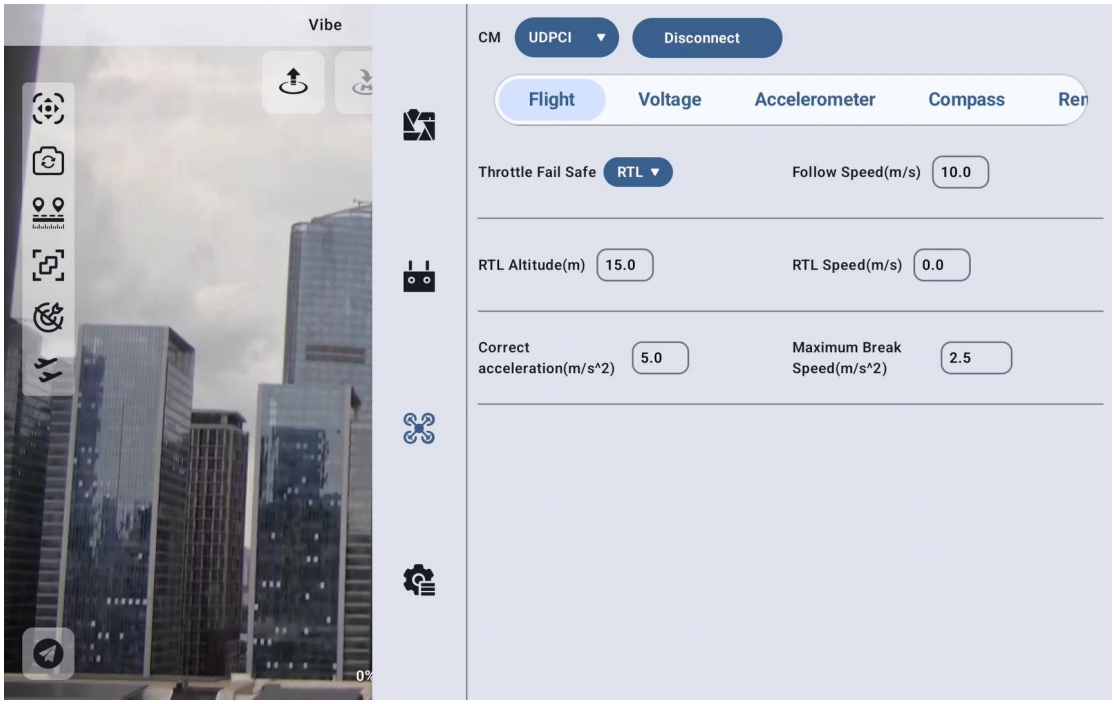
Follow the steps below to bind the ground control station and the air unit:

1. On the “UniGCS” interface, open the remote controller settings menu and tap “Bind Remote Controller”;
2. The status indicator on the ground unit will begin flashing red rapidly, the “Binding” menu will show “Binding in Progress,” and the handheld ground station will emit a beeping sound;
3. Press and hold the binding button on the air unit for 2 seconds. Its status indicator will also start flashing red rapidly;
4. Wait approximately 5 to 10 seconds. When both the ground unit and air unit status indicators turn solid green, the binding process is complete.



4.3 Flight Controller Module

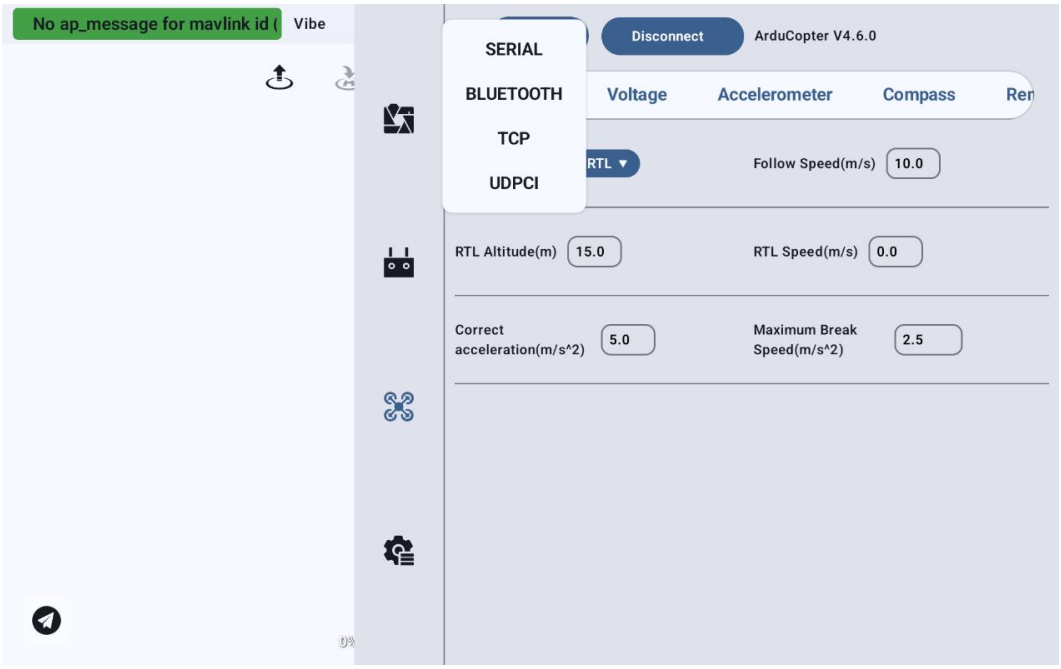
4.3.1 Main Menu



4.3.1.1 Connection Method

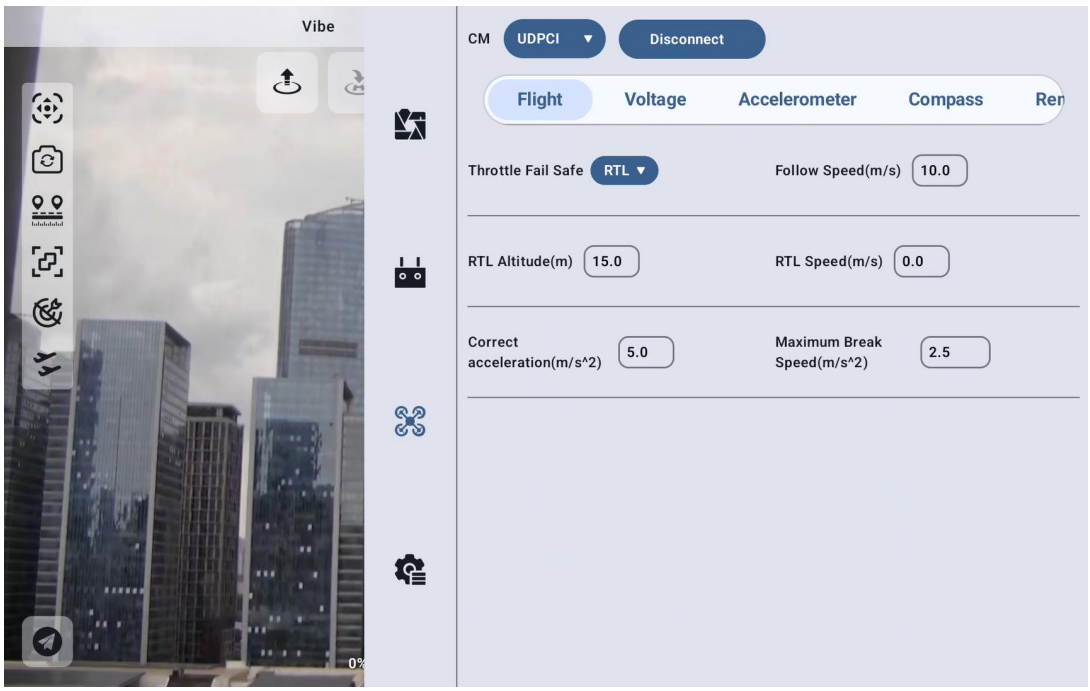
Switch the connection type within the flight controller module to the desired mode. Click “Connect” and follow the on-screen instructions to establish the connection.

If you intend to use the built-in telemetry function of the remote controller, ensure that the selected connection method matches the telemetry mode configured in the Remote Controller module (refer to section 4.2.3 Telemetry Settings).



4.3.2 Flight Settings

This section includes configurations such as speed limits, altitude limits, and failsafe behavior. After entering the desired parameters, click the "Send" button in the bottom-right corner of the on-screen keyboard to save your settings.



Quick Settings and Corresponding ArduPilot Copter Firmware Parameters:

Throttle Failsafe — FS_THR_ENABLE

Follow Speed — WPNAV_SPEED

Return-to-Home Altitude — RTL_ALT

Return-to-Home Speed — RTL_SPEED

Loiter Acceleration Limit — LOIT_ACC_MAX

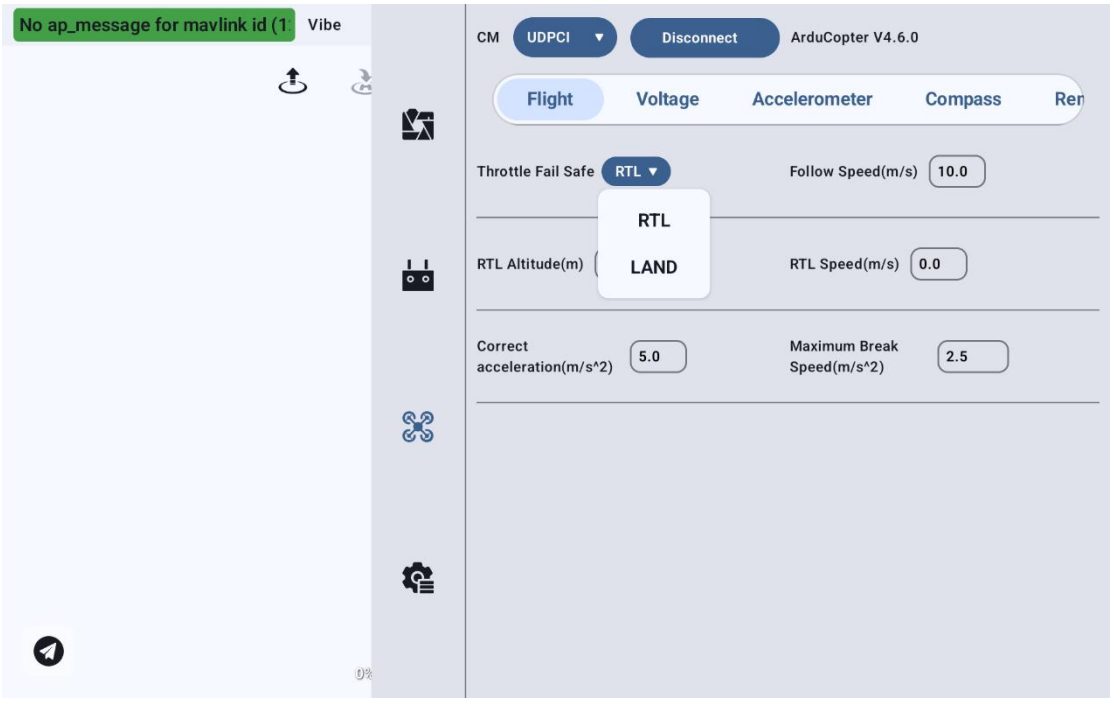
Maximum Braking Acceleration — LOIT_BRK_ACCEL

Waypoint Radius — WPNAV_RADIUS

Waypoint Turn — WP_YAW_BEHAVIOR (Used to determine the aircraft heading in AUTO/GUIDE/RTL modes.)

4.3.2.1 Failsafe Behavior

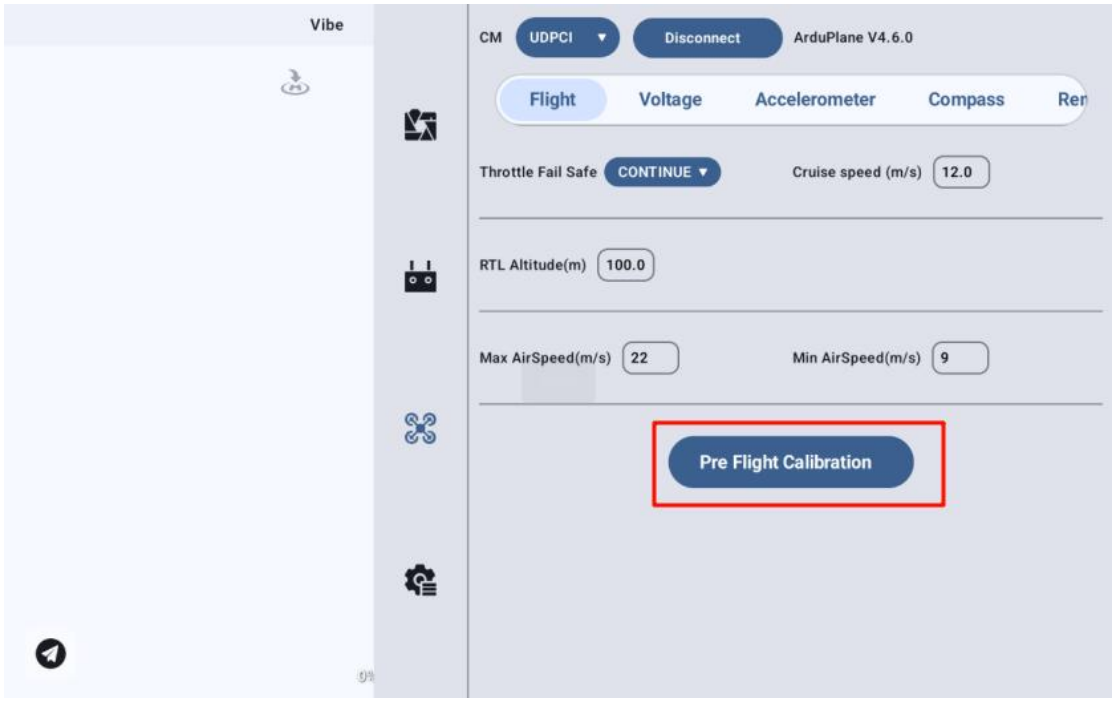
By configuring throttle failsafe behavior, the UAV will execute the preset safety maneuver when a communication loss occurs.

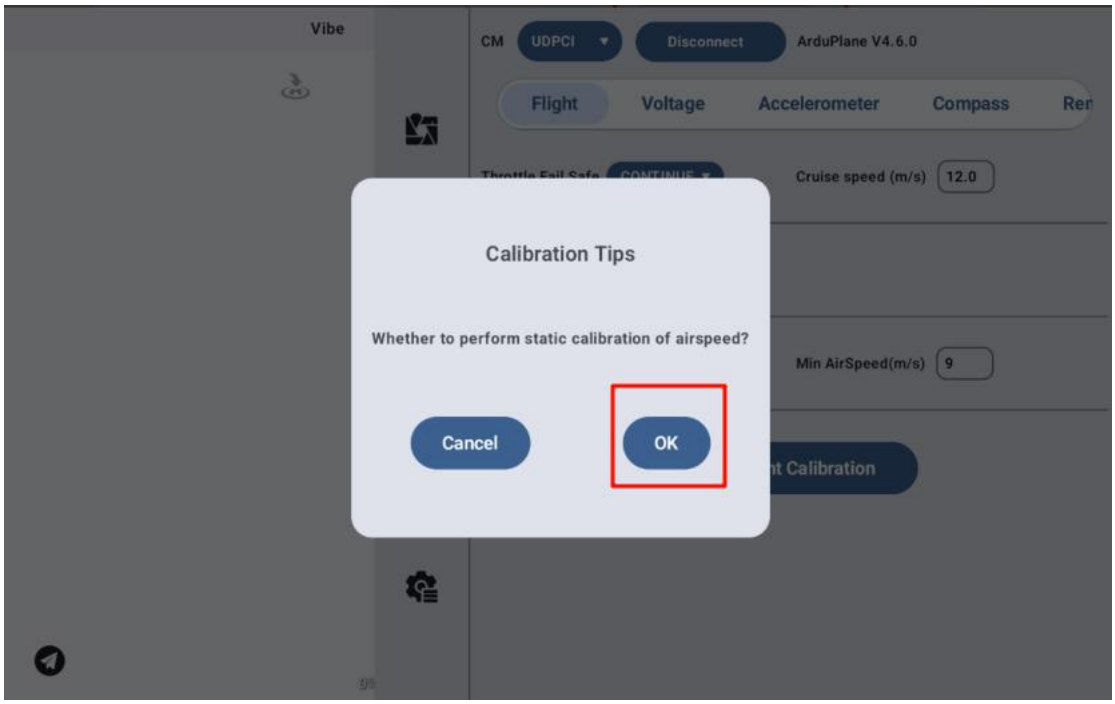


4.3.2.2 Pre-Flight Calibration

For fixed-wing firmware, a pre-flight calibration function is available to calibrate the airspeed sensor.

Tap "Pre-Flight Calibration", then confirm to start the airspeed sensor calibration process.

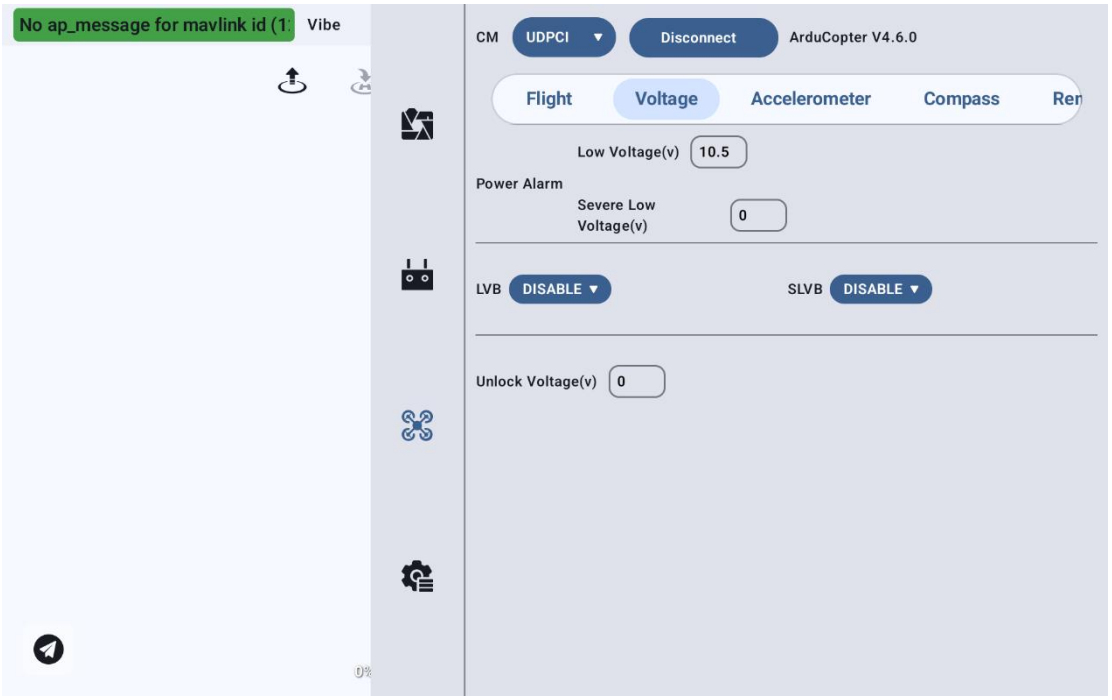




4.3.3 Voltage

Configure voltage alarm thresholds and low-voltage response behavior.

After entering the parameters, tap the “Send” button in the lower right corner of the keyboard to save the settings.



Quick Settings and Corresponding ArduPilot Copter Firmware Parameters:

Low Voltage — BATT_LOW_VOLT

Critical Low Voltage — BATT_CRT_VOLT

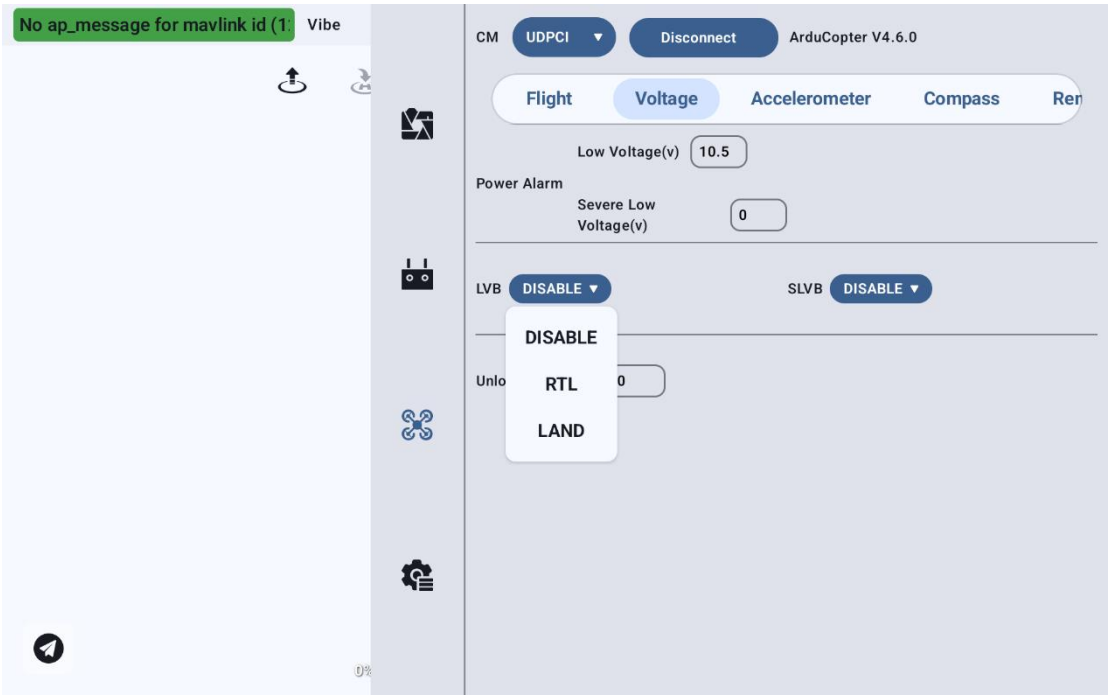
Low Voltage Action — BATT_FS_LOW_ACT

Critical Low Voltage Action — BATT_FS_CRT_ACT

Arming Voltage — BATT_ARM_VOLT

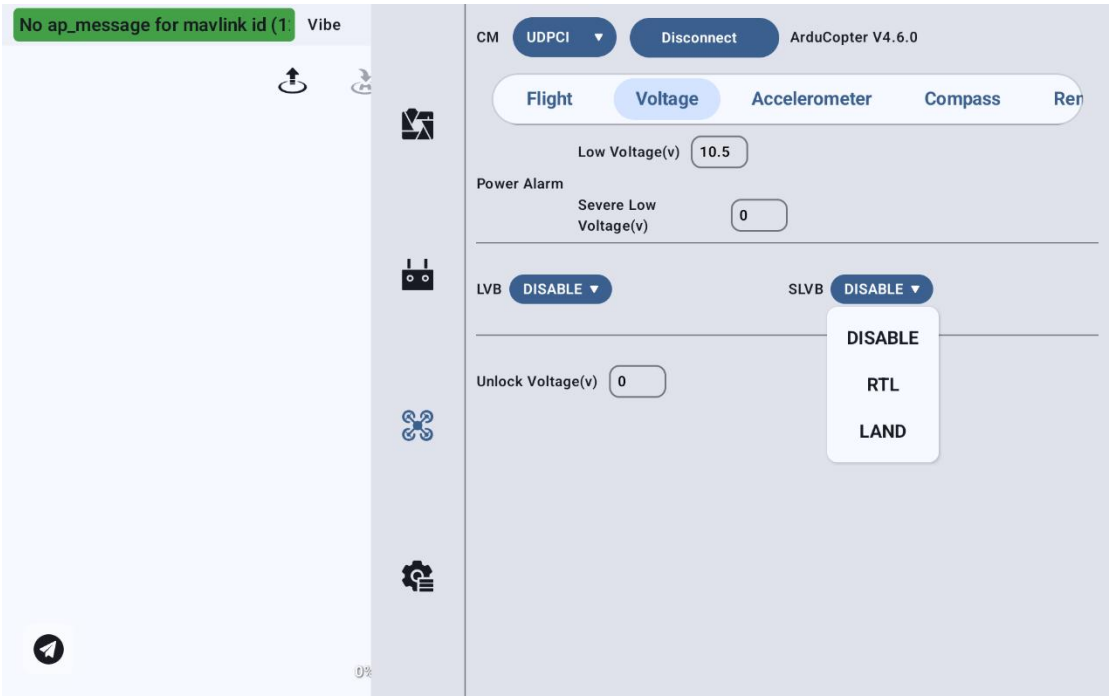
4.3.3.1 Low Voltage

When the battery voltage remains below the configured low voltage threshold for more than 10 seconds (as per flight controller default), the system will trigger the action specified under the Low Voltage Action setting.



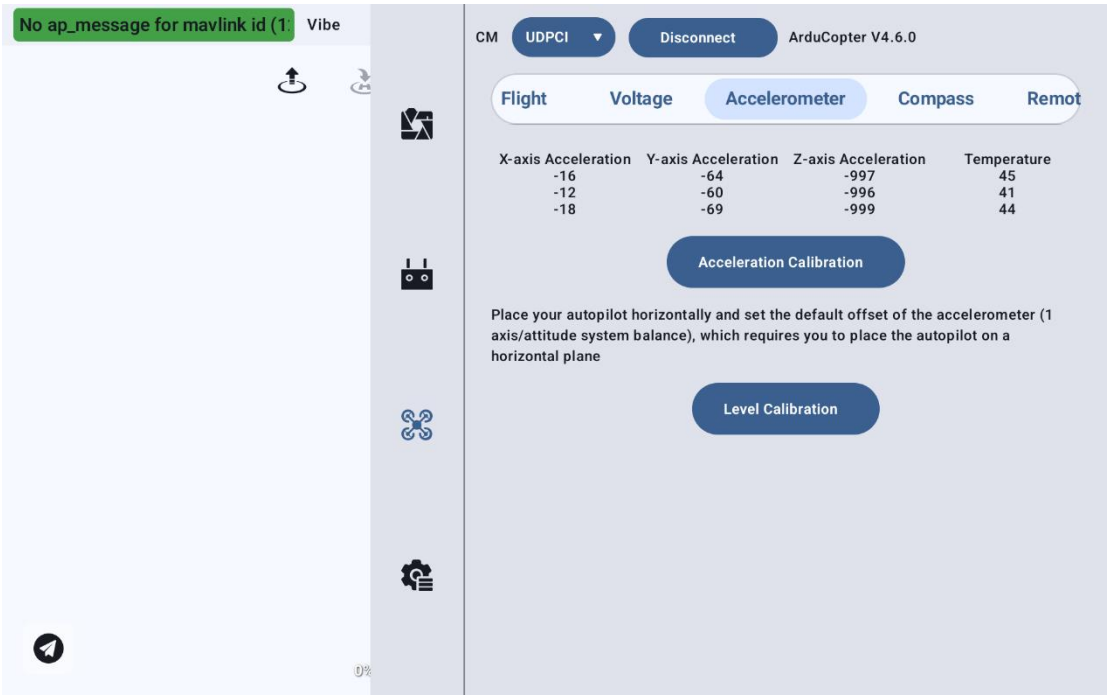
4.3.3.2 Critical Low Voltage

When the battery voltage drops below the configured critical low voltage threshold, the system will trigger the action specified under the Critical Low Voltage Action setting.



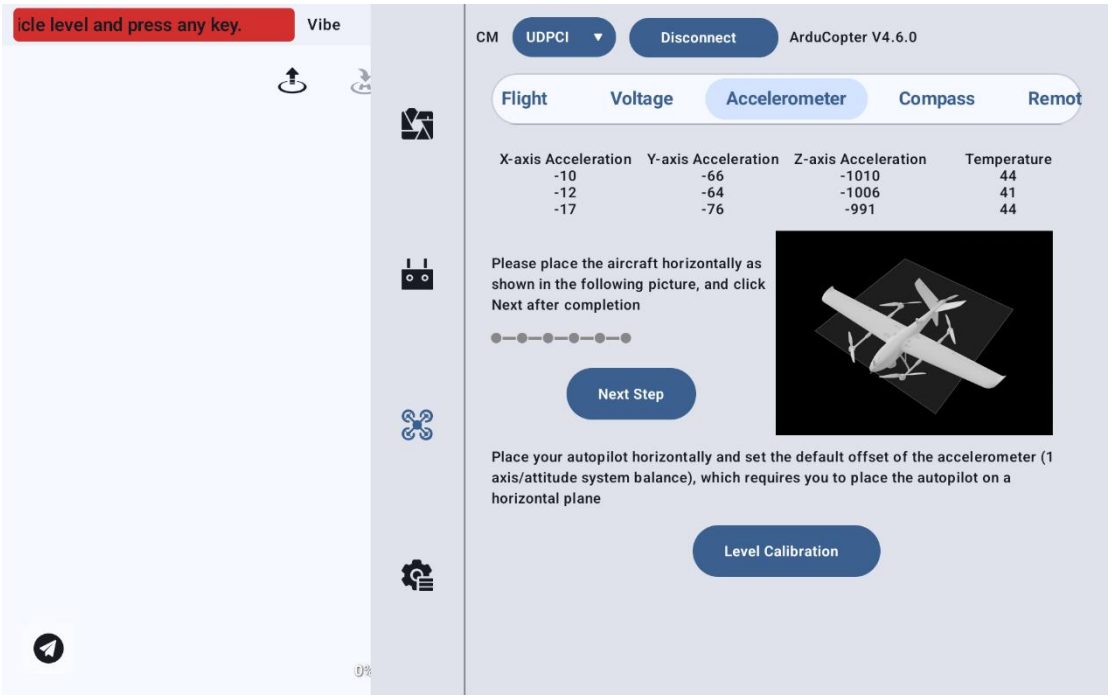
4.3.4 Accelerometer Menu

This menu displays the accelerometer data and IMU temperature from the flight controller. It also provides options for accelerometer calibration and flight controller leveling calibration.



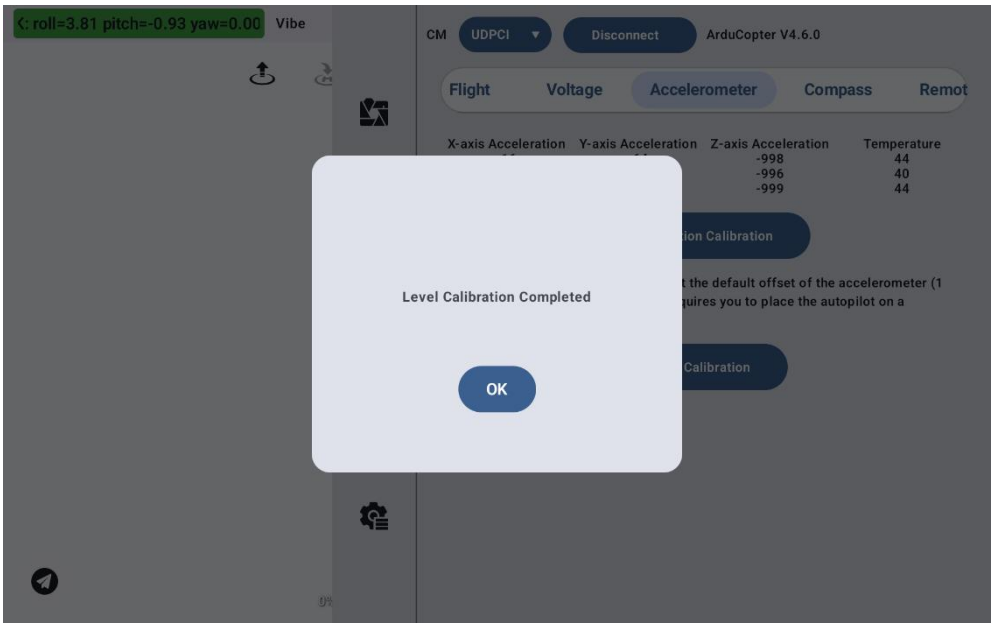
4.3.4.1 Accelerometer Calibration

Follow the instructions to place the drone as shown in the diagram. Click "Next" and proceed with calibrating the six faces of the drone. After completing the six-face calibration, restart the drone as prompted to finish the accelerometer calibration.



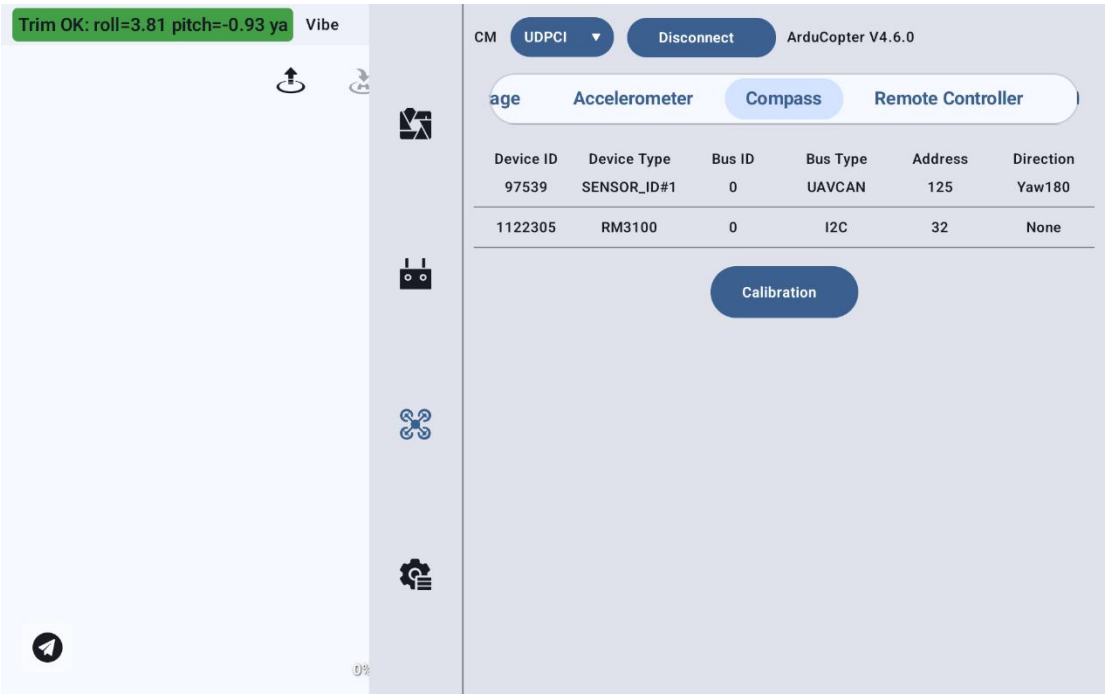
4.3.4.2 Horizontal Calibration

Place the drone on a flat, level surface and ensure it remains still. Click "Horizontal Calibration" to calibrate the drone's horizontal alignment.

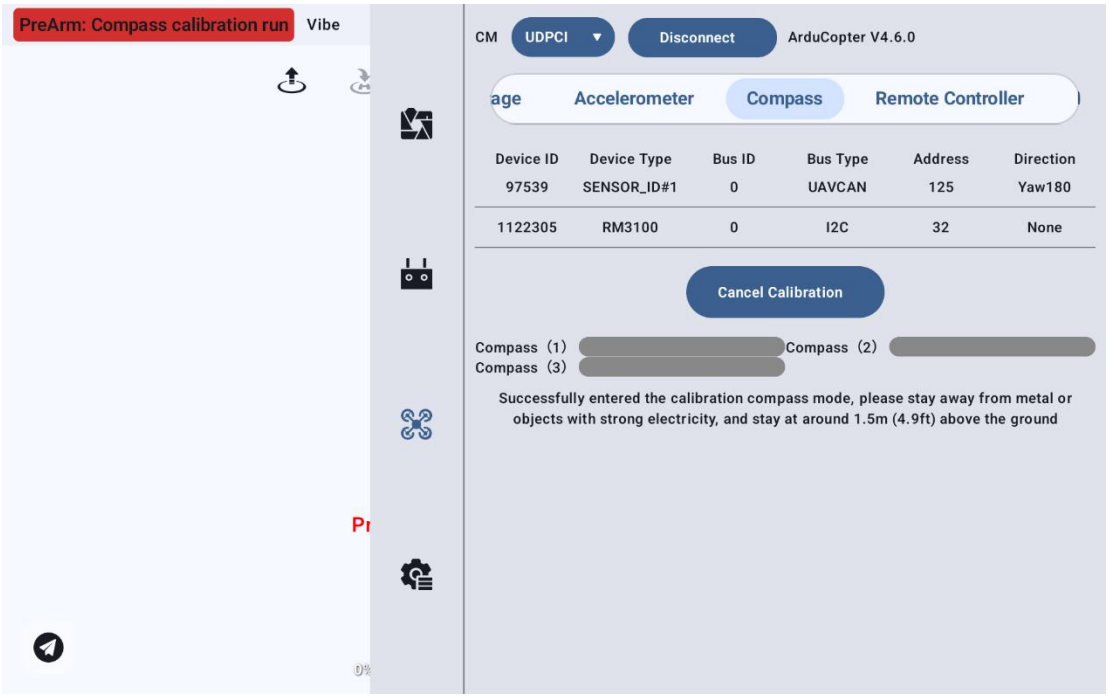


4.3.5 Compass Menu

This menu includes various compass-related information and calibration functions.



4.3.5.1 Start Calibration



Note:

Do not calibrate in areas with strong magnetic fields or near large metal objects, such as magnetic minerals, parking lots, or areas with underground steel reinforcements.

Avoid carrying ferromagnetic materials like mobile phones during calibration.

Steps for Compass Calibration:

1. Open the compass calibration interface in the correct sequence.
2. Select Calibration Difficulty Level.
3. Click "Calibrate."
4. Lift the drone and rotate it in different directions. Ensure each side (front, back, left, right, top, and bottom) points downward toward the

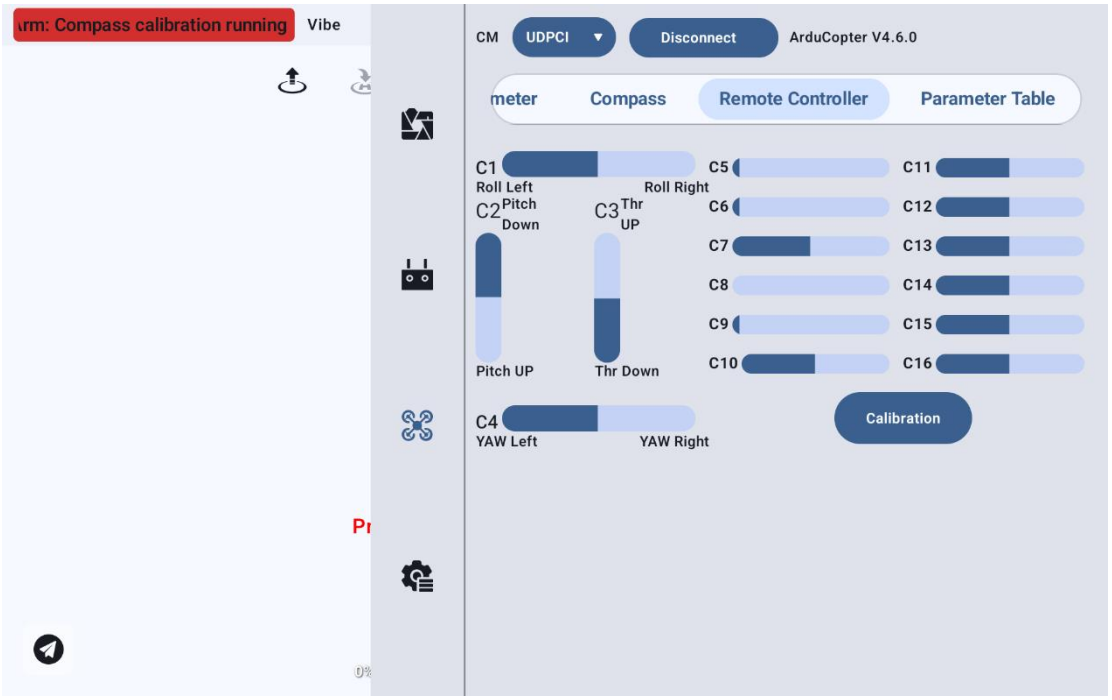
Earth for a few seconds, until the compass progress bar completes.

5. Restart the drone.

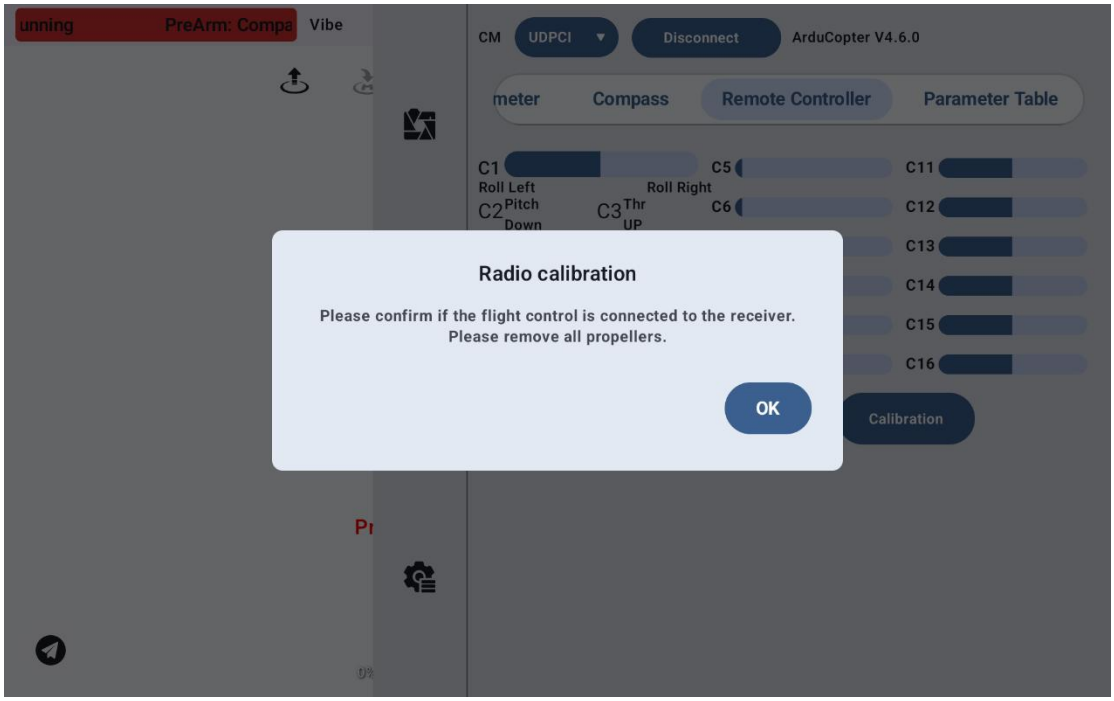
4.3.6 Remote Control Calibration

Provides remote control calibration functionality and allows viewing of the current channel values recognized by the flight controller.

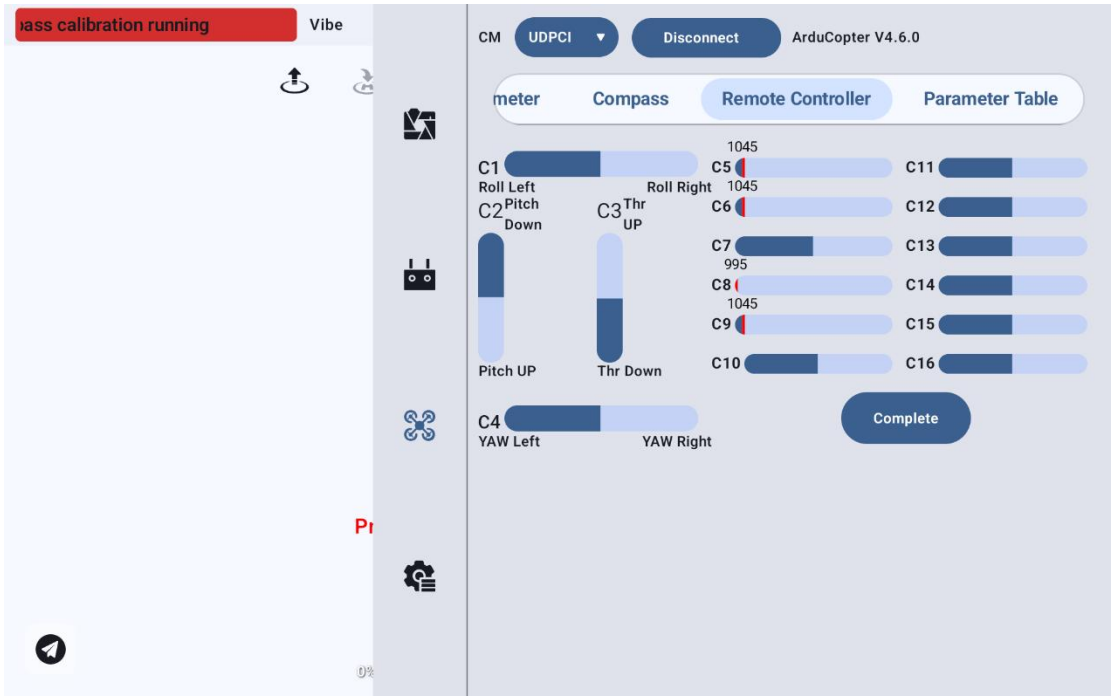
1. Before calibration, ensure that all sticks are centered, confirm the correct polarity of the channels, and then click "Calibrate."



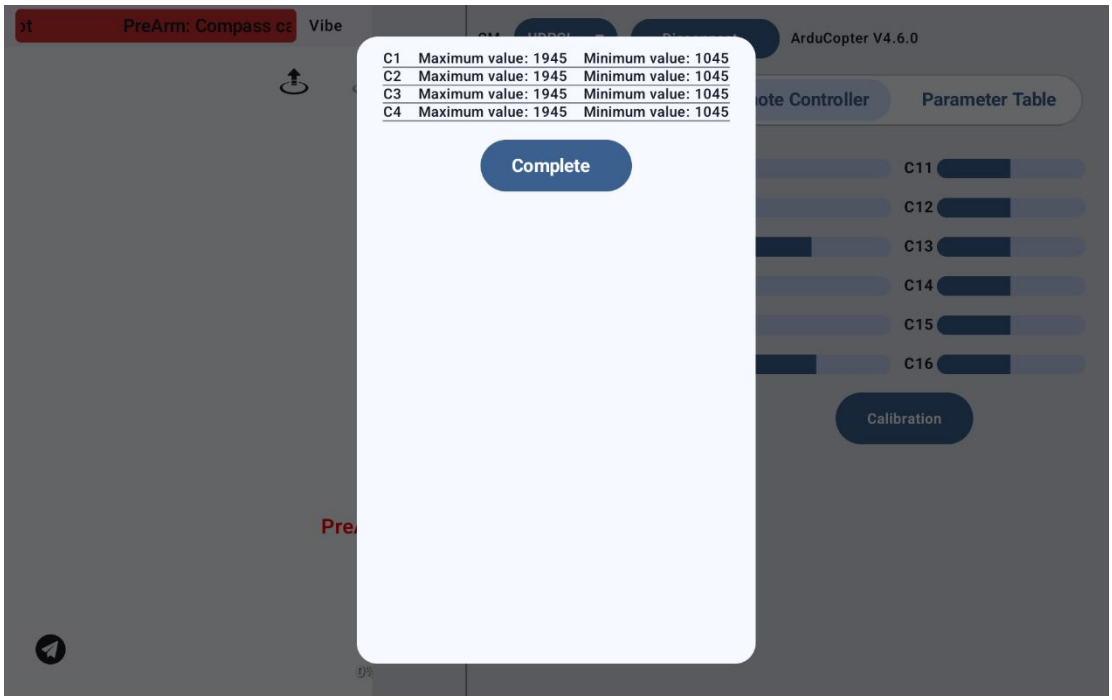
2. Follow the instructions to remove all propellers, then click "Confirm."



3. Gradually move the joysticks and switches of each channel to their maximum and minimum positions in sequence, allowing the software to record the maximum and minimum values of each channel.

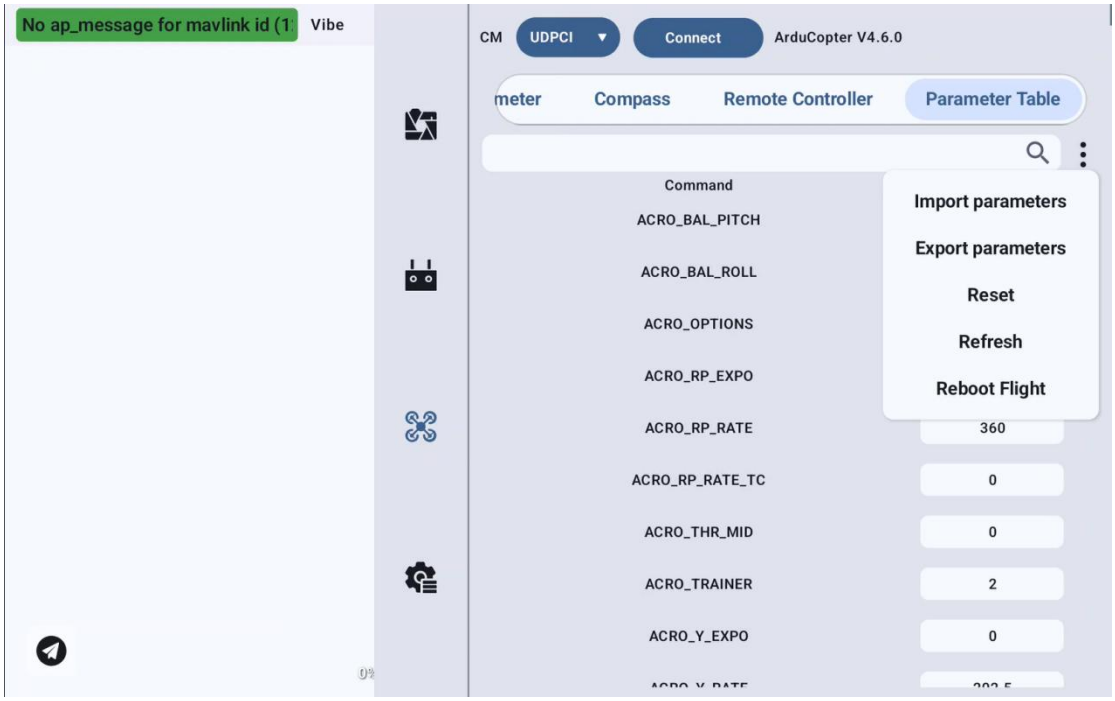


4. Click "Complete," and the software will display the recorded maximum and minimum values for each channel. Click "Complete" again to finish the remote control calibration.



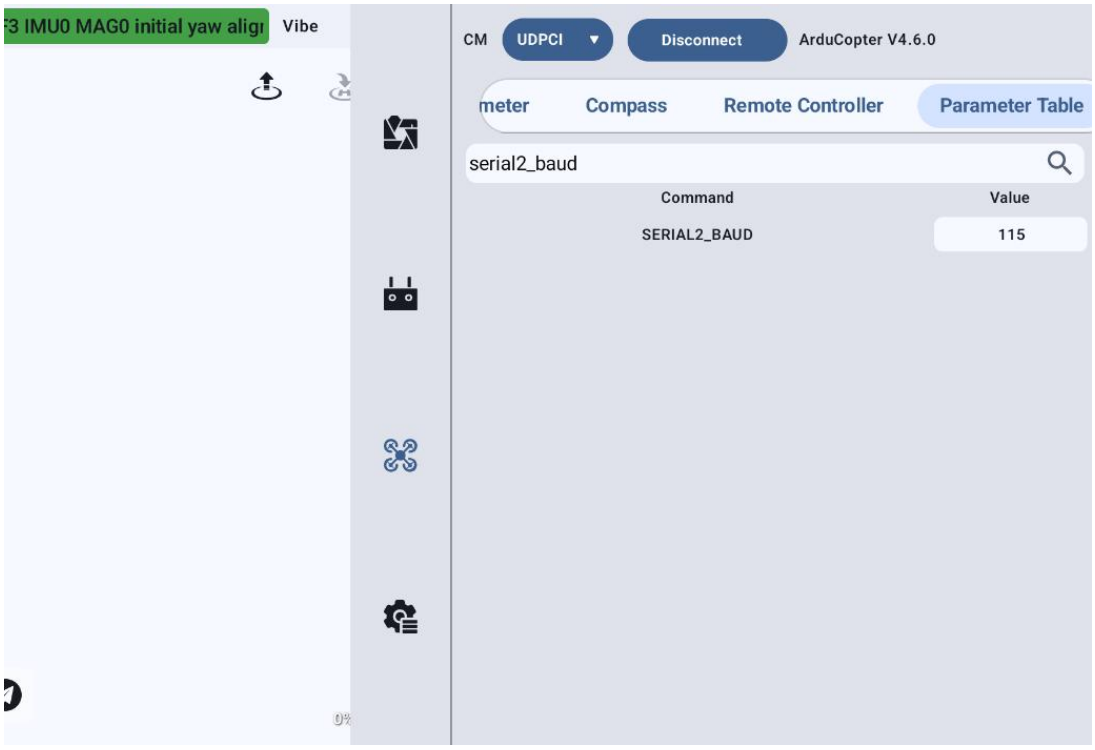
4.3.7 Parameter Table

Includes functions for importing, exporting, searching, modifying, refreshing, resetting, and rebooting the flight controller.



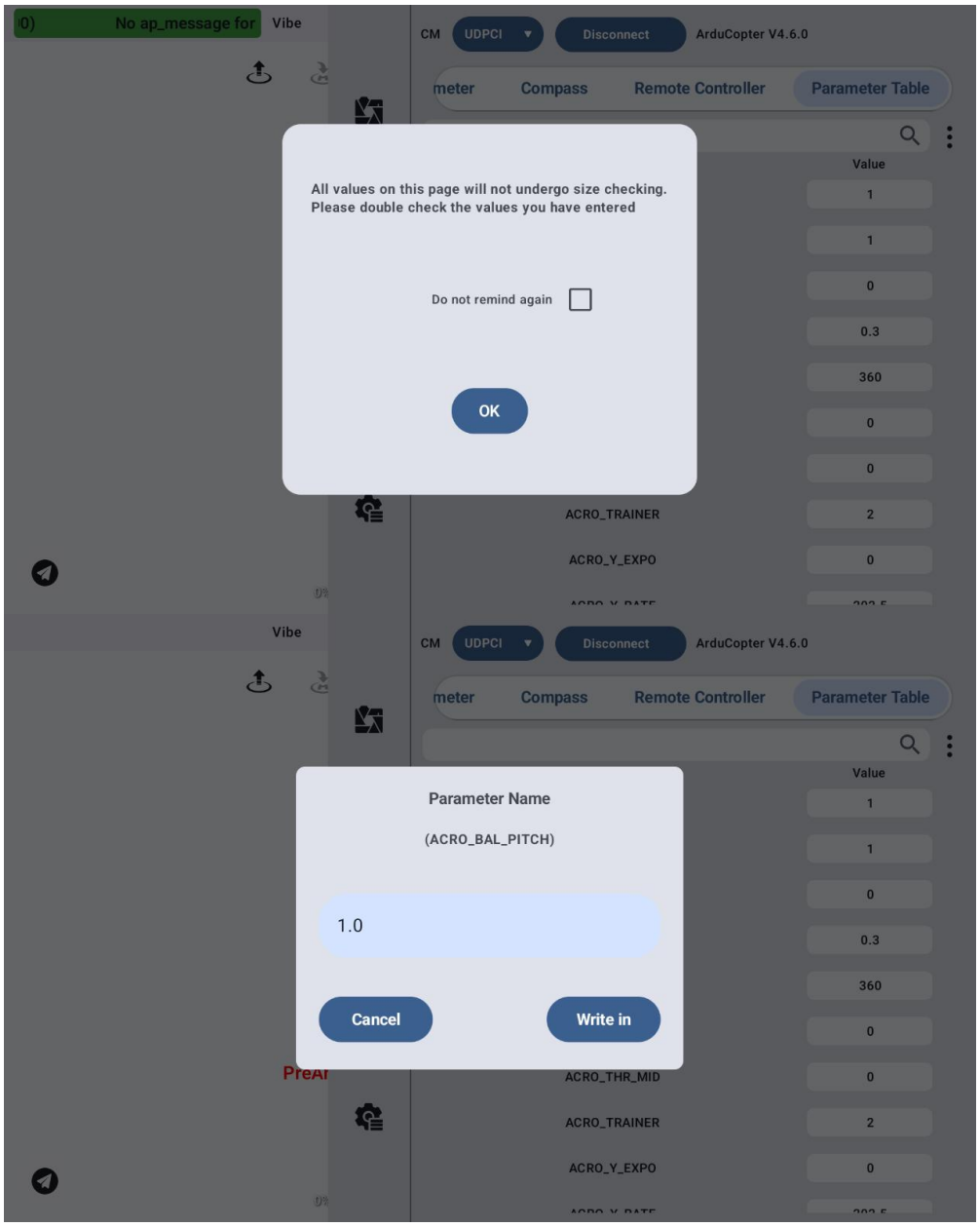
4.3.7.1 Parameter Search

Enter the parameter name you want to search for and click the search button. The system will search for the exact name or parameters that contain the entered name.



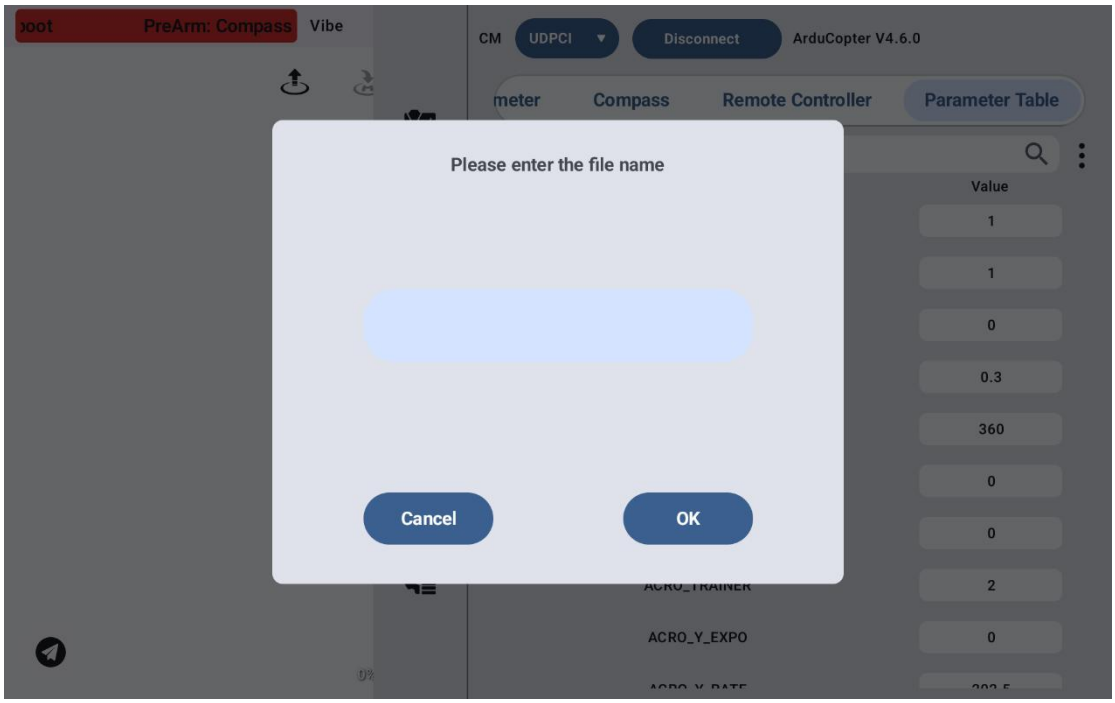
4.3.4.2 Parameter Modification

Before making any modifications, please double-check the parameters to be changed and make a backup if necessary. In the value box of the parameter you want to modify, enter the desired value and click "Write" at the bottom right of the input field to complete the parameter modification.



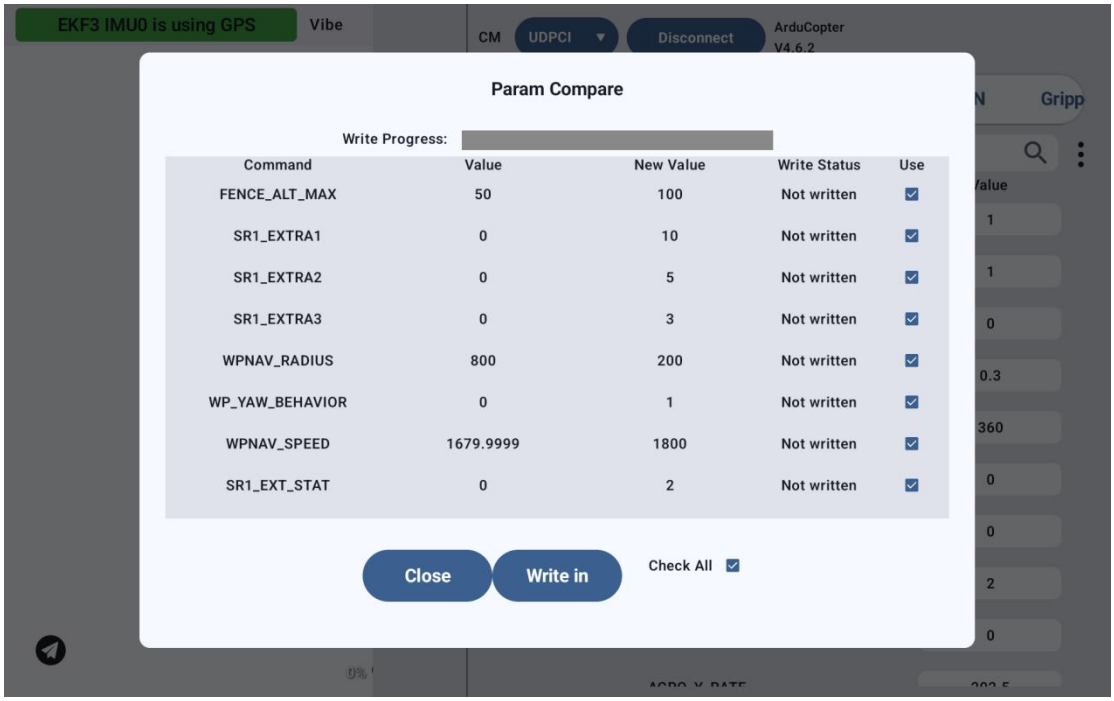
4.3.7.3 Parameter Export

Click "Export Parameters" to save all the parameters from the parameter list to the remote controller.



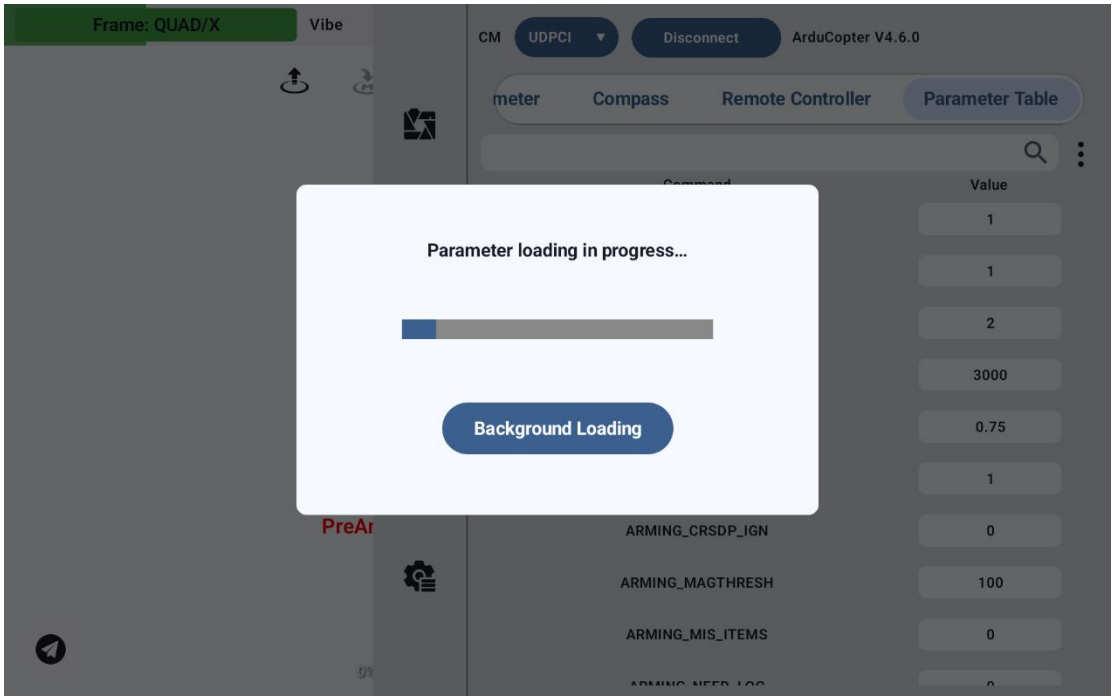
4.3.7.4 Parameter Import

Click "Import Parameters" and follow the prompts to import the parameters to the flight controller. It supports importing flight controller parameters saved by UniGCS and parameters saved from other devices.



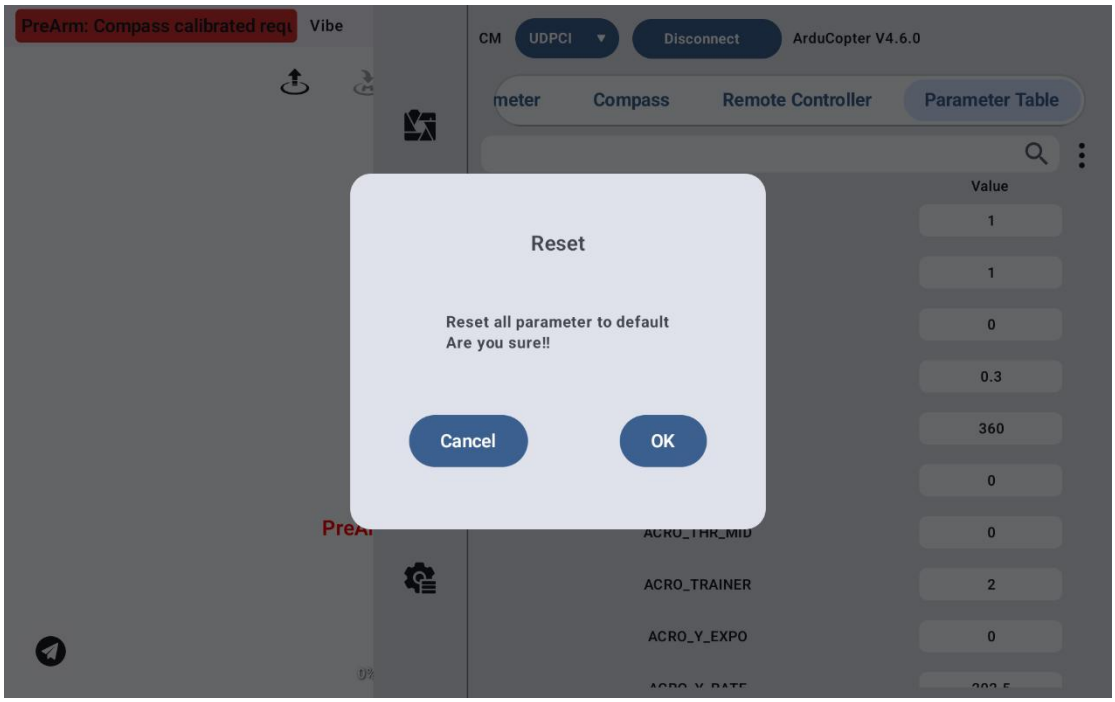
4.3.7.5 Parameter Table Refresh

Click "Refresh" to refresh the current parameter table. You can choose to click "Hide to Background" to hide it to the title bar, where a progress bar will appear. Once the refresh is complete, the progress bar will disappear. It is not recommended to refresh the parameter table during flight.



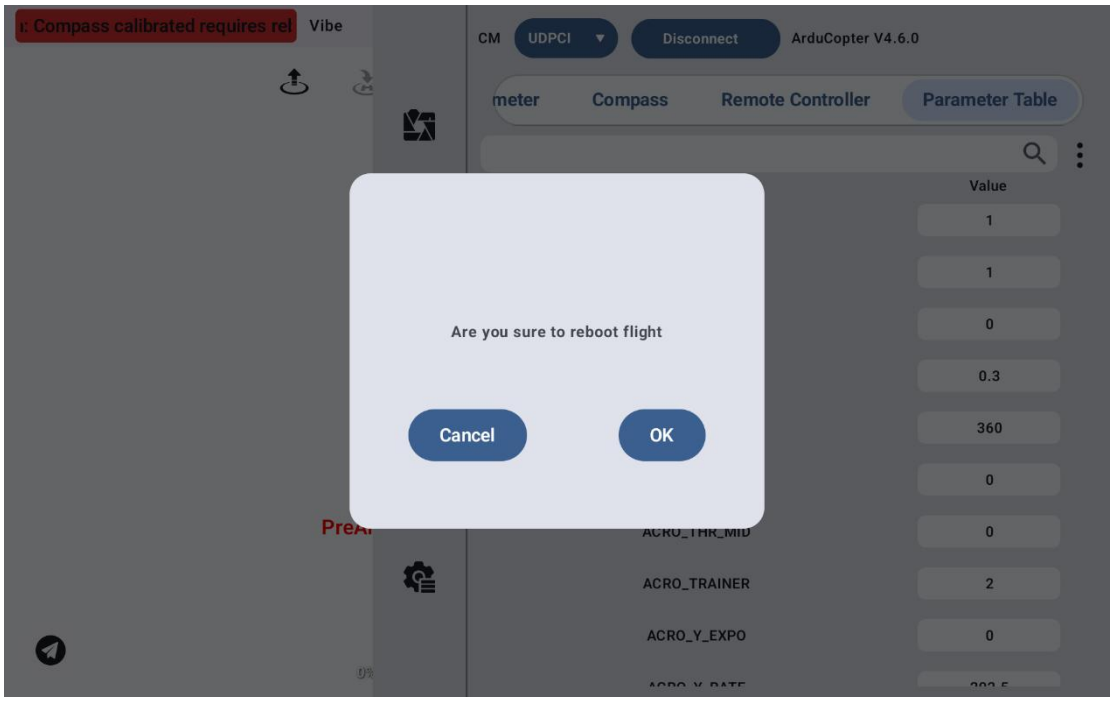
4.3.7.6 Parameter Reset

Click "Reset" to restore all parameters in the parameter table to the default settings of the current firmware.



4.3.7.7 Flight Controller Restart

Click the "Restart Flight Controller" button to remotely reboot the flight controller. The flight controller must be in an unlocked state to perform the restart.



4.3.8 Parameter Mapping

Here is the mapping of the shortcut parameters to their corresponding Ardupilot firmware parameters:

ArduCopter 4.7.0 Firmware:

Throttle Fail-safe Protection — FS_THR_ENABLE

Follow Mode Speed — WPNAV_SPEED

Return to Launch (RTL) Altitude — RTL_ALT

Return to Launch (RTL) Speed — RTL_SPEED

Loiter Acceleration — LOIT_ACC_MAX

Maximum Brake Speed — LOIT_BRK_ACCEL

Low Voltage — BATT_LOW_VOLT

Critical Low Voltage — BATT_CRT_VOLT

Low Voltage Behavior — BATT_FS_LOW_ACT

Critical Low Voltage Behavior — BATT_FS_CRT_ACT

Arm Voltage — BATT_ARM_VOLT

Waypoint Radius — WPNAV_RADIUS

Waypoint Turn — WP_YAW_BEHAVIOR (Used to determine the aircraft heading in AUTO/GUIDE/RTL modes.)

ArduPlane 4.7.0 Firmware:

Throttle Fail-safe Protection — FS_LONG_ACTN

Cruise Airspeed — AIRSPEED_CRUISE

Maximum Airspeed — AIRSPEED_MAX

Minimum Airspeed — AIRSPEED_MIN

Return to Launch (RTL) Altitude — RTL_ALTITUDE

Low Voltage — BATT_LOW_VOLT

Critical Low Voltage — BATT_CRT_VOLT

Low Voltage Behavior — BATT_FS_LOW_ACT

Critical Low Voltage Behavior — BATT_FS_CRT_ACT

Arm Voltage — BATT_ARM_VOLT

Waypoint Radius — WPNAV_RADIUS

ArduRover 4.7.0 Firmware:

Throttle Fail-safe Protection — FS_THR_ENABLE

Waypoint Speed — WP_SPEED

Low Voltage — BATT_LOW_VOLT

Critical Low Voltage — BATT_CRT_VOLT

Low Voltage Behavior — BATT_FS_LOW_ACT

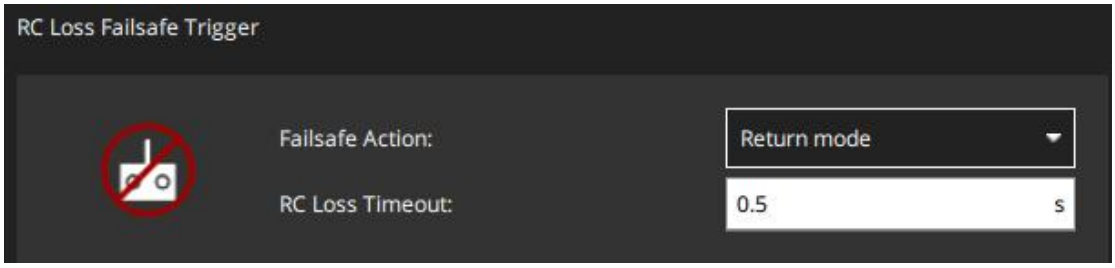
Critical Low Voltage Behavior — BATT_FS_CRT_ACT

Arm Voltage — BATT_ARM_VOLT

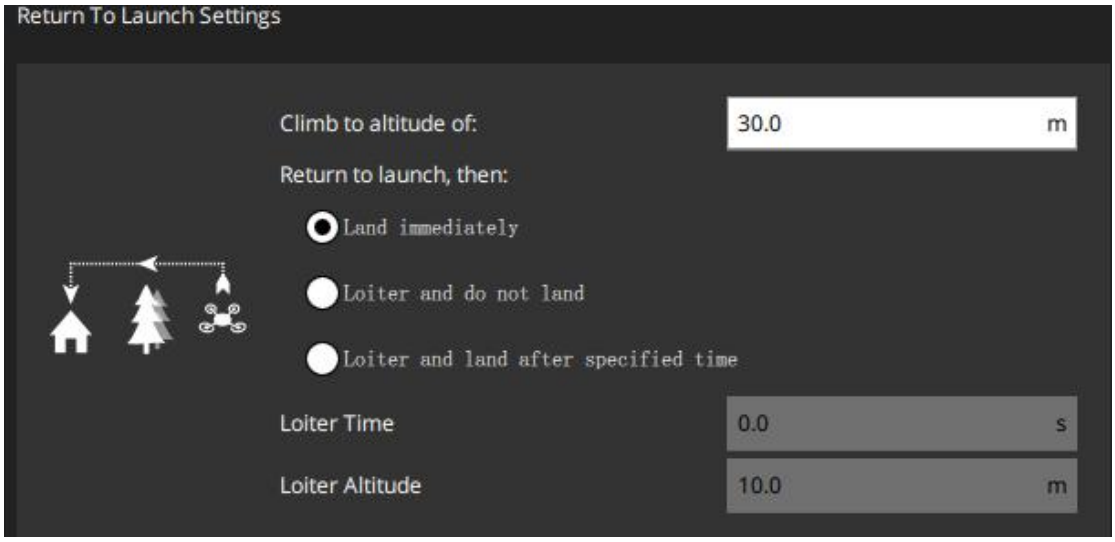
Waypoint Radius — WPNAV_RADIUS

Px4 Multirotor 1.15.4

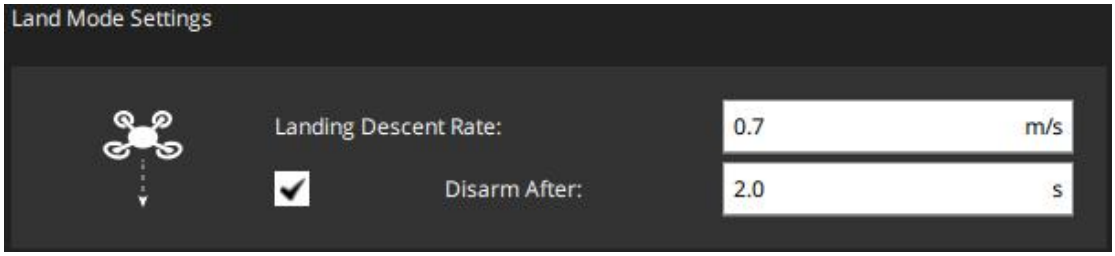
- Remote Control Failsafe Protection



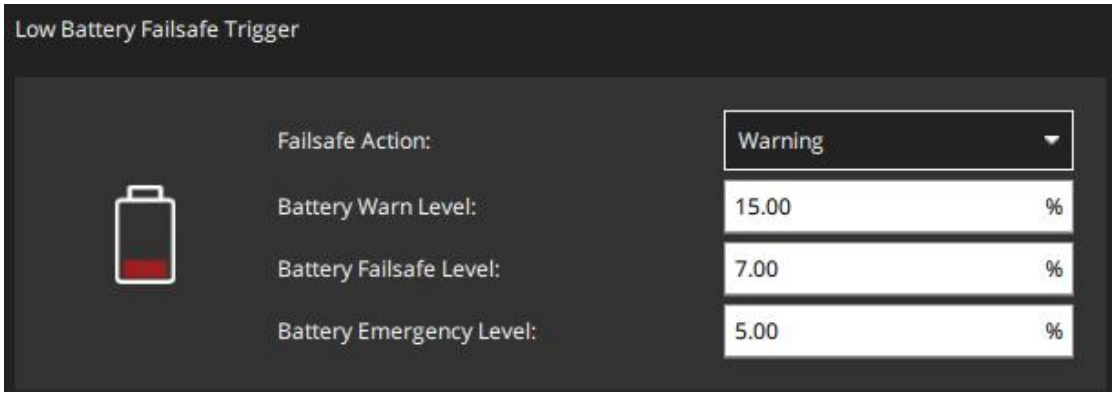
- Return-to-Launch (RTL) Altitude



- Landing Descent Rate

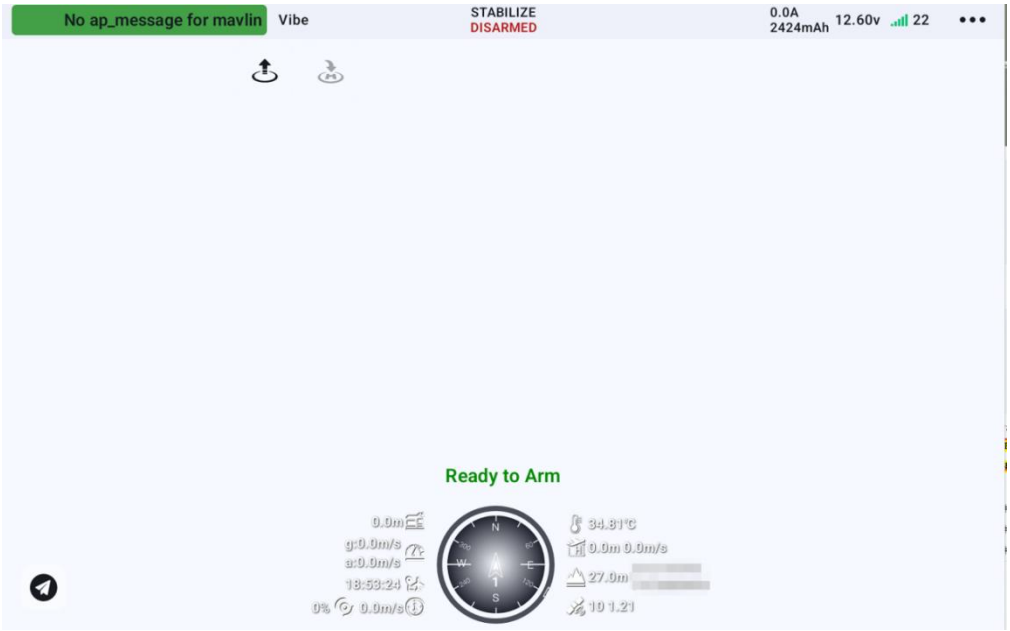


- Low battery fail-safe protection, battery warning level, battery critical level, and battery emergency level.

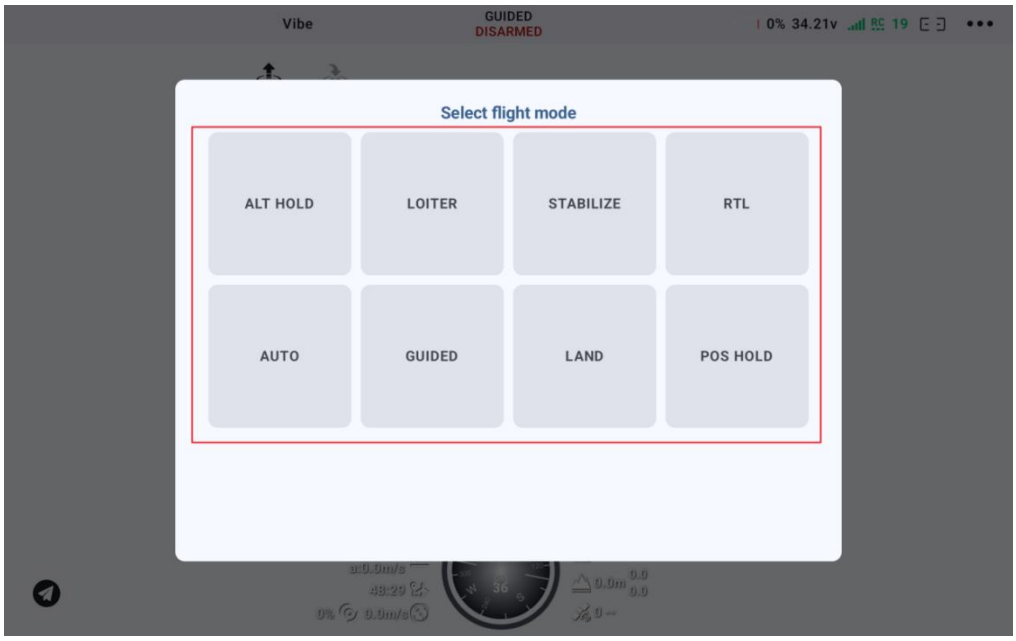


4.3.9 Quick Flight Mode Switching

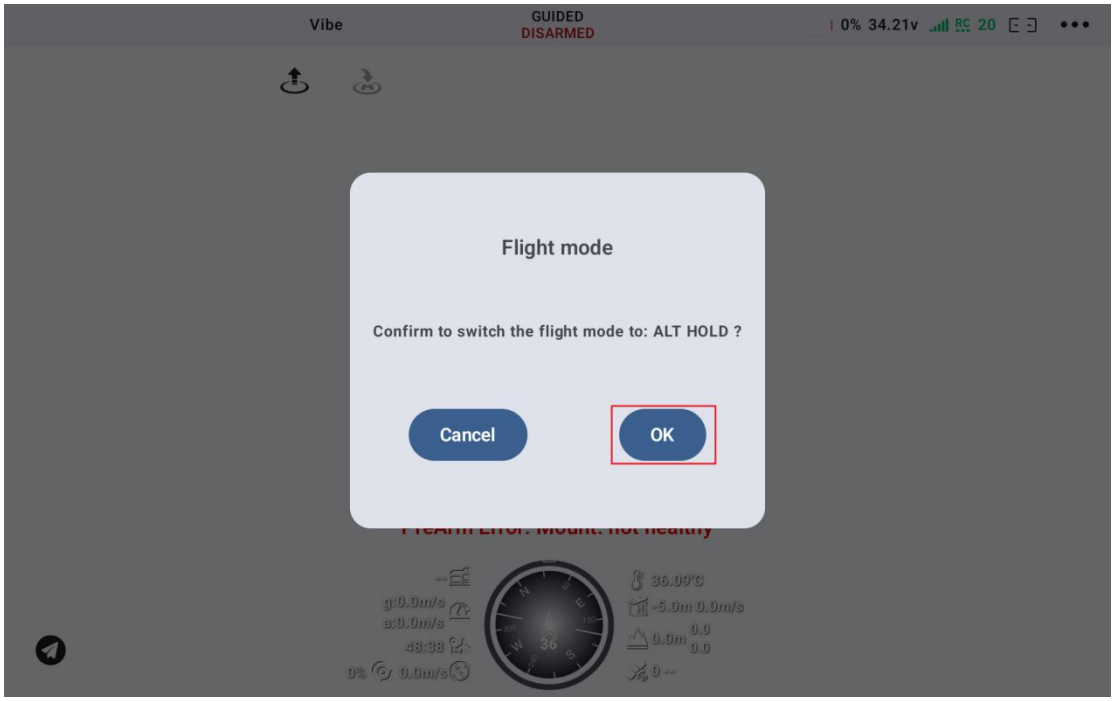
Quick switching of the drone's flight mode through the top menu bar of the App.



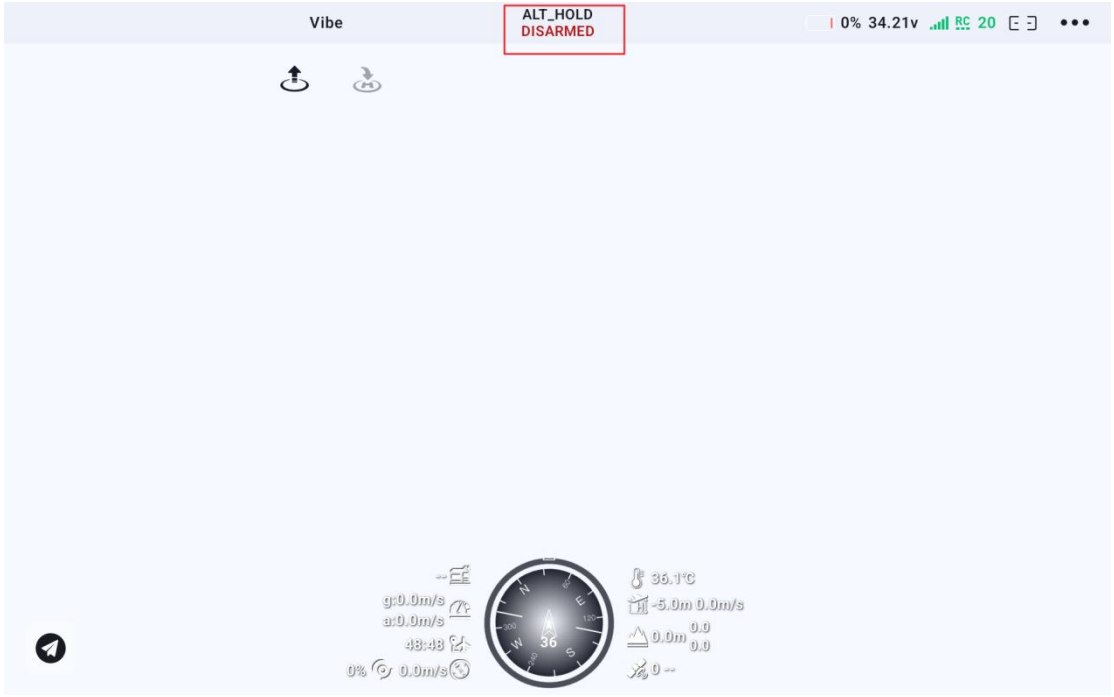
Connect the autopilot, click the flight mode selection area at the top, and optional flight modes will appear.



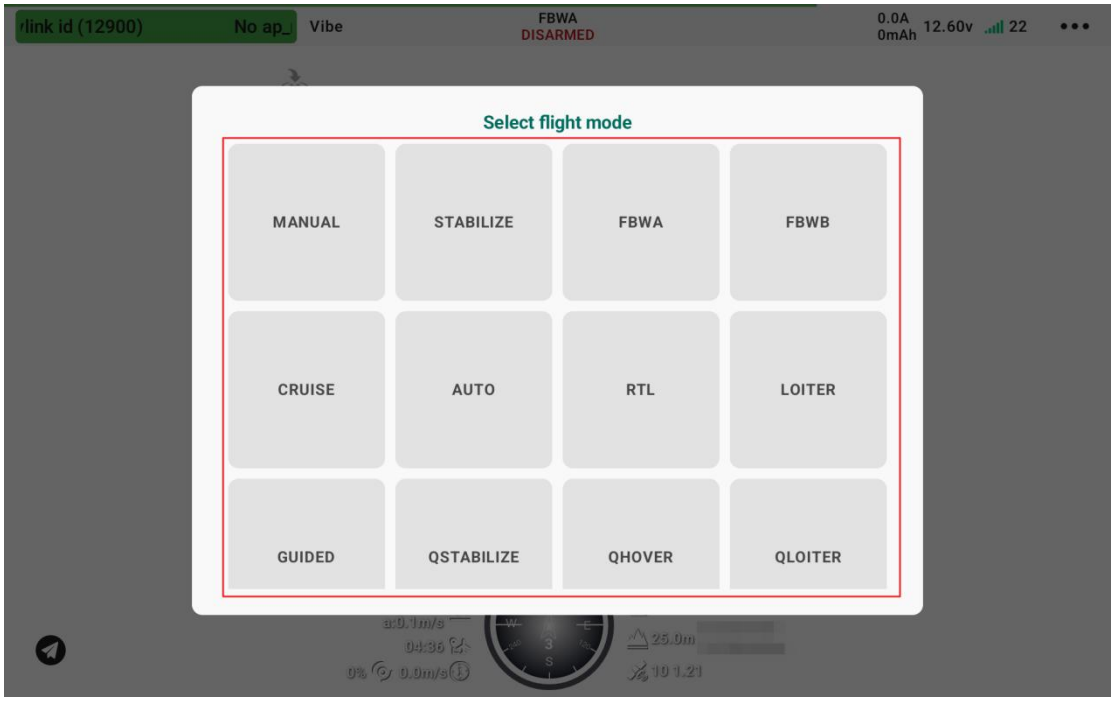
Select the flight mode you want, then click the confirmation button.

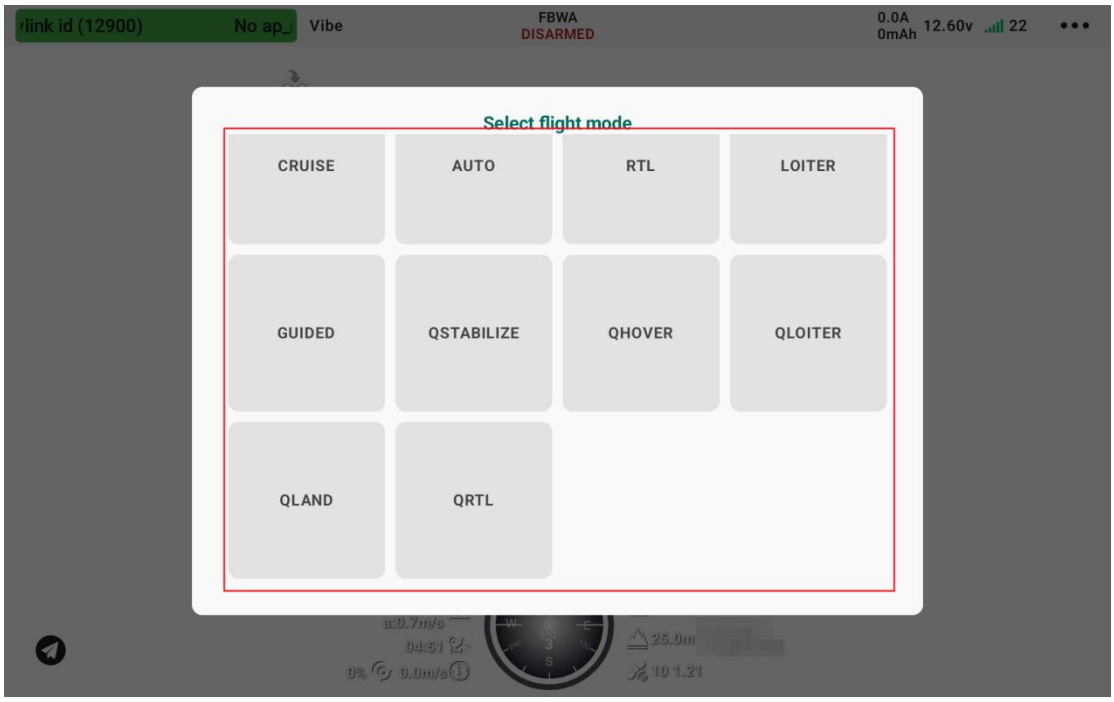


Then you can observe that the drone’s flight mode has been changed.



The selectable flight modes for VTOLs.



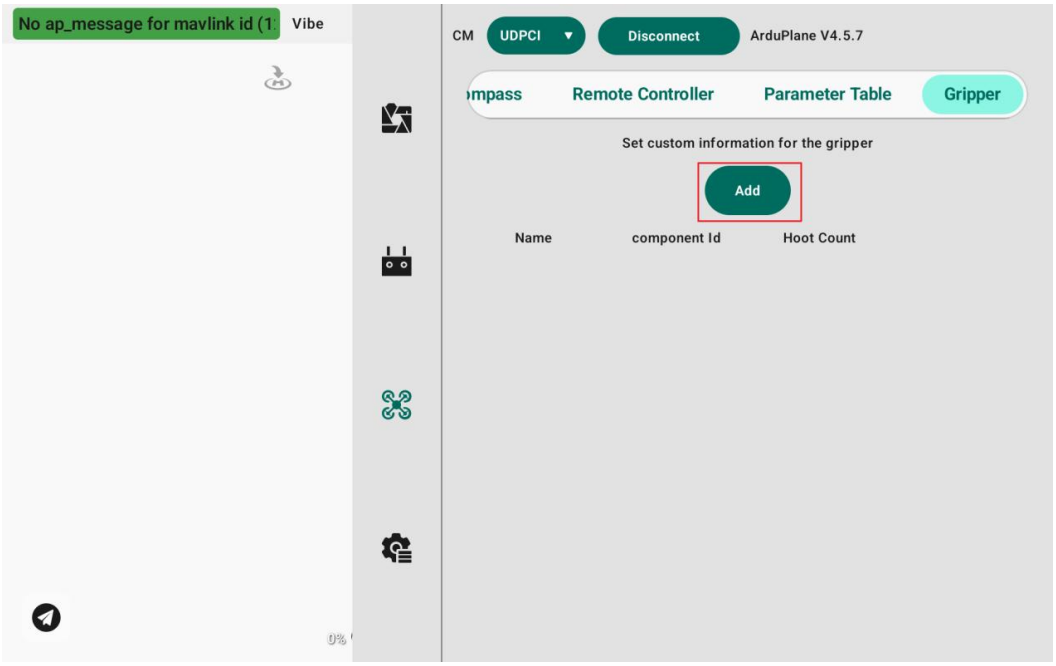


Note:

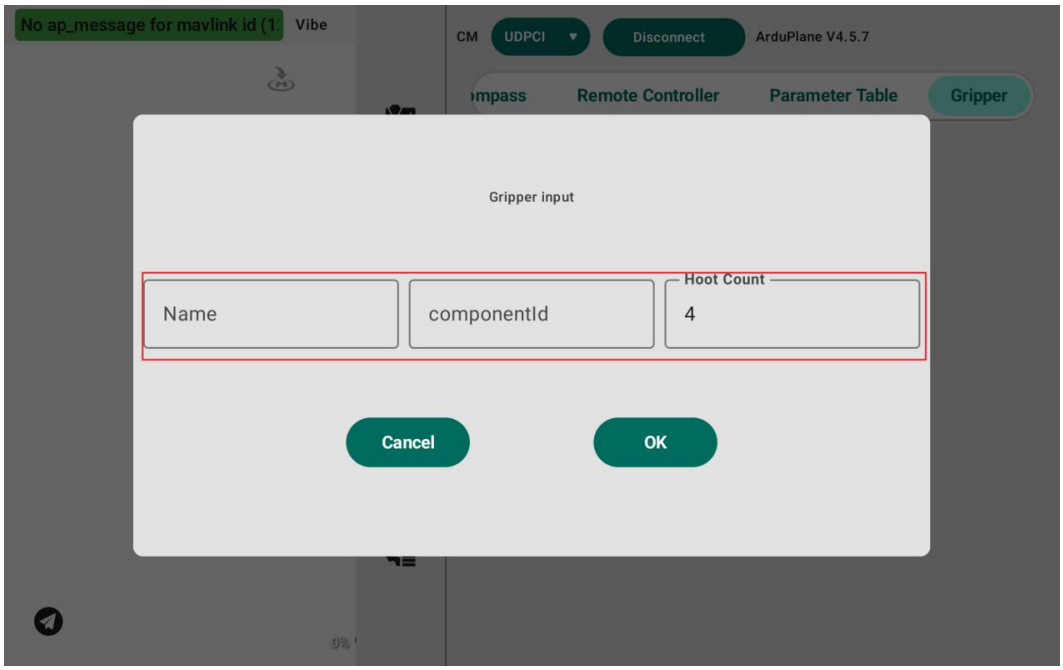
For flight safety considerations, some high-risk flight modes have been hidden in the selectable flight modes.

4.3.10 Gripper

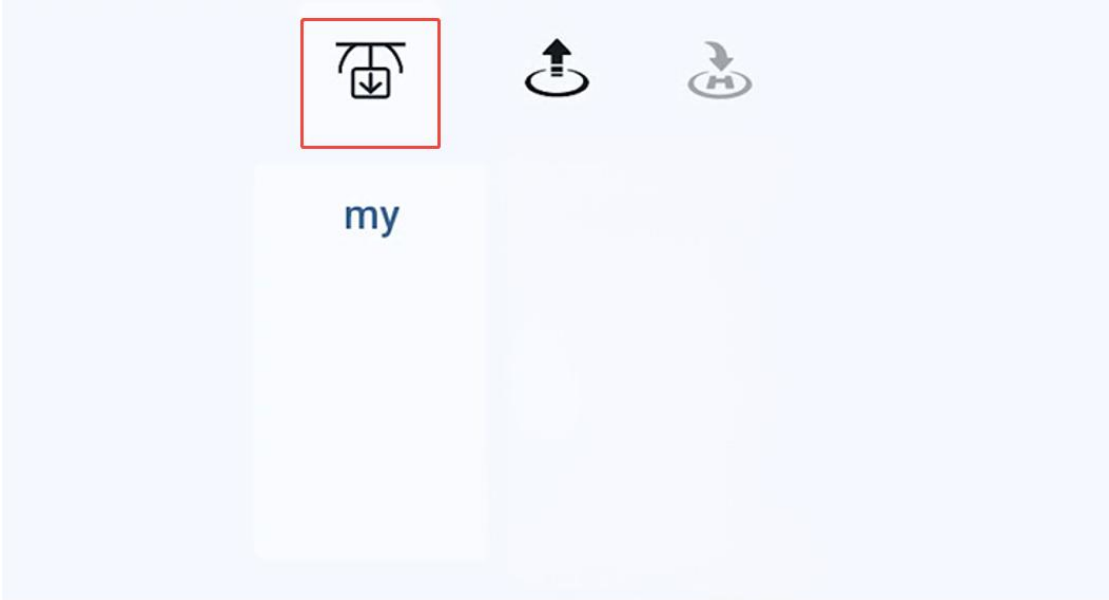
Support the function setting with the gripper, including device name, component ID, and hook quantity settings. Also supports adding multiple grippers.



Enter the gripper menu and click Add.



Enter the correct component ID, device name and the hook quantity.



After addin g and correctly connecting the cables, when the gripper icon appears in the upper-left corner, it indicates that the device has been correctly identified. Meanwhile, you can adjust the position of the icon on the screen by long-pressing the gripper icon.

Note:

The component ID of the gripper is provided by its manufacturer. For details, please consult the gripper manufacturer.

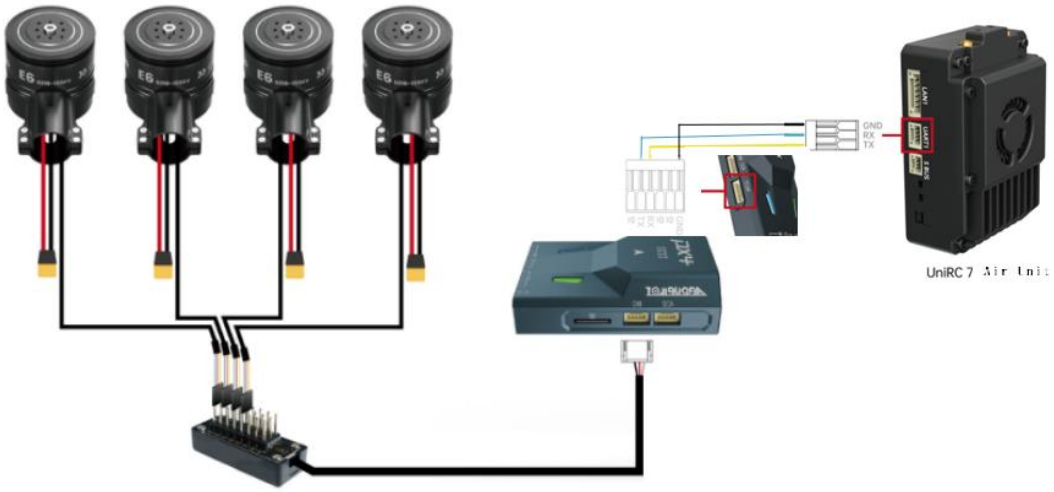
4.3.11 ESC / CAN Device Status Information Display

4.3.11.1 ESC Information Display

For ESCs with telemetry capability, UniGCS provides real-time monitoring of current, voltage, temperature, and motor RPM for each ESC on the UAV.

Take the SIYI E6 propulsion system as an example:

1. **Wiring:** Configure the CAN ID and throttle ID of the propulsion system, connect the CAN three-color cable to the CAN 1 interface on the flight controller via the CAN hub board. And then connect the TELEM 1 on the flight controller to the UART 1 interface on the air unit.



2. **Parameter Configuration:**

Set CAN_D1_PROTOCOL = 1, CAN_P1_DRIVER = 1, CAN_P1_BITRATE = 1000000, MOT_PWM_MAX = 1950, MOT_PWM_MIN = 1050, and set CAN_D1_UC_ESC_BM to an appropriate value according to the actual situation.

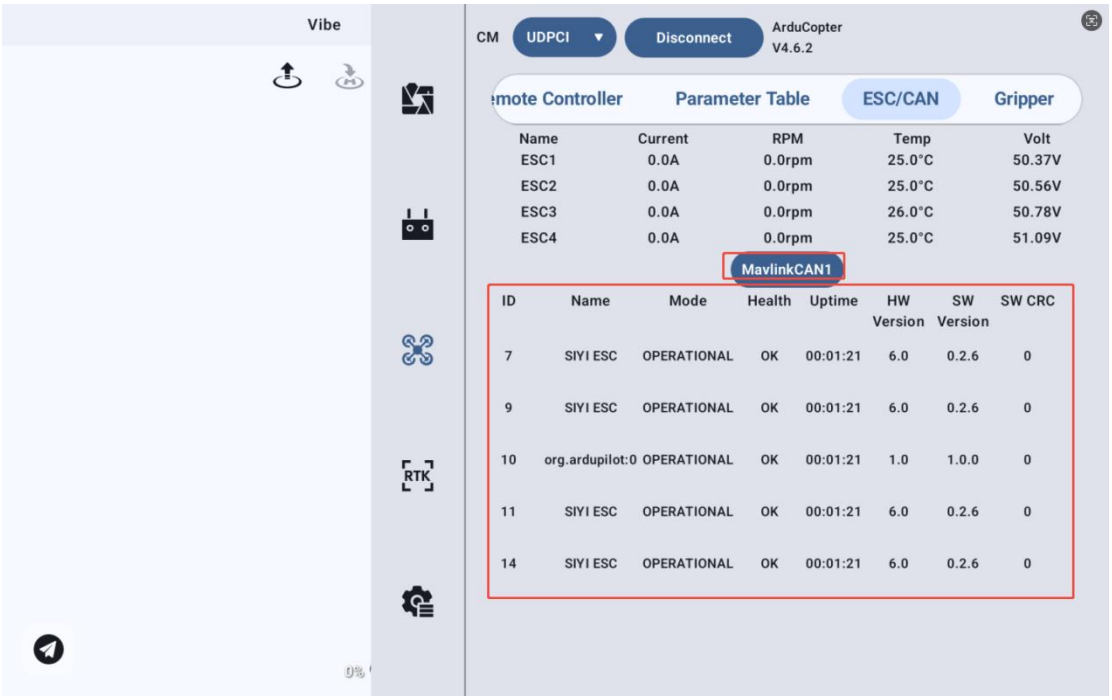
Warning

Please do not install the propellers when setting the MOT_PWM_MAX\MIN parameters. The propulsion motor may briefly activate during correct parameter writing, which is normal behavior.

3. Power on the propulsion system, flight controller and the air unit. After the air unit establishes communication with the transmitter, lauch the software and wait for parameter loading to complete. Navigate to the flight control module, swipe left to locate the ‘ESC/CAN’ menu to view real-time propulsion system data.

4.3.11.2 CAN Device Status Information

Click the [MavlinkCAN1] button to scan the device connected to the Flight Controller's CAN1 port. The scan will display the CAN device's ID, name, mode, health status, last update time, and version number.

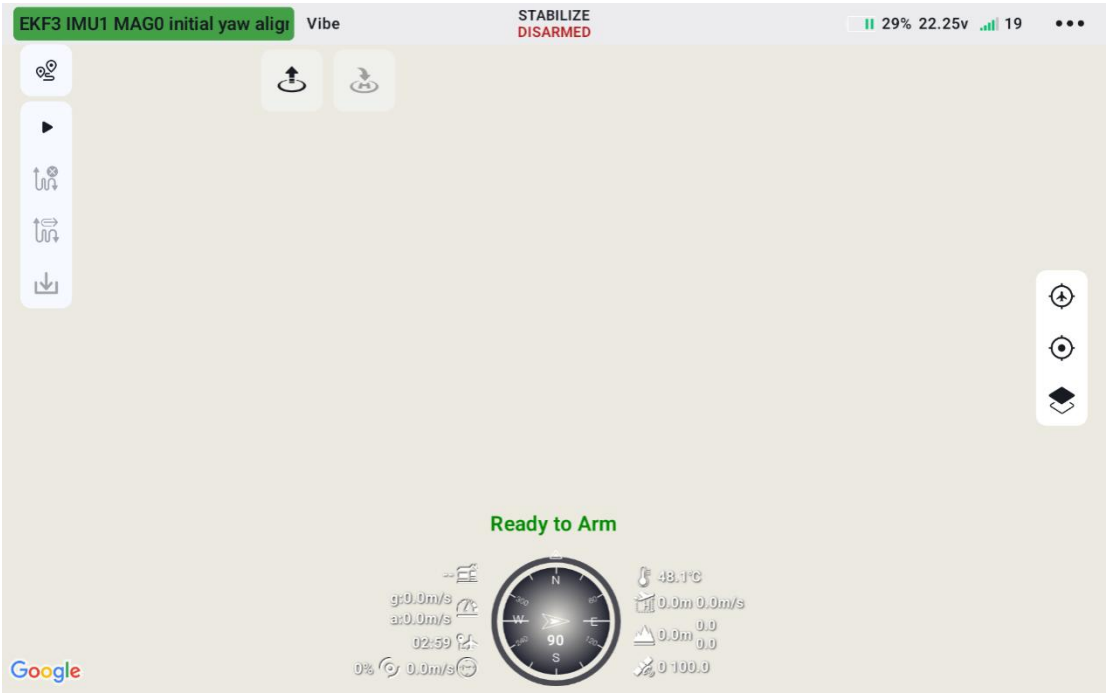


Note:

Please do not press the safety switch while using the scan function. This feature is not recommended during flight, as the scanning process will occupy part of the datalink bandwidth and may cause telemetry data loss.

4.4 Waypoint Module

Main Menu of the Waypoint Module



- View and Plan Waypoints: View the waypoint library and plan waypoint missions.
- Start/Pause Mission: After planning and uploading the waypoint mission, click this button to start the mission. During execution, clicking this button will pause the mission. At this point, multirotors will hover, fixed-wings will enter Loiter mode, and rovers will enter Hold mode. Click again to resume the mission.
- Clear Mission: Clears the current mission from both the interface and the flight controller. When this button is clicked during mission execution, a confirmation prompt will appear. Upon confirmation, multirotors will hover, fixed-wings will enter Loiter mode, and rovers

will enter Hold mode.

Note:

After clearing the mission, there will be no waypoint tasks remaining in the flight controller. The mission cannot be resumed unless a new waypoint mission is uploaded.

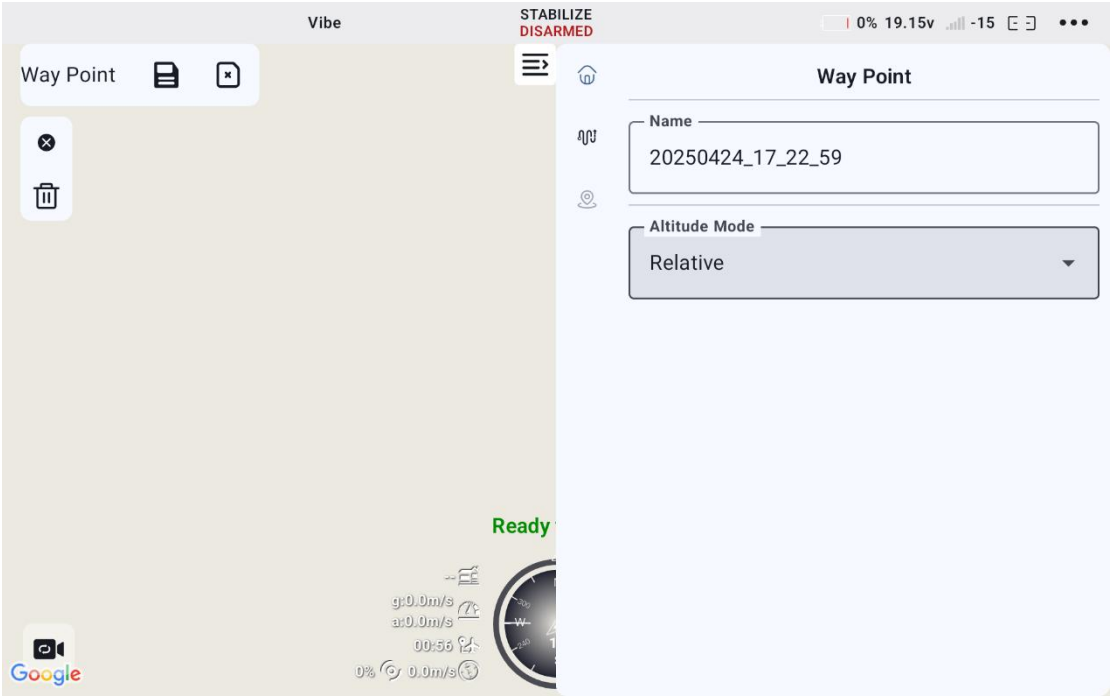
- Exit Mission: During mission execution, tap this button to exit the mission. The multirotor will enter hover mode, the fixed-wing will switch to loiter mode, and the rover will switch to hold mode. Tap the mission start button again to resume the mission.
- Download Mission: Tap this button to download the mission stored in the flight controller.
- Locate Aircraft: Tap this button to center the aircraft on the map. When highlighted, the map will follow the aircraft in real-time during flight. If the user manually drags the map, the map-following function will be disabled.
- Locate Remote Controller: Tap this button to center the remote controller on the map.

  Note: This feature requires an internet connection.
- Map Type: Tap this button to switch between street map and satellite map based on your preference.

  Note: Internet connection is required to load the map.
- No-Fly Zone Display: When the device is connected to the internet

and the map interface is opened, the software will automatically load and display no-fly zones.

Mission Planning Main Menu



- Delete Waypoint: Tap this button to automatically delete the waypoint which have chosen when planning the mission.
- Clear All Waypoints: Tap this button to remove all waypoints planned on the current page.
- Cancel Save: Tap this button to cancel saving all waypoints currently planned on the page.
- Save Mission: Tap this button to save all the waypoints planned on the current page into the mission library.
- Show/Hide the Edit Menu: Tap this button to hide the edit menu for

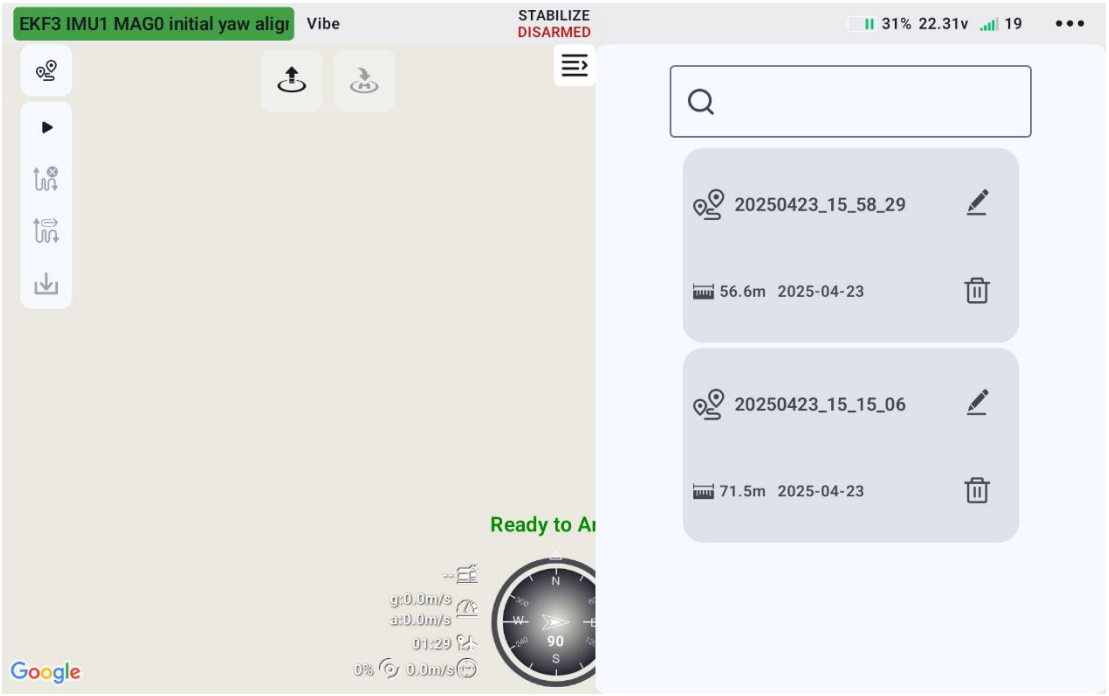
better visibility and ease of dragging waypoints. Tap again to expand and show the edit menu.

4.4.1Mission Library

Include route storage, rapid recall, editing & updating, and cross-device synchronization.

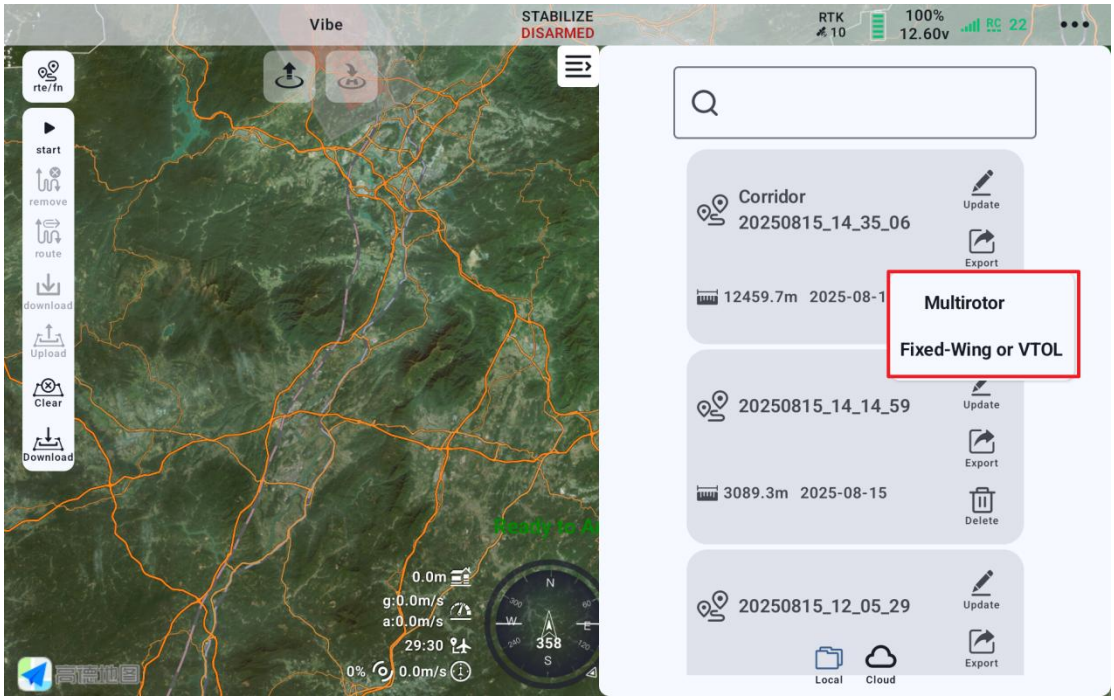
4.4.1.1 Mission Library List

Intuitively displays the planned and saved missions, facilitating easy review and modifications.



4.4.1.2 Mission Management

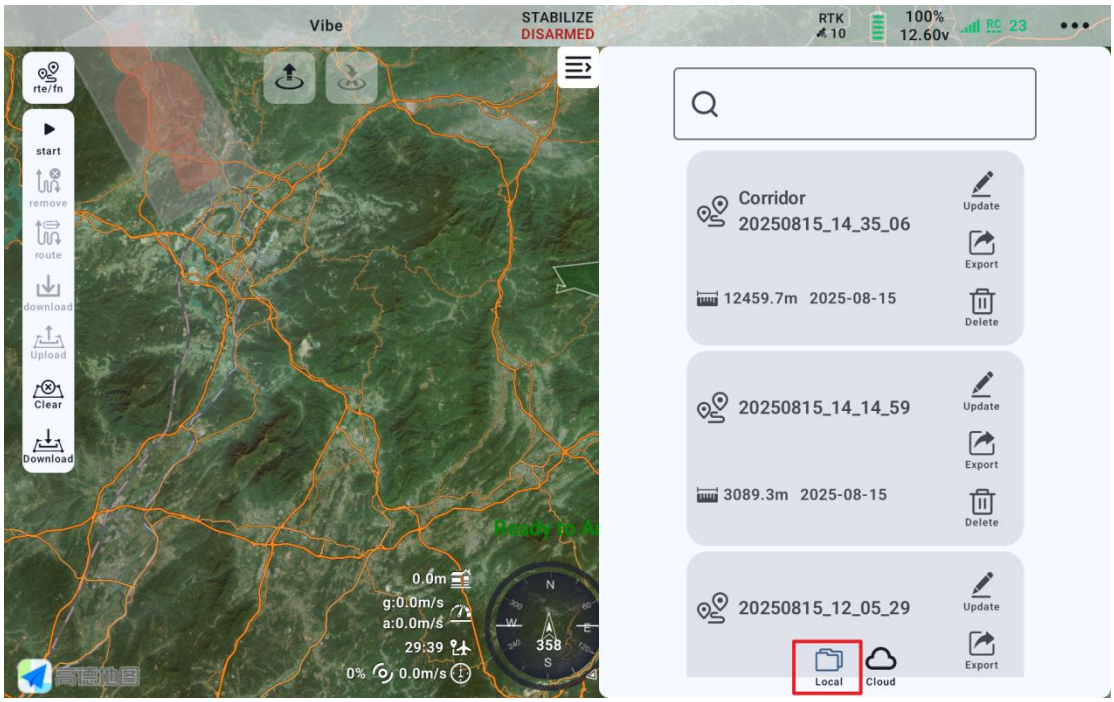
- Edit: After entering the mission library list, click the edit button on any route to perform secondary editing.
- Export: In the mission library, click the export button for any route to save it as a mission for multi-rotor, fixed-wing, or VTOL aircraft. The file will be stored locally in Waypoints format.



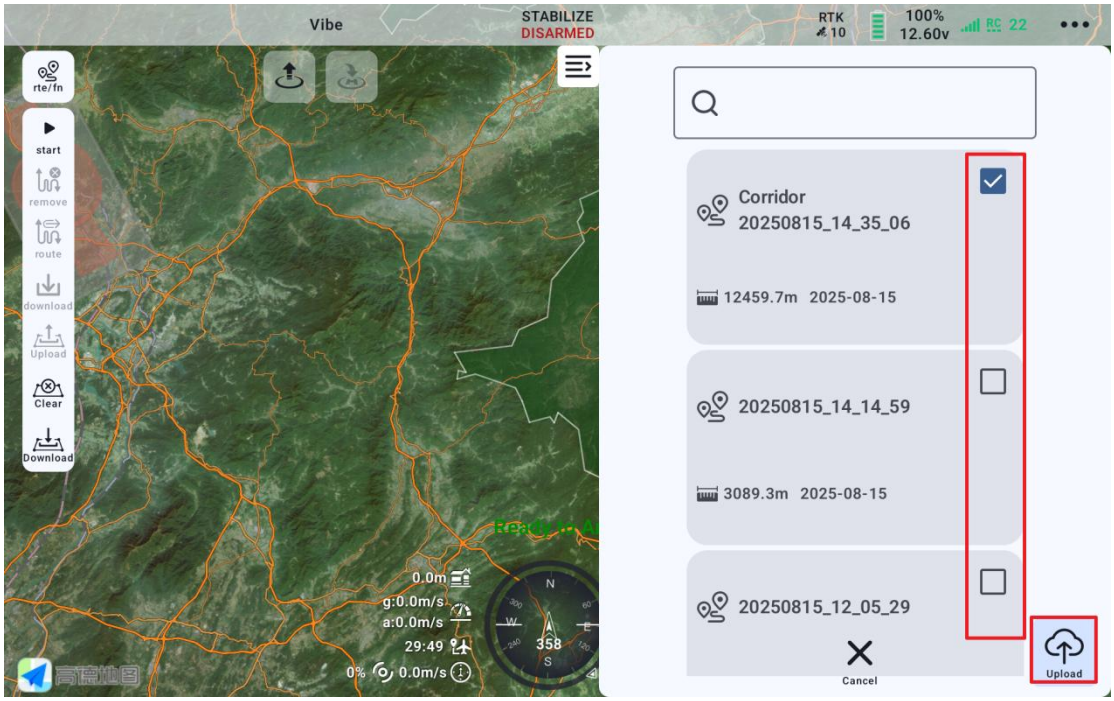
- Delete: Click the delete button for any mission to remove it from the mission library.

4.4.1.3 Upload Mission to Cloud

After successfully logging into your account, long-press any mission in the local mission library. Selection buttons will automatically appear on the right side of the mission.

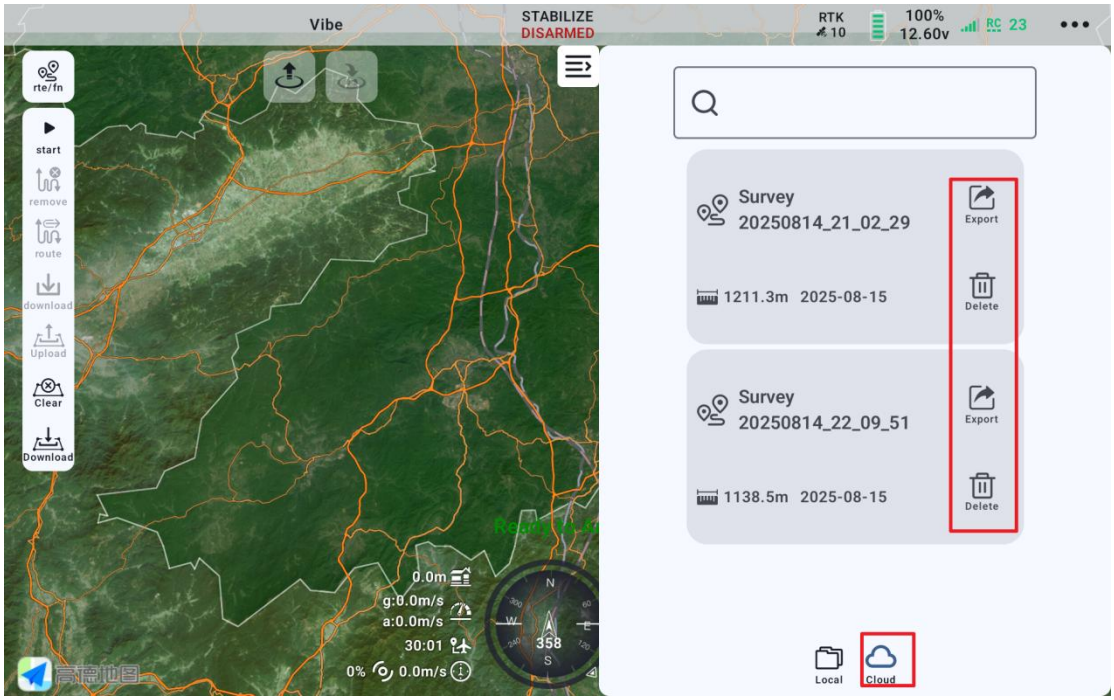


Simply check the box next to the missions you wish to upload to the cloud, then click the 'Upload to Cloud' button to complete cloud storage. This enables cross-device access to your missions, significantly enhancing the convenience of mission reuse and allowing you to easily retrieve any required mission on different devices.

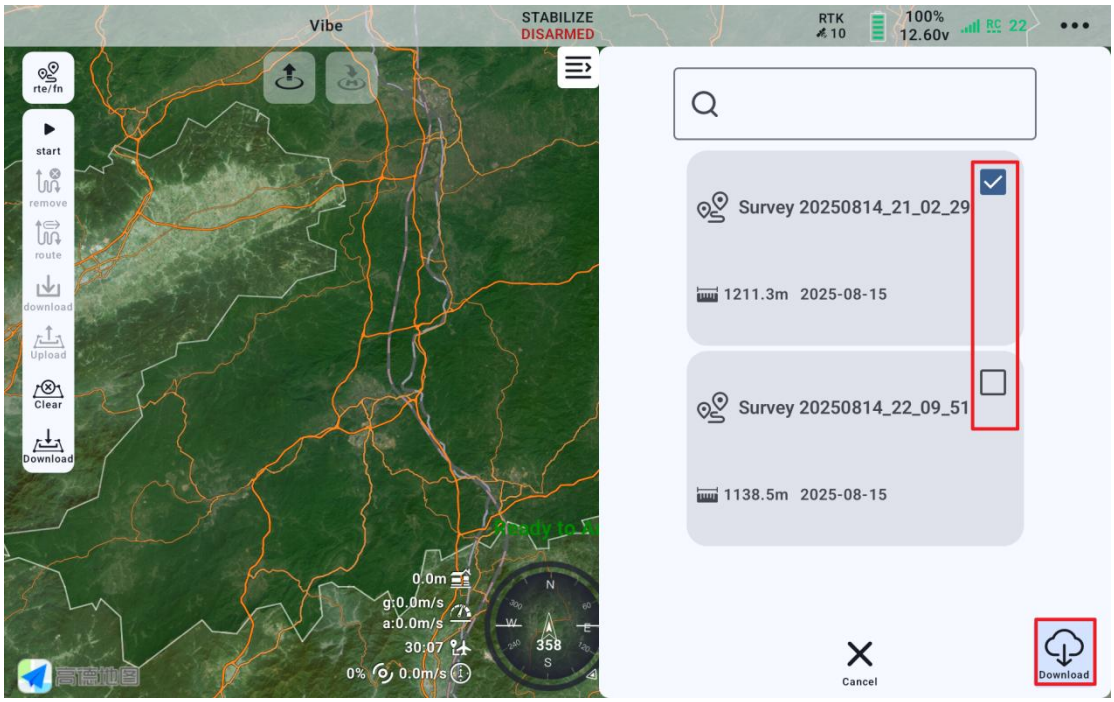


4.4.1.4 Download the Mission to Local Device

After successfully logging into your account, you can view, export, and delete cloud flight routes from your cloud mission library.



Long-press any mission, and selection buttons will automatically appear on the right side. Simply check the boxes for the missions you want to download locally, then click the 'Download' button to complete the cloud download.

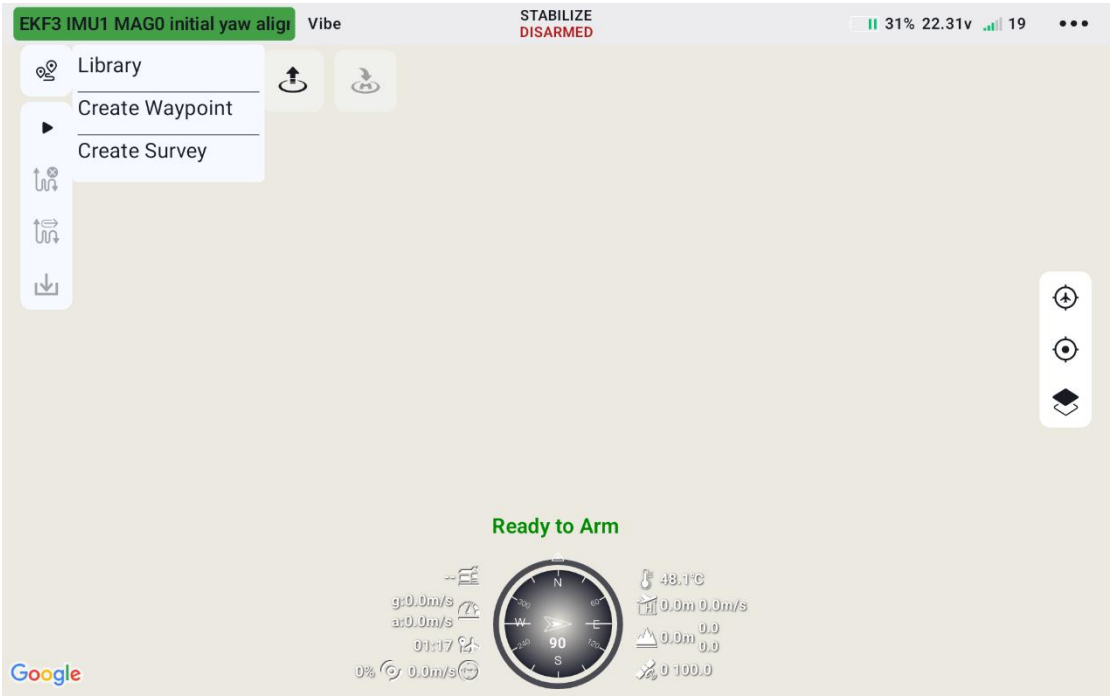


4.4.2 Waypoint Mission

A route that follows predefined waypoints in sequence. Each waypoint contains parameters such as coordinates and altitude. It is suitable for accurately executing point-specific tasks (inspection, fixed-point shooting) and offers high flexibility with customizable paths.

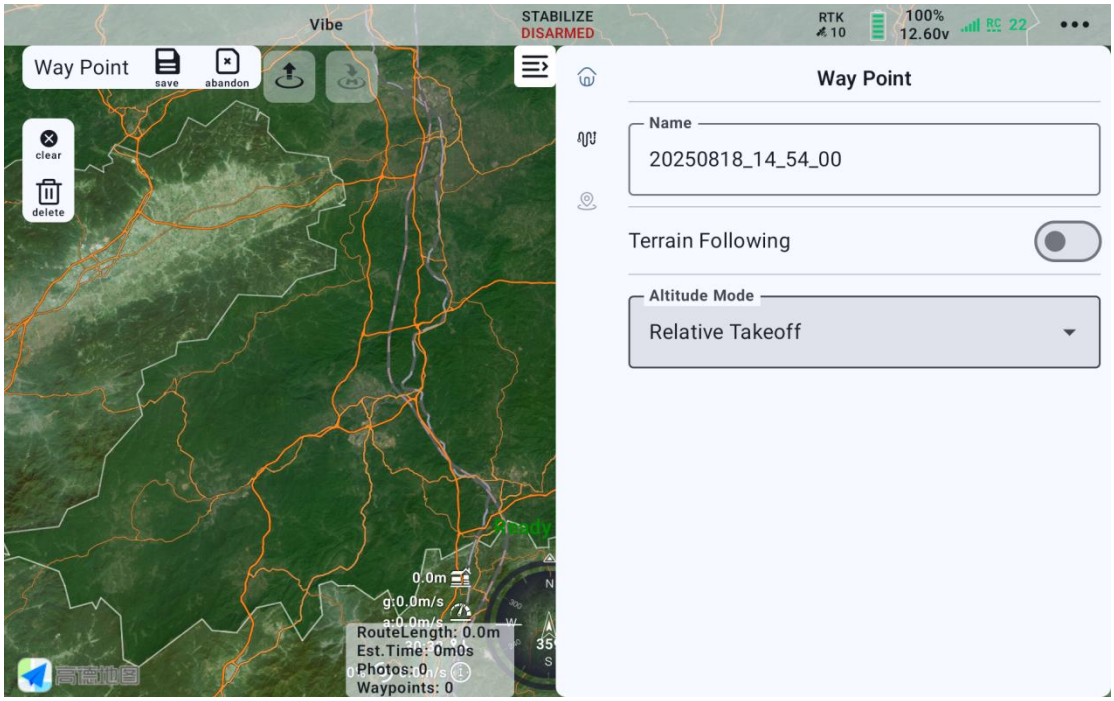
4.4.2.1 Create Mission:

Click the "Mission Planning" button and select "Create Waypoint Mission" to start planning the waypoint mission.



4.4.2.2 Waypoint Flight

In the Waypoint Mission tab, you can name the current task, enable or disable terrain-following, and switch between altitude modes for the mission.



- Flight Route Name: After entering the desired name in the input box, save the flight route, and it can be viewed and managed in the flight route library.
- Terrain-Following: After enabling the terrain-following switch, the drone will use downloaded terrain data to automatically adjust its flight altitude according to the preset terrain-following height.

Note:

The terrain-following altitude data is sourced from open-source databases and may deviate from actual terrain. Please ensure a safe flight environment.

- Altitude Mode: Switch the altitude mode for all waypoints in the route, including:

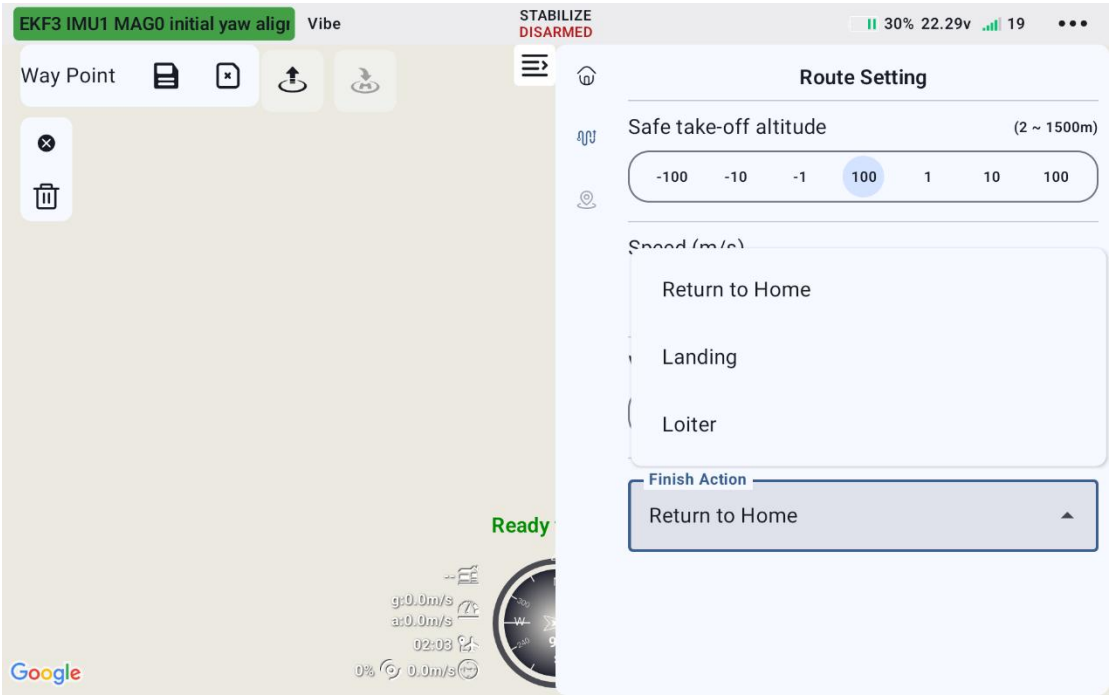
1. Absolute Altitude: The height of the drone relative to mean sea

level (MSL).

2. Relative Altitude: The height of the drone relative to the takeoff point or the ground reference level.

4.4.2.3 Route Settings

In the Route Settings tab, you can modify the safe takeoff altitude, route speed/altitude, and mission completion action.



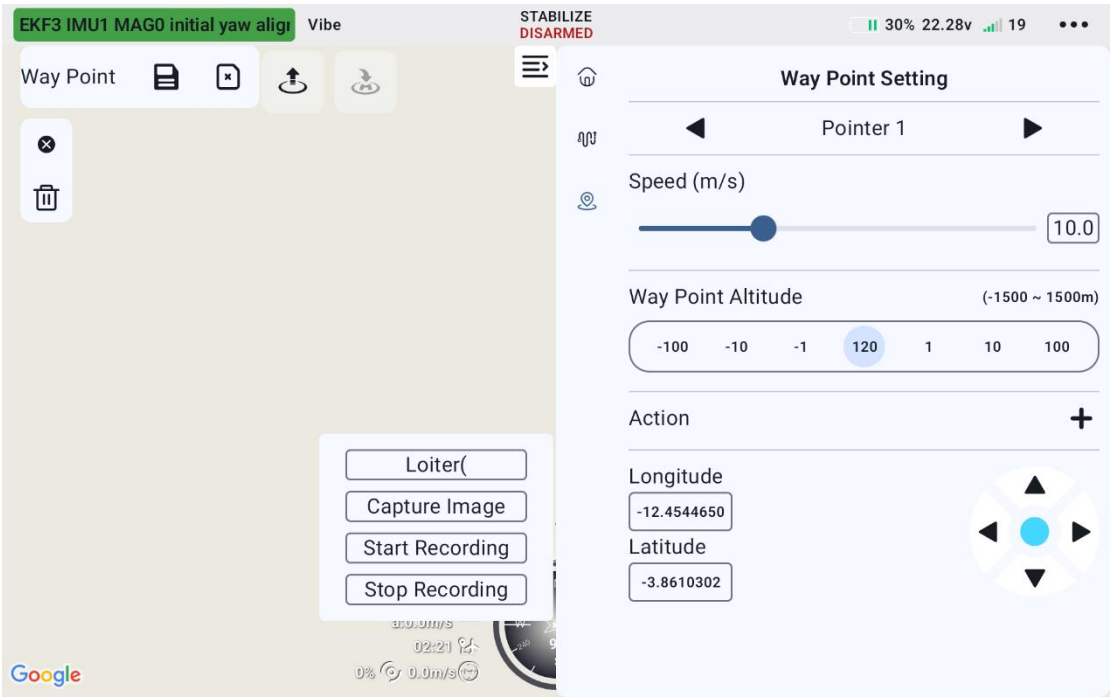
- Safe Takeoff Altitude: Set the altitude to be reached during takeoff before proceeding to the first waypoint.
- Speed: Set the horizontal speed during waypoint route flight.
- Route Altitude: Set the flight altitude after reaching the safe takeoff altitude when continuing the mission.
- Terrain-following flight altitude: When the terrain-following function

is enabled, this altitude value is set to determine the relative distance between the drone and the terrain during flight.

- Mission completion Action: Set the action to be taken after completing the waypoint route task.
  1) Return to Home: Return to the home location from the last waypoint of the mission.
  2) Landing: Perform a landing at the location of the last waypoint.
  3) Hover: Hover at the location of the last waypoint.

4.4.2.4 Waypoint Settings

Enter the waypoint settings tab to adjust the height, speed, waypoint actions, and fine-tune the latitude and longitude of each individual waypoint.



- Speed: The flying speed after reaching the waypoint.
- Height: The required flying altitude when reaching the waypoint.
- Follow Route: Selected by default. When checked, sets the speed/height for this waypoint to the values configured in 'Route Settings'.
- Waypoint Action: The actions to be executed after reaching the waypoint, with support for combining multiple actions.

  Hover: Hover at the waypoint for the set duration.

  Take Photo: Capture a single image upon reaching this waypoint.

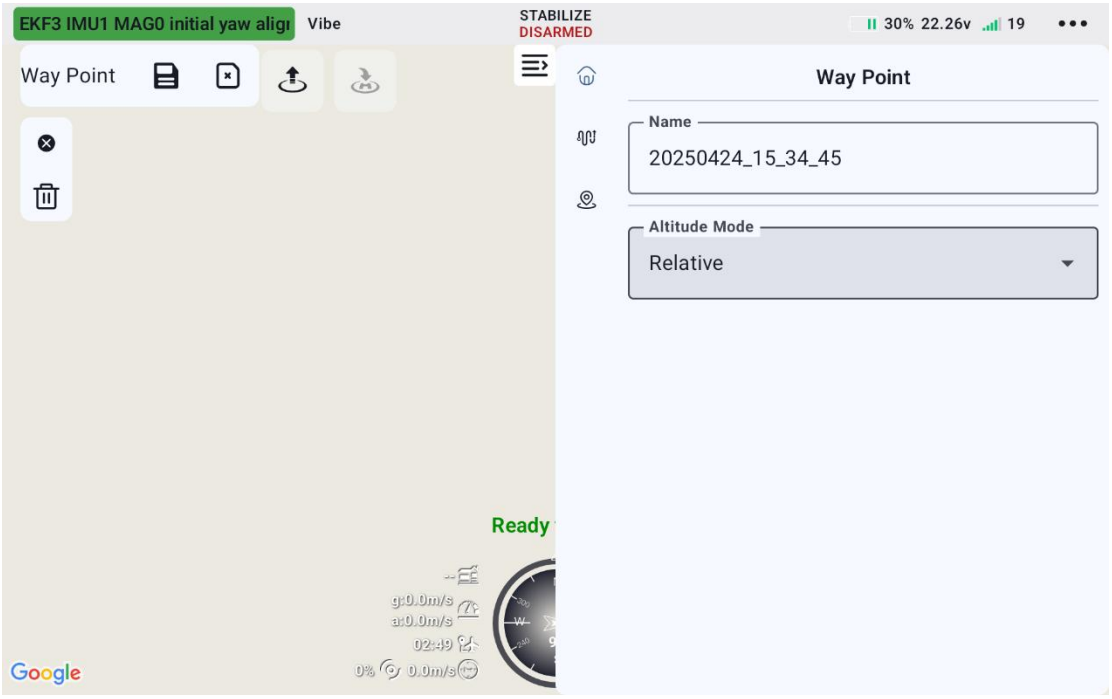
  Start Recording: Begin video recording upon reaching this waypoint.

  Stop Recording: End video recording upon reaching this waypoint.

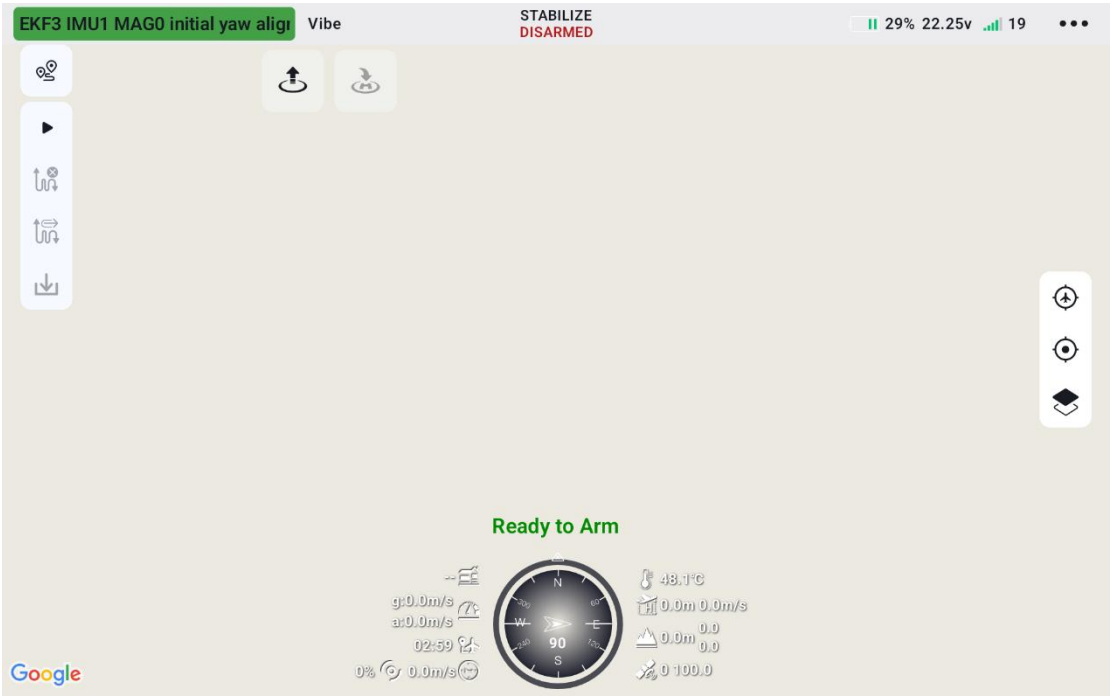
  Jump to Waypoint: Upon arrival, proceed to the specified target waypoint. Set repeat counts for back-and-forth execution between jump points. A value of '-1' represents an infinite loop.
- Latitude/Longitude Fine-tuning: Fine-tune the latitude and longitude of the current waypoint, adjusting longitude left or right, and latitude up or down.

4.4.2.5 Task Execution

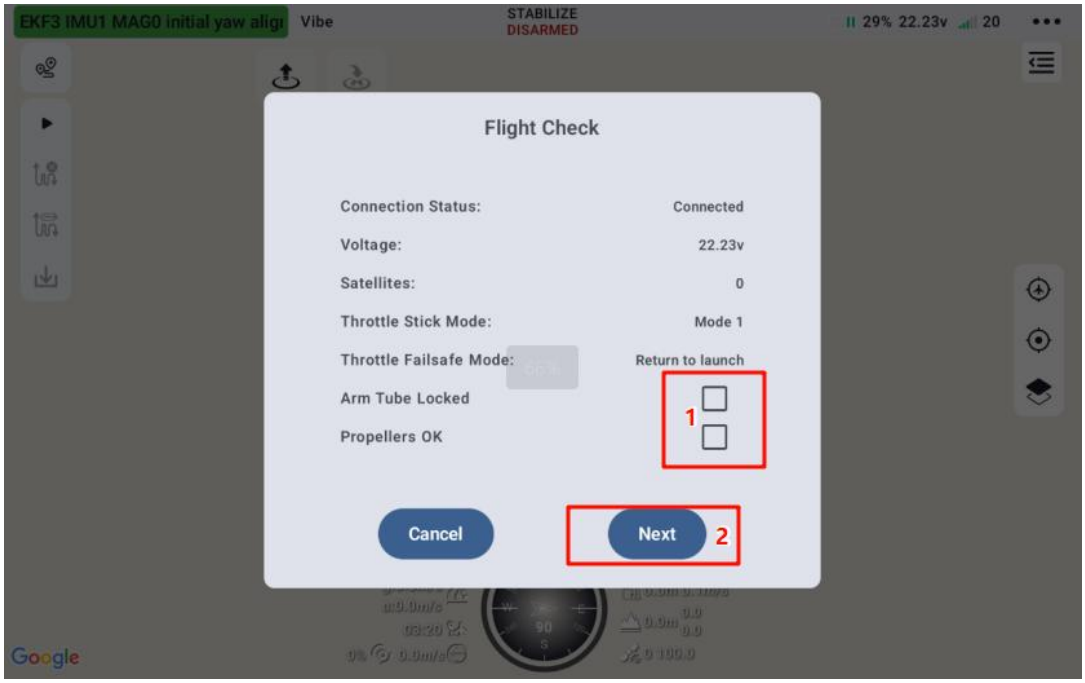
Step 1: After planning the flight route, click the save button.



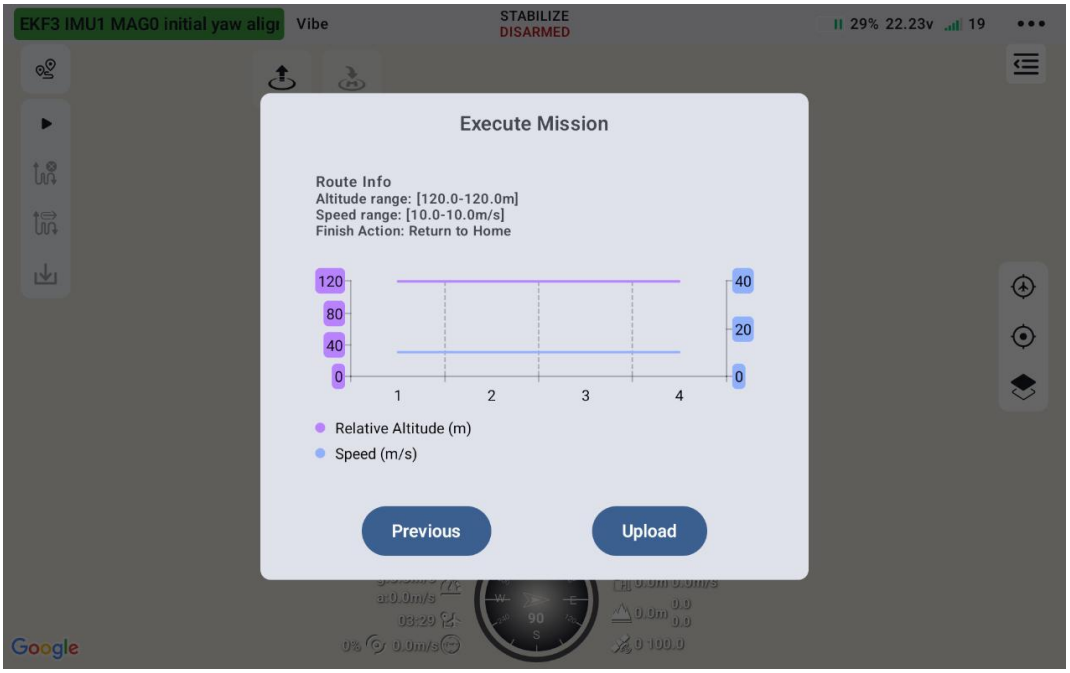
Step 2: Click the start button to upload the flight route.



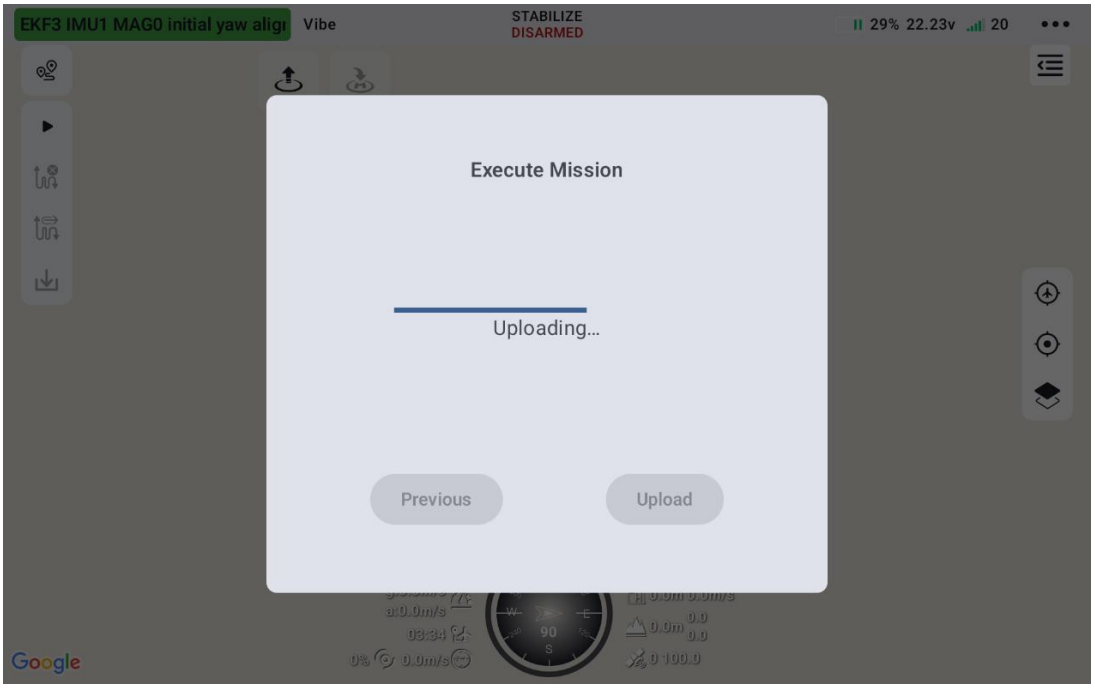
Step 3: Confirm the flight checklist, and after confirming, click the next step.



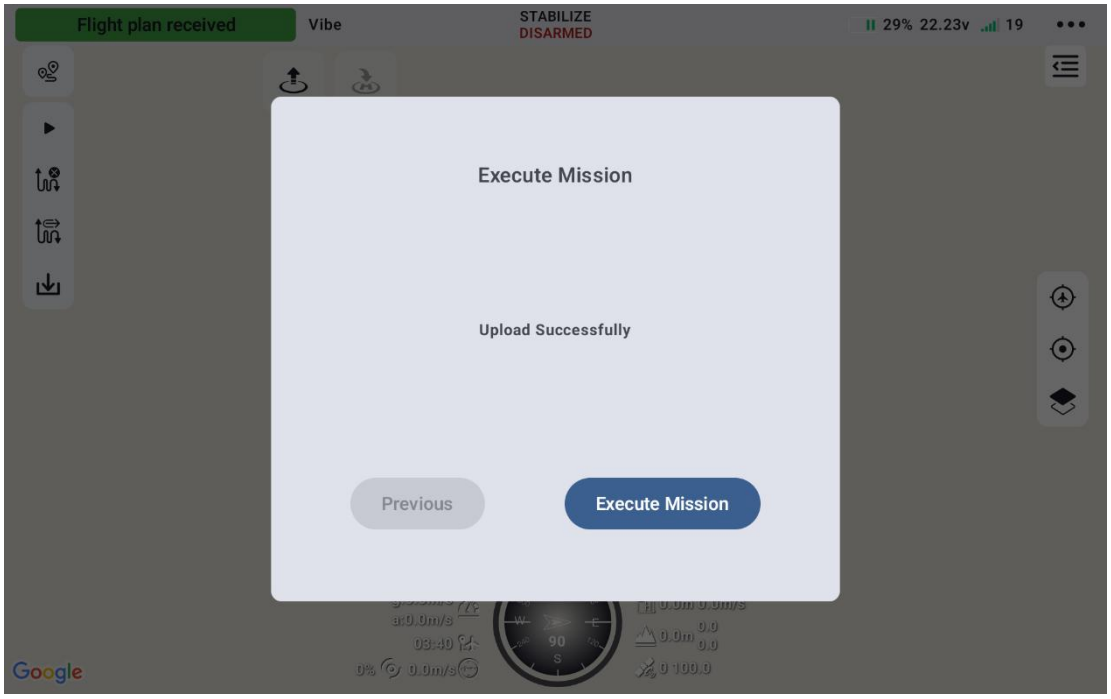
Step 4: Check the route information, where you can view the current task's route speed, altitude range, and route completion actions. After checking, click to upload the route.



Step 5: Wait for the route to finish uploading.

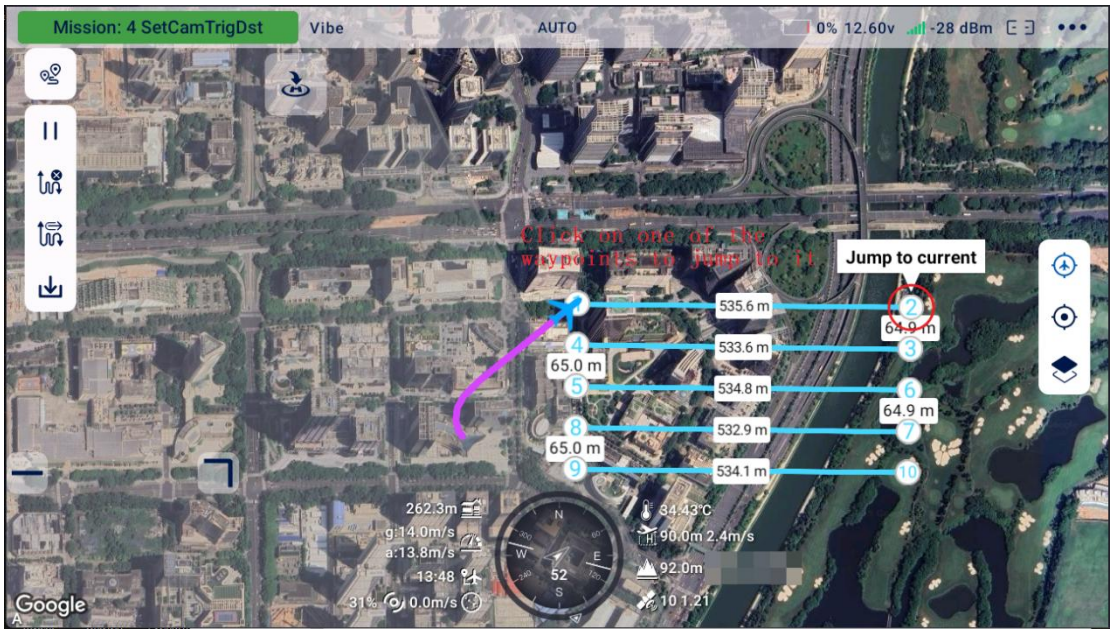


Step 6: Unlock the drone and click "Execute Task" to begin executing the waypoint mission.



4.4.2.6 Jump to Current

Under the current flight route, click on a specific waypoint and then click "Jump to current " The drone will fly directly to the selected waypoint (Applicable to all route types except bevel route).



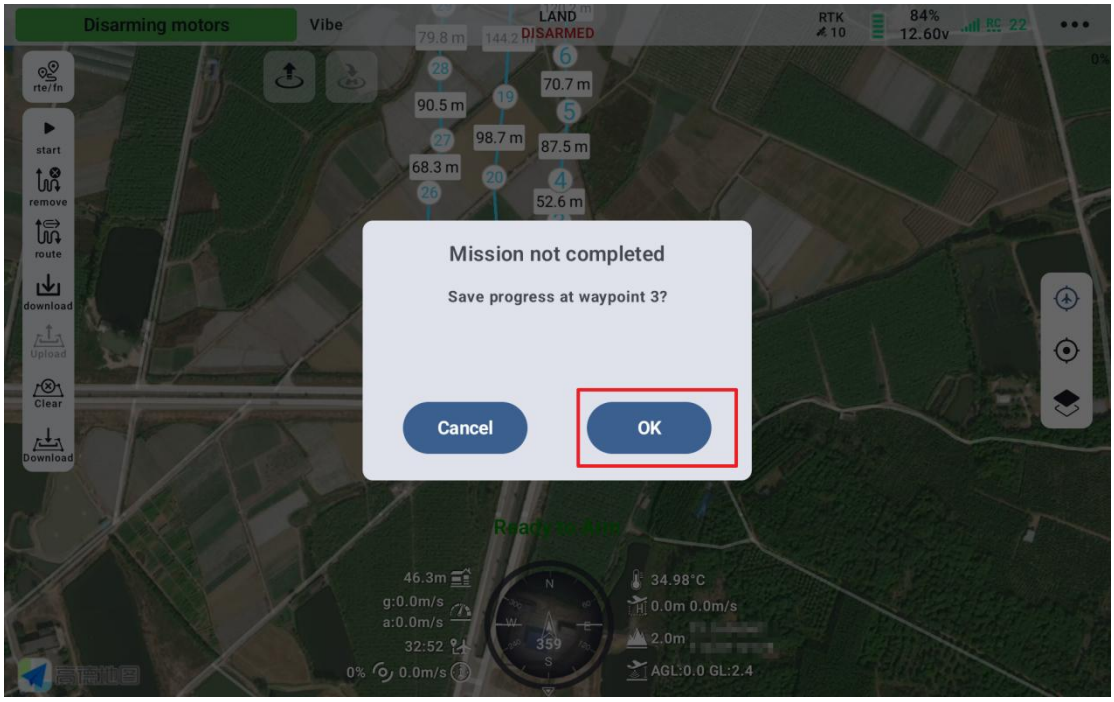
Note:

If clicking has no effect, please check whether the waypoint jump is being performed within the current flight mission. You can download the flight route first, then select a waypoint to execute the jump-to-waypoint action.

4.4.2.7 Resume Mission from Waypoint

After a drone mission is interrupted, the remaining route can be resumed from the waypoint prior to the interruption point, without needing to restart from the beginning. Applicable to all route types except bevel route.

Operation Procedure: After the drone mission is interrupted, wait for the drone to return, land, and disarm. A notification indicating incomplete mission will pop up on the main page—click 'Confirm'.

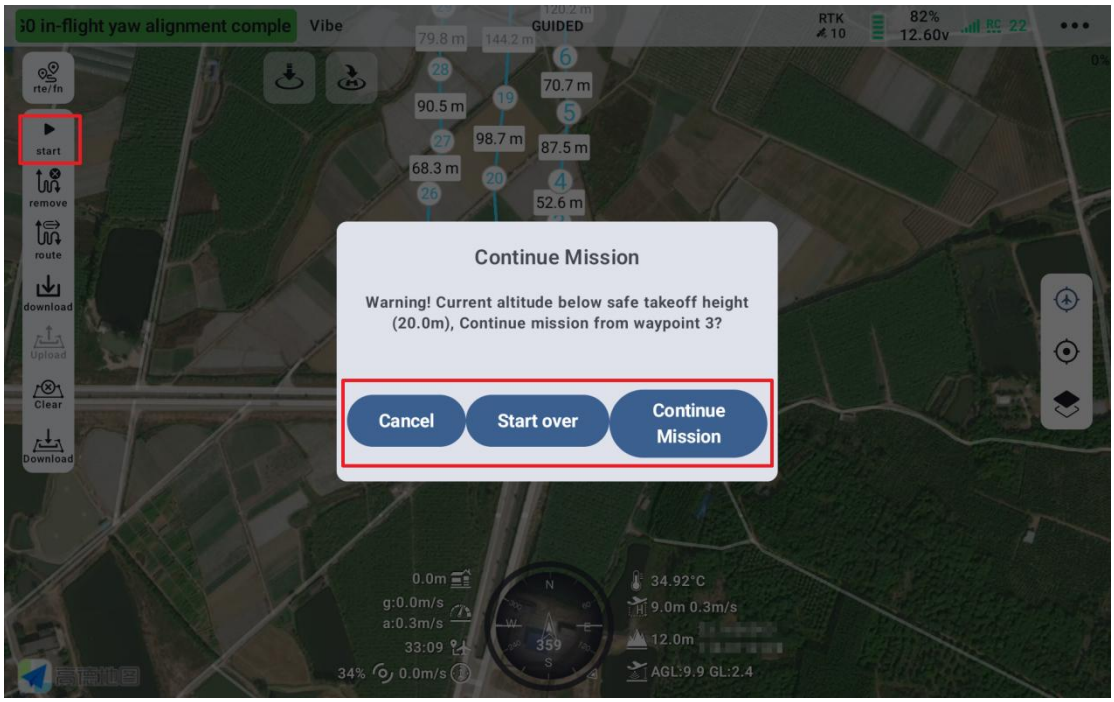


When the drone is ready again, the operator manually arms the drone, lifts it to a safe altitude, and clicks the 'Start Mission' button. The system will then pop up a 'Continue Mission' dialog box with the following options:

- **Cancel:** Selecting this option will terminate the current automated

mission. The drone will stop executing the preset route.

- **Start Over:** Upon clicking, the drone will restart from the first waypoint of the route and execute the complete automated mission process again.
- **Continue Mission:** When this option is triggered, the drone will resume from the waypoint prior to the last mission interruption point and continue executing the remaining route, ensuring mission continuity and coherence.

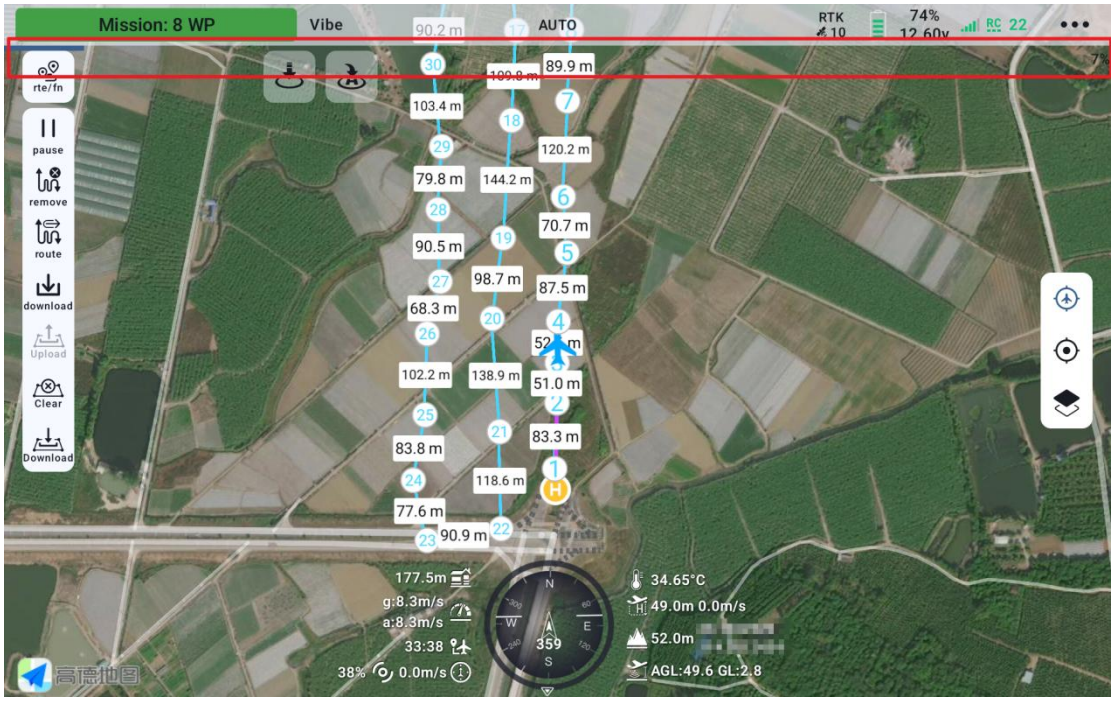


Note:

To ensure successful execution of the mission resume operation, please keep the application running normally during flight. Before initiating the resumed mission, manually fly the aircraft to a safe altitude.

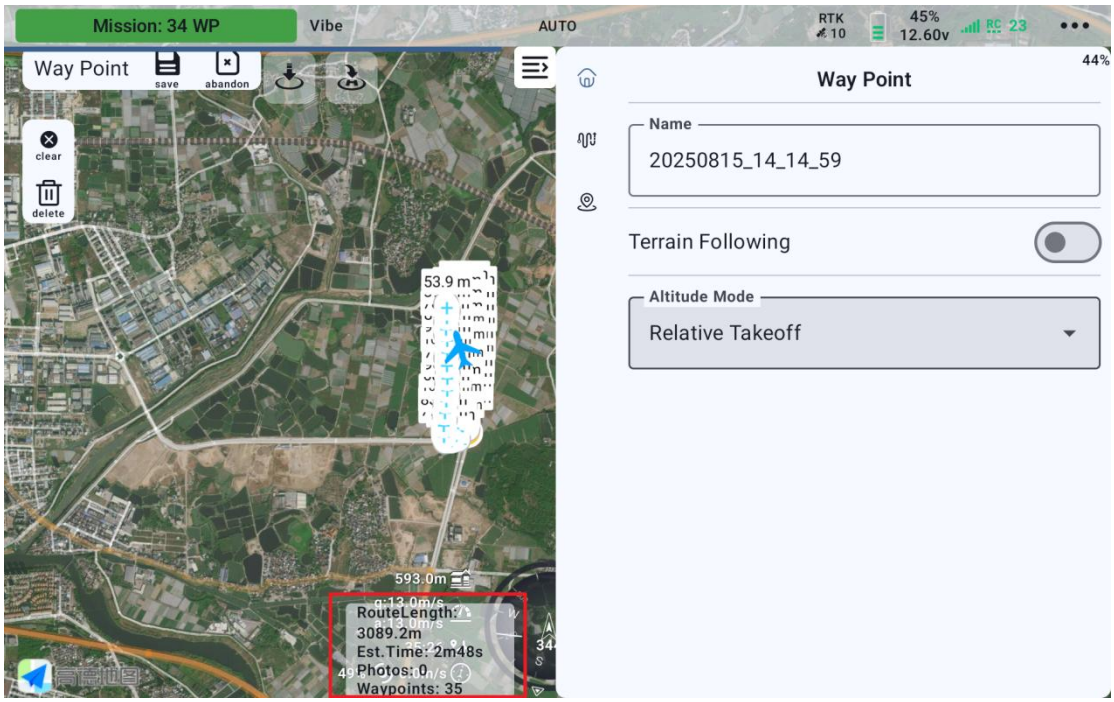
4.4.2.8 Route Progress Display

During mission execution, a dynamic progress bar is displayed below the title bar, indicating the completed route percentage. The progress bar length increases synchronously with mission advancement.



4.2.2.9 Route Information Estimation

Estimate the route length, number of waypoints, flight time, number of photos, and survey area for the current route during flight.



During route planning, the system provides real-time estimation and display of key parameters for the current route, offering precise references for mission preparation and execution:

- **Route Length:** Visually displays the total distance of the entire route, helping operators determine if battery endurance is sufficient and avoiding mission interruption due to insufficient power.
- **Waypoints:** Clearly indicates the total number of waypoints included in the route, making it easier to grasp segmented nodes and complexity of the mission.
- **Flight Time:** Estimates the total duration required to complete the

entire route (excluding takeoff and landing phases) based on route length and preset flight speed, assisting in scheduling and personnel arrangement.

- **Photos:** Automatically calculates the total number of photos to be captured based on camera shooting interval, overlap requirements, and route coverage, providing storage capacity reference for later data storage and processing.
- **Survey Area:** Displays the actual size of the surveying area covered by the route, accurately matching mission requirements and result scope.

Through real-time updates of estimation information, comprehensive understanding of resource consumption, time costs, and operational scale can be achieved before mission launch, thereby optimizing planning strategies and enhancing mission controllability and efficiency.

Note:

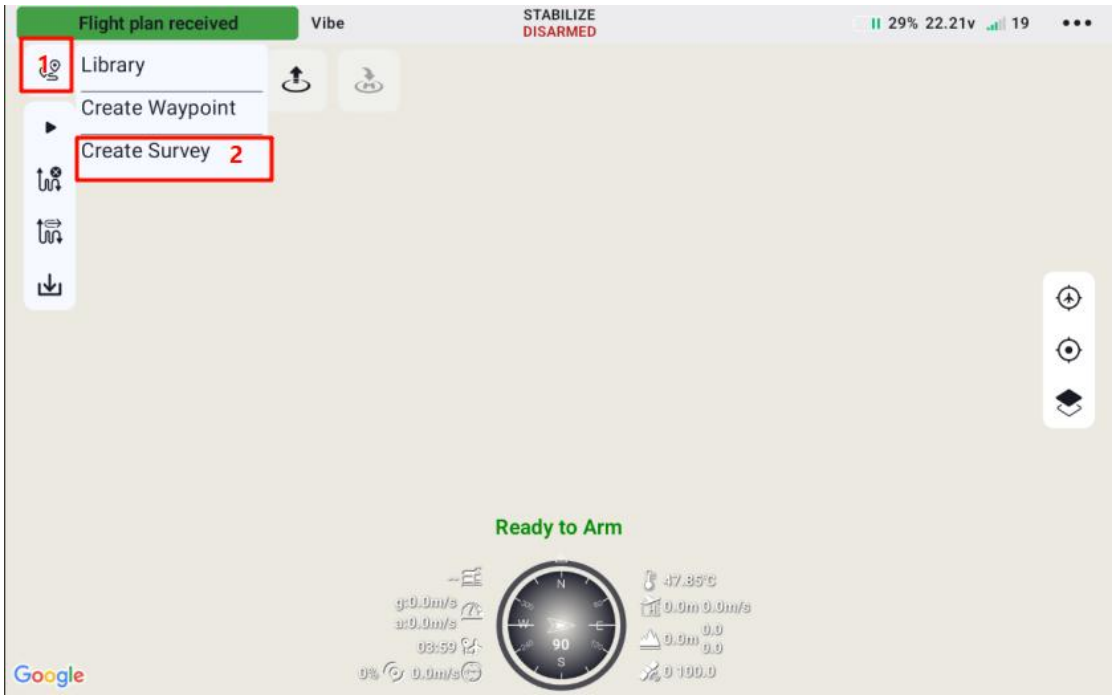
There may be deviations between actual operations and estimated results. It is recommended to add a 10%-20% margin to the estimated baseline during practical operations to accommodate unexpected situations.

4.4.3 Mapping Route

Mapping Route: A flight path where the drone's camera is vertically pointed at the ground. The captured imagery can be directly used to create orthophoto maps, accurately reflecting the planar position and shape of surface features. It is suitable for large-scale map surveying, land planning, and similar applications.

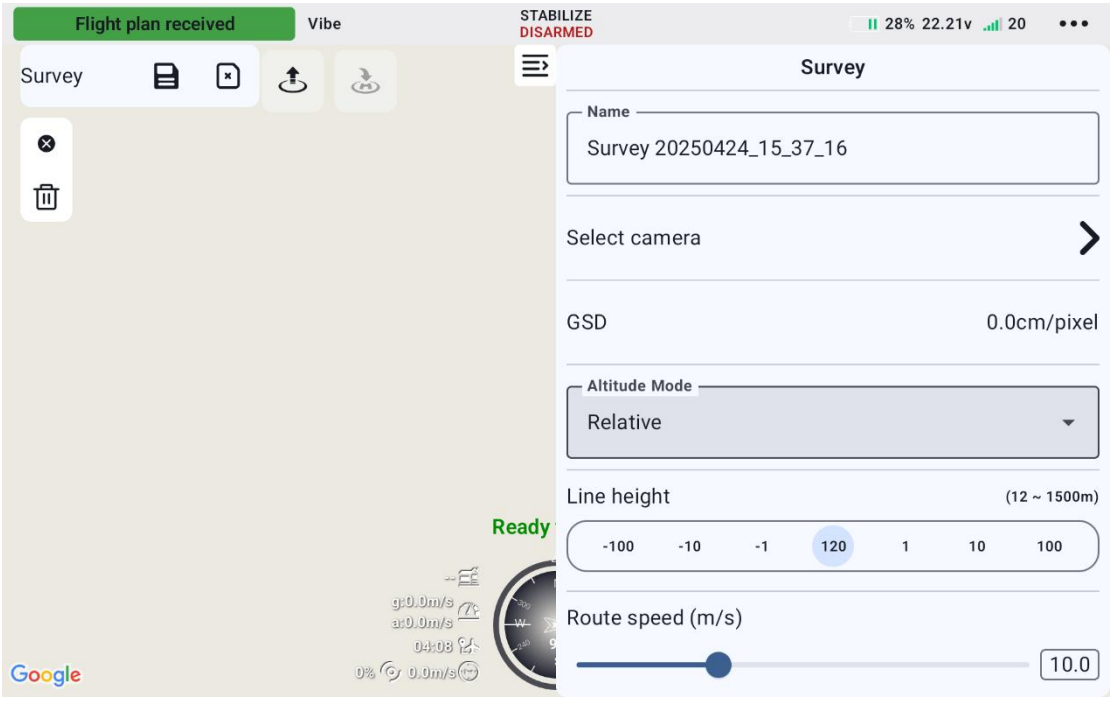
4.4.3.1 Route Planning

Click the "Route Planning" button and select "Create Mapping Route" to plan the mapping route.



4.4.3.2 Mapping Route Setting

In the Mapping Route tab, you can name the task, select the camera, set the route height, speed, safe takeoff height, altitude mode, completion actions and others.



- Route Name: After entering the desired name in the input box, save the route, and you can view the current route in the mission library.
- Select Camera: Choose a different camera for mapping tasks, including the wide-angle/thermal infrared lens of the ZT30 camera, the wide-angle/thermal infrared lens of the ZT6 camera, and the A8mini camera. Also supports manually adding third-party cameras, with camera parameters provided by third-party manufactures.
- GSD: GSD (Ground Sample Distance) refers to the actual ground distance corresponding to a single pixel in the image. After selecting

the camera, the GSD data will be displayed.

- Terrain-Following: After enabling the terrain-following switch, the drone will use downloaded terrain data to automatically adjust its flight altitude according to the preset terrain-following height.

  Note:

  The terrain-following altitude data is sourced from open-source databases and may deviate from actual terrain. Please ensure a safe flight environment.

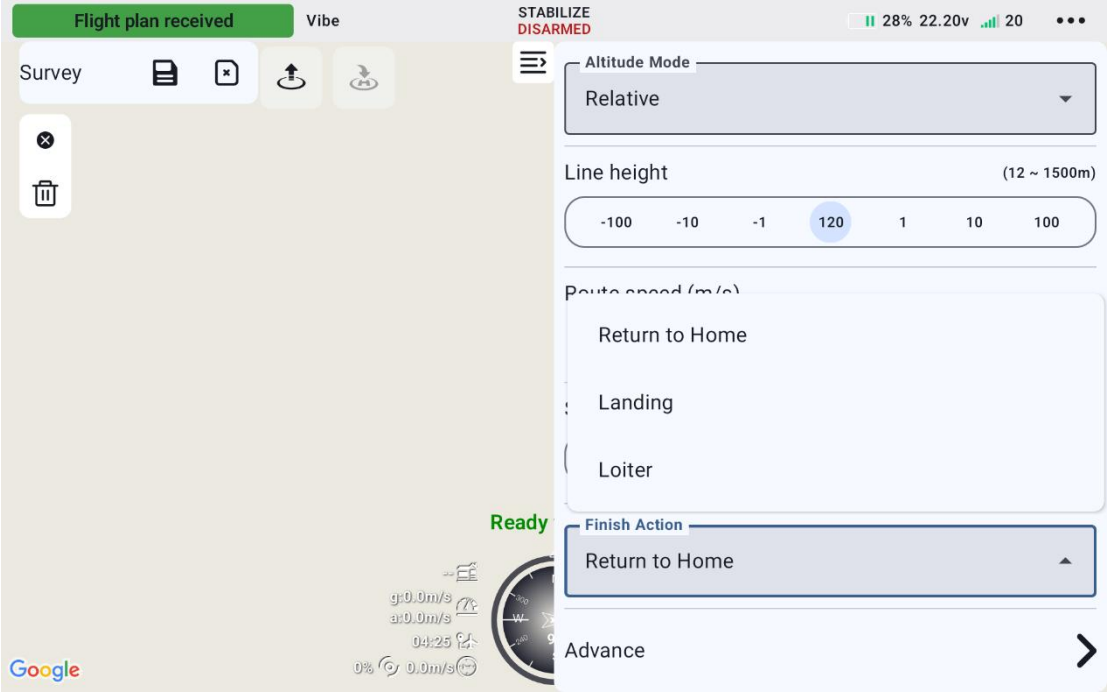
- Terrain-following flight altitude: When the terrain-following function is enabled, this altitude value is set to determine the relative distance between the drone and the terrain during flight.
- Altitude Mode: Switch the altitude mode for all waypoints in the route.

  1. Absolute Altitude (WGS84): The height of the drone relative to mean sea level (MSL).

  2. Relative Altitude : The height of the drone relative to the takeoff point or the ground reference level.

- Route Speed: Set the horizontal speed during the execution of the mapping route.
- Route Height: Set the flight height when executing the mapping route, after reaching the safe takeoff altitude, to continue with the task.
- Main Route Angle: By adjusting the main route angle, it can match

the environment and mission requirements, balancing efficiency and safety while ensuring data quality.



- Safe Takeoff Altitude: Set the altitude the drone must reach before proceeding to the next point in the route.
- Heading lock: Lock the heading of the nose, ensuring the uniformity and stability of surveying and mapping data by reducing variables (attitude, angle, light).

Note:

The heading lock function is only supported by multi-rotor models and must be used in conjunction with the waypoint turning function, which can effectively avoid frequent head-turning behaviors when switching lines on short edges.

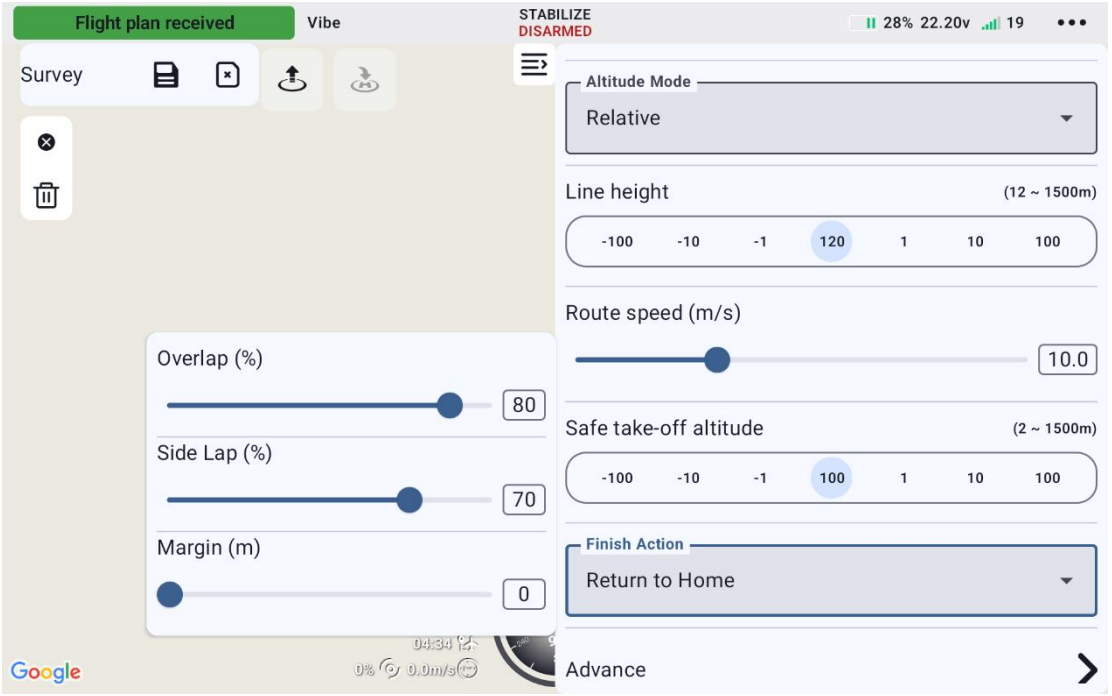
- Completion Action: Set the behavior after completing the mapping

route task.

1) Return to Home: Return to the home location from the last waypoint of the task.

2) Landing: Perform a landing at the last waypoint of the task.

3) Hover: Hover at the last waypoint of the task.



- Advanced Settings: Set heading overlap, side lap, external margin, and photo mode.

  1. Heading Overlap: The percentage of the overlap area between two adjacent images on the same flight path, relative to the length of a single image.

  2. Sidelap Overlap: The percentage of the overlap area between two adjacent flight lines, relative to the width of a single image.

- Margin: In mapping tasks, the external margin (also known as buffer

zone or extension area) refers to the additional planned flight and data collection area outside the target measurement area. In fixed-wing or vertical takeoff fixed-wing flights, the drone’s turning path can be planned within the margin area.

- Photo Mode:

  1. Equal Distance Interval Photo Capture: Ensures data uniformity through 'spatial benchmarking,' suitable for high-precision and complex scenario mapping.

  2. Equal Time Interval Photo Capture: Relies on a 'time benchmark' and is only suitable for simple scenarios with stable speed.

Note:

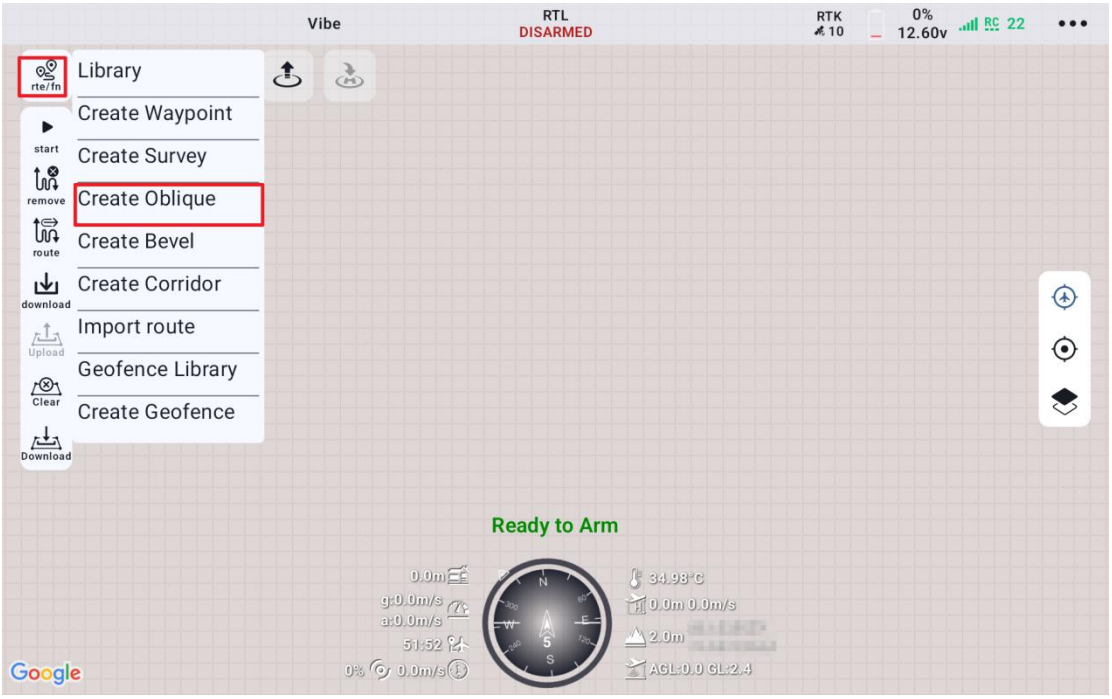
In actual operations, Almost all high-precision mapping adopt equal distance intercal photo capture mode to avoid the impact of speed fluctuations on data quality.

4.4.4 Oblique Photography Route

Routes captured from different angles (vertical + oblique) can comprehensively capture details such as building facades, primarily used for high-precision 3D modeling to restore the three-dimensional form of objects.

4.4.4.1 Mission Planning

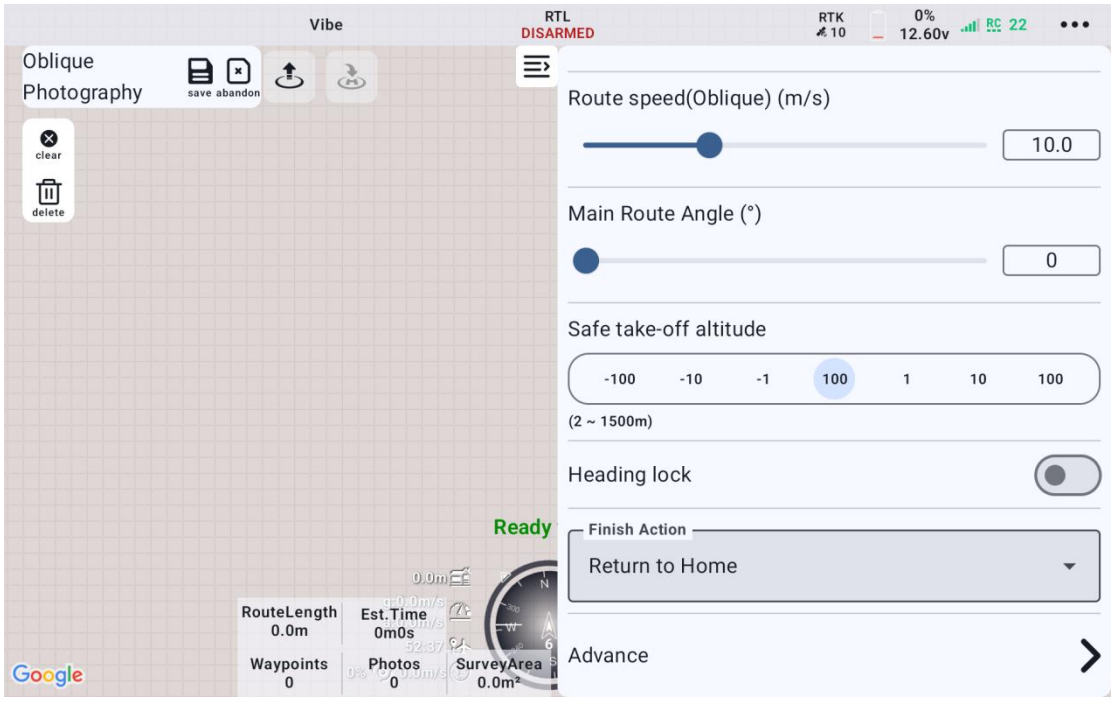
Click the route planning button, select 'Create Oblique Photography Route,' then you can plan an oblique photography route.



4.4.4.2 Oblique Photography Route Setting

In the Oblique Photography Route tab, you can name the current task, and configure settings such as camera selection, resolution viewing, route altitude, speed, safe takeoff altitude, altitude mode, completion action,

and advanced settings.



- Route Name: After entering the desired name in the input box, save the route, and you can view the current route in the mission library.
- Select Camera: Choose a different camera for obliqie photography route tasks, including the wide-angle/thermal infrared lens of the ZT30 camera, the wide-angle/thermal infrared lens of the ZT6 camera, and the A8mini camera.
- Gimbal Pitch Angle: Adjusting this option controls the camera lens pitch angle of the drone in non-nadir areas.
- GSD: GSD (Ground Sample Distance) refers to the actual ground distance corresponding to a single pixel in the image. After selecting the camera, the GSD data will be displayed.
- GSD (Oblique): GSD (Oblique) refers to the actual ground distance

represented by a single pixel in the image within the oblique photography area. After selecting the camera, the GSD data will be displayed.

- Terrain-Following: After enabling the terrain-following switch, the drone will use downloaded terrain data to automatically adjust its flight altitude according to the preset terrain-following height.

  Note:

  The terrain-following altitude data is sourced from open-source databases and may deviate from actual terrain. Please ensure a safe flight environment.

- Terrain-following flight altitude: When the terrain-following function is enabled, this altitude value is set to determine the relative distance between the drone and the terrain during flight.
- Altitude Mode: Switch the altitude mode for all waypoints in the route.

  1. Absolute Altitude (WGS84): The height of the drone relative to mean sea level (MSL).

  2. Relative Altitude : The height of the drone relative to the takeoff point or the ground reference level.

- Relative Height of Subject to Takeoff Point: Refers to the vertical difference between the height of the photographed object and the drone's takeoff point. Appropriately adjusting this parameter can

optimize modeling effect. If the height of the subject is unknown, please keep the default distance.

- Route Speed: Set the horizontal speed during the execution of the oblique photography route.
- Route Speed (Oblique): Set the vertical speed during the execution of the oblique photography route.
- Route Height: Set the flight height when executing the oblique photography route, after reaching the safe takeoff altitude, to continue with the task.
- Main Route Angle: By adjusting the main route angle, it can match the environment and mission requirements, balancing efficiency and safety while ensuring data quality.
- Safe Takeoff Altitude: Set the altitude the drone must reach before proceeding to the next point in the route.
- Heading lock: Lock the heading of the nose, ensuring the uniformity and stability of surveying and mapping data by reducing variables (attitude, angle, light).

Note:

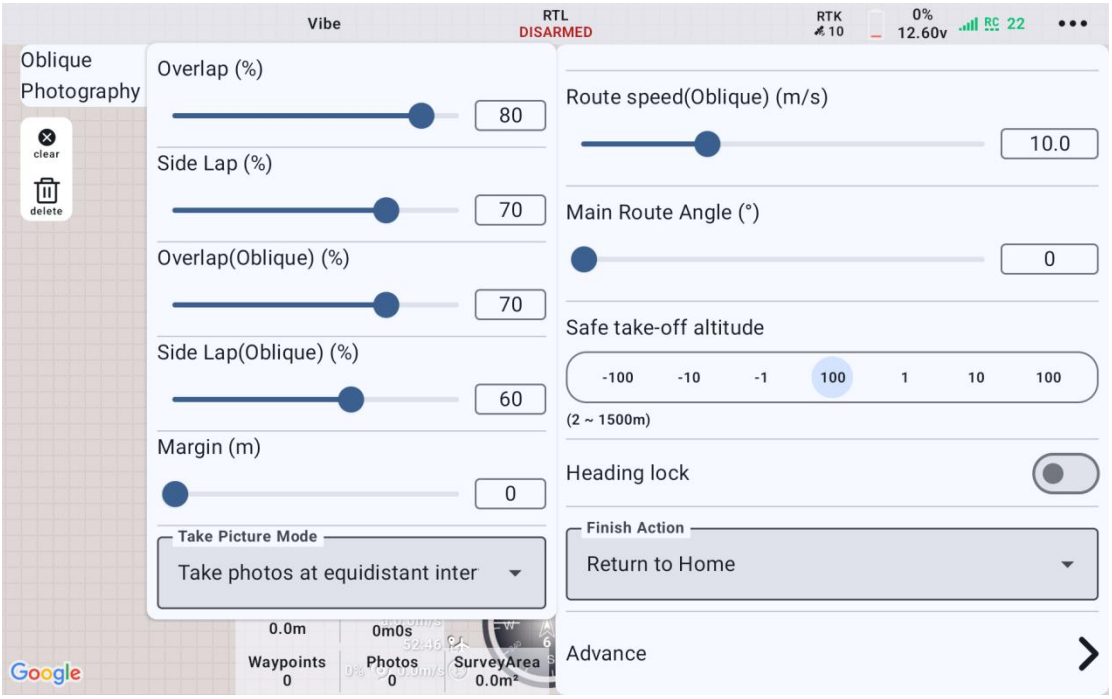
The heading lock function is only supported by multi-rotor models and must be used in conjunction with the waypoint turning function, which can effectively avoid frequent head-turning behaviors when switching lines on short edges.

- Completion Action: Set the behavior after completing the mapping route task.

  1) Return to Home: Return to the home location from the last waypoint of the task.

  2) Landing: Perform a landing at the last waypoint of the task.

  3) Hover: Hover at the last waypoint of the task.



- Advanced Settings: Set heading overlap, side lap, external margin, and photo mode.

  1. Heading Overlap: The percentage of the overlap area between two adjacent images on the same flight path within the nadir photography area, relative to the length of a single image.

  2. Sidelap Overlap: The percentage of the overlap area between two adjacent flight lines within the nadir photography area, relative to the

width of a single image.

3. Heading Overlap (Oblique): The percentage of the overlap area between two adjacent images on the same flight path within the oblique photography area, relative to the length of a single image.

4. Sidelap Overlap (Oblique): The percentage of the overlap area between two adjacent flight lines within the nadir photography area, relative to the width of a single image.

- Margin: In oblique photography route tasks, the external margin (also known as buffer zone or extension area) refers to the additional planned flight and data collection area outside the target measurement area. In fixed-wing or vertical takeoff fixed-wing flights, the drone's turning path can be planned within the margin area.
- Photo Mode:

  1. Equal Distance Interval Photo Capture: Ensures data uniformity through 'spatial benchmarking,' suitable for high-precision and complex scenario mapping.

  2. Equal Time Interval Photo Capture: Relies on a 'time benchmark' and is only suitable for simple scenarios with stable speed.

Note:

In actual operations, Almost all high-precision mapping adopt equal distance intercal photo capture mode to avoid the impact of speed

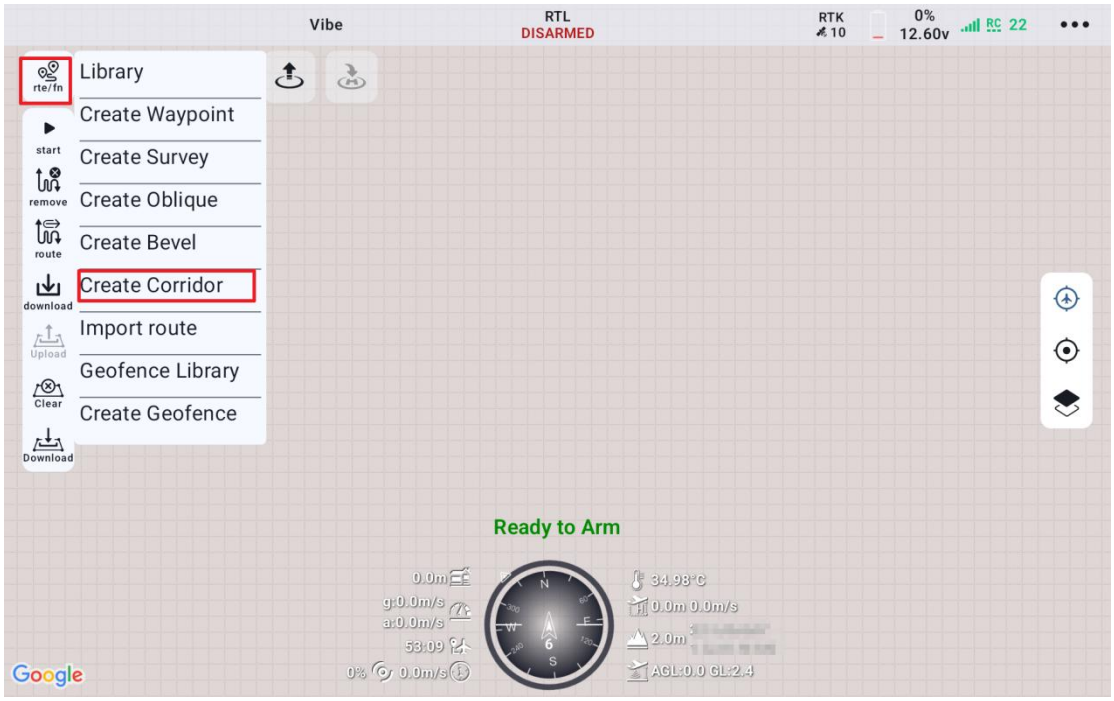
fluctuations on data quality.

4.4.5 Corridor Route

Strip-shaped parallel flight lines for surveying elongated areas (e.g., roads, rivers). Area coverage is achieved by mosaicking multiple strips, requiring controlled spacing to maintain side overlap.

4.4.5.1 Route Planning

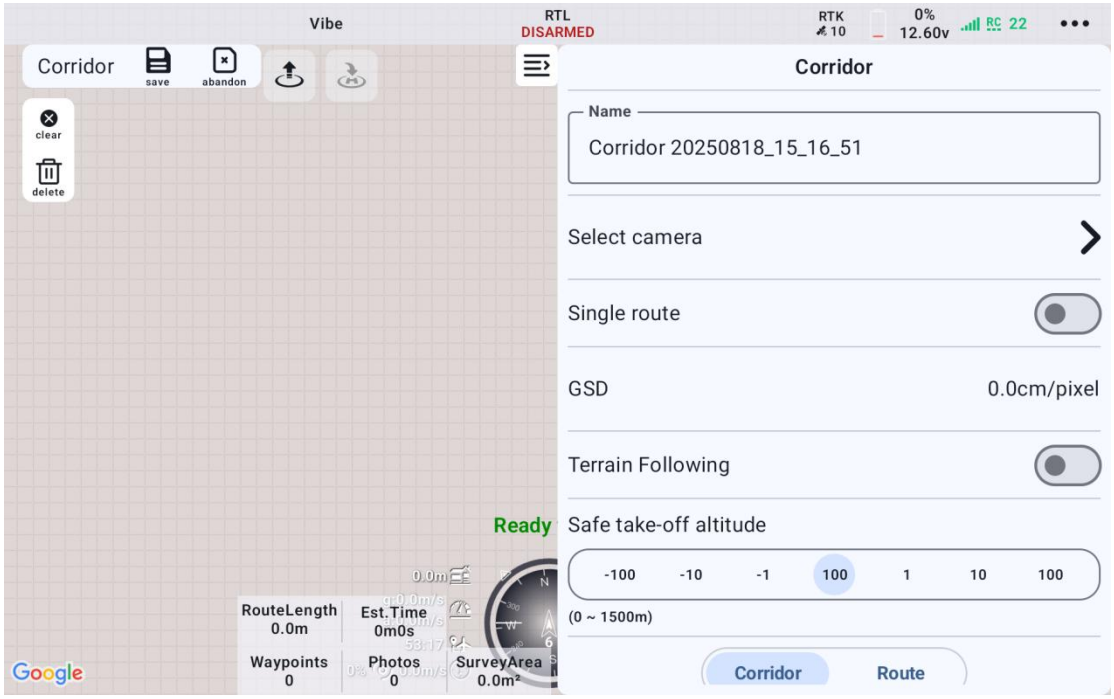
Click the route planning button and select ‘Creat Corridor’ to plan a corridor route.



4.4.5.2 Corridor Route Setting

In the corridor route tab, you can name the current task, and configure settings such as camera selection, resolution viewing, route altitude,

speed, safe takeoff altitude, altitude mode, completion action, and advanced settings.



- Route Name: After entering the desired name in the input box, save the route, and you can view the current route in the mission library.
- Select Camera: Choose a different camera for corridor route tasks, including the wide-angle/thermal infrared lens of the ZT30 camera, the wide-angle/thermal infrared lens of the ZT6 camera, and the A8mini camera.
- Single Flight Line Mode: Activating this mode configures the drone to execute only the central flight path. The aircraft will not perform any extended flight operations to the areas on either side of this central line.

Note:

When the Single-Line Mode is enabled, the system will compute a minimum flight altitude for the operation. This altitude is a constraint determined by the selected camera parameters in conjunction with the pre-set overlap rate requirements.

- GSD: GSD (Ground Sample Distance) refers to the actual ground distance corresponding to a single pixel in the image. After selecting the camera, the GSD data will be displayed.
- Terrain-Following: After enabling the terrain-following switch, the drone will use downloaded terrain data to automatically adjust its flight altitude according to the preset terrain-following height.

Note:

The terrain-following altitude data is sourced from open-source databases and may deviate from actual terrain. Please ensure a safe flight environment.

- Terrain-Following Flight Altitude: When the terrain-following function is enabled, this altitude value is set to determine the relative distance between the drone and the terrain during flight.
- Same Expansion Distance: This function simultaneously sets the expansion width on both sides of the flight line's centerline to ensure precise coverage of a strip-shaped survey area. When this option is disabled, the left and right expansion distances can be set individually.

- Include the Center Line: When this option is enabled, the system will incorporate the pre-defined centerline into the generated flight plan. This means the drone will not only fly over the expanded areas on both sides of the centerline but will also directly traverse the centerline itself.
- Segment Distance: Once configured, this parameter automatically segments the entire flight strip into multiple sub-sections, each with the specified length. By setting an appropriate segment distance and uploading the target area, operational efficiency is maximized and battery power is utilized optimally while ensuring flight safety.
- Heading lock: Lock the heading of the nose, ensuring the uniformity and stability of surveying and mapping data by reducing variables (attitude, angle, light).

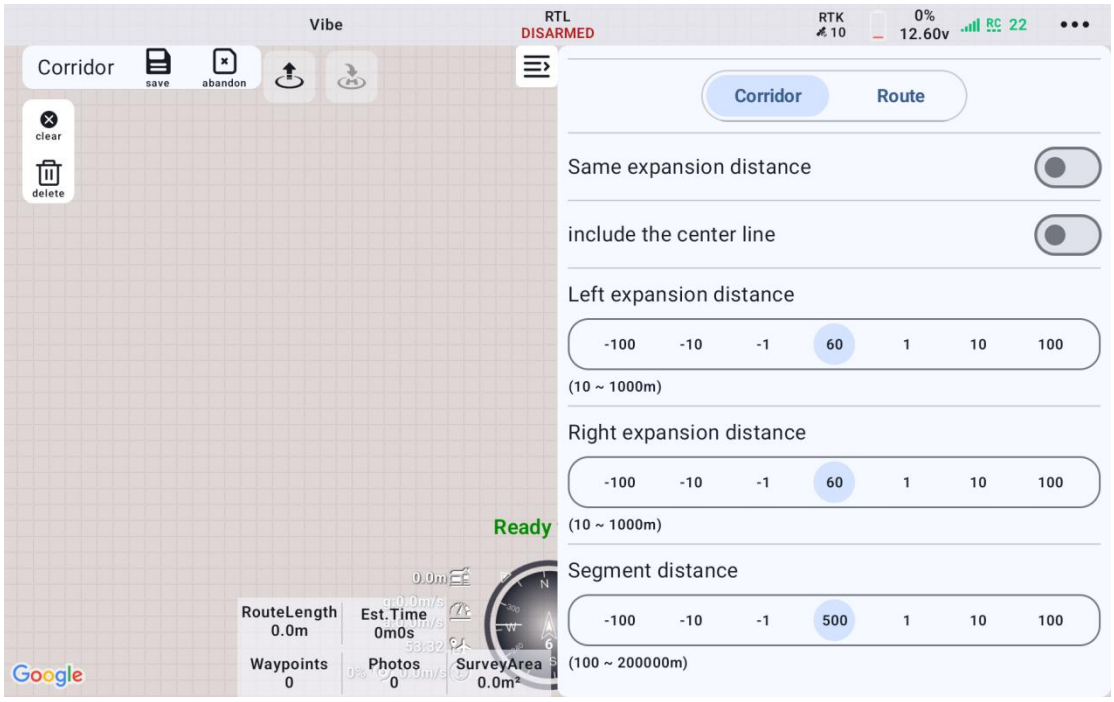
  Note:

  The heading lock function is only supported by multi-rotor models and must be used in conjunction with the waypoint turning function, which can effectively avoid frequent head-turning behaviors when switching lines on short edges.
- Altitude Mode: Switch the altitude mode for all waypoints in the route.

  1. Absolute Altitude (WGS84): The height of the drone relative to mean sea level (MSL).

2. Relative Altitude : The height of the drone relative to the takeoff point or the ground reference level.

- Route Speed: Set the horizontal speed during the execution of the oblique photography route.
- Route Height: Set the flight height when executing the oblique photography route, after reaching the safe takeoff altitude, to continue with the task.
- Relative Height of Subject to Takeoff Point: Refers to the vertical difference between the height of the photographed object and the drone's takeoff point. Appropriately adjusting this parameter can optimize modeling effect. If the height of the subject is unknown, please keep the default distance.



- Safe Takeoff Altitude: Set the altitude the drone must reach before

proceeding to the next point in the route.

- Completion Action: Set the behavior after completing the mapping route task.

  1. Return to Home: Return to the home location from the last waypoint of the task.

  2. Landing: Perform a landing at the last waypoint of the task.

  3. Hover: Hover at the last waypoint of the task.

- Photo Mode:

  1.Equal Distance Interval Photo Capture: Ensures data uniformity through 'spatial benchmarking,' suitable for high-precision and complex scenario mapping.

  2.Equal Time Interval Photo Capture: Relies on a 'time benchmark' and is only suitable for simple scenarios with stable speed.

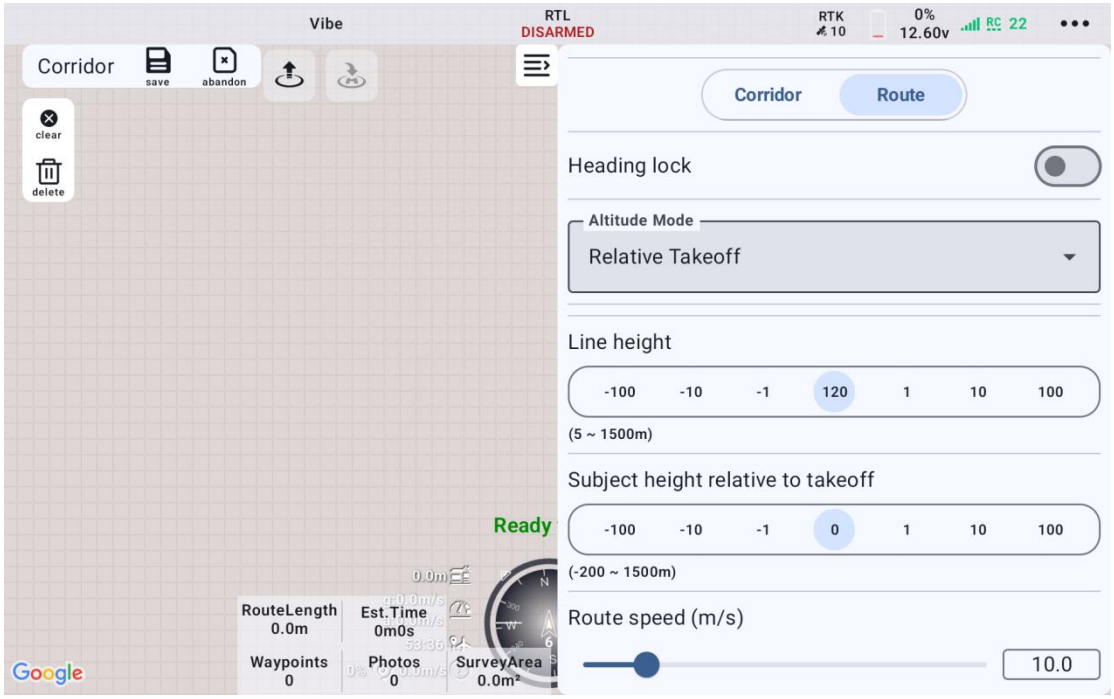
Note:

In actual operations, Almost all high-precision mapping adopt equal distance intercal photo capture mode to avoid the impact of speed fluctuations on data quality.

- Advanced Settings: Set heading overlap, side lap, external margin, and photo mode.

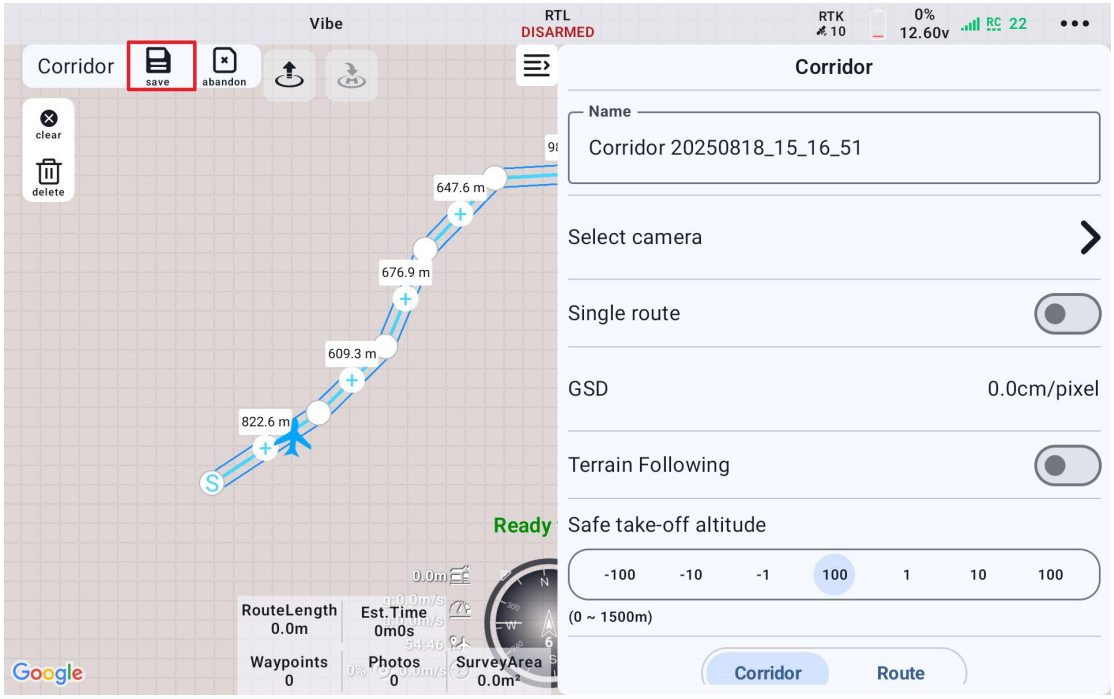
  1.Heading Overlap: The percentage of the overlap area between two adjacent images on the same flight path, relative to the length of a single image.

2.Sidelap Overlap: The percentage of the overlap area between two adjacent flight lines, relative to the width of a single image.

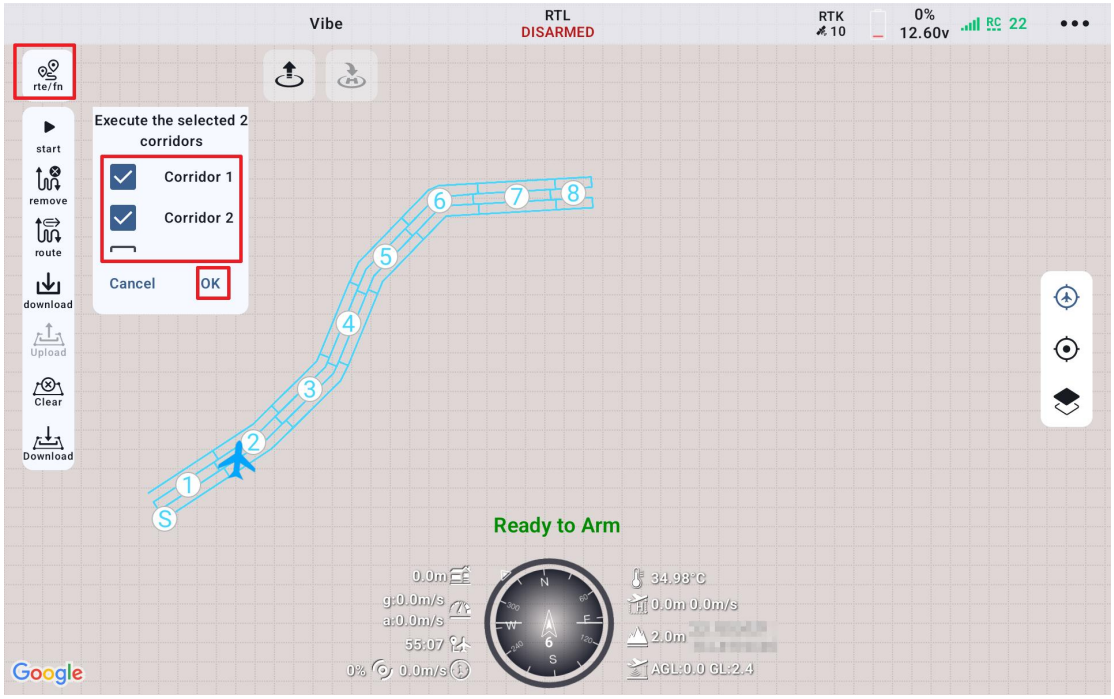


4.4.5.3 Task Execution

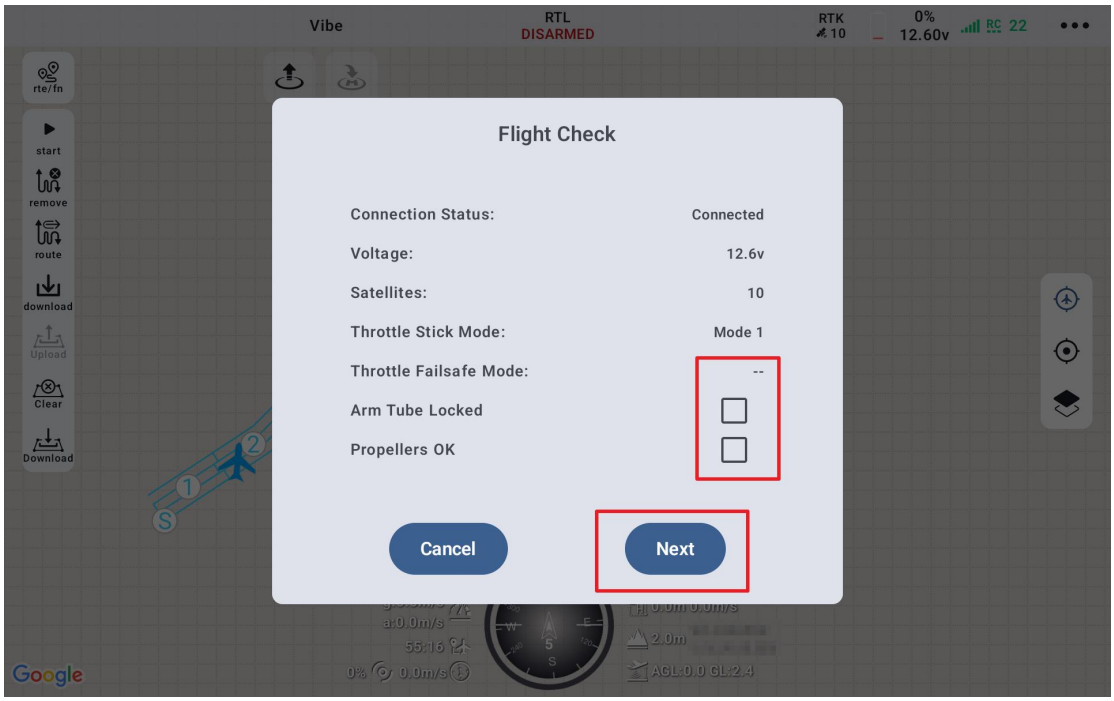
Step 1: After planning the flight route, click the save button.



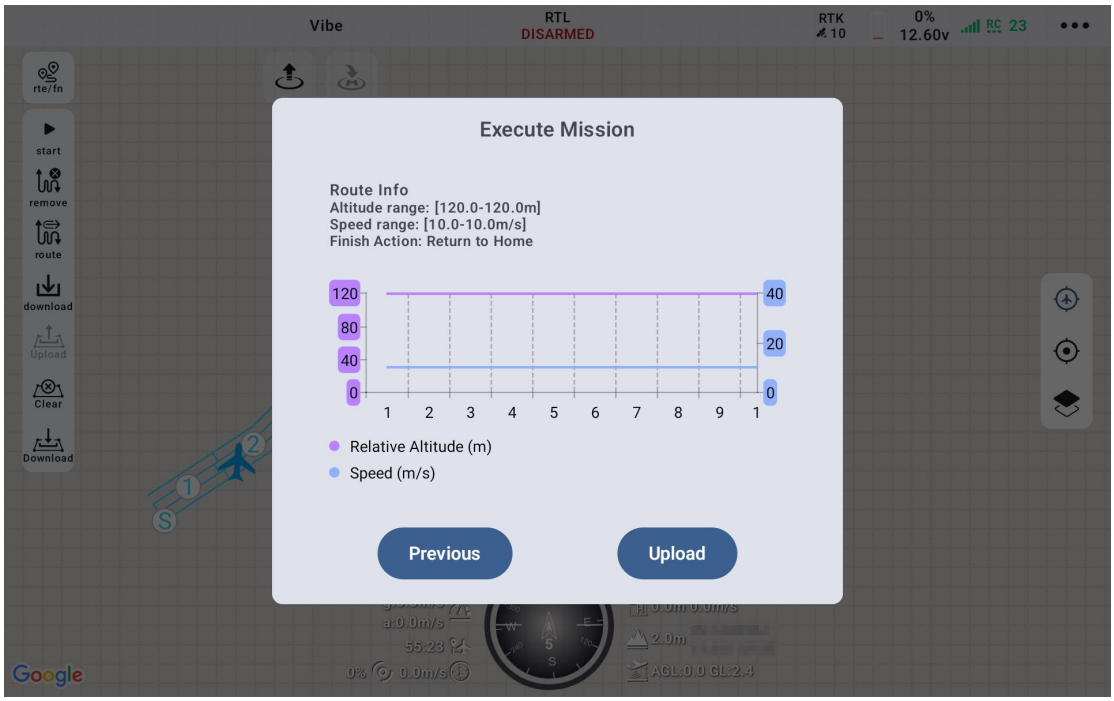
Step 2: Click the "Start" button, select the target flight area, confirm your selection, and proceed to upload the flight route.



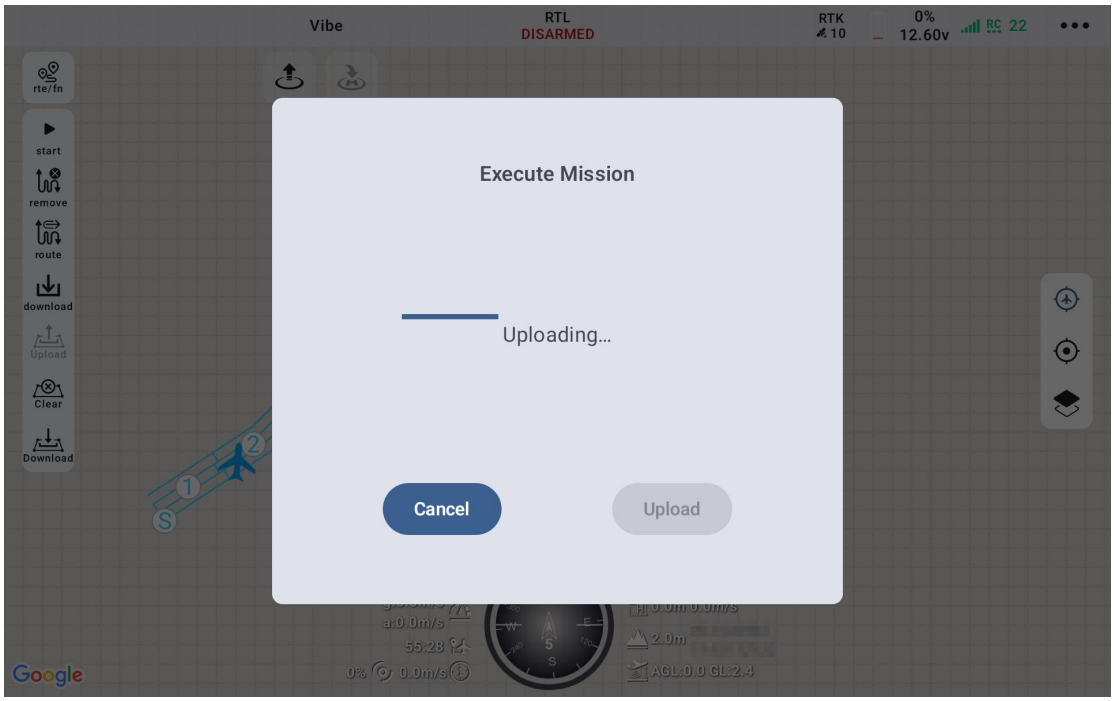
Step 3: Confirm the flight checklist, and after confirming, click the next step.



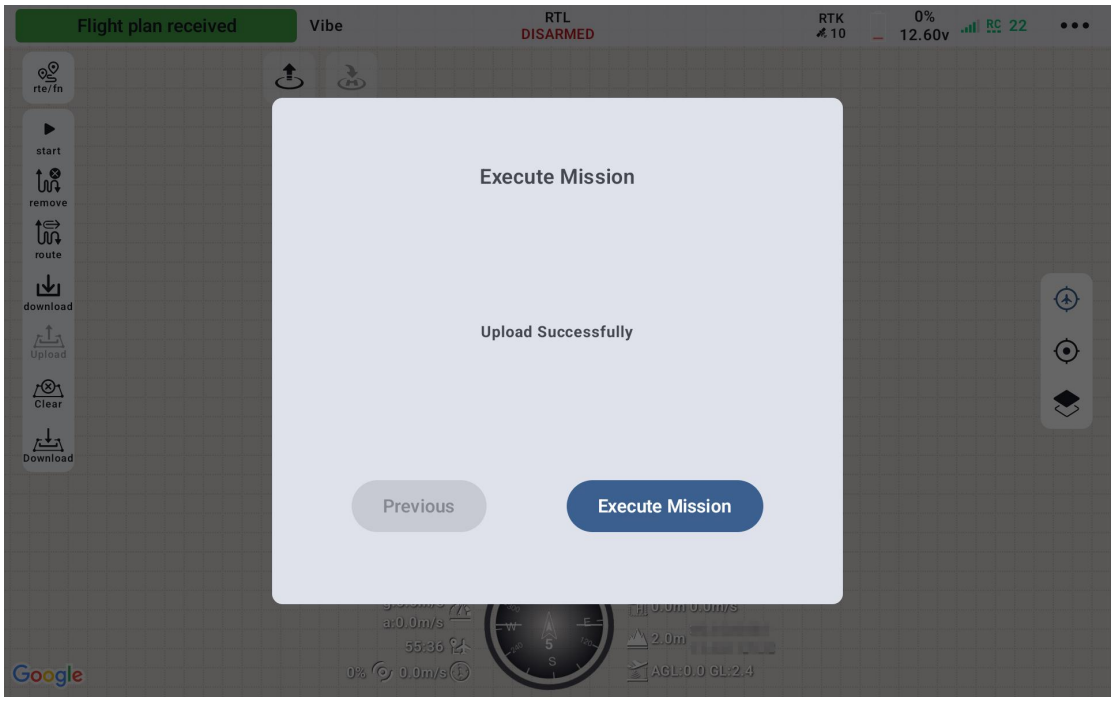
Step 4: Check the route information, where you can view the current task's route speed, altitude range, and route completion actions. After checking, click to upload the route.



Step 5: Wait for the route to finish uploading.



Step 6: Unlock the drone and click "Execute Task" to begin executing the corridor mission.



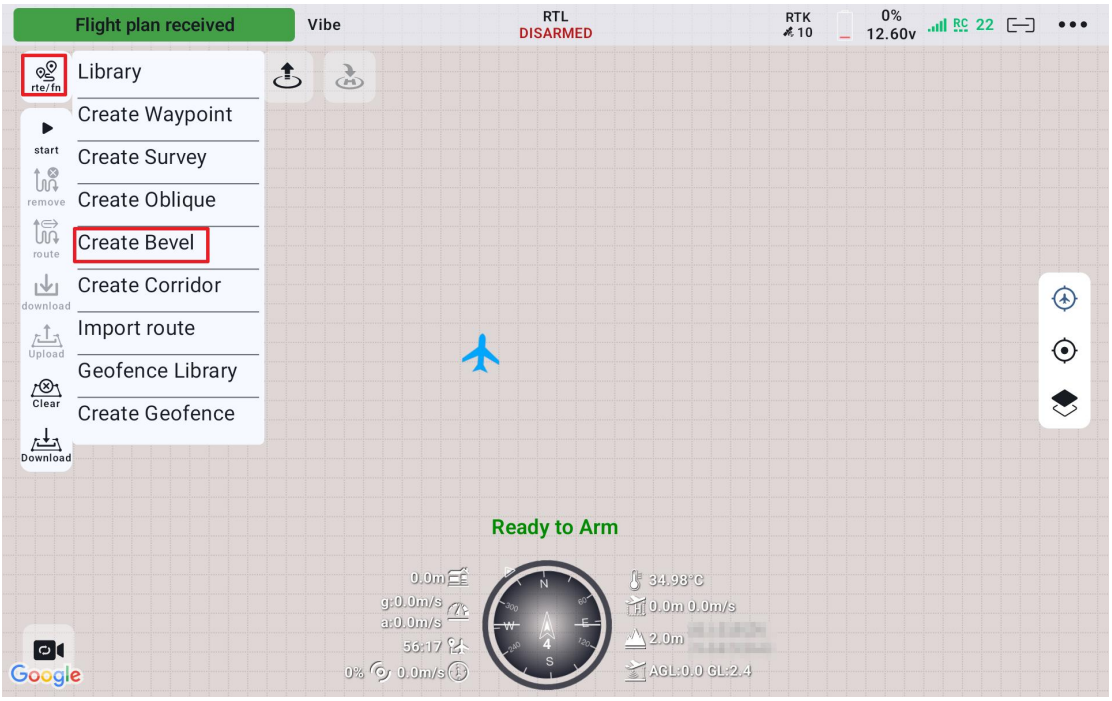
4.4.6 Bevel Route

This route pattern is specifically engineered for vertical and sloped surfaces (e.g. retaining walls, embankments). The flight path maintains a constant offset distance relative to the surface contour, ensuring high-resolution imaging of structural details. Typical applications include slope monitoring and vertical mapping. Note: Current version (V2.0.3) exclusively supports vertical surface missions.

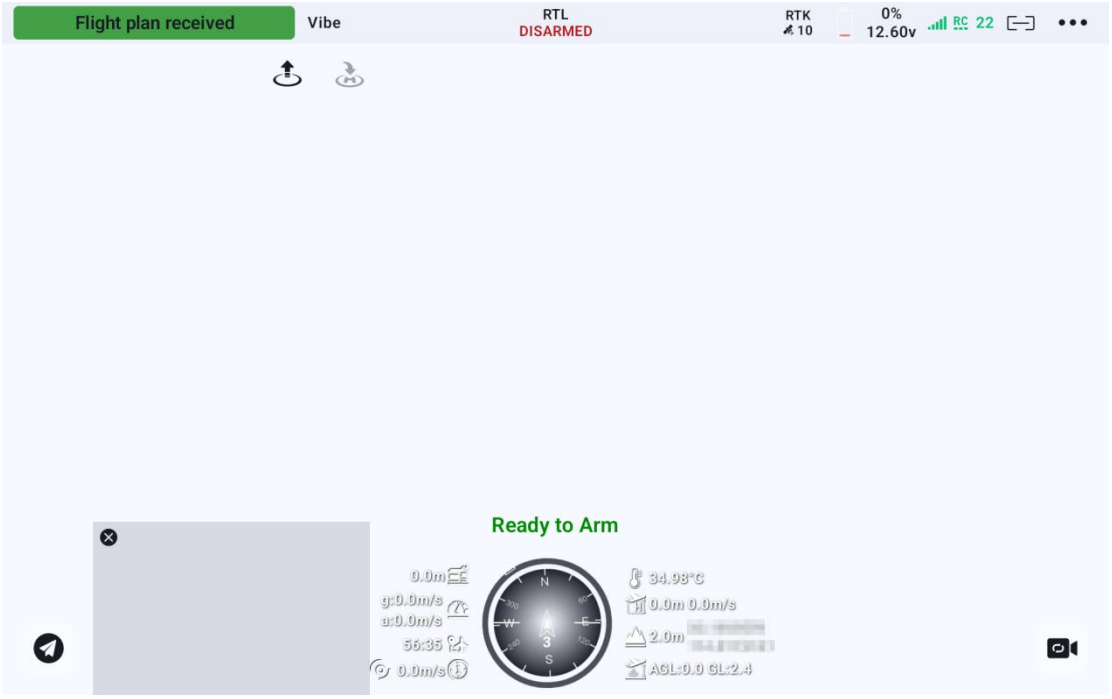
4.4.6.1 Route Planning

1. Click the "Route Planning" button and select "Create Bevel" to plan the

bevel route.



2. A blank dialog box appearing in the lower-left corner of the interface indicates that flight route planning operations may now be initiated.



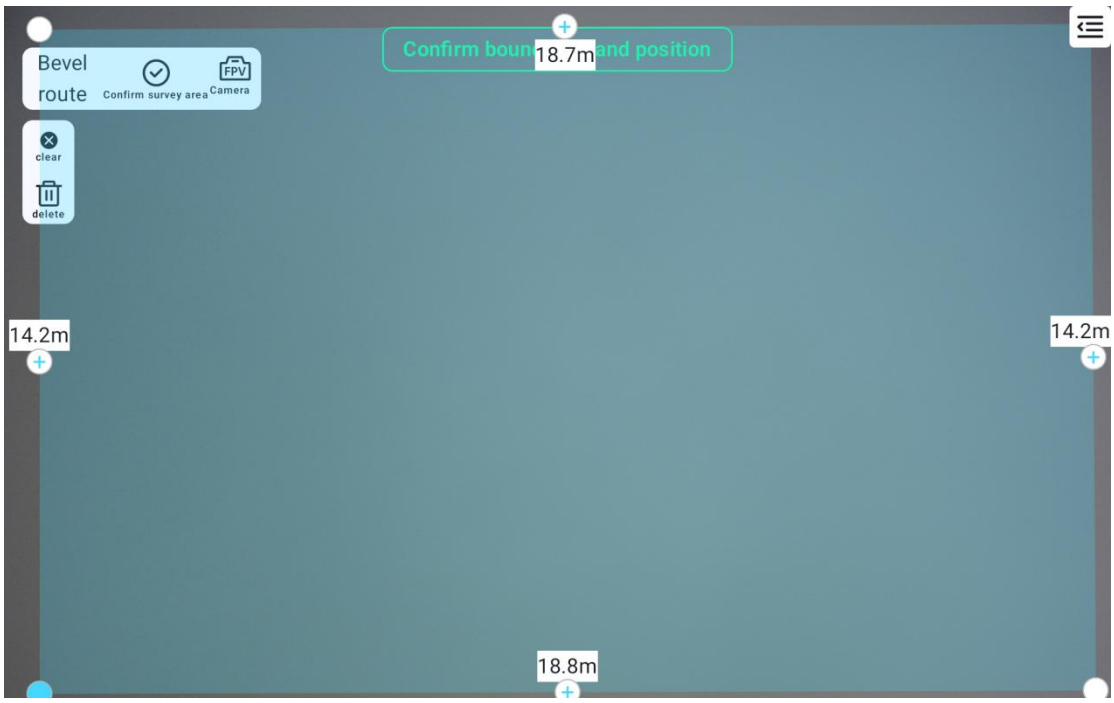
Note:

Bevel Route Planning is only available when the system successfully

obtains the live camera feed and the aircraft heading is set to "Maintain Current Course".

3. Unlock the UAV following standard procedures. Manually pilot the aircraft to the predetermined altitude, then activate the capture function. The preview window in the lower-right interface will subsequently update with the captured imagery. The UAV may now be landed to proceed with dedicated mission planning operations.

4. Operational Prerequisite: Distance measurement between the UAV and the subject must be acquired before proceeding with survey area delineation and parameter configuration.



Note:

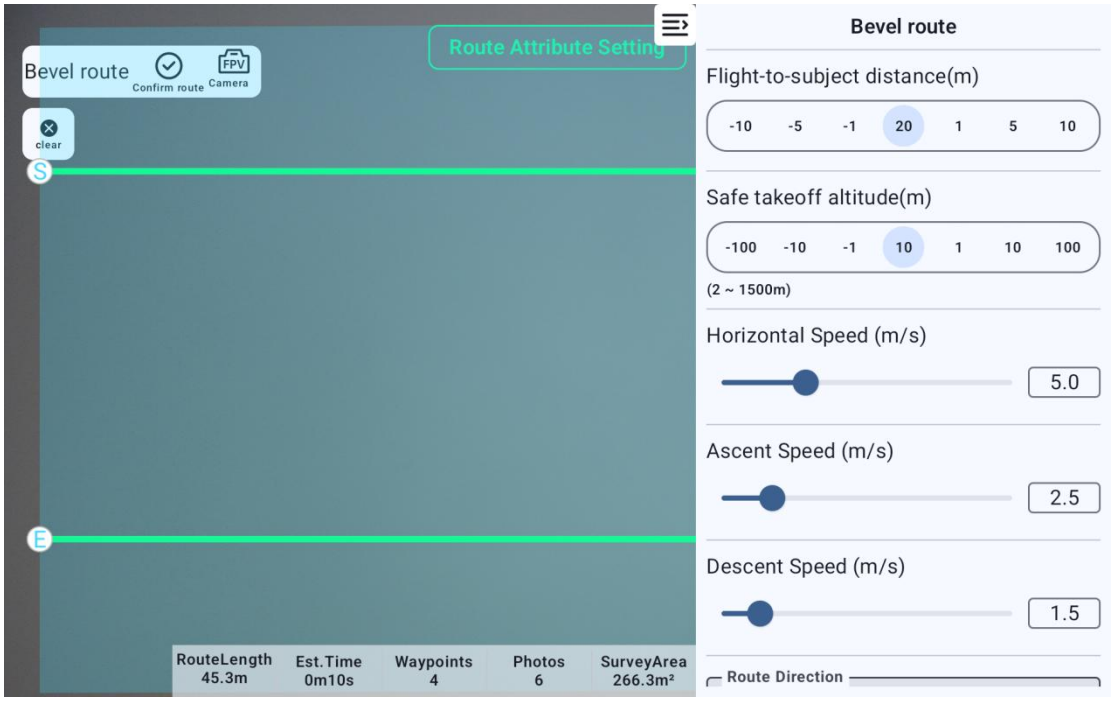
If a SIYI series camera with laser rangefinder is installed, the system will automatically acquire the distance data. When using cameras without this

functionality, the distance between the UAV and the subject must be manually confirmed and adjusted.

4.4.6.2 Bevel Route Setting

In the bevel route tab, you can configure settings including flight speeds, safe takeoff altitude, routee direction and completion action.

- Distance from drone to subject: Refers to the straight-line distance between the UAV and the bevel subject during capture of imagery for route planning purposes.
- Subject-to-object distance: Refers to the distance between the imaging plane of the camera and the actual subject being photographed.



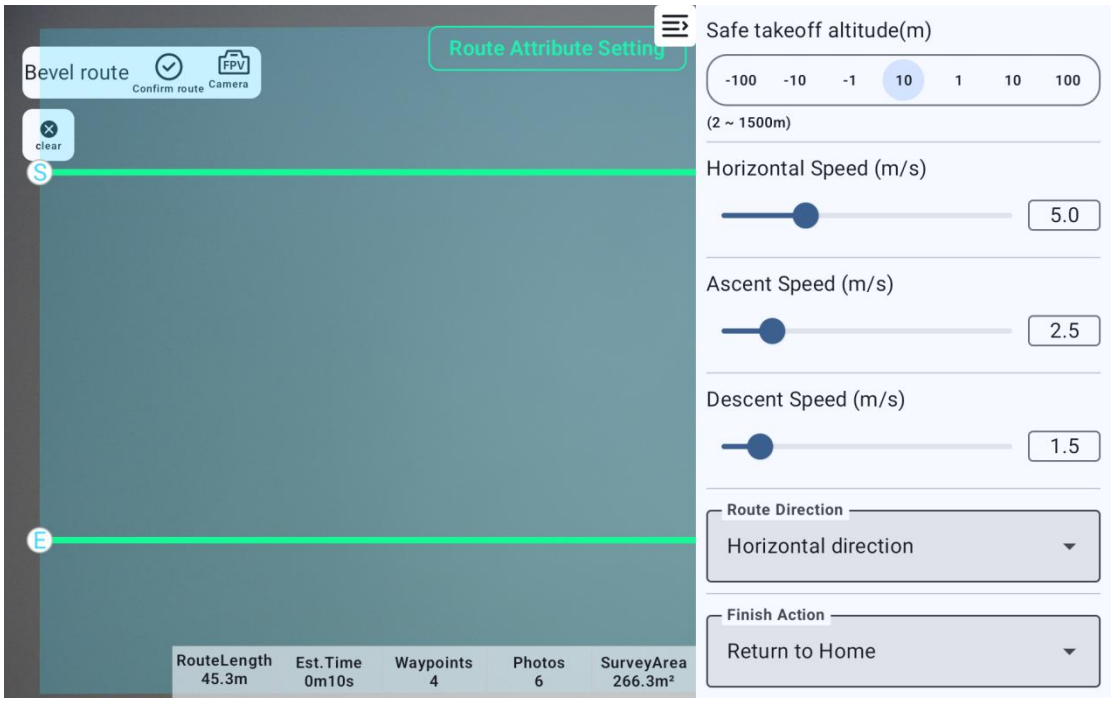
- Flight-to-subject distance: Refers to the vertical distance between the UAV's flight path plane and the subject's bevel surface during bevel missions.
- Safe takeoff altitude: Set the altitude the drone must reach before proceeding to the next point in the route.
- Horizontal / Ascent / Descent speed: Set the horizontal / ascent / descent speed during bevel missions.
- Route direction:

  1. Horizontal direction: Runs parallel to the bevel's extension direction, making it suitable for large-area, elongated bevels with high operational efficiency.

  2. Vertical direction: Perpendicular to the bevel's extension direction, , making it suitable for narrow slopes and complex gradients, providing

superior detail capture.

In practice, these two patterns are often combined to create a cross-hatch flight route, ensuring complete coverage and data accuracy.



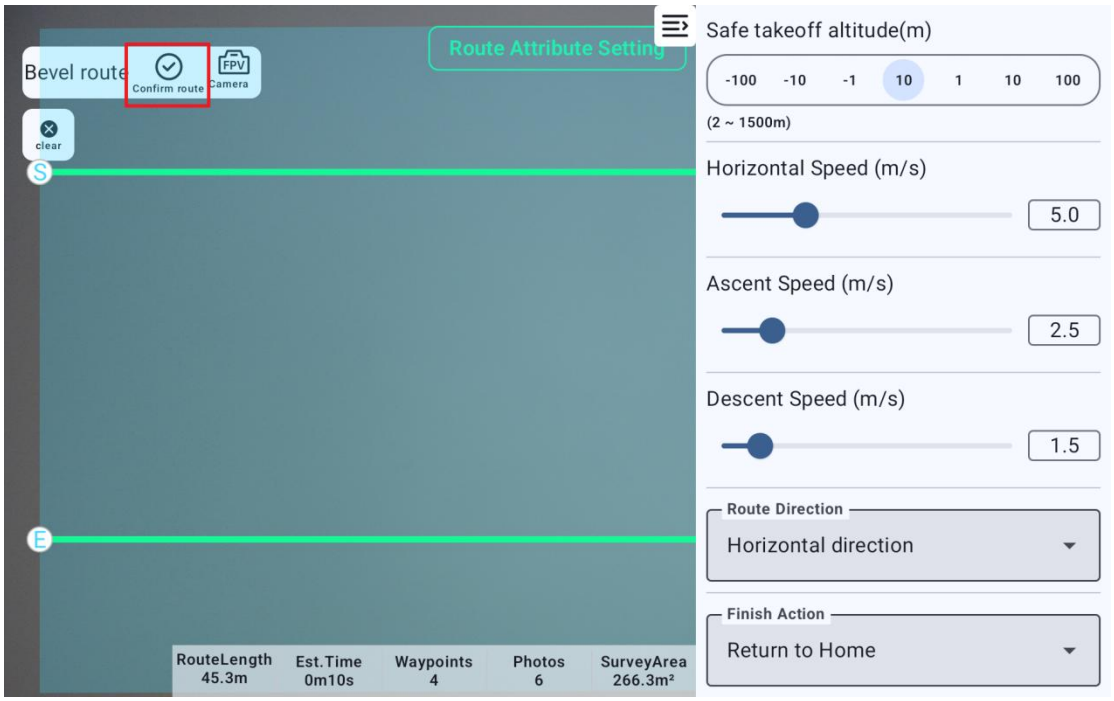
- Completion Action: Set the behavior after completing the bevel route task.

  1. Return to Home: Return to the home location from the last waypoint of the task.

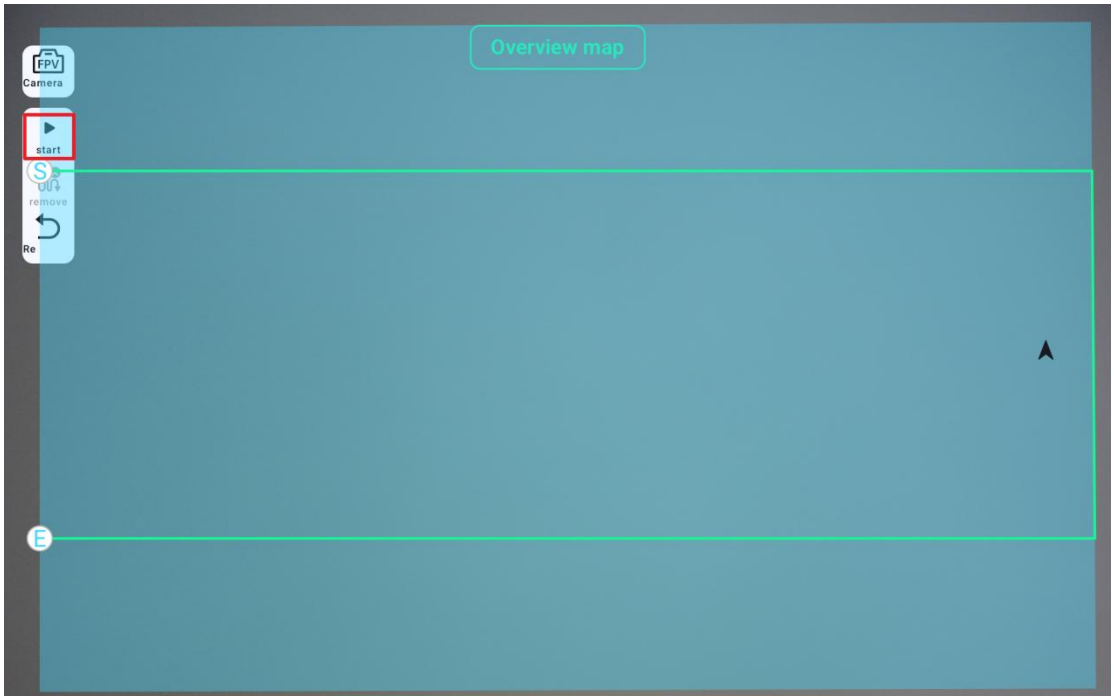
  2. Landing: Perform a landing at the last waypoint of the task.

4.4.6.3 Task Execution

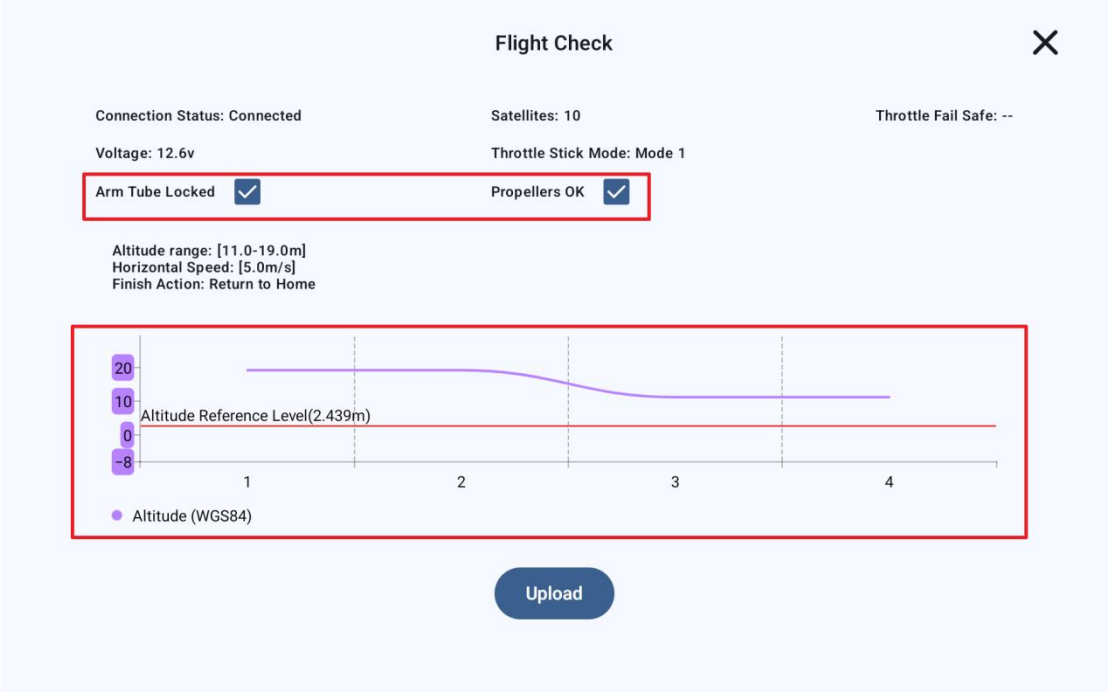
Step 1: After planning the flight route, click the ‘conform route’ button.



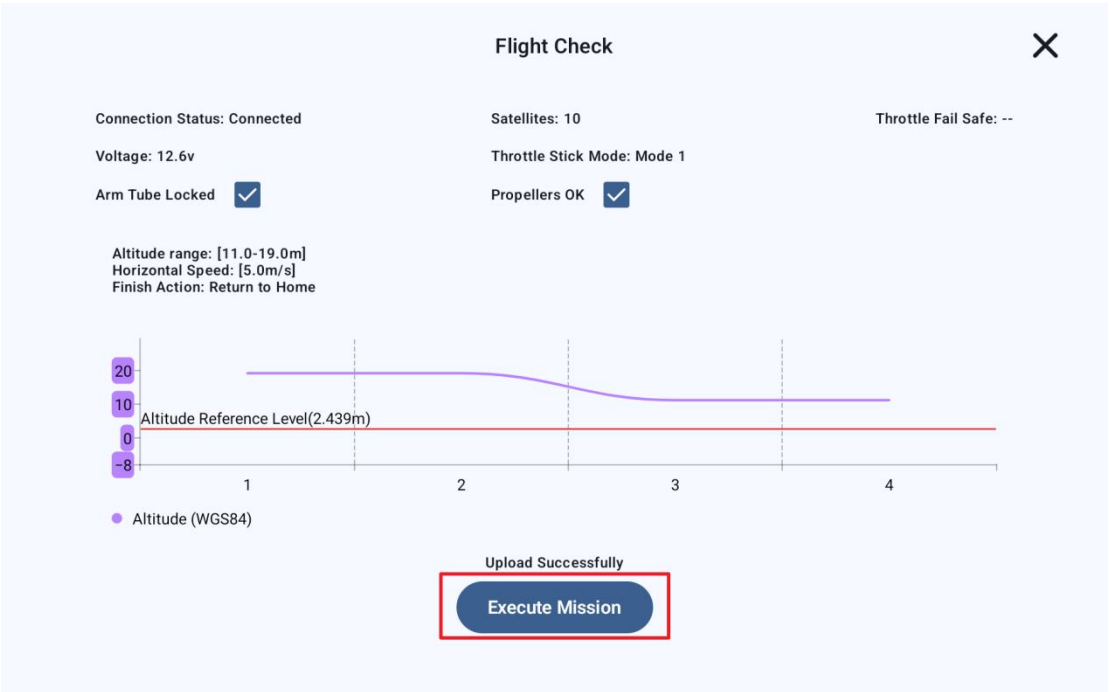
Step 2: Click the "Start" button and proceed to upload the flight route.



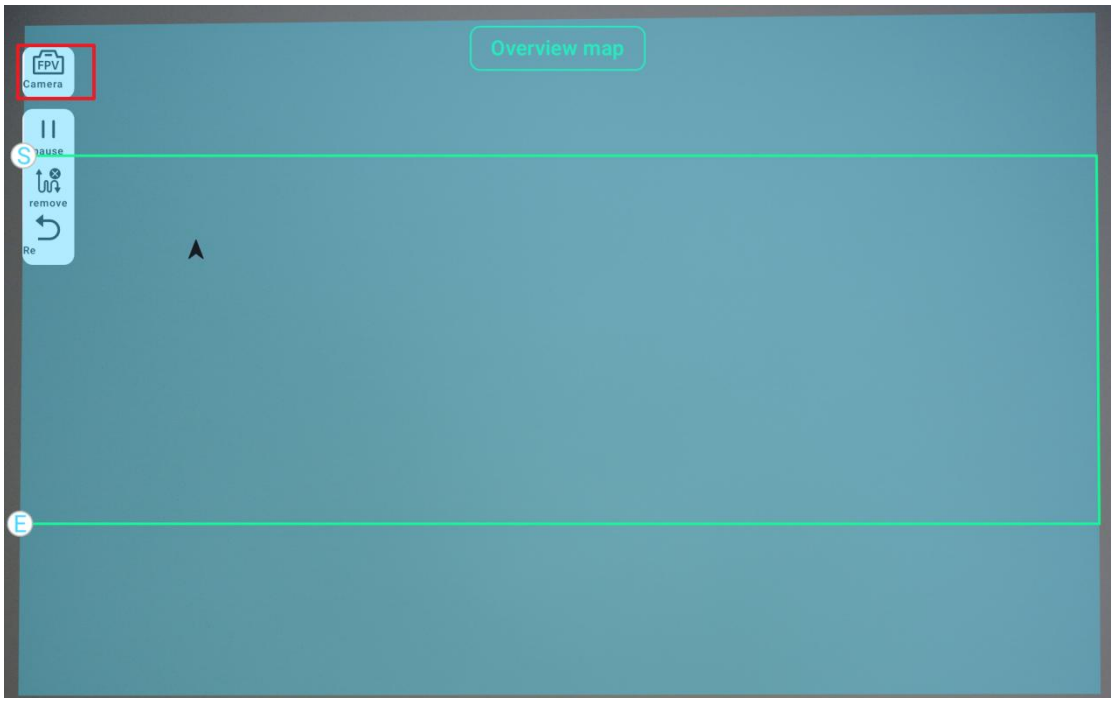
Step 3: Confirm the flight checklist, and after confirming, click the next step.



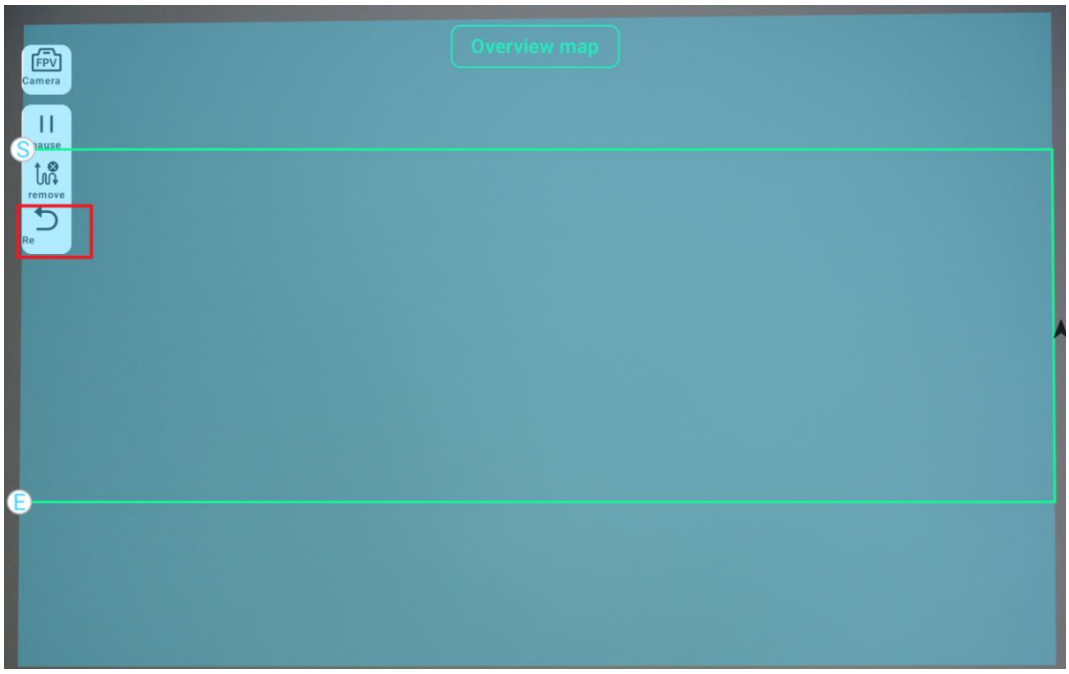
Step 4: Wait for the route to finish uploading, then click "Execute Mission" to begin executing the corridor mission.



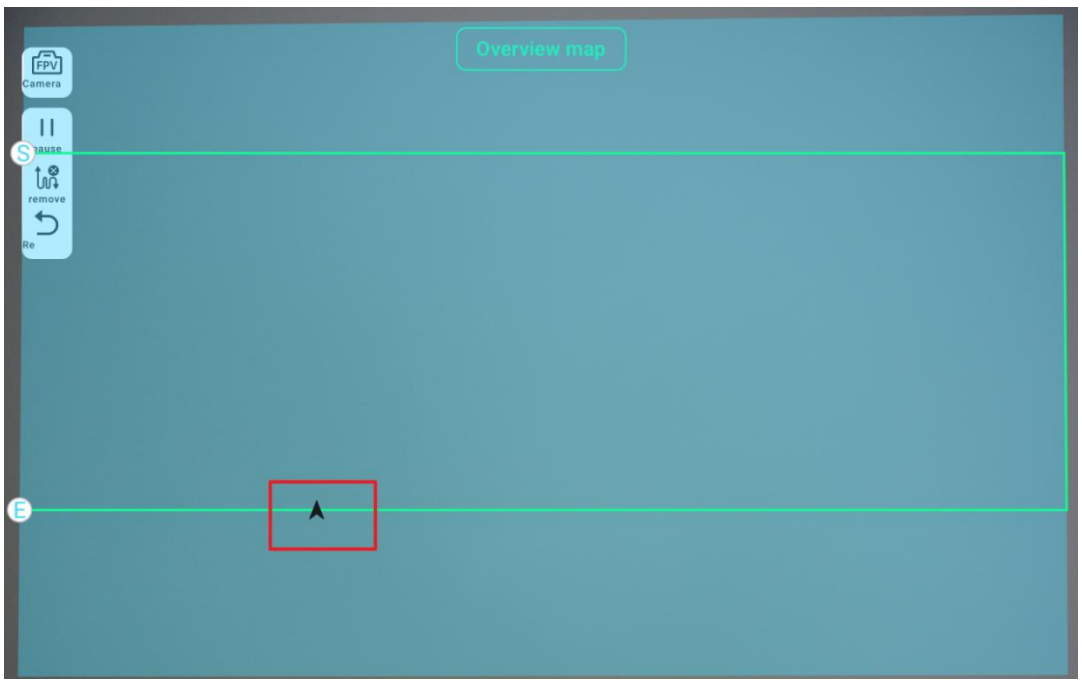
- Camera: Click the camera feed button in the upper-left corner to view the real-time transmission, enabling operators to intuitively monitor the current shooting perspective and scene details for timely adjustments to capture strategy.



- Replan: Click this button to readjust the survey area directly on the route planning base map, while flexibly modifying various flight parameters (e.g., altitude, speed, overlap rate, etc.) to easily adapt to changing mission requirements.



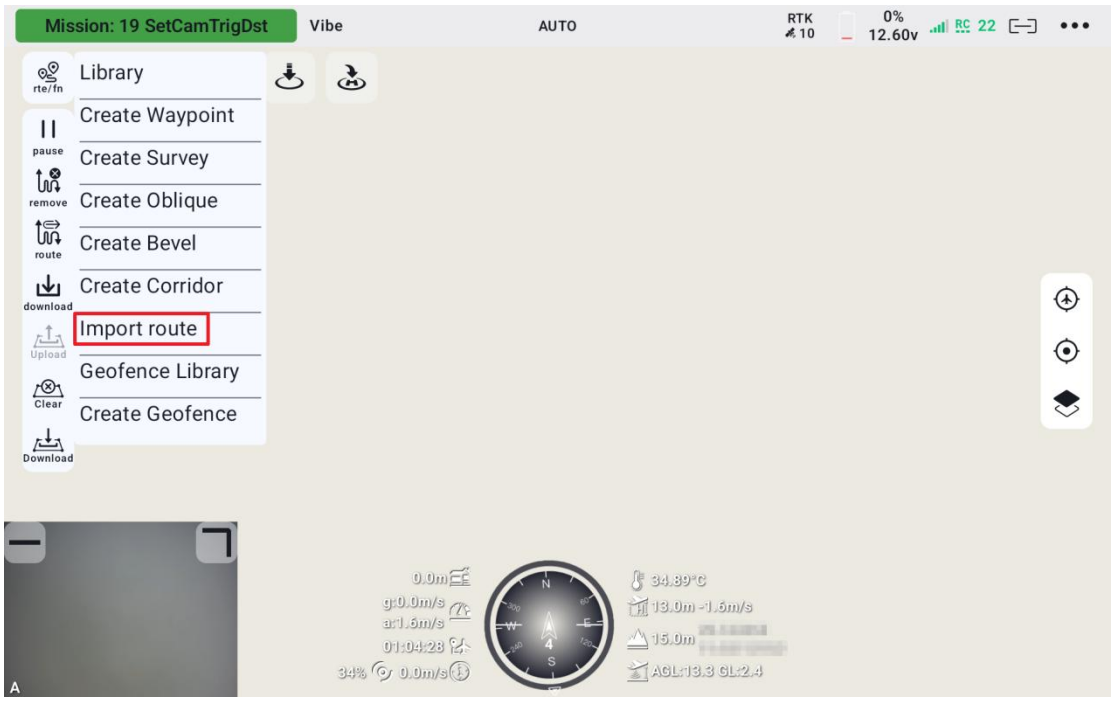
- UAV Route Position Monitoring: Provides clear visualization of the aircraft's relative position on the flight path in both full-screen overview and compact display modes, enabling real-time mission progress tracking and accurate assessment of remaining operational requirements.

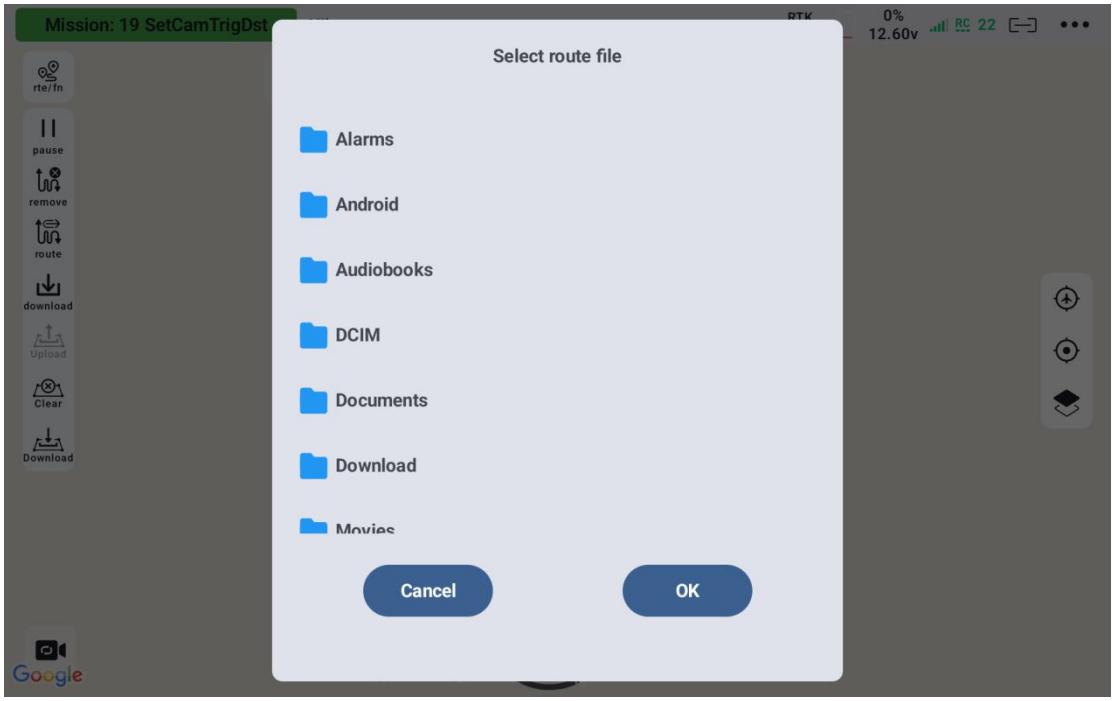


- Exiting Bevel Route Mode: Click the button on the preview window to exit the sloped route planning mode.

4.4.7 Import Route

Click the "Import Route" button and select a local waypoints-format route file or KML file to initiate the import process.

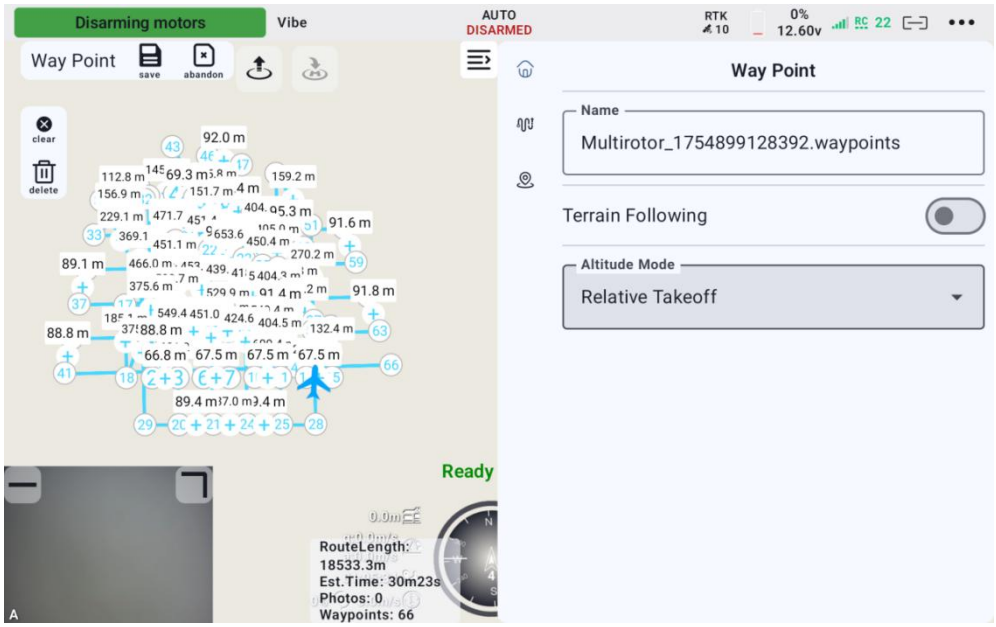




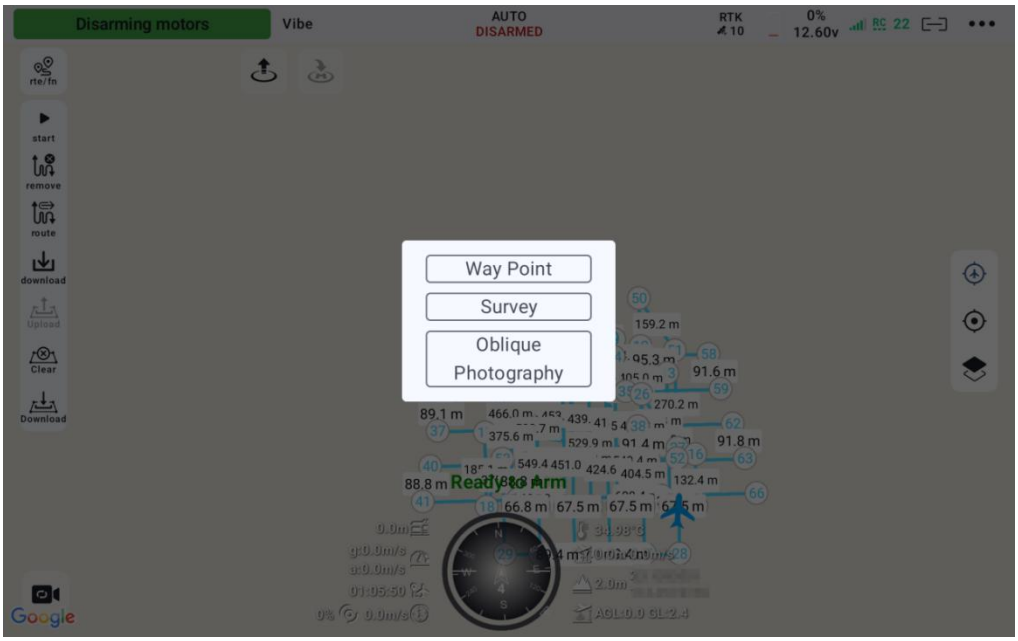
- Waypoints Format Import: Files in Waypoints format will be automatically converted to waypoint routes.

Note:

Carefully review and configure all route parameters before saving after import.

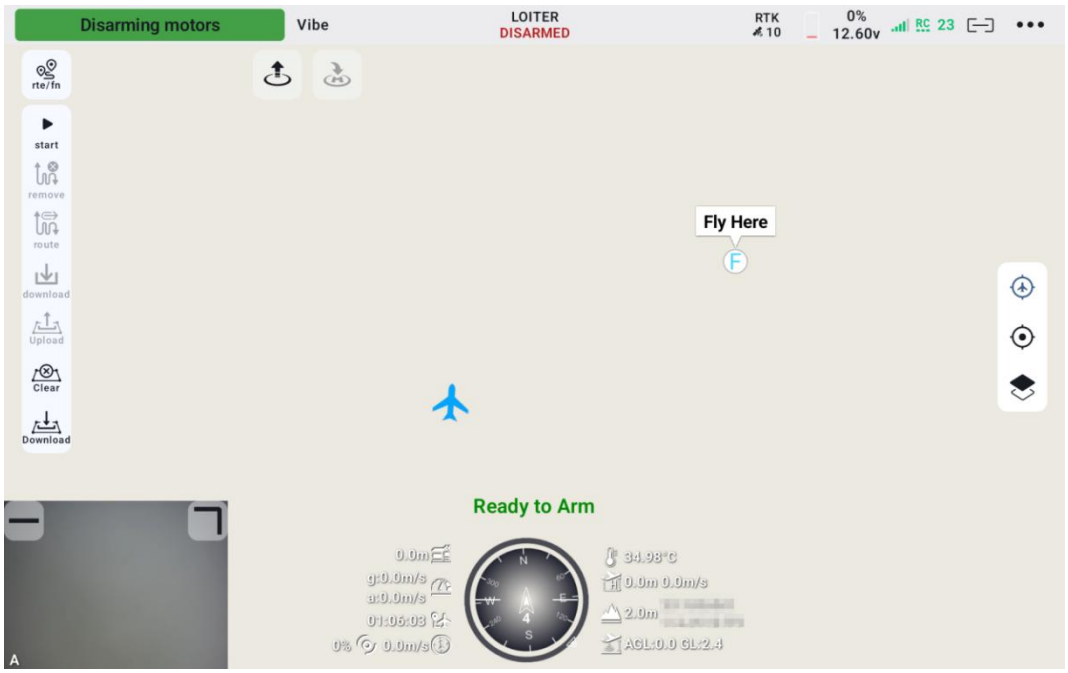


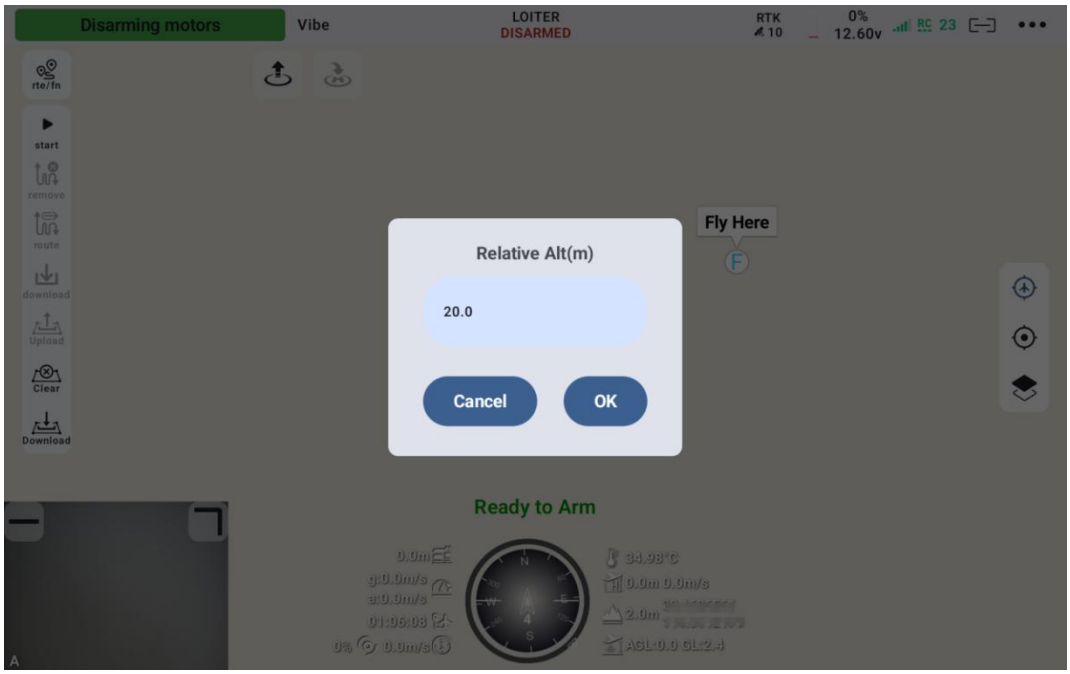
- KML Format Import: After selecting the KML file, a prompt will appear. Please choose the appropriate route type for import based on actual operational requirements.



4.4.8 Point-to-Point Navigation

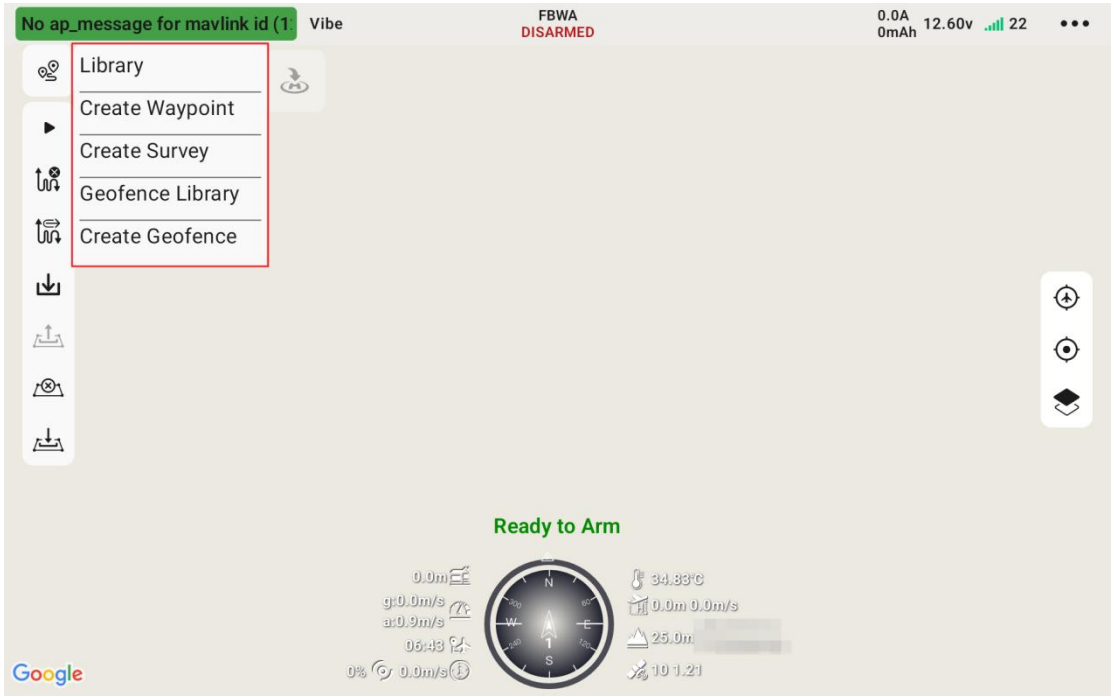
Long-press any location on the map during flight to activate the "Fly Here" window. After entering the specified altitude and confirming, the UAV will autonomously proceed from its current position to the target point.

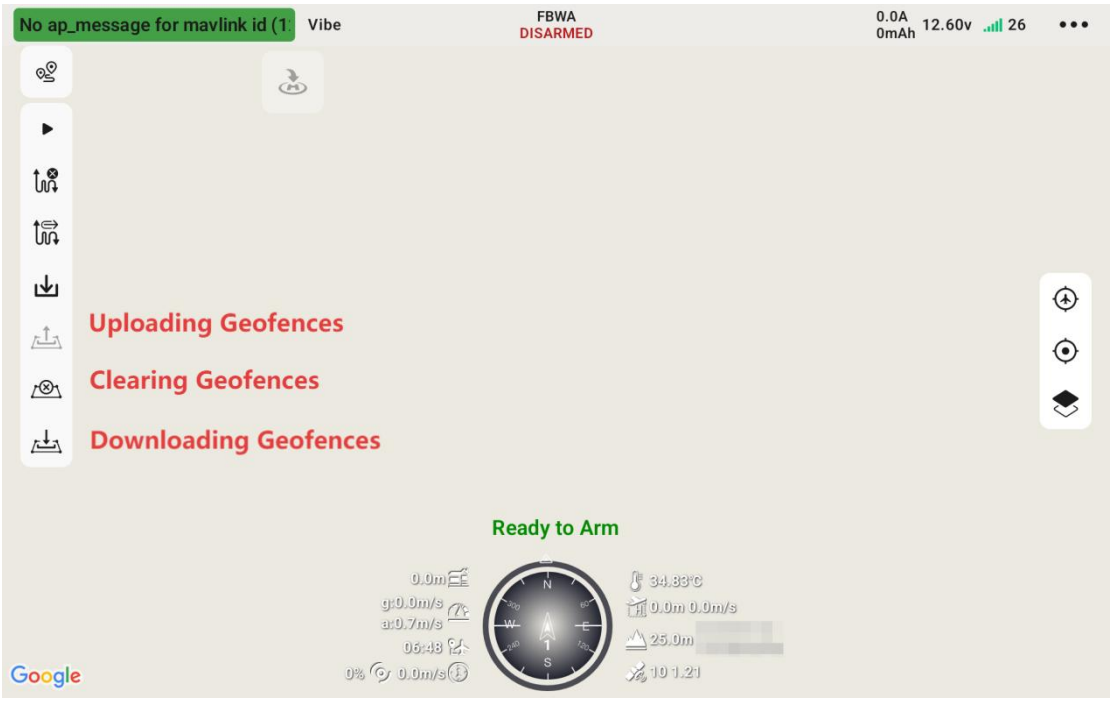




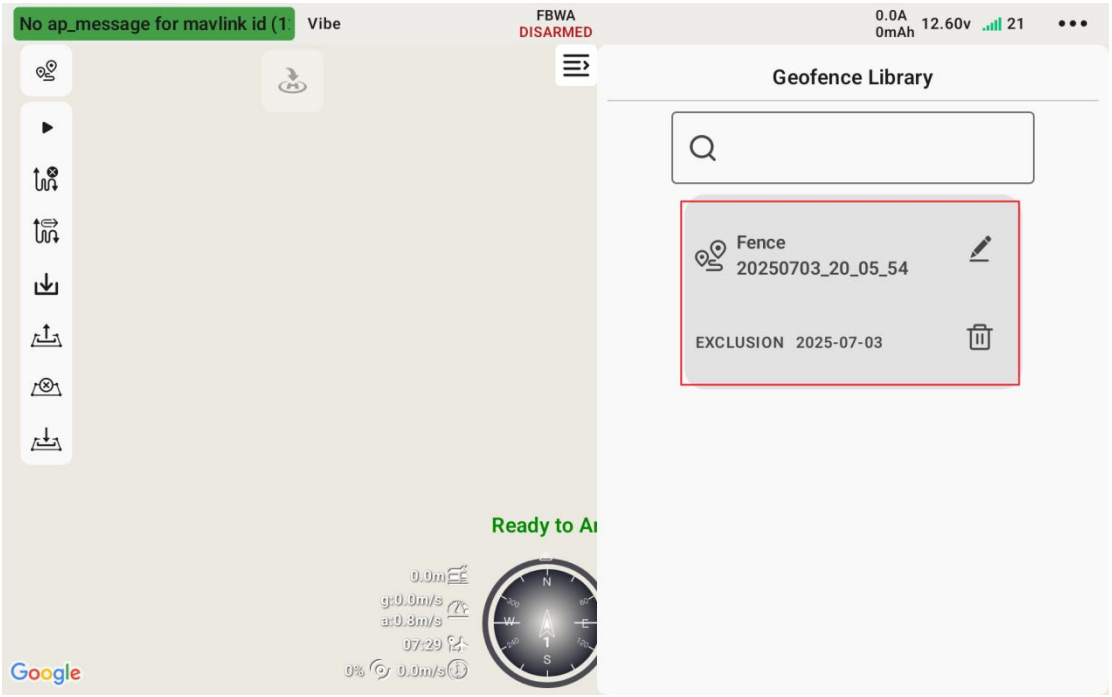
4.5 Customized Geofence

The geofence module includes functions such as a geofencing library, as well as drawing, uploading, downloading, and clearing geofences.



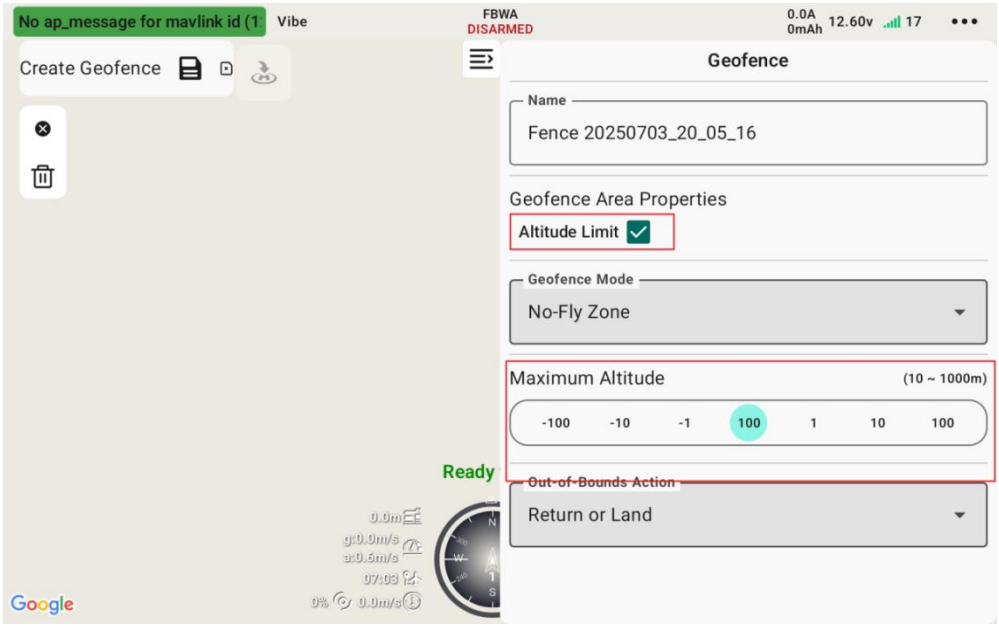


4.5.1 Geofence Library

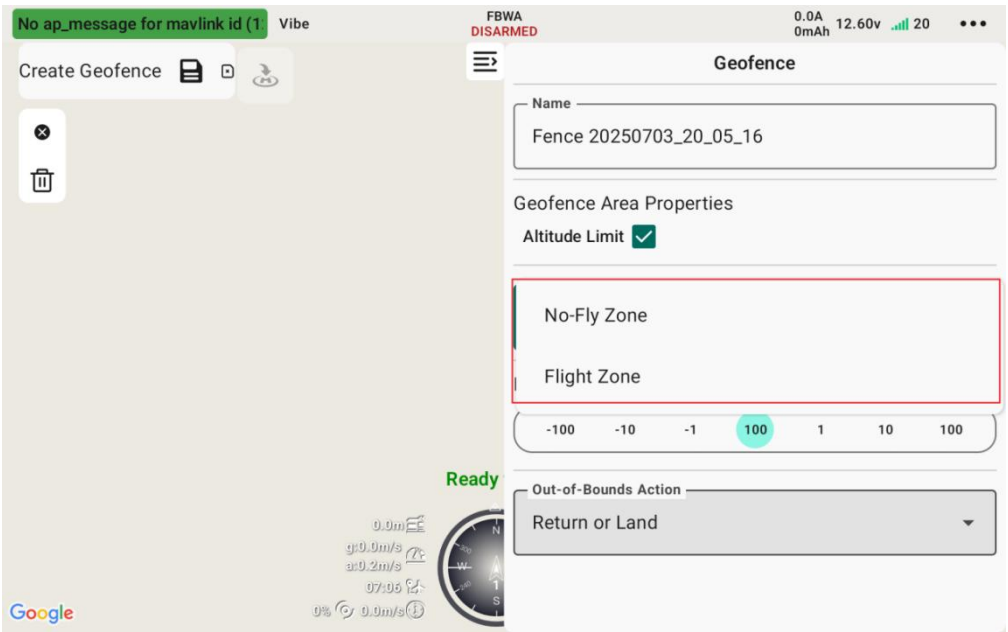


4.5.2 Creat a Geofence

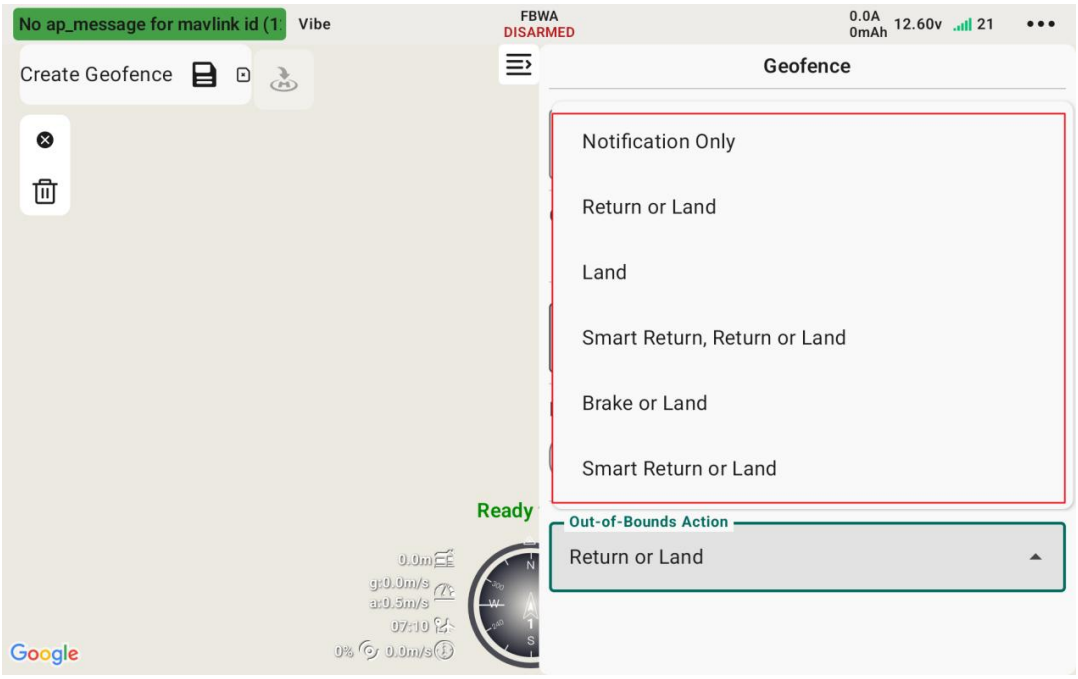
Click the geofence library to display a list of drawn geofences, allowing secondary editing and deletion of the drawn geofences.



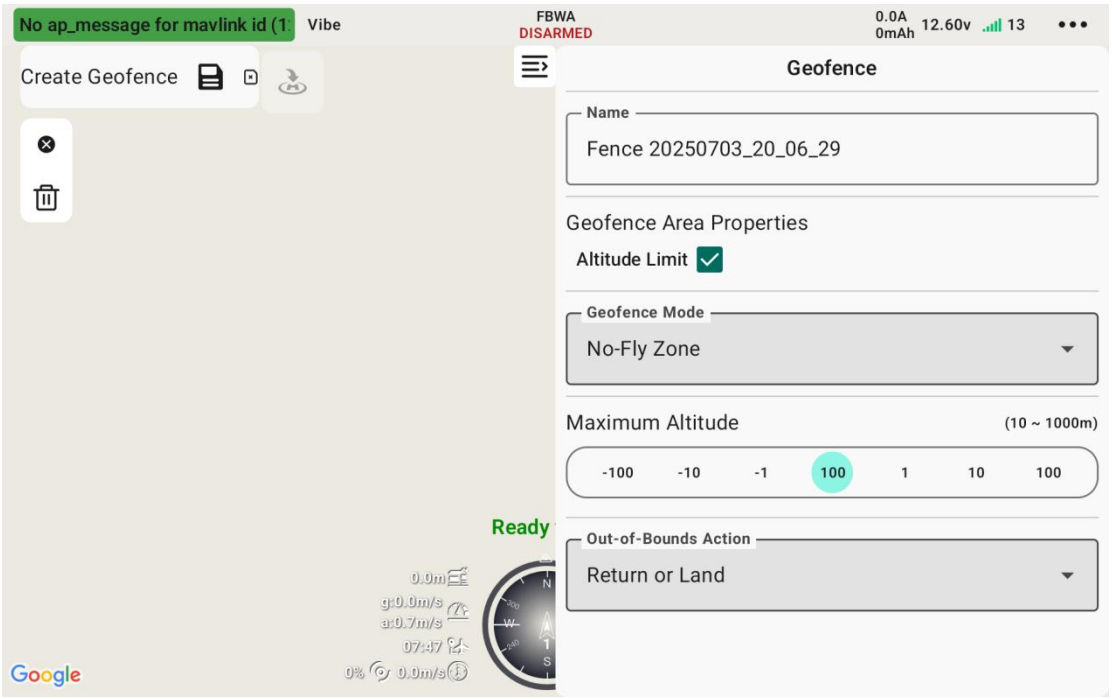
After enabling the altitude limit function and selecting the max altitude, the drone's flight altitude will be restricted to below the max flight altitude.



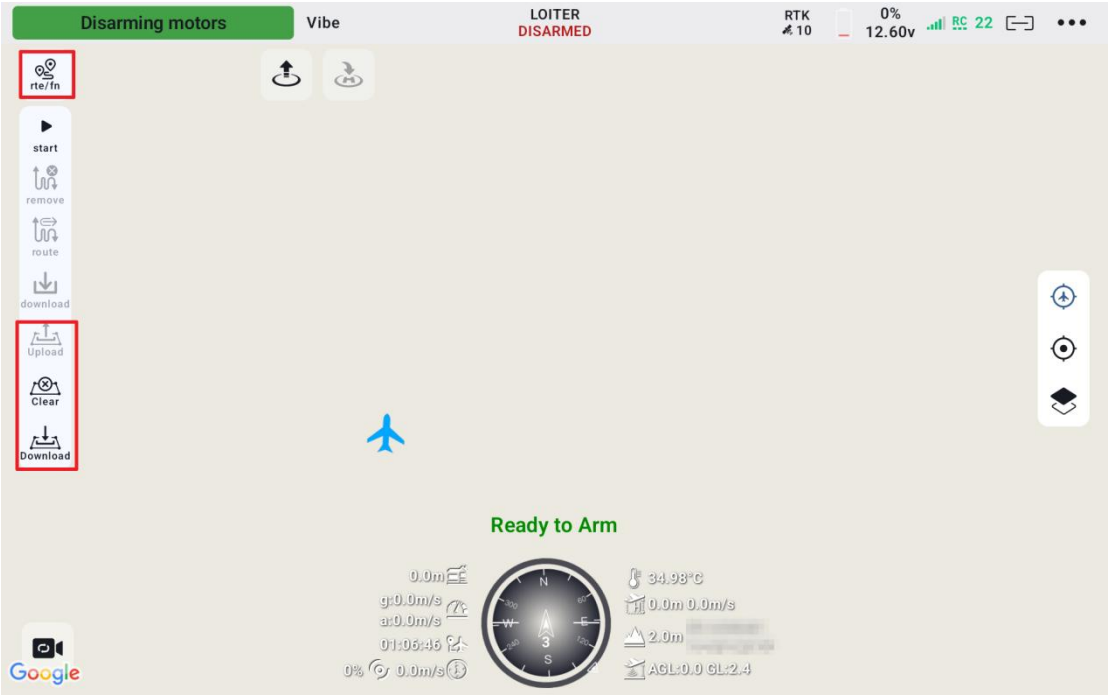
Also you can select whether the planned area is a fligh zone or a no-fly zone in the geofencing mode.



We provide multiple choices for out-of-bounds handing.



4.5.3 Geofence Operation



- Uploading Geofence: Upload the planned geofence to the flight controller.
- Clearing Geofence: Clear the geofence in the flight controller.
- Downloading Geofence: Download the geofence in the flight controller.

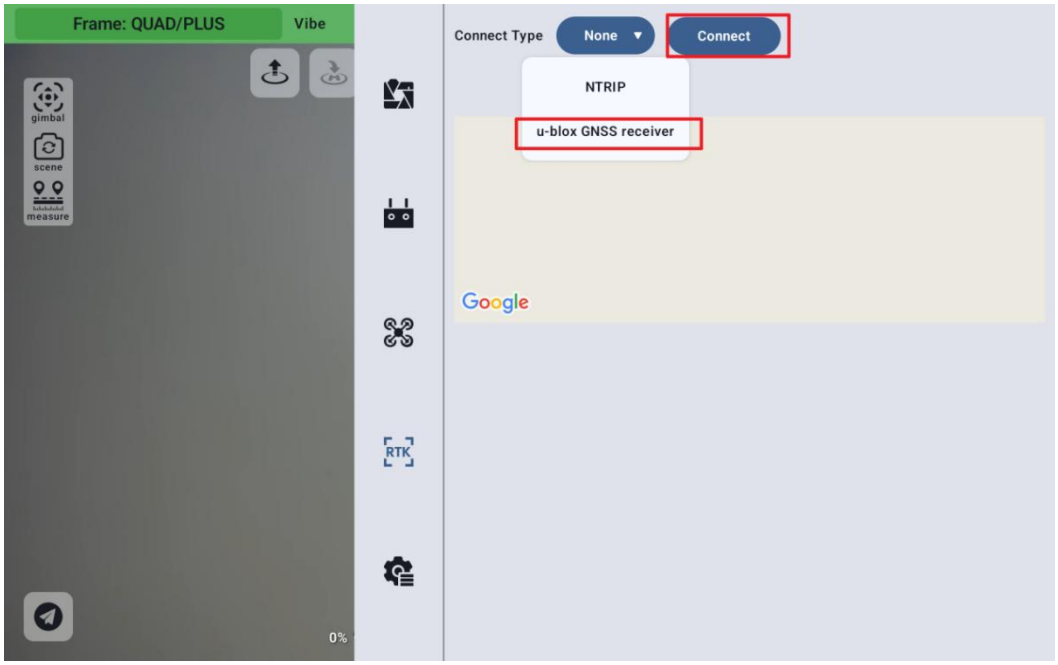
4.6 RTK Module

RTK (Real-Time Kinematic) is a high-precision positioning method based on carrier phase differential technology. Its core principle involves utilizing relative position differences between two or more GNSS (Global Navigation Satellite System, e.g., GPS, BeiDou, GLONASS) receivers to perform real-time positional data correction.

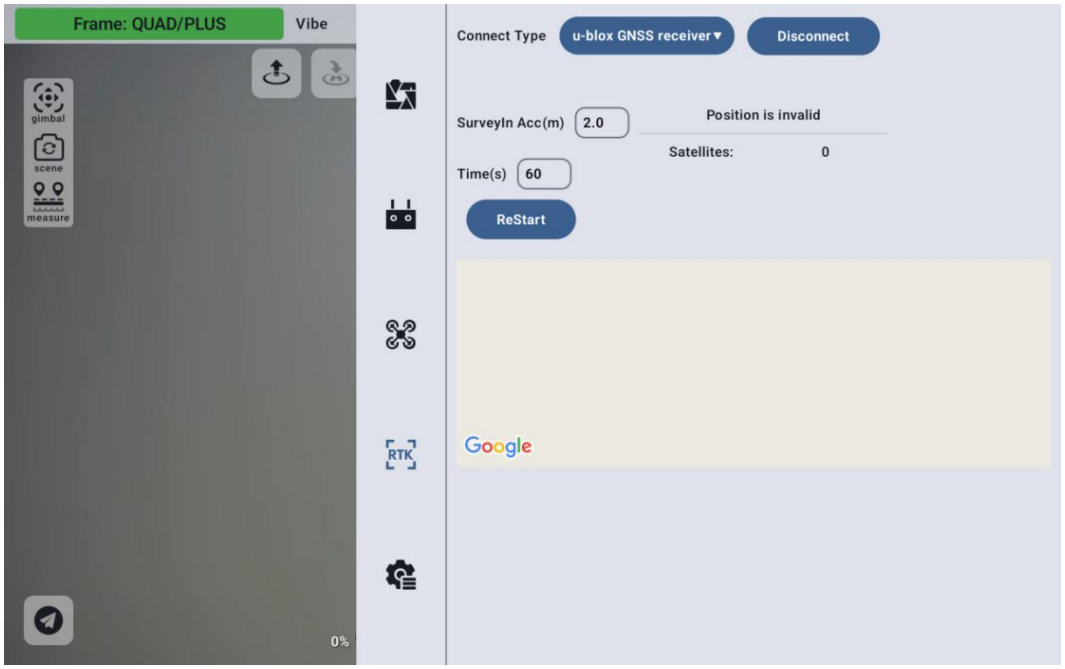
4.6.1 Coventional RTK

1. Hardware Connection: Connect the RTK base station to the USB port on the top of the remote controller using a USB cable.

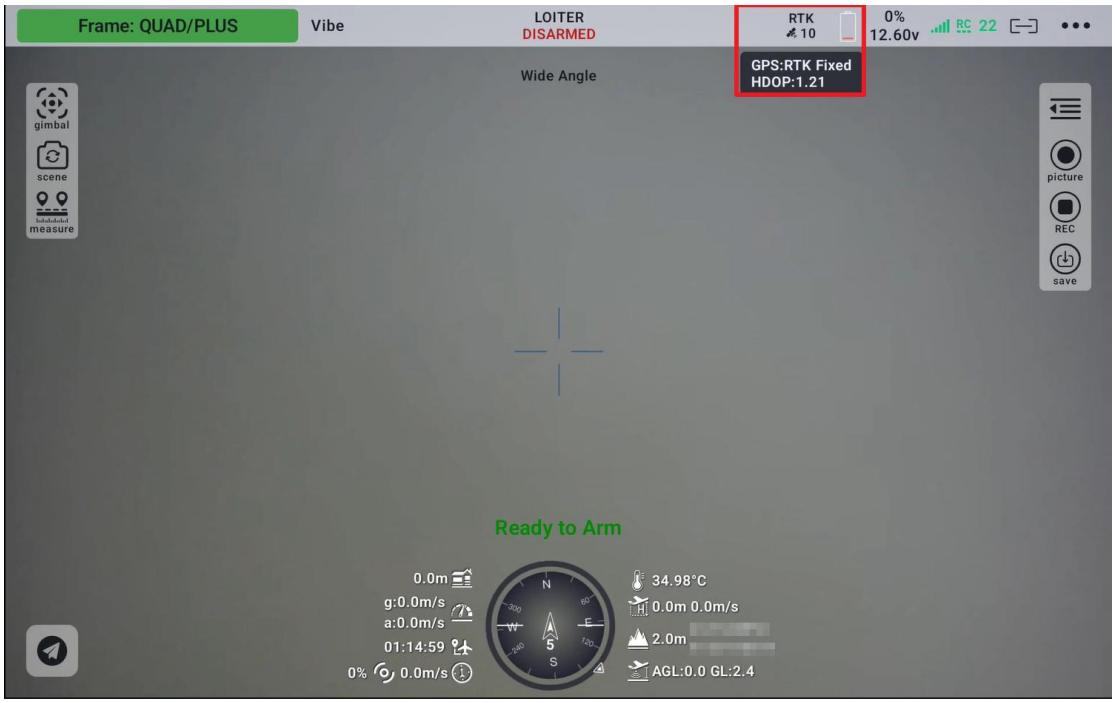
2. Connection Method: Click "Connection Method" and the system will automatically recognize and display the "u-blox GNSS receiver" option. Select this option to complete the connection.



3. Connection: After setting the desired position accuracy and observation time, click "Connect" to complete the operation.

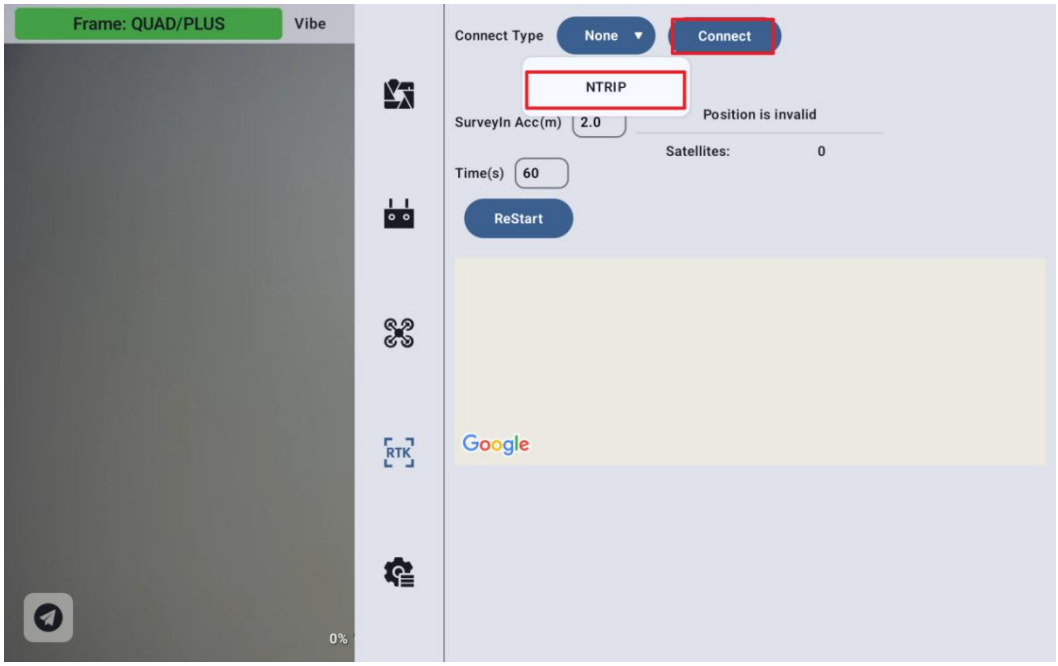


4. Operational Condition: The feature can be normally enabled when the GPS status in the top status bar displays "RTK FIX" for positioning information.

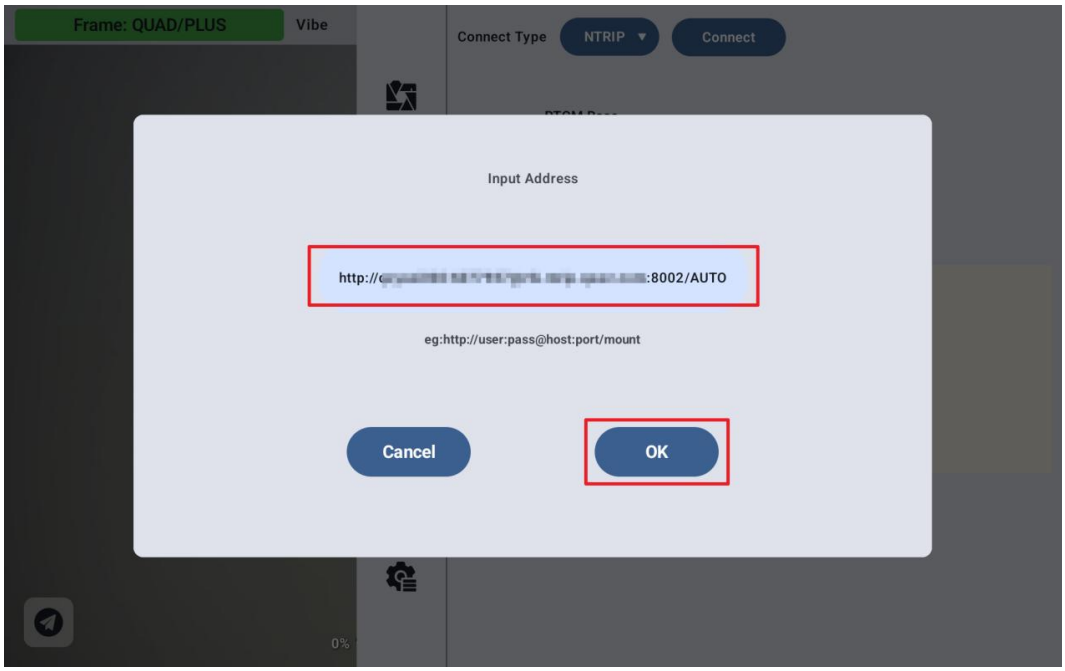


4.6.2 Network RTK

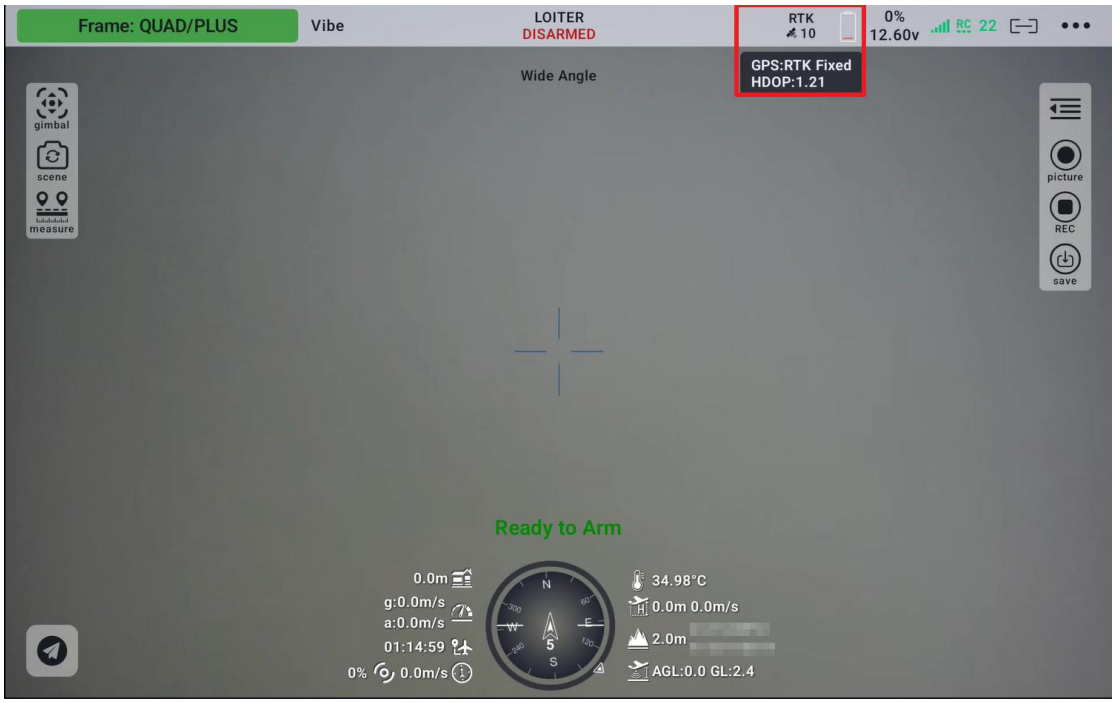
1. Connection Preparation: Ensure the device is connected to the network and select "NTRIP" in the "Connection Method" menu.



2. Connection: Click "Connect", enter the NTRIP URL, then select "Confirm" to establish the link.



3. Operation Condition: The feature can be normally enabled when the GPS status in the top status bar displays "RTK FIX" for positioning information.

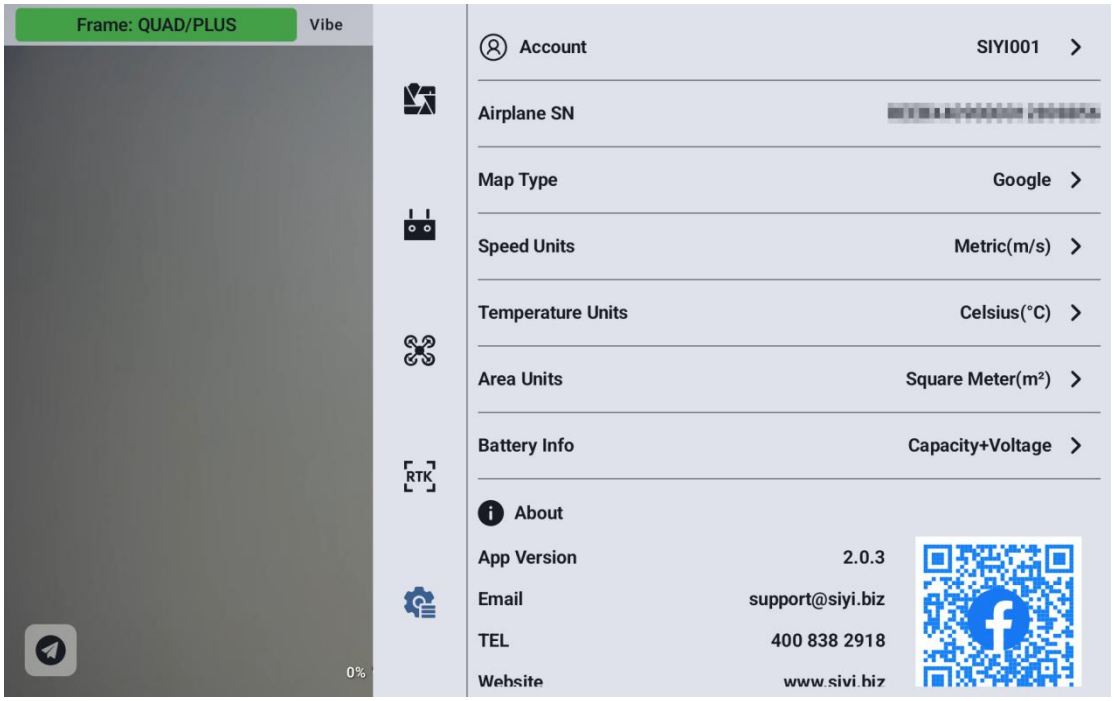


Note:

Positioning accuracy is subject to device performance and environmental conditions. Actual attainment of "RTK FIX" status depends on real-time operational factors.

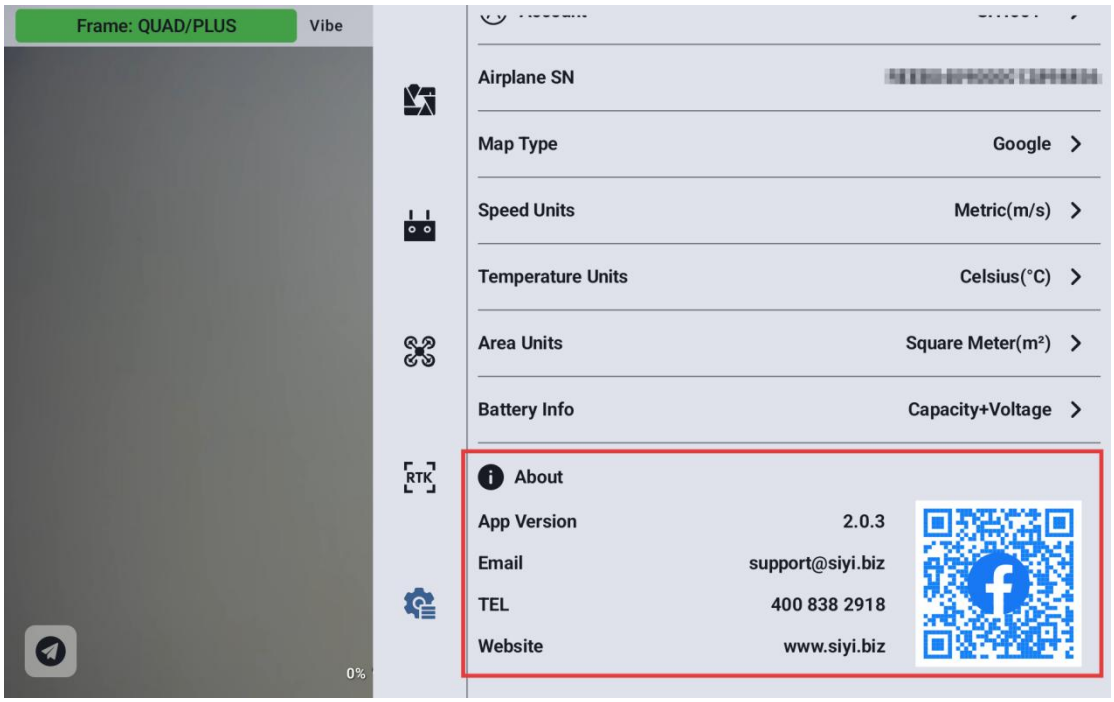
5. Settings and Preferences

- Account: When logged out, click to log in. When logged in, click again to log out.
- Airplane SN: Displays the serial number of the current device.
- Map Type: Click on the map type to select either Gaode or Google Maps. The changes will take effect after restarting the app.
- Speed Units: Click on the speed unit to choose different units of speed.
- Temperature Units: Click on the temperature unit to choose different units of temperature.
- Area Units: Click on the area unit to choose different units of area.
- Battery Info: Click the battery info to configure two different battery data displays according to your preference.
- Language: The default language for UniGCS is set to the system language.



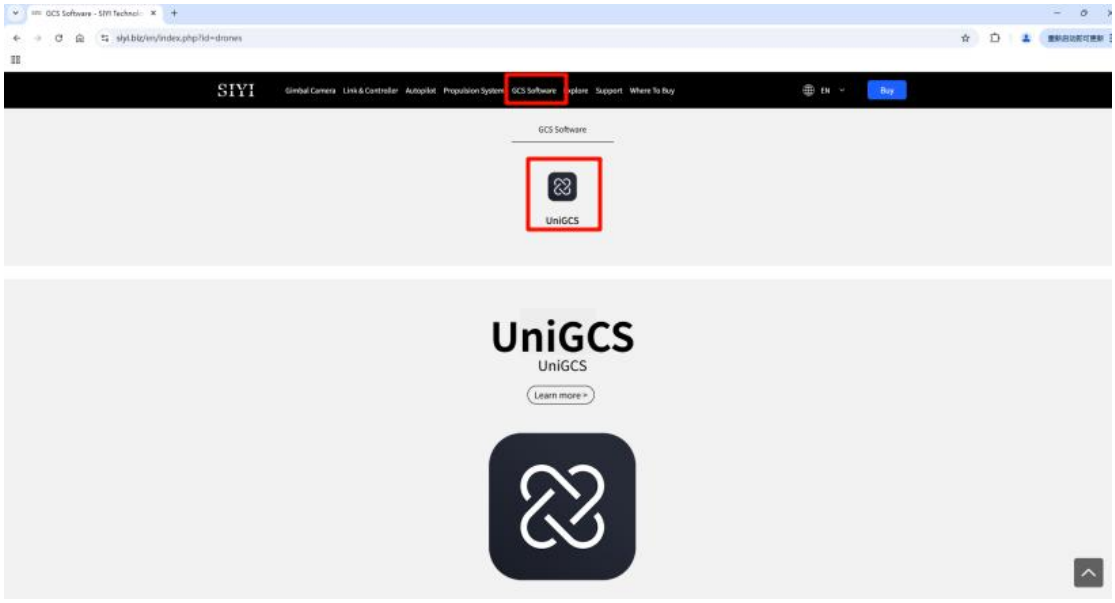
5.1 Software Version Information

In the software settings menu, under the "About" tab, you can find the current version number of the software.



6. Maintenance and Updates

- Log in to the SIYI official website and select the Ground Station Software section to access the latest version of UniGCS.



- When the remote controller is connected to the internet, if there is a newer version of UniGCS available, opening the UniGCS software will prompt a notification for the update.

7. Troubleshooting

7.1 Common Errors

Steps to troubleshoot common issues such as data link connectivity problems and camera display issues.

7.1.1 Unable to Connect to Data Link

Solution for when the data link fails to connect (using UniRC7 as an example):

If the ground and air units are in normal communication, but you are unable to establish a successful data link connection with the ground station software, follow these steps for troubleshooting:

1. First, ensure that the air unit is properly connected to your flight controller using the correct data link cable.
2. If you are using a DIY data link cable to connect the air unit and your flight controller, please check:

- Is the wiring sequence correct?
- Are the TX and RX pins in the flight controller and air unit data link serial ports properly crossed?
- Are Data Link 1 and Data Link 2 configured correctly?

3. In the "UniGCS" app, go to the "Link Information" menu and check the values to determine if the communication between the flight controller and the air unit is normal. When the communication is

normal, the "Data Link Downlink" value will be greater than 0. If the value is 0, please go back to steps 1 and 2 to check the connection cables.

4. In the "UniGCS" app, go to the "Data Transmission Settings" menu and check the following:

- Is the data transmission connection method set correctly?
- If using PX4/ArduPilot open-source flight control or a custom flight controller, is the baud rate set correctly?
- Check the data transmission connection settings in the flight control ground station software.

5. If using PX4/ArduPilot open-source flight control or a custom flight controller, try switching the data transmission cable to the TELEM 1 or TELEM 2 port.

6. Are both the ground station and sky end running the latest firmware?

7. If using a wireless hotspot for UDP data transmission, disable the Ethernet on the computer and try connecting again.

Note:

If you have followed the above steps and are still unable to identify the issue, please immediately contact your distributor or reach out to SIYI Technology for further troubleshooting and resolution.

7.1.2 Unable to Display Image

Troubleshooting for not displaying video images (using UniRC7 as an example)

If you are unable to view the video transmission via the SIYI link, please follow these steps to troubleshoot:

1. Check the connection:

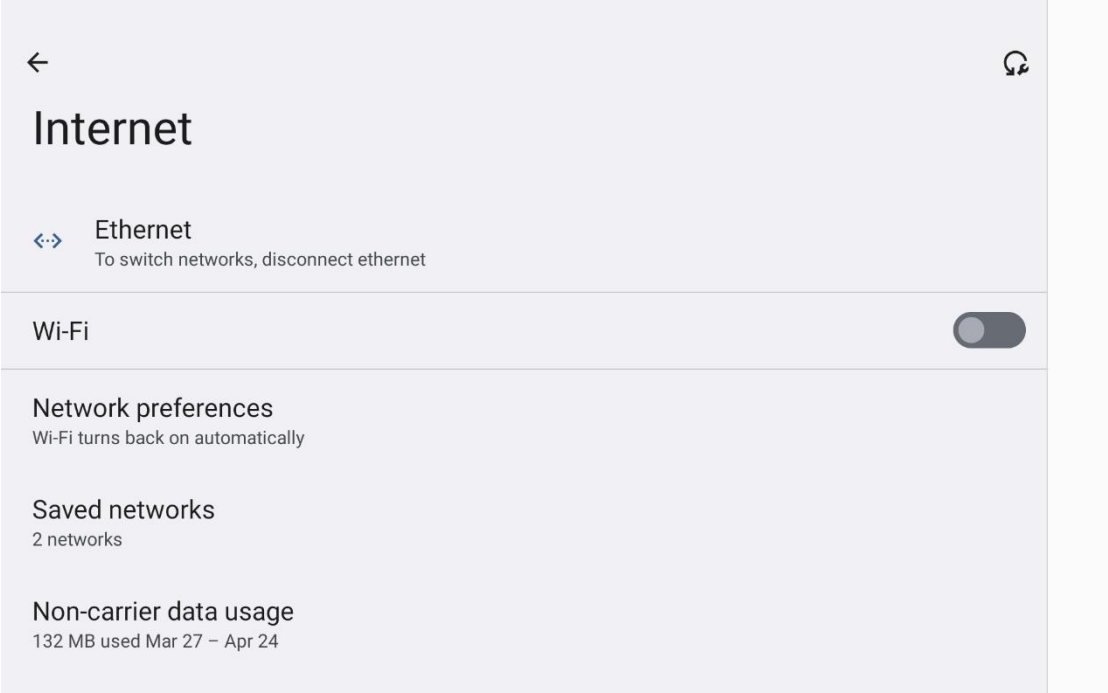
- Ensure that the ground end and sky end are properly synchronized (i.e., the status indicator light on either the ground end or sky end is green).
- Verify that the camera is correctly connected to the sky end (check if the link and camera can be reached via Ping Tools).

2. Check software settings:

- UniGCS Application: Verify that the camera address field is correctly set.

If you're unable to view the video feed through the SIYI handheld ground station, please check the network status of your Android system:

Ethernet switch: Check if the Ethernet icon is displayed on the Android home screen. If not, go to the Android system settings and enable the Ethernet function.



Note:

If you have followed the above steps and still haven't identified the issue, please contact your dealer or directly reach out to SIYI Technology for further troubleshooting and resolution.

7.2 Contact the Support Team

Please visit SIYI Technology's website at https://www.siyi.biz/index.php?id=support for the latest updates.

8. Appendix

8.1 Glossary

- RCU: In the UAV system, RCU (Remote Control Unit) usually refers to the remote controller, which is the core device for operator interaction with the drone. It is responsible for sending flight commands, receiving real-time data, and monitoring the drone's status.
- UDPCI: Refers to the UDP-based Communication Interface, which is primarily used to achieve efficient data transmission between the UAV and the control terminal or network nodes.
- RTSP: RTSP (Real Time Streaming Protocol) is a network protocol used to control the transmission of real-time streaming media.

8.2 Version Update Log

UniGCS 2.0.3 Update Summary

1. Added the oblique photography route.
2. Added the corridor route.
3. Added the bevel route.
4. Added the terrain-following function.
5. Added ESC/CAN device status information display.
6. Support coventional RTK & network RTK.

7. Added import/export route and cloud flight route function.
8. Optimize the flight logic of the route.
9. Added voice broadcast function.
10. Added resume mission from waypoint function.
11. Added route progress display & route information estimation function.
12. Optimized some other features.

UniGCS 1.1.11 Update Summary

1. Added the gripper function.
2. Added the customized geofence function.
3. Added third-party camera grid lines and flip function.
4. Added camera manufacturer and model selection function.
5. Added quick flight mode switching function.
6. Optimized some other features.

UniGCS 1.1.6 Update Summary

1. Fixed some known issues.
2. Optimized certain features.
3. Added infrared camera high-temperature alarm feature.

UniGCS 1.1.4 Update Summary

1. Added mapping flight path functionality.
2. Added flight control parameter settings.
3. Added one-click takeoff, landing, and return-to-home functions.
4. Fixed some known issues.

9. After-Sales and Warranty

Please visit the SIYI Technology support page at Service and Support - SIYI Technology | Empowering and Building an Intelligent Robot Ecology for the latest after-sales and warranty information.