FS60-CX/62-CX/64-CX Hyperspectral Camera - User Manual

Revision Record:

version number	Revision Date	Reviser	Revised content overview
1.0	2025-12-31	Zheng Jiajia	Initial version
1.1	2026-8-31	Huang Xinyi	Add waypoint planning settings
1.2	2026-9-5	Cheng Yan	Added Maintenance Instructions for hyperspectral camera.

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1. summary

The purpose of this guide is to provide users with a comprehensive and detailed airborne hovering hyperspectral camera flight operation guide to help users efficiently and safely complete the task of collecting hyperspectral data. As an advanced remote sensing equipment, the airborne hyperspectral camera can capture the spectral information reflected by objects, and provide accurate data support for agricultural monitoring, environmental protection, geological exploration and other fields.

2. Compatible Models

This User Flight Guide is adapted to the following models of hyperspectral cameras:

FS60-CX/62-CX/64-CX sine

3. Flight Environment Requirements

3.1 Flight Environment Requirements

1. Do not fly in bad weather, such as strong wind (the maximum wind speed supported by the UAV is greater than 15 m/s. In order to ensure that the image of the camera is not distorted during acquisition, please fly in an environment with a wind speed less than 4 m/s. When flying in the rain, it is important to follow the requirements stated in the IP45 rating instructions.
2. Choose open, no tall buildings around and no large drop in terrain as the flight site. A large number of buildings using steel bars will affect the work of the compass, and will block the GNSS signal, resulting in poor positioning effect of the aircraft or even unable to locate.
3. When flying, please keep control in line of sight, away from obstacles, people, water, etc.
4. Do not fly in areas with high-voltage lines, communication base stations or transmission towers to avoid interference with the remote control.
5. In high altitude areas, the performance of the aircraft battery and power system will be reduced due to environmental factors, and the flight performance will be affected. Please fly with caution.

3.2 preflight check

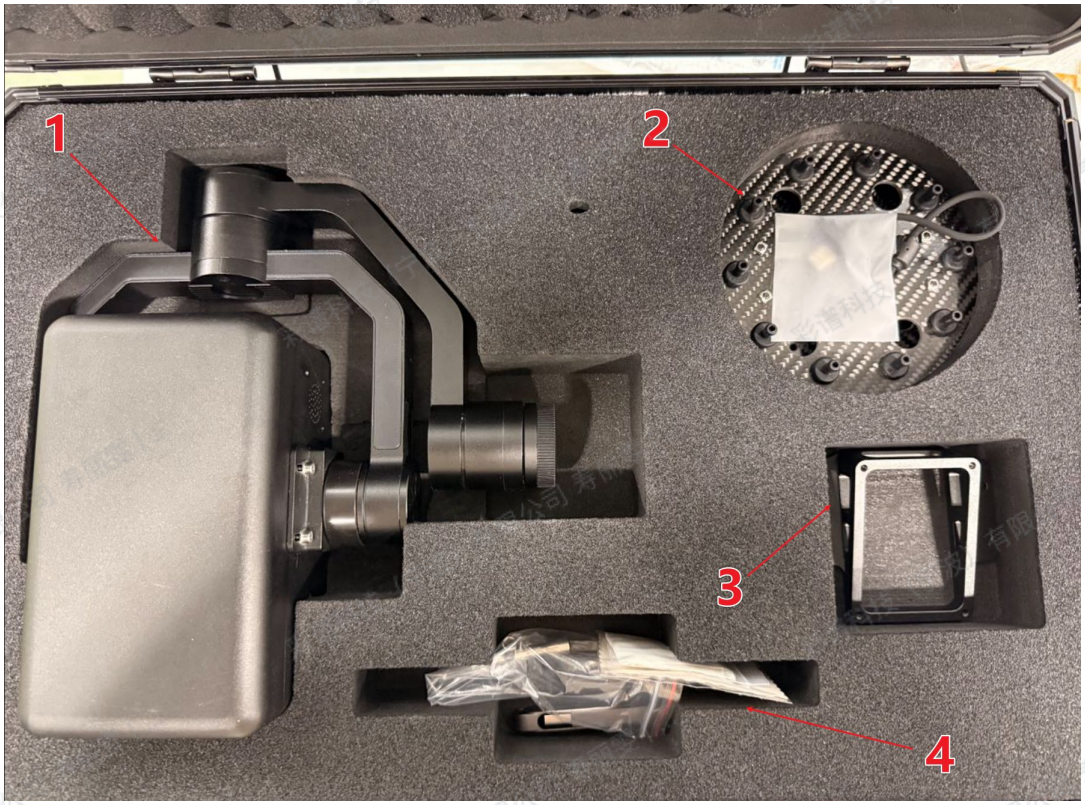
1. The batteries of the remote control and the aircraft are fully charged.
2. The arm is deployed and the arm sleeve, landing gear and battery are all locked to the indicated position.
3. The motor and blade are fixed reliably without looseness; The motor is not jammed, and the blade is not damaged.
4. All device firmware is the latest version of the official website.
5. Ensure that the runaway behavior setting meets the requirements of the pilot, it is strongly recommended to set to return.
6. Set the appropriate return altitude according to the flight environment to ensure the safety of return.
7. Make sure the controls are in accordance with the flying habits.
8. Check whether the obstacle avoidance is open and whether the obstacle avoidance distance is set reasonably.

9. If multiple aircraft operate at the same time, please divide the airspace to avoid mid-air collision.

3.3 Landing Precautions

1. FS60CL-X, due to the large size of the equipment, the obstacle avoidance sensor under the UAV is covered, so manual landing is required when landing.

4. Unpacking List



1. Hyperspectral camera
2. Belly Buffer Disk
3. Camera mounting angle adjustment bracket
4. Accessories + U disk

5. Installing a hyperspectral camera

5.1 Mount the camera to the drone

1. Grab the top of the gimbal, hold the top of the gimbal, and take out the camera, as shown in the figure.




2. Remove the protective lens cover.



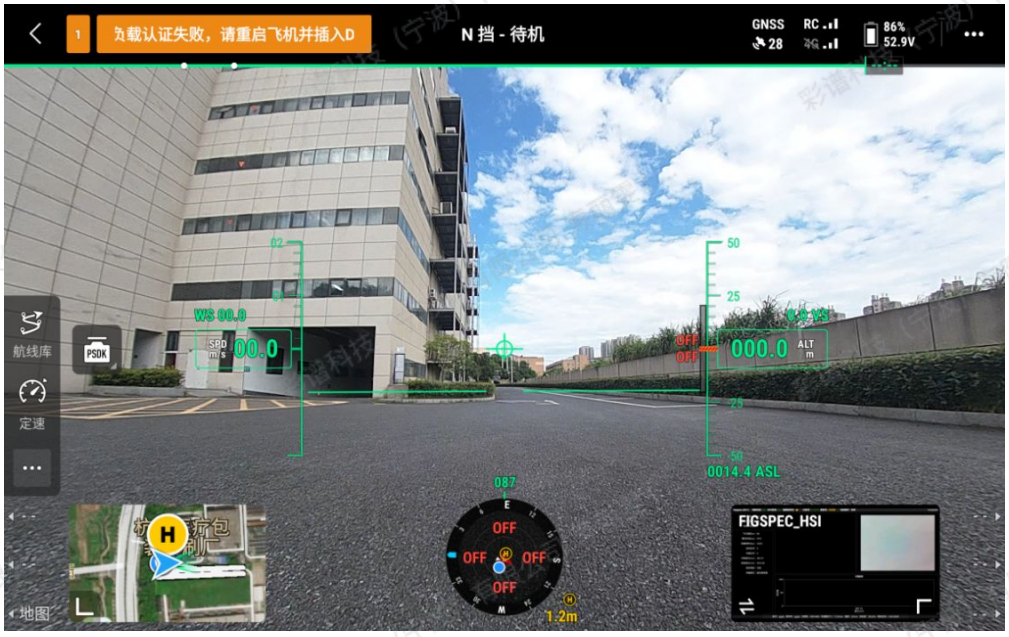
3. Rotate the pan-tilt protective cover counterclockwise and remove it, turn the white dot towards yourself, buckle it to the UAV pan-tilt bracket, and rotate the pan-tilt to align the red dot of the pan-tilt bracket with the red dot of the UAV pan-tilt bracket.




5.2 Turn the hyperspectral camera on or off

Camera power-on sequence:

1. Open the drone remote control, open the drone.
2. Wait for the camera rotation to complete and return to the middle position.
3. Then wait for the camera to turn on. After the camera is turned on, a small window named "FIGSPEC_HSI" will appear in the lower right corner of the remote control.



4. When the camera is turned on, the software will start automatically. After the software is started, the camera status will be displayed in green in the upper status bar, indicating that the camera has been connected.



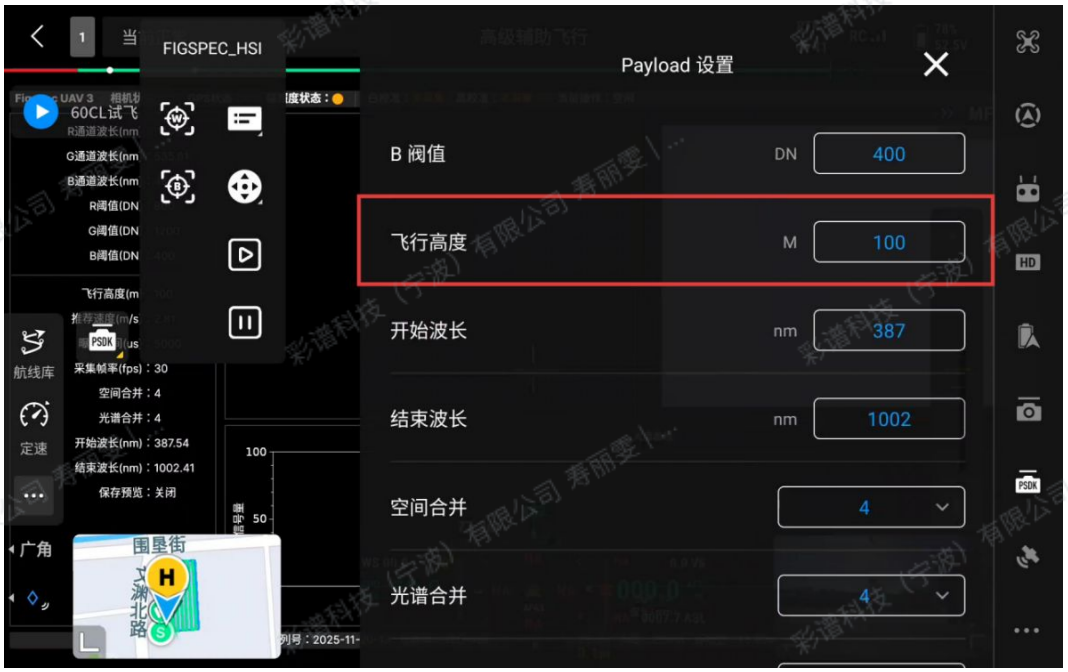
Camera shutdown:

1. Shut down the drone.
2. Turn off the remote control.
3. Remove the camera again.

6. Camera parameter settings

6.1 Set Flight Altitude (only in line scan mode)

- The flying height of the UAV, in meters (m).
- The flying height is set according to the actual needs of the individual, and the recommended "flying height" is 50-150 meters.
- Flight altitude affects both flight speed and target resolution (I. E., the actual size of space for a single pixel).
- The flight altitude of the UAV in the route mission needs to be consistent with the parameters of the PSDK.





6.2 Set up space consolidation (set as needed)

Set space merge in PSDK.



The supported spatial merges are as follows.

Camera model	Merge mode	1 Consolidation	2 Consolidation	4 Consolidation
FS60CL-X	Summation	1920px	960px	480px

6.3 Set Spectrum Merge (set as needed)

Set up spectral merging in PSDK:



The spectra are combined as follows. Note: FS-60A only supports simultaneous spatial and spectral merge settings.

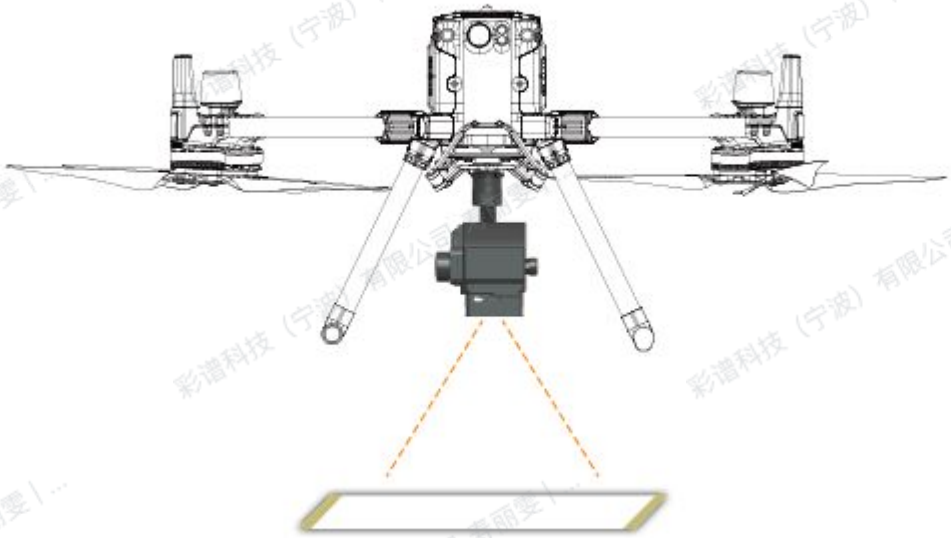
	Merge mode	1 Consolidation	2 Consolidation	4 Consolidation
FS60CL-X	Summation	1200	600	300

6.4 Set exposure time

The basic principle of setting the exposure time is to avoid overexposure and underexposure: Setting the exposure time too long will lead to overexposure of the image, too high brightness and loss of details; While setting too short will lead to underexposure of the image, insufficient brightness and increased signal-to-noise ratio. Therefore, it is necessary to find an appropriate exposure time so that the image is neither over-exposed nor over-dark.In the case where neither the reflectivity plate nor the sample is Overexposed: the higher the signal, the better. Software provides 2 kinds of exposure settings can be selected.

Automatic exposure setting method:

1. Place the "Reflectivity Calibration Cloth" under the camera without shadows directly under the camera.



2. Click "white calibration" in PSDK, the camera will automatically calculate the appropriate exposure time and set.

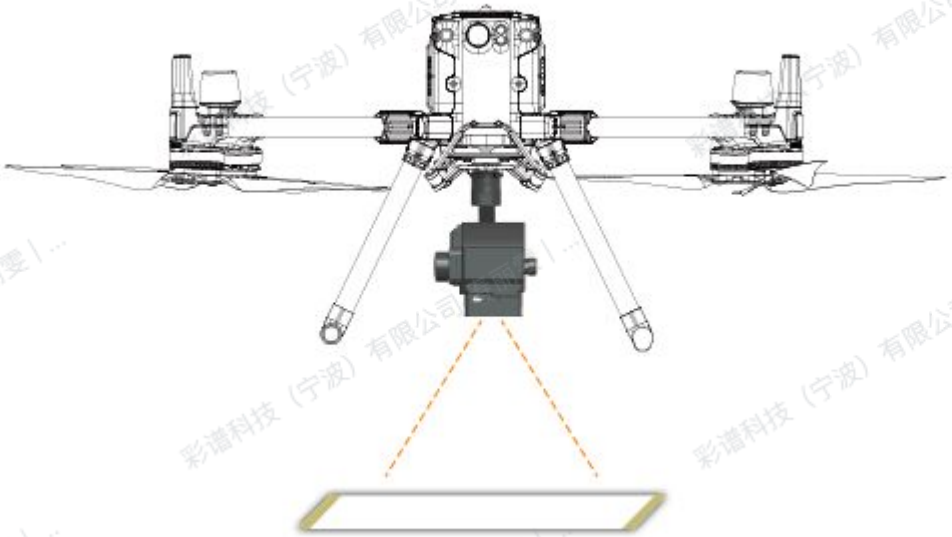


3. The software will set the exposure time to between 70% and 80% of the signal during the acquisition of the reflectivity plate, update the white calibration status to "acquired" and generate a white calibration file for subsequent calibration.

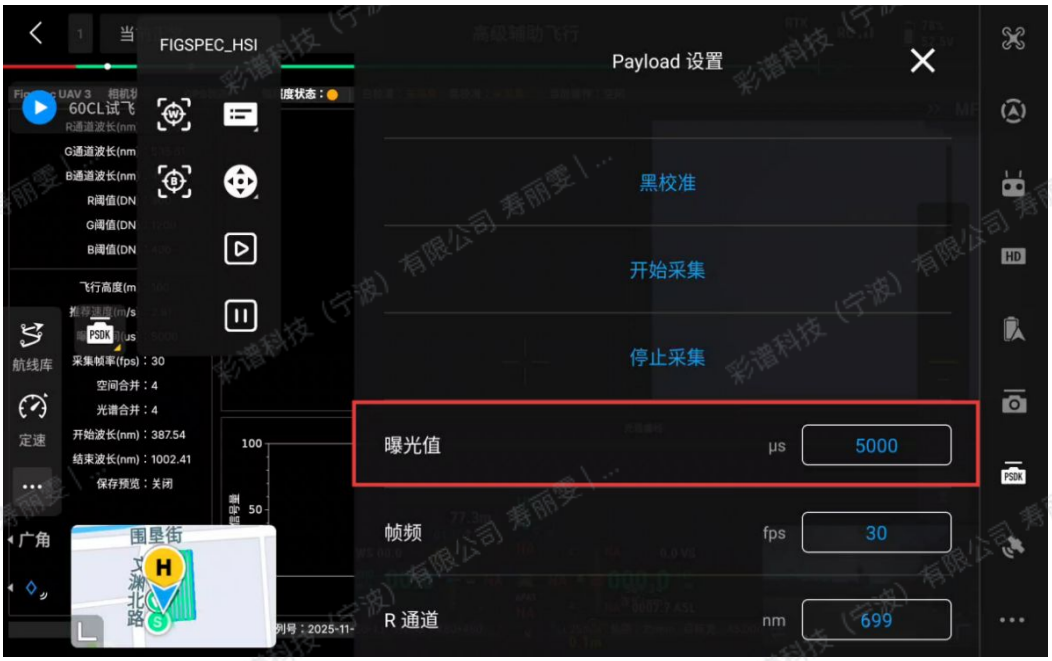


Manual exposure value adjustment mode

1. Place the "Reflectivity Calibration Cloth" under the camera without shadows directly under the camera.



2. Click "Start Acquisition" to view the maximum signal amount of the spectral curve below the software.
3. "Stop acquisition", adjust the exposure value in psdk to start acquisition.

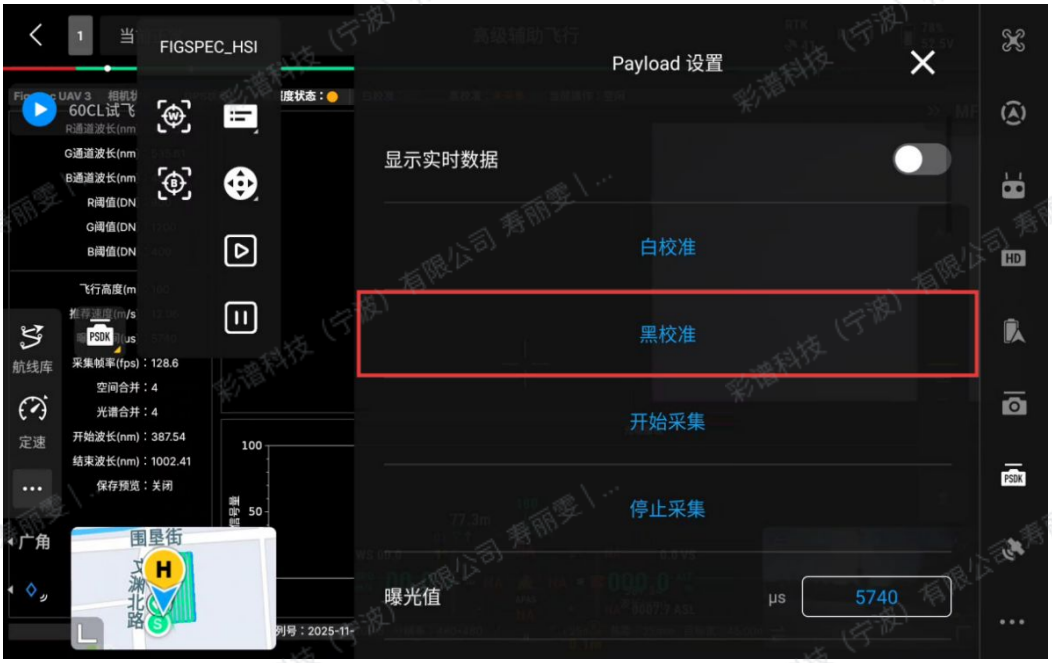


4. Repeated operation to make the maximum signal quantity and observe the changes of image brightness and details, find the most suitable exposure time, and generally adjust the maximum signal quantity of reflectivity cloth to about 3000.

6.5 Black calibration

Black calibration is also called "dark current deduction". The spectral data collected after black calibration will generate a black calibration file for subsequent deduction of camera dark current signals.

1. Close the lens cover and click "black calibration" in PSDK ".



2. The software interface displays "black calibration in progress", and the black calibration status is updated to "collected" after successful calibration.



6.6 Set Frame Rate

In surface scanning mode: the frame rate range is 1-128fps; In line scanning mode: in order to avoid the UAV flying too fast, it is recommended to set the "frame rate" to between 50-100.



7. Route planning (suitable for line scan acquisition mode)

7.1 Planned route

1. Click "route" on the homepage of DJI Pilot2 to enter the route Library → "create route" → "plane route".





2. Click four points in turn in the map to draw a rectangular area, and then click "√" in the upper left corner ".



3. Select the model as "M350/M300 RTK".



7.2 Select or add an onboard hyperspectral camera

1. Select a camera and select Custom Camera to add a hyperspectral camera.



2. Create a new camera according to the illustration.



a. Name: Name according to camera type and resolution.
b. Photo size: The resolution is filled in according to the parameters calculated under the camera software.
c. Sensor size: The size of the FS60-CX series sensor is fixed at 11.3mm * 11.3mm.

   The dimensions of the FS62-CX and FS64-CX sensor are fixed to 6.4mm * 6.4mm.
d. Focal Length: 25mm.
e. Click Finish after setup to save the camera.



3. After saving, select the added camera, and then click "OK" to proceed to the next step.

7.3 Set the heading overlap rate to 10%

At the bottom of the route setting interface, enter Advanced Settings and set Heading Overlap Rate to 10% ".





7.4 Set the side overlap rate above 70%

At the bottom of the route setting interface, enter Advanced Settings and set the Side Overlap Rate to above 70%.





7.5 Set course altitude

The "flight altitude" in the UAV route mission needs to be consistent with the PSDK parameters.



7.6 Set acquisition flight speed

The "route speed" in the UAV route task must be consistent with the "recommended speed" in the left interface of the software.





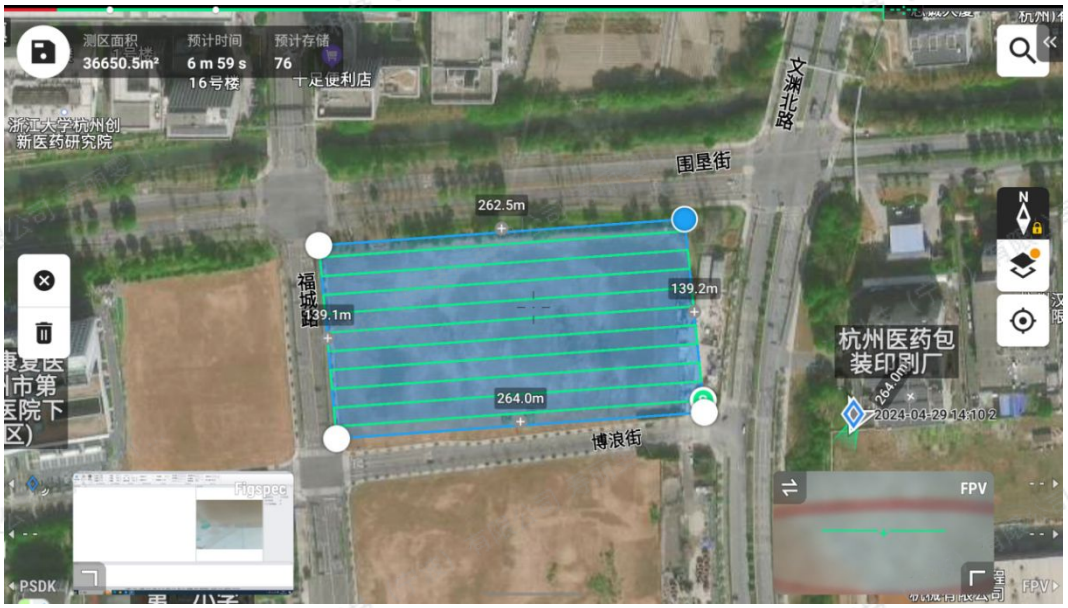
7.7 Turn off elevation optimization

Turn off Elevation Optimization ".



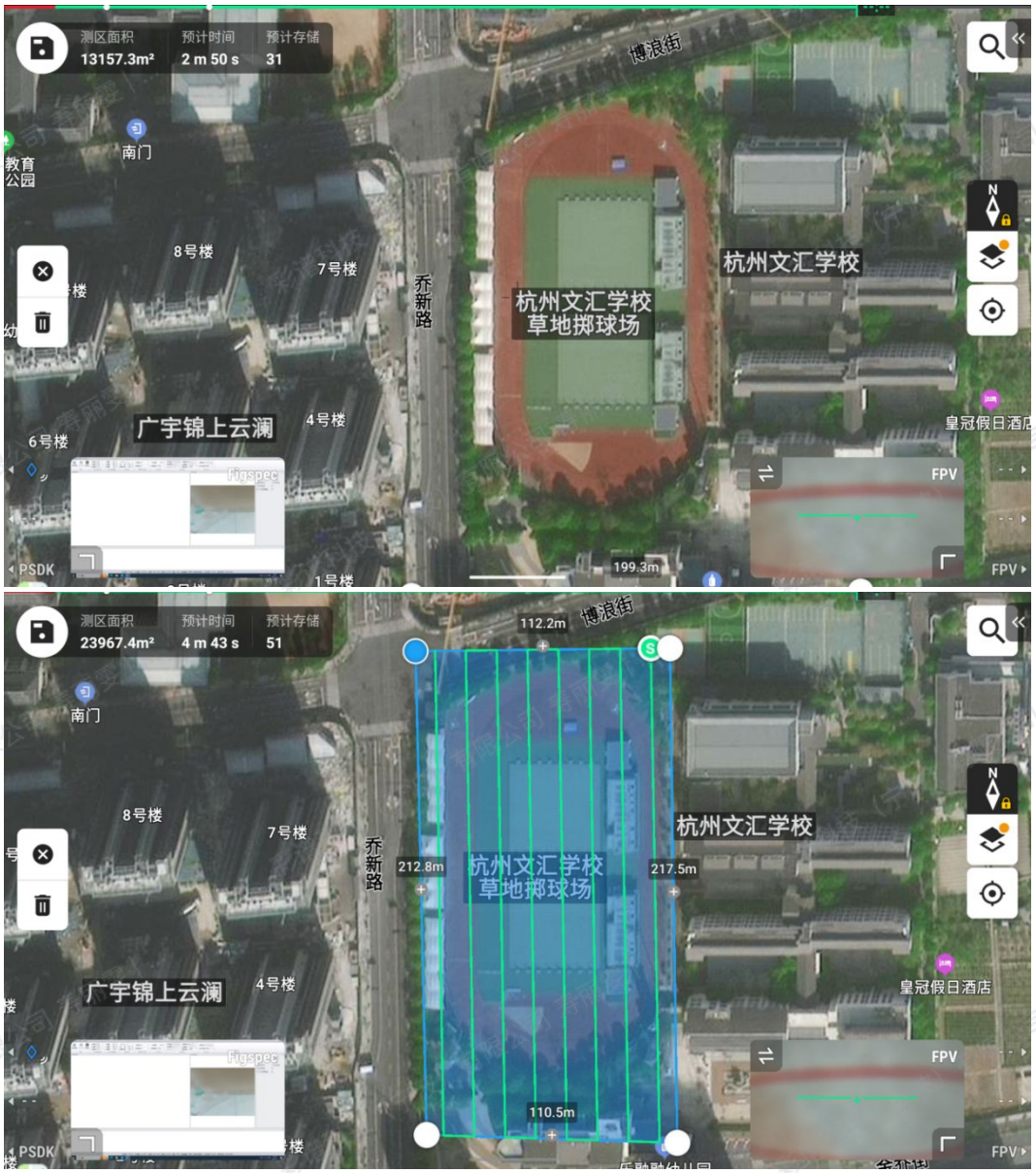
7.8 Heading Angle

1. When the target area is approximately rectangular: Set the main course angle as shown in the figure, not as shown in the error example.



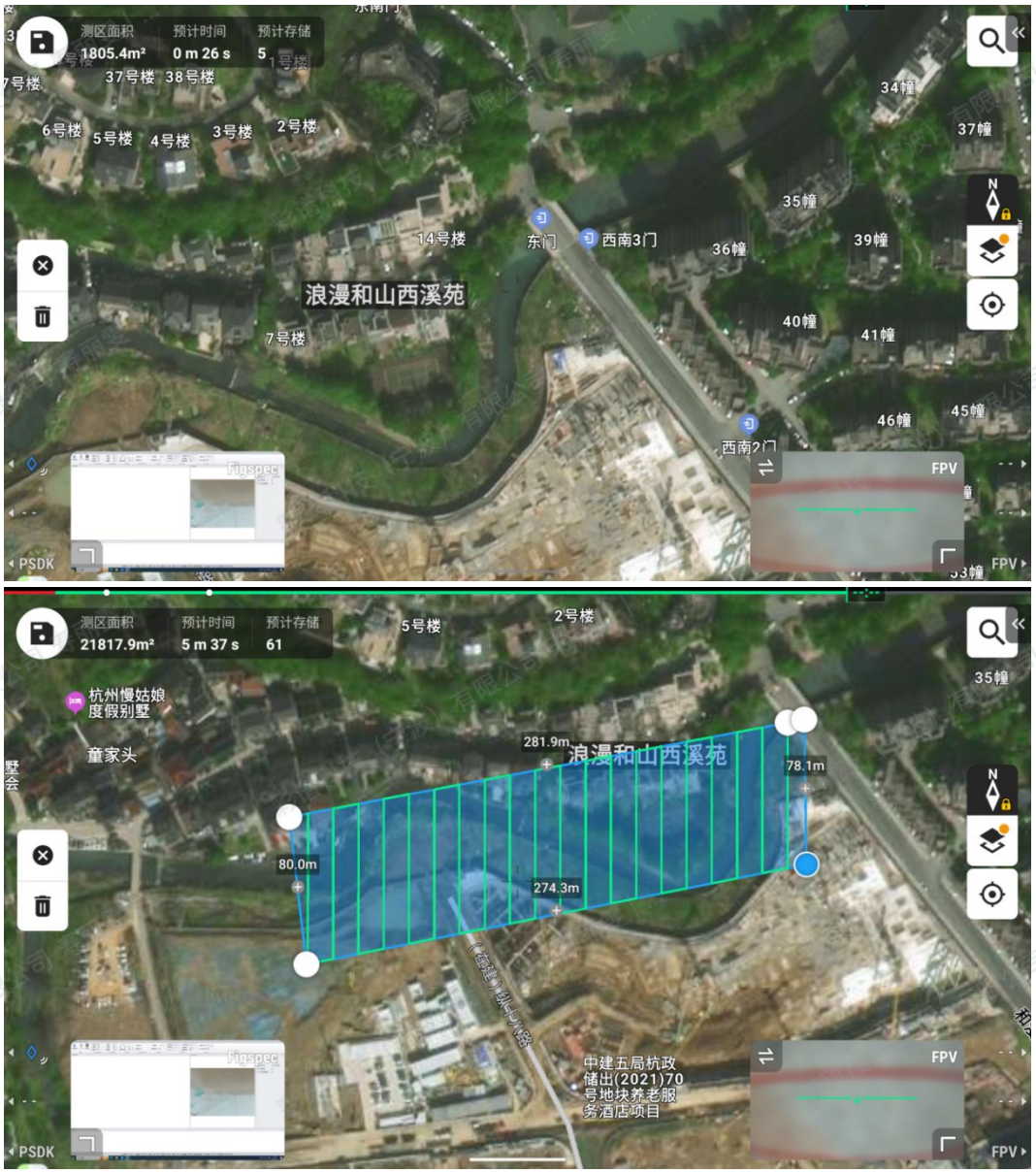
7.9 When the target area is irregular

Take the playground in the figure as an example, use a rectangle to contain the target area, set the measurement area as shown in the figure, and follow the 7.1 rules for the angle of the main route.



7.10 When the target area is a river course

Take the river as an example, set the measurement area as shown in the figure, and adjust the angle of the main route to fly back and forth on both sides of the river bank.

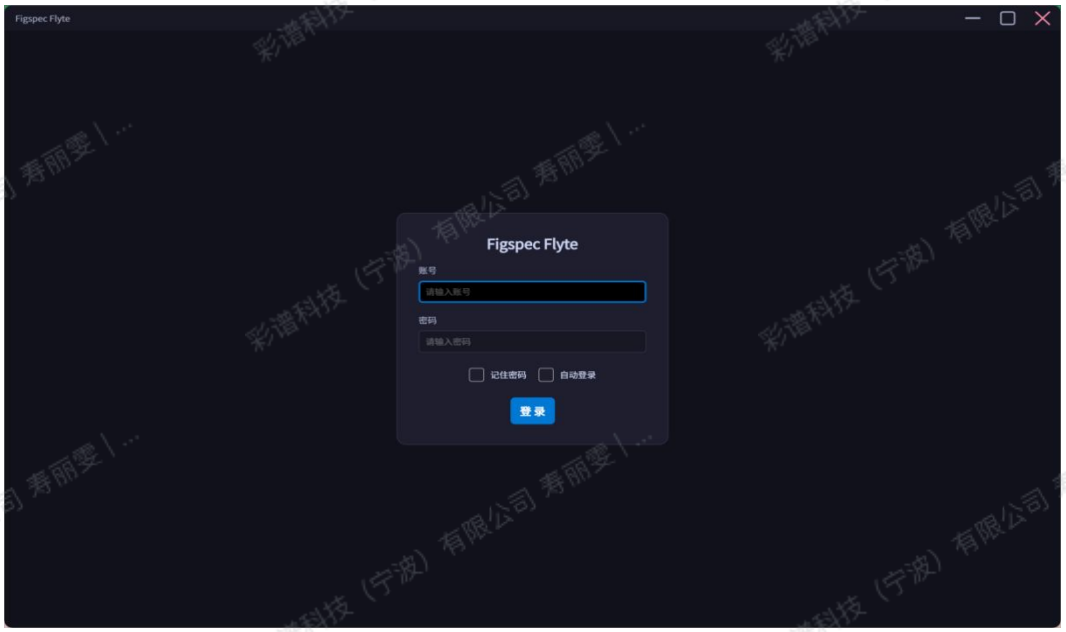


8. Waypoint planning (suitable for surface scan acquisition mode)

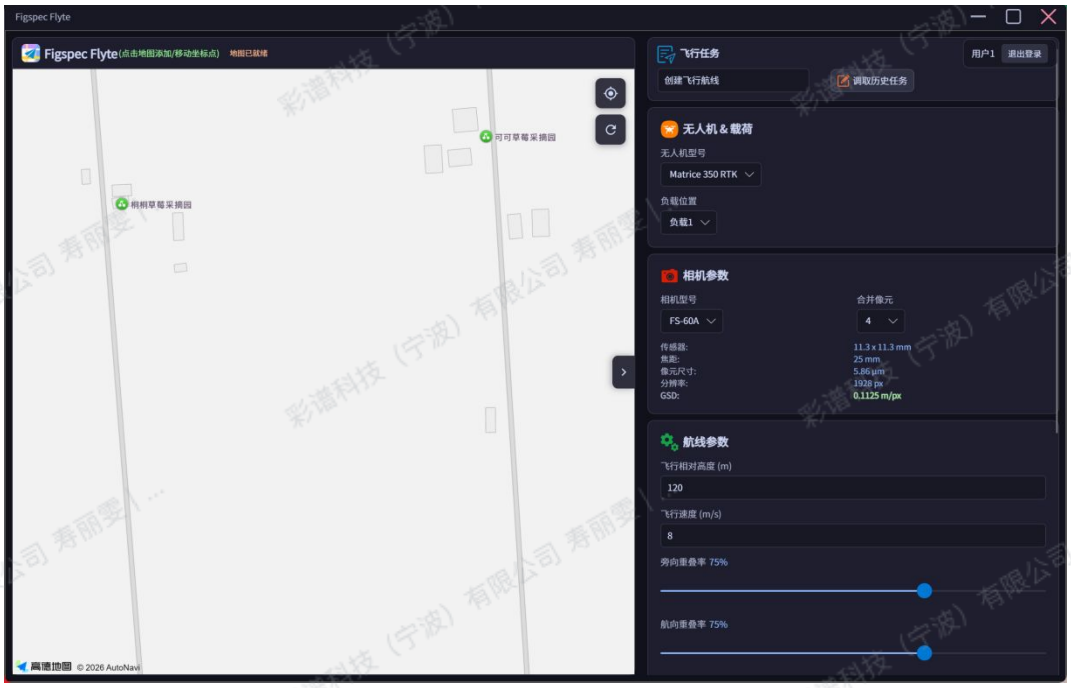
Note: The waypoint planning needs to be completed by Figspec Flyte software, which is divided into App version and PC version. The two versions have common accounts and the operation method is the same.

8.1 Account Login

1. Double-click to run the software of Figspec Flyte, enter the account number and password in the login interface, click the "login" button, and wait for the loading of "login" to enter the main interface of the waypoint planning software.
2. Remember password: check the next run after the software will automatically fill in the password;
3. Automatic login: check the next time you run the software will automatically log in, no need to fill in the account number and password.

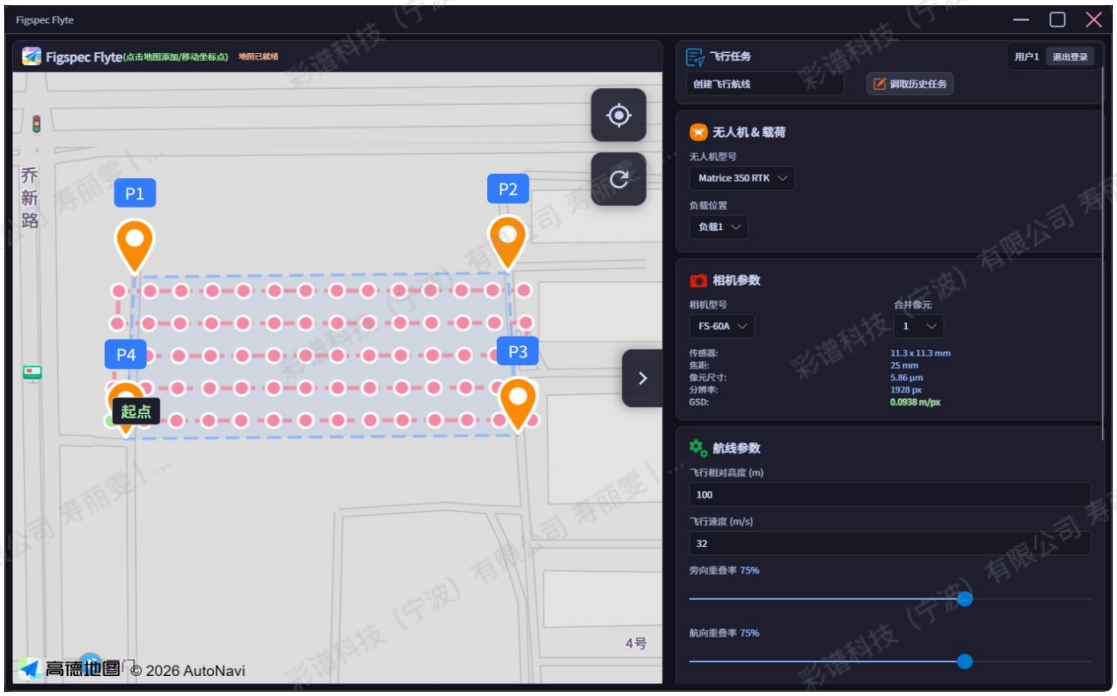


4. The user name of the account and the "Logout" button will be displayed in the upper right corner of the main interface. Click the "Exit Login" button to exit the main interface and return to the login interface.



8.2 Setting of route parameters

1. Route area planning: click 4 points in turn in the map to draw a rectangular mapping operation area.



2. Flight Task Name Setting: The flight task name is Created Flight Route by default.



3. **Drone & Load Settings:**
   a. Click the drone model drop-down box to select the "Matrice 350 RTK" model or the "Matrice 400" model.
   b. Click the load position drop-down box to select the "load 1" position or the "load 2 position, depending on the actual installation position of the hyperspectral camera.



4. **Camera parameter settings:**



   a. Click the camera model drop-down box to select the corresponding job camera model.
   b. Click the Merge Pixel drop-down box to select the pixel merge mode. The higher the merge degree, the lower the spatial resolution, but it usually improves the signal-to-noise ratio and reduces the amount of output data. Routine work can start with 4 merges and then adjust by Target scale and lighting.
   c. Sensor: FS60-CX series sensor size is fixed at 11.3mm * 11.3mm;FS62-CX series sensor size is fixed at 6.4mm * 6.4mm.
   d. Focal Length: 25mm.

e. Pixel size: The pixel size of the FS-60A series camera is 5.86um; The pixel size of the FS-62A series camera is 5.00um.

f. Resolution: The number of pixels at the height of the image captured by the camera, which varies according to the model of the camera and the number of merged pixels.

	1 Merge	2 Merge
FS62CL-X	1280px	640px
FS60CL-X	1920px	960px

g. GSD: represents the actual ground size corresponding to one pixel in a single image. The software calculates GSD based on flight height, focal length, pixel size and merging method. Incorrect filling of the height reference, focal length, or model will cause the result to deviate.

5. **Setting of route parameters:**



a. Flight relative height (m): The height of the UAV relative to the ground at the takeoff point.

b. The flight altitude should be set according to individual needs; the recommended flight altitude is 50–150 meters. Flight altitude affects both the airspeed and the ground resolution (i.e., the actual ground size represented by a single pixel).
c. Flight speed (m/s): The flight speed of the UAV from the previous waypoint to the next waypoint. Set as needed.
d. Side overlap rate: the setting range of side overlap rate is 30% ~ 95%, and it is usually recommended to set
e. Heading overlap rate: the setting range of the heading overlap rate is 30% ~ 95%, which is usually recommended to be set
f. Hover photo time (s): the time to hover after flying to the Photo Point, which is usually recommended to be set
g. Margin (m): The distance reserved between the outermost flight line and the mapping boundary contour. The outer margin can avoid the image missing at the edge of the measuring area.
h. Main heading angle (°): The forward direction of the UAV's round-trip scanning route. The deflection angle is calculated in the clockwise direction with the north direction as the 0 ° reference. After "Automatically calculate optimal heading" is checked, the software will automatically generate the optimal route direction, and the manual heading parameters will no longer take effect.

6. **Export Routes:**

   When the route profile shows the green check pattern and the route preview is completed, you can click the "Export Route" button, the system will automatically generate the output directory, and the folder where the route is located will be automatically opened after the export is successful.

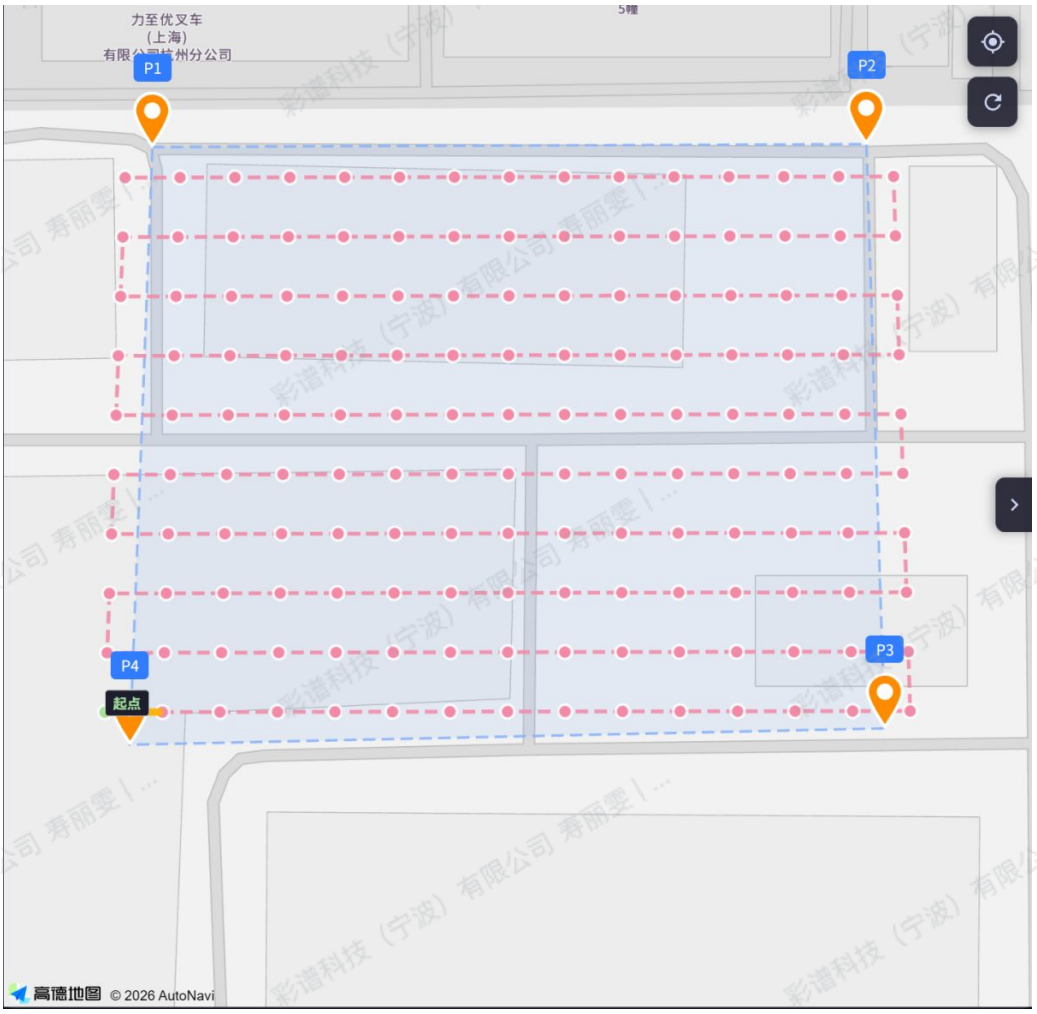


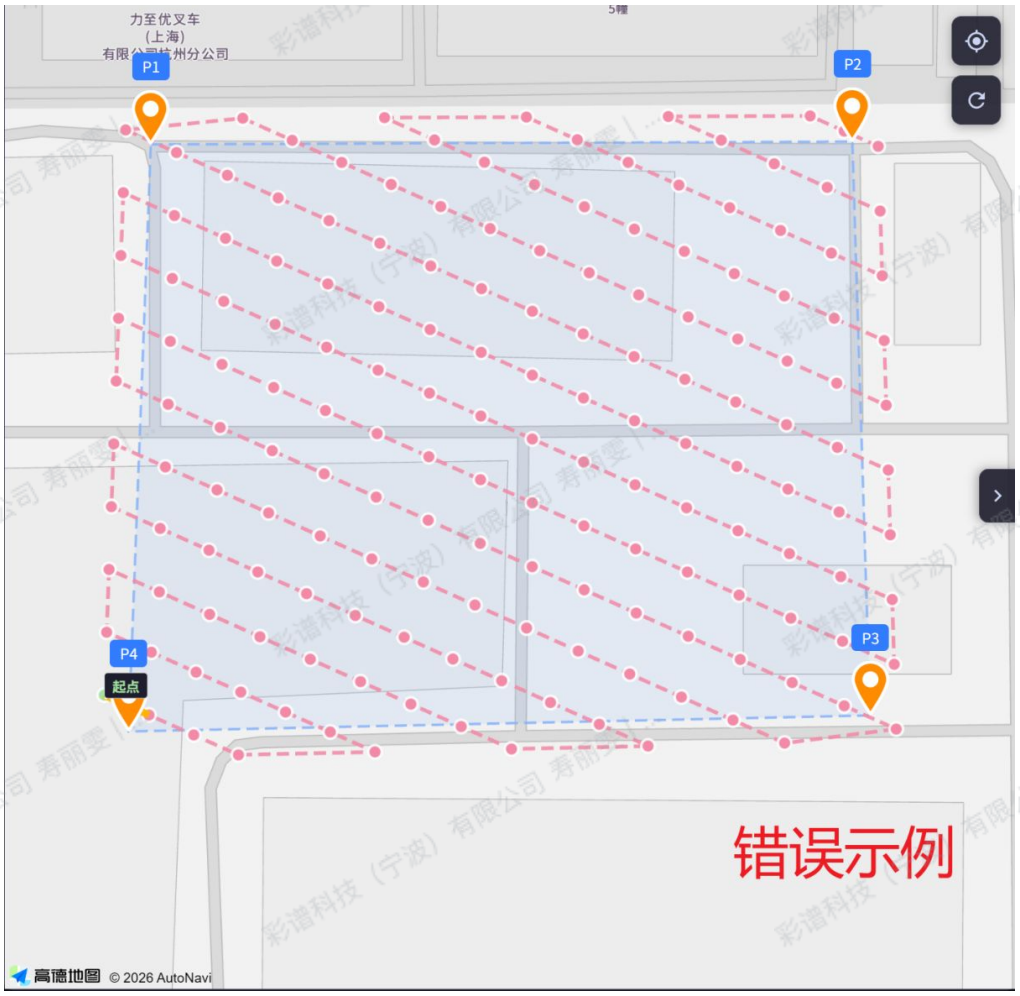


8.3 Heading angle

1. **When the target area is approximately rectangular:**

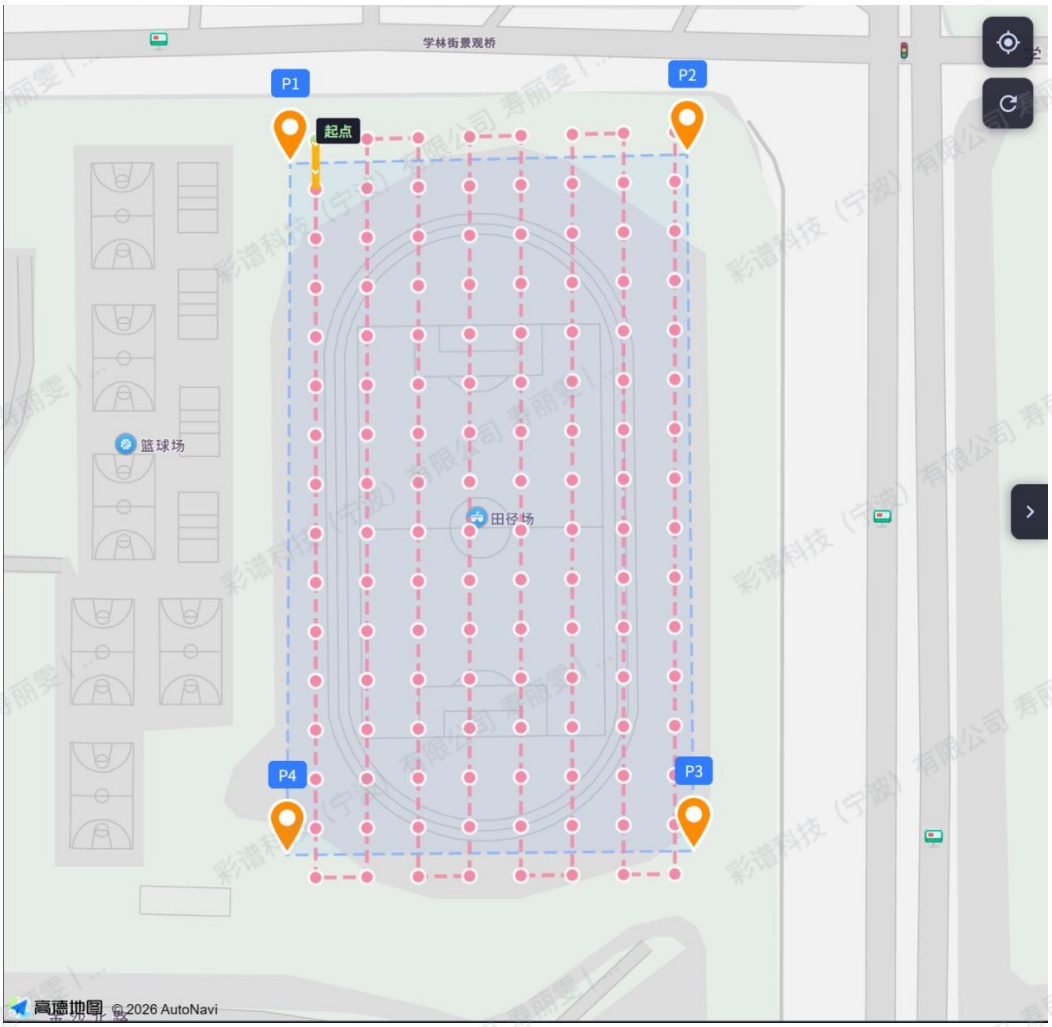
Set the main heading angle as shown in the figure below. The main route direction should be set parallel to the long side of the rectangular survey area as much as possible to reduce the number of route turns, instead of the wrong example.


力至优叉车
(上海)
有限公司杭州分公司
P1
P2
P3
P4
起点
高德地图
© 2026 AutoNavi



2. **When the target area is an irregular pattern**

   Take the playground in the figure as an example, use a rectangle to contain the target area, set the measurement area as shown in the figure, set the main heading based on the long side of the external rectangle, and avoid generating self-intersecting polygonal routes when planning routes.



1. When the target area is a river channel

Take the river as an example, set the measurement area as shown in the figure, and adjust the main heading angle to fly back and forth on the river banks on both sides.



9. faq frequent answer question

9.1 How do I delete a planned waypoint?

Click the waypoint coordinate icon , the waypoint turns red, and then click the delete icon in the upper left corner. Confirm Delete to delete this planned waypoint.

9.2 How to improve the puzzle effect?

Maintain stable illumination and sufficient overlap rate, reduce excessive speed, avoid large posture changes, and ensure the consistency of time, positioning and camera parameters; Improve redundancy and strengthen on-site quality inspection for single texture or undulating areas.

10. Starting collection

After reaching the starting point, a voice prompt will be given to "arrive at the starting point of the route and start executing the task". The camera will rotate 90 degrees upward to observe that the camera is shooting in the air. At this time, click "Start acquisition" (or shortcut C1), the camera will turn to the bottom to carry out the acquisition task, and the hyperspectral image will be refreshed in real time on the hyperspectral image interface.
During the collection process, if the GPS status is displayed in red, it means that no GPS information has been obtained.
Note: The line scan acquisition mode is only applicable to route planning acquisition, and the surface scan acquisition mode is only applicable to waypoint planning acquisition.



Click "Stop Collection" when you reach the end of the route ".

11. Copy data

Insert the USB flash drive into the camera type-c port, select the data to be copied in psdk, and click "copy data to USB flash drive".



12. Clear data

Select the data to be emptied in psdk, click "Empty Data", and click OK again after the prompt box pops up.



It is recommended that the data be copied out after each flight and cleared before the next departure.

13. How to maintain a hyperspectral camera?

Hyperspectral camera is a precision optical equipment, do a good job of daily maintenance, in order to continue to protect the quality of data, effectively extend the life cycle of equipment. 6 Important maintenance points are summarized below

1. **Camera surface cleaning**

When the camera window appears dust, water stains, oil stains and other dirt, you can use the camera matching dust-free cloth to wipe, at the same time can be sprayed with anhydrous ethanol to remove stubborn stains. If hard objects (such as gravel and glass chips) are

attached to the window, they should be blown off with air before wiping to avoid scratching the camera window.





2. **Camera storage device maintenance**

Different models of multispectral cameras come standard with external storage devices such as TF cards, high-speed U disks, CF cards, etc. Frequent reading and writing will lead to an increase in storage bad blocks and a decrease in reading and writing speed, resulting in image loss. This is an inherent property of memory cards and is not a quality problem. Regular low-speed formatting, reducing storage device cyclic overwrite writes, etc,Can relatively extend the service life;

Avoid in the camera power state or data copy process, do not directly plug the memory card, otherwise it may lead to data loss. At the same time, it should be avoided to directly process data in the storage medium supporting the camera, even when ordinary USB flash drives or mobile hard drives are used daily, this will accelerate the aging of the storage device,And not within the scope of the warranty. Formatting a memory card Camera storage device maintenance

3. **Camera storage environment**

The multi-spectral camera shall be stored in the packing box under the conditions of temperature -20 °C ~ +55 °C and humidity 20% ~ 80% (non-condensing), and can be stored in a constant temperature and humidity cabinet if conditions permit, so as to avoid internal failure caused by high and low temperature and water vapor.

Friendly reminder:

If you encounter any problems such as testing, repair, maintenance and replacement of accessories, you cannot return to the factory by yourself. Please contact the market sales people in various regions of color spectrum technology.