User Manual

Shandong Aolan Drone Science & Technology Co., Ltd.
Add.:No. 6888, Jiankang East Street,Weifang Hi-tech Zone, Shandong Province, China

2022

Contents

"Aolan" is the abbreviation of Shandong Aolan Drone Science and Technology Co., Ltd. (hereinafter referred to as "Aolan") and its subsidiaries. Products, brands, and other names appearing in this document are labeled names of their respective owner companies.

Aolan reserves the right to update this disclaimer.

Suitable model: AL4-22,AL6-30

1. Disclaimer and Warning

Aolan products are NOT toys and are NOT intended for children under 18. Adults should keep the product out of the reach of children and DO NOT operate this drone in the presence of children. The operator must have some flight experience. It is not advised that inexperienced individuals use the farm drone. It is advised to fly it after completing Aolan training.

Do not throw, launch, fire or project any dangerous payload on any building, person or animal, that maybe cause personal injury or property damage. DO NOT use the products for any reason other than general personal use. DO NOT use it for any illegal or inappropriate purpose (such as spying, military operations, or unauthorized investigations). DO NOT use this product to violate the right of privacy and private property of others.

Aolan's products are multirotor aircraft designed for agricultural uses in fields, forests, orchards, etc. It offers easy flight when in good working order. DO NOT use it for other purposes. We disclaim all responsibility if you modify the Aolan drone in any way.

The information in this document affects your safety and your legal rights and responsibilities. Read this entire document carefully to ensure proper configuration before use. This paper contains important information that should be read and followed to avoid losing product, injuring yourself, or damaging your drone. By using the products, you hereby signify that you have read this disclaimer carefully and that understand and agree to abide by the terms and conditions herein. You agree that you are solely responsible for your own conduct while using the products, and for any consequences thereof. You agree to use the products only for purpose that are proper and in accordance with all applicable laws, rules and regulations Aolan has made and may make available.

Aolan accepts no liability for damage, injury or any legal responsibility incurred directly or indirectly from the use of the products if users DO NOT obey the instructions and warnings. The user shall observe safe and lawful practices including, but not limited to, those set forth in these safety guidelines.

2. Using This Manual

2.1 Before You Begin

Check all of the included parts listed on the table in the box and read the operating manual. Make sure you fully understand the functionality of each individual part, the flight condition requirements, the key contingency warning functions/systems, and all

government regulations before each flight. If you have any question or problems during the assembly, maintenance or use of this product, please contact Aolan or Aolan authorized dealer.

2.2 Precautions Before First Flight

⚠ **Pre-flight checklist (refer to individual Pre-flight checklist)**

a. Remote controller and drone batteries are fully charged.
b. Every part is in good condition.
c. Propellers are in good condition and been unfolded. Frame arms are unfolded and the screws are firmly tightened.
d. There is nothing obstructing the motors. You can test the motors on the ground to see if they are running in right direction.
e. Spraying system is without any blockage and works properly.
f. Calibrate Compass(GPS) and accelerometer (IMU) before first flight, after long way transportation/crash/big vibration, and calibrate GPS again at new flight location 5km away.

2.3 Pesticide Usage

a. Pesticides are poisonous and can pose serious risks to human safety. Use them in strict accordance with their specifications.
b. Residue on the equipment caused by splashes or spills when pouring and mixing the pesticide can irritate your skin. Be sure to clean the drone after mixing.
c. Use clean water to mix the pesticide to avoid blocking the strainer. Clear any blockages before using the drone.
d. Wear protective clothing to prevent direct body contact with the pesticide. Always rinse your hands and skin after handling pesticides. Clean the drone and remote controller after applying the pesticide.
e. Effective pesticide application is dependent upon pesticide concentration, spray rate, spray distance, drone speed, wind speed, and wind direction. Consider all aspects while using pesticides, but NEVER at the expense of the safety of humans, animals, and the environment.
f. DO NOT contaminate rivers and sources of drinking water.

2.4 Operation

a. Stay away from the rotating propellers and motors.
b. The maximum takeoff weight cannot be exceeded.
c. Always keep your drone in sight.
d. You should never turn off the engine while in flight.
e. DO NOT answer incoming calls during flight. DO NOT fly under the influence of

alcohols or drugs.
f. If the drone displays a Low Battery Warning, it should land in a secure area immediately.
g. If there is an obstruction in the route on the return flight, you can avoid it by pressing the "E" button again and steering the drone around it with the remote control.
h. Always keep your hands on the remote controller so long as the motor is still spinning.
i. Turning on remote controller before powering on the drone.
j. Power off the drone before turning off the remote controller after landing.

2.5 Maintenance and Upkeep

a. NEVER USE worn out, damaged, or missing blades on your propellers.
b. To prevent the spray tank from leaking or causing damage to the landing gear, take it apart or empty it before transporting or storing it away.
c. The optimal storage temperature (empty spray tank) is between -20 and 40 degrees Celsius.
d. Clean the drone immediately with clean water after spraying.
e. Inspect the drone every 100 flights or after flying for over 20 hours.
f. DO NOT over-charge or dis-charge the batteries.
g. For more maintenance guidelines, refer to the following document.

2.6 Environment

a. Always fly in places that are clear of people, cars, buildings, and other obstacles.
b. Be very careful when flying over 2,000 m above sea level.
c. Temperatures between 0 and 40 degrees Celsius are ideal for flying..

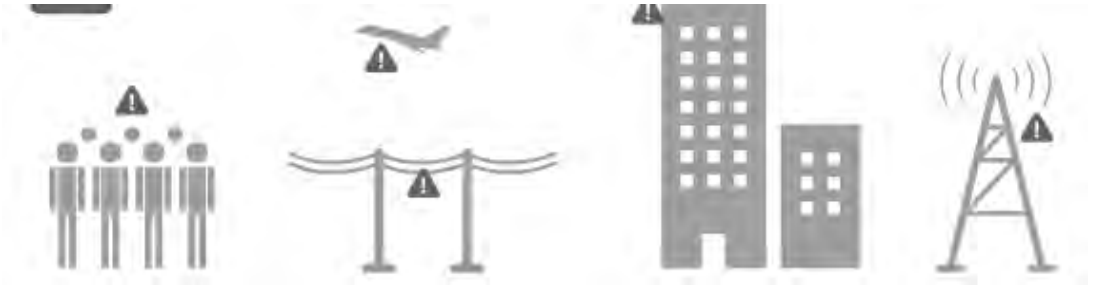
2.7 Observe Local Laws and Regulations

a. Avoid flying over restricted airspace and always follow the rules set forth by local authorities.
b. Fly in open areas and control flight height below 50 m, maintain lines of sight.

Make sure your GPS is properly calibrated before taking off, and only fly in areas with good GPS reception.

d. Avoid flying over or near obstacles, crowds, high voltage power lines, airports, mines or bodies of water. DO NOT fly near strong electromagnetic sources such as

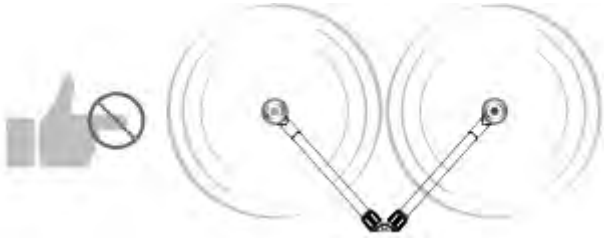
power lines and base stations as it may affect on magnetic compass.



e.

e. DO NOT fly in adverse weather conditions such as rain (precipitation rate exceeding 25mm in 12 hours), wind speeds exceeding 8m/s, fog, snow, and lightning.

f. Stay away from working propellers and motors, otherwise it may cause serious injuries to people and property.



3. Product description

3.1 Sprayer drone

3.1.1 Profile

The Aolan drone is a battery-powered multirotor drone designed for agricultural applications in variety of environments and terrains, including terraces, fields, forests and orchards. It is dust-proof, water-proof and made of anti-corrosive materials.

The drones also include industry-leading flight control system and three operation modes: attitude (ATT), GPS and AB point, can spray in various terrain.

The remote controller features a range of controls for navigation, flight and spraying. When the drone finishes all the work of spraying pesticides in the field, you still keep controlling the drone.

3.1.2 Drone Body

1. Carbon fiber propeller	10. Flow meter
2. FOC power system (motor+motor mount+ESC)	11. FPV: camera + LED light
3. ESC indicator	12. Landing gear
4. Vent valve	13. Water pipe
5. High pressure nozzle	14. Drone arm
6. Protective cover	15. Folding joint
7. Brushless water pump	16. Chemical tank
8. Terrain following radar (optional)	17. Water inlet
9. Obstacle avoidance radar (optional)	

3.2 Remote Controller

3.2.1 Profile

The H12 remote control has a maximum transmission range of 1.5 kilometers.

The drone remote control system operates at 2.4 GHz- 2.483 GHz. The remote controller features a number of spraying system control functions to help complete operations.

Remote controller has inner datalink, can work with autonomous flying APP perfectly. All data has been set up in advance before delivery, please DO NOT change any data of RC. We are not liable for the consequences of modifying the remote controller data.

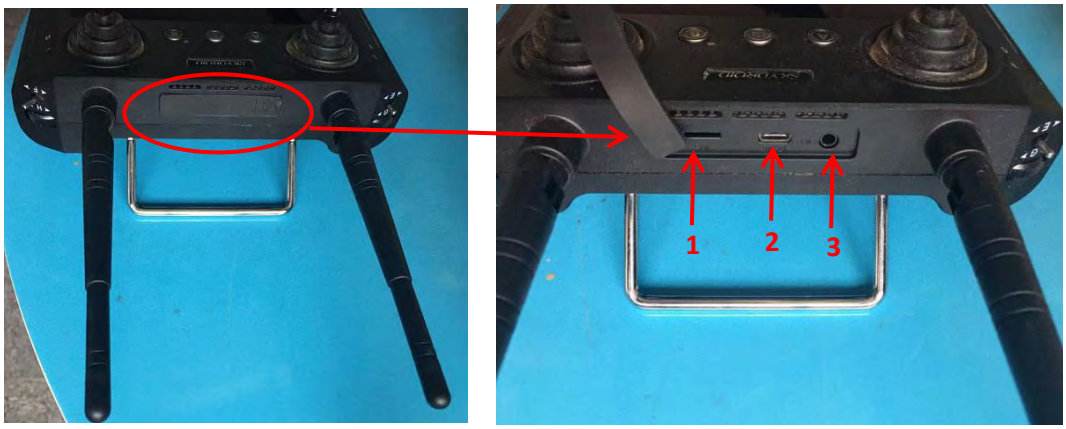
3.2.2 Introduction of buttons and switches of RC

1. Power ON/OFF switch
2. **A** button - One click return
3. **B** button - no function
4. **H** button - Adjust the disc throwing speed of the spreader (If granule spreader device is used)
5. **D** button - Turn ON/OFF water pump or hopper open mouth
6. **E** stick - Flight mode switch, left -ATT mode, middle -Manual job mode, right -AB point mode
7. **F** stick - Mark A & B point switch, left -turn OFF, middle -Mark point A, right-Mark point B
8. Screen 5.5” for App software operation, no need extra phone
9. Left rocker - control the drone direction of Up, Down, Clockwise and Counterclockwise
10. Right rocker - control the drone direction of Forward, Backward, Left and Right

⚠ Note:The buttons C and G are inactive. NEVER alter remote control settings

It can be charged with normal charger of phone. Connect to the 2A-5V to charge.

Battery working parameters:
(1) Built-in High Capacity Battery: 3.7V 10000mAh Li-ion Battery
(2) Working Current: 130mA
(3) Duration: 20 hours
(4) Charging Port: Micro USB port charging
(5) Charging time: 3-4 hours

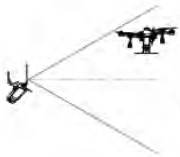


1. The port to insert SIM card. When operating the App software, you can insert the SIM card or connect WIFI.

2. The port for charging

3. Audio function (external headphones can be connected)

Tilt the display device on the remote controller to the desired position, then adjust the antenna so that it is perpendicular to the remote control. The position of the antenna affects the signal strength of the remote controller.



Try to keep the aircraft inside the optimal transmission zone. If the signal is weak, adjust the antennas or fly the aircraft closer.

Optimal Transmission Zone

Avoid using wireless devices that use the same frequency bands as the remote controller.

3.3 Optional Function

3.3.1 Integrated night job indicator + camera (FPV function)

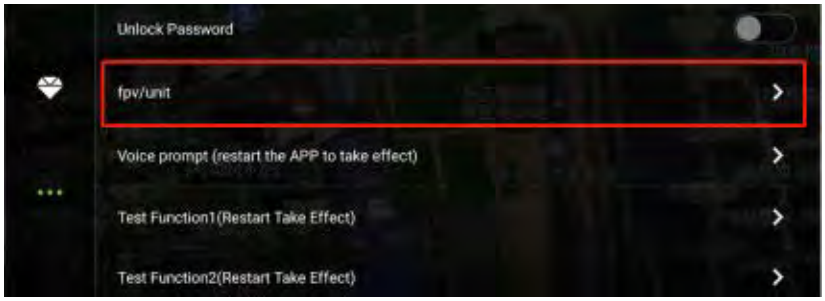
(1) Profile

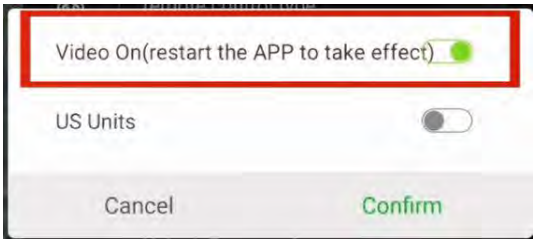
FPV is used to observe the situations ahead of the drone in real time. Configured with 8W 120 degree wide-angle night job indicator. Maximum transmission distance is 1.5 km (without obstacles).

(2) Overview

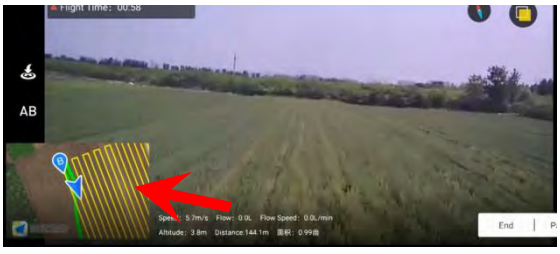
(3) Use

Turn on/off FPV (camera and led light) through the APP.

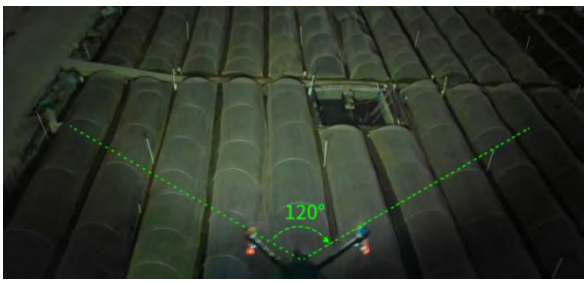




When the camera is turned on, the image will be transferred to the APP widget window in real time. Tap to switch between the Map View and the Camera View.



The night job indicator also can be turn on and off by click  on App.



3.3.2 Terrain following radar

(1) Profile

The terrain following radar module uses millimeter-wave radar technology. Through continuous scanning of the radar, the drone is able to detect terrain changes in the flight direction and modify the flight altitude in accordance with the terrain and crop height to ensure uniform spraying while in flight. The radar module has stable detection performance and good environmental applicability. It has strong anti-interference ability, is not affected by light, and has a long detection range. It has all-weather all-day characteristics.

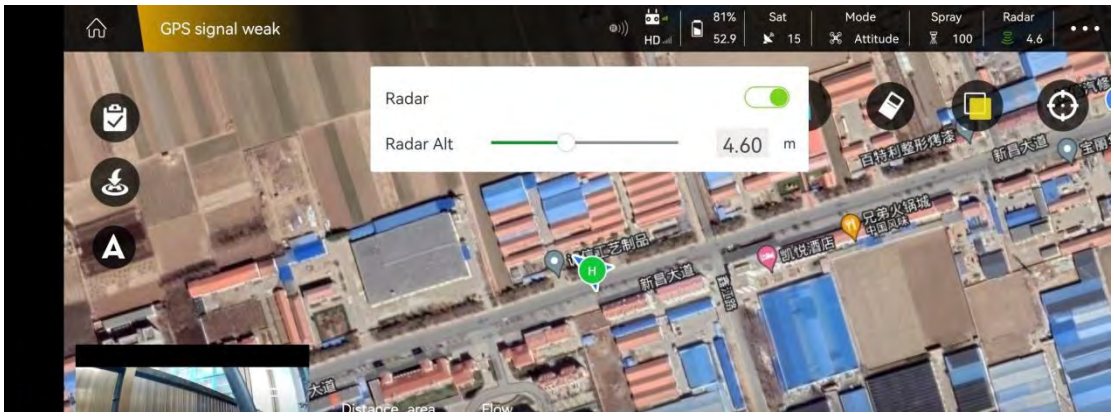
(2) Features:

- Strong penetrability (including fog, smoke, dust, light rain) is not affected by light;
- Strong anti-interference ability, good environmental applicability;
- stable performance, detection distance 15m;
- Power saving, total power It consumes only 1.5W;
- It works all day and night;
- It is small in size and light in weight.

(3) Overview:

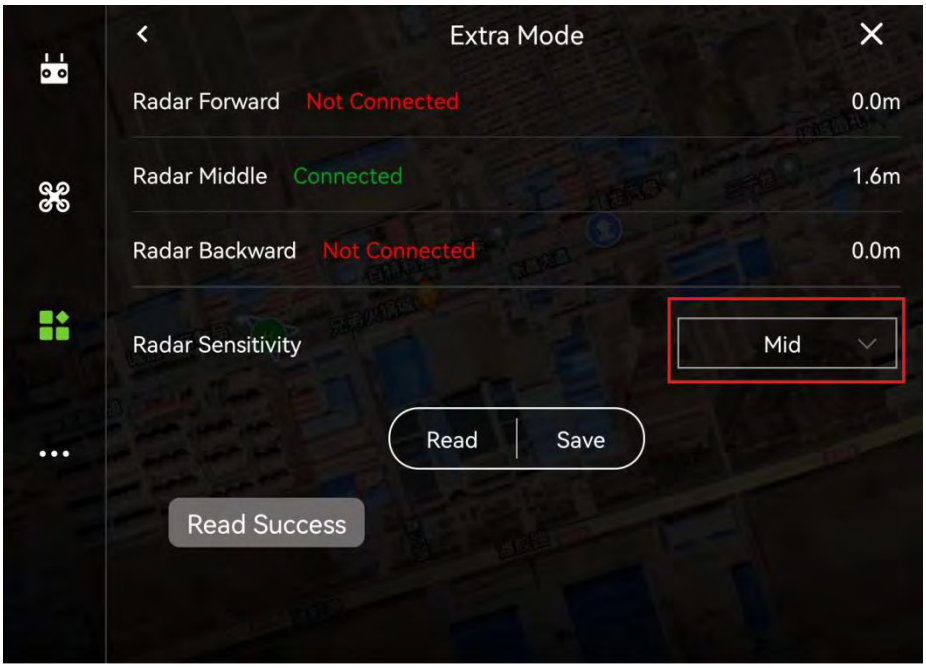
(4) Use

①Turn on & turn off the terrain follow radar by APP. Set the Radar work Altitude from 0 to 10 meters.



②You can select the terrain following sensitivity according to the different working scenes:

- Low sensitivity: Suitable for high-crop crops (such as sorghum, corn, etc.), limiting the rate of decline. It can prevent the high drop and twitch caused by the high pole falling down and the high pole unevenness.
- Medium sensitivity: Suitable for most scenes and non-high crops (such as rice, wheat, soybeans, etc.). Imitation speed and responsiveness are both moderate.
- High sensitivity: It is suitable for demonstration effects, as well as some non-job entertainment occasions, which are imitation, fast, and fast.



NOTE:

- Please disable the radar while spraying high crops and fruit trees above 4 meters. It will be perilous since the crops will cover the ground and the radar will detect the height of the crops, causing the drone to become extremely unstable and perhaps crash if it is not turned off.

- Terrain following radar is disable in ATT mode.

- When the terrain radar is turned on, the drone will maintain a fixed altitude to fly. At this time, you can temporarily adjust the height of the drone with the throttle stick of the remote control. When the throttle stick is released, the drone will automatically return to the radar setting altitude.

- The radar-assisted altitude function may be invalid under adverse weather conditions, such as heavy rain, typhoon, severe wind (wind speed above 8 m/s), thunderstorms, hail, and foggy weather, among others.

- The radar-assisted fixed-height function may fail under conditions where the terrain change speed exceeds the maximum vertical maneuverability of the drone.
  ① Larger height differences (bigger than 1 m in normal operating environments, such as ditches or ponds around, sparse fruit trees or shrubs above, terraces).
  ② The speed of the drone is too fast (greater than 5 m/s).

- Surface of the object whose inclination exceeds the following values: 15° (drone speed 1 m/s), 6° (drone speed 3 m/s), 3° (flying speed 5 m/s).

- If the distance between the drone and the surface being measured exceeds the set height (1.5–10 m), the radar-assisted altitude function may be disabled.

- Ensure that the pitch and roll angle of the drone attitude does not exceed 20°.

- Always pay attention to the relative height of the drone and the surface being measured.

- Use radar-assisted elevation modules in accordance with local radio regulations and legal regulations.

3.3.3 Obstacle avoidance radar

(1) Profile

The obstacle avoidance radar module is mainly used to measure the relative distance between the drone and the obstacle in front of the flight, so as to effectively avoid obstacles. The obstacle avoidance radar adopts 24GHz radar technology, which can work around the clock in strong light, high temperature, fog, dust, wind and night. The sensitivity is high, the detection distance is long, the signal transmission is fast and stable, and the cable can be detected more than 1cm. Wires, small trees of 10cm

trunks, 1.7m tall people and 15cm poles provide excellent obstacle avoidance for high-speed drones, making them ideal for plant protection drones operating in outdoor complex environments.

(2) Features:

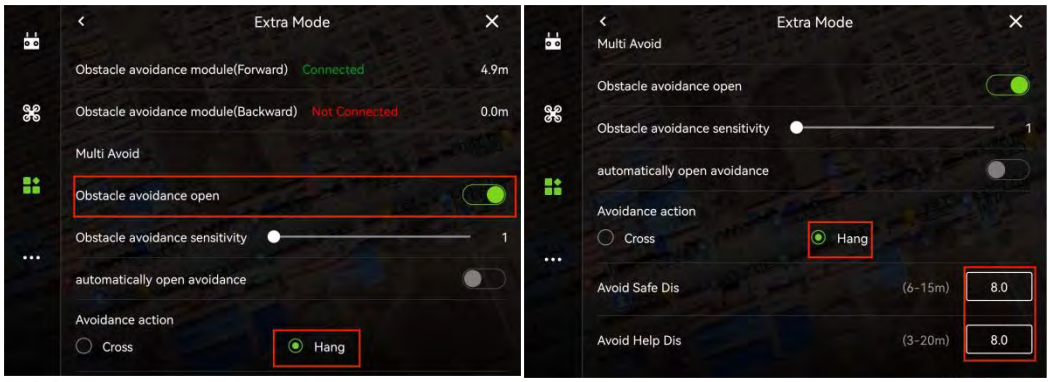
- High sensitivity;
- Detection distance is far;
- Signal transmission is fast;
- Signal transmission is stable;
- All-weather work;
- Environmental adaptability.

(3) Overview

Installing position

(4) Use

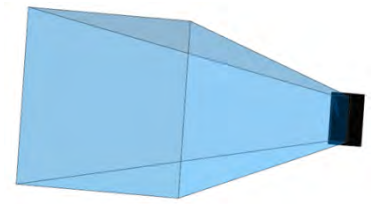
Open APP, turn on Obstacle avoidance function. Select “Hang” in Avoidance action.



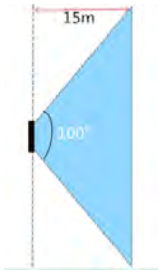
Obstacle avoidance radar operation warning!

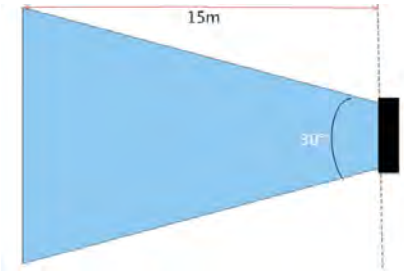
- Please keep the control of the drone throughout, and DO NOT rely solely on the information provided by the APP. The obstacle avoidance radar function will not be available in certain flight modes or flight environments. When the obstacle does not meet the radar detection conditions, the obstacle avoidance function may fail. Please ensure that the line of sight is clear, relying on the naked eye observation or the camera to return the image observation in real time, so that you may accurately assess the flight condition and avoid obstacles in a timely manner.

- Detection range.
  Radar module detection range: 100° in the horizontal direction and 30° in the vertical direction. If an obstacle is outside the detection range, the drone cannot sense the obstacle and should fly with caution. When the drone is working in any mode, it must be observed in real time to prevent the drone from entering the radar detection blind zone to avoid collision.



Radar detection area





Horizontal direction Vertical direction

- Range of direction: (Outside the effective range, the obstacle perception function may be malfunctioning or invalid)
  Target obstacle diameter ≥ 1 cm cable-stayed wire: 2 ~ 10m
  Target obstacle diameter ≥ 15 cm utility pole: 2 ~ 15m

Small tree with a target obstacle diameter ≥10CM (trunk diameter): 2~15m

- The radar does not regard anything inside 2m to be an obstacle, hence the avoidance function cannot be implemented. If obstacle suddenly enter the detection range within 3 meters, the drone may not be able to stop and cause obstacle avoidance failure.
- In the manual operation mode, AB point mode, and automatic operation mode, please confirm that the obstacle-avoidance radar on the APP remains open. Otherwise, the obstacle avoidance function is turned off.
- If the drone's pitch angle exceeds 20°, it may affect the obstacle avoidance effect. Please fly with caution.
- Obstacle avoidance radars are suitable for use in flat farm environments and cannot be used in environments with significant drops. It is recommended that the flight speed be ≤3.5m/s on slopes with an inclination of >10°. Otherwise, the operation may be stuck.
- The radar module is more precise and should not be crushed or collided.
- The radar sensitivity may be reduced when multiple drone are working at close range. Please fly with caution.

3.3.4 Granule spreader / Particle spreader device （optional）

(1) Profile

The granule spreader device can be used for spreading seed or granule fertilizer,sow, allowing the drone to serve a dual purpose.

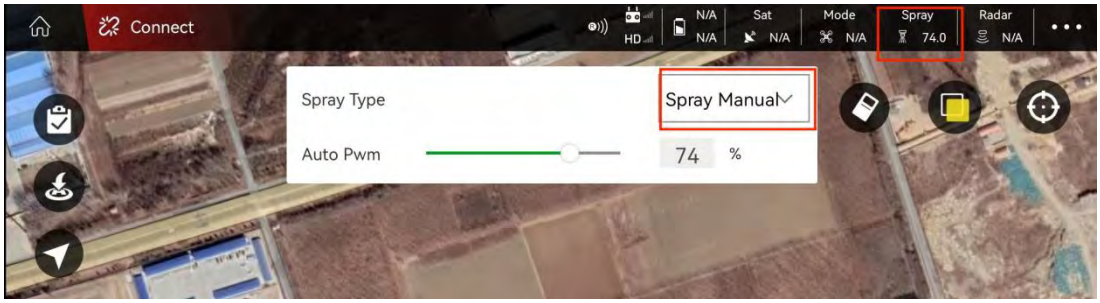
(2) Overview

(3) Use

 Install the granular spreader device in advance. Please consult the pertinent documents.

② Connect the drone battery

③Turn on the remote controller. Adjust hopper open size by APP setting -Spray Manual, the bigger of the value (%), the bigger of the hopper open size.



④ After the drone takes off, press the button "D" on the remote control to open the black spreading device, and then press the button "H" to adjust the rotation speed of the disc, and the spreading work begins.

3.4 Battery & Charger

3.4.1 Smart Battery for sprayer drone

Smart battery 14S 22000mAh/28000mAh

Note:

- After receive the batteries, please check if the appearance of the battery is intact and whether there is a bulge problem.
- **Fully charged batteries prior to usage.**
- The battery will be charged automatically after connecting it and pressing Start.
- **Check the battery voltage every months, make sure its voltage more than 1 level (Full** charge shows **4 levels, the below show 3 levels).**

3.4.2 Quick charger

- Our intelligent charger has a total of 4channels and can connect 4 batteries at once. It has three charging modes. The slow charging mode can charge 4 batteries at the same time; The standard mode can charge 2 batteries at the same time; The fast charging mode can only charge one battery, which can be fully charged in about 10-15 minutes.

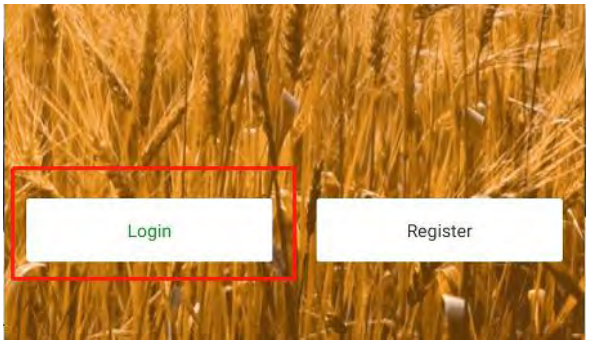
4. Use Aolan sprayer drone

4.1 Preparation before taking off

4.1.1 APP software & connect

All settings are finished in H12 remote controller, it is ready to use, see steps below:

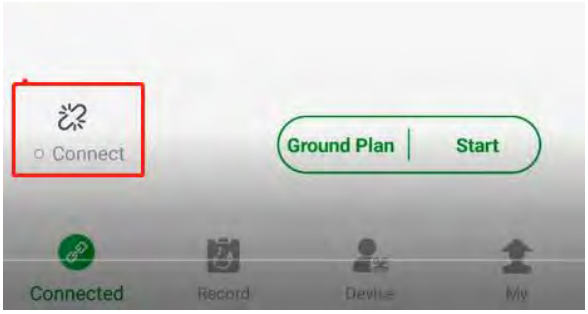
◆ Download APP on the remote controller screen, click “Register” and follow the prompts to register with your mobile phone number.



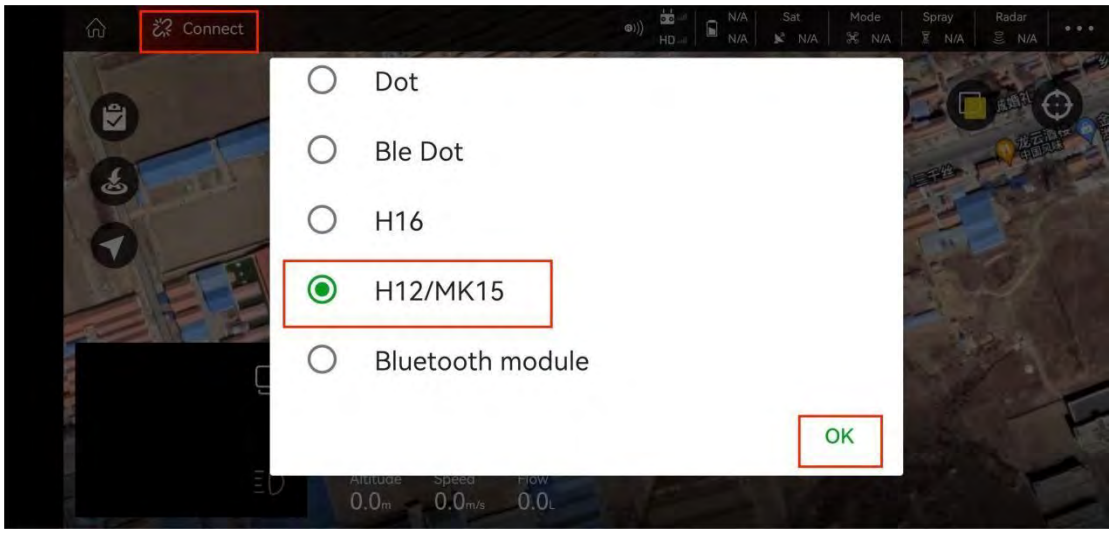
◆ Please log in to the app with the account assigned by our company.

Account: your phone number
Password: xxxx

◆ Click “Connect”.



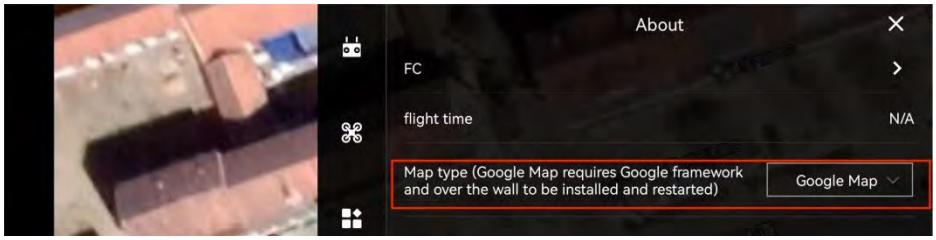
1) Select “H12/MK15”, Click “OK”.



◆ Connected.

◆ App connection completed. Click “Start”, enter into the Home page.

◆ Change the map to **Google map**



4.1.2 APP Introduction

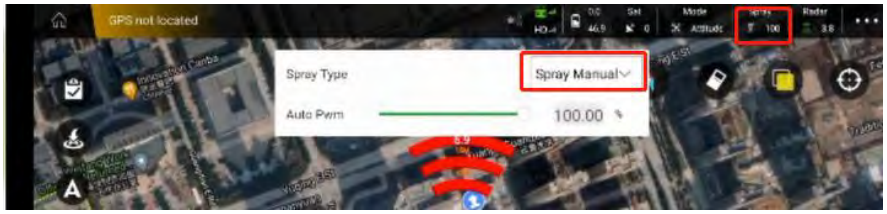
(1) Main interface introduction

(1) GPS quantity

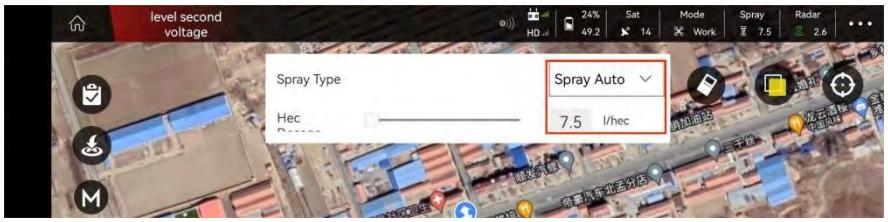
⚠ In order to fly, a minimum of 12 operational GPS satellites is required. If there are less than 12 active GPS satellites, aircraft operations should be suspended. If not, it could lead to an accident because of a severe positional error.

(2) Spray mode

① Spray manual - Manually adjust the spray flow rate.



② Automatic spraying - the best spraying type is recommended. Precise spray settings. Effective spray range: 10-25 L / hectare.

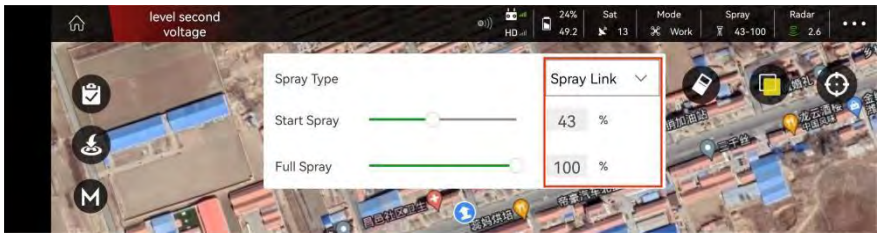


③ Spray Link - The rate of spraying is automatically modified to match the rate of flight.

Start spray - The spray flow rate when the drone starts to fly.

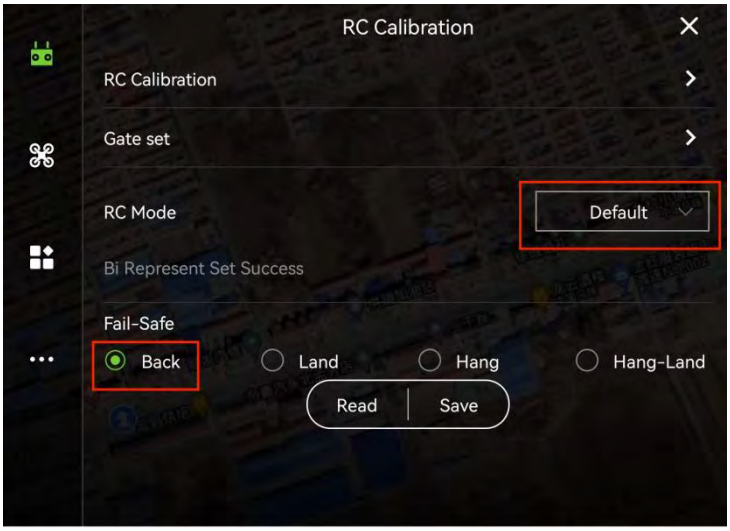
Keep default setting 10%.

Full spray - The spray flow rate when the drone reaches its maximum speed. Keep default setting 100%.

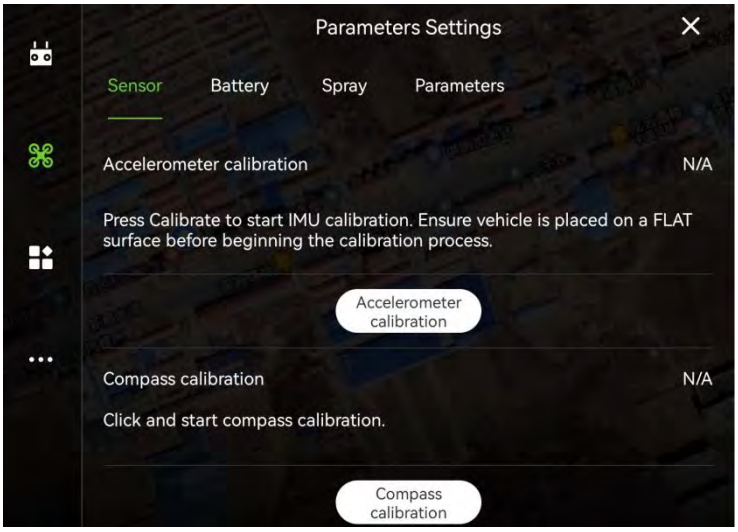


⚠ Warning: Please turn on the drone, remote controller, and APP on the remote controller prior to modifying any APP parameters. Click "Read" to fill in data, then click "Save."

(2) RC Calibration interface



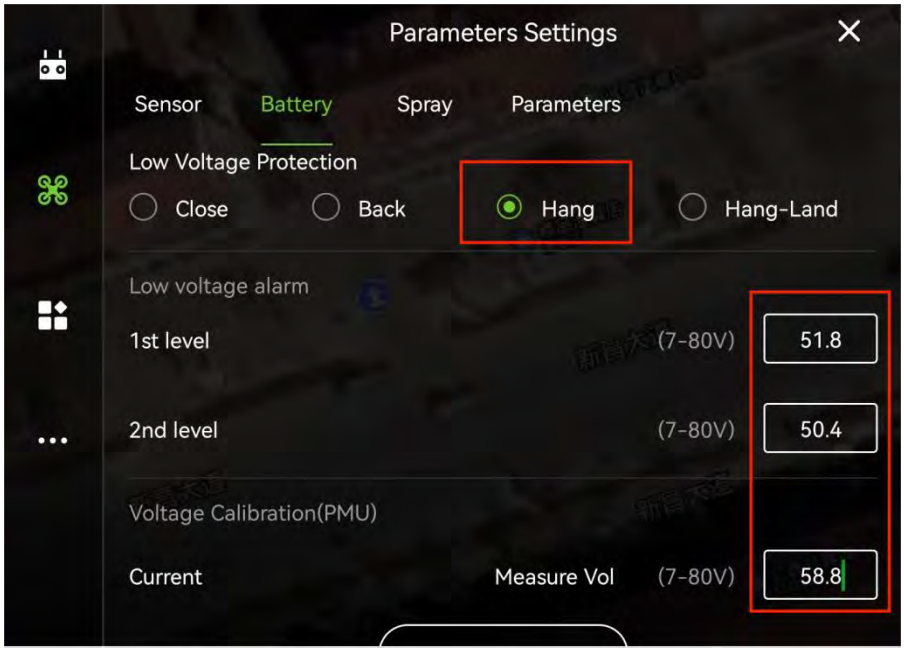
(3) Sensor interface



➢ This interface indicates the status of compass and Accelerometer calibration

(4) Battery interface

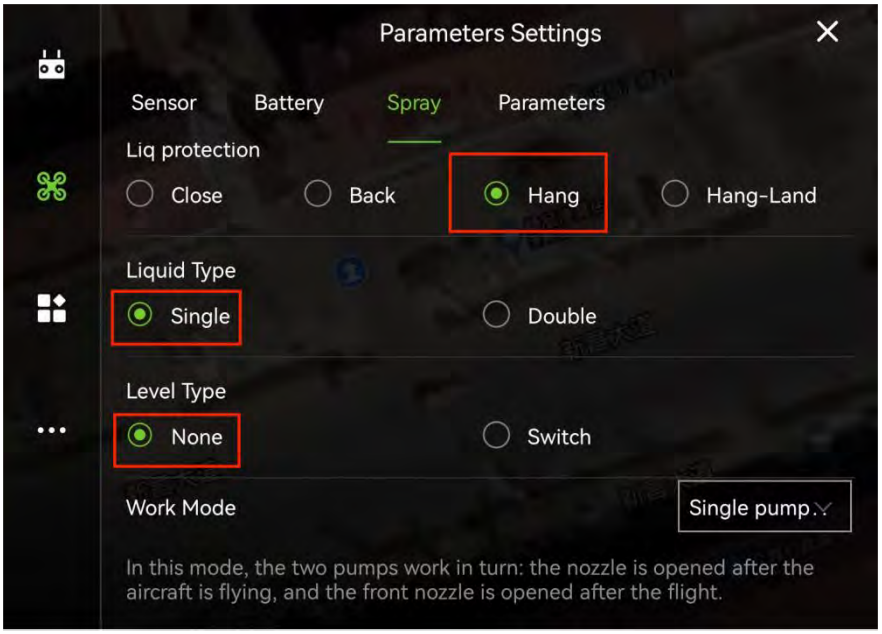
①Battery type - 14S 22000mAh/28000mAh

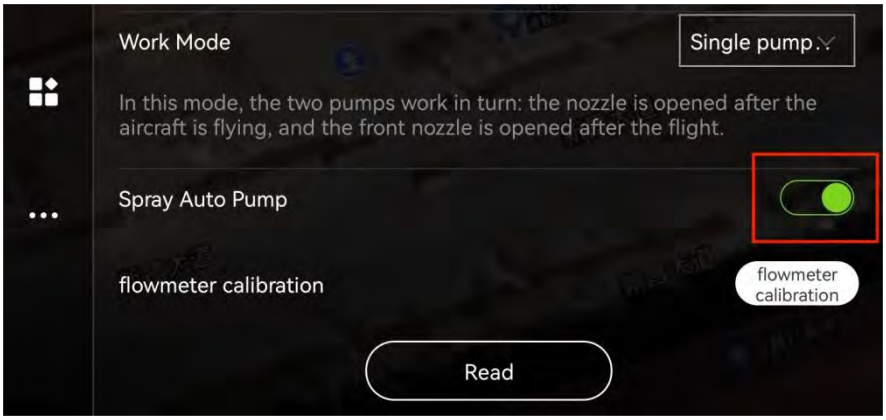


The first alarm level is 51.8V, which will alert in the app; the second alarm level is 50.4V, which will prompt in the app and cause the drone to cease flying and hovering.

Note: Be prepared to return the drone at 1st level low voltage alarm; Immediately return and land the drone at 2nd level low voltage alarm.

(5) Spray setting interface

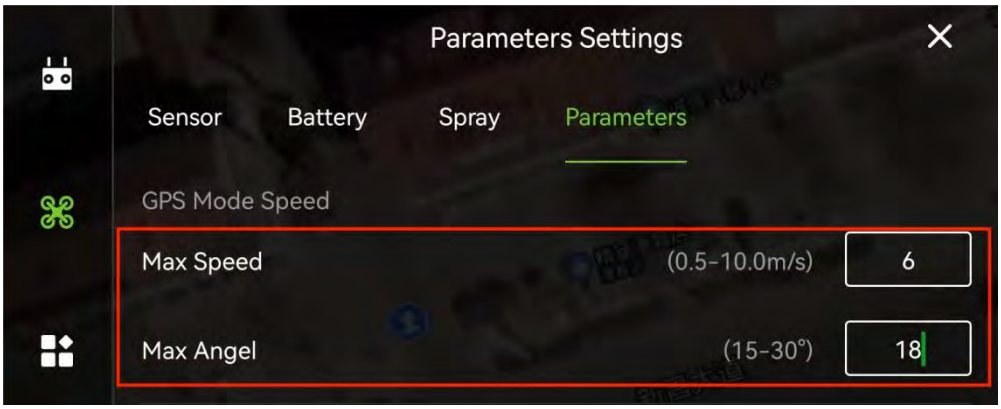




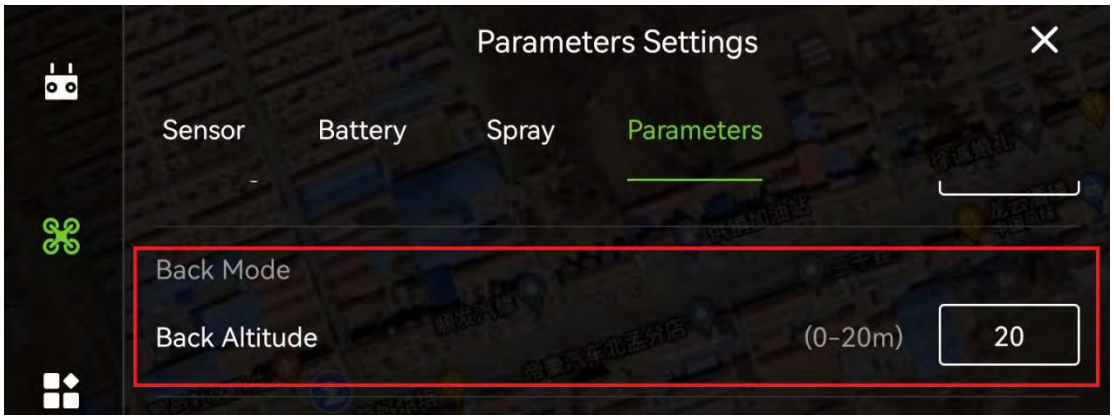
- Flowmeter calibration has been performed prior to shipment. If you need to make the calibration again, choose "Flowmeter calibration," enter the amount of water you fill the tank with (5 liters minimum), and click "Start." The calibration concluded when the water ran out.

(6) Parameters interface

① GPS Mode Speed - Max Speed / Angle in Manual - Job Mode.

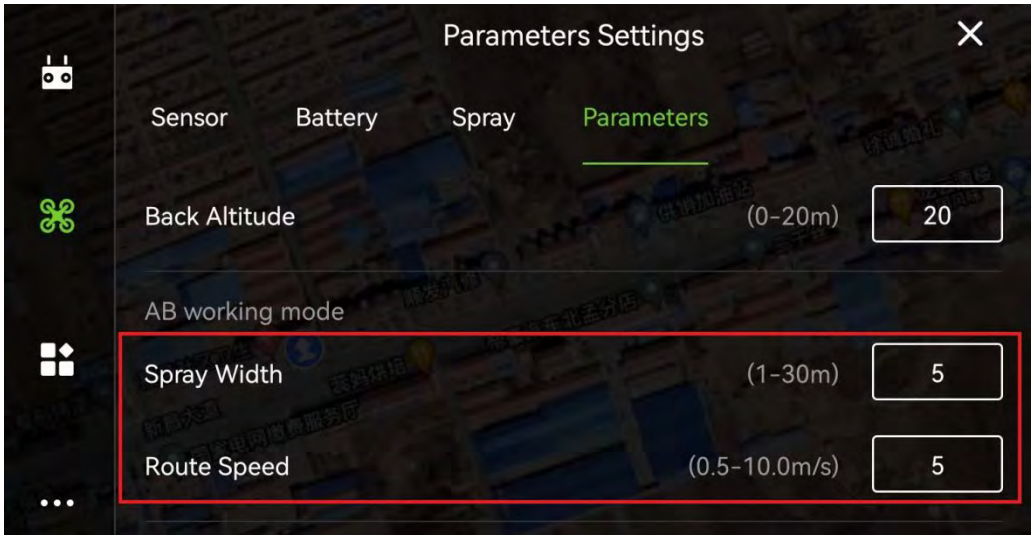


② Back Altitude. Please set the suitable back altitude when the drone return to home automatically. **Please note that the return altitude should be higher than the height of obstacles that may be encountered in the return route.**

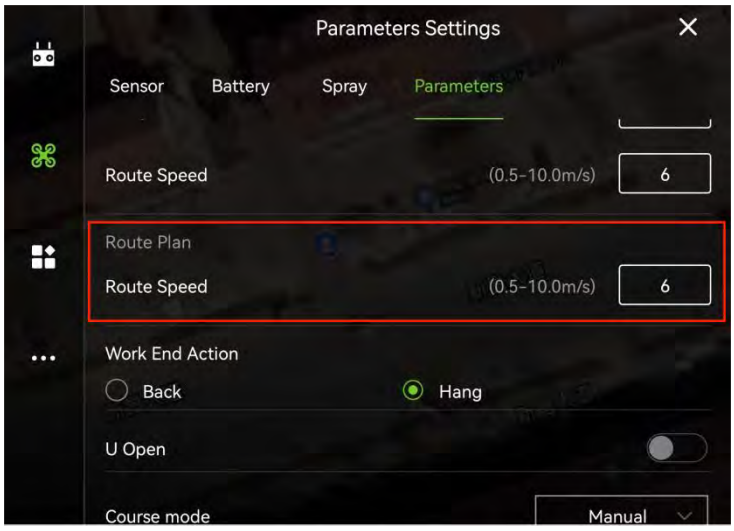


⚠ **If the drone does not have an obstacle avoidance radar, and if it finds an obstruction and needs to instantly cease the automatic mode during the automatic return process, please press the A button again; the drone will quit the automatic return-to-home mode.**

③ AB job parameters set.

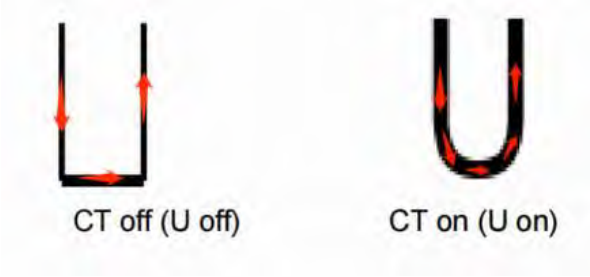


④ APP route work parameters set.

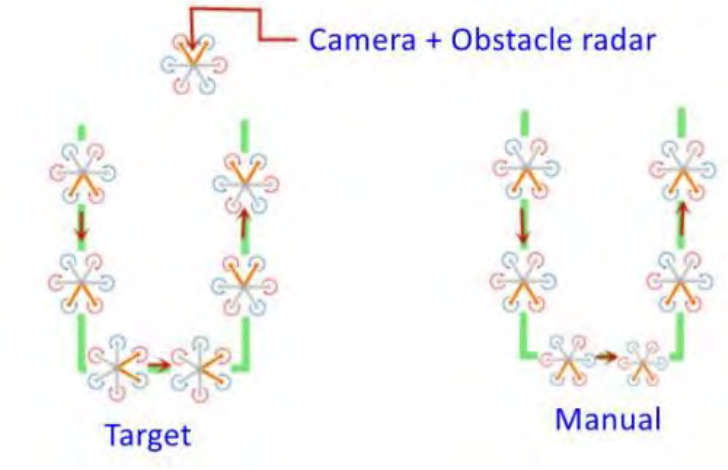


⑤ Work End Action - Hang

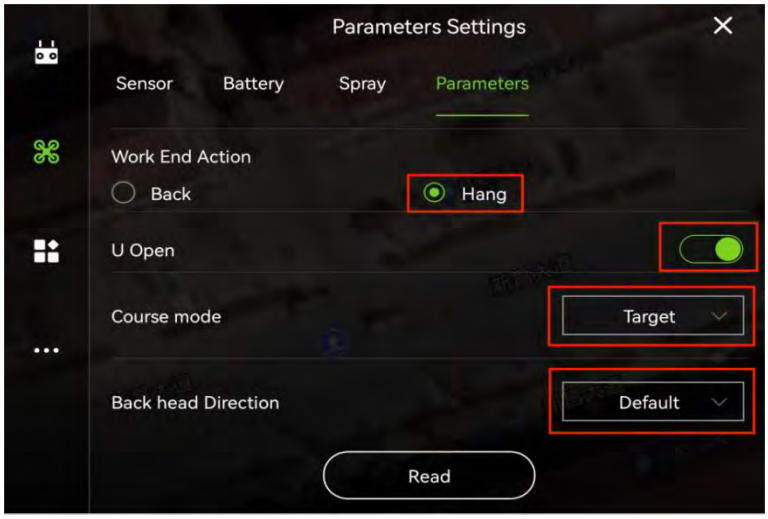
U open - ON. It is advised to turn it on to increase work efficiency.



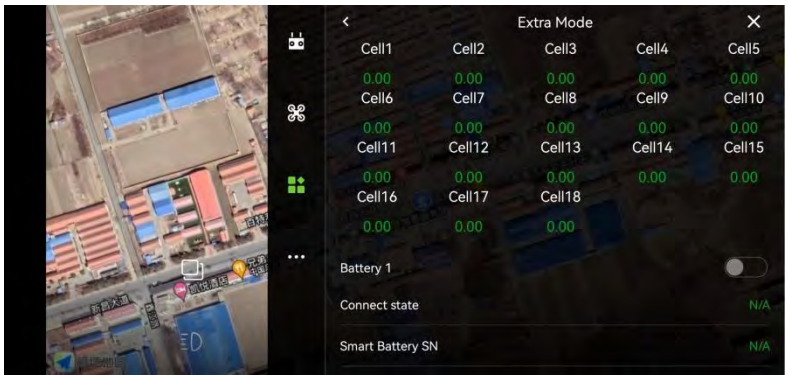
Course mode - Please select “Target”. Keep the camera and obstacle radar valid all the time.



Back head Direction - Head to Home

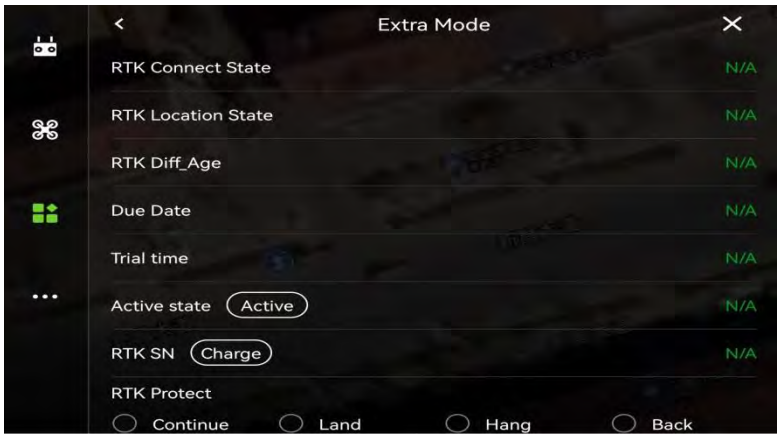


(7) Smart Battery interface



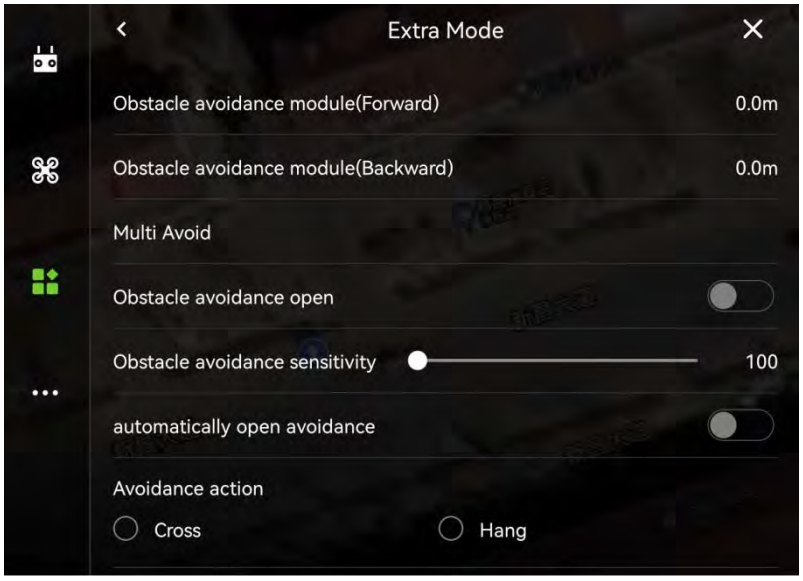
➢ It's only for Smart Battery users.

(8) J-RTK



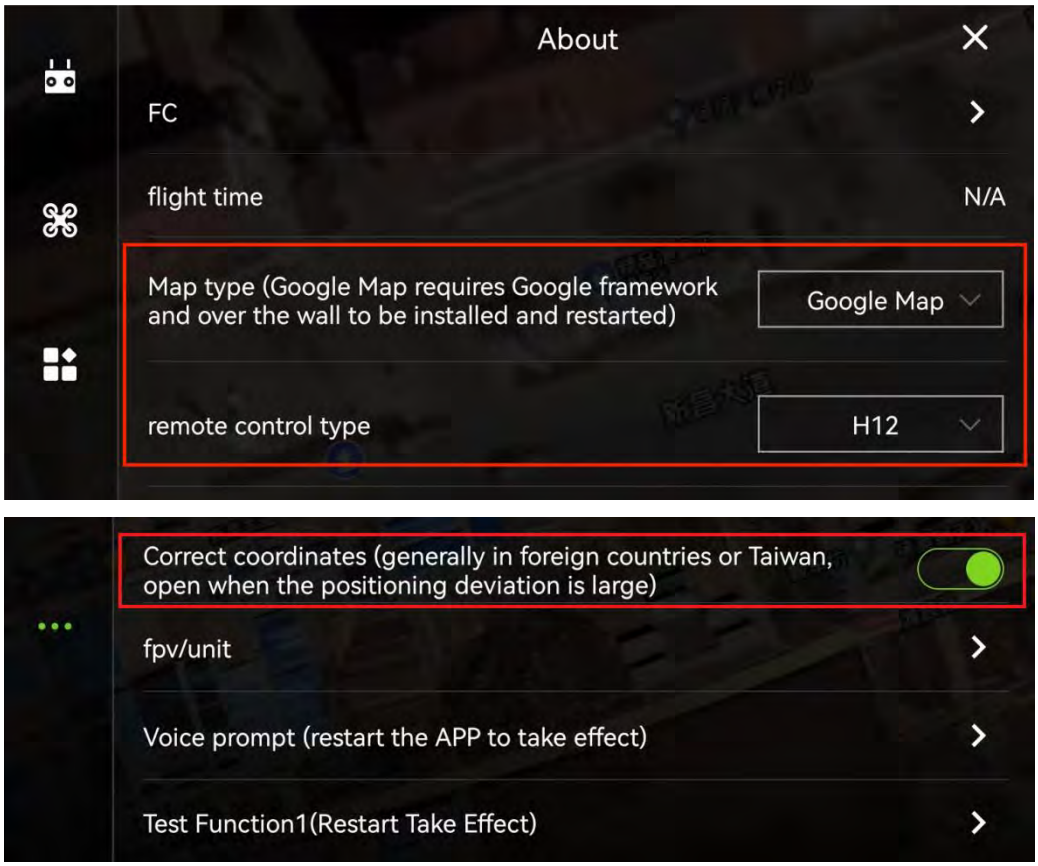
- It's only for J-RTK users

(9) Obstacle avoidance module



- Indicating radar detected distance
- Obstacle avoidance status: On/Off
- Avoid sensitivity: Mid. (Could be adjusted per to request)
- Avoidance action: Hang

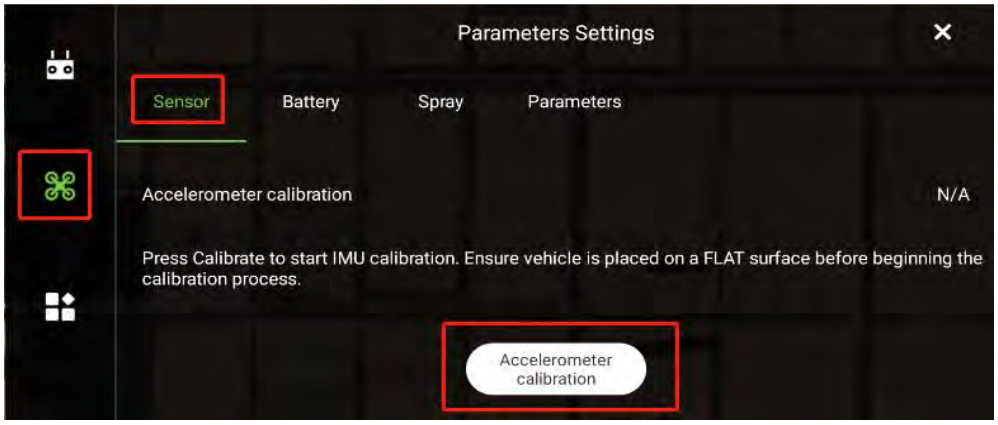
(10) About



- Map type: Gaode Map or Google China for China domestic areas; Google Map for other countries.
- Correct coordinates: On/Off. (Default as off, open when positions offset)

4.1.3 Accelerometer calibration (IMU Calibration)

Calibrate "ACCELEROMETER" upon receiving the drone, following long-distance transport or a crash, or when prompted by the message "please calibrate ACCELEROMETER."



IMU Calibration process:

Put the drone on a flat ground, turn on remote controller, power on drone, connect App to remote controller, make sure App is connected. Click “Accelerometer calibration” to start calibration, after 3~5 s to complete the calibration. DO NOT move the drone throughout the entire calibration process. During the calibration process, LED light alternately blinks red, green, and yellow. When the indicator turns solid green for more than three seconds, indicating a successful calibration, the message "calibration is successful" is displayed.

⚠ Note: please don’t move the drone during whole calibration process.

When is accelerometer calibration required

- Before the first use;
- After the drone has experienced long-distance transportation or bumps;
- After the drone crashes and is repaired, before taking off again;
- The APP prompts the accelerometer to calibrate；
- **If the drone tilts significantly when taking off, please immediately terminate the takeoff and calibrate the accelerometer.**

4.1.4 Compass Calibration (GPS calibration)

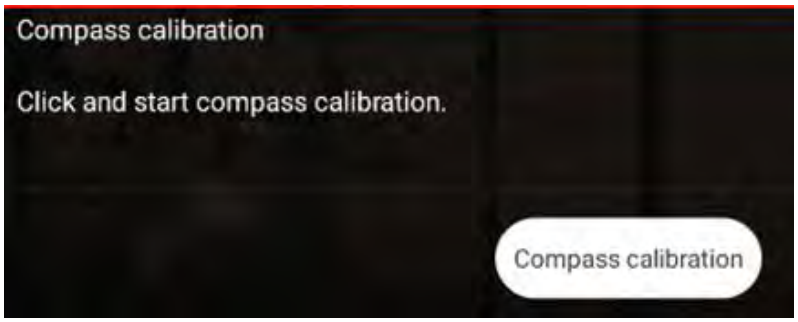
When you initially receive the drone(s), carefully calibrate the COMPASS (GPS). Please calibrate GPS again while moving to a new field 50 km distant. Please calibrate your GPS before flying again after a crash.

GPS Calibration process:

① Put the drone on a flat ground, turn on the remote controller, power on the drone;

② Waiting for the drone self-check, after the self-check finished, continuously and quickly toggle **E** stick 5-10 times from left to right until the indicator light turns constant yellow; Or you can start calibrating by click “Compass calibration” on APP.

A) 

B) 

③Rotate the drone clockwise and horizontally about 360 degrees until the indicator light turns constant green;

④Put the drone head vertically downward (LED indicator upward), then rotate the drone **clockwise** about 360 degrees **until** the indicator light blinks red and yellow and green alternatively, the calibration finished.

Note: If the indicator light turns red all the time after the calibration, the calibration was unsuccessful and must be repeated. If the calibration failed many times, move the drone to another place and try again. Please keep your keys, phone, and other magnetic items away from the drone during the calibration process.

Warning!

Please note the following conditions to try to protect GPS from damage. If the GPS module is magnetized by the external environment, a large positioning error or magnetic compass interference will occur.

① Nothing magnetic or metallic should be within 10 meters of the drone when it is in its storage state to prevent excessive magnetic interference.

②Please remove all metal or electrical items from the operator, such as mobile phones, tablets, metal tools, etc., prior to GPS calibration.

③ When repairing or maintaining a drone, do not keep the GPS module in close proximity to a computer or mobile phone for an extended period of time. Avoid placing your mobile device on the drone. Do not leave used tools on the drone, such as screwdrivers, pliers, etc.

When to re-calibrate the GPS

- Before the first flight;
- App prompts warning message - compass requires calibration;
- Significant changes in the latitude of the operation field;

- Flight controller or GPS antenna replaced;
- Drone deviates from planned course;
- The drone was relocated five kilometers away to a new place.

4.2 Manual flight

4.2.1 Introduction to flight mode

- Attitude mode (ATT Mode)

The motor can only be unlocked in attitude mode. In other modes, it cannot be unlocked. You need to switch to other modes after the attitude unlocks and takes off. In attitude mode, the terrain-following radar is disabled.

In the attitude mode, the fixed height and the fixed point are automatically switched according to the search satellite state. When there is no GPS or the GPS signal is not good, the altitude is set high, and when the GPS signal is good, the fixed-point flight can be determined.

- Manual job mode

In this mode, you cannot unlock and takeoff. You need to unlock the takeoff mode in the attitude mode and cut into this mode.

In this mode, the remote controls the water pump's on/off switch.

In this mode, the terrain-following radar function must be enabled by the APP. The remote control can briefly adjust the altitude, with the height reverting to the previous APP setting when the remote throttle is returned to the middle position.

- AB job mode

The AB point record must be recorded in the manual mode and cannot be recorded in the attitude mode, otherwise the AB job cannot be used.

In this mode, the pump is automatically turned on and the pump control mode can be debugged via the APP.

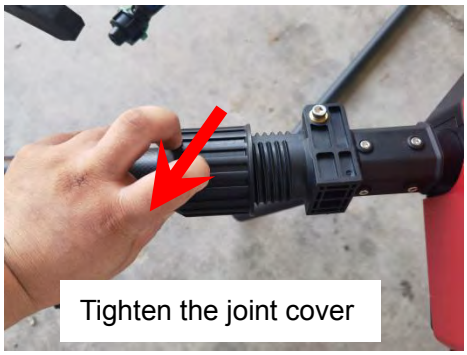
In this mode, the terrain-following radar is automatically activated and can be deactivated by the APP setting. The remote controller can temporarily control the altitude, and the height will automatically revert to the previous APP setting when the remote throttle is returned to the middle position.

4.2.2 Manual job mode (First flight after receiving the drone)

(1) First flight test with empty tank

Step 1: Turn on remote controller

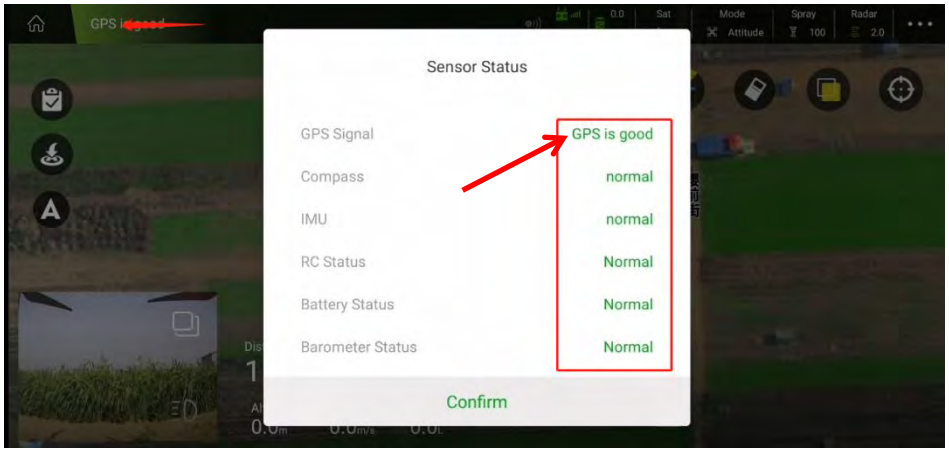
Step 2: Unfold the drone and connect the battery (fully charged battery before flight).



Step 3: Connect APP (section 4.1.1)

Step 4: IMU Calibration (section 4.1.5) and GPS Calibration (section 4.1.6)

Click the Status bar to check the flight control status. Takeoff is only permitted when all indicators are showing Normal or Good.



Step 5: Take off, please unlock motors and take off in ATT Mode.

① Unlock. Switch stick E in left position, push two rockers to the inside of bottom as below until motors start running at the same time, then release back to central position, the motor will keep idle running speed.

② Slowly push up the left rocker, the drone takes off slowly. When drone rises to the

altitude you want, release the stick back to middle position. The drone will be hovering in the air.

③ After take off, toggle E stick to middle - Manual job Mode, then slowly push the Left rocker or Right rocker to test the drone fly.

Step 6: Landing, manually landing via remote controller

① Please land the drone in ATT Mode.

②Switch stick E in left position, pull the left rocker down slowly below middle position and hold. The drone will land slowly by itself. Remember **DO NOT to pull down directly to the lowest position, otherwise, the drone will lose power and fall.**

④ After the drone land, pull the left stick downward to the lowest position. The engine stopped and the first flying test concluded.

⑤

Caution - Urgent lock .

In an emergency situation where there is a risk of harm to people or property, the drone can be locked in place such that the propellers stop spinning and the drone falls to the ground.

Note: You can also return & land the drone automatically in Manual mode. One key Return To Home and landing. Press Button A on of the remote controller, the drone will rise to Back Altitude – 5 meters by default setting, then return to the take off point and landing automatically.

(2) Fill some water and to test the spray system (Pump + Nozzle) on the ground

Or

Touch Button D on the remote controller to turn on pump & high pressure nozzle to test them.

4.2.3 AB job mode

Warning:

Obstacle Avoidance function open: works in any flight mode.

Terrain Following Function Open: doesn't work in ATT mode.

The pump automatically turns on and off during A B operation and route operation.

(1) Hold or toggle switch **E** to middle - Manual job mode

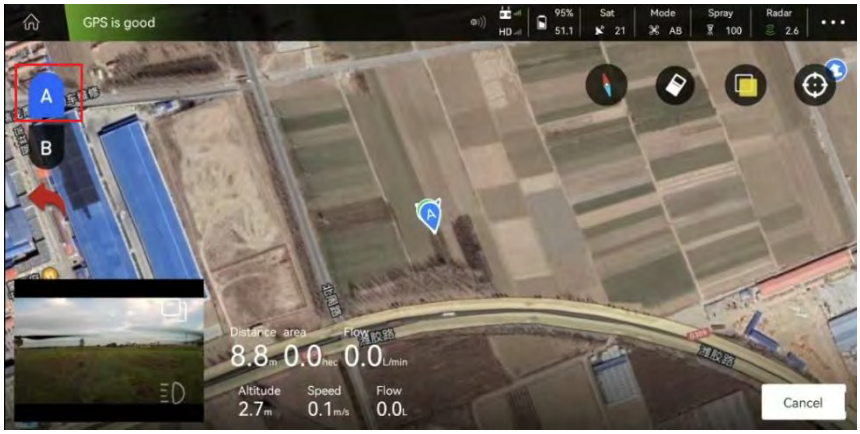
(2) Clear A&B point: before take off, quickly toggle switch F stick 5 to 10 times from left to right until the LED light flash Red – Green – Yellow three times.

(3) Stick F: left -turn OFF, Middle -Mark point A, right -Mark point B

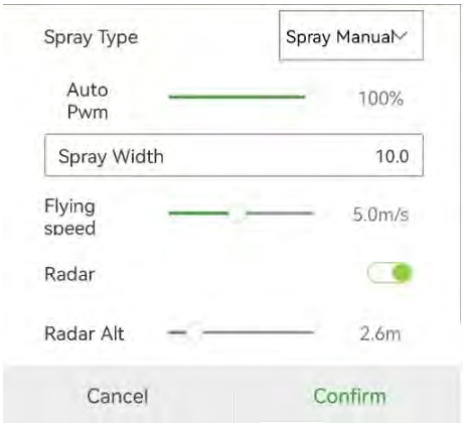
(4) Take off in ATT mode and fly the drone.

(5) Click A - AB. Enter into AB job mode.

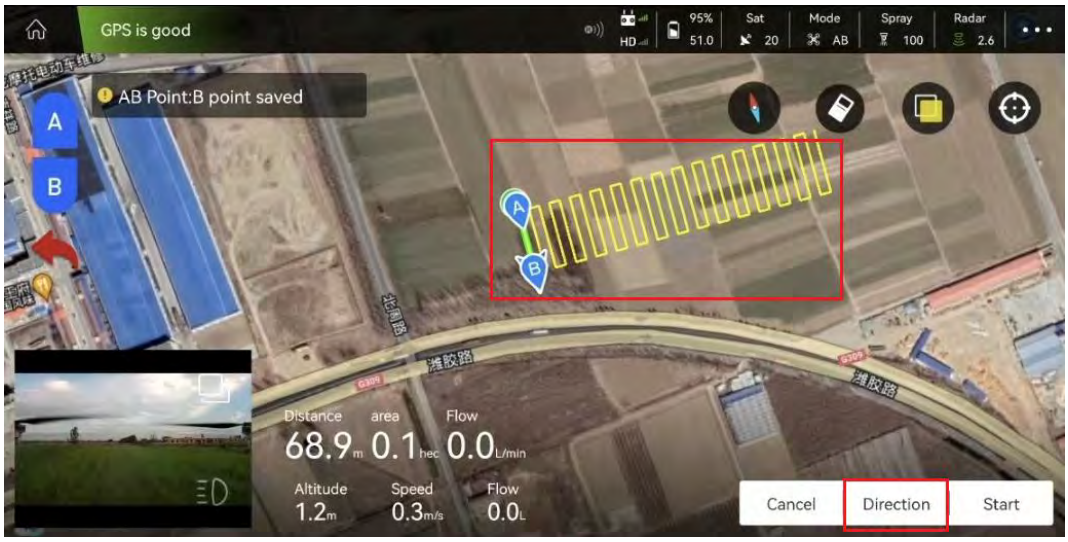
(6) Mark Point A: Operate the drone to fly to point A. Click A to mark point A, or switch Stick F to middle position. The LED light flashes yellow 2 seconds.



Then confirm the spray parameters in AB mode.

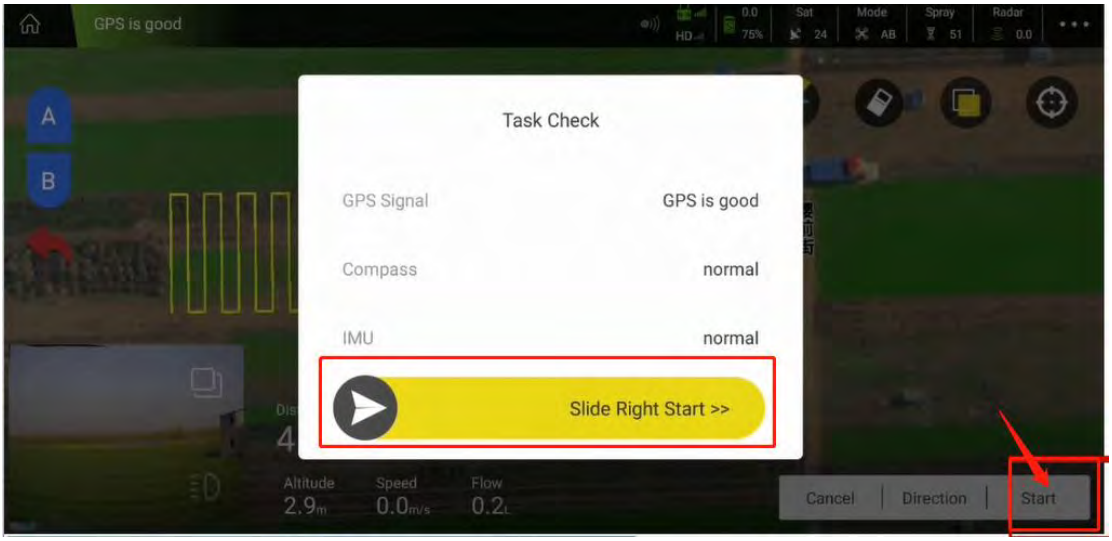


(7) Mark Point B: Operate the drone to fly to point B. Click B to mark point B, or switch Stick F to right position. The LED light flashes green 2 seconds.



After mark point B, the APP will automatically select the route to the left based on the route AB. Click "Direction" to switch to the right direction.

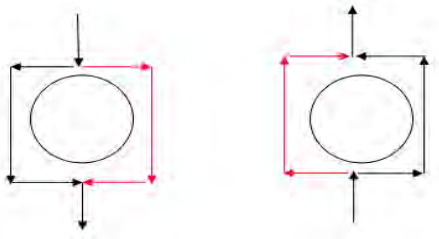
(8) Click "Start", slide the arrow, the AB job will start automatically.



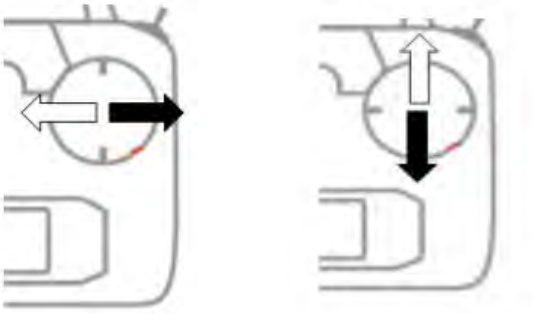
- During the AB job operation, the flying height can be adjusted by vertically moving left stick.

- During the AB job point operation, toggle switch E to ATT mode to exit the A&B point mode.

(9) Avoid obstacles during the AB job point operation. (Without obstacle radar)



When the drone flies in front of the obstacle, immediately shift the right rocker to the left or right until the drone reaches the edge of the obstruction, as depicted in image A below. Then, move the right rocker vertically and hold it as shown in picture B to cross obstacles, and then release the right rocker to the middle position. The drone will return to its normal route and automatically resume spraying.



A B

(10) Operation Resumption in AB job Mode

①Applicable conditions: Low medicine protection & Battery low voltage warning.

➢ Low medicine protection:

The default setting for low medication protection in APP is Hovering. When the pesticide is all used up, the drone will hover in place automatically and mark the break point. Toggle switch E to ATT mode to exit the A&B point mode.

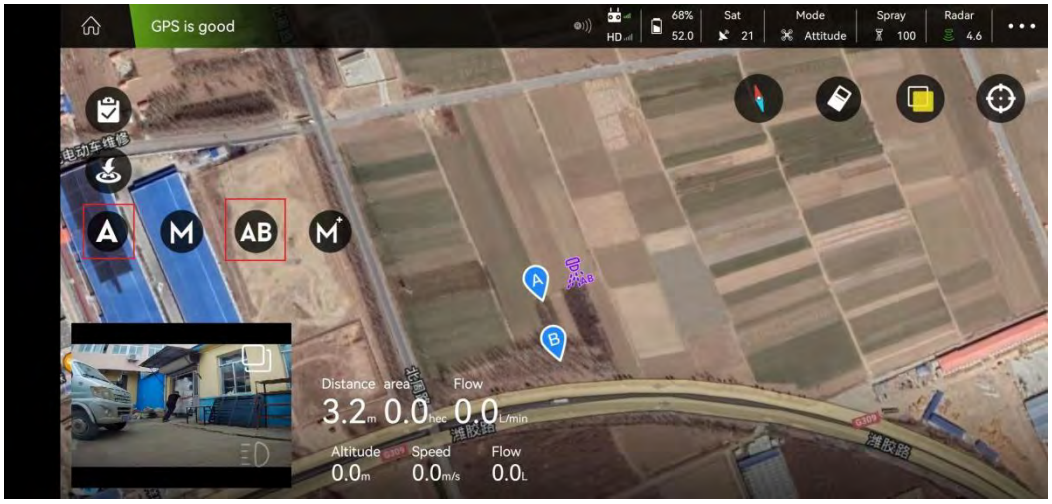
➢ Low voltage warning:

When the voltage is in second warning level, Toggle switch E to ATT mode to exit A&B point mode, the drone will hover automatically and record break point.

② Operation

Turn off spray system. Click A key return to Home button. The drone will rise to Back Altitude – 5 meters by default setting, then return to the take off point and land automatically. Back Altitude can be adjusted in App.

After the drone landing, promptly refill pesticide or replace full charged batteries. Take off in ATT mode, **click A - AB - Continue (or switch the E stick to the right).** the drone will fly back the recorded break point, turn on nozzle, the drone will continue AB job spraying work automatically.



(11) Once the AB operation is complete, kindly click End & one-key return to land the drone.

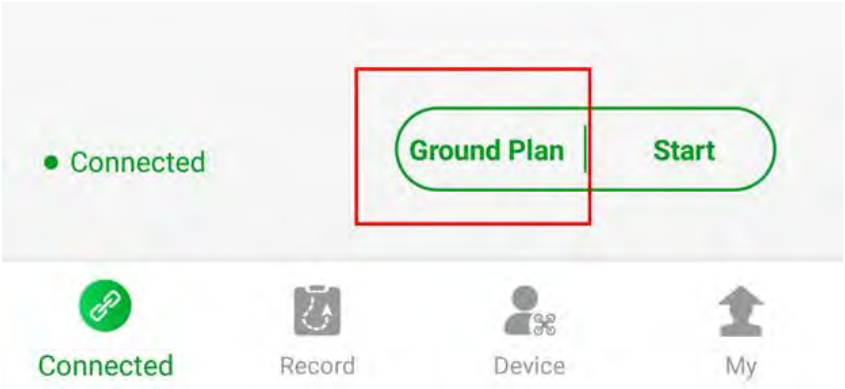
(12)

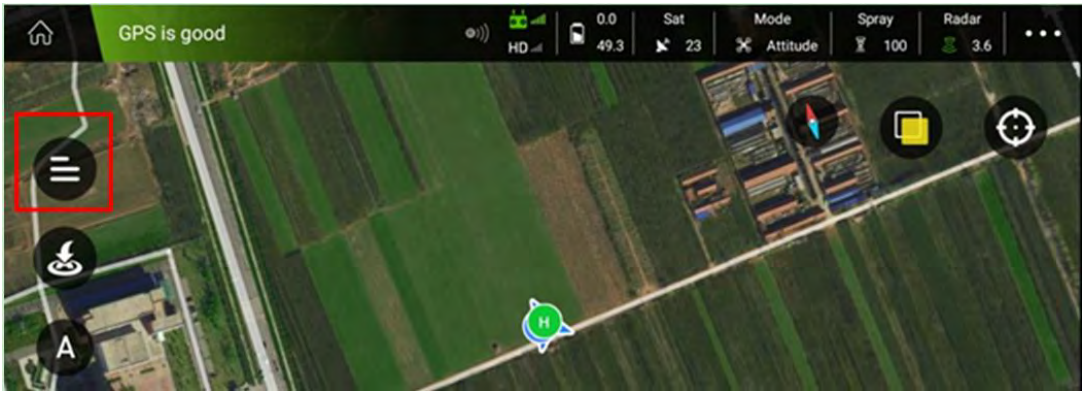
4.3 Route Operation Mode

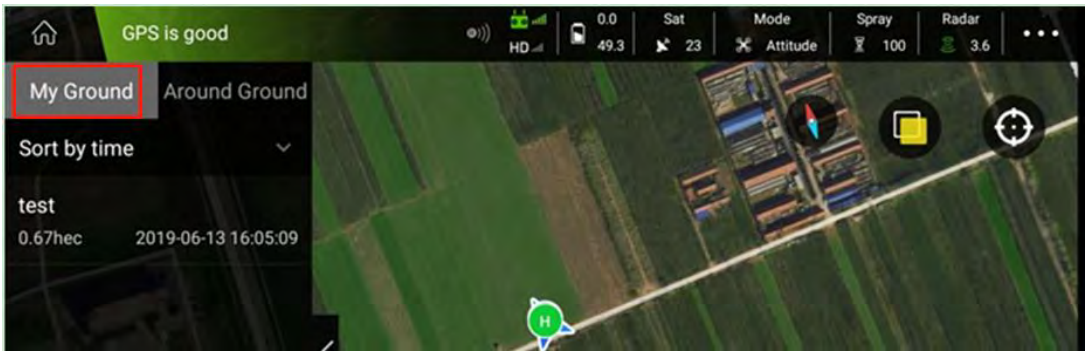
4.3.1 Ground Plan

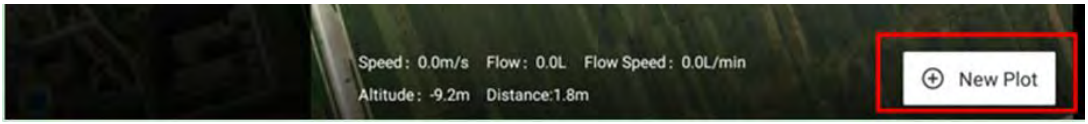
(1) Method 1: Map selection:

①Click “Ground Plan”，enter the APP, click the left main menu  --choose“my Ground”, then click the bottom right corner “New Plot”. Please as following picture shows:

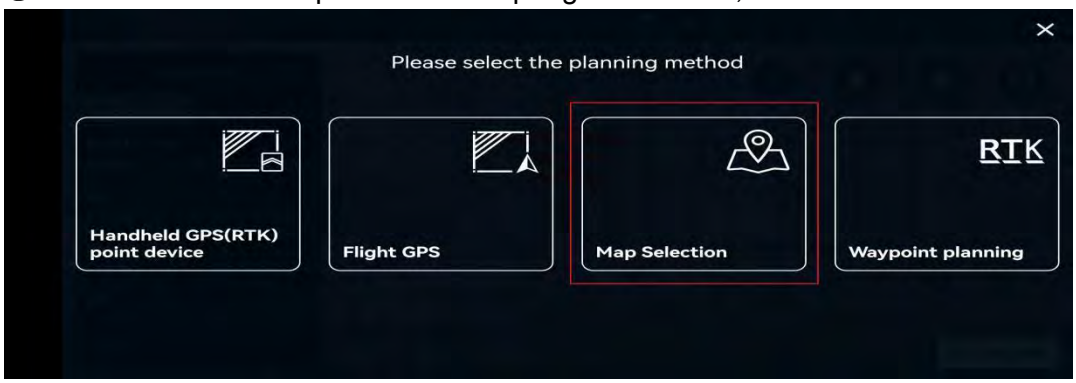


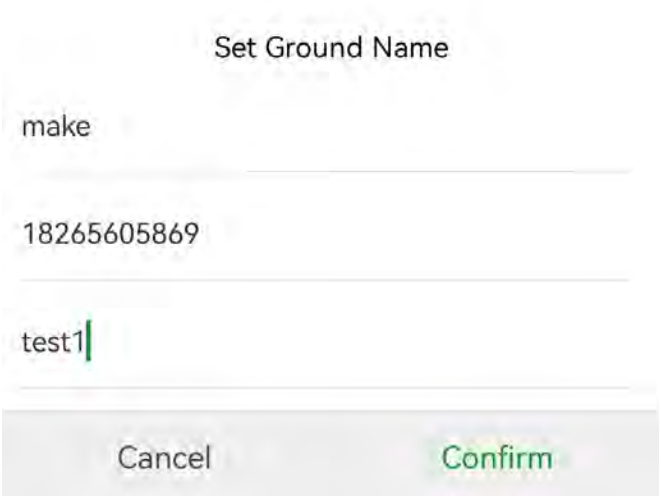




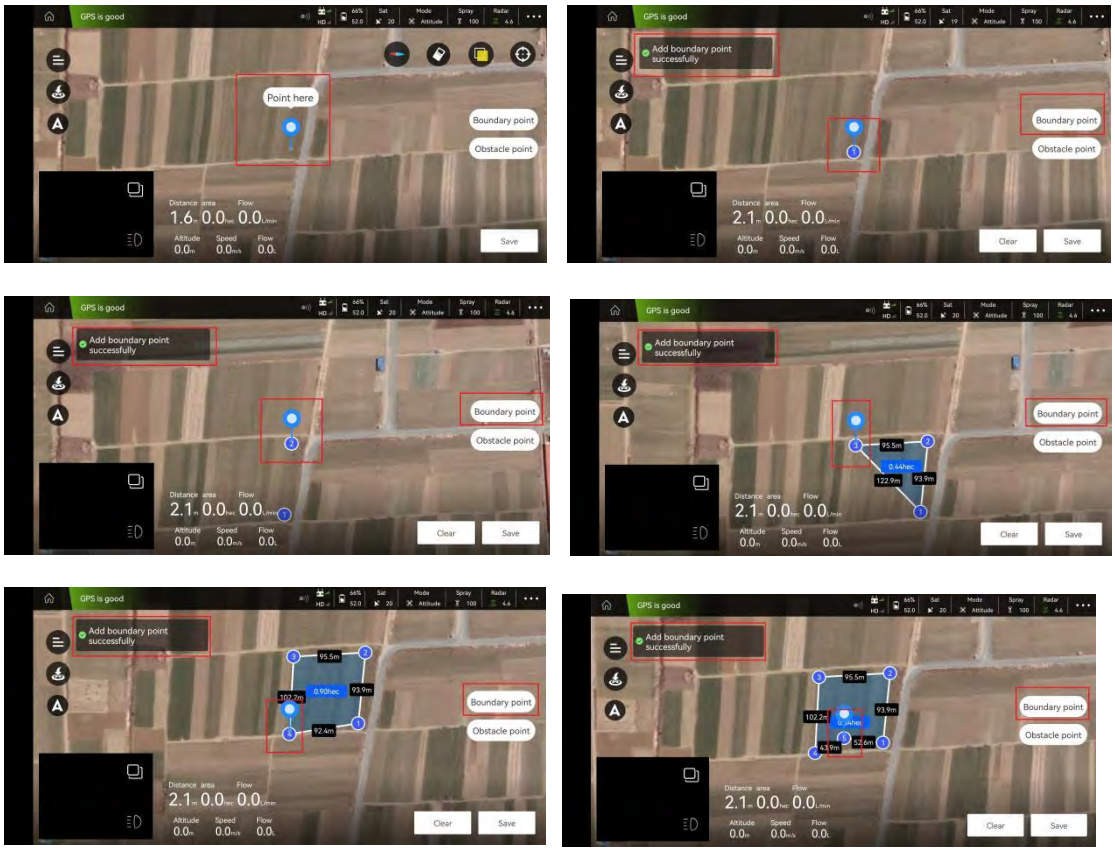


②Choose and click “Map Selection”--input ground name, such as “test1”--confirm.





③Please select the location on the map where the field will be sprayed. Such as point 1, click on the map, click “Boundary point”, then the App will remind you “Add boundary point successfully”. Repeat the preceding procedure and add points 2, 3, and 4... Up to 1,000 points can be added.



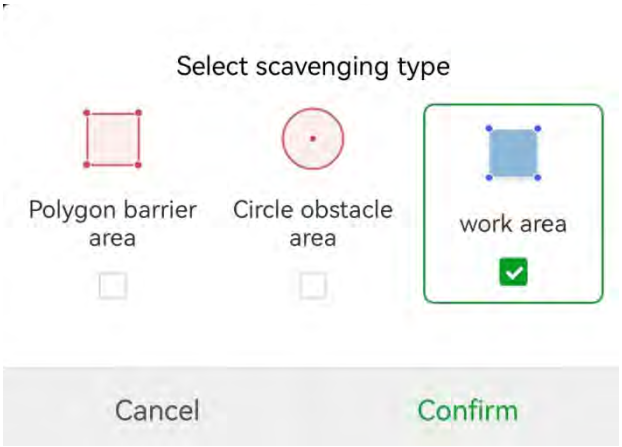
- Added point can be adjusted or removed.
-

--Adjustment: For example, click point 5. The app will display "Boundary point

adjustment," which you can alter by moving up/down/left/right; then click “confirm”

--Remove: If you wish to erase it, click the upper-right corner. 

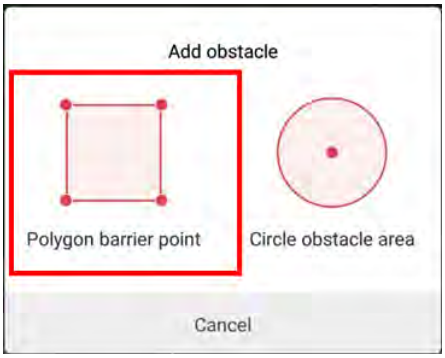
➢ Click the“clear”, you can delete the all obstacle area or work area. Click “work area” will delete all the points.



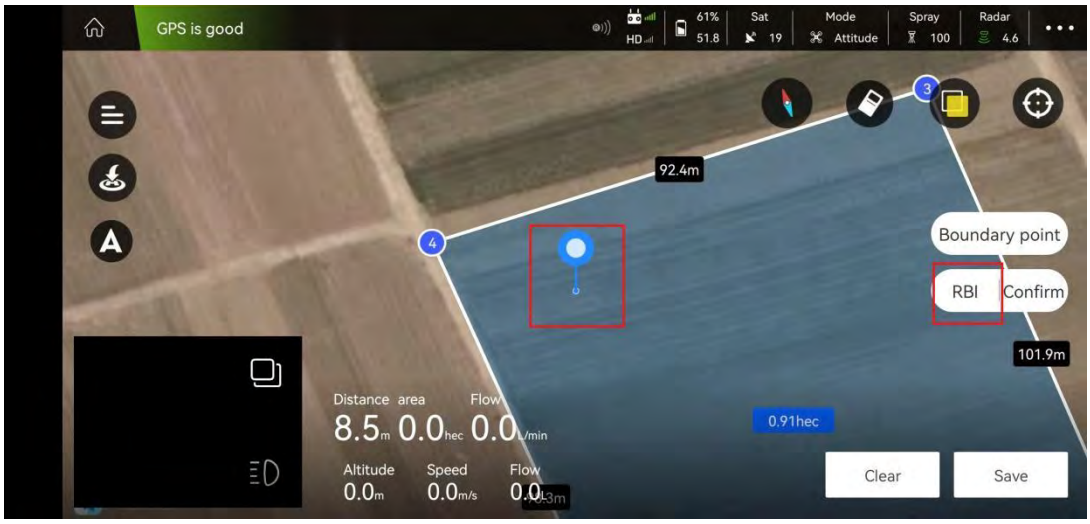
④ Add polygon obstacle area:

Click “Obstacle point”

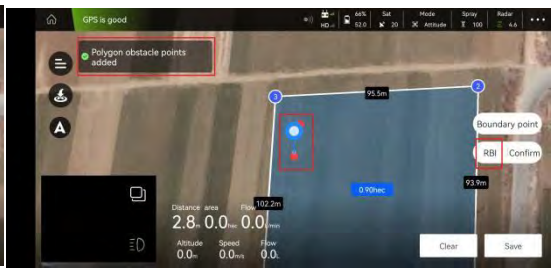
Click “polygon barrier point”--choose the obstacle site on the map.

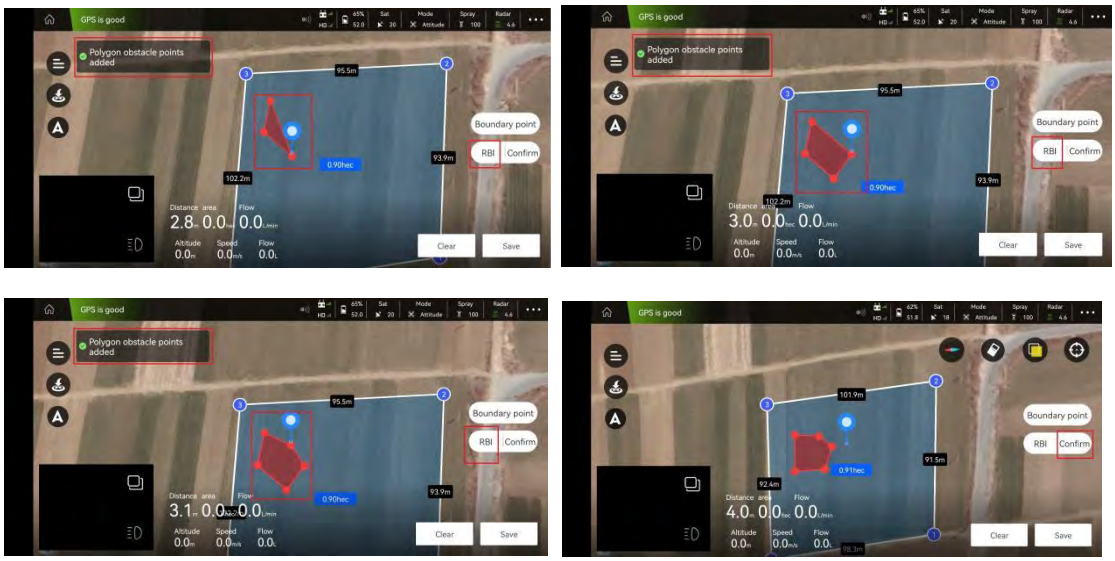


--By clicking "RBI," the red obstacle point will be displayed.



Repeat the preceding steps until the entire obstacle shape is drawn.

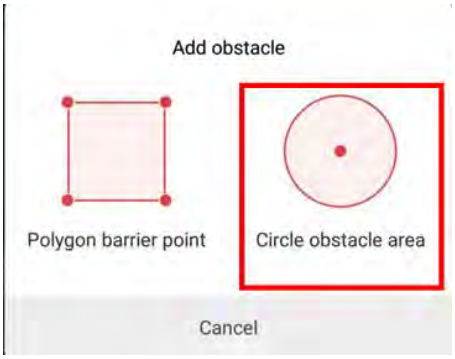




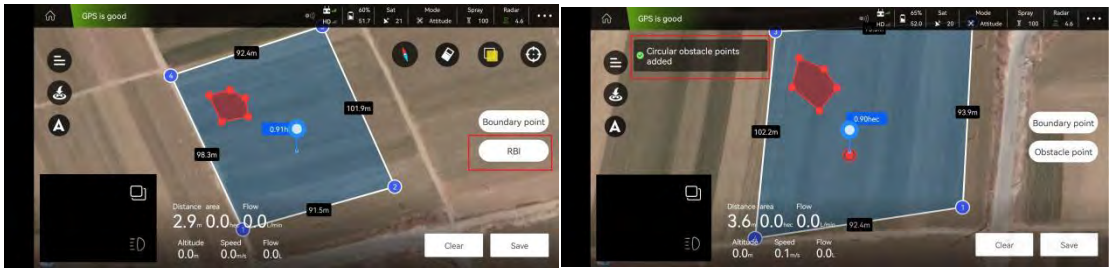
Click "Confirm" to save your changes.

⑤Add the circle obstacle area:

Click “circle obstacle area”

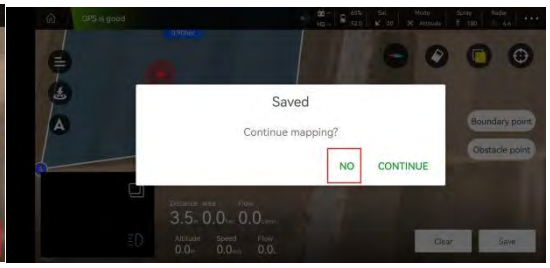


Select the obstacle site on the map--click “RBI”,



Click the red point to display the "obstacle adjustment" window, where you may alter the "radius" and "position." Click "Confirm" to save your changes. Clicking  will delete the obstacle point.

Clicking “Save” will finish and save the ground plan.

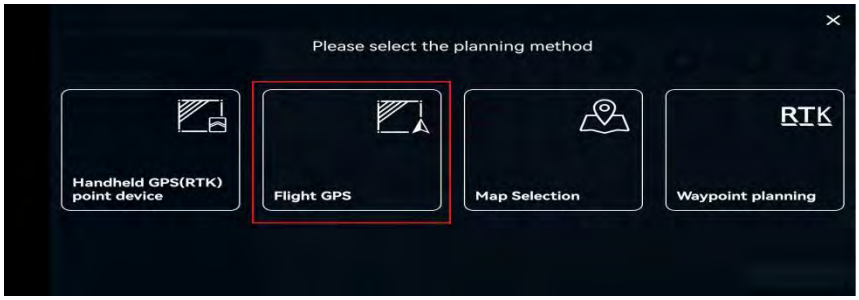


Completed.

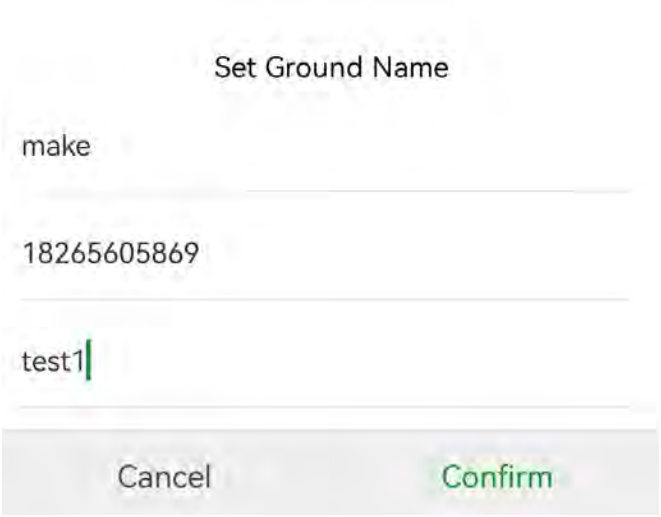
(2) Method 2: Flight GPS

①Click the icon “  ”. -“My Ground”, -“New Plot”

②Click “Flight GPS”



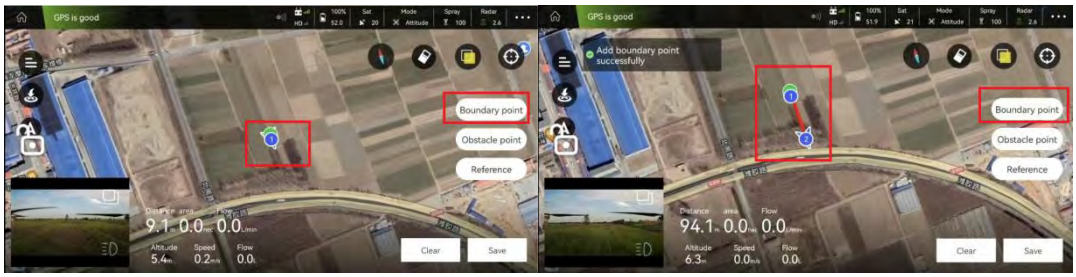
③Set Ground Name and Confirm



④In ATT mode, take off the drone.

⑤Please fly the drone to the required spraying area boundary point and hover it there.

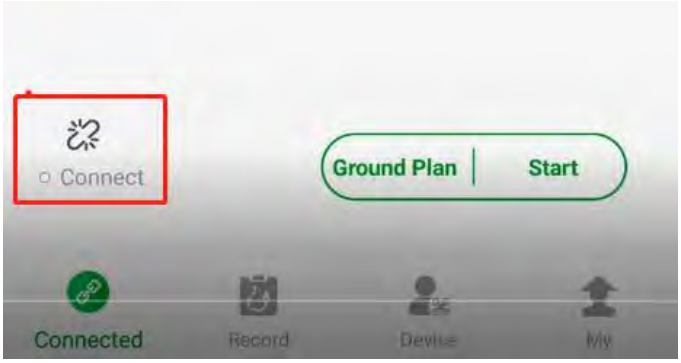
Click "Border" or "Obstacle" to add the boundary point. For further instructions, please refer to "Map Selection."



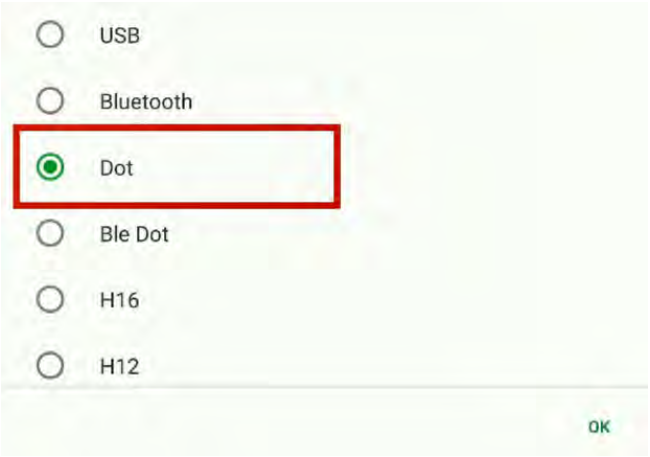
(3) Method 3: Handheld GPS point device (Optional part)

①Connect Handheld GPS point device with phone. Activate APP.

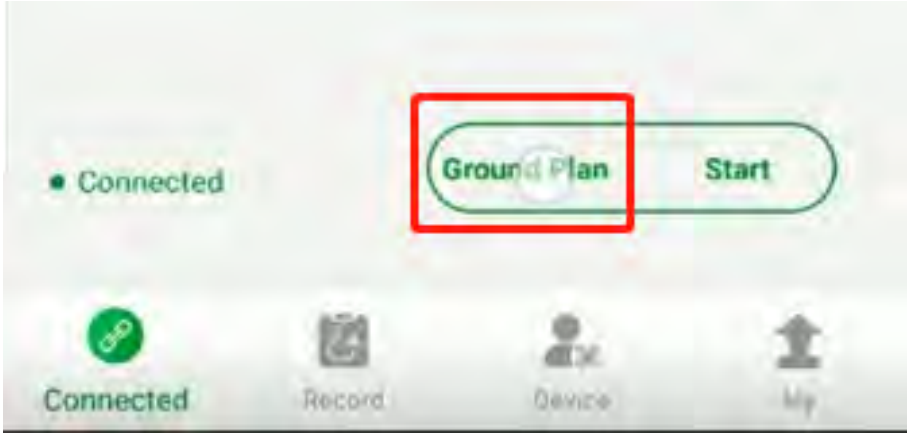
②Click “Connect”,



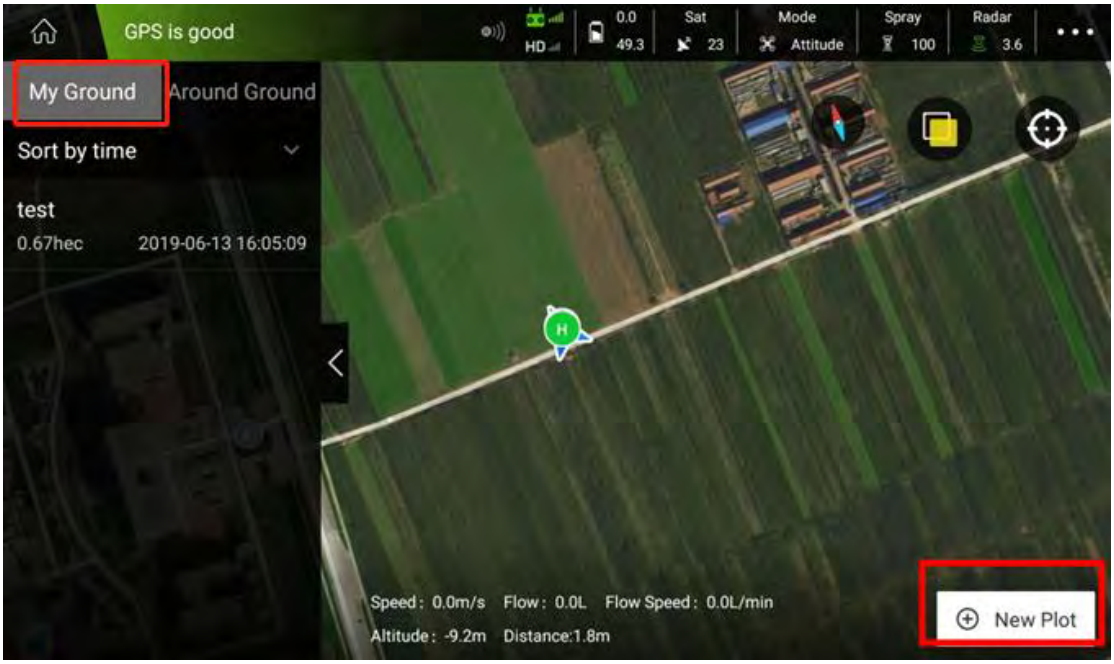
③Select “Dot”



④Click “Ground Plan”



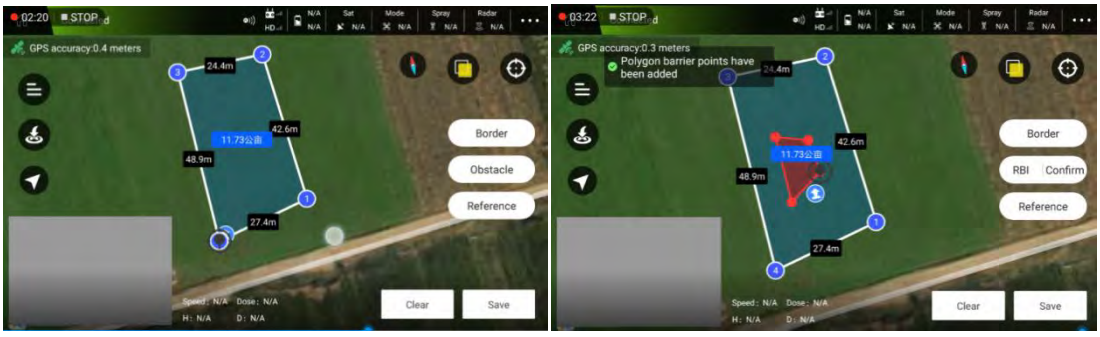
⑤Click “My Ground”, Click “New Plot”



⑥Click “Handheld GPS point device”

⑦Select the points when the GPS accuracy ≤0.5m

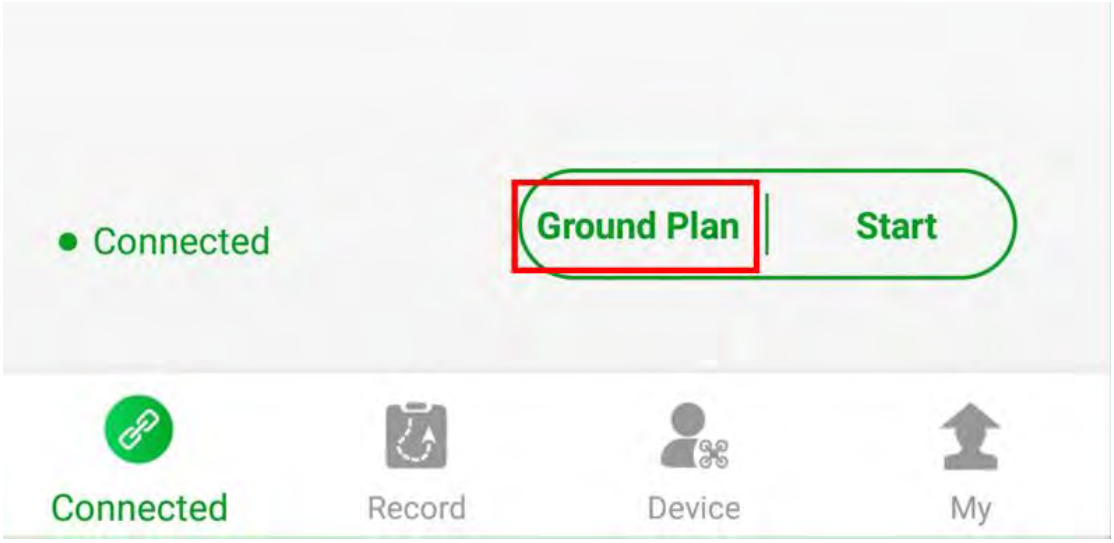
⑧The operator holds the mobile phone and the GPS device and walk to the needed area, click "Border" or "Obstacle" to add the boundary point. For further instructions, please refer to "Map Selection



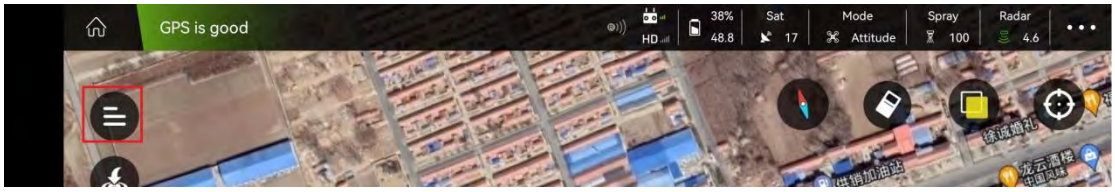
4.3.2 APP route operation begins

(1) Task Assignment

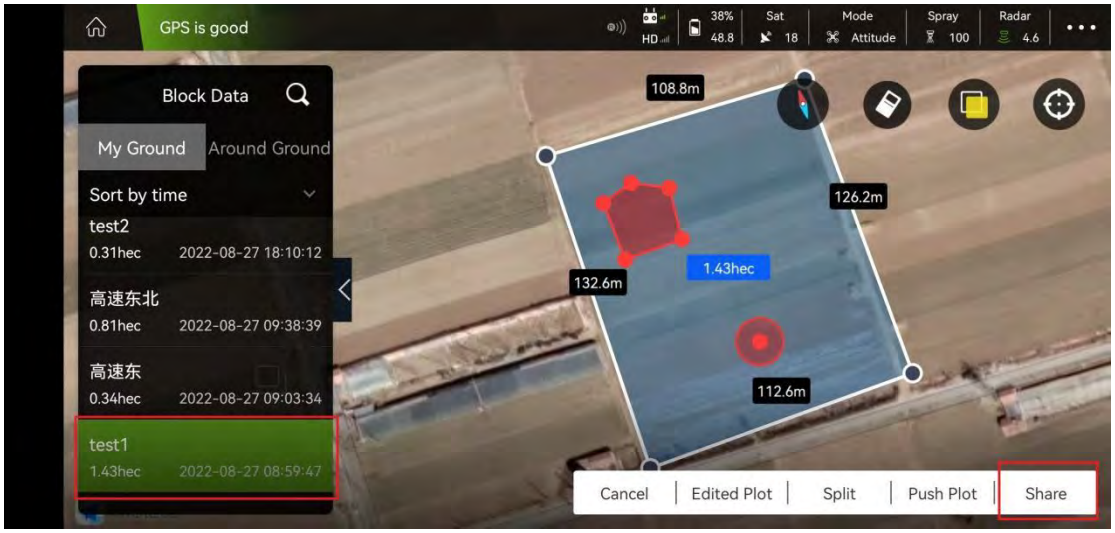
①Click “Ground Plan”



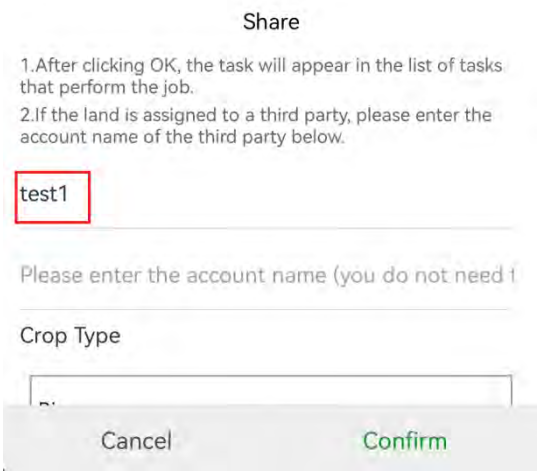
②Click  ,



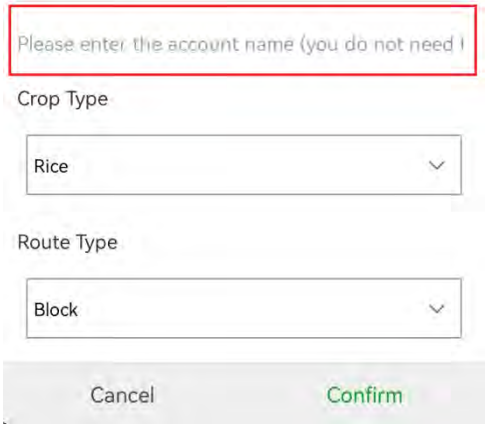
③Click “My Ground”, select the plot to be sprayed. For example “ test 1” in below picture. Then click “Share”



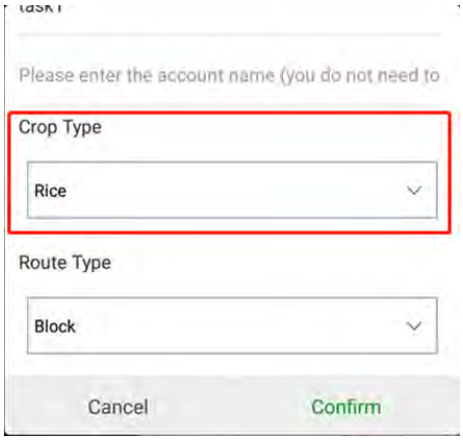
④Set the Task Name. For example “Task 1” in the picture below.



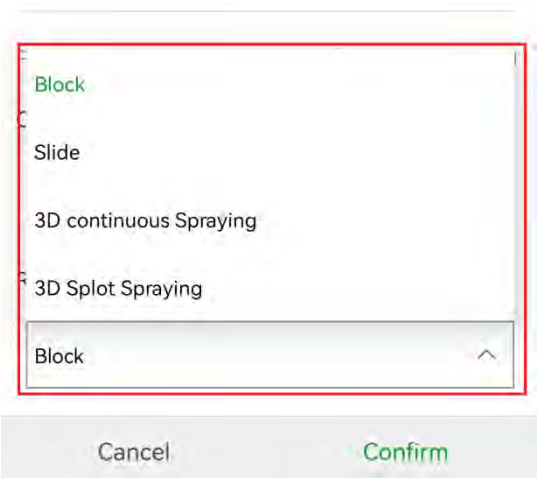
DO NOT input account name.



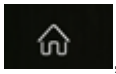
⑤Select “Crop Type”.

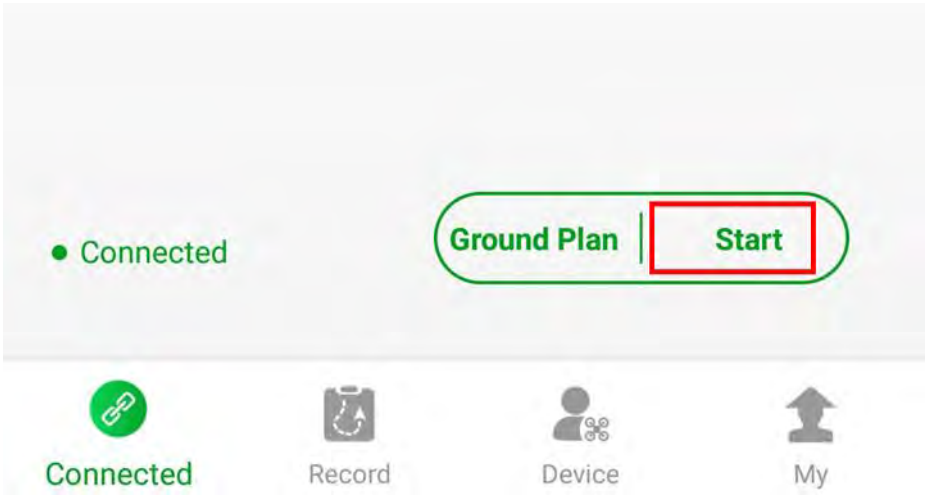


⑥Route Type. Select “Block” by default. Then click “Confirm”. Share the task successfully.

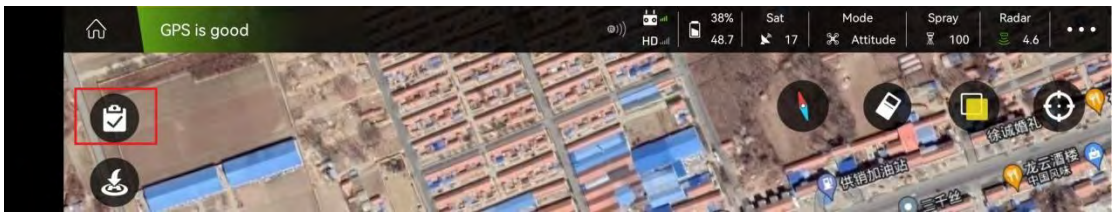


(2) Perform route operations.

①Click  , back to homepage. Click “Start”



②Click  , open the Job list.

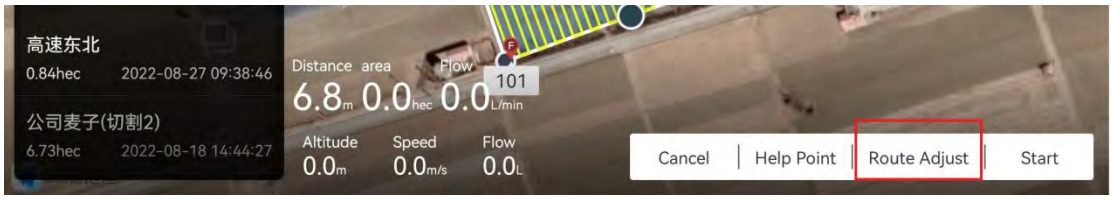


③Click “Wait-Job”, find the task named “task1” just shared from ”Test 1” ground. Click it.

④Adjust fly route.

➢ Click  , which can adjust the direction of the route.

➢ Click “Route Adjust”,



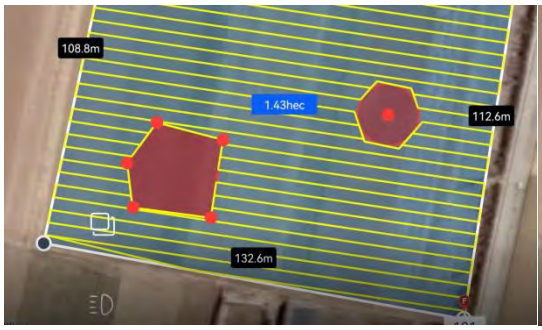
➢ Click “Spacing” and adjust spray width. It is recommended to keep the default settings : 6m

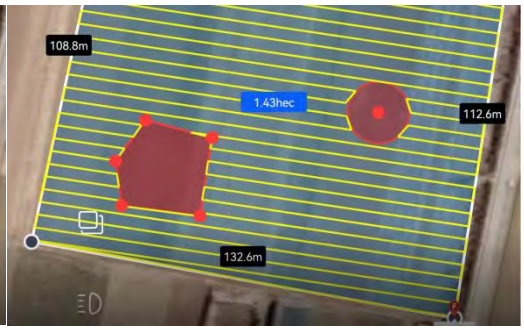
➢ Click “Indentation”, adjust the indentation distance between the plot and the edge.

➢ Click “Obstacle boundary distance”, adjust the indentation distance of the obstacle boundary.

➢ Click “Route Type”, choose how obstacles will be automatically avoided. It is

recommended to maintain the default settings - Cross.



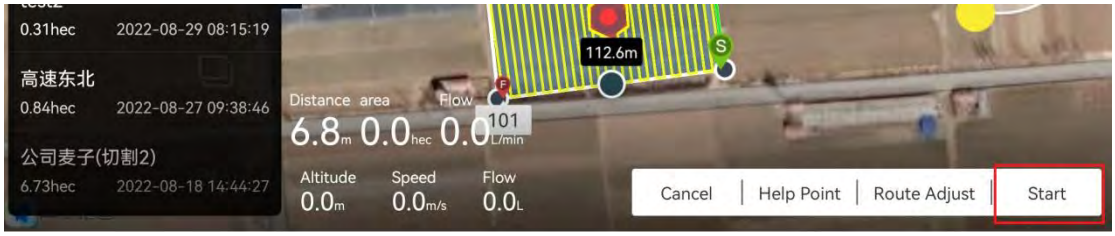


Cross Turn

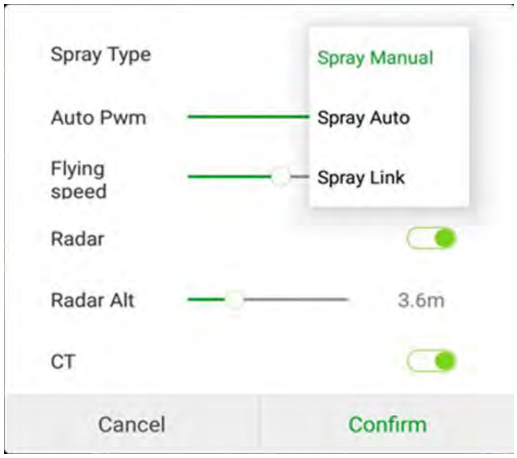
➢ Click “Route setting”, fine-tuning the planned plot location.

⑤Start flying.

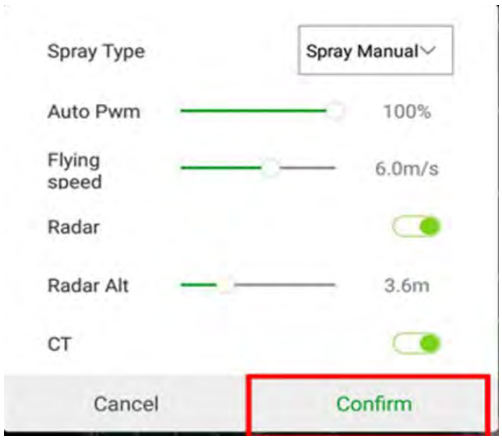
➢ Click “Start”,

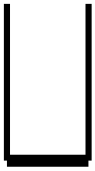


➢ Confirm again and adjust the flying parameters.



➢ After confirm the flying parameters, click “Confirm”.

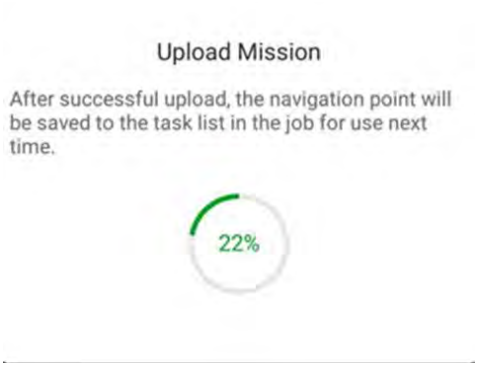




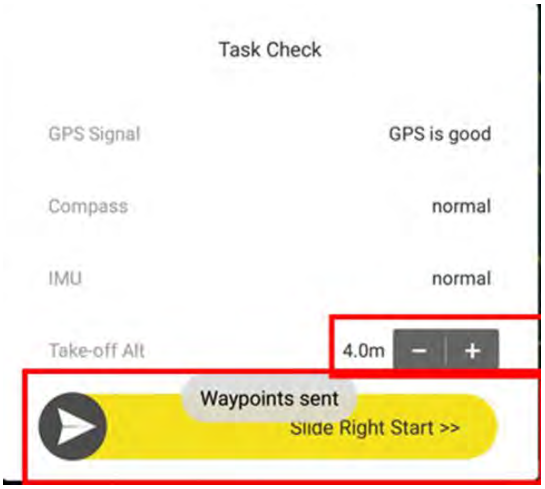
CT off (U off)

CT on (U on)

➢ Upload Mission



- Set Take – off Altitude. Note: The takeoff height must be higher than the crop height. Then Slide Right to Start.



- The drone will take off and fly to the start point automatically. Press "D" on the RC to activate the Nozzle switch for automatic spraying.

If your drone is not equipped with a terrain following radar, or if you turn off the terrain following radar function, the drone will automatically fly at the altitude set by the takeoff altitude.

If your drone is equipped with a terrain-following radar, it will automatically change its altitude to the radar's specified height after takeoff if the radar is turned on and the Radar Altitude is set.

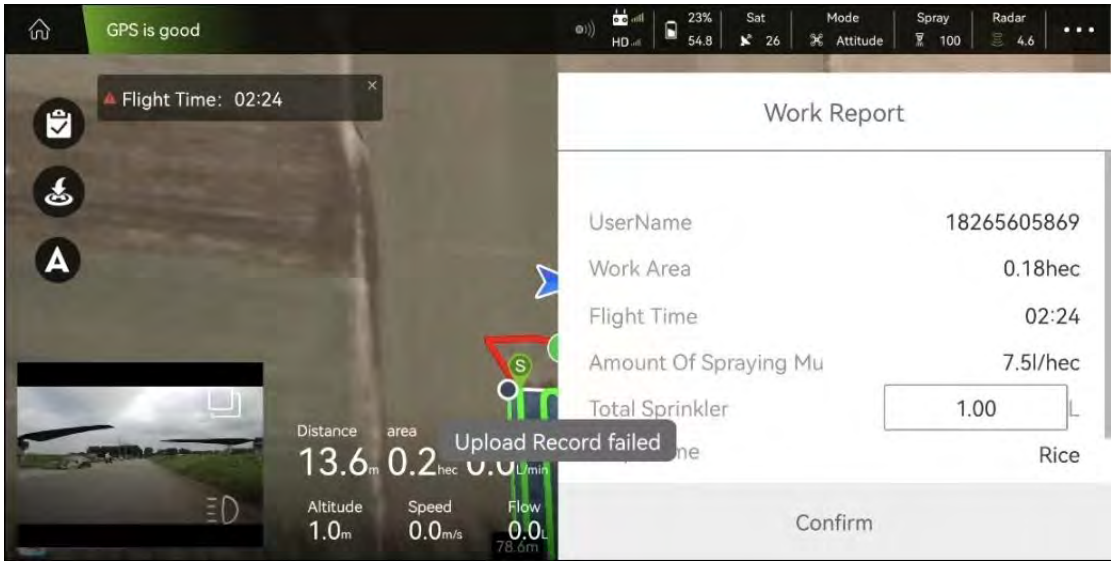
- After drone arrive the start point, the water pump will turn on automatically. Start spraying. The route followed by the drone will be indicated in green.

- The drone will automatically bypass the marked obstacles.

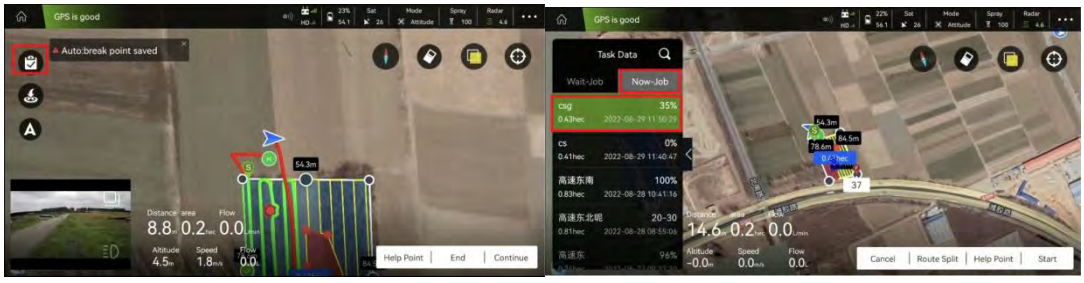
The liquid breaking alert will be flashed when the liquid in the medicine box is depleted. The drone will cease spraying automatically and hover by default. It will also record the location of the break point.

- Return and land the drone by click  in APP, or toggle G stick on RC or manually operating by RC.

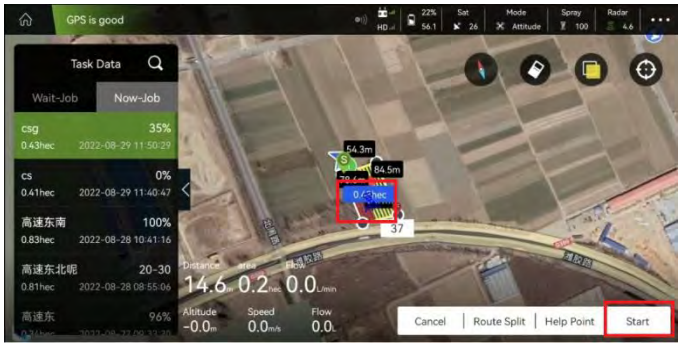
➢ Click “Confirm”.

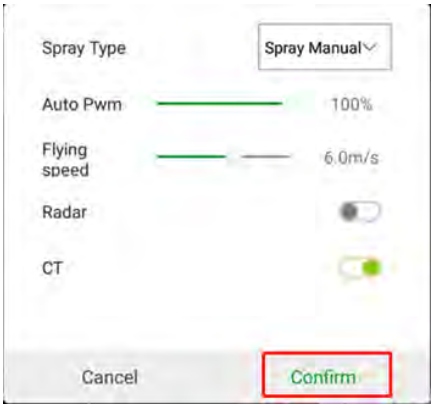


➢ Fill the liquid again and replace the batteries if necessary.Click  , select “Now Job” list. Activate the ongoing process "task1"

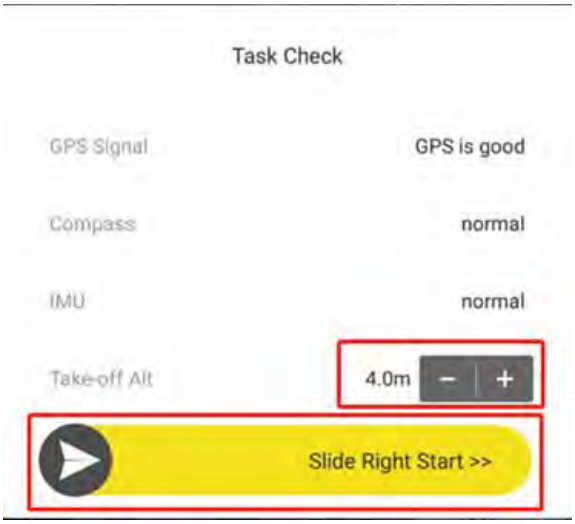


➢ Click “Start”, confirm fly and spray parameters again, click “Confirm”.

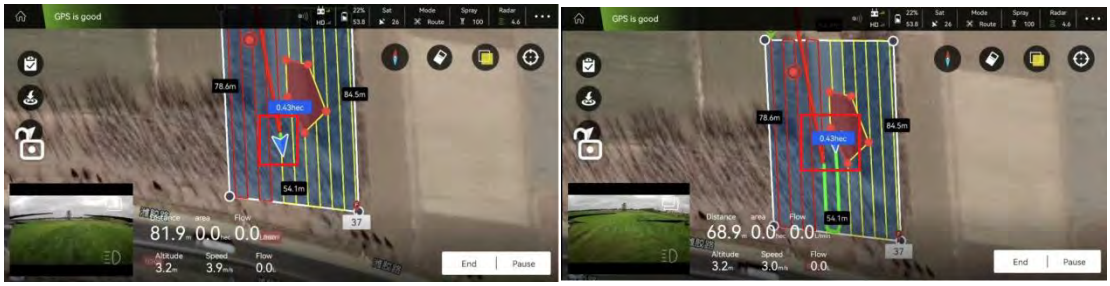




➢ Set Take-off Altitude, Slide to restart.



➢ The drone will automatically take off and return to the recorded break point. The spraying operation will then resume.



➢ To finish the spray work, please click "End" or "Pause" after the work is complete.

5 Maintenance and Upkeep

To ensure flight safety and optimal performance, performing comprehensive and regular maintenance is recommended. This manual is intended to assist users in maintaining their drone and maximising its dependability. Please remember that the most efficient approach to extend the life of your drone is to inspect it before and after each flight in order to check for entrapped items and damaged parts, and to schedule repairs as needed.

We recommend conducting a pro flight checklist each time you use the drone as outlined below.

Post-Flight Checklist

5.1 Cleaning drone after finish spraying

① Clean the drone immediately after finish spraying. Keep the drone away from sand and water, and wipe them down if they've been exposed to sand or water.

Please note: Use a soft brush or wet/dry towel to clean the drone. DO NOT rinse the drone with liquids.

② Batteries: Verify that the battery's connection to the drone is dry. Towel-dry the drone and battery prior to storage.

③FPV camera and terrain following radar: Ensure the camera and radar are dry.

④ Drone arms: Ensure that the arms and folding joints are dry before unlocking and folding. Use a compressed air duster to dislodge any granules of sand or other debris that may have become stuck in the connector or arm.

⑤ Remote controller: Ensure the remote controller are clean. Check that each stick, switch and button are working properly. Use a compressed air duster to remove small items, like sand, that have become caught in the stick or switch.

⑥ Clean spray system: Fill the spray tank with clean water, open pump to spray water through nozzle until the tank is empty. Avoid residual pesticide blockage and damage to the spray system.

⑦ Clean spreader system: clean the residue inside the spreader tank and spreader. It is advised to use dry compressed air and a clean, soft, dry towel. DO NOT rinse with liquids.

5.2 Checking for worn and loose parts

① Motors: Remove the propellers and turn on the motors. Please replace the motors if you hear any unusual noises.

②Propellers: Check for cracks in the propellers and replace them if necessary. Verify that the propeller base screws are tight.

③ Screws: Check all the screws on the drone are tightened.

④ Ensure that the folding joint can be connected/disconnected smoothly.

⑤ Check the following parts for signs of wearing: wires, hoses, propellers, landing legs and motors.Please replace them if they appear to be broken or worn.

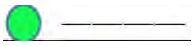
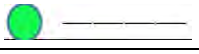
6. Updating Apps and Firmware

Aolan keeps updating the firmware and software, we will inform you once the new version released, please DO NOT update the software without Aolan permission.

Make sure you are using the latest firmware and App when flying Aolan Series drone:

Contact Aolan to check the latest firmware version:
Email: service@aolandrone.com

7. LED Status description

Indication of Flying Mode	**Status Indicator**		**Priority Level**
Attitude(ATT-STA, ATT-ALT)	green indicator blinks once		Low
Manual Job mode(angle, speed)	green indicator blinks twice		Low
Function mode (During AB job or APP routing job.)	green indicator blinks three times		Low
Self-driving mode(ground station control, return-to-home)	green indicator blinks quickly		Medium
Indication of GPS	**Status Indicator**		**Priority Level**
Disconnection of GPS or GPS didn't receive the satellite	red indicator blinks three times		Low
Poor GPS signal	red indicator blinks twice		Low
Ordinary GPS signal	red indicator blinks once		Low
Strong GPS signal	No blink of red indicator		Low
RTK positioning	yellow indicator blinks once		/
Indication of Low Voltage Alarm	**Status Indicator**		**Priority Level**
Level one alarm	yellow indicator blinks three times		Low
Level two alarm	yellow indicator blinks quickly		High
Indication double-faced of calibration	**Status Indicator**		**Priority Level**
Horizontal calibration	Yellow indicator is solid on		Medium
Vertical calibration	Green indicator is solid on		Medium
Calibration failure	Red indicator is solid on		Medium
Calibration success	Alternating blink among red, green and yellow indicators		/
Indication of accelerometer Calibration	**Status Indicator**		**Priority Level**
Being calibrated	Alternating blink among red, green and yellow indicators		Medium
Calibration success	The green indicator is solid on		Medium
Calibration failure	Red indicator is solid on		Medium
Indication of Abnormal status	**Status Indicator**		**Priority Level**
Lost control of remote controller	Quick blink of red indicator		High
Compassisdisturbed/ abnormal	Alternating indicators blink between green and yellow		High
GPS loses the signal	Alternating blink between green and		High

	red indicators		
IMU vibration is too fierce/ abnormal	Alternating blink between red and yellow indicators		High
Indication of other Status	**Status Indicator**		**Priority Level**
Initialization of power on	Alternating blink among red, green and yellow indicators		High
Unlock	Alternating blink among red, green and yellow indicators		High
Unlock failure	Red indicator is normally on		High

8. Basic Maintenance

(1) Spraying system

- Whether the nozzle is not spraying normally, check to see if air is trapped in the hose; if so, releasing the air from the nozzle and the pump should fix the issue.
- Inspect the tank & pump inlet/outlet if stuck.
- Inspect if pump ESC is burned. If ESC signal cable is connected incorrect pump will have beep sound.
- Inspect if centrifugal nozzle ESC is burned. If signal cable is connected incorrect centrifugal nozzle will beep.

(2) Drone flight is not stable

- Inspect all the spare parts are in good condition and connected well, all the screws are fastened.
- Calibrate IMU
- Remote controller warn “Please relink”
- Examine whether the remote receiver has a red or green light. If the indicator is red, please reconnect it.

(3) Remote Controller can not unlock

- Ensure all the sticks are in correct position
- Calibrate IMU
- Calibrate remote controller sticks
- Inspect remote controller settings if changed carelessly: RC channel and Reverse

(4) Remote Controller warn “throttle not idle”

- Pull throttle stick to bottom

(5) GPS Calibration Failure

- Ensure there is no magnetic influence in the environment
- Move SC stick fast and continuously until LED turns correct color

- Change place and calibrate again

(6) App Disconnected

- Ensure using Android cellphone/tablet with OTG function and OTG in turned on
- Inspect the USB cable and OTG cable connections are correct
- Change cellphone/tablet and try again

(7) Replacement & Calibrations After Crash

- If the motor direction is incorrect, switch any 2 of the 3 ESC signal wires until the direction is correct.
- If the motor/centrifugal nozzle/pump emits a beeping sound, check the ESC to see if it is burned, unplugged, or connected incorrectly. Change the connection sequence of any 2 of the 3 wires until the beeping stops.
- If changed ESC or motor, calibrate ESC (FOC power system no need calibrate ESC)
- Calibrate IMU and GPS before fly again

(8) Digital Fence

Drone flight is restricted to the area inside the red circle. Default height is 30m, radius is 300m. If you want to fly far need change the settings on Assistant.

9 Technical support

Please contact Aolan Company or your sales to get technical support .

10. FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular

installation. If this equipment does cause harmful interference to radio or television reception,

which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

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

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

To maintain compliance with FCC' s RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna.

山东翱蓝无人机科技有限公司
Shandong Aolan Drone Science & Technology Co., Ltd.
Add.:No. 6888, Jiankang East Street,Weifang Hi-tech Zone, Shandong Province, China

Website: http://www.aolandrone.com
E-mail: sales@aolandrone.com