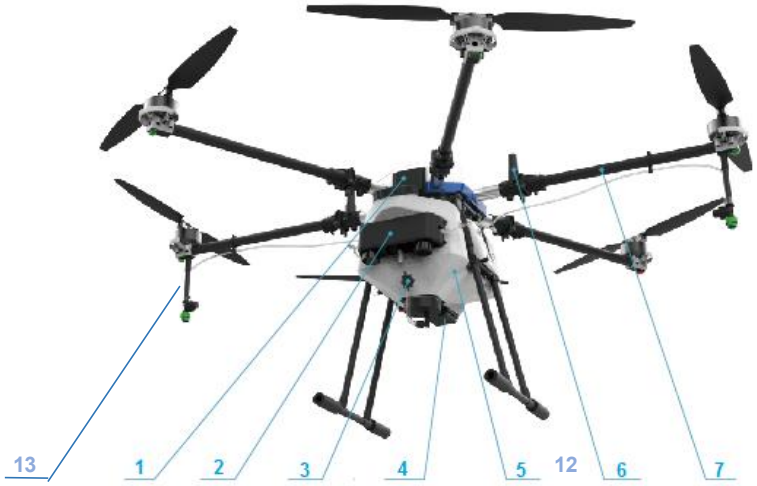
TTA M6E-G200 USER INSTRUCTIONS V3.0

TT AVIATION

Beijing TT Aviation Technology Co.,Ltd.

Make sure the pilot is well-trainned in operating UAVs before going on mission.



Item	Component	Item	Component
1	Obstacle Avoidance Radar	8	Intelligent Battery
2	Pump	9	Electronic Box
3	Flow meter	10	Camera & LED
4	Terrain Follow Radar	11	Main Body
5	Tank	12	Tank Holder
6	RTK Antenna (optional)	13	Sprinkler
7	Arm		

Version Description			
Version	Data	Contents	Editor
V1.0		First release	Chris
V2.0		Change to H12 remote	Chris
V3.0		Page 44，”Auto Avoid Route” contents update	Chris
		Page 14, update battery attentions	Chris

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1.Use Instruction

1.1 Safety Instruction

- The product is not suitable for the ones who are less than eighteen or who do not have full capacity for civil conduct.
- The product have bigger fuselage size, high speed rotary and strong flight dynamics. At runtime have a certain dangerousness . Not in accordance with the requirement operation and usage will cause to potential danger and hurt.
- When using this product, please keep away from airport, railroad, high speed road, high buildings ,electric wire and other dangerous environments.
- When using this product, please keep away from mobile phone base stations, high power transmitting equipment, and other high electromagnetic interference environments.
- When using this product，please keep away from army and kinds of manned craft flight area.
- Don’t use this product in rain, thunder, sandstorm, fog snow ,high wind ,and low temperature and other bad environments.
- When flying in more than three kilometers. Environmental factors can lead to flight performance degradation, please care of using it.
- When operating this product fly in low sky .Please always keep UAV and people & animals in a safe distance of ten meters
- When using this product in desert area, please keep UAV within the range of operator’s eyes
- Don’t hover or fly over the crowd, Don’t be delight in scaring others.
- When it is close to the crowd ,please land this UAV as soon as possible and guide people to keep and avoid potential accident.
- Don’t operate it in the area of children playing.
- If not in the extreme necessary condition, please do not power off when flying in the air.
- You can not fly it you are in drinking , tied, drugs, physical ,discomfort, etc. .

- Please inspect it before using very time, including but not limited to parts of fastness, organism and propeller of cracks, and abrasion ,battery ,the effectiveness of light. When error happens, please stop using immediately and replace the corresponding parts.
- Abnormal working state of the UAV maybe happen accidentally, don't open the propellers and forcibly fly with wrong.
- Do not try to prevent the moving parts while working.

1.2 Chemical Usage

- All chemicals are poisonous. Please be careful and work strictly according to the safety instructions of chemicals.
- When dispensing, please use clear water. If not, will cause jams mesh of impurities. If it is blocked, please clear it before reuse
- When dispensing , please note that liquid sparks and the chemical residue in fuselage will be harmful to human body.
- When dispensing, please pay more attention and use protective tools, and do not let body directly touch with the chemicals; After chemical spraying, please clear your skin, copter and remote control.
- When changing chemicals to spray, user should clean spray system completely, or there will be interaction between different chemicals
- Spraying shall be carried out in windless sunny day, don't spray under high temperature at noon. Pilot should stand in the upwind area outside the operating area; Not suggested to perform missions if wind speed is above 5.4m/s
- When spaying ,if you feel uncomfortable ,headache or dizzy, please leave the site at once and rest. If once severe symptoms occur, immediately be sent to hospital.
- Chemical effect and the solution concentration, spray rate ,copter high from crops ,wind direction, wind speed and so on are close related. When using chemical should consider the above factors, to achieve the best effect. Please make sure that do not damage the human beings and animals and surroundings during the process of sprayings.
- When using chemical , do not pollute river and drinking water

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1.3 Inspection

- Before flying, ensure the battery is enough
- Ensure all the parts are installed firmly, and all the screws are tight as required.
- Ensure all the wires are correctly linked.
- Ensure all parts goes well. If it is broken or aging, please replace timely.
- Before flying, carefully check the propellers installation direction、rotation direction, control and others.
- Ensure all the propellers are fine, no any scratch and tightly installed.
- Ensure the sprayer is fluent without any clogging and work normally.

1.4 Environment

- While flying, please ensure the UAV away from the crowds, dangerous goods, high buildings, high-voltage wires and others. Please fly the UAV in a dedicated space.
- Please ensure the UAV fly within the operator's eyesight.
- The UAV working temperature is between 0℃-40℃.
- Ensure the UAV fly within the permit of local law and regulations.
- To fly the UAV safely as required, please fly it within in the height of 50 meters. If it has local flying height limit within 5ometers, please make sure obey the related regulations.

1.5 Operation

- Please ensure the multi-rotor UAV flying height is within 8 meters, except the special requirements.
- Before remote control calibration、hardware update, parameter setup, please remove the propellers and avoid the potential moving suddenly.
- Remove the battery if it does not fly, to avoid flying it when touching the remote control once.
- Please remove the batteries once landing. Do not move the UAV when it is in power.
- Do not touch the joy stick mistakenly, and prevent start the UAV.
- When it is powered, please stand in the safe distance of above 10 meters.
- Ensure the propellers completely stop and power off.
- Please switch it to the manual operation mode when errors happen. When the manual

operation mode does not work, please press the emergency bottom. Please keep away from the crowd.

- When the battery is damaged, please ensure it is stored in the disposal area and avoid spontaneous combustion. In order to protect environment, please don't throw batteries randomly. And consult the maker about the proper disposal method.
- During the flight, don't fly overload and do not cause any potential dangers.
- When low battery is warning, please return as soon as possible.
- Ensure that the remote control and battery is enough, to ensure that firmware has been updated to the latest version.
- Ensure flying sites outside of the restricted areas and is proper for flight . .
- Please make sure do not fly or operate the UAV when you are drunk or with medicine limitation.
- Be familiar with the remote control operation & each flight mode, and ensure you know how to operate the control condition.
- User shall know and obey all the law and regulations in flying location.

1.6 Compass Calibration Requirements

- Compass has to be calibrated before using the first time. If else, it cannot work and will affect flying safety.
- Please do not calibrate it in the place close to the high-magnetic field or big metal materials, such as high-voltage, magnet, parking lot, concrete iron building, etc.
- When calibrating, please do not bring the magnetic materials, such as keys and cellphone.
- If it is calibrated indoor, please do not re-calibrate it outdoor. It prevents that the two magnet differences cause the potential flying data errors.
- Magnetic field location is different, please make sure re-calibrate when it changes to another place from the previous one.

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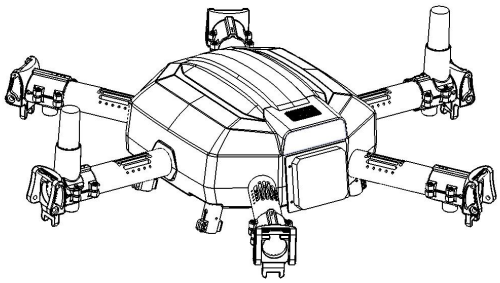
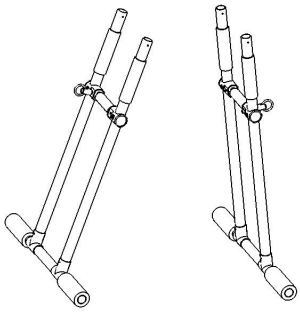
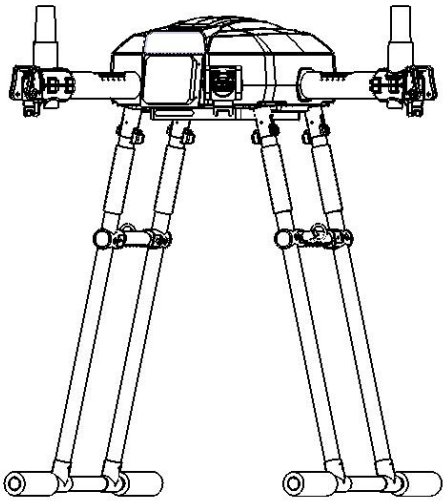
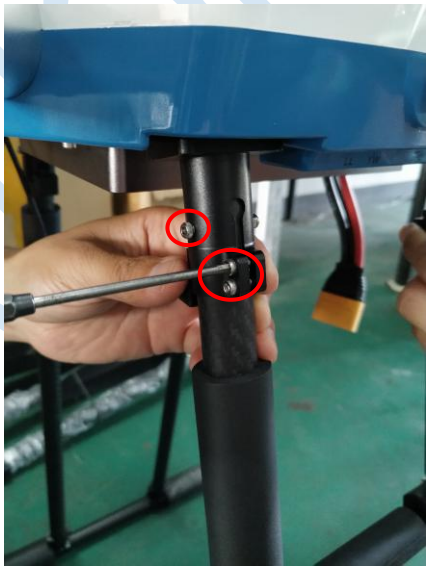
2. Product Introduction

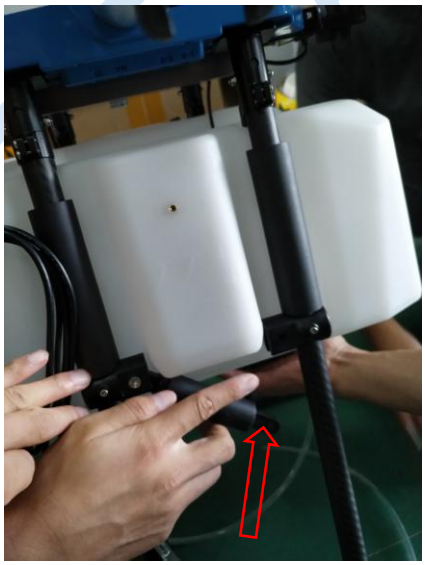
2.1 Tank and Landing Gear Installation

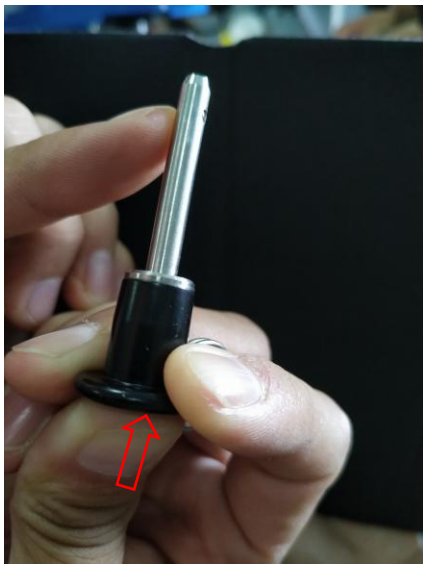


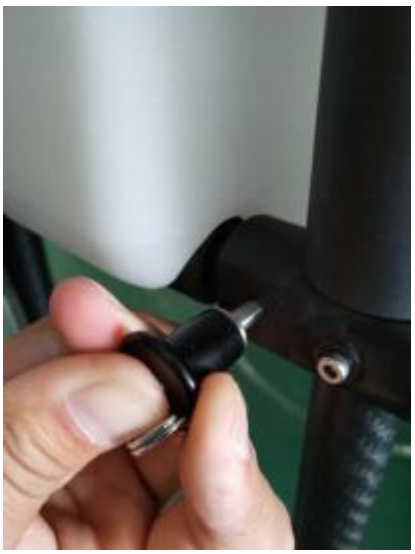


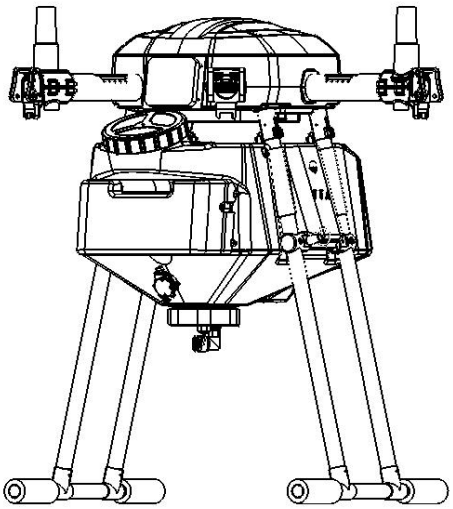












1) Take out the aircraft body and the land gear assembly as the above figure. The camera points to the orientation of aircraft head.

2) Insert the land gear legs into the corresponding landing skid, then tighten the hexagon socket head cap screws to lock them with its head facing toward outside. Tighten the two below screws to fix them.

3) Tank Installation.

▼ Press down the tank holder and mount the tank to the corresponding location from down to top with the water inlet pointing to the back of aircraft.

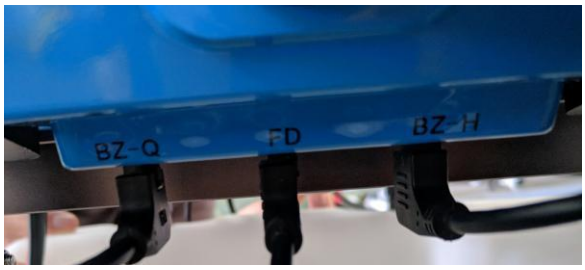
▼ Pull up the tank holder to proper location to lock the tank.

▼ Insert quick-release plug to lock the holder with the quick-release plug being pressed down and held.

4) Plug the modular connectors to the ports of electronic box accordingly.

Port	Module	Port	Module
LL	Flowmeter	BZ-Q	Obstacle Avoidance Radar
YW	Liquid Level Sensor	FD	Terrain Following Radar
S-2	Pump 02	BZ-H	Obstacle Avoidance Radar
S-1	Pump 01		

Attention: There is no particular correspondence between S-1,S-2 connectors and 2 pumps.



Ports of Electronic Box

2.2 Arm Installation

1) Arm Location

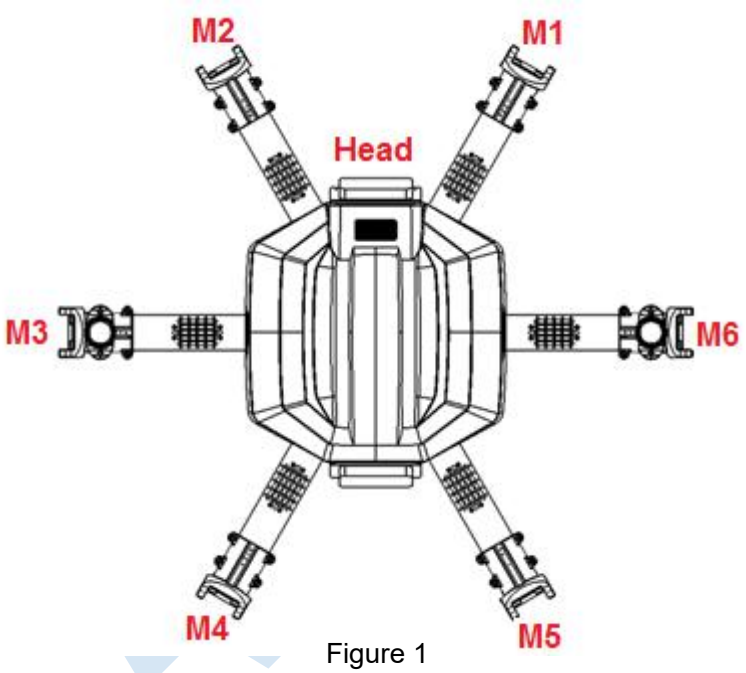


Figure 1

2) Connect the XT30 and MT60 connectors as Figure 2.

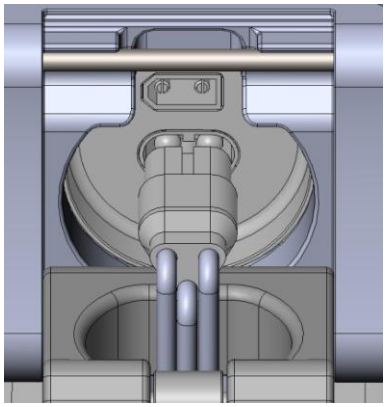


Figure 2

3) Mount the arm and match the 6mm inner hole of arm joint with body's joint 6mm inner hole.

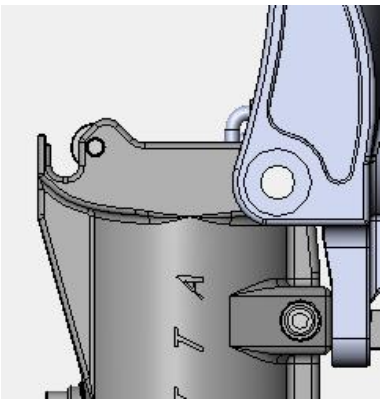


Figure 3

4) Install the M5*57.2 plug screw from the hexagon side of the 6mm hole on body's arm joint, and tighten the M5 nut on the other side to lock the plug screw as figure 4

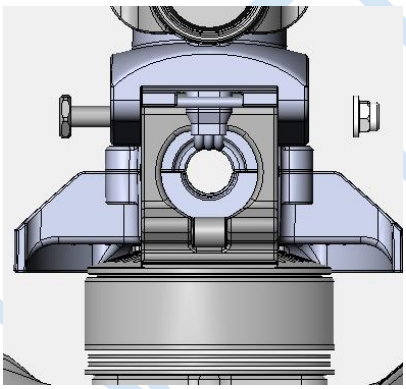


Figure 4

5) Install the rest 5 arms as above.

Attention:

1) The difference between CCW arm and CW arm is different rotation direction of the propellers which produce lift force. There is a mark arrow on every motor holder to help differentiate. CCW arrow means CCW arm, you need to install the CCW propeller,otherwise it will be CW arm which you need to install the CW propeller.

2)The camera points to the orientation of aircraft head.

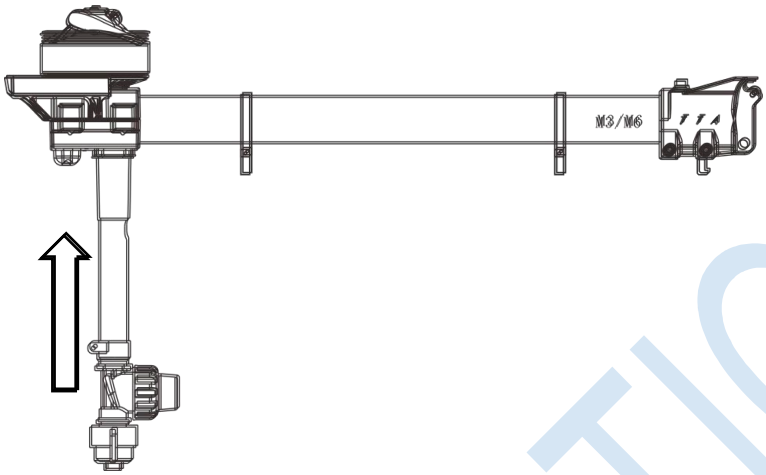
3) Attention: CCW M1 arm with Red LED, CW M2 arm with Red LED, CCW M3 arm with Green LED and nozzle, CW M4 arm with Green LED, CCW M5 arm with Green LED, CW M6 arm with Green LED and nozzle.

4) Arm could only fold down instead of up during the arm installation. The max lift

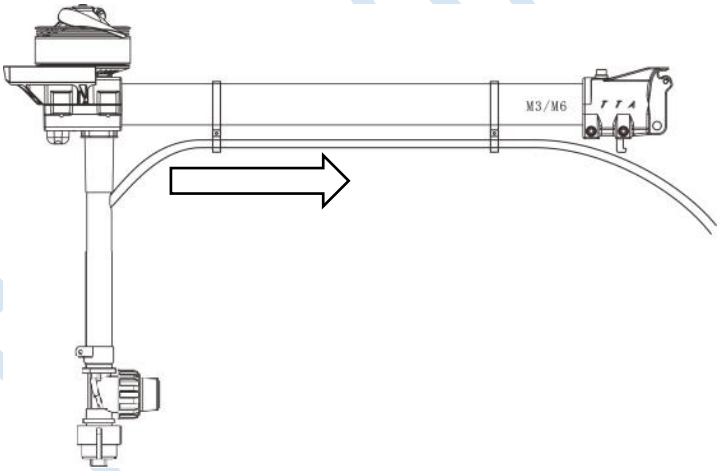
angle should be in an horizontal level with ESC tube

2.3 Sprinkler Installation

1) Put the sprinkler into the rudder holder under the motor in place and ensure it has been fixed firmly.



2) Insert the hoses into bracket tube and plug it into the port of nozzle assembly.



3) Plug the hoses to the 3-way connector of spraying system.

3.Product Introduction

3.1 UAV

3.1.1 UAV Introduction

G200, the multi-rotor UAV, is the cost-effective solution for all the agriculture spraying services. This UAV is waterproof and easy to repair, long-time flight with high-strength & light fuselage material. The big power brushless motor guarantees the sensitiveness and flexibility. The Lipo batteries guarantee stable power supply and easy-to-repair and maintenance. Various spraying tests proves the best performances of this UAV.

3.1.2 UAV Parameters

G200 UAV Parameters

Weight (without battery)	15.8KG	Max Pitch Angle	≤25°
Standard Takeoff Weight	36KG	Best Spraying Speed	4--6m/s
Max Takeoff Weight	38KG	Max Spaying Speed	8m/s
Max Thrust-weight Ratio	2.3(Flying weight 36Kg)	Working Time	6--12min/ flight
Battery	14S LiPo Intelligent Battery	Max Climbing Speed	5m/s
Max Power Consumption	5000W	Max Landing speed	3m/s
Hovering Power Consumption	2600W	Max Flying Speed	8m/s
Hovering Time	Empty flight ≥20min; Full Tank flight ≥10min	Recommended Working Temperature	10-35°C
Hovering Accuracy	Horizontal ±0.2m,Vertical ±0.5m(GPS); Horizontal ±0.1m,Vertical ±0.1m(RTK)	Max Wind Resistance	11m/s
Spraying Height	2--4m	Max Flying Altitude	3500m
Max rotation angle	360°	Best Storage Temperature	10-25°C

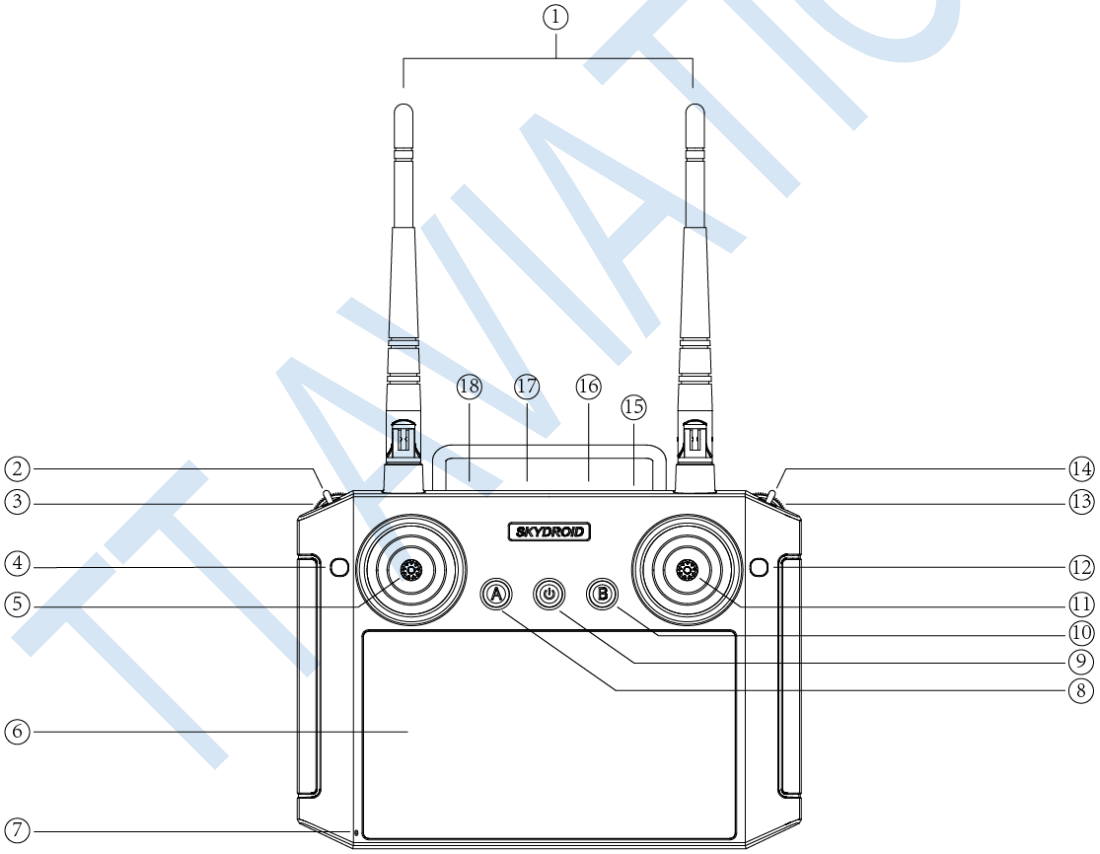
3.1.3 G200 Agriculture UAV Specification

G200			
Frame	Frame	Diagonal Wheelbase	1700mm
		Arm Length	574mm
		Unfolded Height	710mm
		Folded Height	710mm
		Folded Width	827.2mm
		Sprayer Distance	1676mm
Power System	Motor	Motor Model	TTA8120
		Diameter	88.6mm
		KV	90KV
		Max Thrust	14KG
		Max Power	2500W
		Weight	634g
	ESC	Max Continuous Current	40A
		Max Peek Current(3s)	80A
		Working Voltage	14S(50.4~58.8v)
		Working Pulse Width	1100--1900us
		Compatible Signal	50--500Hz
		Drive PWM frequency	400Hz
	Foldable Propellers	Material	High toughness engineering plastic
		Diameter /Screw pitch	3090 (L=762mm)
		Weight	203g
	Battery	Capacity	14S, 17000MAh
Spraying System	Tank	Rated Payload	16L
	Sprayer	Model No.	Pressure Type (Sector/Cone)
		Quantity	4~6 pcs
		Nozzle Diameter	0.5-1.5mm
		Spraying Volume	1--4L/min
		Spraying Width	4-6m (up to height)
		Spraying Droplet Diameter	80--200μm （adjustable）
Remote Controller	Remote Controller	Model No.	R4
		Working Frequency	2.4G
		Endurance	10h (battery detachable)

		Effective Signal Distance (no interference,no shelter)	1KM
		Battery capacity	4400mAh
		Charging	Micro USB. 5V,2A
		Charging time	3-4.5h
		Working Environment Temperature	0--40°C
		Best Storage Temperature	10--25°C
		Best Charging temperature	10--25°C

3.2 Remote Controller

3.2.1 RC Introduction



No.	Specifications	No.	Specifications
1	2.4G 3DB Antenna	10	Button B
2	3-Segment Lever E	11	Joystick X2, Y2
3	Dial G	12	Button D

4	Button C	13	Dial H
5	Joystick X1, Y1	14	3-Segment Lever F
6	5.5 Inch Screen	15	Speaker
7	MIC	16	SIM Card Slot
8	Button A	17	Charge Port
9	Power Button	18	PPM Output

3.2.2 RC Parameters

No.	Item	Specification	Remarks
1	Model	H12	
2	Working Voltage	3.7V	
3	Frequency Band	2.400-2.483GHz	
4	Firmware Upgrade	Online Upgrade	
5	Dimension	190mm*152mm*94mm	
6	Endurance	6~20 hours	
7	Quantity of Channels	12	
8	Modulation	FHSS	
9	Weight	530g	
10	Battery capacity	10000mA	
11	Charge port	TYPE-C	

3.2.3 Attentions

- Please use the official charger to charge the transmitter.
- Any damaged,smoking or abnormal heating situations, stop using immediately.
- Charging should not be continued in condition of smoking,smelly,weeping.
- Charging should not be in the area of baby playing.
- Charging should not at temperature more than 60℃.

3.3 Intelligent Battery

The 14S self-balancing intelligent battery pack is specially designed for UAVs with charging and discharging management functions. Its intelligent data cloud service system is developed and designed to provide users with application and security services in various aspects.

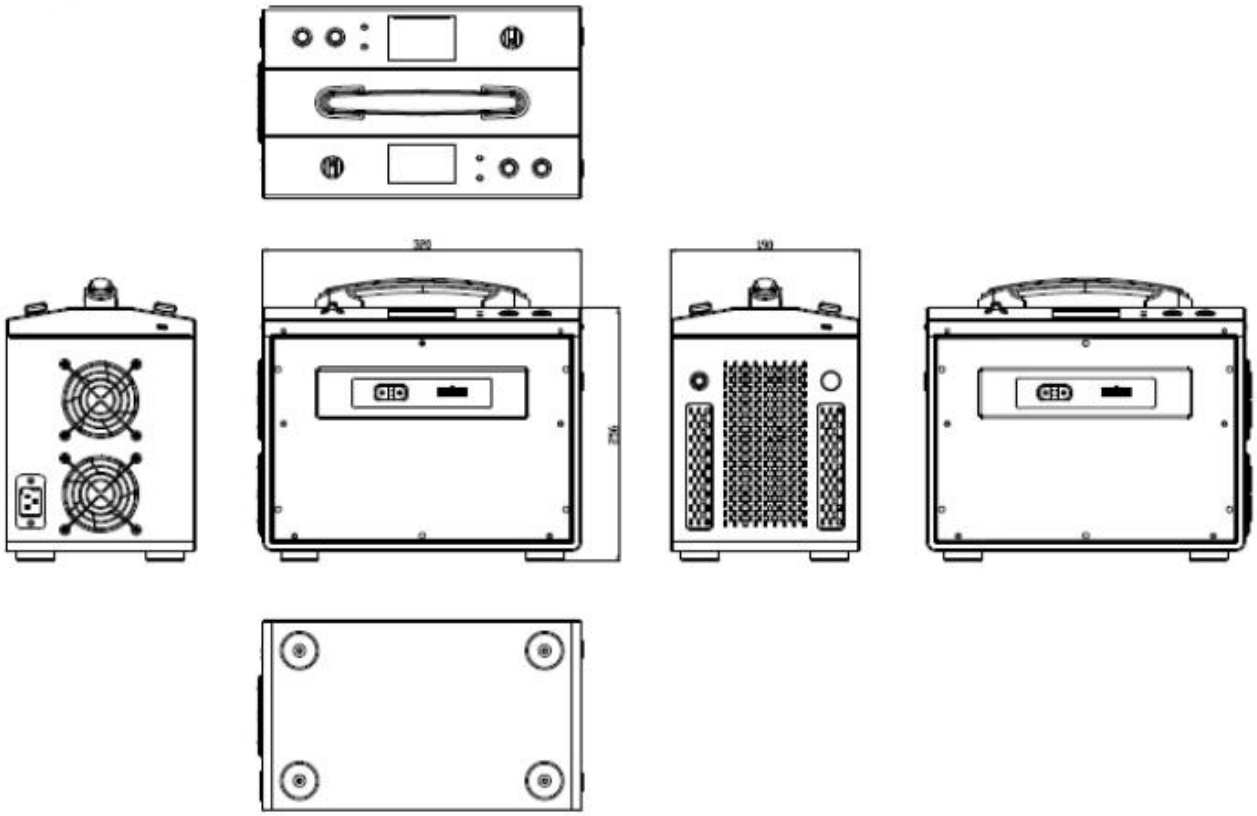
No.	Item	Specification	Remark
1	Rated voltage	51.8V(14S)	
2	Charging voltage	58.8V(4.20V/Cell)	
3	Charging current	Max.30.0A	
4	Charging time (30A)	50min (reference value)	
5	Operation temperature(discharging)	-10℃—+60℃	
6	Operation temperature(charging)	0℃—+45℃	
7	Storage temperature	-10℃—+35℃	
8	Weight of Battery pack	5900±100g	
9	Dimensions	112.5mm*167.5mm*235mm	

Attentions:

- Never assemble the battery by yourself;
- Inspect and Do a charge-discharge cycle to maintain battery immediately when you receive a new battery.
- Battery shall be maintained properly and regularly, or it would be damaged.
- Damages caused by improper use or improper maintenance will not be covered by warranty.
- For More use, maintenance and safe instructions, refer to <.Battery Use and Maintenance Instruction> please.

3.4 Charger Station

U5+ balance charger features fast charging speed, high balance accuracy, easy to operate, low energy consumption, dual-channel independent output, support CAN communication charging. Charging current is adjustable, 10A, 20A, 30A; When charging batteries, the LCD screen can accurately display the single cell voltage and total voltage in real time for easily checking battery performance and charging status. The internal heat dissipation channel of the product is designed reasonably, which can effectively dissipate heat and ensure continuous, stable and reliable operation of the product.



3.4.1 Charger Specification

1) Input voltage: AC110V~240V

2) Max charging power: 1200W*2

3) Charging Mode: 10A, 20A, 30A

4) Battery supported: 14S

5) Operation temperature: 0-30℃

3.4.2 Safety Rules

Please noted and comply with the following rules in case of charger and battery damage or fire case.

1) The charger only support 14S LiPo battery.

2) If find out any malfunction after power on the charger, stop operating it immediately and check the manual.

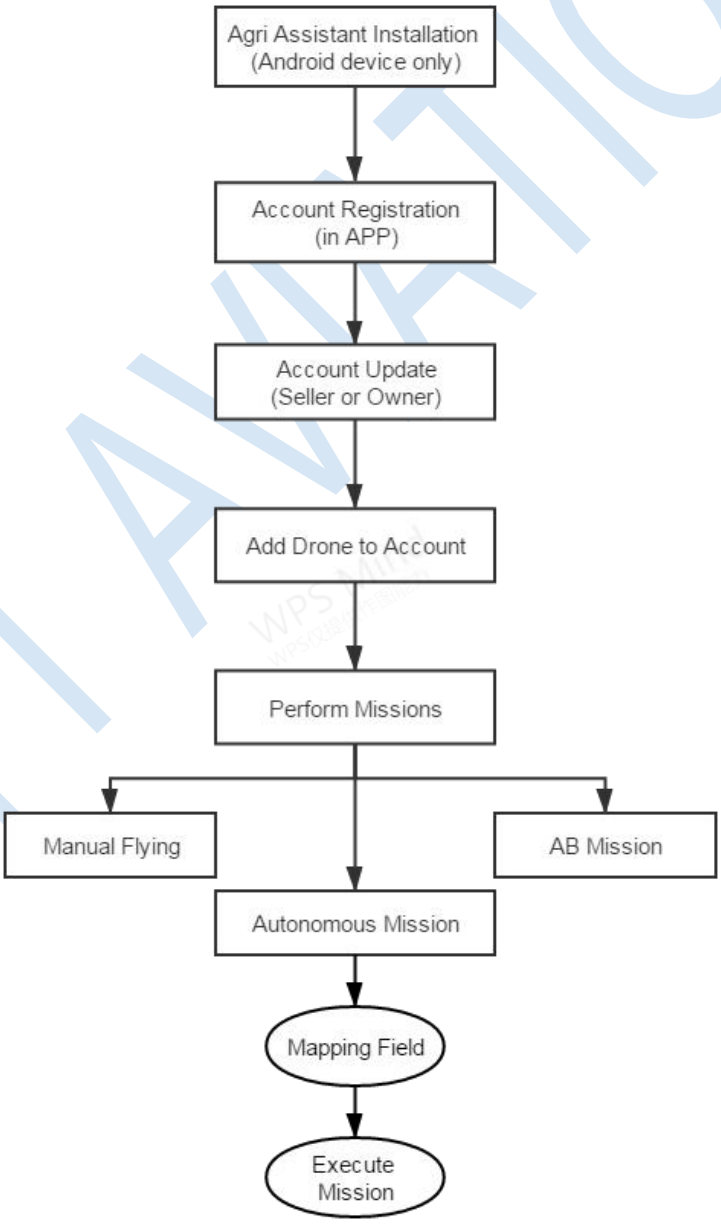
3) Be sure charger is far away dust,moisture,rain,heat source,direct sunlight,vibration and some other unsuitable environment.

4) Battery and charger must be placed on uninflammable,insulated surface.

5) Please strictly follow the manual.

4. Prepare for Work

Operation Flow of A New Drone



4.1 Software Installation

1. Please download and the GCS software in the following link:

https://www.ttaviation.org/downloadcat/app

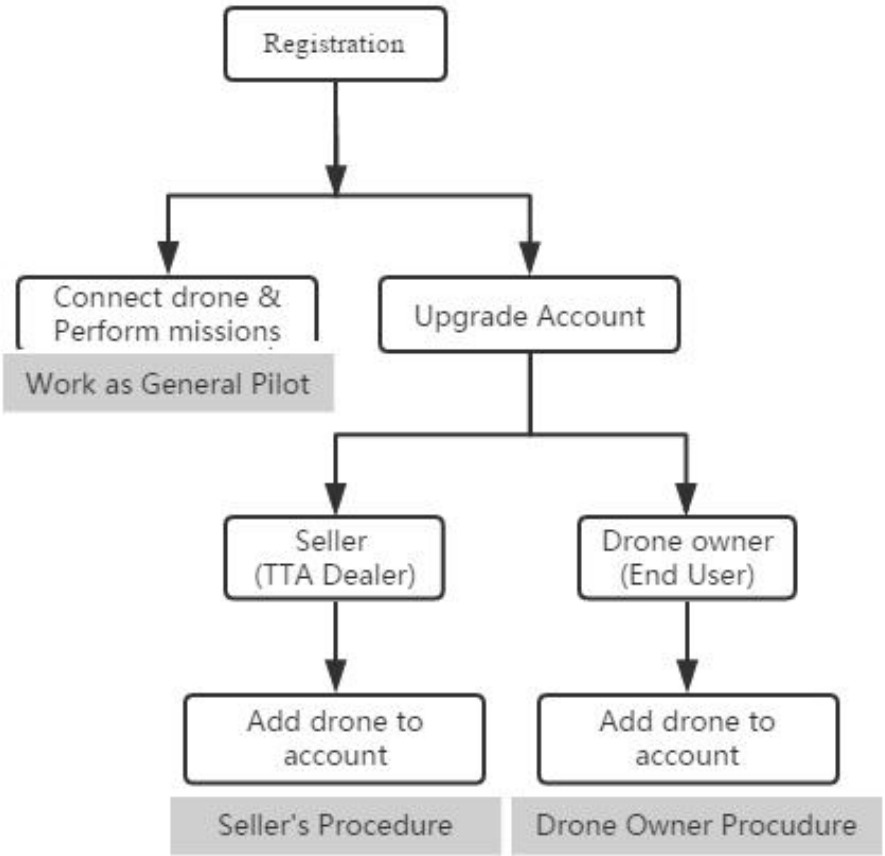
2. After GCS installation,the label will be appeared as figure 5-1.

Figure 5-1

TTA GCS support Android 4.0 or above

4.2 Registration Procedure

4.2.1 Registration Procedure



Attention: Account has two selectable level, Seller and Owner. Customer can apply to the corresponding level to update. One drone can only be added to one account of one level.

4.3 Registration and Login

4.3.1 Registration

(1) Click “Register” to start registration.
(2) Use phone number or email to receive the verification code.
Attention: When using email to register, please view the junk mail list as the verification mail may be recognized as junk mail.

4.3.2 Login

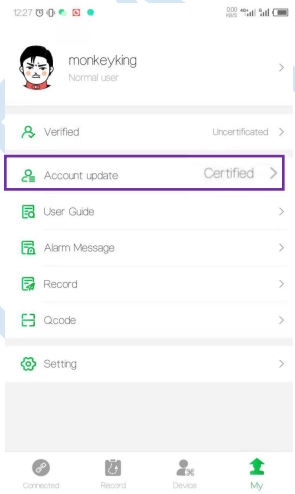
(1) Click “Login” to enter the login page
(2) Input your account to log in.

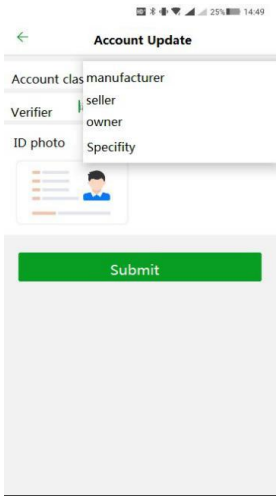
4.3.3 Account Update

There are four classes of account type: Manufacturer (TTA), Seller (TTA’s dealer), Owner(drone owner), Normal.
User shall upgrade the account’s class for getting according rights. Upgrading process is as follow.

◆ **“Normal” Upgrading to “Seller”**

(1) Click “Account update” to enter the upgrading page.
(2) Select the according account class - “seller”, input “**19801108966**” as the Verifier, and upload the photo of relevant materials for applying for the account class.
(3) Click “Submit”, and then contact TTA AS engineer to notice them for further verification.

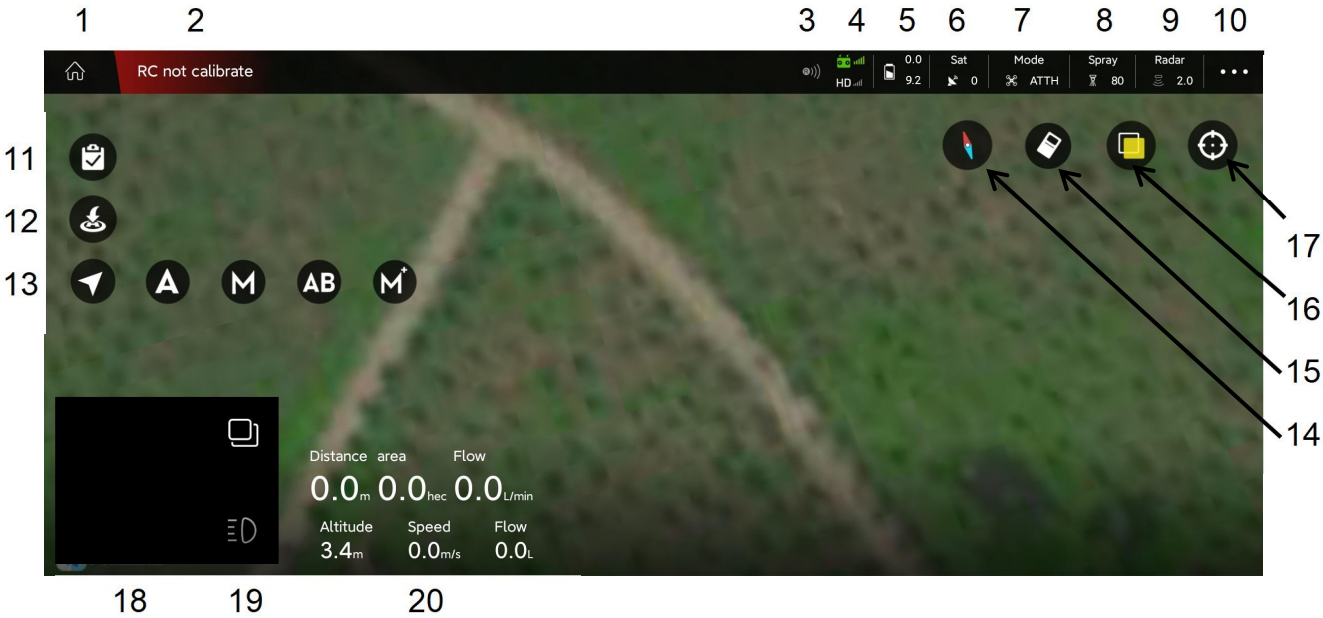




◆ **“Normal” Upgrading to “Owner”**

(1) Click “Account update” to enter the upgrading page.
(2) Select the according account class - “owner”, input “**19801108966**” as the Verifer, and upload the photo of relevant materials for applying for the account class.
(3) Click “Submit”, and then contact TTA AS engineer to notice them for further verification.

4.4 Flying Homepage



(1) Back to home page

(2) Connection Button

If no device is not connected, press it to select the device to be connected as Figure 5.41.

With devices connected, press it to view the drone status as Figure 5.42.

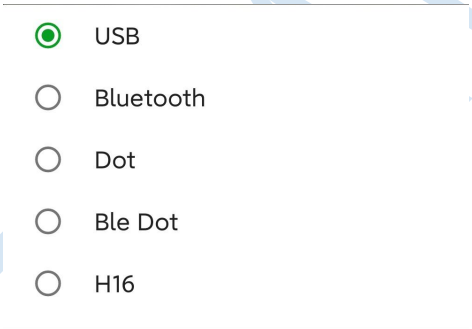


Figure 5.41

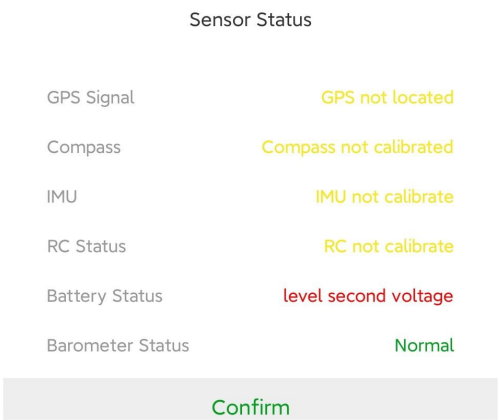


Figure 5.42

(3) RTK Icon

“Red” indicates not connected; “Green” indicates connected; “Grey” indicates not installed yet.

(4) Remote control connection status

The upper part represents the signal strength of the remote controller, and the lower part represents the image transmission signal strength.

“Green” means the remote control is connected; “Gray” means the remote controller is not connected

(5) Battery display

A green S icon represents a smart battery connection, and white represents an ordinary battery connection. The upper part represents the ordinary battery voltage, and the lower part represents the smart battery voltage.

(6) Number of satellites

(7) Flight mode

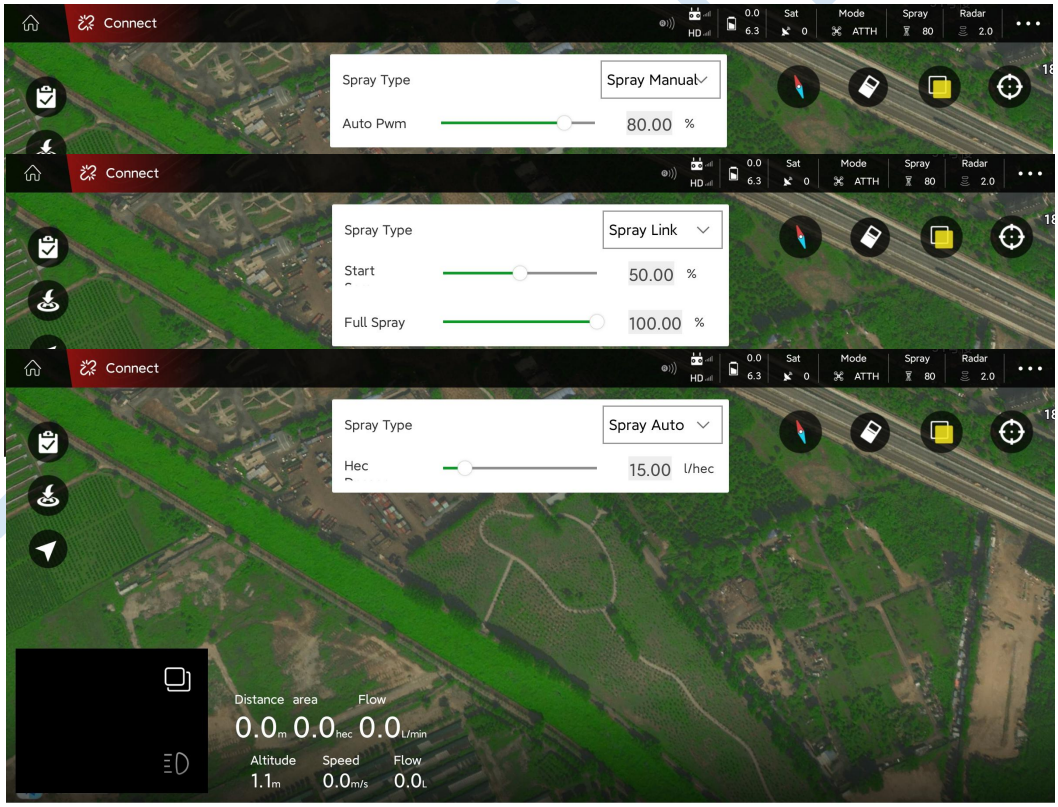
'**A'** indicates Attitude mode; '**M**' indicates Manual work mode, equal to GPS mode; '**AB** mode' indicates AB work mode; '**M+**' indicates M+ work mode.

(8) Spray Mode

'**Spray Manual**': the flow rate is fixed once pilot set it up. But it can be adjusted at any time during flying.

'**Spray Auto**': It is precise spraying. Drone can spray a certain amount of liquid per hectare. The spray amount can be set in APP before each flight.

'**Spray Link**': The flow rate is relative to flight speed. Pilot can set the flying speed for controlling the pump. At which speed, pump will start to be turned on from the min setup flow rate; At which flying speed, pump will reach its max setup flow rate. The faster the flight speed, the bigger the flow rate. Besides, pilot can choose the min and max flow rate as a percentage of the Max pressure of pump.



(9) Terrain Following Radar

Drone height to ground can be set when radar has been connected.

"Green" indicates connected, and "Gray" indicates not connected; Parameters can not be reset unless radar has been connected.

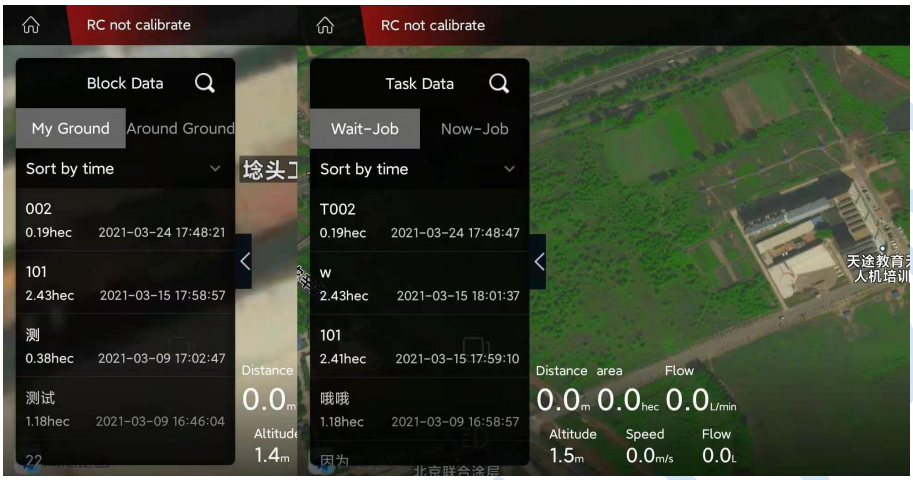
Attention: Drone will descend or ascend to the set height and maintain the height after pilot activate the terrain radar. PS. If height value set to 0, Drone will descend and land after activate the radar.

(10) APP Settings

(11) Ground List or Task list

Ground list: My Ground, Around Ground

Task List: Wait-Job, Now-Job



(12) One-key RTH

One-key return to home

(13) Flight Mode Switch

“A” is attitude mode; “M” is manual work mode(GPS mode); “AB” is AB mode;

(14) Map Compass

(15) Clear Flight Track

(16) Switch between normal map and satellite map

(17) Locate “my” location or aircraft’s location

(18) FPV image display

Press the small window to switch between video transmission display and map display

(19) Camera LED Switch

(20) Display "Speed", "Flow Rate", "Altitude", “area”, and "Distance" information (Altitude is the drone height to ground when terrain radar is activated.)

4.5 Connect

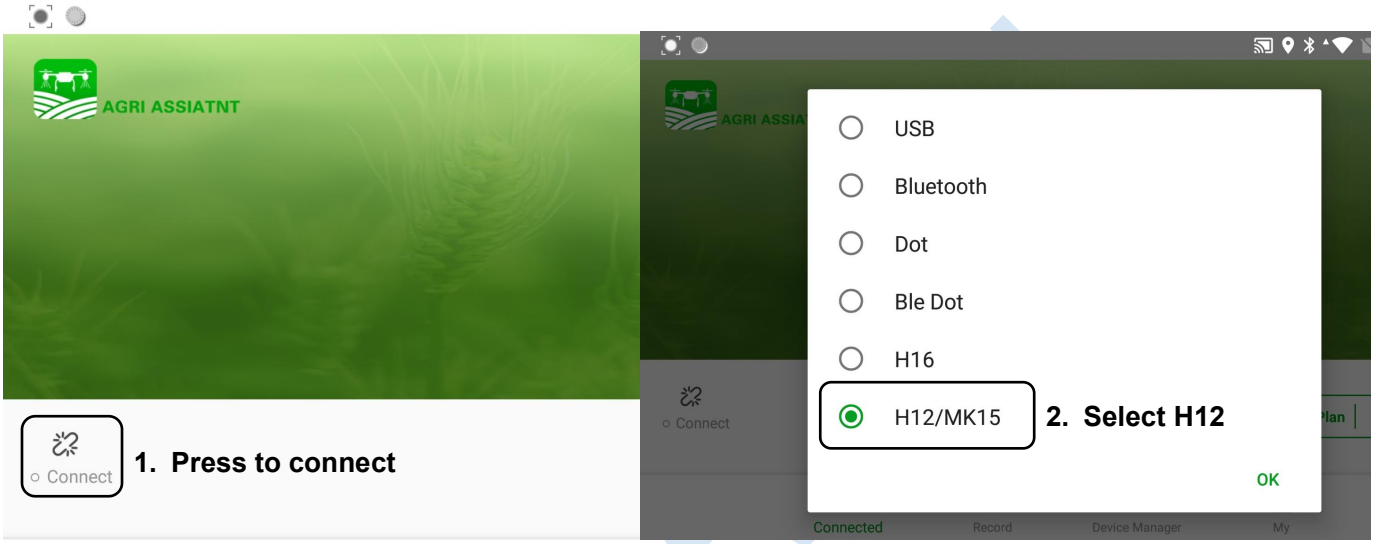
(1) Power on Remote controller.

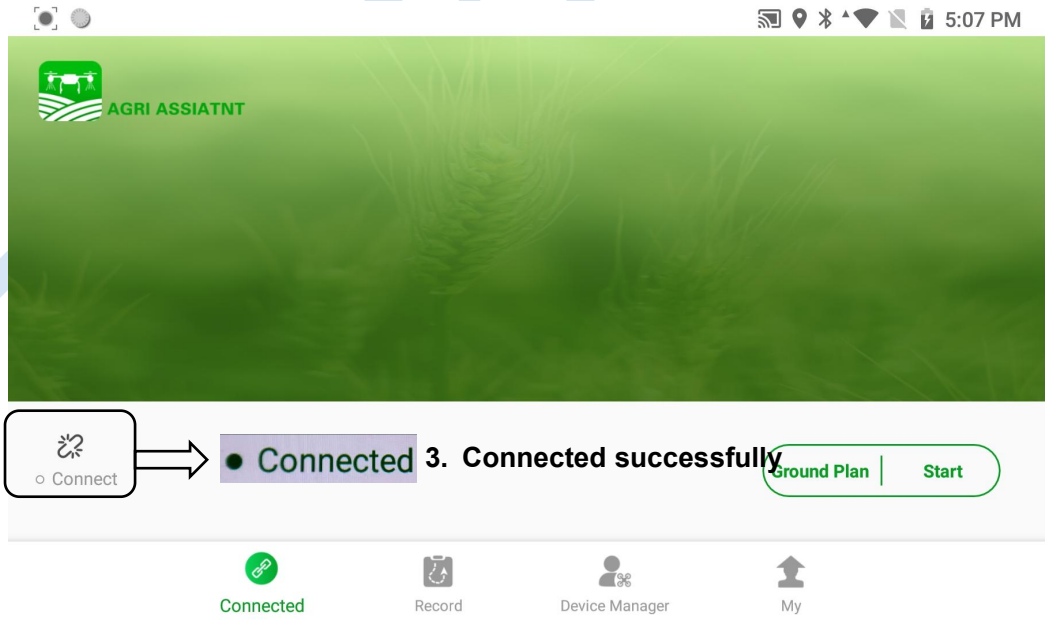
(2) Power on the drone

(3) Open the Agri Assistant APP.

(4) Log into your account

(5) Press [Connect], select [H12]. The [connect] icon will turn to [connected] after connecting successfully.





4.6 Device

4.6.1 Plane list

After UAV is successfully added to your account as ”**5.6.2 Plane Add**”, aircraft can be viewed in the “Plan List” as the **Figure 5.6.1** .

4.6.2 Plane Add

After logging in, click "Device" in the lower right corner and click "Plane Add"; "Flight Control Serial Number" will be read automatically after connecting to the aircraft, then click the "Completed" button to finish adding as **Figure 5.6.2**.

Figure5.6.1 Plane List

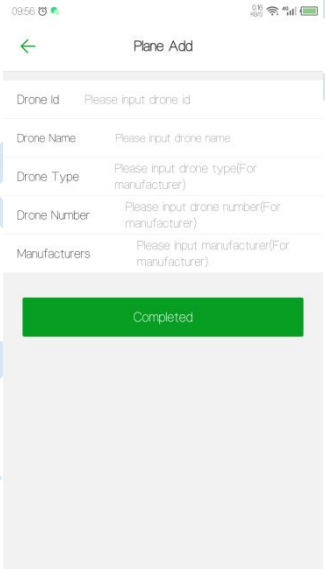
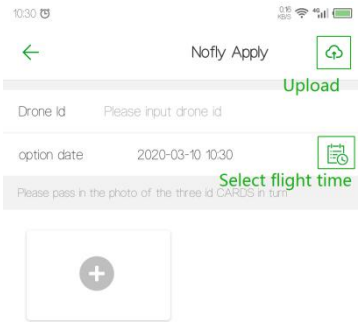


Figure5.6.2 Plane Add

4.6.3 Nofly Apply

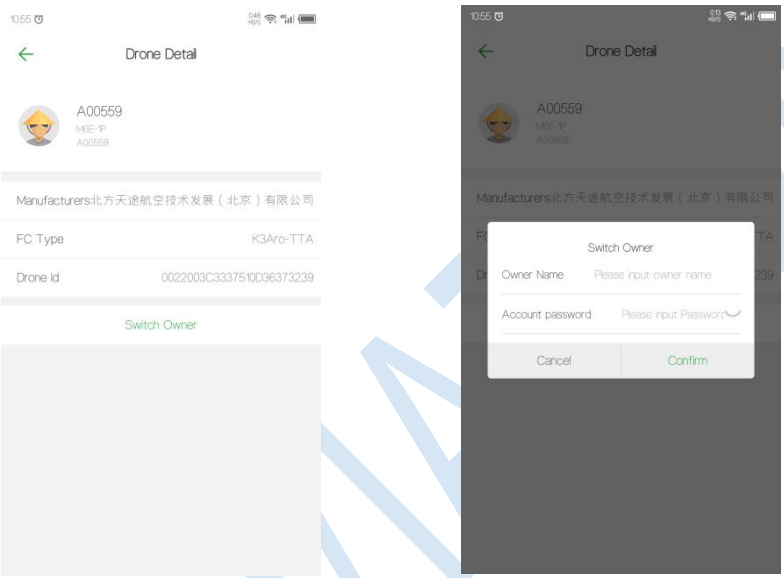
“Nofly Apply” is used to apply to UAV manufacture for flying in No-fly zones in special situations. Drones can not take off in No-fly zones without manufacture’s permission.
Click "Device", click "Nofly Apply"; select the expected time of performing mission, upload the relevant certificate (the flight control serial number is automatically recognized when the mobile phone is connected to the aircraft), after completing, click the "Upload" button in the upper right corner to upload the data



1) Waiting for permissions from UAV manufacturer.
2) After getting the permission, the time displayed on the “Device” interface will be the time you submitted in “Nofly Apply” when the APP connects to the aircraft. It indicates that the no-fly zone is successfully lifted temporarily during the apply time.

4.6.4 Switch Owner

“Switch Owner” can only be performed in “Owners” for transferring the ownership of UAV.
1) Click “Device” - “Plane List”;
2) Select the UAV and click “Switch Owner”;
3) Input the info. and click “Confirm”;



5.6.4 Switch Owner

4.7 Record

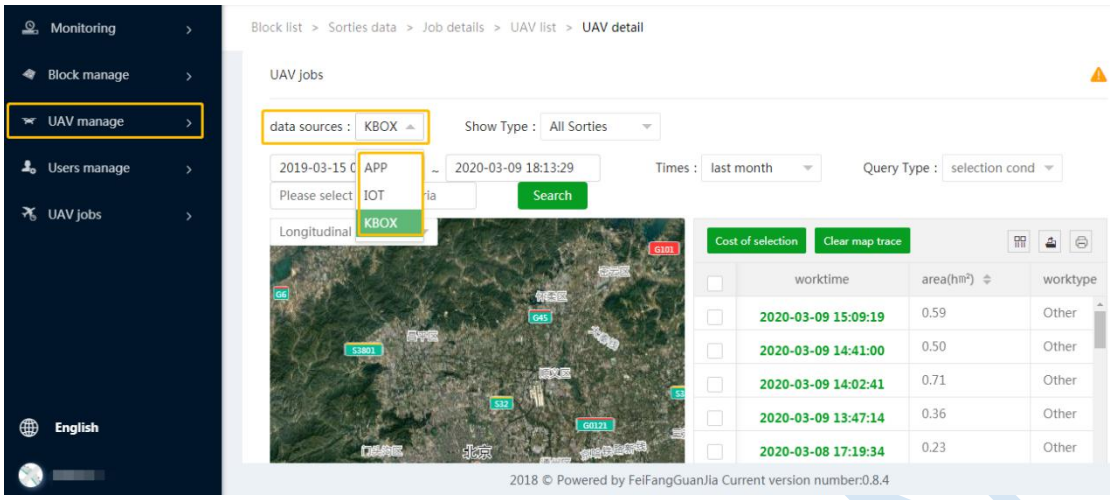
(1) Log in to your account, add the UAV to the “Device manager”.

(2) Connect to the app and perform missions.

(3) After the flight is over, enter the “Record” page of APP or go to the "ai.fei-fang.com" website to view the mission records.

Process of viewing records on website

1) Enter "ai.fei-fang.com" and use your account to log in.
2) Click “UAV manage” to view the drone list and select the drone you want to check
3) Chose the “data sources” of the records - “APP”, “KBOX”, “IOT”. APP is the default
“**APP**” - Mission data is uploaded to sever via APP.
“**KBOX**” - Mission data is uploaded to sever via KBOX (build-in 4G device)
“**IOT**” - Mission data is uploaded to sever via IOT module (temporary offline data storage device)
4) Click “Search” to find the data.



Note:

If APP cannot connect to the internet while performing missions, the mission data will be stored in the devices which is used to run the APP. When internet becomes available, the local mission data will be read and appear in this “Record” page, and the data will be uploaded to the cloud platform automatically.

4.8 Route Planning

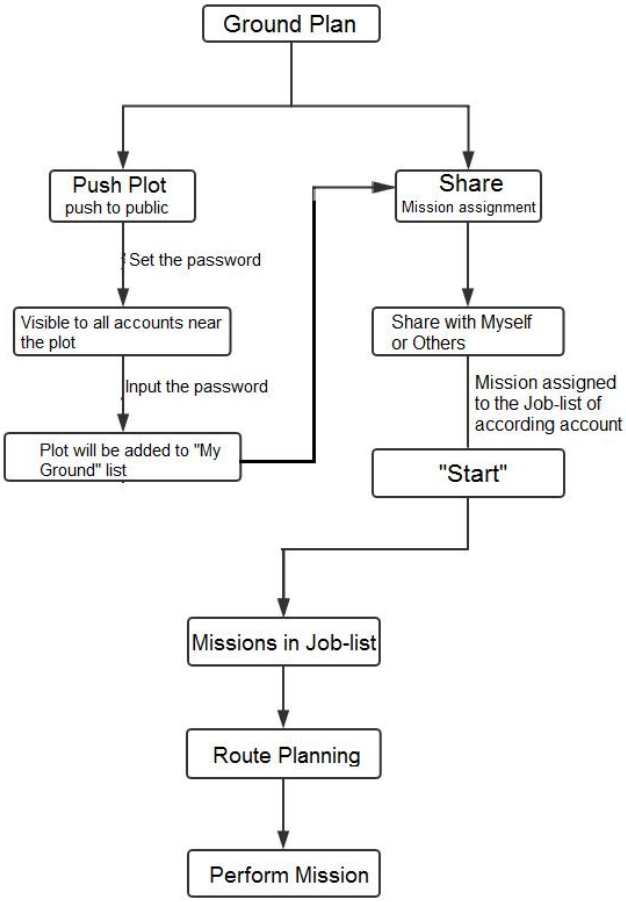


Figure 5.8 Mission Planning Procedure

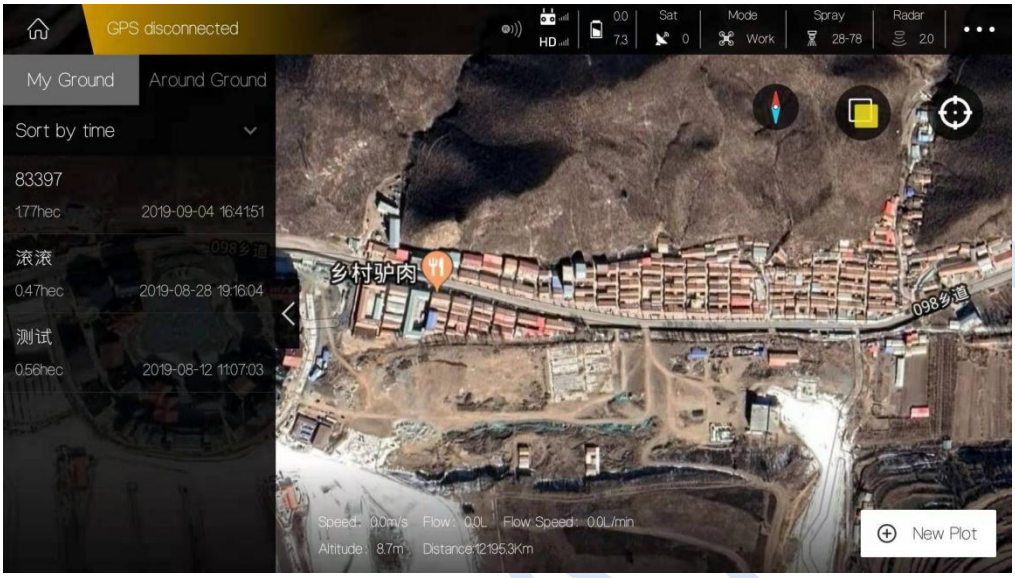
4.8.1 Mapping

Click [Ground Plan]

to enter the Plot Mapping page

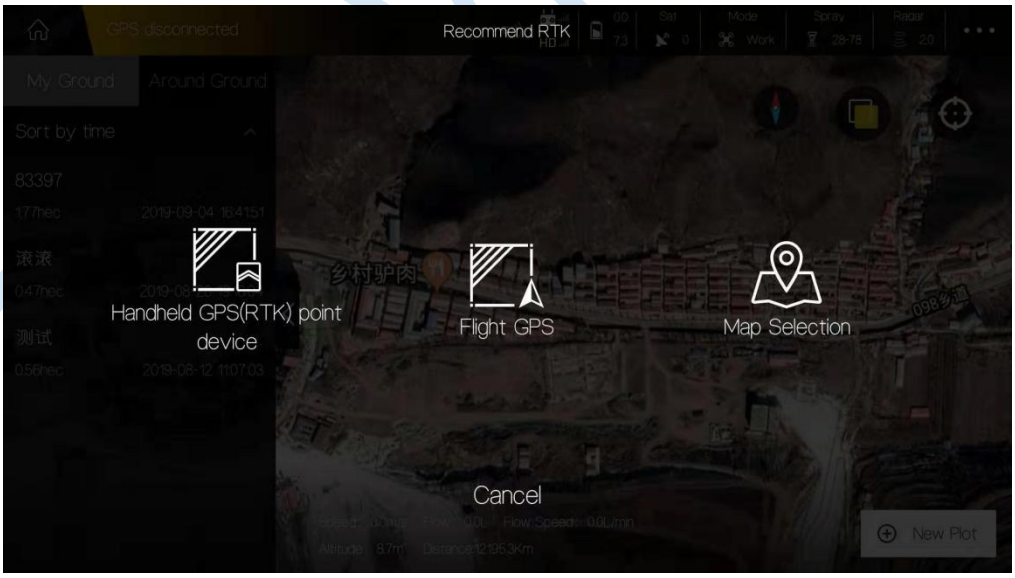
1) Press [Block management] to view the marked blocks and online blocks nearby.

[**My Ground**]: User have right operate ground in this list, such as performing, sharing, editing, etc. This ground list includes the ground created by you and the ground added from the [Around ground].



[**Around Ground**]: Ground will be displayed here when its position is nearby and it has been posted to the public by others or yourself.

2) Press [New Plot] to start mark blocks and select mark method.



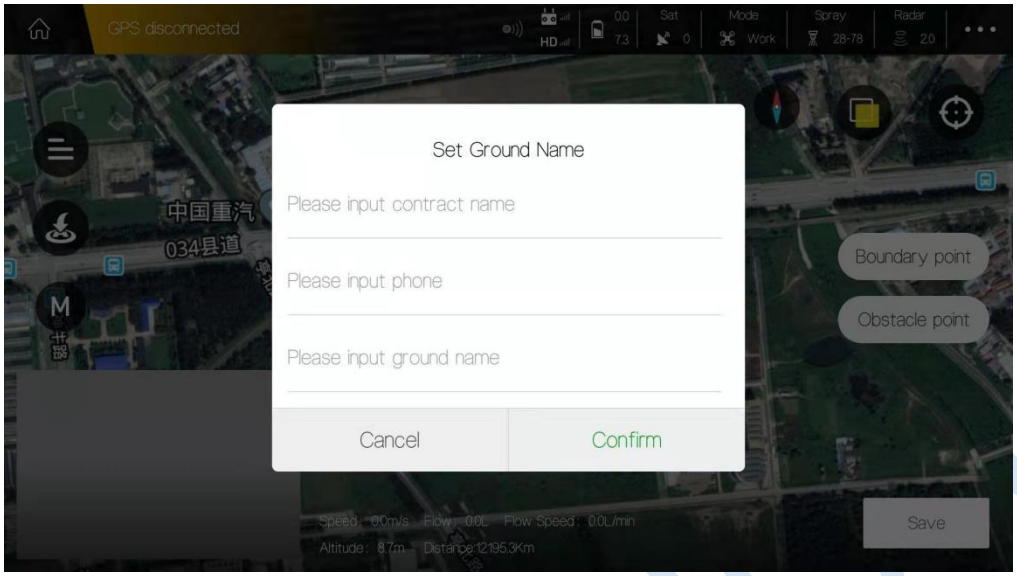
[**Handheld GPS(RTK) point device**]: use portable marked device to mark out boundary point.

[**Flight GPS**]: use drone as mark device and fly drone to the boundary point location and mark it out.

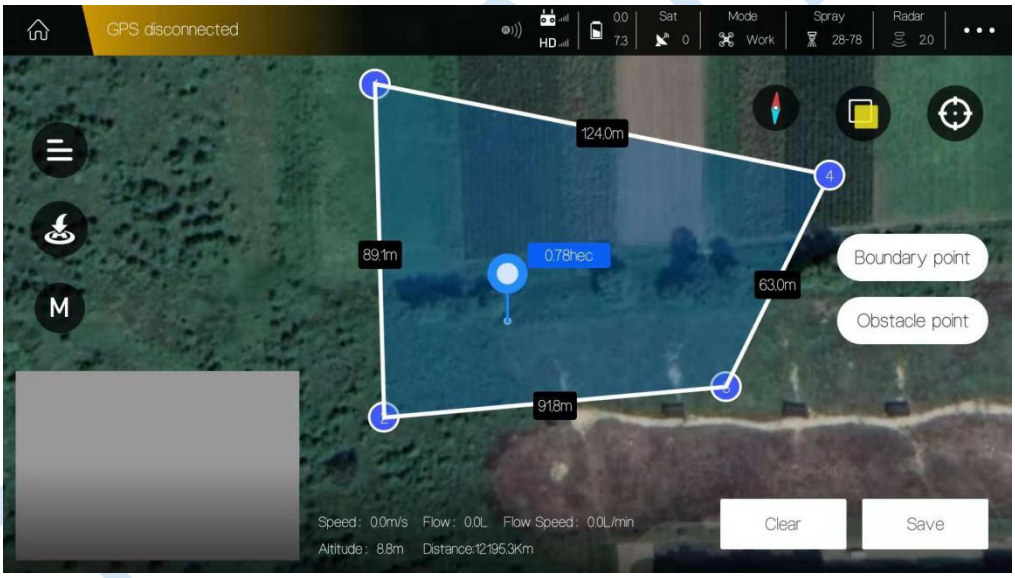
[Map Selection]: mark out boundary points manually on map.

Here will use [Map Selection] as an example.

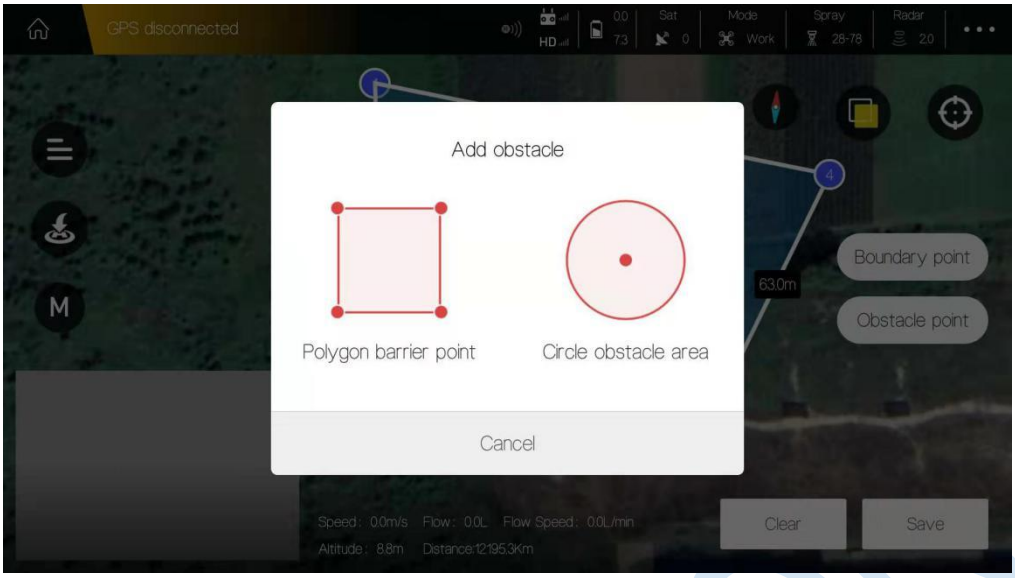
3) Input contract name, cellphone number, block name to name the blocks.



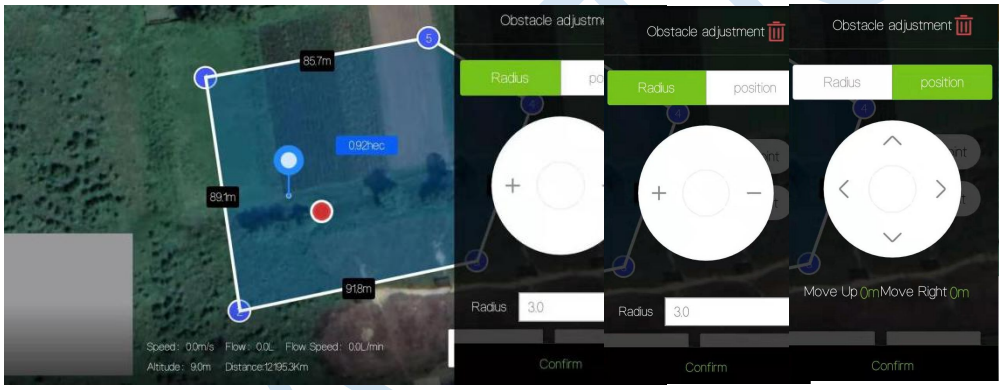
4) Mark area. Slide the map to place the Mark icon on the proper point, press [Boundary pint] to mark one boundary point.



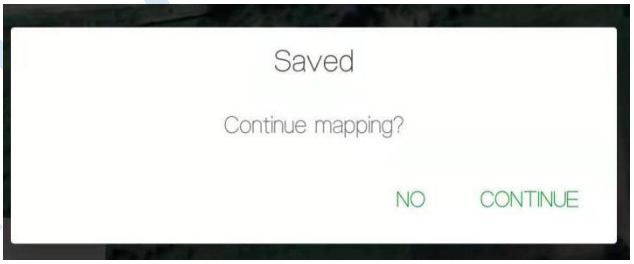
5) Add obstacles. Press [Obstacle point] to select the shape of obstacle: Polygon or Circle.



Take a circle obstacle as an example. Slide the map to place the Mark icon on the proper point,and press [RBI] to mark one red obstacle point. Then press the obstacle point to edit it.

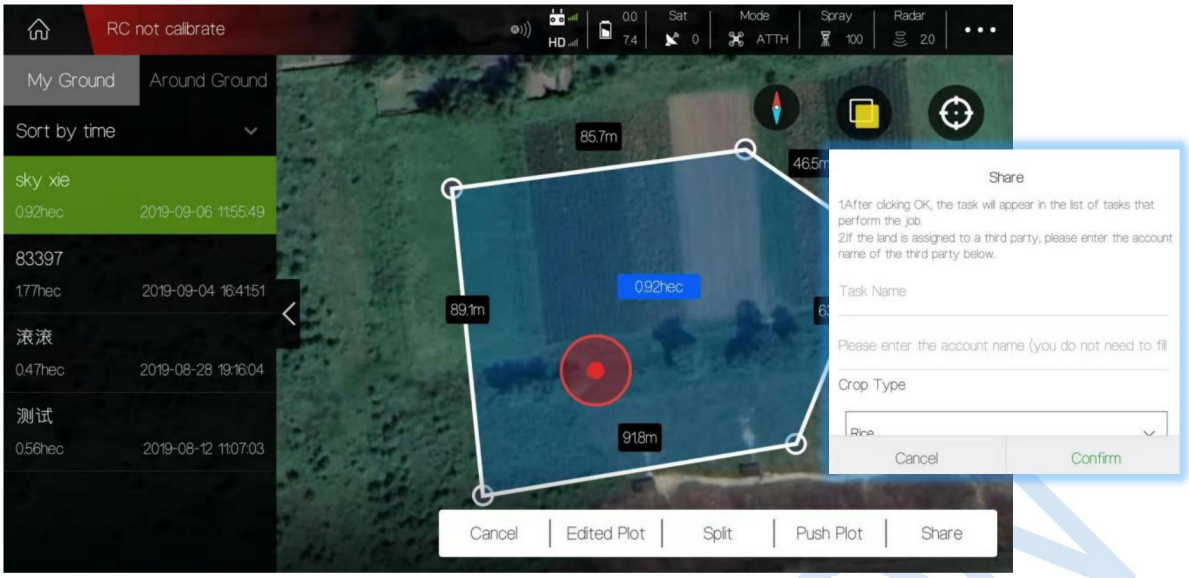


(4) Save blocks. Chose to continue mapping or exit mapping.



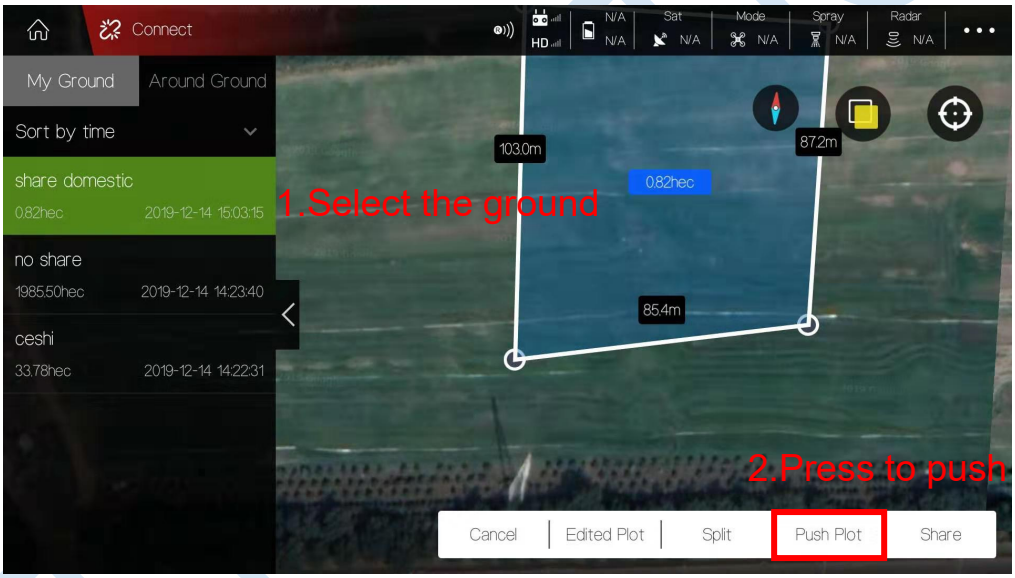
4.8.2 Mission Assignment

(1) After mapping, click “My Ground” to view the plot list.
(2) Select the plot you want to share with others.
(3) Click [Share] on the right corner of the interface, input task name (e.g. “sky start”), the account name which you want to share with. Crop type, Rout type.
Attention: The account name do not need to fill if the blocks is shared with yourself.



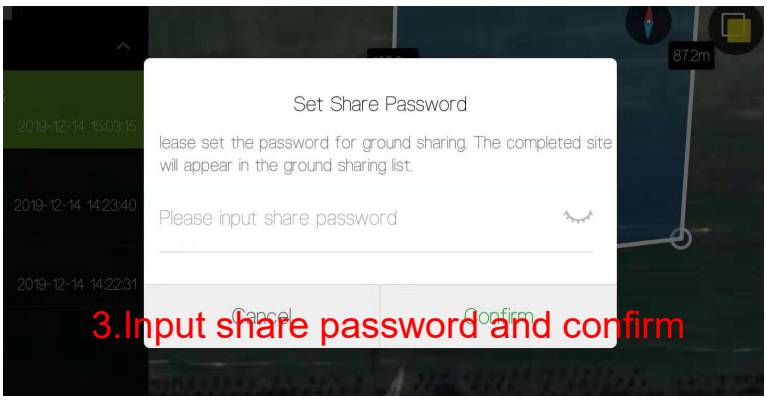
4.8.2.1 How to share your ground to everyone nearby?

- Select the ground in “My Ground” you want to share and Press ”Push Plot”.



- Input the password of this ground and “Confirm”.

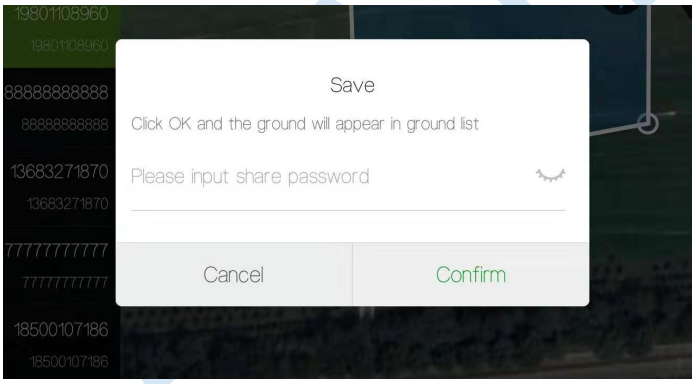
Everybody nearby can view the shared ground in “Around Ground”.



4.8.2.2 ADD a ground from “Around Ground” into my ground list

- Select the ground in ”Around Ground” list and press “Save ground plot”

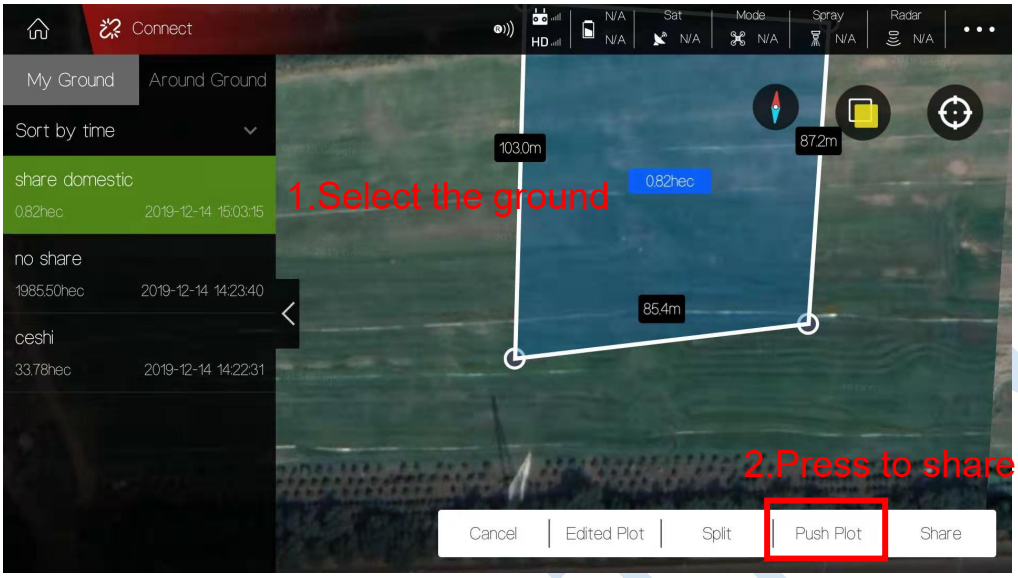
- Input share password and confirm. Then ground will be added into “My Ground” list.



4.8.2.3 Add the ground into my “Wait-Job” list or a specific account

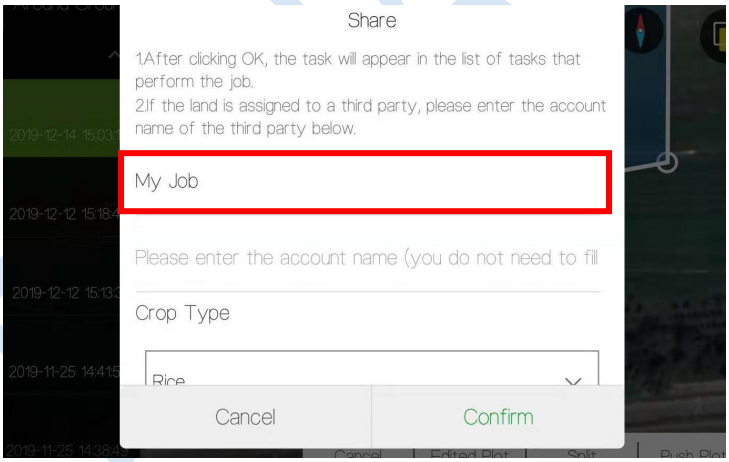
You need to share the ground in “My Ground” list with yourself.

- Select the ground and press “Share”

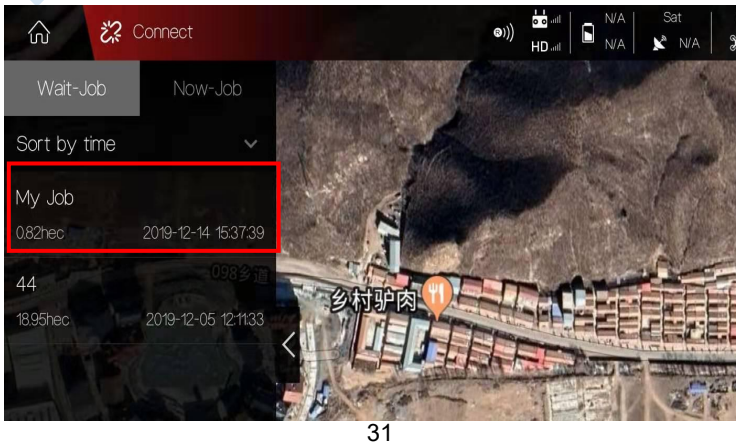


- Input the “Task name”and “Account name” you want to share with.

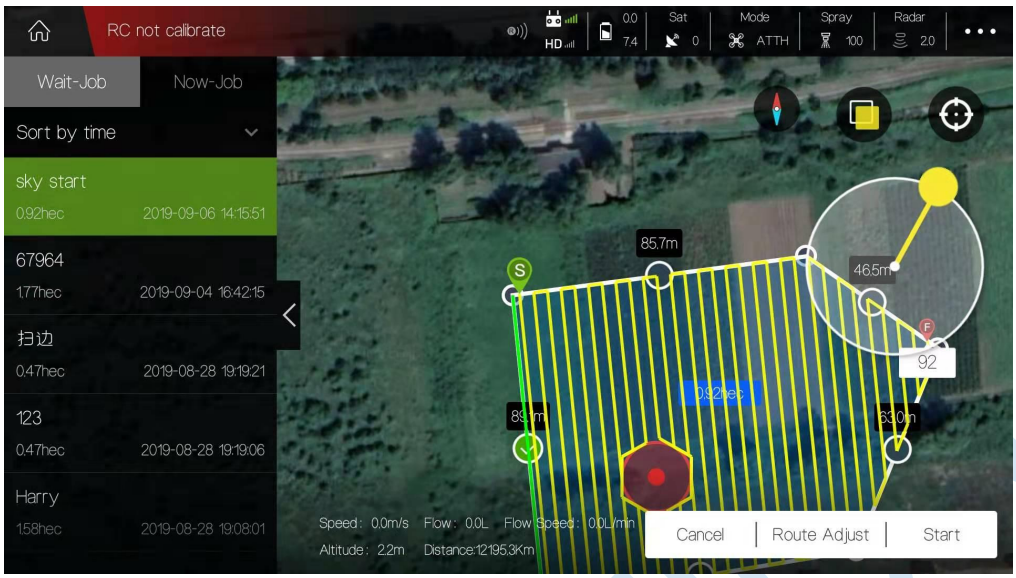
Attention: The account name do not need to fill if the blocks is shared with yourself.



- Back to home page and open “Start” section. The ground has already in your “Wait-job” list.



4.9 Start Mission

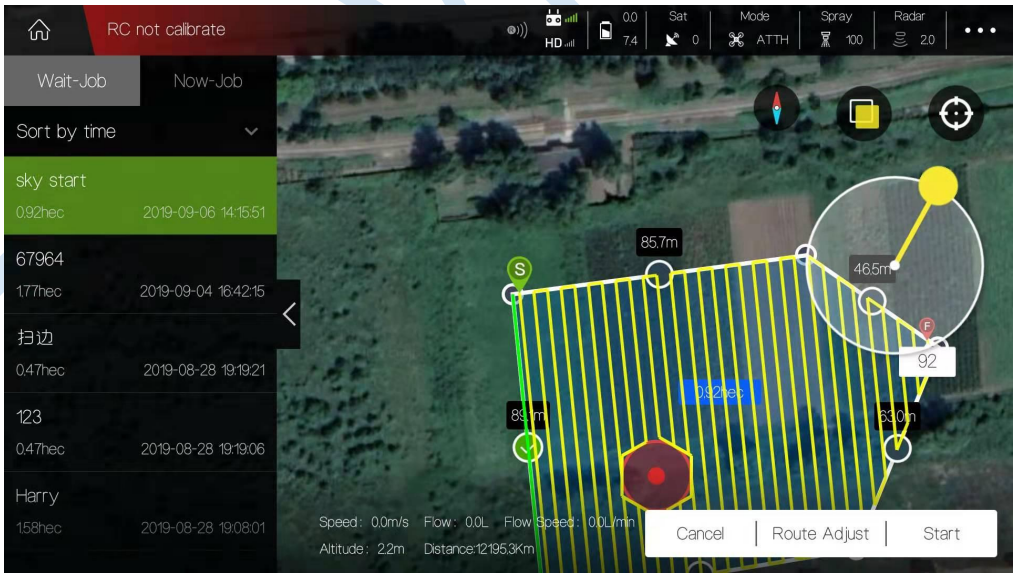


4.9.1 Route Adjust

(1)Press [Task Management] to view the tasks which is assigned.

[**Wait-Job**] indicates the job need to be finished after somebody released a marked field to you.

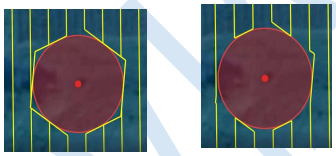
[**Now-Job**] indicates the job you are performing now.



(2)Select the task and press [Route Adjust] to edit the route.

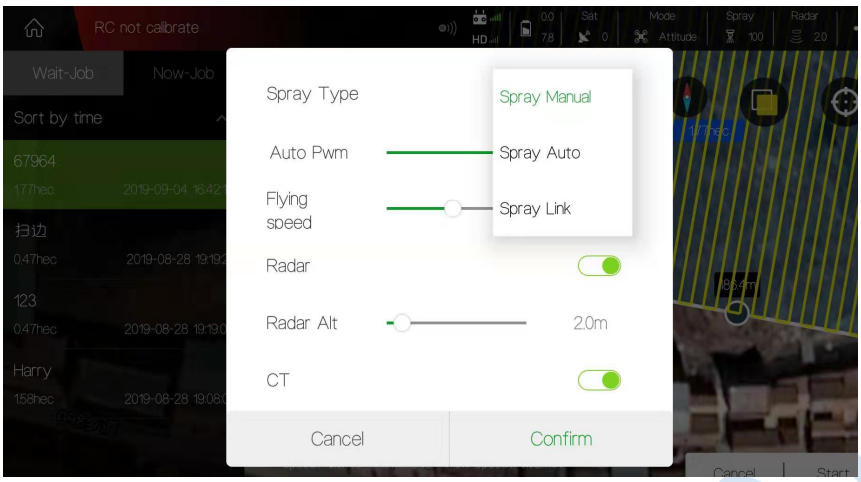
Spacing: adjust lateral distance between each 2 routes
Indentation: adjust the distance between route and one selected boundary line
Obstacle boundary distance: distance between obstacle boundary of nearby route.
Route Type: Route arrangement when encountering obstacles
Route settings: Position adjust of the whole routes.

2 kinds of Route types: Cross Turn back



4.9.2 Start Spraying

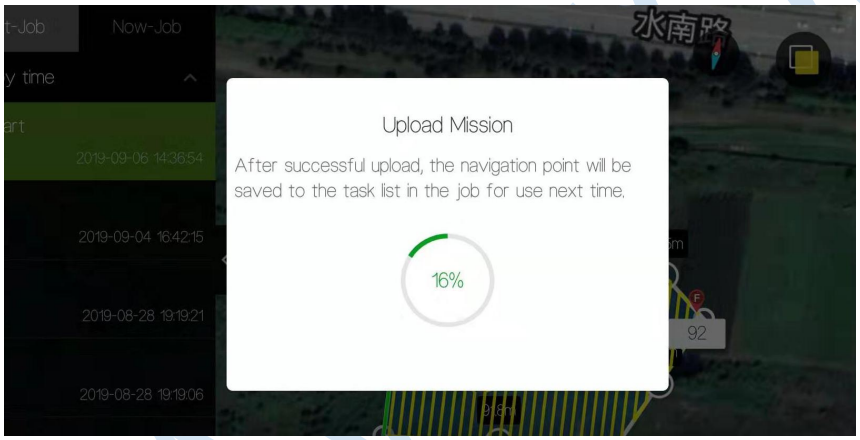
(1) After adjusting route completely, press [Start] to enter into spraying process.
(2) The spraying parameters can be adjusted in the spraying interface,such as spray type, flying speed, Radar etc.



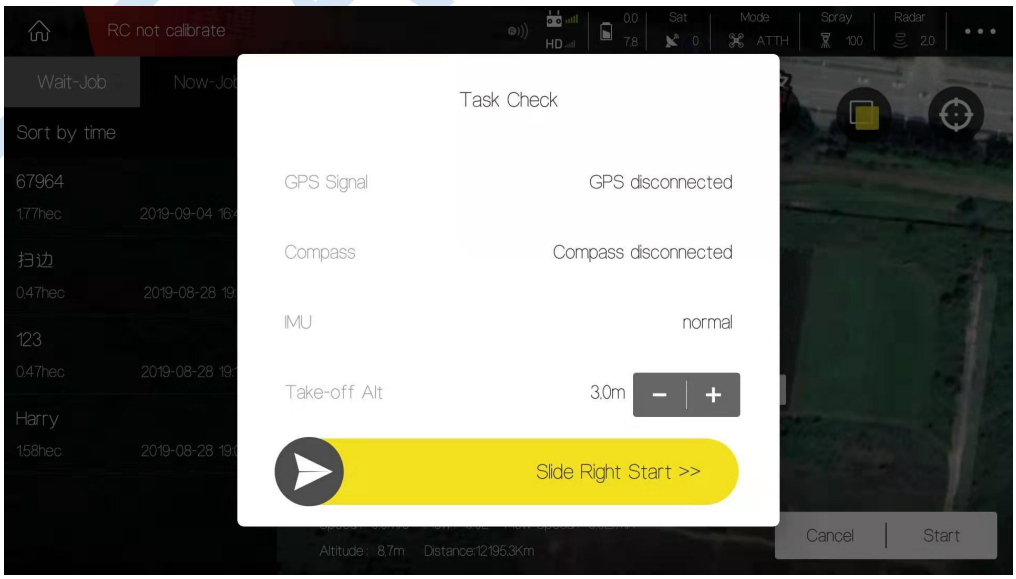
Auto Pwm - spraying volume per area unit

CT - U type turn (coordinated turn)

(3) Press [Confirm] and the route will be uploaded by itself.



(4) After uploading complete, the “Task Check” will pop up. Ensure all parameters are normal. Forbid taking off if any sensor is incorrect such as the pictures below.

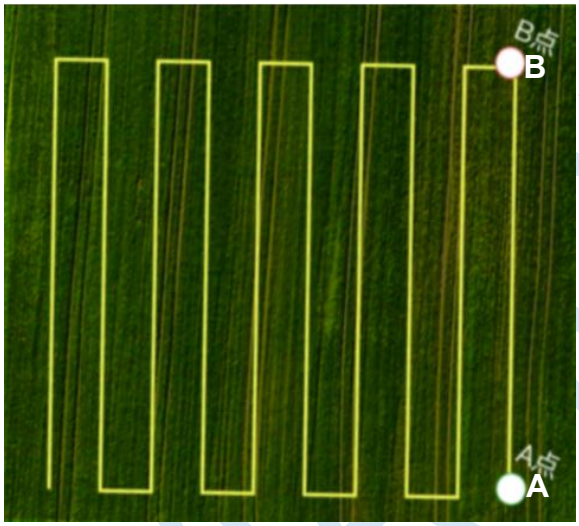


(5) Slider the arrow rightward to start the task.
(6) If needed, operator can press the [RTH] icon to make drone return to home.

4.10 AB Mission Mode

AB mission mode is a simple and easy mission mode particular suitable for regular blocks. By setting the two boundary points A and B, a simple regional flight can be created as show below

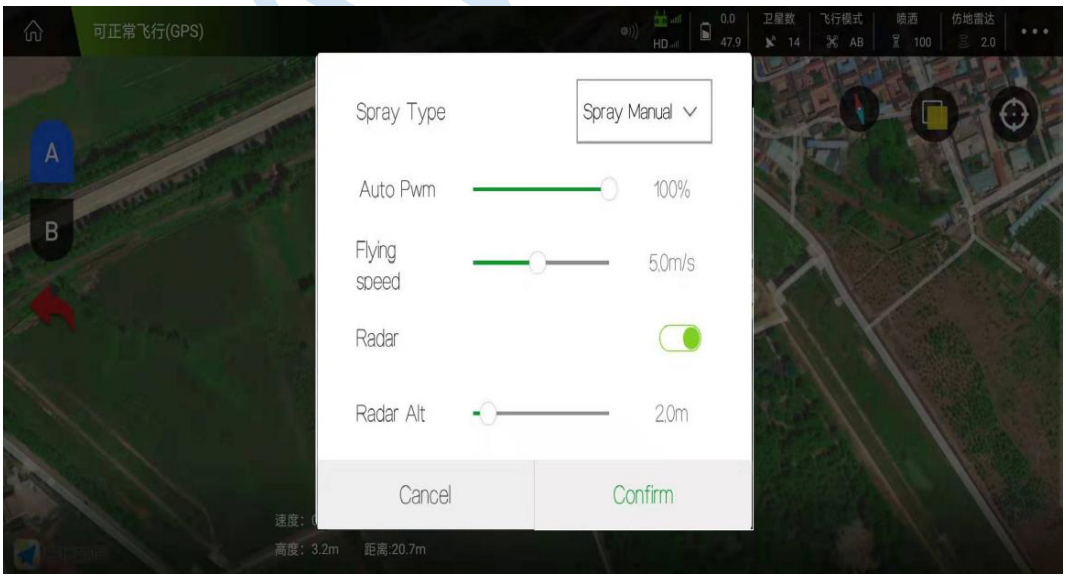
Note: Before record AB points, previous AB data must be removed by moving the F lever rapidly from top to bottom.



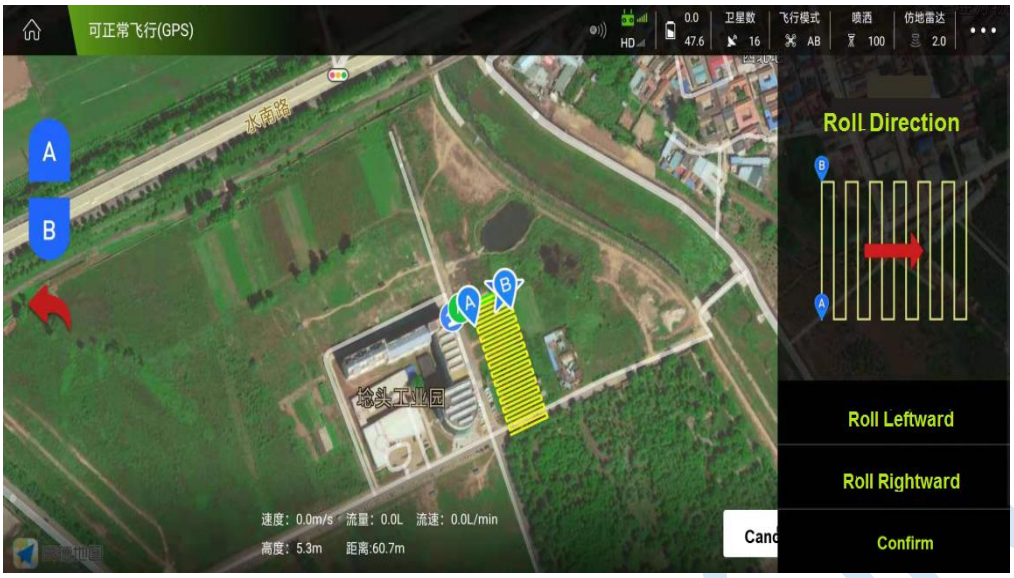
(1) AB recording.

- Switch the flight mode to AB mode.
- Fly the drone to expected A point and click “A” icon to record point A .

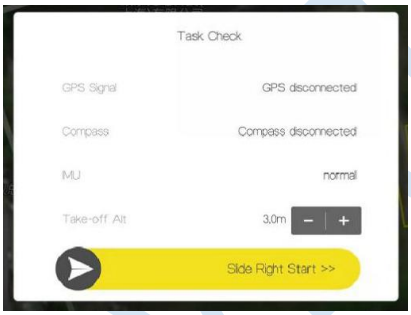
The below window of spraying settings will pop up for setup parameters.



- Record Point B, and select the roll direction.



(2)Check the drone state and ensure all are normal before take off.



Note: User can adjust the take off altitude, extend or shorten the course with the remote control during the flight.

5 Settings

5.1 RC Calibration

(1) “RC Calibration” is used to calibrate the maximum and minimum values of the remote control, and finally display the middle value.

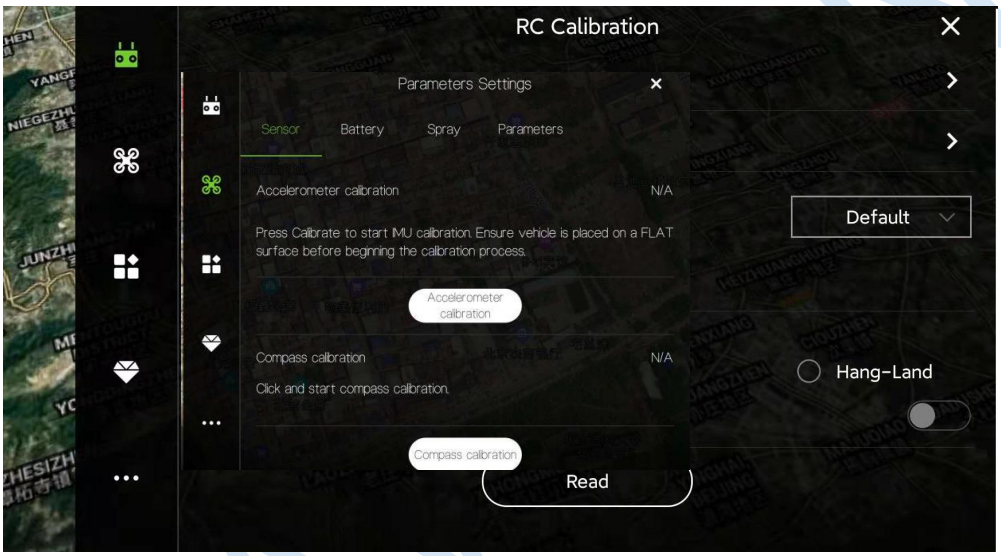
Attention: Do ‘RC Calibration’ when drone receiver or transmitter is changed.

(2) “RC Mode” is used to select the stick mode of RC.

After switching, one beep sound from the remote control indicates successful change.

(3) “Fail-Safe” is used to set the protection action when RC is out of control.

(4) “Fail-Safe Continue”. After turn it on, drone will continue performing the missions instead of triggering Fail-Safe protection action when drone is out of control.



5.2 Parameters Settings

5.2.1 Sensor

(1) Accelerometer calibration

Place the UAV on a horizontal platform, click the button “Accelerometer calibration”, LED will flash in red,green,yellow alternately. Solid *green* LED means successful calibration,data will be stored by restart.

(2) Compass calibration

▼Situations when need calibration

1) Everytime you transport the drone to another place, the compass have to be calibrated .

2) If you fly in the mountain , every time you move from one hill to the other one , do the compass calibration .

3) Everytime you get new drone or a repaired drone , do the compass calibration .

4) Once you find that the drone cannot stay when it's hover in GPS (it might be moving like

a cycle), do the calibration .

▼Calibration order

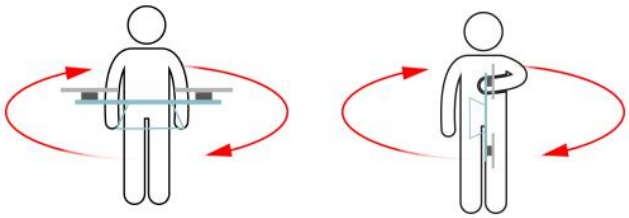
Two kinds of method of compass calibration:

Click the button “Compass calibration” to enter into calibration status.

Switch switch “E” back and forth more than 4 times to enter into calibration status.

▼Calibration Step

ensure GCS has been connected to the drone, compass has been mounted properly, and copter is outdoor. Clicking calibration, yellow LED of copter will be on, hold and keep copter rotating clockwise and slowly; leave copter head to the ground when green led is on, rotate copter clockwise and slowly till LED flash in red,green and yellow alternately.



After vertical calibration,calibration mode will be exited automatically and LED will flash normally if successful. If fails, LED will keep red for 3 seconds, then user need to calibrate again.

Please power again after successful calibration.

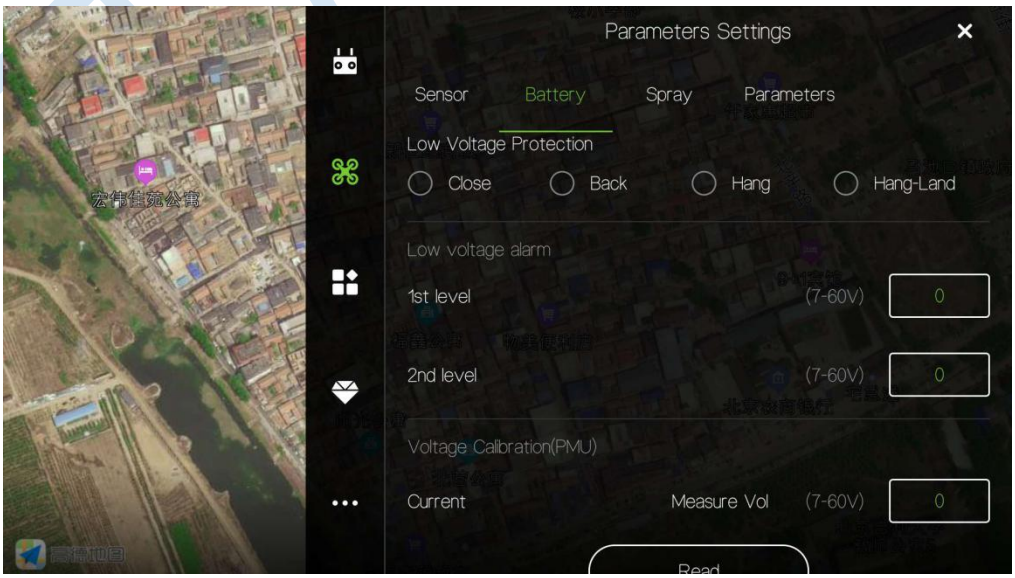
▼Attention

Calibration should be done in outdoor,wild and far away from high tension line tower which is easy influenced by magnetic interference.

Keep horizontal and vertical during the slow calibration.

Clockwise is the only direction.

5.2.2 Battery



Before doing any settings, click “Read” on the bottom to read the current settings.

(1) Low Voltage Protection

When battery voltage drops to the “2nd level” of low voltage alarm, the protection will be triggered.

Five voltage protection actions for user to select: Close(close the protection), return(auto home landing), Hang(hovering), Hang-Land(hovering and then landing).The default is Return(Home landing).

(2) Low voltage alarm

Settings of first alarm and second alarm. It’s recommended to 44.4V for the first alarm and 44V for second alarm.

LED will flash when get to the first alarm level; LED will flash rapidly when get to the second alarm level,and low voltage protection will be triggered.

(3) Voltage Calibration

Flight controller voltage sensor need to be calibrated if the result of sensor is different from real voltage. Real battery voltage should be filled after measuring battery voltage, then voltage sensor will be calibrated by clicking save. **It’s unnecessary to set by user without encountering sensor error as calibration has been done before delivery.**

Note:The calibration is more accurate when the battery is fully charged.

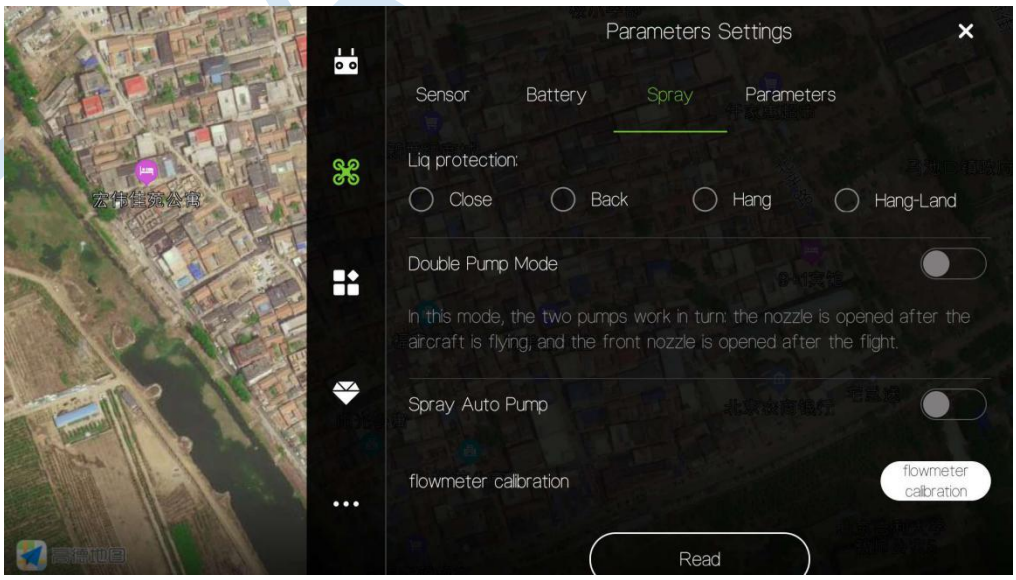
5.2.3 Spray

(1) Liq protection

When liquid is out, “Liq protection” will be triggered, then drone will execute the set protection actions.

(2) Double Pump Mode

“Double Pump Mode” is specially for drones with dual pumps and the two pumps work alternatively.



(3) flowmeter calibration

1) First drain all the liquid in the tank and hoses;

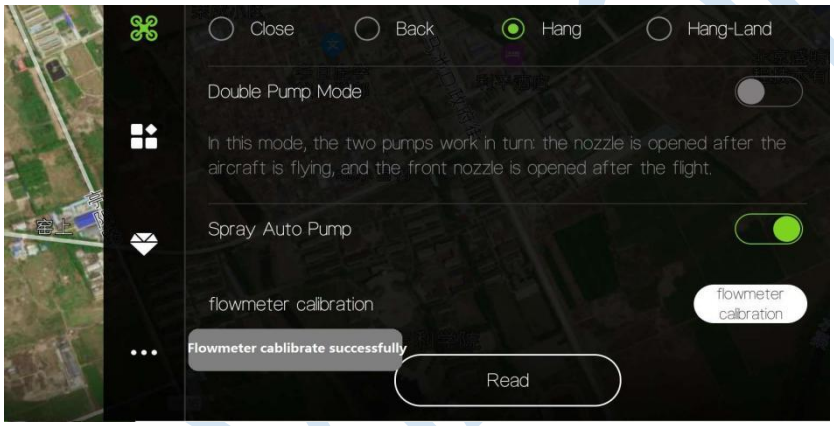
2) Pour 5-10 liters of water into the tank with measuring cup

3）Input the value of the water into the blank

4) Input the output percentage of pump

5) Click “Start”, then APP will prompt the flowmeter to start calibration successfully

6) After the calibration is completed, the APP voice will prompt the flowmeter calibration successfully.



5.2.4 Parameters

User can reset the parameters in this page. .

Click the button “Read” to get the current flying parameters. After resetting, click button “Save” to save the changes.

Note: It’s not suggested to reset the Max Angel.

’**Work End Action**’ refers to what drone will do after mission is completed.

‘**U Open**’ refers to the turn shape.

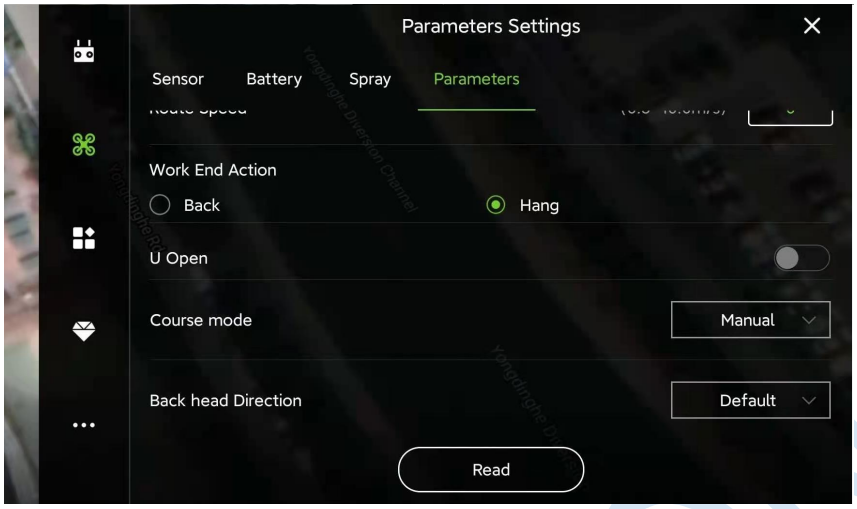
‘**Course Mode**’ refers to the drone heading direction when drone is performing missions.

‘**Manual**’ indicates drone will keep the heading direction in AB mode or autonomous route mode,unless turn it manually.

‘**Auto**’ indicates drone will keep the heading direction to flight routes, and drone won’t turn.

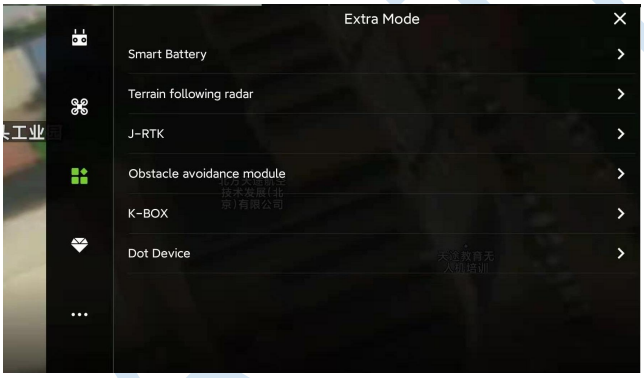
‘**Target**’ Indicates drone heading direction always point to the next target point.

'**Back Head Direction**' refers to the heading direction when flying to home automatically.



5.3 Extra Mode

This section is used for setting external modules, including smart batteries, terrain following radar, etc..



5.3.1 Smart Battery

This function is under developing.

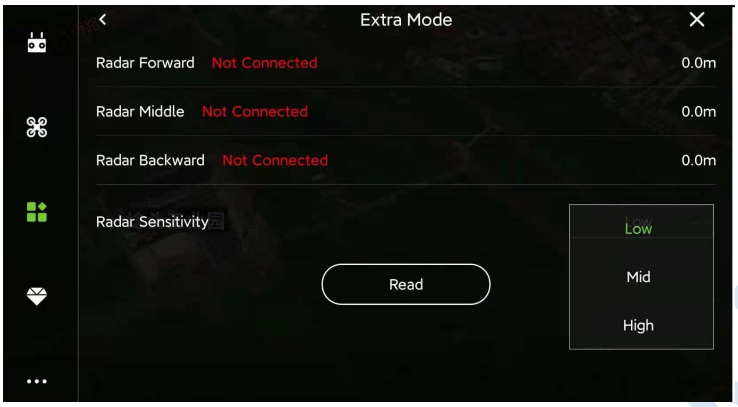
5.3.2 Terrain Follow Radar

Terrain following sensitivity: Control the drone to follow the height change of the terrain, and keep the relative distance from the ground fixed at all times.

1) **Low sensitivity**: suitable for high-stalk crops (such as sorghum, corn, etc.). It can prevent falling and twitching caused by high loft lodging and uneven high loft.

2) **Medium sensitivity**: suitable for most scenarios and non-stalk crops (such as rice, wheat, soybeans, etc.). The speed of the simulation is moderate, and the response is moderate.

3) **High sensitivity**: It is suitable for demonstration effects and some non-operational entertainment places. It is sensitive to imitation, rising fast and falling fast.



5.3.2 J-RTK

'**RTK Location Status**' display the yaw angle fixed status; If RTK module has been mounted on aircraft, its status should be Fixed before takeoff.

'**RTK Diff_Age**' display the latency of RTK differential data. If the value changes between 1~3. it indicates the RTK signal status is good.

'**RTK Protect**' display the protection action when RTK fails.

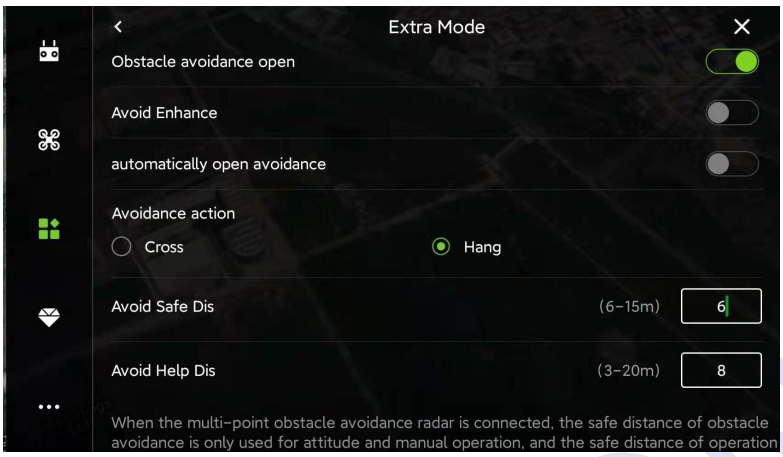
'**RTK trust**': recommended to set on Mid.

'**Hight**': Drone can't be armed, unless RTK positioning and **RTK Location Status** is fixed

'**Mid**': Drone can't be armed, unless RTK positioning is fixed, and RTK yaw angle is the same with compass yaw angle.

'**Low**': Drone can be armed when GPS positioning is fixed.

5.3.3 Obstacle Avoidance Module



'**Avoid Enhance**': Enhance the detection sensitivity of radar.

'**Automatically open avoidance**': Avoidance radar will be activated only when drone is performing AB mission or Autonomous mission.

'**Avoidance action**': what drone will do when detected any obstacle.

"**Cross**": Drone will plan and execute the routes to avoid obstacles automatically when detected obstacles.

'**Hang**': Drone will hover when detected obstacles.

'**Avoid Safe Dis**': After the aircraft detects the obstacle, the distance between the final hovering position of the aircraft and the obstacle (generally set 8-10 meters).

"**Avoid Help Dis**": When triggering the **Cross** avoidance action, the actual avoidance flying distance = swath*2 + Avoid Help Dis, referring to the **Figure 5.3.3**. Only valid in AB mission and autonomous mission.

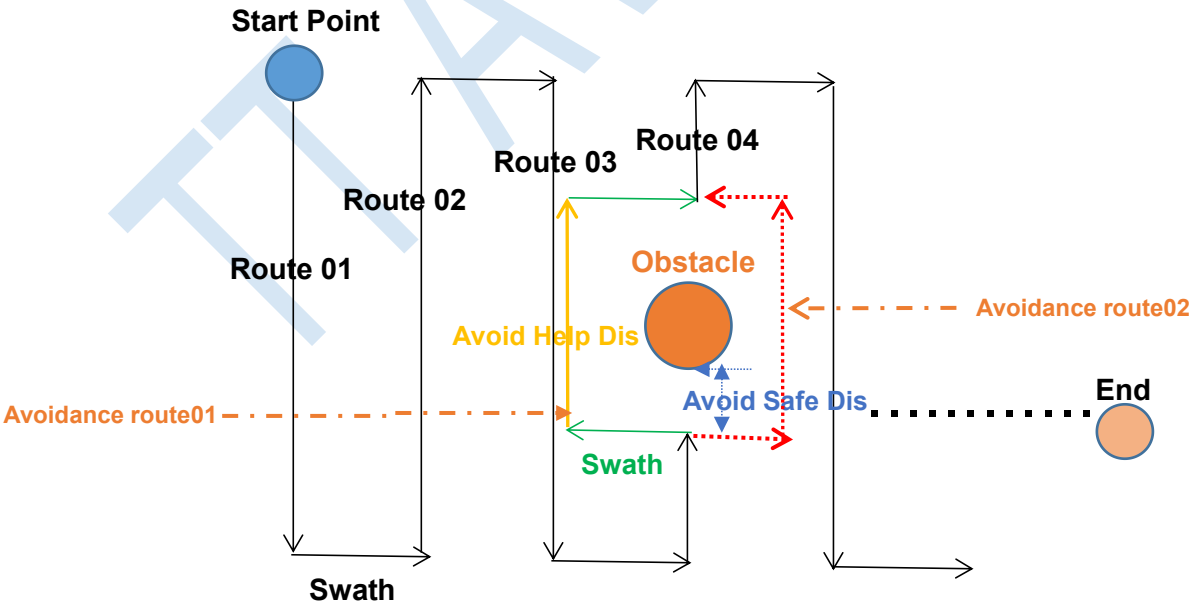


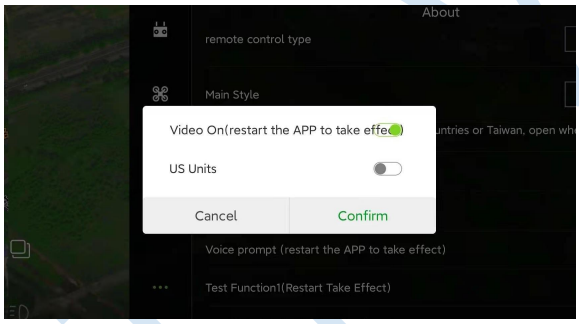
Figure 5.3.3 Auto Avoid Route

When Cross Avoidance is triggered, drone will always fly to **Flied Area** to avoid obstacles.

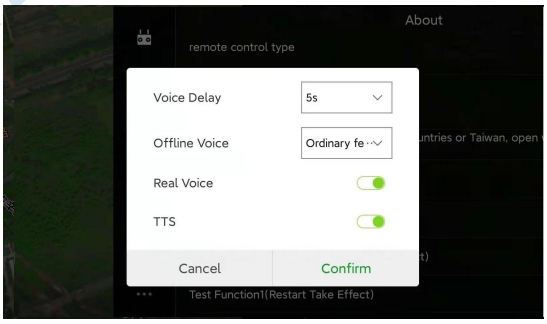
In situation as above Figure 5.3.3, drone will perform Avoidance Route01, instead of Avoidance Route02.

5.4 About

[FC] On the FC page, users can view the flight control firmware version, serial number, IOT version number, lease control status and lease management expiration date.
[flight time] User can view the total flight time in this page.
[Map type] User can chose proper map tape according to the working country.
[Correct coordinates] It is suggested to turn it on when the positioning deviation is large.



fpv/unit

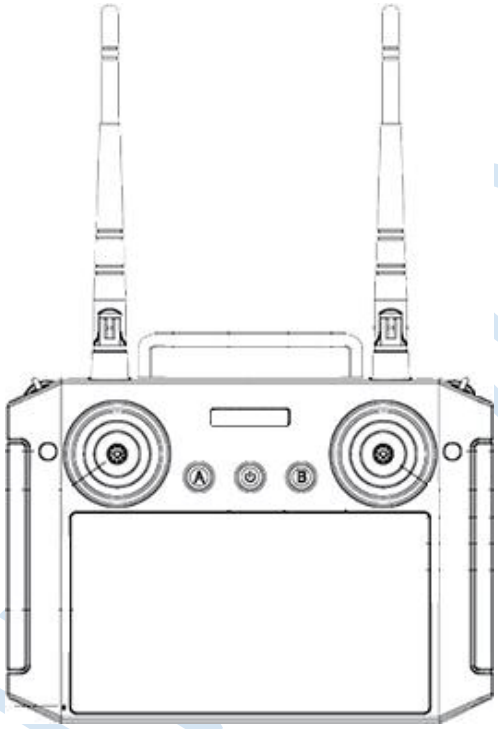


Voice Prompt

[fpv/unit] Turn on or off FPV display; Switch to Metric Unit or US unit
[Voice Prompt] Turn on or off the voice prompt of APP.
[Unlock Password] Set the password of arming drone.
[US Units] Switch statistic unit between Metric Unit and US Unit.
[SIYI] “SIYI”is used to adapt to SIYI remote controller.

6.Remote Controller

- Charger output more than 5V should not be used.
- Remote controller charging current should be not more than 2A.
- Any damaged,smoking or abnormal heating charger should not be used.
- Charging should not be continued in condition of smoking,smelly,weeping.
- Charging should not be in the area of baby playing.
- Charging should not at temperature more than 60℃.



6.1 Function Description

Switch	Function	Left Position	Middle Position	Right Position
E	Flying mode	Attitude mode	GPS mode	AB mode
F	AB recording	Recording Point B	Recording Point A	/
G	Pump mode	OFF	/	ON
H	Terrain following	ON	/	OFF
Dial	Channel	Top Position	Middle Position	Right Position
A	Avoidance Function	Disabled	/	Enabled
B	Home landing	OFF	/	Triggered

Note: The flying altitude can be set in APP after Terrain following radar has been connected.

6.2 Bind

Before binding, remove all propellers for safety.

Power on drone for 1 second and cut off immediately, repeating this step for five times. Then power on the drone for the sixth time and keep the power connection. Drone will enter into binding mode automatically.

- Power on remote controller. Drone will bind the remote controller successfully with seven beeps from remote controller.

Remote controller need to be calibrated after binding.

Remark: Binding remote controller can not be operated for more than one pair at the same time. Only one-to-one pairing is allowed.

6.3 RC Adjustment

H12 Tool is the application for adjusting RC setting.

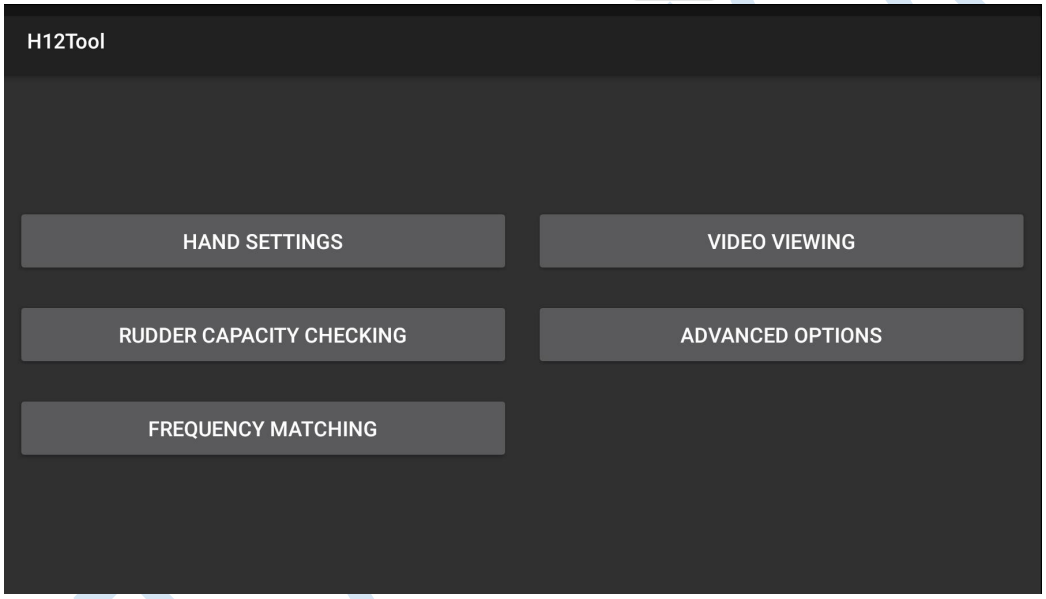
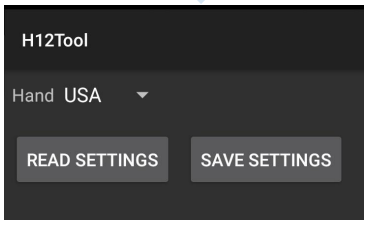


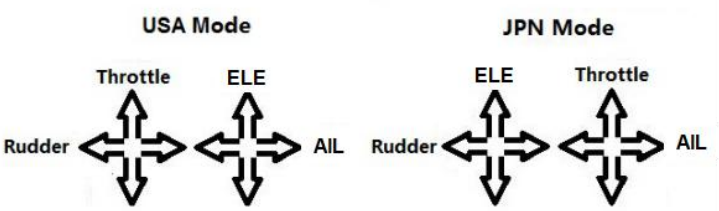
Figure6.3 H12 Tool

(1) Hand settings

Use can chose handing setting in this page. The specifications of USA mode JPN Mode are showing as picture below.



Hand Change

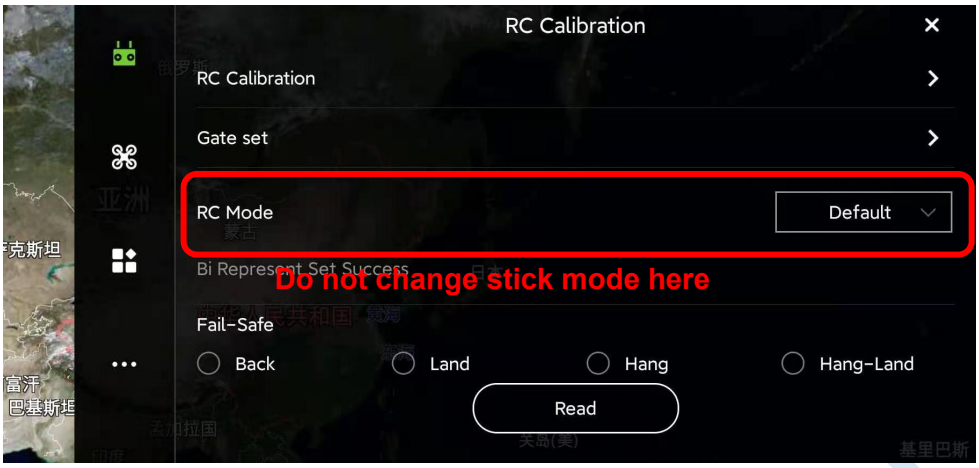


Hand Mode Specification

Note:

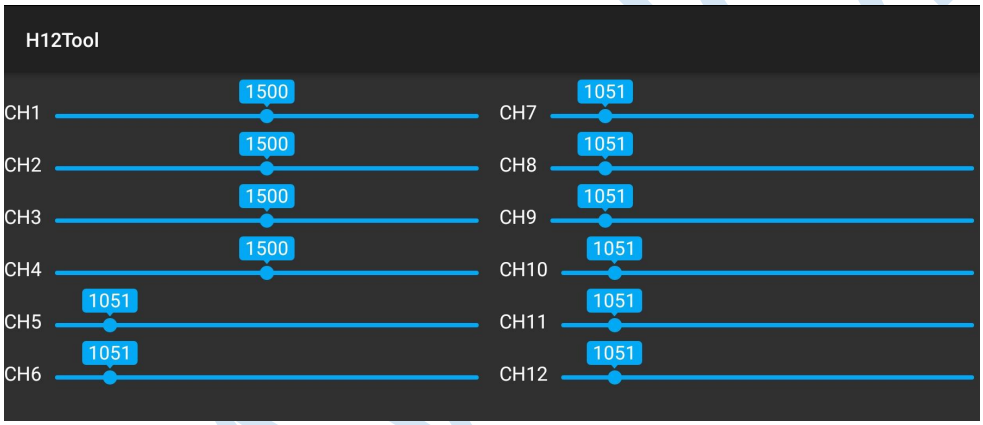
(1)The default mode is USA mode / mode 2.

(2)Do not change stick mode in “RC Mode” of “RC Calibration” page.



(2) RUDDER CAPACITY CHECKING

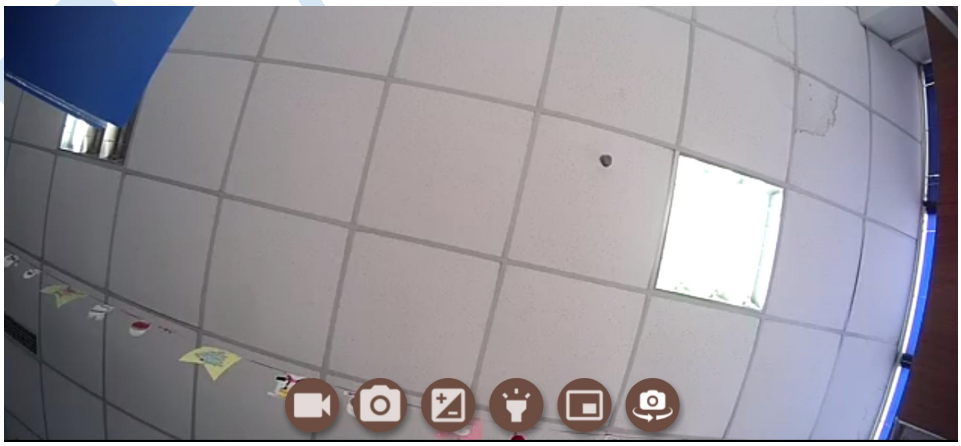
Monitor the value range of each channels. The proper range of each channel should be 1050~1950, or transmitter needs calibration.



(3) VIDEO WATCHING

Real-time FPV images can be monitored here.

Attention: Ensure to exit this page before open the Agri Assistant.

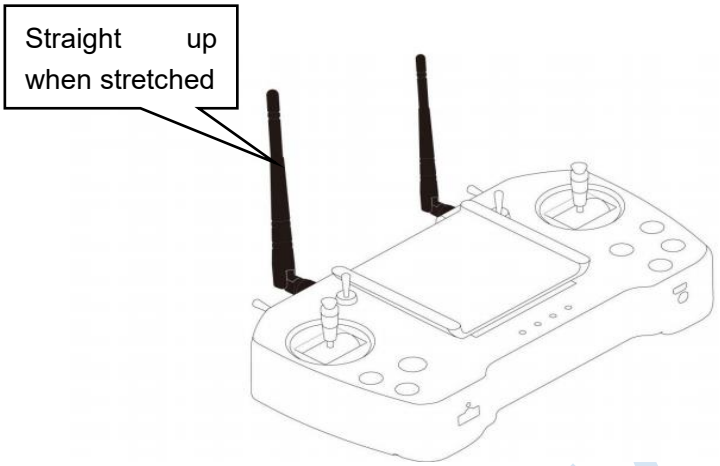


Caution:

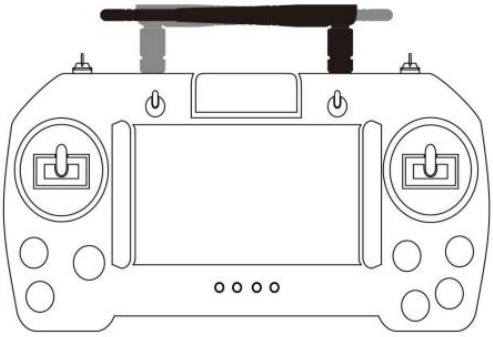
Don't do any adjustment, unless under professional introduction. Otherwise, any consequences caused are undertaken by its users.

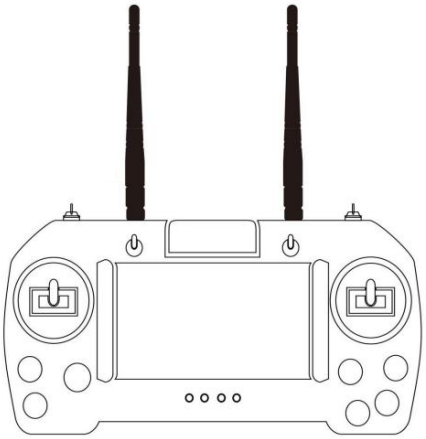
6.4 Remote Controller Antenna

Remote controller antenna should straight up when it is stretched.

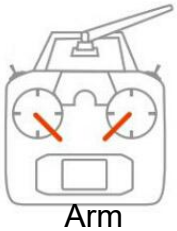


Caution: Incorrect directions as the two pictures below.

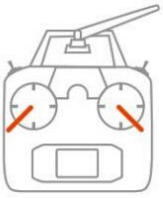




6.5 Flying Control



Arm



Emergency Disarm

6.5.1 Manually Arming and Take-off

1) Switch to **Attitude** mode.
2) Pull control sticks to the bottom inside corners to arm drone.
3) After armed, switch to **GPS** mode. Then push the throttle above the neutral position to take off.
4) After unlocked, motor will be stopped and locked automatically if user do not push the throttle above the 10% position from neutral in 3 seconds.

Note:

(1) Before arming, ensure no human is within 10 meters of the drone.

(2) Drone can only be armed in **Attitude** mode. After arming, pilot should switch to GPS mode before take off drone.

(3) It is suggested to take off in GPS mode, when satellites is more than 14, no magnetic field interference and all parts of aircraft are in good condition.

(4) Before take off, please check the **stick mode** and confirm the current settings is the mode you want. If not, never reset by yourself without the introduction of TTA 's engineer.

6.5.2 Disarming

After landing the aircraft, push the throttle down and hold for 3 seconds. The motors will be stopped, and drone will be disarmed at the same time.

Emergency disarming: Pull control sticks to the bottom outside corners to lock drone(only for emergency use. This operation can control motor stop spinning immediately when flying).

Cautions:

1. During autonomous mode or AB mode, missions can be **interrupted** by switching the flight mode manually. After that, operator can **fully take over** the aircraft.
2. When drone executes protection action such as low-voltage protection and low-liquid protection, operator can **take over control** by switching the flight mode manually if needed.

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Appendix Ⅰ Implication of Indicator

Items	Indicator light	Priority
Flying Mode		
Gyro mode(stabilization,attitude)	Green light single flash🟢	Low
GPS mode（angle,speed）	Green light double flash🟢🟢	Low
AB mode	Green light triple flash🟢🟢🟢	Low
GPS		
GPS unconnected/GPS receive no satellite	Red light triple flash🔴🔴🔴	Low
GPS bad signal	Red light double flash🔴🔴	Low
GPS general signal	Red light single flash🔴	Low
GPS Good signal	Red light off ○	Low
Low Voltage Warn(alarm)		
First alarm level	Yellow light triple flash🟡🟡🟡	Low
Second alarm level	Yellow light quick flash🟡🟡🟡🟡🟡	High
Compass Calibration		
Horizontal calibration	Yellow light constant light🟡 ——	Middle
Vertical calibration	Green light constant light🟢 ——	Middle
Calibration failed	Red light constant light🔴 ——	Middle
Calibration succeed	Red,green and yellow light alternating flash🔴🟢🟡	Middle
Accelerator Calibration		
Calibrating	Red,green and yellow light alternating flash🔴🟢🟡	Middle
Calibration succeed	Green light constant light🟢 ——	Middle
Error		
Remote controller lose control	Red light quick flash🔴🔴🔴🔴🔴	High
Compass interfered/error	Yellow and green light alternating flash🟡🟢🟡🟢	High
GPS lose satellite/error	Red and green light alternating flash🔴🟢🔴🟢	High
IMU over vibration/error	Red and yellow light alternating flash🔴🟡🔴🟡	High
Other Situations		
Initializtion of power on	Red,green and yellow light alternating flash🔴🟢🟡	High
Unlock	Red,green and yellow light alternating flash🔴🟢🟡	High
Unlock failed	Red light constant light🔴 ——	High

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Appendix Ⅱ Important Attentions and Clauses

1. Ingress Protection Rating

Drone has a certain degree of waterproof, dustproof, when it is functioning normally. However, this protection rating is not permanent and may reduce over time after long-term use due to aging and wear. The product warranty does not cover water damage.

2. Battery Maintenance

(1) Charge batteries with balance cable connecting.

(2) Never use deformation or bulge batteries.

(3) Drone battery needs maintenance regularly.

- Generally balance battery voltage every 5 work days.
- In long-term storage, charge battery in storage mode every 20 days, as battery itself is discharging all the time. Otherwise, battery may be damaged because of over self-discharge.
- In long-term storage, charge and discharge battery to activate battery every 2~3 month. Otherwise, battery performance will be largely reduced.

More details, referring to <Battery Use and Maintenance Instruction>.

Any losses caused by improper battery maintenance and storage shall be taken by users.

3. Drone Idle Time Protection

To maximize the service life of drone electronics, TTA presets a relative protection on drone idle time. If Agricultural drone is powered on for over 30mins without flying, once every takeoff, drone have a possibility of losing control, which may crash caused by.

In case of staying over 30mins with battery connected, disconnecting and re-connecting drone battery will make drone ready for takeoff.

Hereafter any crashed by the over 30min ground issue, any crashed losses caused shall be responsible for users.

4. Drone Payload Weight

Each time the flying altitude is increased by 1000m, the tank payload should be reduced by 2KG.

5. Radars

- The radar can only function properly in flat field, and cant work properly in sloping

field with an inclination of more than 10° or field with sudden elevation changes.

- Be extra careful when flying on inclined surfaces. Recommended maximum inclination at different aircraft speeds: 10° at 0.9 m/s, 6° at 3.2 m/s, and 3° at 4.5 m/s.
- Pay attention that obstacle avoidance radar will be adversely affected when aircraft pitch angle exceeds 15° .

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This content is subject to change.

If you have any questions, please contact TTA: lan.li@ttaviation.com

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