BOYING

Ground Station User Manual V3.6.4

2022.09

CATALOGUE

Use Attention

The user accepts this statement by using the PALADIN Android mobile phone ground station.

Please read this manual carefully before using the mobile phone ground station. If you have any questions, please contact us.

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If users have any questions about this manual or PALADIN products, please call: 15011162722 or send E-mail: sunlifeng@byaero.com, or visit our website: www.byaero.com, we will solve your problems as soon as possible!

Manual Navigation

Common symbols：

💡 An explanation of a problem or phenomenon, or a link to other content related to it

🔴 Some problems or phenomena that require special attention

APP Brief Introduction

Function Introduction

Boying mobile ground station is a mobile APP that integrates functions such as flight debugging, calibration, parameter adjustment, route planning, and status monitoring.It can intuitively display the position, altitude, speed, flow and other diversified data collected by the UAV flight control system on the screen, and can also directly upload the customized flight mission data to the flight control system to realize the direct interaction effect with the flight control;at the same time, it supports users to register and log in, and cooperate with Boying big data platform to view and count job data and information.

The ground station APP is the link and bridge connecting the flight control, big data platform and various peripherals.It is a public platform for the concrete display of abstract systems, and it is also the most effective and direct channel and carrier for evaluating the operating status of the overall system.At present, the ground station system is still developing in the general direction of clear logic, simple operation, specific functions, humanized interaction, stability and reliability, and plays a pivotal role in the execution of flight missions.

Use Environment

It is recommended to use mobile phone Android version 7.0 and above

Corollary Equipment

Handheld mapping box, data transmission—Bluetooth relay, OTG data transmission, data transmission—Bluetooth module, Yunzhuo remote control, Siyi remote control, RTK base station, RTK surveying and mapping station,Siyi remote control & GPS dotting module, remote control surveying and mapping equipment integrated with Qianxun module, Beidou companion and other surveying and mapping equipment.

Matching Method

Turn on the Bluetooth function of the mobile phone. When the flight control is powered on, turn on the Bluetooth connection device switch, search the corresponding device name on the mobile phone and pair it. The pairing password is "1234" by default.

Registration and Login

Click register on the login page to enter the registration channel.The app provides the registration function of plant protection team and pilots. The user fills in the necessary information and can log in after successful registration.
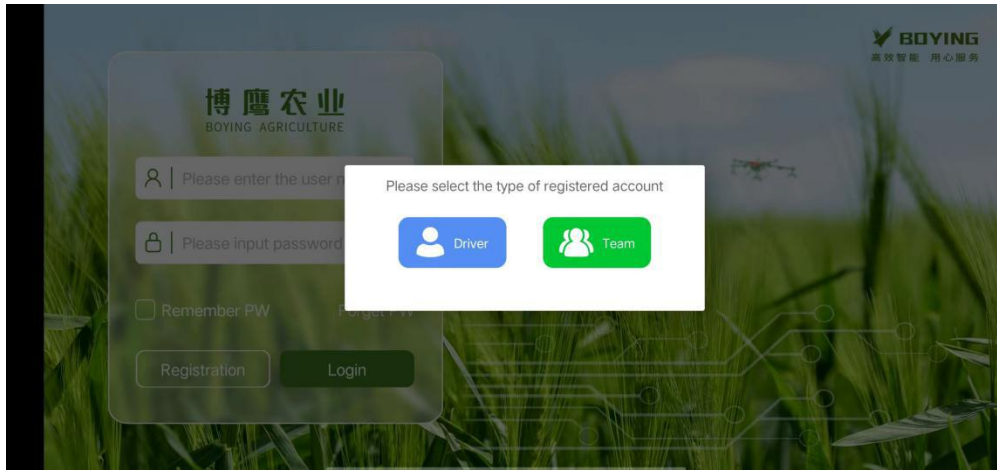

Fig. 1 registering an account

If you forget your password, you can click forget password and input the registered mobile phone number / email to retrieve it.
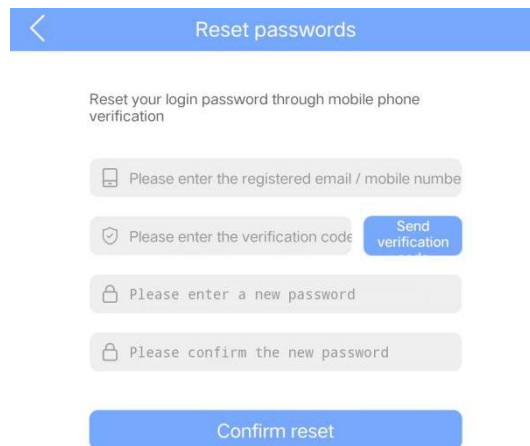

Fig. 2 reset password

Connect the Device

Mode Selection

After logging in to the APP, you need to select the operation mode, which is divided into spraying mode and sowing mode.
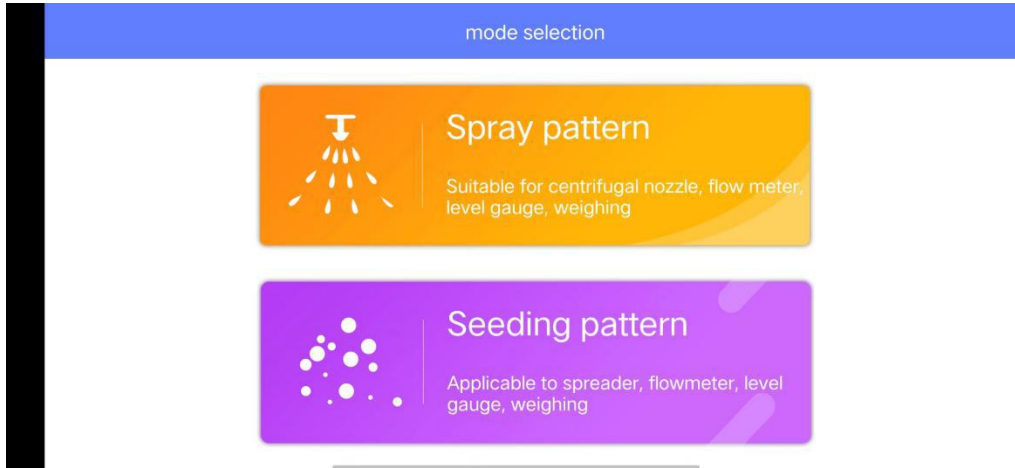
Fig. 3 mode selection page

Connection device type

After entering the corresponding operation mode, click the unconnected part of the main interface, the connection page will pop up, and categorize each device, mainly divided into four categories: UAV, RTK surveying and mapping, single-point surveying and mapping, and RTK equipment. The user can select the device connection as needed.When connecting the drone, you need to select the connection method, and you can select the device type for other devices.

Fig. 4 connection options

Interface Introduction

The interface connecting the UAV is as follows：

Fig. 5 main interface
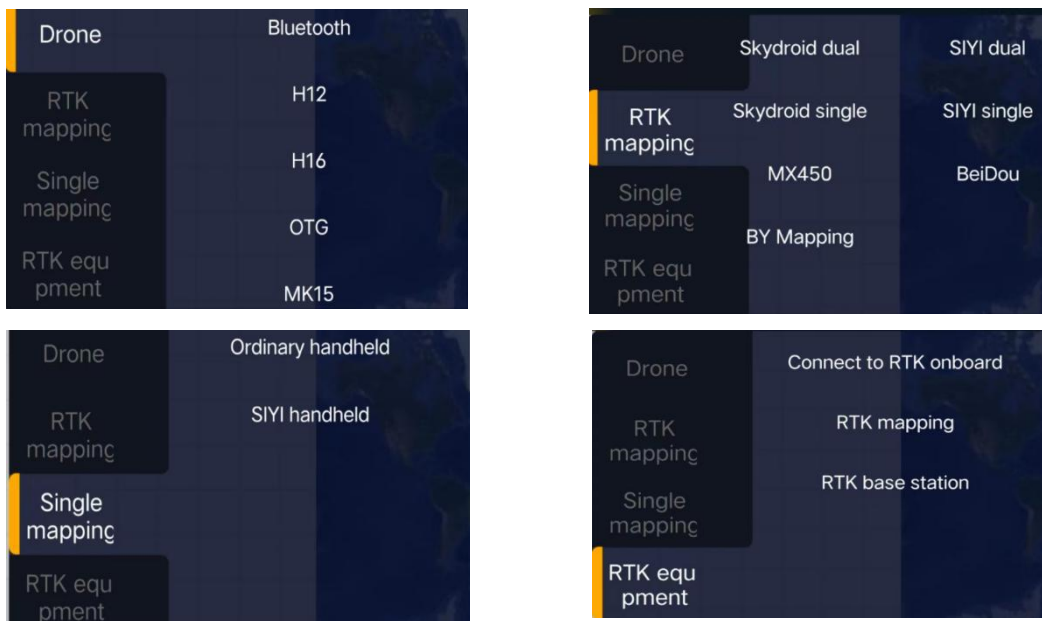
Figure 5 shows the display page after connecting flight control in spraying mode. Slide up or click the auxiliary data display area to display the user-defined data display setting page. Users can open the data types to be displayed according to their own usage habits, and can display up to 6 items.Click the flight mode area in the upper left corner to pop up the prompt of disconnection.Click the speed, radar height, and operation data area to set parameters such as AB point speed, mu consumption, centrifugal, turning mode, etc.If the user is using a smart battery, the power will be displayed as a percentage. Clicking the power percentage area will pop up a smart battery information display box.
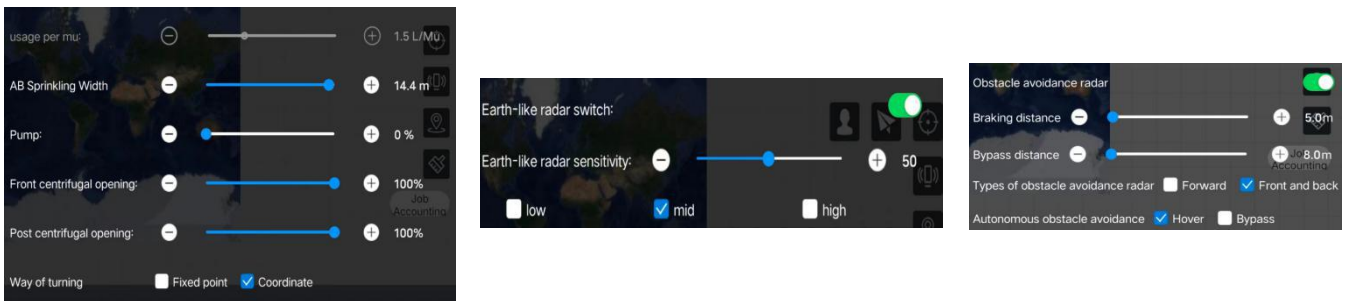

Fig. 6 common parameter settings

During the adjustment of operation parameters, the flow rate control or flow control switch needs to be turned on on the setting page to adjust the consumption parameters. Different operation modes have different adjustment ranges of per mu

dosage; To adjust the opening of the water pump, you need to turn off the spraying with speed function on the setting page.

Click the obstacle avoidance radar function button to adjust the parameters in real time in the pop-up options.By setting the parameters of braking distance, users can set the distance between obstacle avoidance and obstacles after braking according to the different weight and wheelbase of the drone, which further improves the safety of obstacle avoidance operation; At the same time, front obstacle avoidance radar or front and rear obstacle avoidance radar can be selected according to the actual installation situation.

Click the video window switch button on the main page to quickly open or close the video window; at the same time, you can also click the video window area to switch between the map and the video window.

When the sensor and peripherals are abnormal, the corresponding fault icon will be displayed in the upper left corner of the interface. Turn on the contactor on the settings page to display the status of the open contactor. The following are the faulty sensor icons and explanations that may appear at the top of the main page:
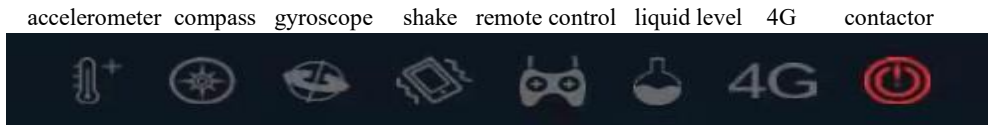
accelerometer compass gyroscope shake remote control liquid level 4G contactor

Fig. 7 fault Icon

Description of 4G indication status at the ground station:

Take Off			Not Take Off		
4G	Gray long light	Not connected to 4G	4G	Gray long light	Not connected to 4G
4G	Yellow long light	Network is abnormal	4G	Yellow long light	Network is abnormal
4G	Green flashing	Network is normal,sending cache	4G	Green flashing	Network is normal,sending cache
4G	No display	Network is abnormal	4G	No display	Network is abnormal and the cache is not sent

💡 This indication status is only applicable to ground station V3.6.3 and 4G firmware version 3803 and above.

💡 The red icon of contactor indicates disconnection and green indicates pull in

Surveying and Mapping Points

Click the dotting button on the main interface and select the corresponding surveying and mapping point taking method to enter the plot name input interface. The user can also cancel the input and directly enter the surveying and mapping point taking interface. After the point taking is completed, name the plot.If the drone is selected to take points, you can enter the dot page only when the GPS positioning is in good condition.If the drone is selected to take points, you can enter the dot page only when the GPS positioning is in good condition.
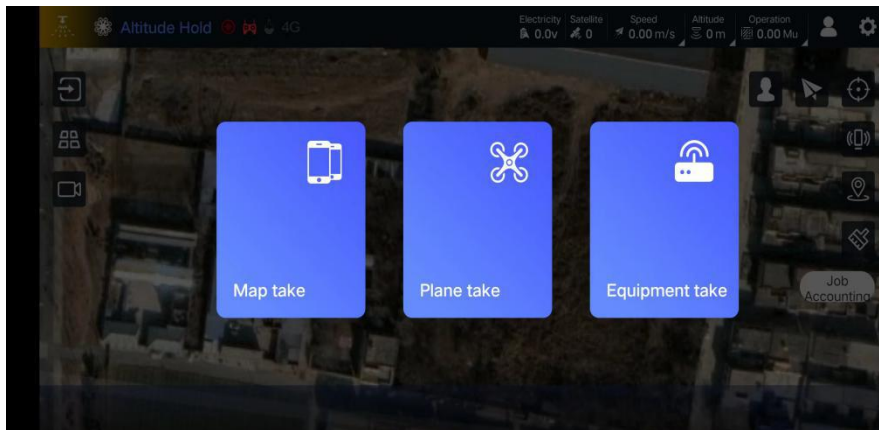

Fig. 8 point type

During the process of surveying and drawing points, different point types can be switched arbitrarily.The point type is divided into: area point, obstacle point, waypoint. The obstacle area includes two types: polygonal obstacle area and circular obstacle area, and the type of obstacle area can be selected according to the needs.Currently, a maximum of 128 work area points and a maximum of 10 obstacle area points are supported, and there is no limit to the number of obstacle areas.
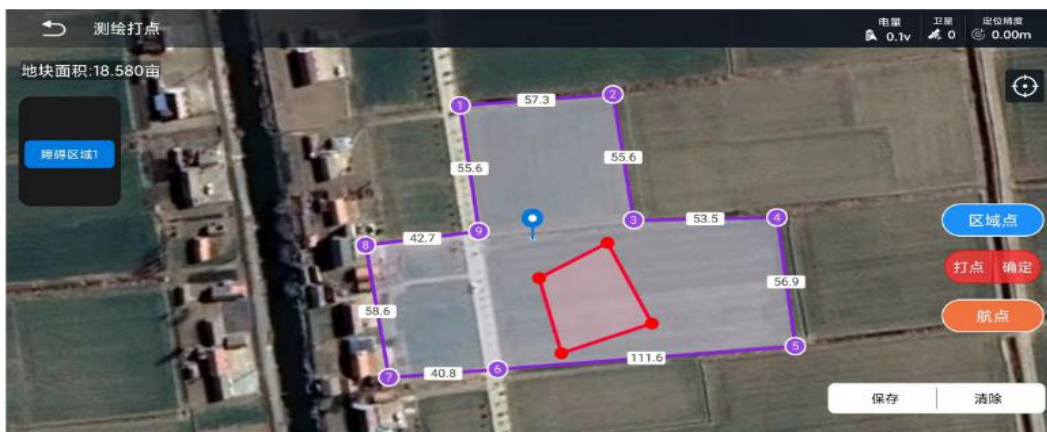

Fig. 9 surveying and mapping points

💡 The maximum number of area points supported is 128, which needs to be used with firmware V3.5.1 and above.

💡 If the firmware version is lower than V3.5.1 and the number of area points is greater than 32, the route will not be uploaded.

Obstacle point exchange function, which can adjust the polygon obstacle area. After selecting the obstacle area, click one of the obstacle points to be exchanged, and then select another point to be exchanged in the pop-up window to exchange.
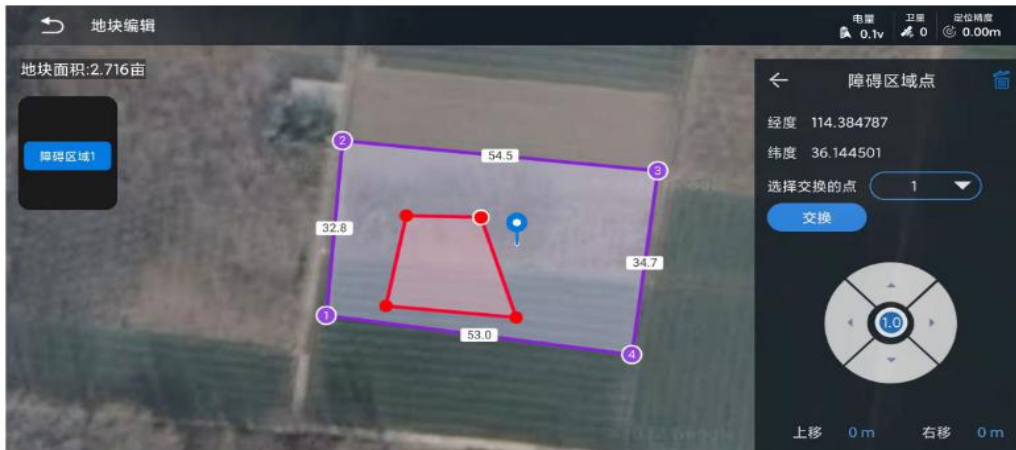

Fig. 10 barrier point exchange

If you directly surveying and mapping waypoints, you need to set the work area in advance and set the waypoints in the work area.When adding a waypoint, the actual altitude of the waypoint will be added at the same time. Users using fruit tree mode need to add the waypoint with RTK surveying and mapping equipment. The altitude of the waypoint is the altitude when the RTK equipment takes the point.

Fig. 11 taking points of fruit trees

The altitude value can be changed, and the altitude of the waypoint takes effect only when the route planning is switched to fruit tree mode.Since there is a large error between the altitude data taken by non-RTK devices and the actual altitude, users who do not use RTK surveying and mapping devices and need to use the fruit tree mode should use it with caution.Users who use the fruit tree mode must ensure the accuracy

of the waypoint altitude data to avoid dangerous operations; users who do not operate in the fruit tree mode do not need to pay attention to the waypoint altitude data.

💡Fruit tree mode requires a separate flight control firmware, if you need to use related functions, please contact technical support personnel

Plot Function

Plot Sharing

Boying provides users with two land plot directories, local and cloud.Boying provides users with two land plot directories, local and cloud. The land is preferentially saved to the local directory. Users can customize the upload to the cloud directory by clicking the upload button, and share it with all users under the same plant protection company.The content of the cloud plot list is consistent with the web version plot management information.At the same time, you can directly delete the plot files in the local directory. Swipe left on the file, and upload, edit, delete plot buttons will appear.

The plot sharing function can share the same plot between different accounts. Switch to the cloud tab, click the share button, enter the account and mobile phone number of the pilot or plant protection team to be shared, and the plot can be shared. The shared person can see the plot in the cloud data under the current account:
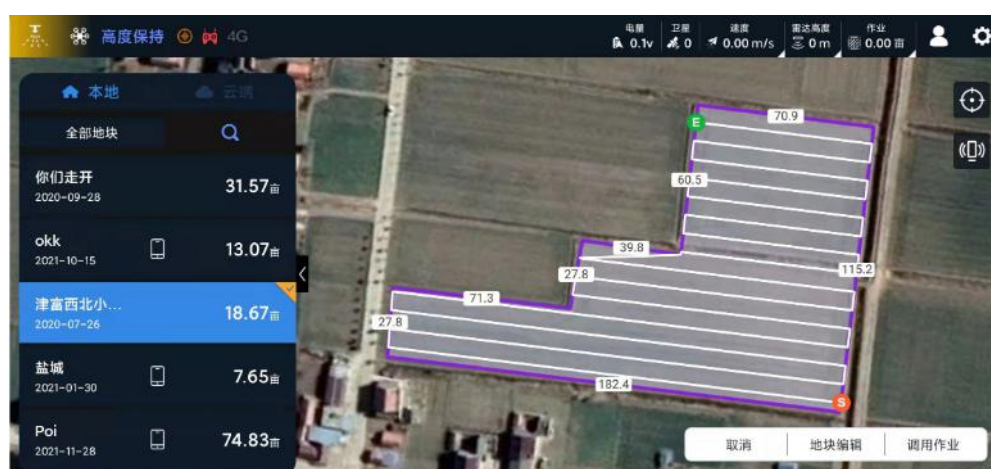
Fig, 12 plot sharing

Nearby Plots

The function of nearby plots needs to be switched to the cloud directory for use.After opening the cloud directory, click the plot sharing function button to turn blue, indicating that plot sharing is turned on, and the search range of plots is the plots uploaded to the cloud by all users;the gray status indicates that plot sharing is closed, and the search scope will be limited to the plots uploaded by the plant protection company. The search area for nearby plots is a 5km radius circular area centered on the current equipment.

When in use, switch to nearby plots in the cloud directory, and the system will automatically search and filter out qualified plots, which will be displayed in the form of 5 plots on a single page. In addition, five plots of the current page can be viewed simultaneously on the map. Users can click any displayed plot area on the map, and the system will automatically switch to the plot.
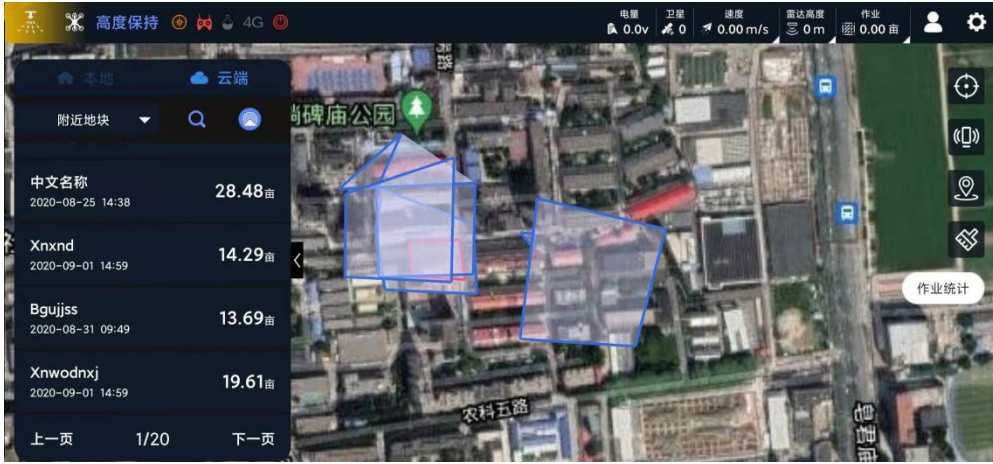

Fig. 13 nearby plots

Surveying and Mapping Type

Users can distinguish the surveying and mapping types of plots through plot identification. There are three surveying and mapping types：

 Equipment point taking   Airplane point taking   Screen point taking

Plot Preview

This function greatly facilitates users to find plots. Entering keywords in the search box can search and locate plots that meet the search conditions and display pictures. It supports fuzzy search and positioning:
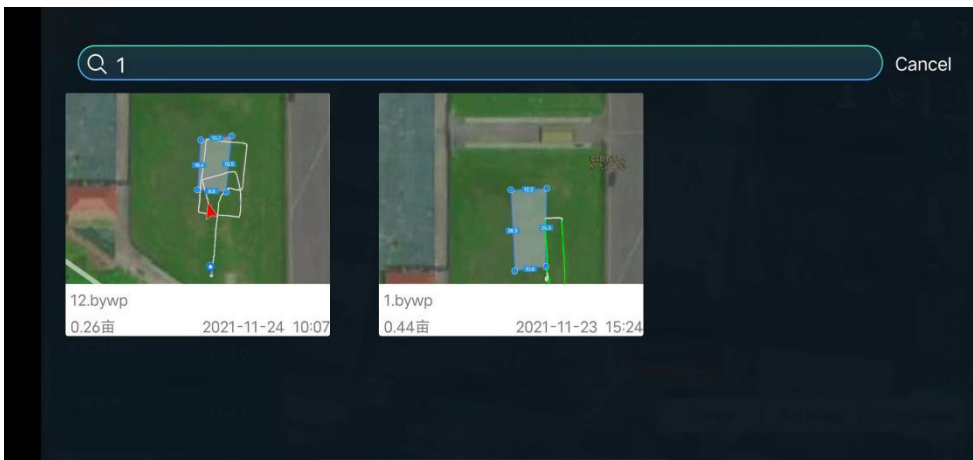

Fig. 14 plot preview

Plot Editing

After opening the plot list, click the plot editing button to enter the plot editing page, which is consistent with the surveying and mapping points page. You can add, delete, and move points in the work area and any obstacle area. The left side of the page is Obstacle area selection, the user can edit the specified obstacle area by selecting:
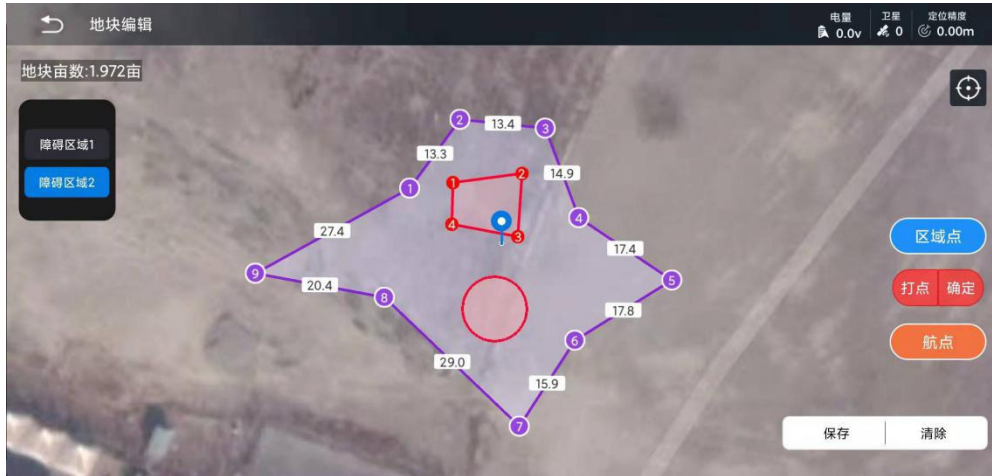

Fig. 15 plot editing

In the process of editing a plot, when you need to add a new area point between two area points, you can use the function of inserting area points.First select an area point, confirm the location of the area point to be inserted, and then click the insert button to add a new area point before the selected area point, and synchronously update the number of all area points without changing the mapped area points.
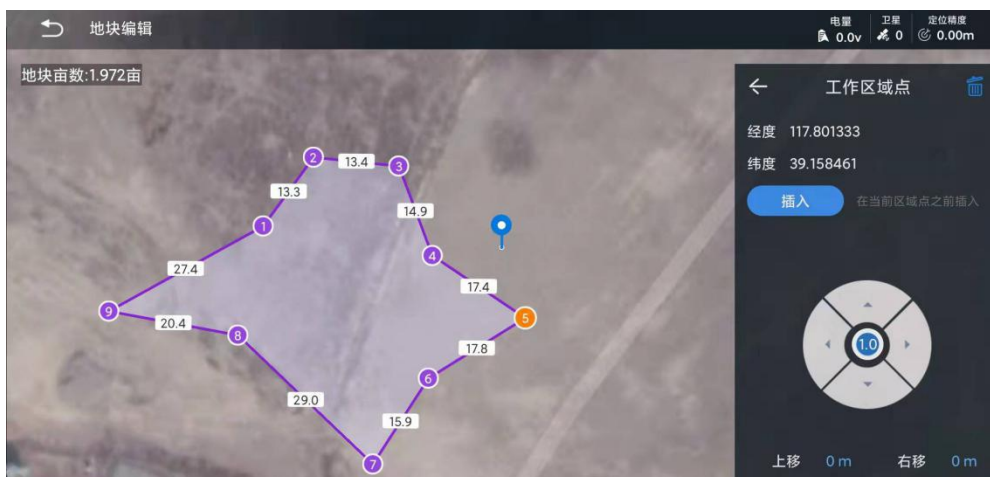

Fig. 16 selecting the insertion point

As shown in the figure above, select the area point 5, and choose the position of the insertion point.
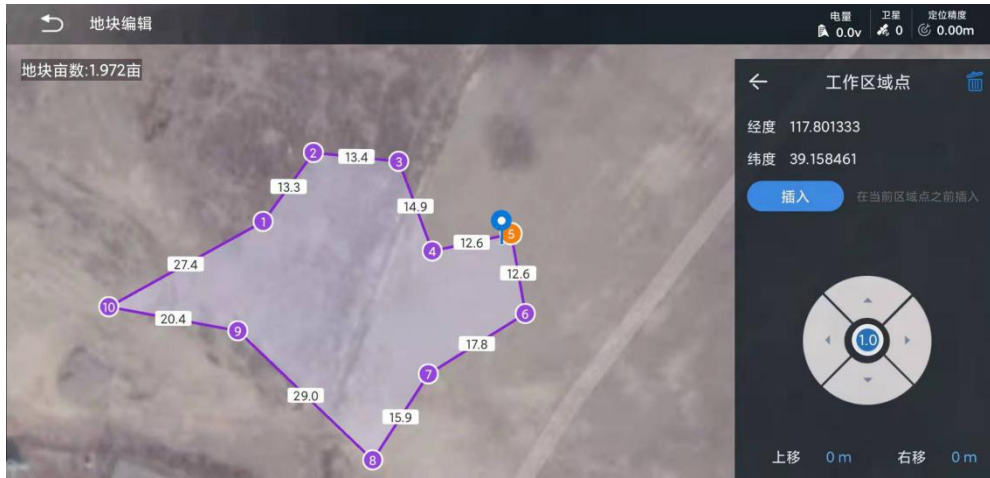

Fig. 17 inserting area points

After clicking insert, a new area point will be inserted before the original 5 points, and the position of the previous surveying and mapping points will not change, and the number will be automatically updated.

Route Planning

Plot Planning

Select any plot in the plot list and click the call operation button in the lower right corner to enter the route planning page. S is the starting point and E is the ending point, as shown in the following figure:

Fig. 18 route planning

Confirm heading angle: select a boundary, and the heading angle will be consistent with the selected boundary;

Confirm starting point: when changing the starting point, you can click the reverse button above to realize it;

Work area contraction / obstacle area expansion: fine tune the work area and obstacle area by selecting work area contraction and obstacle area expansion. The maximum adjustment range is 15m. Work area contraction can be unilateral contraction;

Route correction: correcting the planned route can minimize the positioning error during surveying and mapping the plot and greatly facilitate the operation of users.The use method is: after the route planning is completed, place the drone in the calibration position, click route correction, the whole area and route will be translated to the position where the positioning point based on the drone is the first waypoint, and then click start operation to upload the route to flight control.

💡 The route correction distance must not exceed 10 meters

When the planned route of the local plot is uploaded to the flight control, the plot in the plot list will automatically become the plot with added route, and will be automatically uploaded to the cloud. After replanning and uploading again, the planning style of the old plot will be overwritten by the new plan.
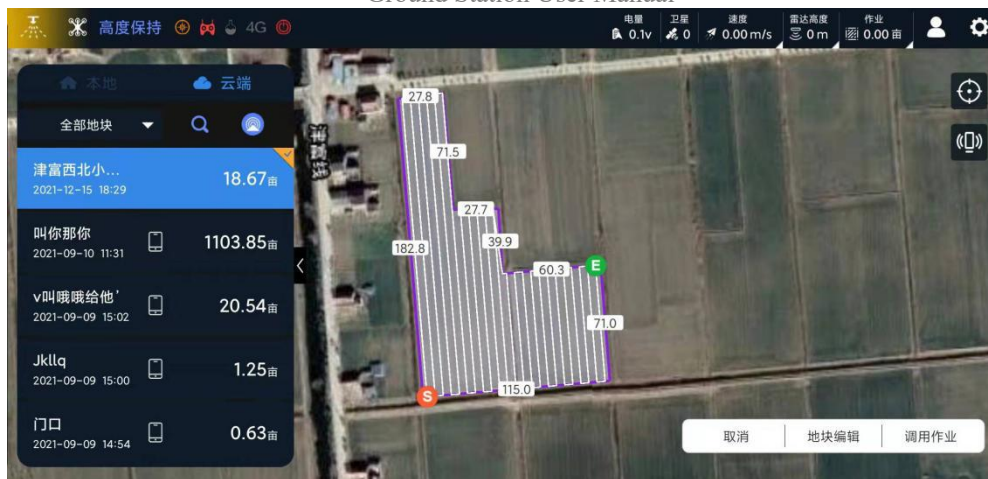
Fig. 19 plot generation route style

If you choose not to re-plan when you recall the route, after entering the route planning page, except that you can change the flight speed, other planning parameters are invalid.
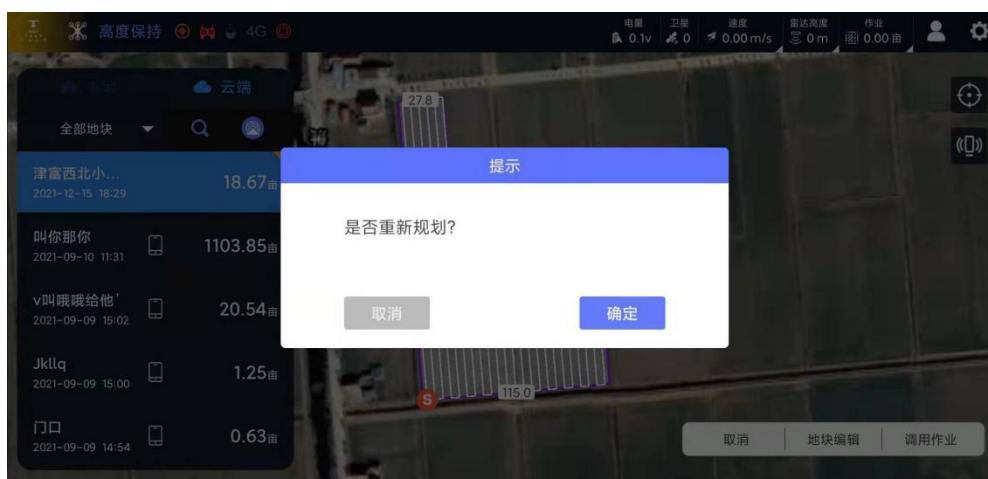

Fig. 20 recall job

Edge Sweeping Mode

After selecting the edge sweeping mode, you can set the number of turns of the edge sweeping flight operation. At the same time, you can also retract the edge sweeping route as a whole or unilaterally, and you can also set the flight speed, spray amplitude and other parameters. The adjustment mode of all flight parameters is the same as that of conventional route operation. When entering the edge sweeping mode, the heading defaults to pointing to the next waypoint.

Fig. 21 edge sweeping mode

Fruit Tree Model

Select the fruit tree waypoints and plots for the surveying and mapping, call the job, cancel the re-planning, enter the route planning page and select the fruit tree mode.Users need to read several precautions for fruit tree mode, and then can set the function of fruit tree mode:

Speed: The speed adjustment of the route in the fruit tree mode;

Height increment: In fruit tree mode, the distance from the altitude of all fruit tree waypoints to the actual working altitude, this parameter can be used to adjust the safe height of the drone from the crops during actual operation;

Waypoint action: the waypoint action can be uniformly set to hover, spin or circle. When the spraying mode is selected as waypoint mode, the setting can be enabled; Hover can set hover spraying time; Spin and circle can set the number of rotations; Circling radius can be set in circle;

Spraying mode: it is the waypoint mode or route mode. The waypoint mode only sprays at the waypoint, and the route mode is the whole process spraying;

Height changing mode: it can be set as slope or fixed point. The slope mode is that the height changes synchronously with the position; The fixed point changes the height and position asynchronously and sequentially. Users need to flexibly select the height change mode according to the difference of terrain to prevent accidents.

The following are some important parameter settings of fruit tree mode:

Fig. 22 waypoint action

Fig. 23 height changing mode

Fig. 24 spraying method

No matter which of the above operation modes, you need to click the start operation button after planning the route, confirm the start and end points of the work area, and upload the route to the flight controller.

💡 Fruit tree mode requires special firmware support. If you need to use RTK surveying and mapping equipment to take points for fruit tree and operate, please contact technical support for help

APP Setting

Agricultural Setting

Users are advised to adjust parameters according to actual needs

Common settings: application pesticide medium, return altitude increment, return speed, motor idle speed, execution action, manual obstacle avoidance,optimal path, estimated breakpoint, and pointing to the next waypoint

AB point parameter setting: manual AB point, AB-T

Position hold mode: speed limit, speed response, brake response

Autonomous operation: autonomous take-off altitude, autonomous route speed response coefficient

Flowmeter: measurement coefficient, proportional coefficient, integral coefficient, protection switch, flow rate control, quantity

Liquid level gauge: protection switch, protection action, type options

Load cell: protection switch, protection setting value, flow control, overweight unlocking check, overweight setting value, proportional coefficient, integral coefficient

Pump (spraying mode) / spreader (sowing mode):spray/sow with speed, switch off the water pump/discharge port, front and rear water pumps, flight control port (PORT1-2), expansion dock port (PORT1-4), minimum flow rate / flow, maximum flow rate / flow, centrifugal / spinner advance opening time, centrifugal / spinner delay closing time, water pump / discharge port speed adjustment range, drone speed range

💡 The red font indicates the parameter name displayed when advanced settings are enabled

Port customization can facilitate users to flexibly configure the pre-implemented functions after the water pump, centrifugal nozzle, spreader valve (discharge port), spreader, and signal line of the agitator are connected to the flight control and expansion dock.The APP supports setting six ports of flight control port (PORT1/2) and docking port (PORT1-4). Flight control port PORT1/2 corresponds to the main control NOZ/PUMP (PORT1/2) (short/long) interface respectively. Port1-4 of expansion dock corresponds to Port1-4 (nozzle 1/nozzle 2, water pump 1/water pump 2) interface of standard expansion dock.You can connect the signal lines of water pump, centrifuge, sowing, and spinner to any port as needed, and use the APP to give the port name and function.

In the spray mode, the ports can be freely selected from the front water pump, the rear water pump, the front centrifugal, the rear centrifugal, and the agitator.For example, in spray mode, the user connects the front and rear water pumps to the ports

of the flight control PORT2 (PUMP) and the docking station PORT3 (water pump 1) respectively, and the front and rear centrifugal nozzles are respectively connected to the flight control PORT1 (NOZ) and the docking station PORT4 (water pump 2) interface.Which can define flight control PORT2 as the front water pump, expansion dock PORT3 as the rear water pump, flight control PORT1 as the front centrifugal, and docking station PORT4 as the rear centrifugal.

In the seed mode, the port can be selected from the discharge port, the spinner, and the agitator. According to actual needs, the user can connect the valve of the discharge port and the spinner to any of the 2 ports. For example, connect the discharge port valve to the flight control PORT1 and set it as the discharge port, and connect the spinner to the expansion dock PORT2 and set it as the spinner to realize the function.

💡 In the spray mode, the ports set as the discharge port and the spinner will be invalid; in the seed mode, the ports set as the water pump and the centrifugal will be invalid; the ports set as the agitator are valid in both modes

The spraying medium function is mainly used to save the calibration results of the flowmeter or spreader for a specific spraying medium, so that the user can directly select the name of the saved medium before the operation or when changing the spraying medium, and automatically write the calibration result, so as to avoid the operation steps of recalibration.

When there is no application pesticide medium option, in spraying mode, change the flowmeter - measurement coefficient, pump parameter settings - maximum flow rate,and in the sowing mode, change the spreader - maximum flow to create a new spraying medium. After naming the application medium, the corresponding calibration results can be saved
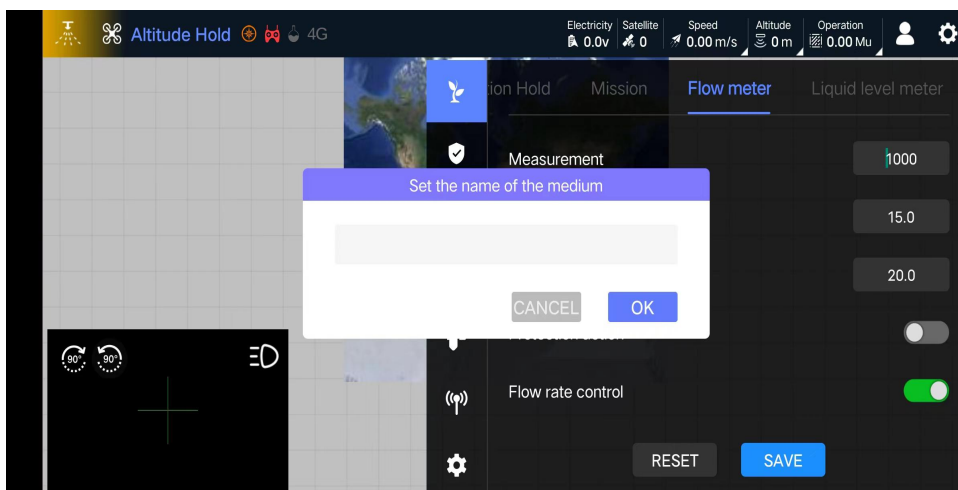

Fig. 25 naming of application pesticide medium

In spraying mode, after calibrating the flowmeter, a pop-up window for creating a new medium will also appear, which can be directly named and the calibration result saved.The user can also directly delete the currently selected spraying medium parameters.The spraying medium only displays the parameters saved in the current

operation mode, and the spraying mode and the sowing mode are independent of each other.

💡 When the same name of the application pesticide medium appears, the file named later will overwrite the original application pesticide medium
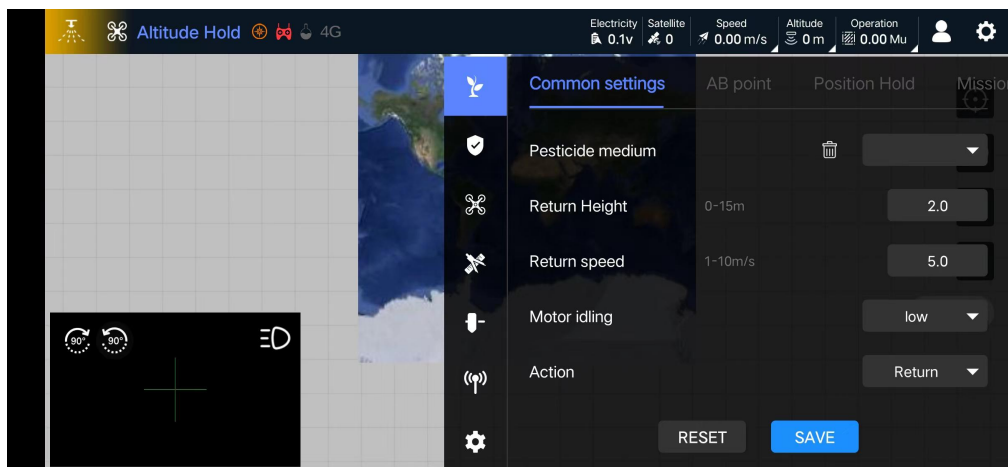

Fig. 26 application pesticide medium parameters

The estimated breakpoint function can intelligently display the estimated breakpoint position, reminding the user to switch the flight mode in advance according to the situation, interrupt the current task and continue the battery life, so as to improve the operation efficiency. Before using this function, the following conditions need to be met:

1. The ground station version is V3.6.1 and above, and the flight control firmware is V3.7 and above;

2. Enable ground station agricultural settings - common settings - function switch of estimated breakpoint;

3. Turn on the closed-loop control, that is, turn on the flowmeter - flow rate control in the spraying mode, and turn on the load cell - flow control in the seeding mode, and set the operating parameters such as the amount per mu, speed, and spray width;

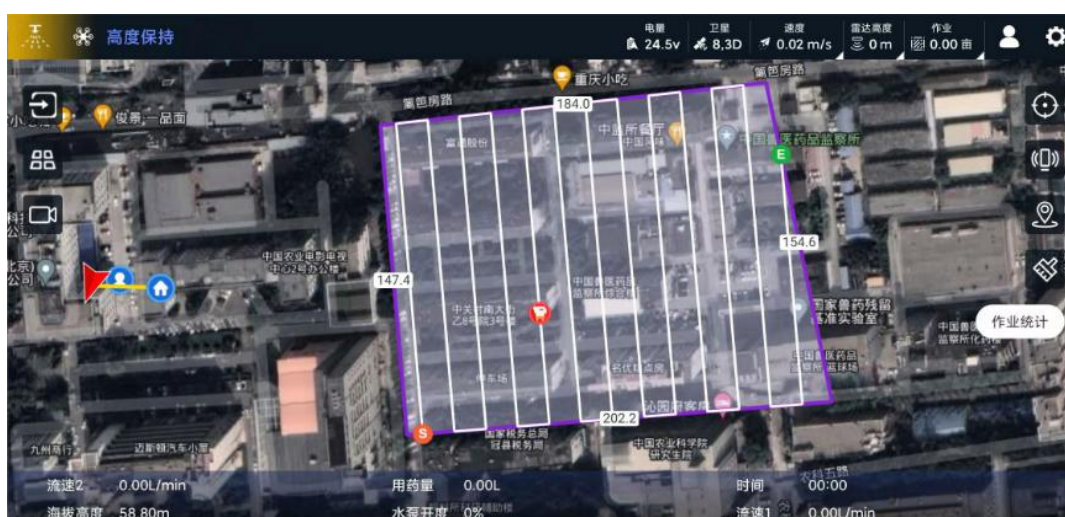4. Use a load cell and measure the quality of the working medium in the medicine/material tank.

Fig. 27 estimated breakpoint

💡 In spraying mode, if the spraying medium is not 1L-1kg, the estimated position may deviate

Turn on the estimated breakpoint, fill the medicine/material barrel with medium, and weigh the quality. After uploading the planned route, the location of the estimated breakpoint will be automatically prompted on the route and updated in real time. The user can refer to the position of the breakpoint automatically estimated by the system to determine the timing of the interruption of the operation, so as to reduce the frequency of the empty or fully loaded route transfer and shorten the invalid operation time.

The optimal path function can reverse the operation route with breakpoints, realize the exchange of the starting point of the remote end and the end point of the near end, so as to achieve the function of working at the nearest point. Optimal path is

another way to reduce unloaded or fully loaded long distance transfers and improve operational efficiency.

Before using this function, you need to upgrade the ground station to V3.6.1 and above, and enable the agricultural settings - the switch of the optimal path in the common settings.
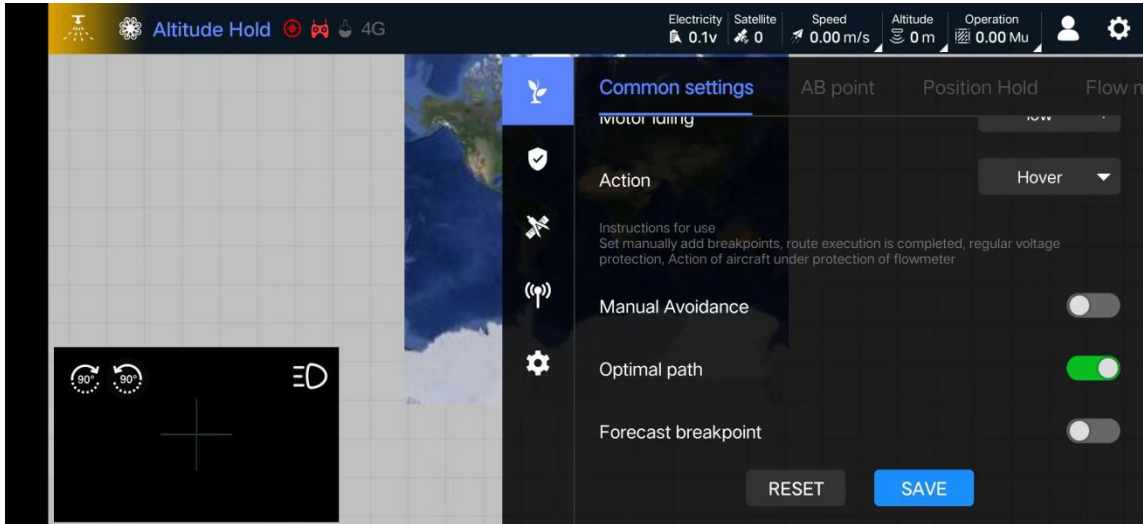

Figure 28 Optimal path switch

During the operation, there is a breakpoint in the route, and the drone will land and lock after returning home. At this time, the system will determine whether to prompt the use of the optimal route according to the position of the breakpoint.When the user is prompted and confirmed, the system will re-plan the original route and prompt the user to confirm whether to upload the new route. After the user confirms again, the route will be uploaded and the optimal route will take effect.The following figure shows the state before the route breakpoint is generated and the optimal route is used:
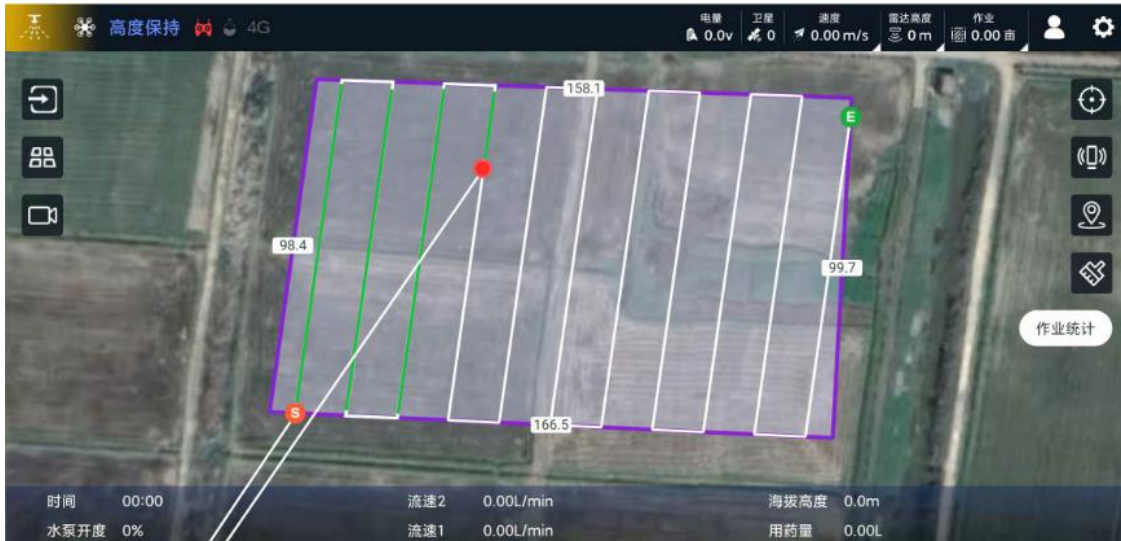

Fig. 29 before using the optimal path

The drone is locked when landing, prompting whether to use the optimal route, the user confirms again, and the status after the route is uploaded and the original track is cleared is shown in the figure below:
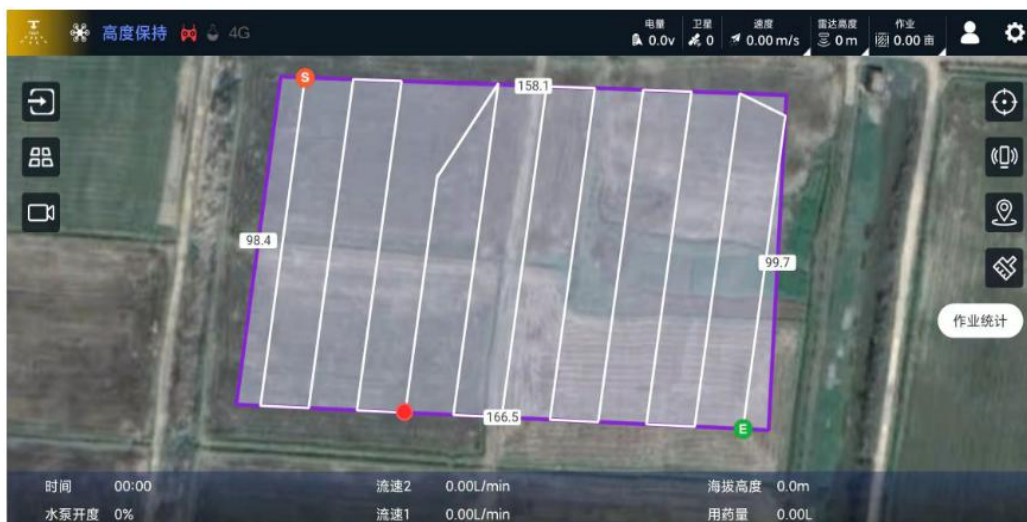

Fig. 30 after using the optimal path

Through the route adjustment, the original breakpoint position (the starting point of endurance sortie) is adjusted to the nearest plot boundary. For long routes, the time for full-load transfer will be greatly saved.

💡 The prompt of the optimal path will only pop up after a breakpoint is generated and the drone is locked after landing

💡 The optimal path function does not apply to plot routes with obstacles

💡 If the user confirms to use the optimal route but cancels the upload, the route will be reset to the original state

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In the seed mode, the port can be selected from the discharge port, the spinner, and the agitator. According to actual needs, the user can connect the valve of the discharge port and the spinner to any of the 2 ports. For example, connect the discharge port valve to the flight control PORT1 and set it as the discharge port, and connect the spinner to the expansion dock PORT2 and set it as the spinner to realize the function.

💡 In the spray mode, the ports set as the discharge port and the spinner will be invalid; in the seed mode, the ports set as the water pump and the centrifugal will be invalid; the ports set as the agitator are valid in both modes
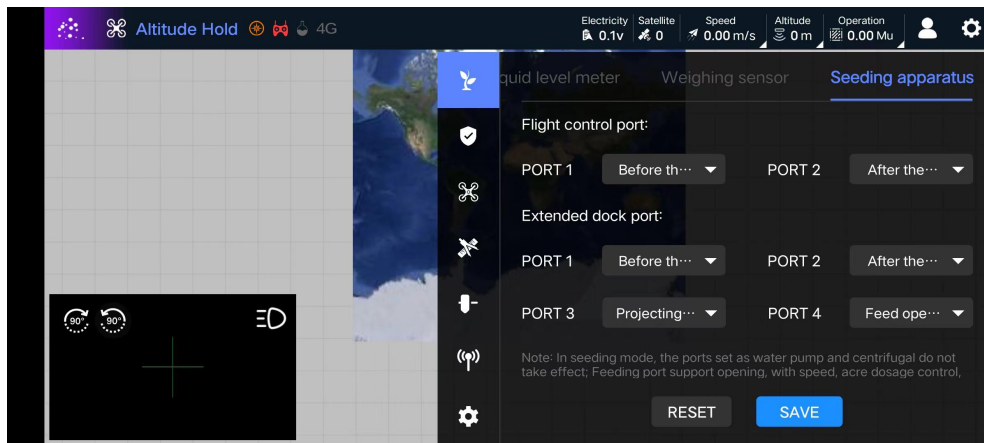
Fig. 31 custom port settings

In the spraying mode, turn on the flow rate control button under the flowmeter to realize the control of the amount per mu; in the sowing mode, open the flow control under the weighing to realize the control of the amount per mu.

💡 Port definition name: front water pump, rear water pump (spray) and discharge port (seed) support opening and spray with speed functions;Port definition name front centrifuge, rear centrifuge, spinner and agitator only support opening control. When assigning port functions, please select according to actual needs

Security Setting

Battery

Using smart batteries, the voltage and electric quantity alarm thresholds set by the ground station will be enabled at the same time, and the corresponding alarm actions will be executed in the order of electric quantity or voltage alarm triggering.The low voltage alarm battery type is the setting for the non-smart battery to correctly trigger the low voltage alarm function. If the non-smart battery is used, such as 13s, 14s, 16S, 18S, 24s, 28s, etc., it needs to be set. It can take effect only after the parameters are written in and the flight control is restarted.

💡 This setting is open to users who use non-smart batteries. Please be sure to set the corresponding parameters, otherwise the voltage alarm function will be abnormal

Flight Restrictions

In the flight restriction function, if the flight restriction is not turned on, the maximum flight altitude of the drone is 30 meters by default. After it is turned on, it is implemented according to the set parameters.
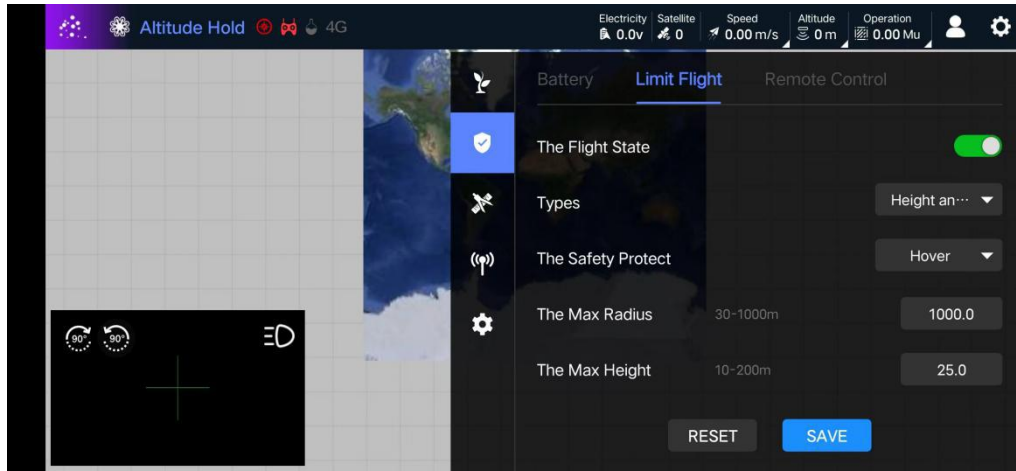
Fig. 32 flight restrictions

A new unlock permission setting has been added to the flight restrictions. When set to "low", the drone can be unlocked when the drone is not in RTK state and the RTK heading is not used; when set to "medium", it is required to enter RTK state before unlocking; when set to "high", the unlocking must meet both the conditions of entering RTK state and normal RTK heading.
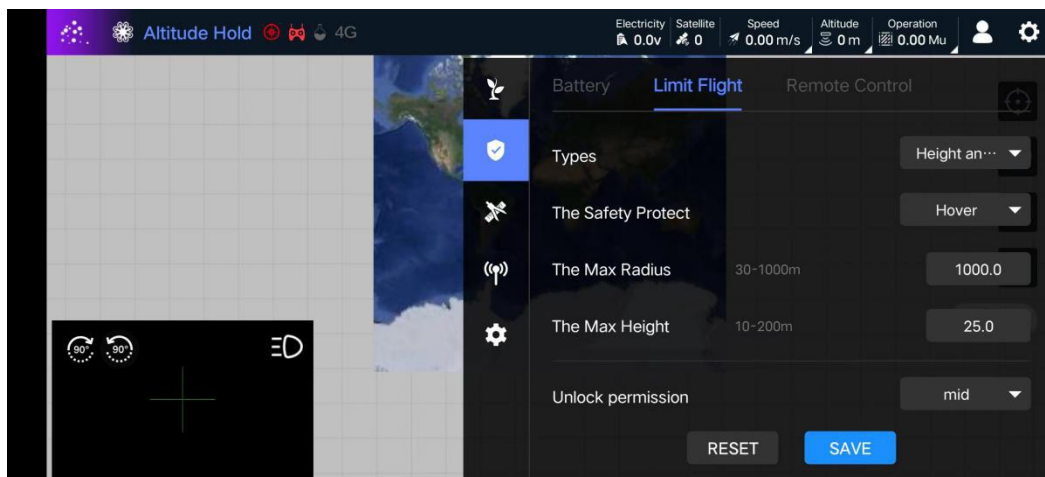

Fig. 33 unlock permissions

Prohibited Flight Area

Meet the operation needs of users in special environment. After the prohibited flight area is successfully created, the prohibited flight area will be updated after it is enabled. After the prohibited flight area is updated, it can be seen on the map. If there are multiple prohibited flight areas, you can see all of them in the area with the drone position as the center and 50km as the radius on the map.

When the drone is in the prohibited flight area, the drone cannot be unlocked; when the drone is outside the prohibited flight area, the drone will enter the hovering state when touching the prohibited flight area.
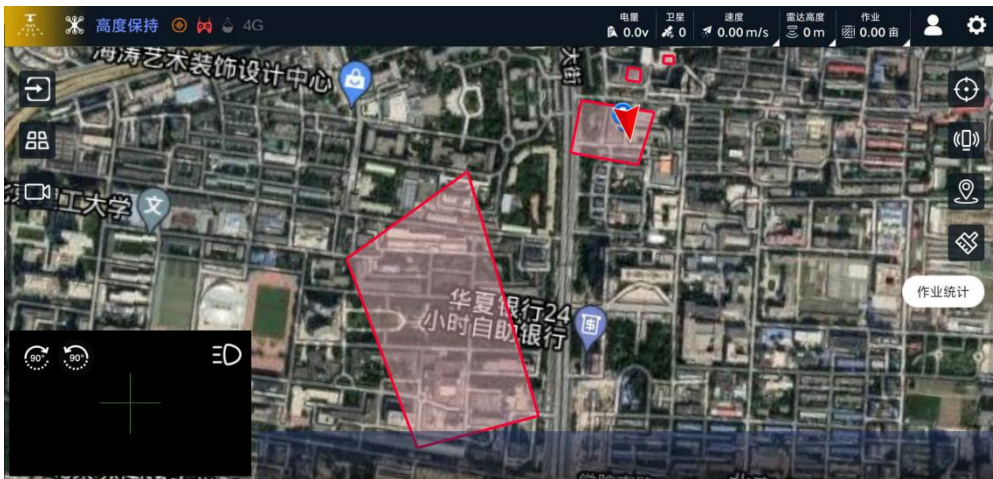
Fig. 34 prohibited flight area

When the prohibited flight area is changed, all devices with the prohibited flight area function enabled will enter the process of updating the prohibited flight area, and the latest prohibited flight area status will be displayed after the update is completed.
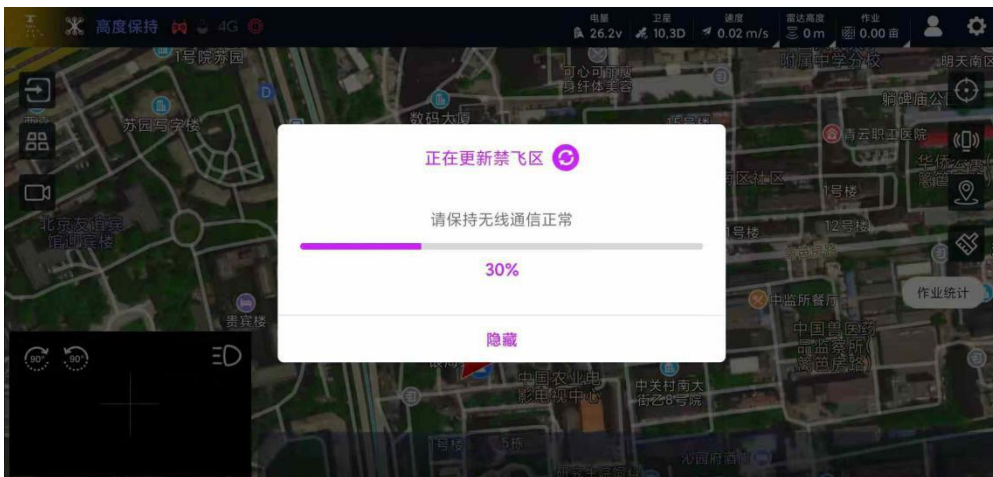

Fig. 35 updating the prohibited flight area

💡 After reaching the prohibited flight zone and entering the hovering state, please switch the mode in time to transfer the drone, otherwise the drone will be forced to land after 20 seconds

💡 To enable the prohibited flight area, you need to enable advanced settings, and it needs to be used with firmware V3.5.1 and above.

💡 Before adding a prohibited flight area, please contact Boying technical service

Rack Setting

Rack Setting

It provides the setting of eleven common rack types and motor test functions. After the rack type is switched, the flight control needs to be restarted.

During the motor test, if the motor does not rotate, you can increase the throttle amount to test.

🔴 Do not use the motor test function without dismantling the paddles

Installation setting

Support the setting of attitude angle, main control installation direction and heading correction.Position correction function for GPS, main control and RTK antenna installation, the unit is m, the accuracy is 0.01, the range is -1—1m.Subject to the body coordinate system, the positive direction is the nose direction (x) and the right side direction of the body (y). The relevant setting parameters need to be checked by opening the advanced setting.
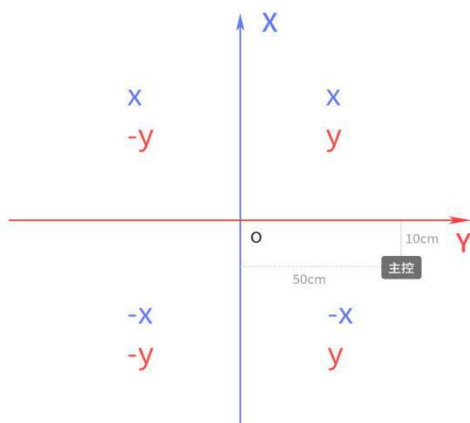
The positive, negative and magnitude of the correction value depends on the relative position of the main control, GPS, RTK positioning antenna (right) to the center of the drone.As shown in the figure on the left, o is the center of the drone, and the correction parameters of the main control should be -0.1m for the X axis and 0.5m for the Y axis.

Calibration Setting

Calibration settings include remote control calibration, accelerometer calibration, level correction, dynamic balance detection, flowmeter calibration, weighing calibration and liquid level calibration.

Remote Control Calibration

In the remote control calibration interface, the user can select and change the operation mode (American hand / Japanese hand), and at the same time can set the flight mode of the 5-channel three-stage gear of the remote control,it supports 3 modes to choose from.Before calibrating the remote control, it is necessary to confirm the

position and stroke amount of each channel. Generally, the stroke of 8 channels needs to be fixed at 1050-1950.Change the control mode (American hand / Japanese hand) through the APP, please confirm whether the firmware of the remote control supports the change before use.

Flowmeter Calibration

Enter the spray mode, click the zero clearing button of the current data of the job statistics on the main page before calibration, reset the current dosage data to zero, fill the medicine box with medicament, and start spraying until all the medicine is sprayed.Then input the accurate volume of the injected medicament and click calibration to complete it.

This version supports the function of radar flowmeter. The calibration method is as follows: make sure that the air in the nozzle is exhausted, and ensure that it is stationary, and click the calibration button after the radar flowmeter.

Weighing Calibration

Click to peel before calibration, then place the weight on the load cell, input the actual weight of the calibrated weight, the unit is kg, and finally click to calibrate. When operation is required, before filling the medicine box or barrel with medium, click peel to remove the quality of the container, and then fill the application medium to start the operation.

💡 The upper limit of the weight of the peeled medicine barrel is + 1kg. The weight of the medicine barrel needs to be accurately input before peeling

💡 The upper limit of the weight of the medicine barrel is: 5kg in spray mode, 7kg in sowing mode

Liquid level calibration

Liquid level calibration is only available for continuous level gauges.First,under agricultural settings —— level gauge, select use continuous level gauge.Then install the liquid level gauge in the medicine box correctly, fill the medicine box with liquid, accurately set and input the medicine box capacity value, save it and click the calibration button after high level calibration to complete the high level calibration.Then empty the medicine box, click the calibration after the low level calibration, and the calibration of the continuous level gauge is completed.
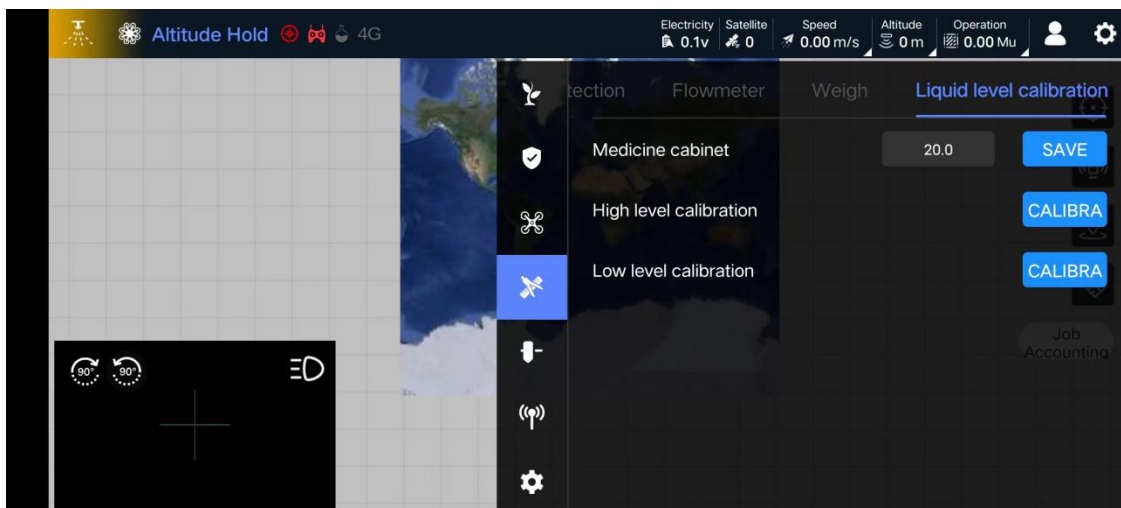
Fig. 36 liquid level calibration

💡 Weighing calibration and level calibration need to open advanced settings

Control Sensitivity

Support roll, pitch, heading, altitude, throttle, remote control and other sensitivity adjustment.

💡 This function is suitable for users who are familiar with flight control sensitivity parameters. Novice users are requested to adjust and use it under the guidance of technical support

💡 Added sensitivity selection, which can directly affect the flight feel, please set as needed

RTK Setting

RTK account query and writing functions are added to the RTK information page, as well as the settings of network version RTK board card, base station, surveying and mapping station, Beidou companion, etc.

Users who use the network version of RTK for the first time, after correctly connecting the drone with 4G module, can directly enter the RTK account writing page and input the RTK account and key. Before inputting, they need to confirm the type of RTK account, SDK or Ntrip:

Fig. 37 RTK account inputting
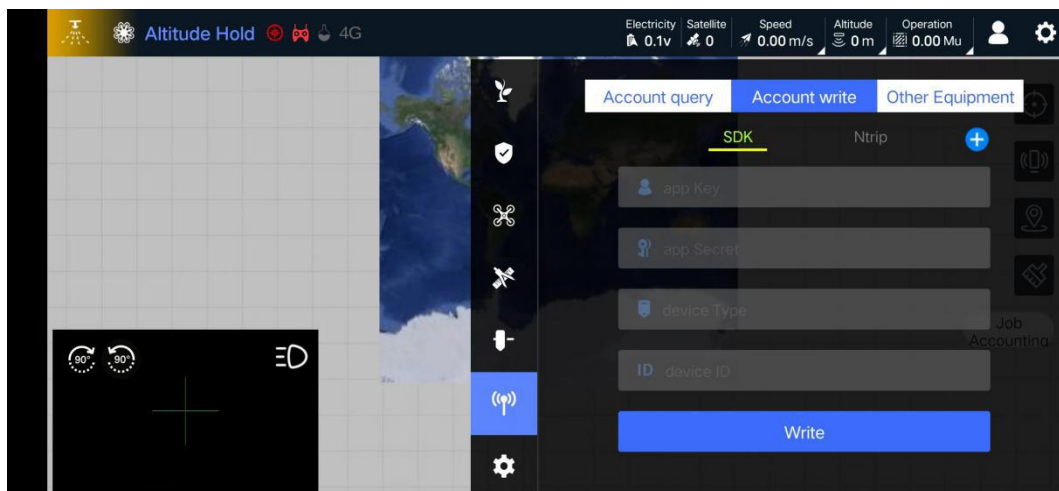
The query result page displays the currently inputted account and type, as well as the important information of the account. When users use the account for the first time, they need to click the activate button on the query result page. After the account is activated, they can enter the RTK state.

Fig. 38 RTK account query

If you use other RTK devices such as base station version RTK, network board or Beidou companion, you need to make corresponding settings on the other device information page.

Fig. 39 other device settings

💡 If you need to write or query the RTK account of the surveying and mapping device, you can enter the RTK information page after successfully connecting the corresponding RTK surveying and mapping device, and use the same operation method to write the account or query the information.

System Setting

About

Display ground station, flight control firmware, 4G firmware version information, flight control number and usage time information.

Firmware Update

Flight control firmware upgrade can be realized in two ways: WeChat file and server download.

The way to upgrade through WeChat is to read the firmware saved in the WeChat file path by default. When selecting this channel to upgrade, the APP will automatically open the default file path of WeChat.
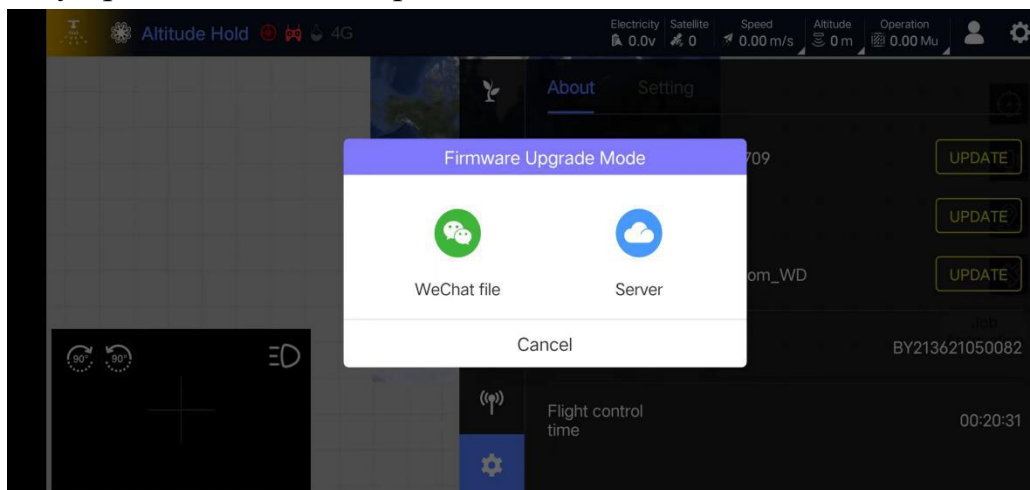

Fig. 40 firmware upgrade channel selection

Select server upgrade, the system will automatically obtain the latest firmware and update it automatically. The timing of automatic updates varies depending on the link. During the automatic update process, please do not interrupt the upgrade link. If it is interrupted or the upgrade fails, you must re-upgrade before it can be used.

💡 When using WeChat files to upgrade the firmware, please do not change the default file storage directory of the firmware in WeChat

💡 Firmware upgrade supports T12, H12, MK15 and other devices. If you have any questions about the upgrade, please contact technical support to confirm the device model

4G Upgrade

Flight control needs to connect to the ground station in the battery powered state, click the check and update of 4G firmware, wait for the automatic download and update of 4G firmware, and then power on the flight control again and refresh the version number.
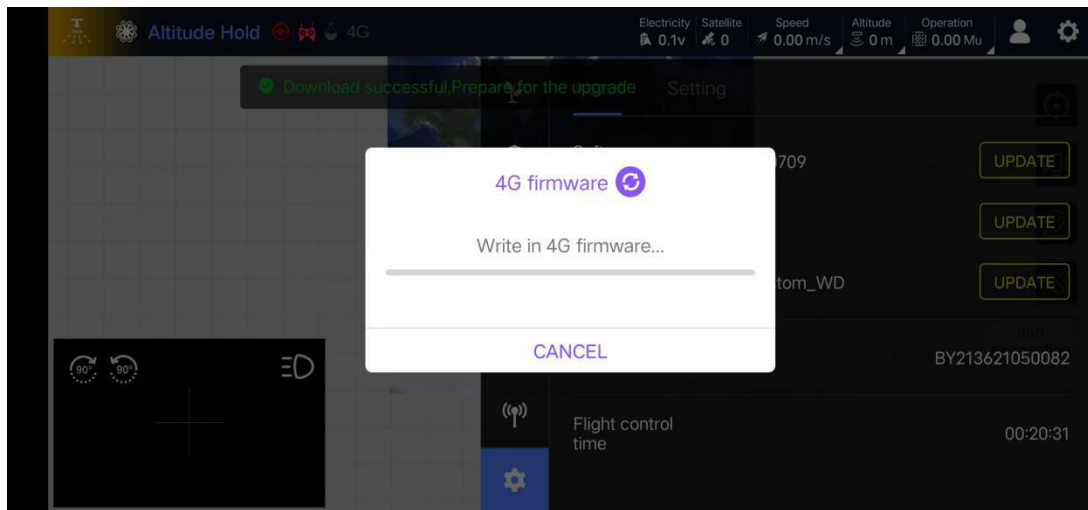
Fig. 41 4G upgrade

Setting

Advanced setting: after opening, more parameter adjustment information will be obtained;

Contactor: if the drone is equipped with a contactor, this function can be turned on. After opening, you can view the status of the contactor through the contactor icon on the main page. The on-off operation of the contactor will also be displayed;

Drone position locking: the drone can be positioned in the center of the screen;

Map selection: you can choose ArcGis or Gaode map, the default is ArcGis map;

Area unit: support mu, hectare, square meter, cent (Taiwan), RAI (Thailand) multiple area unit options.
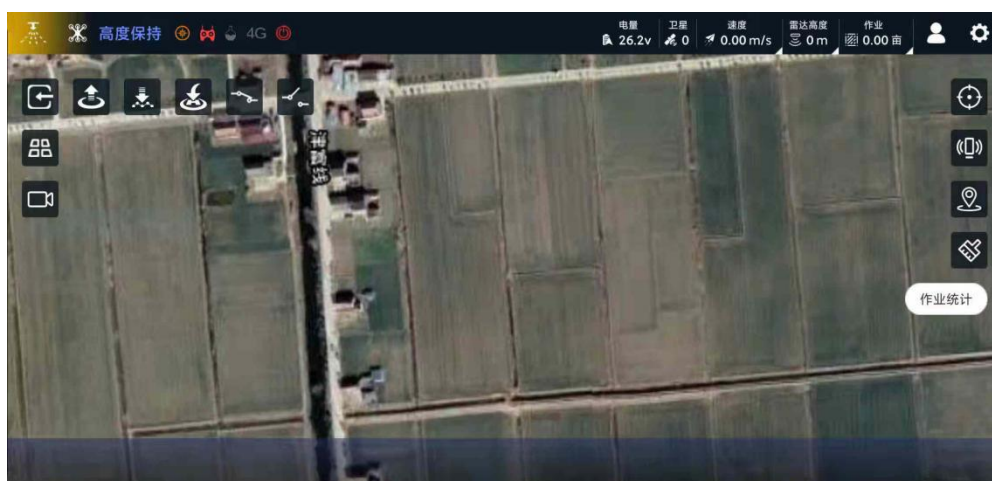
Fig. 42 contactor switch

Personal Center

The content of the personal center page is associated with all the information of the app login account and some flight control related functions. Click the personal center icon in the upper right corner of the home page to enter the following page:
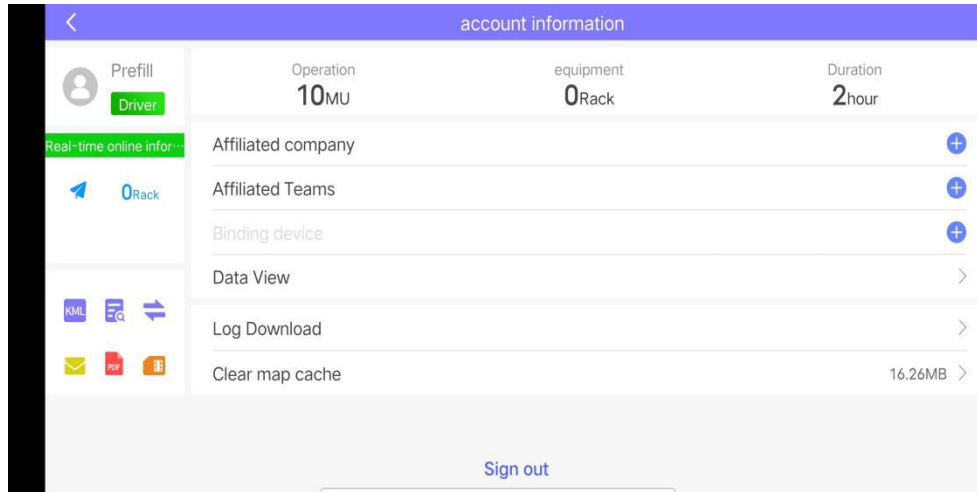
Fig. 43 personal center

Personal Information

Click the avatar area in the upper left corner of the page to enter the personal information modification page. On this page, you can modify personal information, account password and upload attachments.
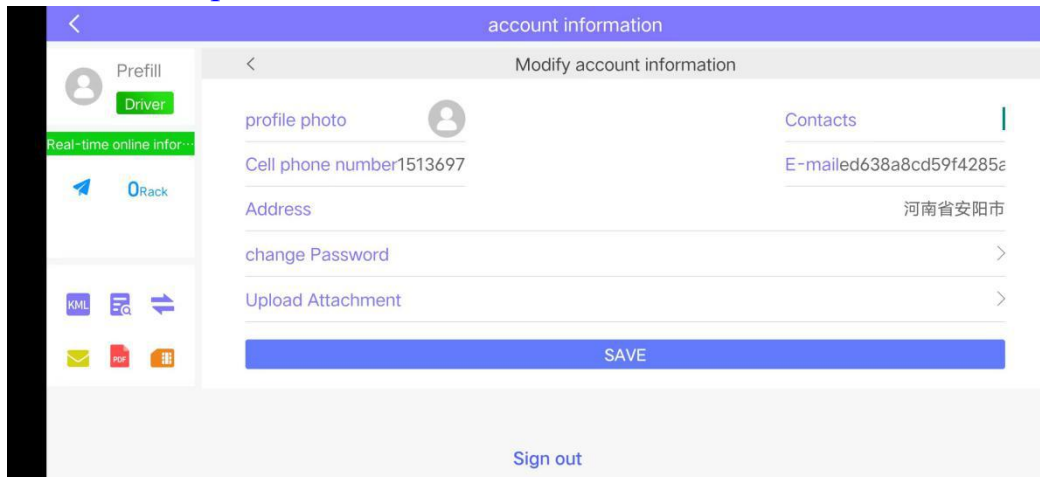
Fig. 44 edit information
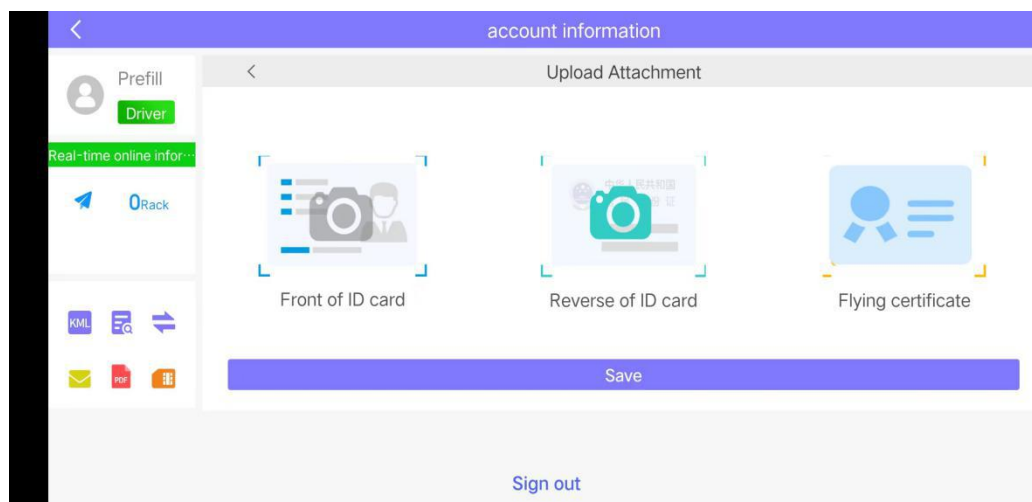
Fig. 45 upload attachments

Apply to Join the Team

After the pilot account is registered, you must successfully apply for and join the company before you can enter the plant protection team under the company.If the pilot has been registered under the company, the application to enter the plant protection team will be reviewed by the plant protection team.The plant protection team's application for employment will be reviewed directly by the company.If users need to register a company or manufacturer, please go to the cloud system of Boying website to register and contact technical support.

When you need to join the company or team, click the corresponding add button behind the company or team, and input the account / mobile phone number to submit the add application. At the same time, the corresponding plant protection company or team will receive the add application. After the company or team agrees, you can add it successfully.
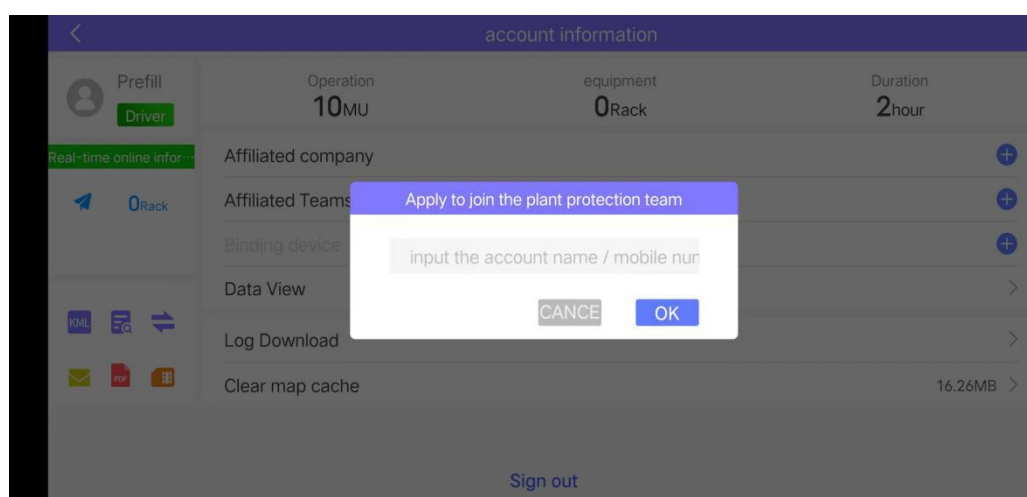

Fig. 46 apply to join the team

Bind the Device

The login account is the account of the complete machine manufacturer or the plant protection company. After connecting the flight control, click the add icon after

bound the device on this page to bind the unbound device.If the connected device has been bound, when you click the add button, a binding change application will be sent to the current device binding account. After the other party agrees, the binding change can be successful.
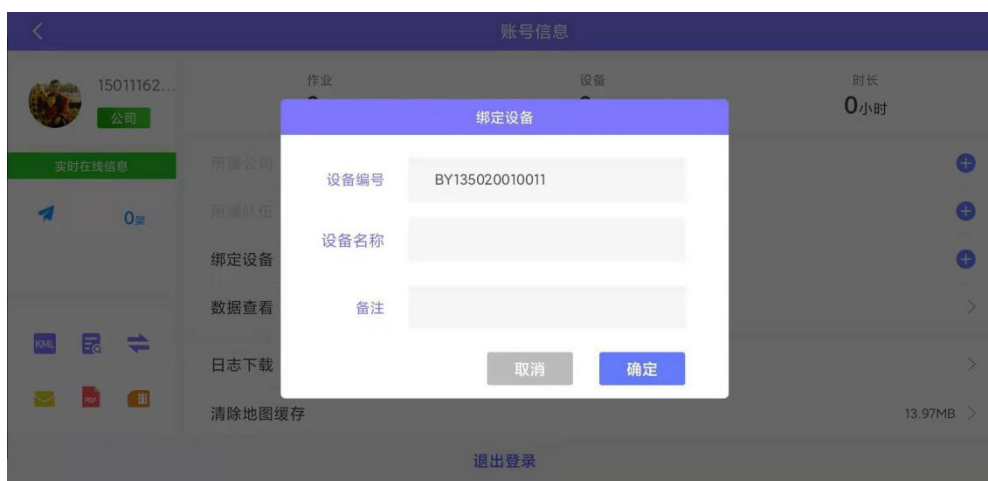

Fig. 47 bind the device

Auxiliary Function

KML File Import

Place the KML file in the device file path under the BoyingGCS_KmlFile folder, click the icon KML to open the KML file import interface. After selecting the KML file to be imported, you can view it in the plot list.

File Verification

Click the button to open the file verification function page.This function allows users to push the job cache files that have not been uploaded successfully and are saved in the mobile phone to the cloud.Select the data file to be pushed in the page and confirm it.

Parameter Import and Export

When the drone is connected, click the button , and the import and export function window will pop-up.When selecting export, the parameters of the device will be exported in the form of a file and saved in the Parameters file of BoyingGCS_Data under the device file path; when selecting import, the file parameters in this path will be imported into the drone.

The parameters are exported in the form of EXCEL table, and must be placed in the BoyingGCS_Data directory to take effect; if the parameters are to be imported successfully, there is only one file Parameters in this directory, and the file name

cannot be modified.

Starting from version 3.5.2, the comparison and verification function has been added for parameter import and export. The parameter files generated by versions lower than 3.5.2 will be used to automatically verify the parameters after importing them into version 3.5.2 and above. When there is a problem with the imported parameters, a prompt will be displayed import failed, and parameters need to be modified.

💡 Remember not to use the parameters exported from version 3.5.2 and above, use the old version to import, if you have any questions, please contact technical assistance in time

Message Reminder

When the message prompts display ✉ status, click to view the message content; when it is displayed ✉ as no message status. The content of the message is mainly divided into personnel application information and device binding application information.

PDF File Download

Click the icon ![PDF] to directly download and view the latest version of the ground station user manual.

SIM Card Information Query

In the lower left corner of the personal center page, click the button ![icon] in the auxiliary function area to obtain the status information of the current SIM card, including card number, status, service time, balance, etc.Please pay attention to the status of the card number in time. Generally, the service period of the card number is one year. After the expiration, the card number will be in the halt mode state and cannot provide network services, which will affect cloud data transmission and network RTK services.Therefore, when the APP prompts that the service is about to expire, or the user inquires that the service is about to expire, please contact Boying technical support in time to renewal recharge.

Fig. 48 SIM card query

View Data

After entering the personal center, click operation data to directly enter the operation data interface. After confirming the time period to be displayed, the user can view all operations of the equipment connected to the account. The following figure shows the default list mode:

Fig. 49 operation data

You can switch to map mode to view the overall track of data:

Fig. 50 operation data

The operation data viewing function can display the operations of all drone under the account. In the operation list, you can filter and query operations, and export them in Excel form. After switching the map tab, you can see the tracks of all operations in the list.Click display to enter the detailed information viewing page of a single operation. The following is the display content:

Fig. 51 detailed information

Log Download/Share

The V3.6 version adds the APP log download function.

On the personal center page, click log download to obtain the log download list. Select a log file to download in the list and confirm the download. During the log download process, the drone cannot be unlocked; when the drone is in the unlocked state, the log download cannot be performed. After the log is downloaded, you need to restart the flight control.

After the download is complete, click the log sharing page, select the log that has been downloaded, click share, and select the connected technician. After the technician confirms, the log can be uploaded.
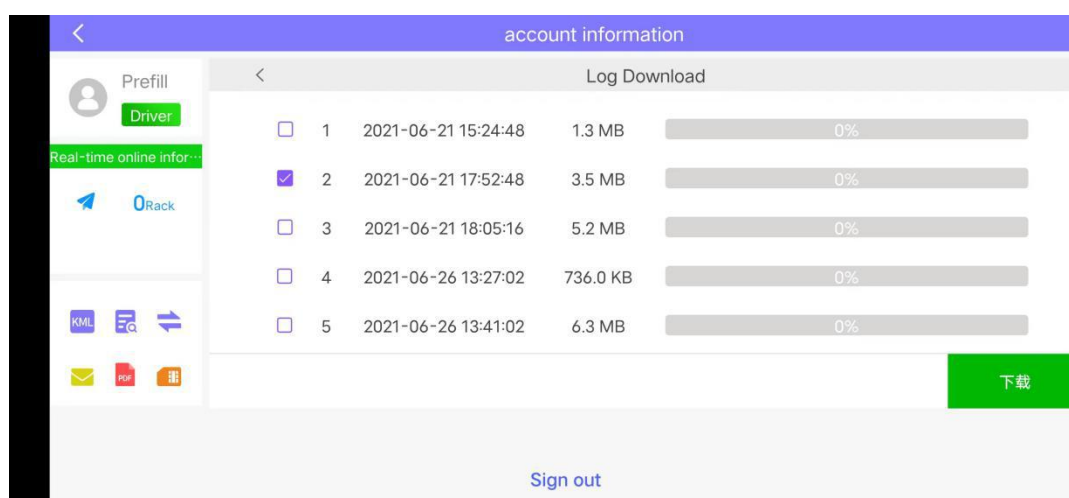
Fig. 52 log download

🔴 The log download speed is related to the remote control equipment and link equipment used. The H12 remote control supports the selection of high-speed download rate, and other devices default to the normal download rate

🔴 The app log download function should be used with flight control firmware version 3.5.1 and above

🔴 If the download process is interrupted, please download again

🟡 The downloaded log file will be saved in the device file path BoyingGCS_DroneLogs by default

Offline Map

The ground station turns on the offline map mode by default. When the network is smooth, the map file of the currently displayed area will be automatically cached, and the cached map area can also be loaded in the absence of the network. The map cache can be cleared.