LiGrip H300

Airborne Kit

Quick Start Guide (A.00)
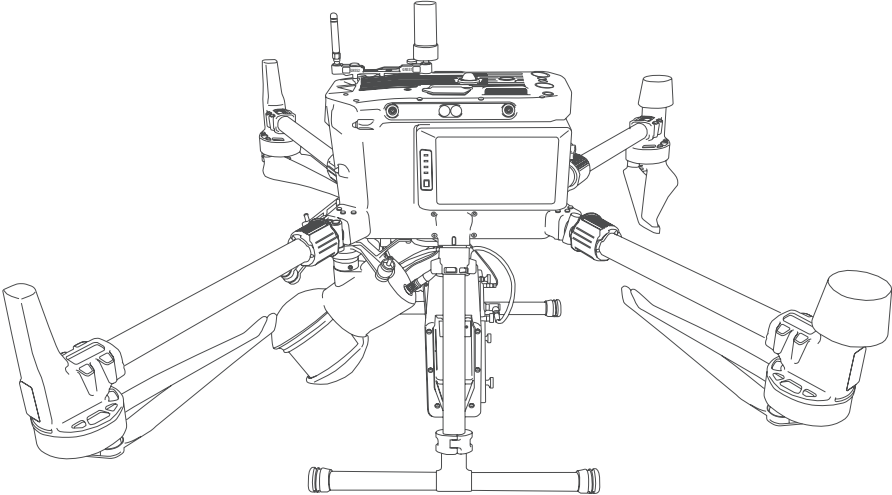
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Battery box main unit ──────────────── ──────────────── SkyPort adapter

──────────────── LiDAR

GNSS module ────────────────

Airborne kit bracket ────────────────

List of airborne kit products

It is subject to the actual arrival of the product.

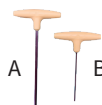|		
Handheld main unit	Battery box	Airborne kit bracket
GNSS module	SkyPort adapter	Laser cable (MAIN port)
RTK cable	GNSS antenna	Screwdriver (A.B type)

Airborne Kit Assembly

> ⚠️ Bolts must be tightened, and cables must be connected steadily. Check all items after assembly. Continue to tighten the screws only when they are engaged properly.

1. Installation of airborne kit bracket (pay attention to the direction of bracket during installation, and make sure that the green dot should face backwards)

2. Installation of battery box (make sure that the connector of the battery box should face upwards)

There is no battery inside the battery box.

> ⚠️ During data acquisition, H300 airborne kit uses the power supply of the M300 aircraft. Do not insert the B58 into the battery box!

3. GNSS module installation (please remove the 4G antenna of the GNSS module)

4. Using a B-type screwdriver to remove the panoramic camera (1 M3 screw)

5. Remove the GCP base

6. Use A and B screwdrivers respectively to remove the handheld handle (3 M3 screws and 1 M6 screw)

7. Handheld main unit disassembled

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8. Installation of SkyPort adapter for handheld main unit (make sure to tighten the screws)

9. Mount the M300 aircraft on the handheld main unit

⚠️ • Align the white dot of the SkyPort adapter on the main unit with the red dot on the shock absorber bracket of the aircraft.
• Slowly rotate the SkyPort adapter counterclockwise to align the red dot on the adapter with the red dot on the shock absorber bracket of the aircraft
• Manually check whether the main unit is installed (The red dot on the SkyPort adapter must be aligned with the red dot on the shock absorber bracket of the aircraft, and now they are locked).
• To remove the main unit, press and hold the button of the shock absorber bracket and turn the SkyPort adapter of the main unit clockwise.

10. Remove the 4G antenna of the GNSS module

11. Install 4G antenna for GNSS(Please make sure that the GNSS antenna and 4G antenna are installed correctly)

⚠️ • GNSS1 connected to GNSS antenna
• GNSS2 connected to 4G antenna

12. Install the GNSS antenna to holes 1 and 2 (as shown in the figure) and tighten two screws.
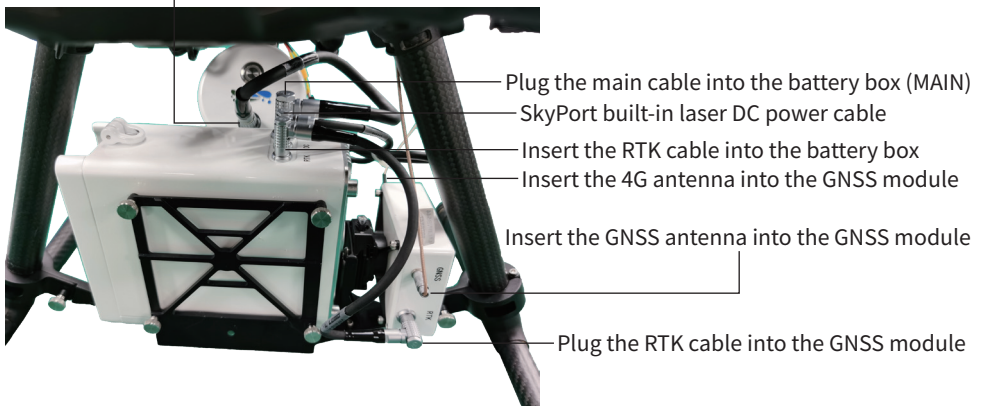
13. Schematic diagram of GNSS antenna connection (attach the matching wire harness buckle to the body area as shown in the figure and lock the cable).
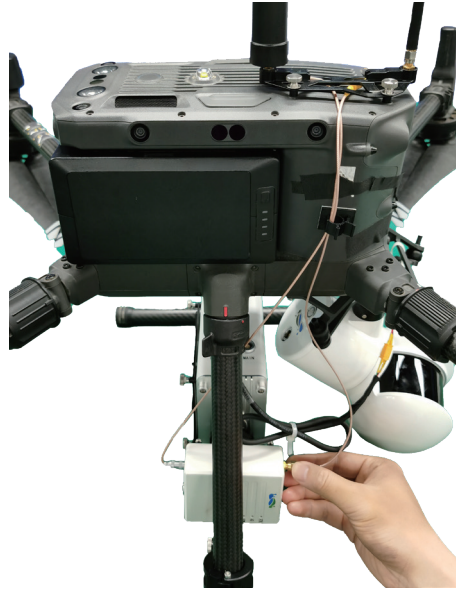
Cable connection schematic for mounting DJI M300 on the airborne kit

Plug the main cable into the laser

Plug the main cable into the battery box (MAIN)
SkyPort built-in laser DC power cable
Insert the RTK cable into the battery box
Insert the 4G antenna into the GNSS module

Insert the GNSS antenna into the GNSS module

Plug the RTK cable into the GNSS module

⚠️ When connecting cables of the airborne kit, please make sure that cables do not cover the sensors of the aircraft! Failure to do so will result in a flight accident!

Front view of the LiGrip H300 airborne kit

Side view of the LiGrip H300 airborne kit

Side view of the LiGrip H300 airborne kit

Using the airborne kit

Base Station Assembly

For more information about the use of the base station, see the manual for the base station. For the network base station services, contact your provider.

PPK Mode

1. Base Station Setup

The base station needs to be set up on a known point (If it is set up on an unknown point, the coordinates of the point should be surveyed). The point requirements for the base station are as follows:

① The ground base should be stable and solid, easy to set up and operate the base station.

② There should be open field of view. The height angle of obstacles around the field of view should be less than 10° -15° , to ensure that the receiving of satellite signals is not affected.

③ There should be no objects nearby that strongly reflect satellite signals (for example, large buildings).

④ The installation site should be far away from high-power radio emission sources (such as TV stations, radio stations, and microwave stations), and the distance should not be less than 200 m. The setup site should be far away from high-voltage transmission lines and microwave radio signal transmission channels, and the distance should not be less than 50 m.
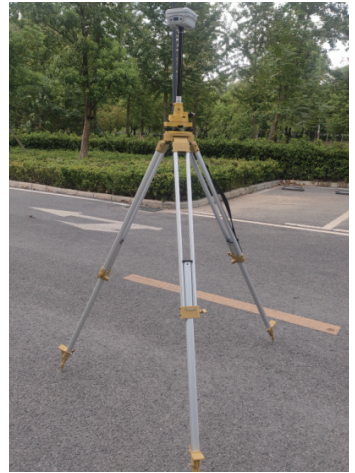
⚠️ The base station must be set up on the leveled ground. Otherwise, the data quality is not reliable.

2. Measuring Height of the Instrument

Instrument height = setup height of base station from the center on the ground to the measurement mark. As shown in the red box in the figure below, the position is measured.

Measure the height of the instrument with a steel tape from 2 directions. If the error is less than 3 mm, take the average value to calculate the antenna height.

3. Static Recording

The static collection starts 10-15 minutes earlier than the LIDAR data collection.
The static collection ends approximately 10 minutes later than the end of the laser data collection.

> ⚠️ Note: The base station should be set up to start the data recording at least 10 minutes earlier than the airborne data collection. The data recording ends and the base station is off at least 10 minutes later than the end of the airborne data collection. That is, the base station is still available even if the airborne data collection ends.

4. Data Transmission

Copy the base station data files. If necessary, convert the static format of the GNSS receivers to the common Rinex format (O-file and P-file).

Virtual Base Station Service (Applicable in China)

The virtual base station service released by GreenValley is applicable in China. Set up the virtual base station service (set up via APP) before the operation. Stop data recording after the scanning operation. Then, you can get the virtual base station data.
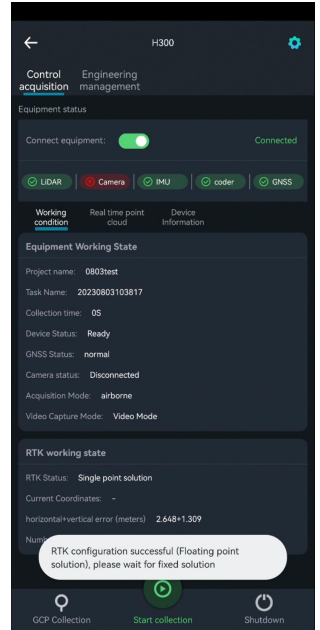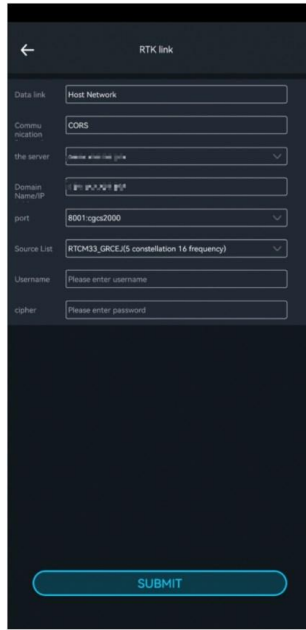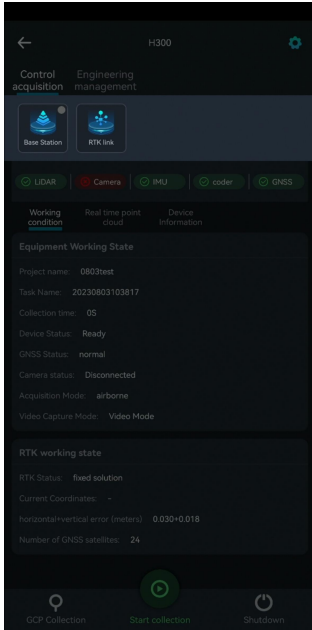
RTK Mode

The GNSS module supports the post-processed kinematic (PPK) and real-time kinematic (RTK) solution modes.
The RTK mode requires a CORS account before you can log in to the CORS network to obtain real-time differential data. If you do not have an available CORS account, the RTK function of the GNSS module will not be available. The GNSS module only supports the RTK function in CORS mode.

If you already have an available CORS account, set it up as follows:

① Move to an open area for searching satellites. Make sure that the device is connected properly and switched on. The device is powered on after the battery is ON. The camera needs to be switched on separately by pressing the on button.

② Connect App to the device corresponding to SN. The App prompts that each sensor of the device is normal ✅

③ Tap the Settings of the APP to set RTK link.

④ Enter the service information (server, domain IP, port, account and password, etc.)

⑤ Tap Submit to start to log in to the service. After the successful login, the prompt is as follows: (Next page image)

RTK status: Displays real-time status information of RTK module.

The current RTK states include fixed solution, floating solution and single point solution.

	RTK Status	Indications
①	Fixed solution	Indicates high real-time RTK module positioning accuracy; the device meets real-time RTK data collection requirements.
②	Float solution	Indicates poor satellite signal reception; nearby obstructions may be present. Wait for the device to fix or move it to an open, unobstructed area with better satellite signal reception.
③	Single solution	Indicates that the real-time RTK module cannot receive satellite signals or that the signals are weak. It is recommended to set up the real-time RTK module in an open, unobstructed area.

After successful configuration of the RTK module, RTK, 4G and POW indicators are always on. That is, RTK module works normally.

Data Collection

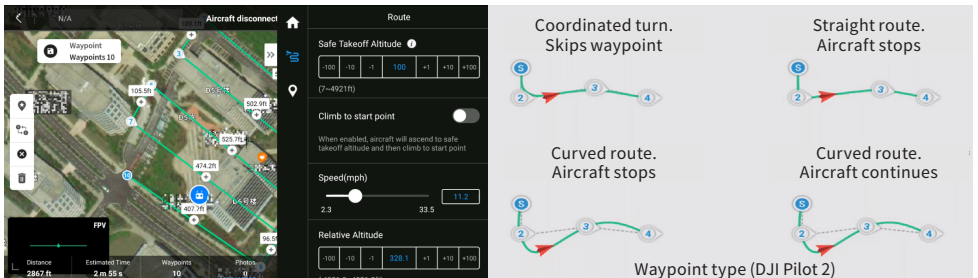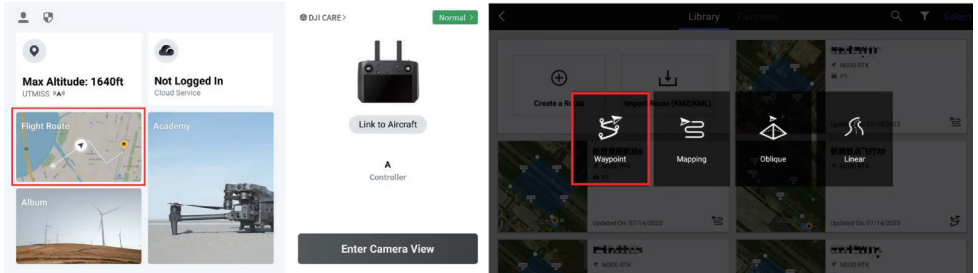## Notes for Safe Operations of LiGrip H300 Airborne Kit

⚠️ • Airborne kit data collection is suitable for areas with obvious features, but not for scenes with weaker features, such as beaches, flat land, water areas, etc.

• As the LiDAR is close to the ground, make sure there is an open and large area.

• When the aircraft takes off or lands, make sure there is an open and large area on the ground, free of sand and dust, away from specular reflection areas such as water and snow, away from high-power radio sources, and away from strong signal interference such as signal emitters. This can ensure the safety of the drone's take-off and landing. For details, see the DJI M300 Safe Operation Guidelines.

• At present, it is only suitable for **DJI M300 RTK** and **Matrice 350 RTK**.

• When installing the airborne kit, tighten the screws, and insert cables securely (red dot aligned with red dot).

• When connecting the airborne kit, make sure the **cable ties are not blocking the sensors of the aircraft**. If necessary, use the adhesive tape. Please ensure that the aircraft is safe to fly.

• It is recommended to use DJI Pilot2 **Waypoint and Mapping** to collect the data from the airborne kit.

① The initialization locations have obvious features for surveying.

② In the route planning, the **Waypoint** and **Mapping** is used.

③ The recommended route altitude is not more than 80 m and the route speed is not more than 5 m/s.

④ It is recommended that the route spacing and flight altitude is 1:1.

⑤ In the flight control parameter settings, select **coordinated turn**.

⑥ The movement in figure-8 trajectory is required before data acquisition. Make sure to **manually** control the aircraft through **movement in figure-8 trajectory**.

⑦ **After the movement in figure-8 trajectory, adjust the nose direction of the aircraft to the direction of the first route, to ensure that the aircraft will not be turned around in the same place when the aircraft follows the route.**

⑧ After the end of the route, the drone needs to move in figure-8 trajectory. Make sure to **manually** control the aircraft through **movement in figure-8 trajectory.**

⑨ Land back to the safe area.

⑩ In all of the above operations, **the aircraft should not turn around in the same place**. Otherwise, the data solution will fail.

DJI Pilot 2 create a route

1. Waypoint

Reasonably plan the flight route of the aircraft according to the size of the target area.

Coordinated turn. Skips waypoint

Straight route. Aircraft stops

Curved route. Aircraft stops

Curved route. Aircraft continues

Waypoint type (DJI Pilot 2)

⚠️ Suggestions: UAV route altitude does not exceed 80m, route speed does not exceed 5m/s, the ratio of route pitch to flight altitude is 1:1, and the waypoint type is selected to **coordinated turn and skips waypoint**.

At the end of the aircraft waypoint flight, it is recommended to control the aircraft manually, please make sure to pay attention to the following matters:

- Make sure when planning for a waypoint flight, set up an air strip that can return to the vicinity of the takeoff area, so that the vehicle will automatically return to the vicinity of the takeoff area, and then manually control the UAV around 8.
- After the end of the waypoint flight mode along the air strip, Make sure to manually control the vehicle to fly near the takeoff area and then manually control the UAV around 8.

2. Mapping

According to the size of the target area, plan the flight path of the drone reasonably.
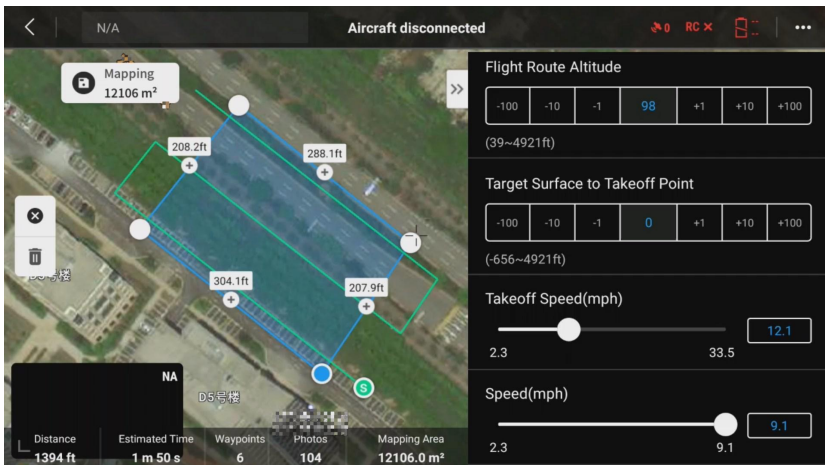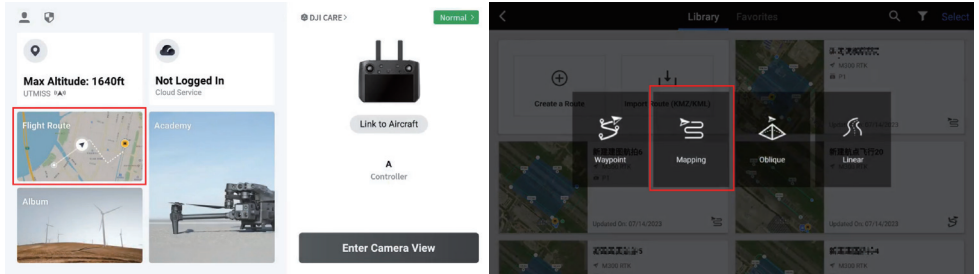
⚠️ It is recommended that the drone route altitude does not exceed 80 m, the route speed does not exceed 5 m/s, and the ratio of route spacing to flight altitude is 1:1, and the coordinated turn is selected in the flight control parameter settings.

At the end of the aircraft waypoint flight, make sure to control the aircraft manually, please make sure to pay attention to the following matters:
- Make sure that when planning for a waypoint flight, set up an air strip that can return to the vicinity of the takeoff area, so that the vehicle will automatically return to the vicinity of the takeoff area, and then manually control the UAV around 8.

Preparations

Power on DJI M300 RTK drone (short press and then long press). Start the ValleyGreen APP, and connect the device via WiFi. When **LiDAR**, **IMU**, **Coder**, and **GNSS** in the APP interface are all ✅ it indicates that the device is ready. You can start the data acquisition at this time.

⚠️ Note: Please use the GreenValley APP to connect to the main unit's WiFi to control the H300 to collect airborne data.

Device WiFi: LiGrip-** (Last four digits of SN)，password: greenvalley**

When LiGrip H300 Airborne kit collects data, the camera needs to be removed. The camera status in APP is displayed as ⊗ .

Creating a New Project

Configure the RTK link as required. For details, see section 2.3. When the RTK status in APP is displayed as fixed solution, tap **Start Acquisition**. The **New Project** interface is displayed. In the GreenValley App, you can create multiple subtask in one project. You can configure project name, collection location, and coordinate system. Tap OK. The new project is created.
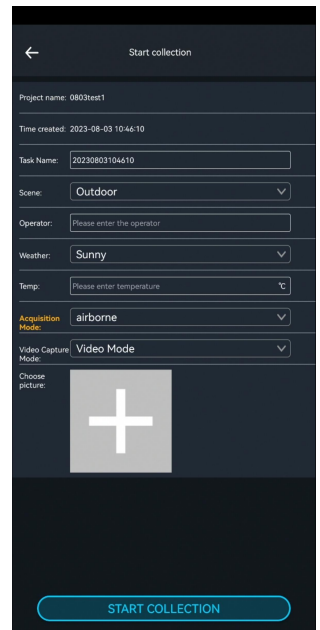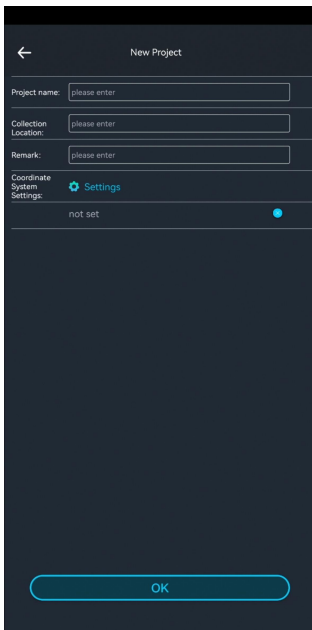

⚠️ Note: In Acquisition Mode, choose Airborne!

Initialization

When the airborne kit is initialized, it is recommended to choose **an open area with distinctive features and low foot traffic to land the drone safely**. In addition, the number of satellites in APP should be more than 20. Keep the device strictly stationary during the initialization.

After creating a new project, fill in the project information on the start page and submit it. Wait for the APP device status to change to "Collecting". The APP prompts "device is collecting" via voice. The initialization is completed.
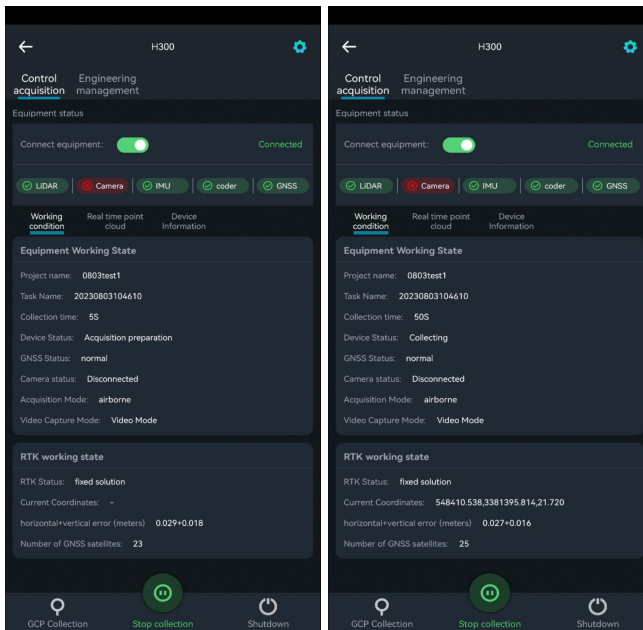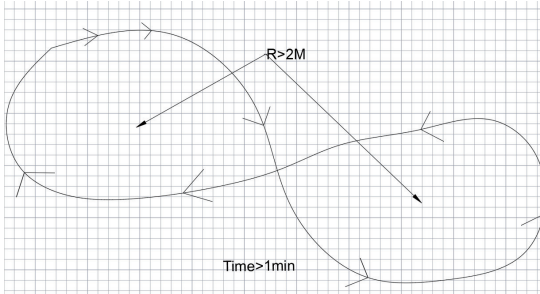
M300 Take-off and Movement in Figure-8 Trajectory

After the initialization of H300, when the number of satellites is more than 20, the aircraft operator will manually control the M300 to take off and lift off.

> ⚠️ When manually controlling the M300 to take off, mplease make sure to control the aircraft to take off slowly at a speed of 1-2m/s!

Before data acquisition, H300 airborne kit needs to move in Figure-8 trajectory.
The operator manually controls the M300 to fly in figure-8 trajectory. It takes approximately 1 minute with a radius of not smaller than 2 m.
Just move around 8 once!

Data Collection

After winding 8, proceed with data collection according to the planned path.

> ⚠️
> - After the movement in figure-8 trajectory, adjust the nose direction of the aircraft to the direction of the first route, to ensure that the aircraft will not be turned around in the same place when the aircraft follows the route.
> - The aircraft must not turn around in the same place. Otherwise, the data solution will fail.
> - When manually controlling the aircraft to turn and fly, please slowly turn around the arc and strictly prohibit the aircraft from turning around in place!

Tap the route flight. The aircraft will automatically fly along the DJI Pilot 2 create a route and collect the data.

Moving in Figure-8 Trajectory and Stopping Acquisition

At the end of the route mission, manually control the drone to fly to **an open area with distinctive features and low foot traffic to land the drone safely.** Manually control the M300 to fly in figure-8 trajectory. It takes approximately 1 minute with a radius of not smaller than 2 m.
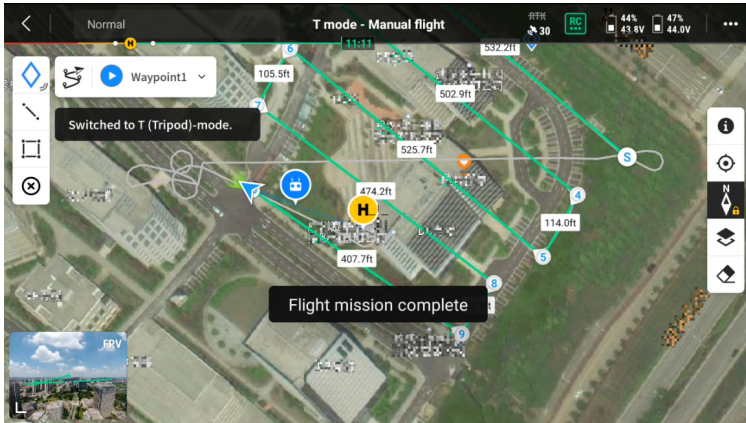

⚠️ After the route mission is completed, it is recommended to manually switch the remote control to T gear, control the aircraft to slowly fly to a safe area, and then go around 8 (or manually switch the remote control to T gear, go around 8 first, and then slowly fly to a safe takeoff and landing area).

After the movement in figure-8 trajectory ends, control the drone to the area to **land safely** and slowly.

After the drone lands, use the APP to connect to the H300 via WiFi. Tap **Stop collection** in the App. Follow the prompts on the interface and voice to stop collecting data. After the laser stops rotating, when the progress bar for saving data disappears, the APP announces "Data saved" in voice. You can collect data of the next project.
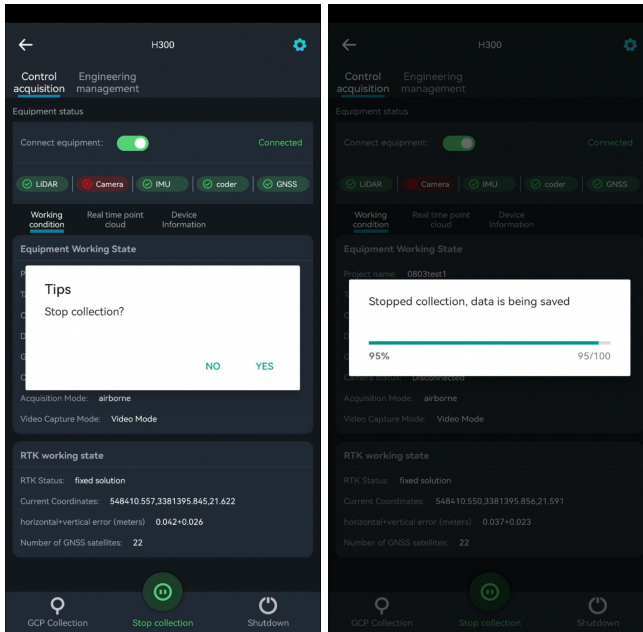
Note: When H300 is equipped with M300 for airborne data acquisition, the device is far away from the mobile phone. The APP may be disconnected from the device. At this time, stopping the acquisition can be done in the following two ways:
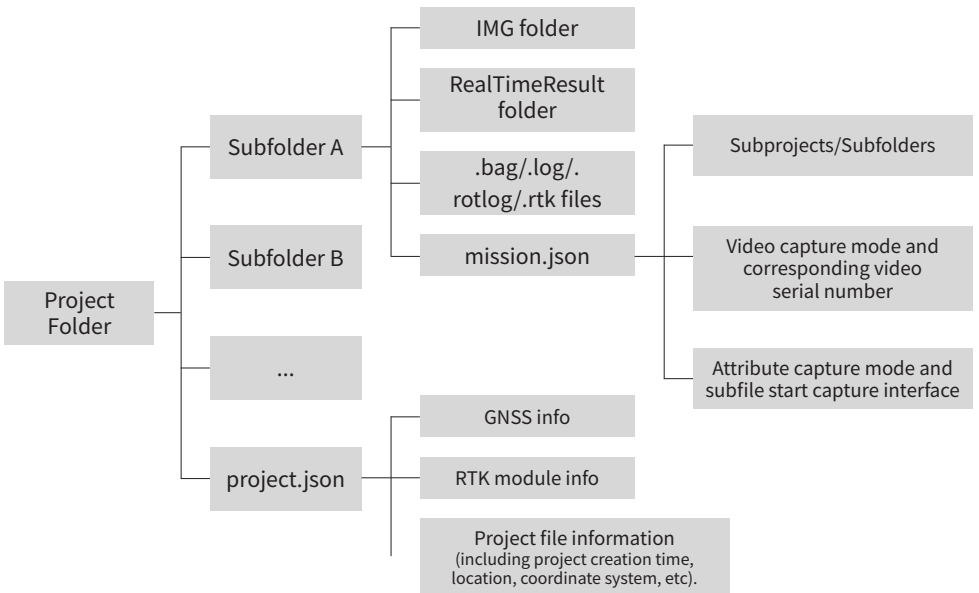
① It is recommended to reconnect the WiFi to control the H300 to stop the acquisition after the M300 drone has landed.

② Manually long press the H300 green wave button until the indicator flashes quickly. Wait until the indicator is always on. Then, the laser stops rotating. As a result, the data is saved successfully.

Data Copy

To copy data from the airborne kit, you need to remove the LiGrip H300's main unit battery box from the drone and insert the B58 battery into the battery box, short press and then long press the main unit battery box to turn it on to start data copying.

Details of Project Documentation

The project folder of the target data contains several subfolders that have been collected, as well as the project.json file, where the subfolders contain the IMG folder, the RealTimeResult folder, the .bag/.log/.rotlog/.rtk files, and the mission. json file (recording the project information for the subfiles).

```
Project Folder
├── Subfolder A
│   ├── IMG folder
│   ├── RealTimeResult folder
│   ├── .bag/.log/.rotlog/.rtk files
│   └── mission.json
│       ├── Subprojects/Subfolders
│       ├── Video capture mode and corresponding video serial number
│       └── Attribute capture mode and subfile start capture interface
├── Subfolder B
├── ...
└── project.json
    ├── GNSS info
    ├── RTK module info
    └── Project file information (including project creation time, location, coordinate system, etc).
```

⚠️ Note: No camera data is available when the LiGrip H300 is equipped with the M300 for data collection.

APP-based Copy

Insert the USB flash drive to the USB port and use the APP to copy the corresponding projects or subprojects (containing bag, log, and rtk files).
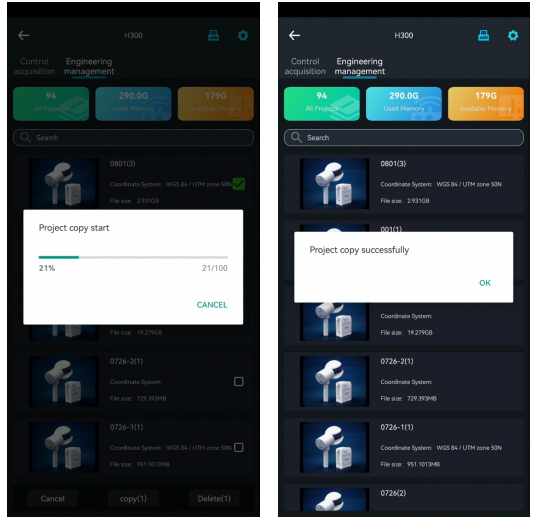
## Copy by Using Network Cables

Insert the B58 battery and power the device up. Connect the Lemo port end of the data transmission cable to the LAN port, and the network port end to the computer.

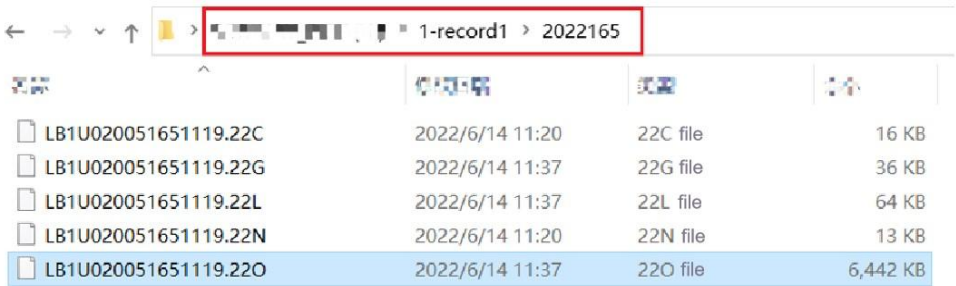(Configure the IP address of the computer)
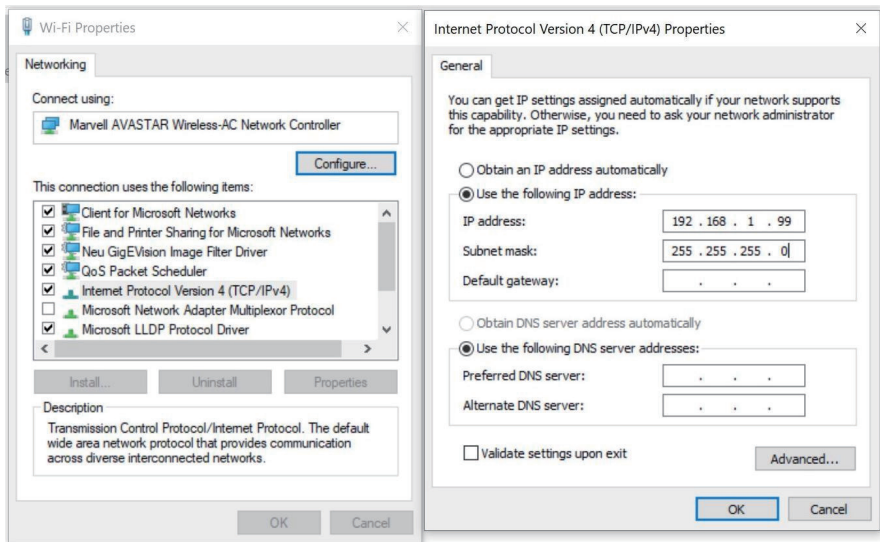
Enter the URL "\\192.168.1.200" on the computer to access the internal storage space of the device. Open the "Share" folder and copy the corresponding project/subproject files to the computer. The data export is completed.
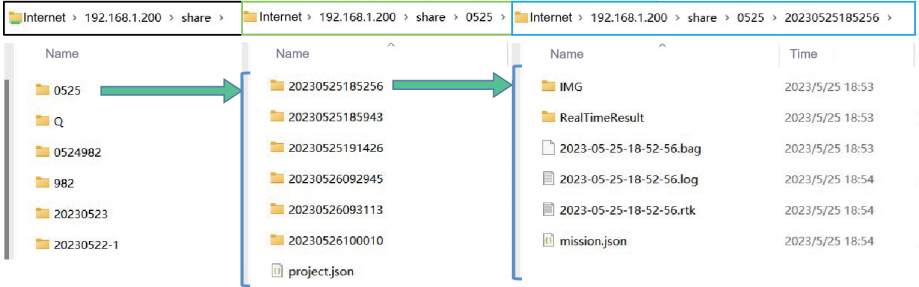
Copying Base Station Data in PPK Mode

Download the reference station data (PPK mode).

Power down the device

Turn of the device by APP, then press and hold the battery button to turn of the power.

LiFuser-ΒP software data processing

The data processing flow of LiGrip H300 airborne kit is the same as that of LiGrip H300 backpack kit, please refer to**the LiGrip H300 User Manual** for specific solution details. You can choose to import RTK data externally or PPK base station according to your needs, both of which can get absolute coordinates.