# EliteScan W50 User Manual

Airborne LiDAR Measurement System

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EPiC LiDAR Tech Co.,Ltd

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# Airborne LiDAR User Manual

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# 1 Product Introduction

## 1.1 Product Overview

The EliteScan W50 is a highly cost-effective, lightweight, medium-to-short range UAV LiDAR product with a high degree of domestic manufacturing. It is perfectly compatible with the DJI M300/M350 drones for aerial operations. The system integrates an independently developed laser line scan module, high-precision inertial navigation, and navigation modules, along with other sensors. It uses proprietary waveform processing algorithms and integrated multi-sensor technology to help users capture high-quality data.

The W50 features high precision, high point density, and multi-echo capabilities. It is equipped with a Skyport interface, making it directly mountable on M300/M350 drones. It can also be mounted on other UAV platforms via a customized epic interface. The compact, lightweight, and integrated design makes the system exceptionally portable. The W50 offers excellent ranging capability, with flying altitudes over 400m in typical terrain. Furthermore, the integration of UAV control and LiDAR equipment control, combined with point cloud and image-based intelligent flight parameter algorithms, simplifies flight path planning, greatly lowering the user learning curve. With real-time color point cloud display, users can assess ground features anytime and anywhere, improving data timeliness. The integrated storage design for both laser and camera ensures tight coupling between images and point clouds, reducing manual intervention and enhancing data matching accuracy.

The W50 is widely applicable in industries such as power line inspection, terrain surveying, agricultural and forestry surveys, open-pit mining, and disaster monitoring, meeting various data collection needs in different scenarios.

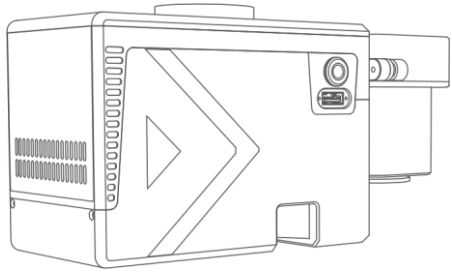


**Figure 1-1** Scanner Unit

## 1.2 Technical Data Sheet

The main technical parameters of the W50 laser measurement system are shown in the table below:

| | Items | Technical Data | Technical Data(PRO) |
|---|---|---|---|
| System Parameters | Overall Weight (Main Unit + Camera) | ≤1.4Kg | ≤1.42Kg |
| | Overall Weight (Main Unit) | ≤1.21Kg | |
| | Dimensions （No including Camera） | L156×W90×H117 （mm） | |
| | System Consumption | 45W | |
| | Power Supply | 9~36V DC | |
| | Interface ① | Skyport/Epic/Customized | |
| | System Accuracy | Vertical：3cm@150m | |
| | | Horizontal：5cm@150m | |
| | Data Storage | U-disk （256G） | |
| | Operating Temperature | -20℃~50℃ | |
| | Storage Temperature | -30℃~60℃ | |
| | Compatible Platform | DJI - M300/M350 | |
| | | Other UAV models | |
| LiDAR Unit | Scanning Principle | Mechanical Rotation | |
| | Laser Class | Class I | |
| | Laser Wavelength | 1550nm | |
| | Operating Height - Reflectivity | 350m @20%Reflectivity | |
| | | 450m @35%Reflectivity | |
| | Ranging Capability | 500m @20%Reflectivity | |
| | | 1000m @80%Reflectivity | |
| | Ranging Accuracy ② | 5mm | |
| | FOV | 90° | |
| | Angular Resolution | 0.0018° | |
| | Line Speed | 90~300 line /s | |

| | | |
|---|---|---|
| | Point Frequency | 100KHZ~1000KHZ |
| | Multiple Echoes | ≥7 |
| | GNSS Signal Tracking | BDS，GPS, GLONASS, Galileo |

| | | | |
|---|---|---|---|
| IMU Unit | Positioning Accuracy (post-processing) | ≥5HZ | |
| | Position Data Rate | ≥500HZ | |
| | Attitude Accuracy (post-processing) | Plane：1cm | |
| | | Elevation：2cm | |
| | Attitude Data Rate (post-processing) | heading : 0.02° | |
| | | pitch/roll : 0.005° | |
| Camera Unit | Effective Pixels | 2600W | 4500W |
| | Dimension of Sensor | 23.5x15.6mm | 36x24mm |
| | Image Resolution | 6240x4168 | 8192x5468 |
| | FOV of Image Width③ | 73° | 90° |
| | GSD | 2.3 cm @ 100m flight altitude | 2.1 cm @ 100m flight altitude |

Tab 1-2 System main technical parameters table

**Remarks:**

① Quick release interface contains 2-way TTL serial port; 1-way LAN 10/100/1000Mbps; 1-way MCX RF interface; 1-way TTL I/O port; 1-way power input, range 9~36V.

② Typical value is 100m range, outdoor ambient temperature 30°C, target reflectivity 30%. Values may be affected by target distance, environmental temperature, and target reflectivity.

③ Vertical flight direction, matching the effective field of view angle of the LiDAR.

# 2 System Components

The W50 system primarily consists of the main unit, camera, mounting bracket, storage devices, and other components.

## 2.1 Scanner Unit

### 2.1.1 Appearance

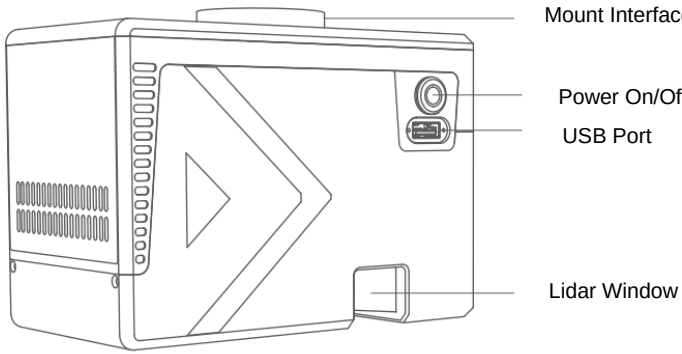
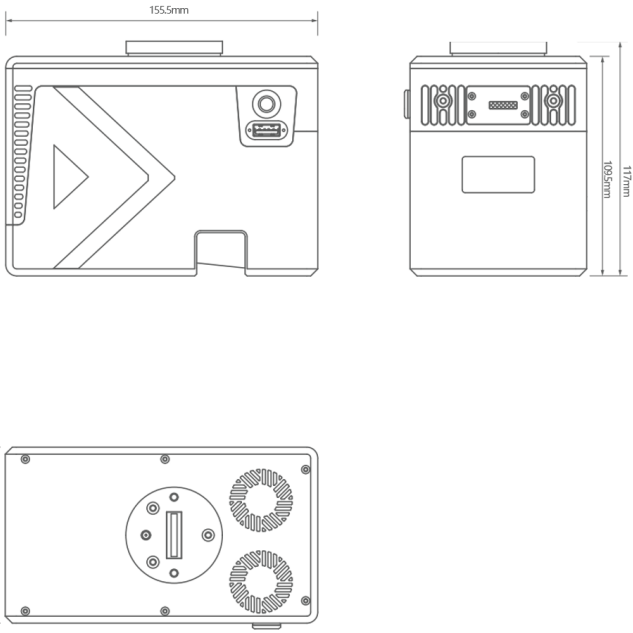


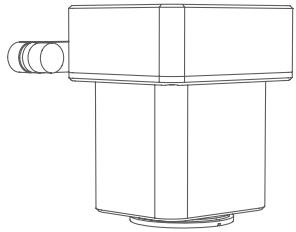

**Figure 2-1** Scanner Unit and Interface Diagram

## 2.1.2 Main Unit Dimensions Diagram

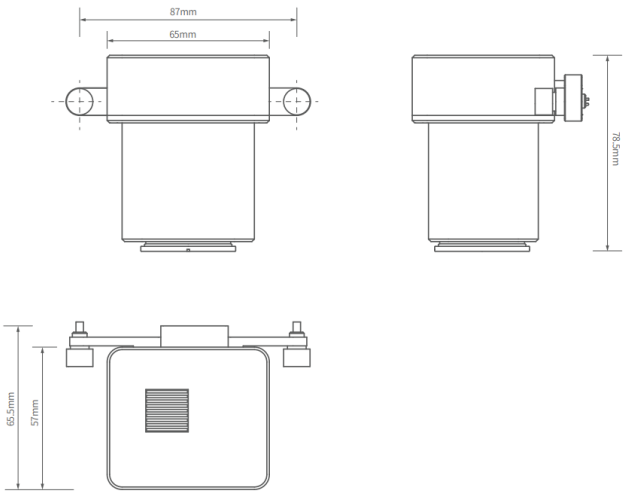


## 2.2 Camera

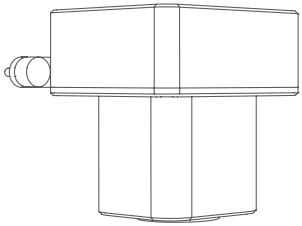
### 2.2.1 Camera Appearance（2600W）



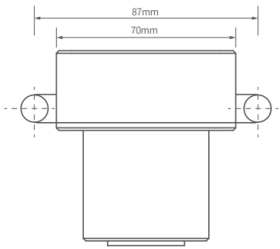
### 2.2.2 Camera Dimensions（2600W）

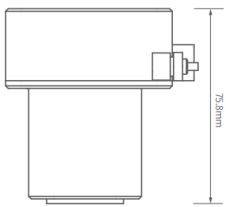


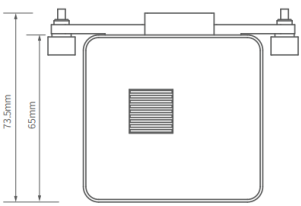
## 2.2.3 Camera Dimensions （4500W）



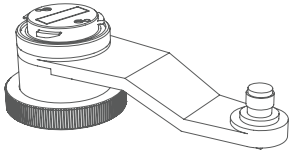
## 2.2.4 Camera Dimensions （4500W）



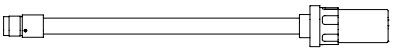



## 2.3 SKYPORT Adapter



## 2.4 Antenna component



## 2.5 USB-Disk 256GB

A standard 256GB USB flash drive attached

# 3 Equipment Installation and Dismantling

## 3.1 Pre-Installation Preparation

Before system installation, please check the equipment against the packing list to ensure all components are complete

| NO | Item Name | Unit | Quantity |
|---|---|---|---|
| 1 | W50 Scanner Unit | PCS | 1 |
| 2 | Camera | PCS | 1 |
| 3 | SKYPORT Adapter | PCS | 1 |
| 4 | Antenna Component | PCS | 1 |
| 5 | USB-disk | PCS | 1 |
| 6 | Dongle | PCS | 1 |
| 7 | Carrying case | PCS | 1 |
| 8 | Certificate of quality | PCS | 1 |
| 9 | Warranty card | PCS | 1 |
| 10 | Product Manual | PCS | 1 |
| 11 | Packing List | PCS | 1 |
| 12 | Desiccant | PCS | 2 |
| 13 | Mirror wipe | PCS | 4 |

**Tab 3-1** Packing List

**Remarks:**

The above list is for reference only. Please refer to the packing list provided with the equipment for the actual contents.

## 3.2 Installation and removal of system equipment

**Warning:**

- When installing the W50 system, handle the equipment with care to protect it.
- During installation and dismantling, ensure the drone is turned off to avoid electrical damage to the equipment.
- After dismantling the equipment, place all components back in their designated positions in the packaging box and check for completeness.

### 3.2.1 Standard Vibration-Damping Mount Installation and Dismantling (Take the DJI M300 Drone as an Example)

**Installation of Standard Shock Absorption Bracket:**

Step 1: Remove the original shock absorption bracket from the M300 and take out the standard shock absorption bracket.

Step 2: Align the four screw holes on the M300, and use an Allen wrench to tighten the four screws sequentially to complete the installation.

**Disassembly of Standard Shock Absorption Bracket:**

Use an Allen wrench to remove the four screws sequentially to complete the disassembly.

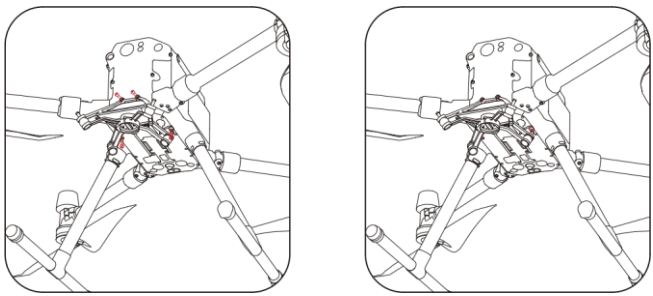


**Figure 3-2** Standard Vibration-Damping Mount Installation and Dismantling

### 3.2.2 Installation and Dismantling of the Mounting Bracket and Quick-Release Interface

**Installation**: Align the antenna interface of the mounting bracket with the antenna interface on the quick-release, then snap it down. Rotate the mounting bracket lock cover clockwise to connect the mounting bracket with the quick-release interface

**Dismantling**: Rotate the mounting bracket lock cover counterclockwise to loosen it, then lift the mounting bracket upwards to detach it from the quick-release interface

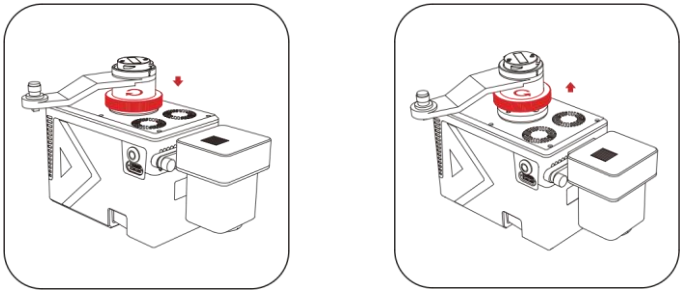


**Figure 3-3** Installation and Dismantling of the Mounting Bracket and Quick-Release Interface

### 3.2.3 Installation and Dismantling of the Main Unit and Standard Vibration-Damping Mount

**Installation**: Align the white circular marking on the main unit with the corresponding circular marking on the drone mount. Once aligned, rotate the main unit counterclockwise as indicated in the diagram. The red circular marking on the SKYPORT adapter should align with the circular marking on the drone mount. When you hear a "KA" sound and the device cannot be rotated, the installation is complete

**Dismantling**: Align the red circular marking on the main unit with the corresponding circular marking on the drone mount. Press the button marked with an arrow, then rotate the device counterclockwise as indicated in the diagram. When the white circular marking on the SKYPORT interface aligns with the circular marking on the drone mount, the device can be removed, completing the dismantling process.

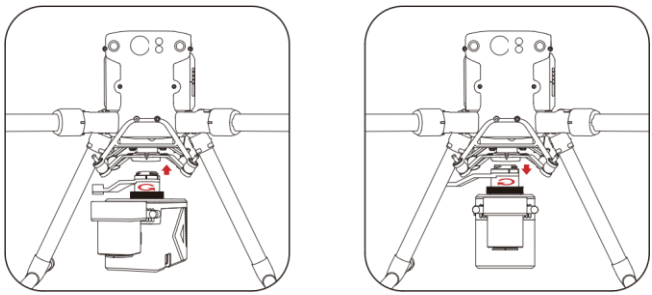


**Figure 3-4** Installation and Dismantling of the Main Unit and Standard Vibration-Damping Mount

### 3.2.4 Installation and Dismantling of the Slide Rail Adapter and Quick-Release Interface

**Installation**: Align the antenna interface of the slide rail adapter with the antenna interface on the quick-release, snap it downward, and rotate the slide rail adapter lock cover clockwise to complete the installation.

**Dismantling**: Rotate the slide rail adapter lock cover counterclockwise to loosen it, then lift the slide rail adapter upwards to complete the dismantling

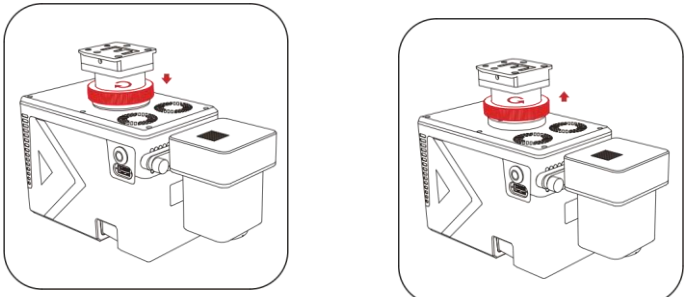


**Foto 3-5** Installation and Dismantling of the Slide Rail Adapter and Quick-Release Interface

### 3.2.5 Installation and Dismantling of the Universal Vibration-Damping Mount and UAV (Take a Quadrotor Drone as an Example)

**Installation**: Align the four installation holes of the universal vibration-damping mount with the mounting holes on the drone, then tighten the screws to complete the installation.

**Dismantling**: Remove the four screws from the universal vibration-damping mount to complete the dismantling.

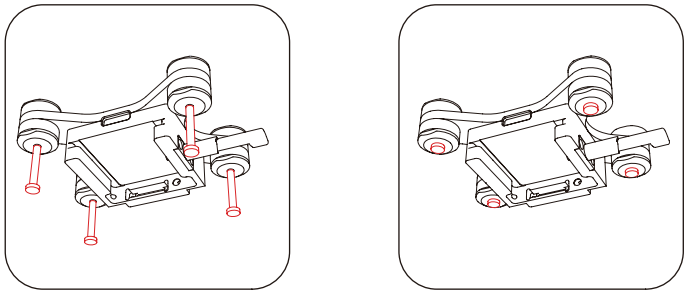
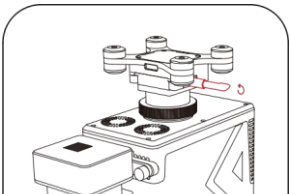


**Foto 3-6** Installation and Dismantling of the Universal Vibration-Damping Mount and UAV

### 3.2.6 Installation and Dismantling of the Main body and Universal Vibration-Damping Mount

**Installation**: Align the connector of the main unit's quick-release section with the universal vibration-damping mount, horizontally insert it into the slide rail, and push it to the bottom. Then, rotate the handle 180° clockwise to lock the main body and slide rail. If the device cannot rotate, the installation is successful.

**Dismantling**: Rotate the handle 180° counterclockwise to unlock the slide rail and main unit. Then, push the main unit horizontally towards the front of the drone to detach the main body.



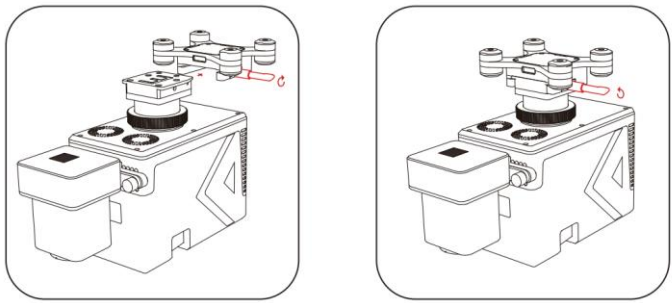


**Foto 3-7** Installation and Dismantling of the Universal Vibration-Damping Mount and UAV

## 3.2.7 Installation & Removal of Antenna Kit

Installation of the Antenna Kit:

After mounting the device onto the drone, align the GPS antenna assembly along the direction indicated by the arrow in the diagram and insert it into the SKYPORT adapter. Then, rotate the locking mechanism clockwise to secure it, completing the installation.

Removal of the Antenna Kit :

First, loosen the locking mechanism by turning it counterclockwise, and then pull the antenna assembly upward to complete the removal.

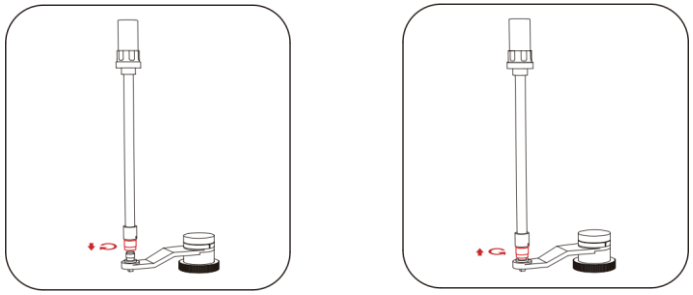


**Figure 3-8** Installation & Removal of Antenna Kit

# 4 Device Operation

## 4.1 Device Startup

After completing the installation of the device as described in Section 3.2, you can begin using the system.

Power on the drone, and once the indicator light changes from flashing red to green, the device is successfully connected, and the system completes its normal startup process.

**Note:** The device requires time (usually about 60 seconds) for initialization after startup. Please be patient during the system initialization period.

## 4.2 Device Connection

The W50 system provides an integrated connection method for UAV and equipment control. Using the dedicated UAV control platform, open the EasyPilotAccess control software, enter the desired project or create a new flight project. On the control interface, wait approximately 30 seconds. Once the connection is successful, the status bar in the upper left corner of the software interface will display a confirmation message.

## 4.3 Device Shutdown

After the system stops data collection and transmission, use the software client to click the "Shutdown" button to turn off the device. Once the status indicator light on the W50 host turns off, power off the drone to complete the shutdown process.

**Warning:**

Do not disconnect the power while the host is not fully shut down to avoid potential equipment damage.

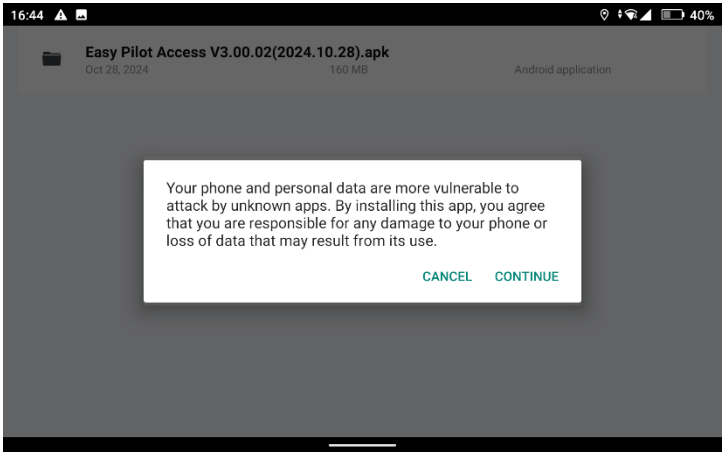
Do not insert or remove devices or USB drives while the system is powered on to prevent damage to the equipment.

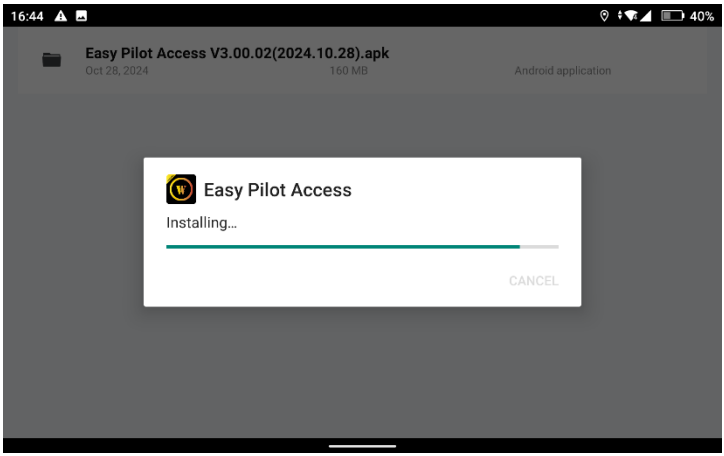
# 5 Data Collection

## 5.1 Operation APP Installation

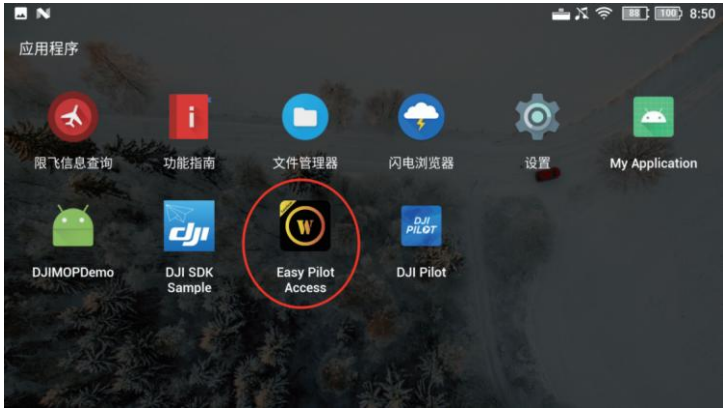
Insert the TF card or USB drive into the M300 remote controller, locate the control software installation package "EasyPilotAccess" on the TF card, and click to install.

In the pop-up permissions dialog box, grant the necessary permissions required by the software. If permissions are not granted, the software may fail to install successfully. Click “Continue Installation” and wait for the software installation to complete.



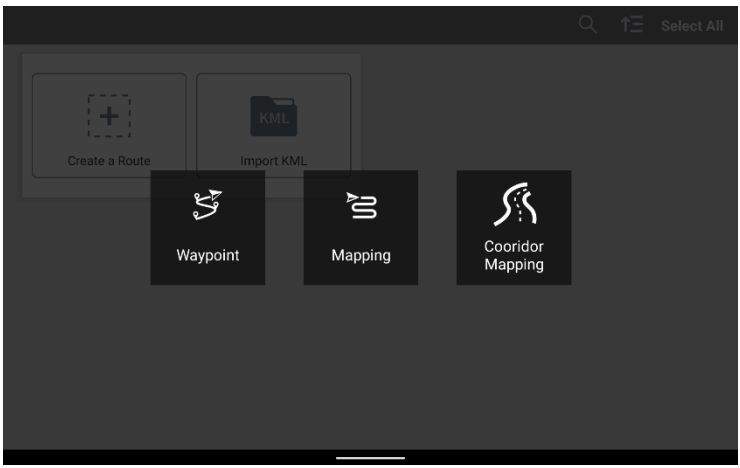



## 5.2 Flight Mission Planning



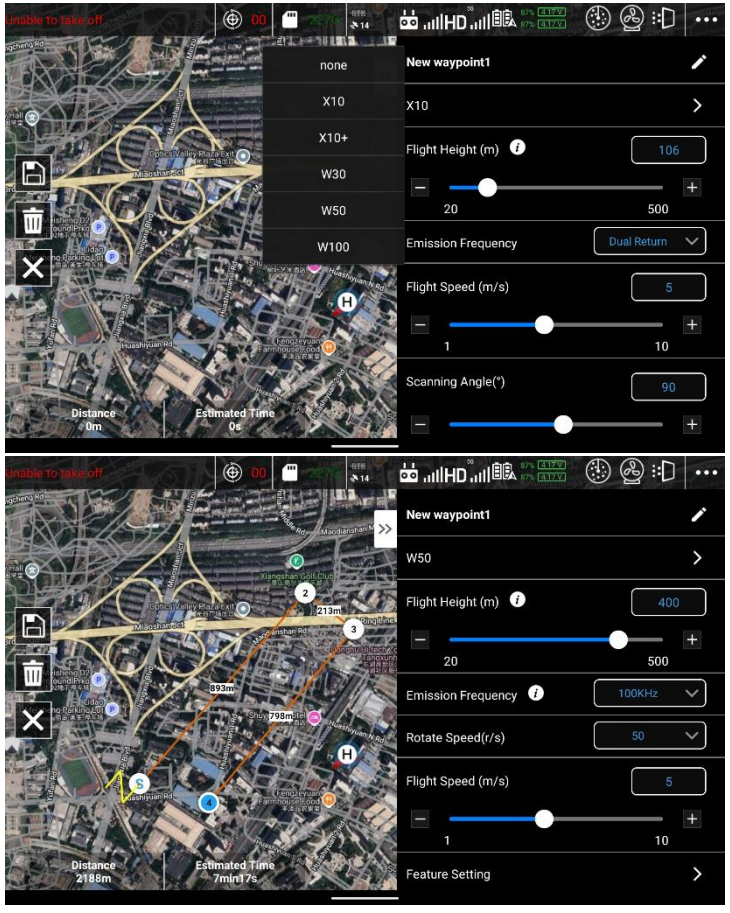

Click the icon to open the control software. In the interface, you can choose between two modes: “Create Flight Path” and “Import KML.”

### 5.2.1 Creating Flight Route Mode




In "Create Flight Path" mode, three task modes can be selected: "Waypoint Flight," "Mapping Aerial Photography," and "Strip Flight."

### 5.2.1.1 Waypoint Flight”




The operation method for Waypoint Flight mode is as follows:

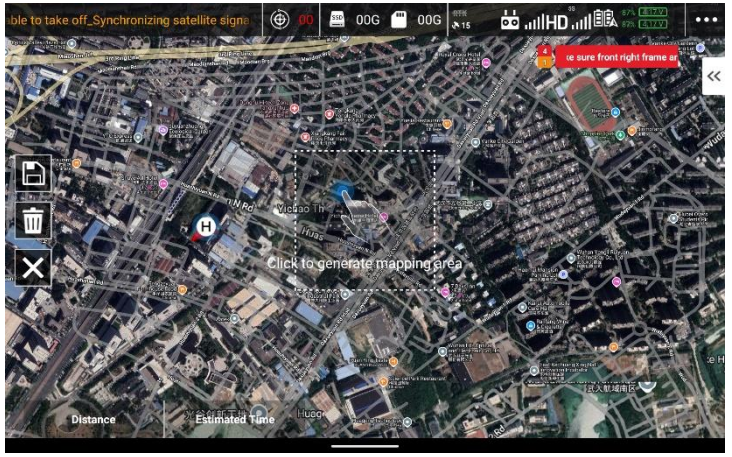
Manually click on the map to add waypoints, and the drone will fly according to the order of the waypoints. After selecting a waypoint by clicking on it, press and hold the waypoint to drag it to a new location. Once the flight path is set, open the right-side menu, where the directional buttons at the bottom can also fine-tune the waypoint positions. In the menu interface, select the corresponding lidar model (if the device is already connected, the app will automatically recognize the model). Set the flight

altitude, flight speed, emission frequency, scanning angle, and actions after the flight path is completed according to your needs.

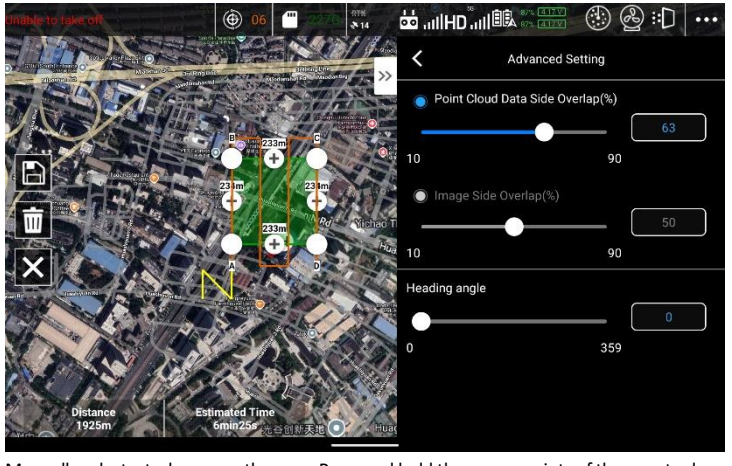
Click“ ”to save the flying route

### 5.2.1.2 Mapping Aerial Photography”

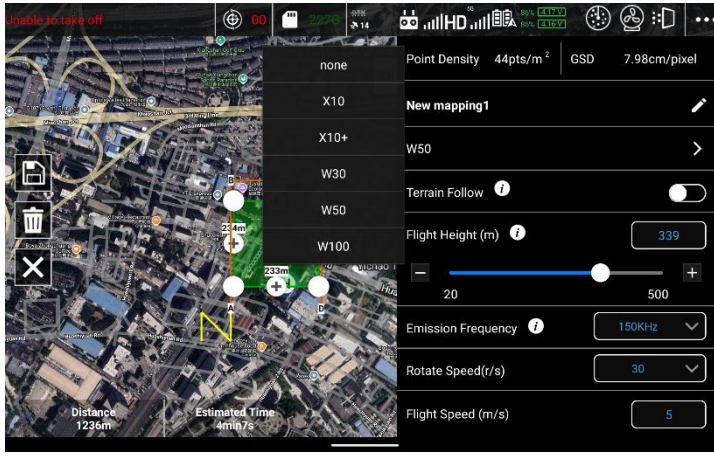
Operation of “Mapping Aerial Photography” mode:

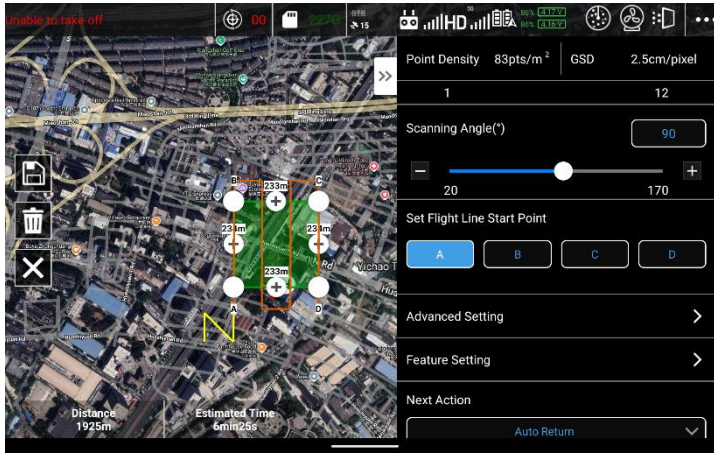



Manually select a task area on the map. Press and hold the corner points of the area to drag them and modify the boundary positions. Click the “+” symbol between two corner points to add a new corner point between them to adjust the task area.




Manually select a task area on the map. Press and hold the corner points of the area to drag them and modify the boundary positions. Click the “+” symbol between two corner points to add a new corner point between them to adjust the task area.



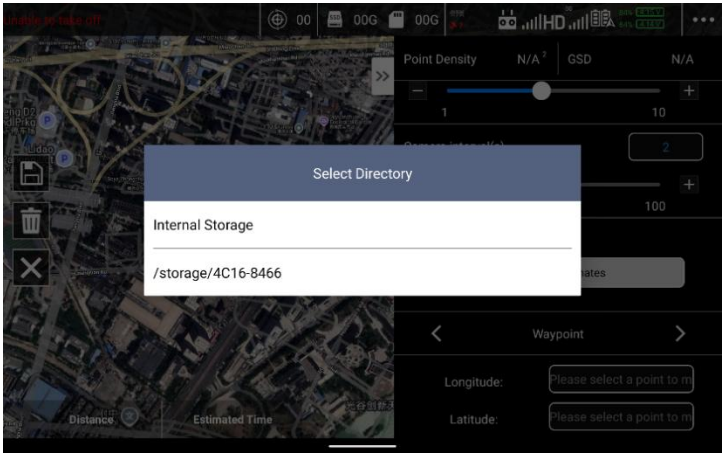




After setting the overlap, adjust the flight altitude. The app will automatically calculate the flight path intervals and generate the flight route based on your overlap settings. Depending on the takeoff point orientation, select the entry point (“A,” “B,” “C,” or “D”). Choose the appropriate flight speed.

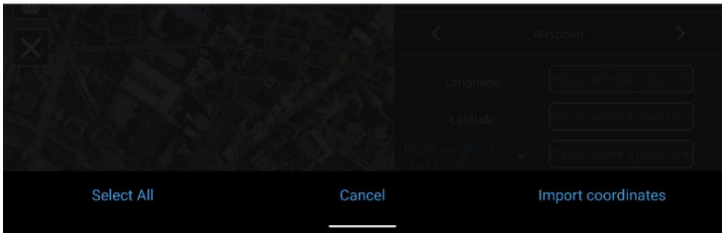
Click“ ”to save the flying route

### 5.2.1.3 Strip Flight”

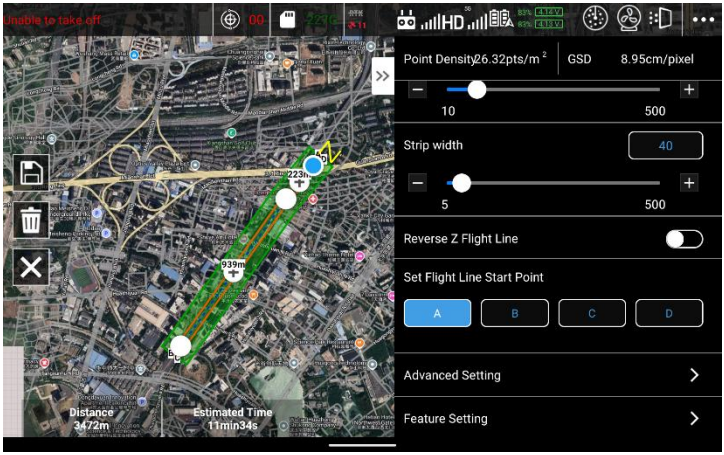
In Strip Flight mode, you can create a centerline by selecting points on the map, or you can use an imported KML file to generate the centerline.



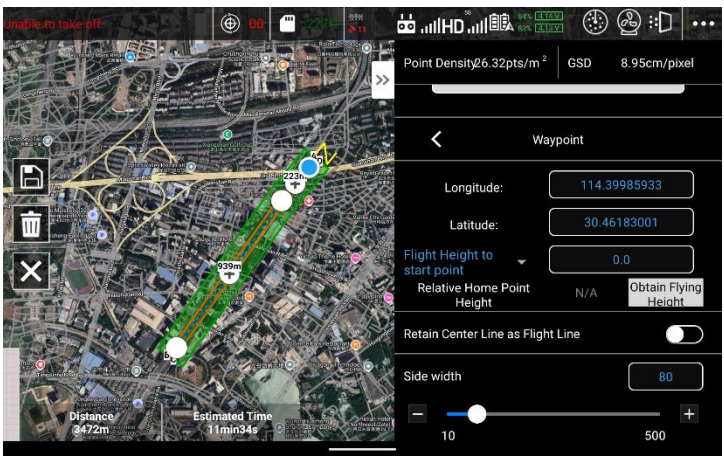

| Name | Longitude | Latitude | Flight Height to start point |
|---|---|---|---|
| 1 | 114.3958096590909 | 30.45722390867329 | Flight Height to start point |
| 2 | 114.3986928547562 | 30.45973574518965 | 0.0 |
| 3 | 114.4002231328976 | 30.46102595249916 | 0.0 |

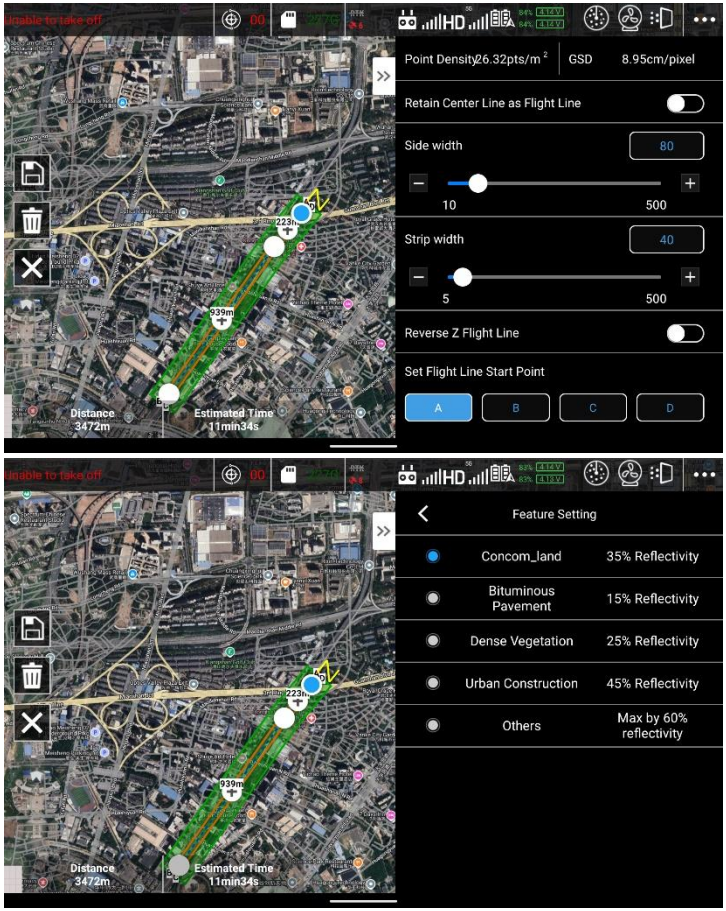



Select to import coordinate points, find the path where the KML file is stored in the remote controller’s internal storage, choose the corresponding KML file, select the points to import, define the elevation of the points, and then import.



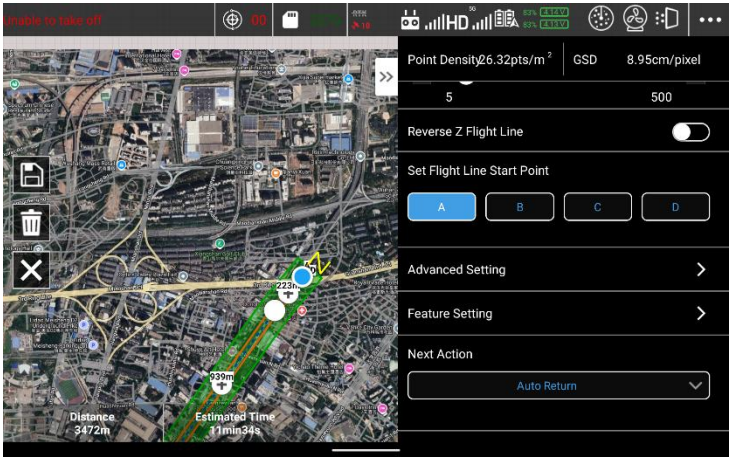

Select the appropriate flight speed and the required single-side expansion width.





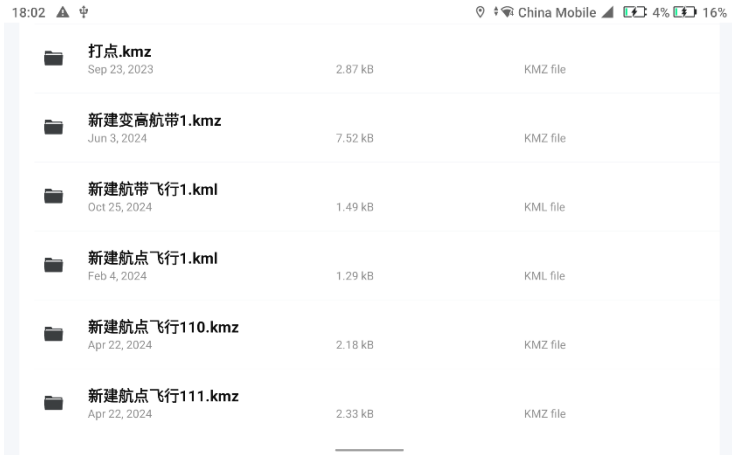

You can choose whether to keep the centerline.

When obtaining the takeoff point's altitude, the local DEM (Digital Elevation Model) must be placed in the "Download" folder, and the remote controller must be connected to the internet to obtain the aircraft's position.

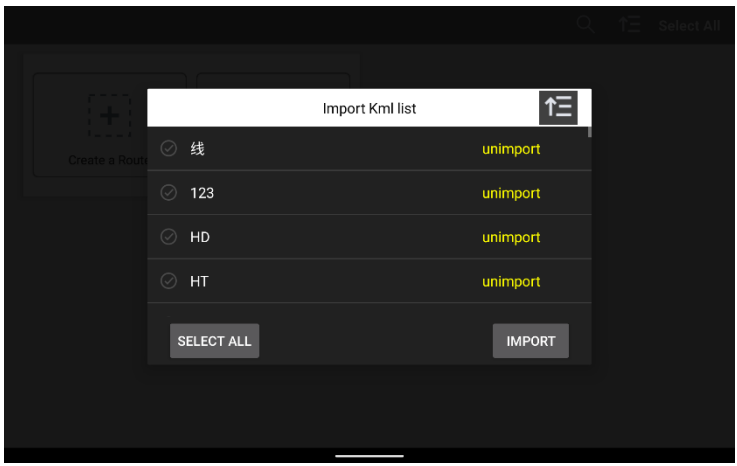



Similar to "Mapping Aerial Photography" "Strip Flight" also allows you to select four positions (A/B/C/D) to start the flight path. If the dynamically aligned flight path is too close to a building, you can choose "Reverse Z-pattern" to change the alignment direction of the flight path.

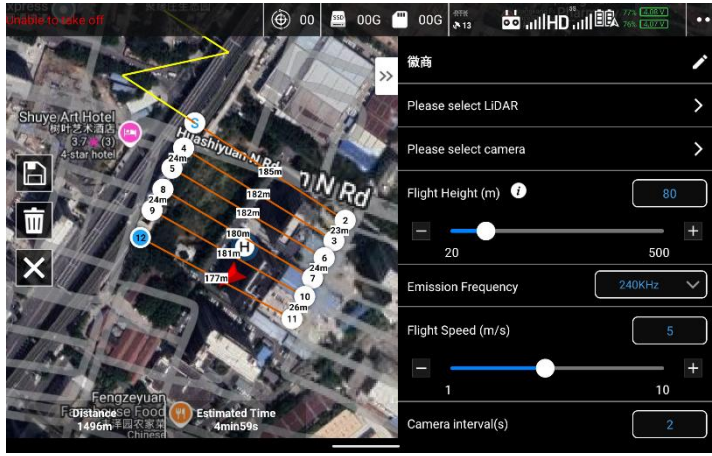
### 5.2.2 Import KML




Before creating a new flight path using the "Import KML" mode, copy the KML file to the M300 remote controller: Local Storage—0—Download directory.



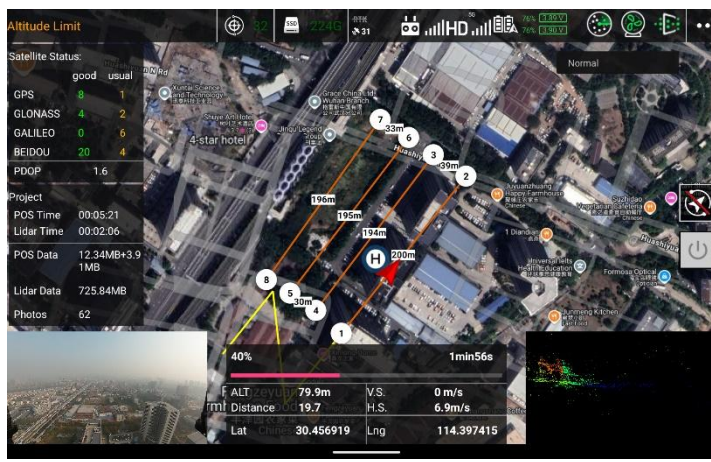
Open the app, click "Import KML," and the app will recognize the KML files in the directory. Select the required KML file and click "Import."




## 5.3 Device Control

### 5.3.1 Software Interface

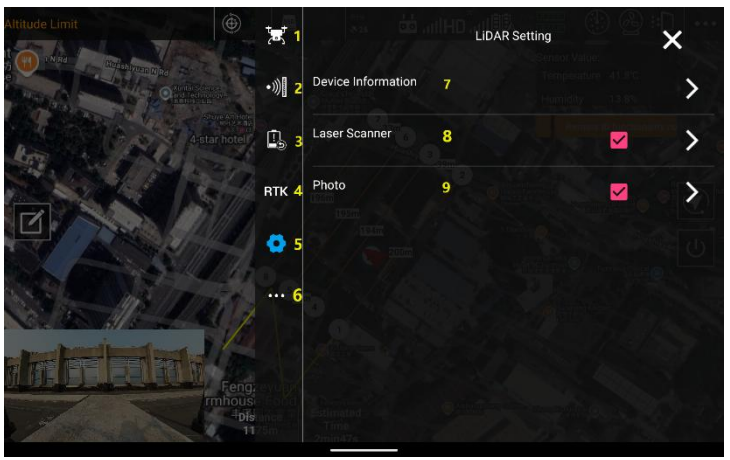
#### 5.3.1.1 Basic Interface




1. Drone Status.
2. LiDAR Satellite Count.

3. Remaining Storage Capacity.
4. Drone Satellite Count, Remote Control Signal Strength, Video Transmission Signal Strength, and Drone Battery Level.
5. POS Collection Status, LiDAR Internal Motor Rotation Status, and Point Cloud Data Collection Status.
6. Settings Menu.
7. One-Click Start/Stop for Point Cloud Project.
8. Flight Path Parameters and Execution Status.
9. Drone FPV Camera View.
10. Project Information: POS Data Size, Point Cloud Data Size, and Number of Photos.
11. LiDAR Satellite Reception Status: Satellite Count—displays current satellite signal quality and used positioning systems; PDOP—3D (spatial) Position Dilution of Precision.
12. Real-Time Point Cloud Preview.

### 5.3.1.2 Device Menu Interface

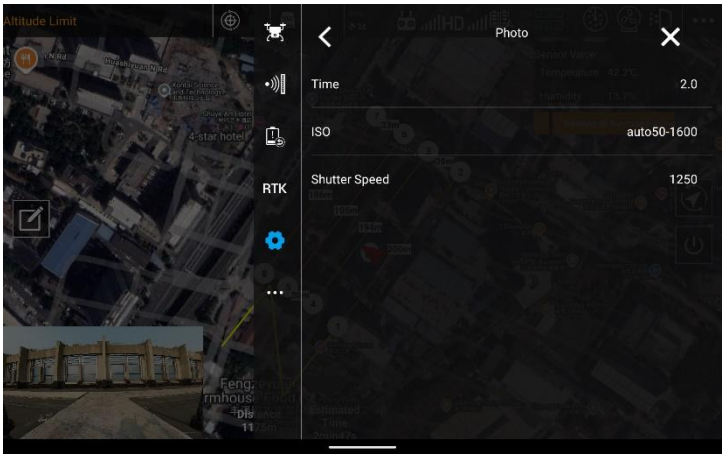



1. Drone Settings.
2. Drone Obstacle Avoidance System Settings.
3. Drone Battery Warning Settings.

4. Drone RTK Positioning Settings.
5. LiDAR Settings.
6. Other Settings.
7. LiDAR Device Information.
8. LiDAR Carrier Configuration File Selection.
9. LiDAR Scanner Parameter Settings: Includes Real-Time Point Cloud and Radar Protection Function Settings.
10. Camera Parameter Settings.
11. Turn Off LiDAR.

### 5.3.1.3 Device Information Interface

Displays detailed device information, including system status, firmware version, and operational parameters.




### 5.3.1.4 Camera Settings Interface

Provides configuration options for camera parameters, such as resolution, exposure, and shooting modes, ensuring alignment with LiDAR data collection.

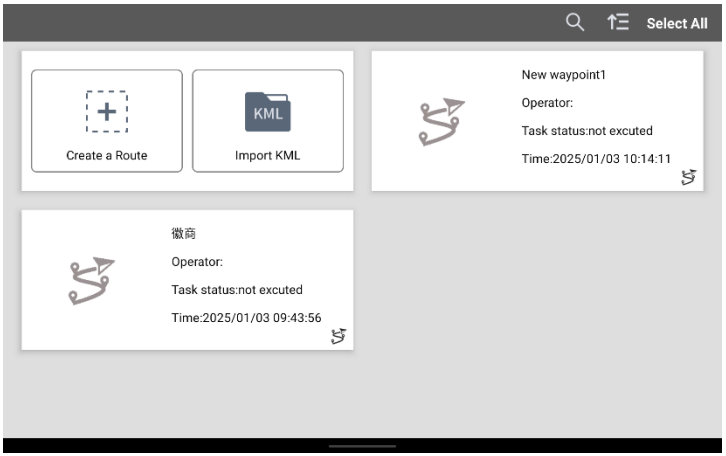
## 5.3.2 Data Acquisition

### 5.3.2.1 Flight Path Planning

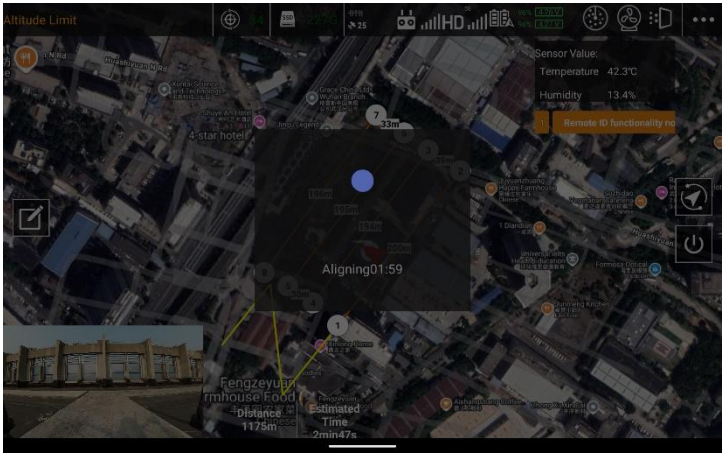
Use the APP's flight path planning function or import KML files to

### 5.3.2.2 Select Flight Path

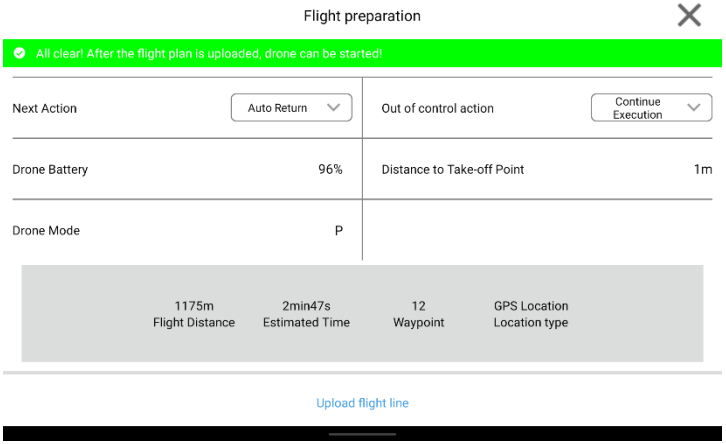
Select a pre-planned task from the list of available flight paths.

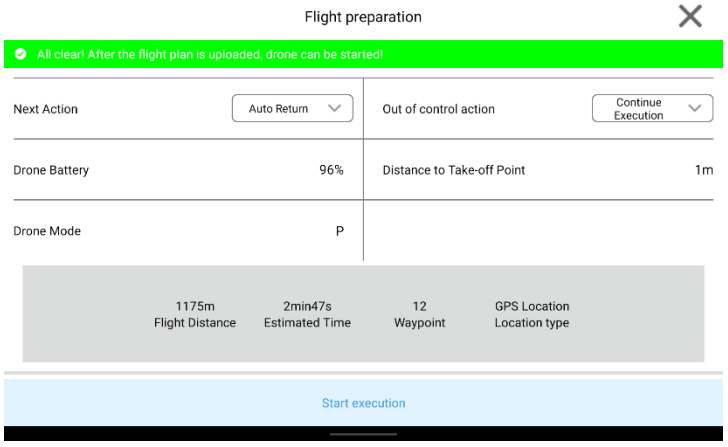


### 5.3.2.3 Start Project



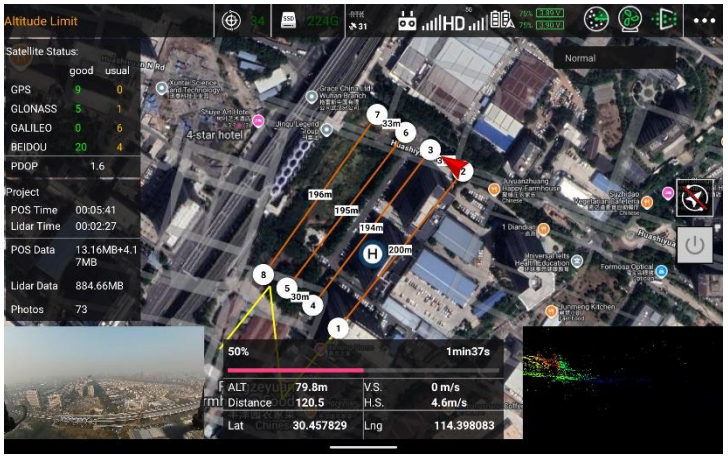

Click the " " button to automatically start recording POS data and begin the project.




Flight preparation
All clear! After the flight plan is uploaded, drone can be started!
Next Action
Auto Return
Out of control action
Continue Execution
Drone Battery
96%
Distance to Take-off Point
1m
Drone Mode
P
1175m
Flight Distance
2min47s
Estimated Time
12
Waypoint
GPS Location
Location type
Start execution

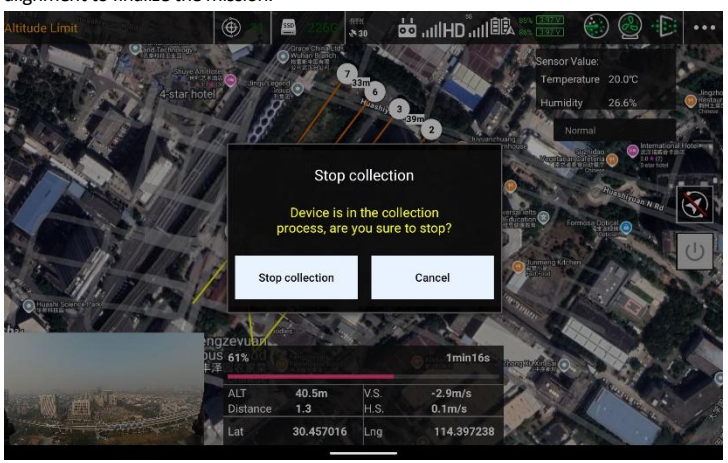
1. Select the appropriate actions for completing the flight path and handling remote controller disconnection, then click **Upload Flight Path**.
2. After the flight path upload is complete, ensure all personnel move away from the drone and confirm the area is free of obstacles. Then, click **Start Execution**.

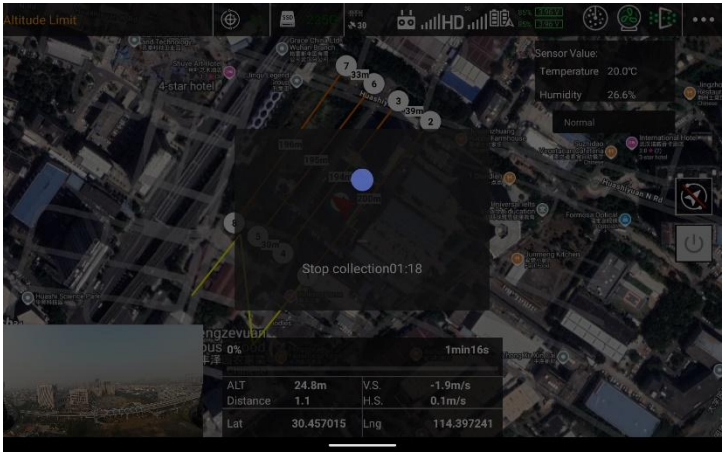
### 5.3.2.4 End Project




Once the flight path is completed, click the " " button to end the mission.

The system will display a confirmation window. In the confirmation window, click “Stop Collection,” and the device will stop recording data and automatically perform dynamic alignment to finalize the mission.




Altitude Limit
HD
Sensor Value:
Temperature 20.0℃
Humidity 26.6%
Normal
4-star hotel
Stop collection01:18
0%
1min16s
ALT 24.8m
V.S. -1.9m/s
Distance 1.1
H.S. 0.1m/s
Lat 30.457015
Lng 114.397241

# 6 Appendix

## 6.1 Routine Maintenance

- **Handle with Care** – Avoid impacts or dropping the device during use.
- **LiDAR Protection** – Prevent scratches on the LiDAR surface. If dusty, clean gently using a lint-free cloth dampened with water.
- **Storage After Use** – Remove all accessories, and place the main unit and components back into the protective case.
- **Keep Connectors Clean** – Ensure the main unit's ports remain free of dust. Use a soft brush or air blower for cleaning if necessary.

FCC Caution.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

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

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

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

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

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

FCC Radiation Exposure Statement:

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