PC Ground Station User Manual V1.0

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Contents

Description

Disclaimer

Please read the manual carefully before operating this product. Once you've used this product, all contents of this declaimer shall be deemed to be approved and accepted. This product is suitable for people over 18 years old.

Thanks for using this product. You can login www.topxgun.com, official website of Shanghai TopXGun Robotics Co., Ltd, for latest product information, technical support and user manual. It is recommended to download and use the latest user's manual. The manual will be updated, without prior notice.

Please use the wireless digital radio under local wireless control regulations. Users shall read the manual carefully before operating this product. Once you've operated this product, all contents of this declaimer shall be deemed to be approved and accepted. Please read the manual carefully and obey the manual to install all software and hardware products strictly, so as to guarantee the ground station and the wireless digital radio operate normally. TopXGun shall not bear legal liability for any result or loss caused by user's improper operation, installation, assembly and refit.

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Profile

Product Introduction

TopXGun PC ground station is designed for the aircraft flying beyond visual range, which features real-time flight state feedback, auto taking off and landing, click-to-fly and waypoint planning, etc. It is used together with TopXGun flight control system and digital transmission equipment. Flight line can be designed in the ground station software, so as to realize autonomous flight. It can not only ensure stability and safety of aircraft flight but also make it easy for operation.

Symbol explanation

Symbol	Meaning	Description
⚠️	Note	Texts with this symbol indicate some potential risks. If you ignore them, that could result in equipment damage, data loss, or other unexpected consequences.
💡	Description	Texts with this symbol are the additional and supplemental information to main part.

1 Ground station installation and connection

1.1 Ground station installation

Step1. Install driver program. Installation package can be download from www.topxgun.com. There are several versions of the driver, and you can select the right version suitable for the operating system of PC.

💡 Don't reinstall if you have installed the parameter adjustment software driver.

Step2. Install ground station software based on the following installation wizard. Installation package can be download from www.topxgun.com.

1.2 Connection

⚠️ Before connection, confirm:
- TopXGun flight control system has been installed correctly.
- TopXGun 900MHz wireless digital radio has been installed correctly.
- Driver and ground station software have been installed correctly.

Step1. Open ground station software.

Step2. Digital transmission ground station is connected to PC using the USB cable. The software interface is as shown in Figure 1.
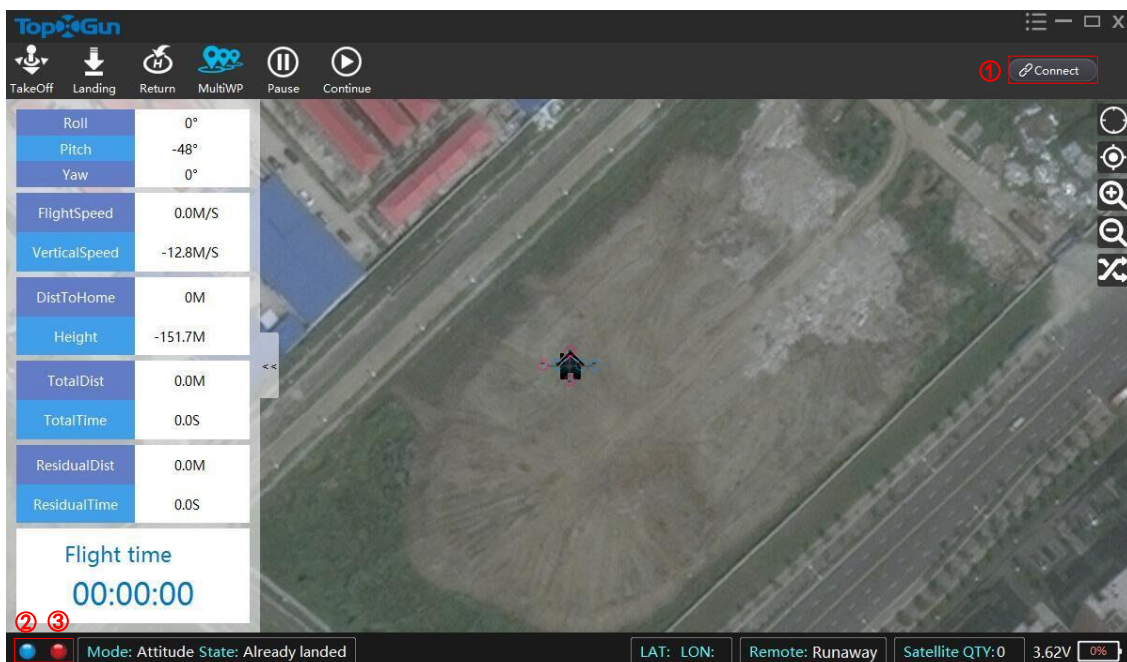

Figure 1 Connecting Ground Station

Notes to the figure are as shown in Table 1

Table 1 Connection Interface

No.	Name	Description
1	Contact State	State of connection between the flight controller and the ground station. Flight can be controlled by ground station when it displays "connected".

No.	Name	Description
2	Data status LED indicator	Blue lights flicker indicates that data is being transmitted.
3	Port state LED indicator	Red being on constantly indicates that the port is connected.

2 Ground station software application

2.1 Interface introduction

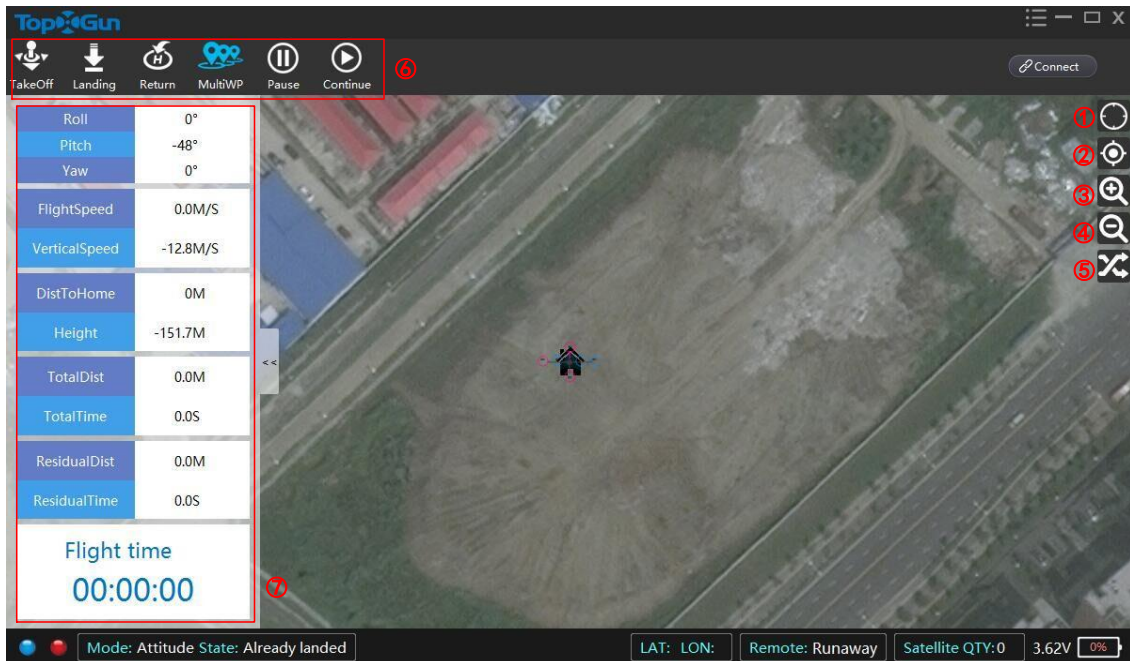TopXGun PC ground station interface is as shown in Figure 2.

Figure 2 Ground Station Interface

Interface descriptions are listed in Table 2.

Table 2 Ground Station Interface Description

| No.	Name	Description
1	Locate the aircraft	Click this button to locate the position of the aircraft.
2	Locate the waypoint	Click this button to locate the map, with the selected waypoint area as the center.
3	Zoom in	Click this button to zoom in.
4	Zoom out	Click this button to zoom out.
5	Load waypoint	Click this button to load the saved route task to the map.
6	Function area	For functional area icons, see "2.2 Function Introduction".

No.	Name	Description
7	Aircraft status	Aircraft status includes the following parameters: ●Roll angle, pitch angle, yaw angle: real-time aircraft attitude ●Flight speed: aircraft horizontal flight speed ●Climbing speed: aircraft vertical flight speed ●Distance from start point: dynamic distance from start point of aircraft . ●Height: dynamic height of aircraft ●Total route distance: total route distance setting ●Total route time: estimated flight time of aircraft completing the total route. ●Remaining route distance: dynamic remaining distance of aircraft ●Remaining route time: estimated dynamic time for remaining distance of aircraft. ●Flight time: dynamic total time of aircraft.

2.2 Function introduction

Aircraft can be controlled by ground station software according your requirement when it is installed and connected successfully.

> It is necessary to connect hot spots to load offline maps and connect the network to manually load maps indoors when locate the aircraft at the first time. The default longitude and latitude location of the aircraft is zero longitude and longitude. Location for last use will be taken as default location of next use.

The functional region in ground station is as shown in red box of Figure 3. ![MultiWP] is the shift button of route flight mode, and it can change to route flight mode by clicking it.
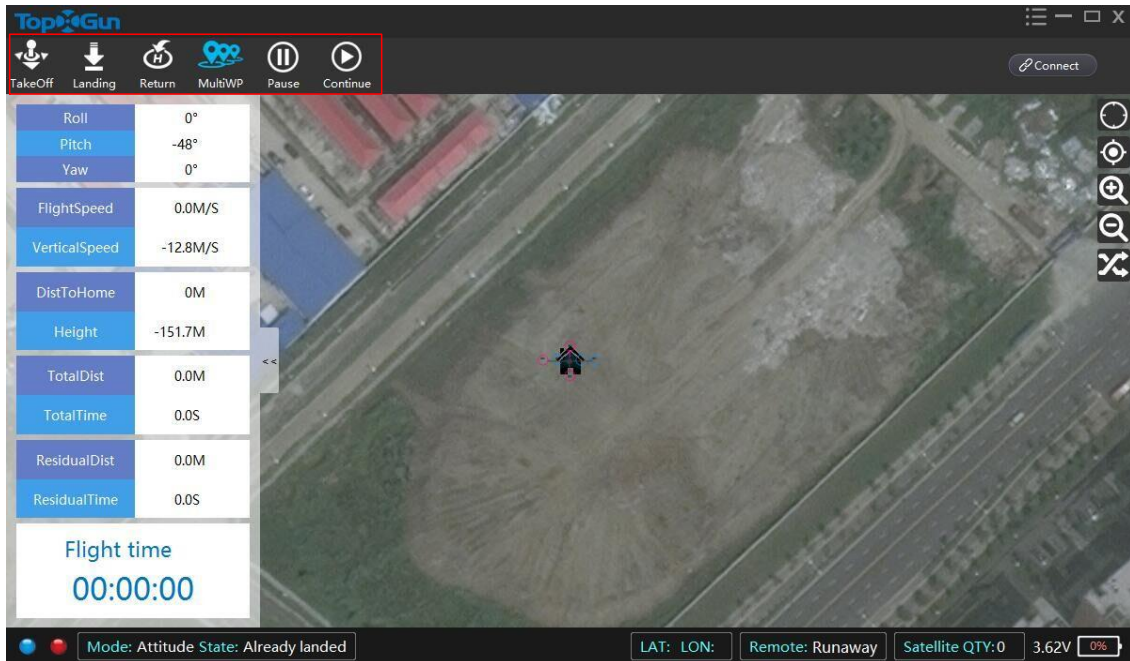

Figure 3 Functional Regions in Ground Station

2.2.1 Flight function

The aircraft can set off and land autonomously using ground station software.

Take off

Click the "take off" button under GPS mode, then operate it as follows: push the throttle stick to 50% when it is unlocked, and the the aircraft will rise up to 5m to hover, and the taking off is completed.

Land

During the flight, the aircraft can land in place by clicking "land" button.

Return

Click "return" button, then the aircraft will return to the start point. If the altitude of aircraft lower than 10m, then it will rise to 10m firstly, return to the start point after hovering 5s, and then land. If the altitude of aircraft higher than 10m, it will return to the start point at the current height.

Pause/resume

Choose "pause" or "resume" to control the aircraft to pause or resume the route flight. It may quit route flight when the remote control is shifted to attitude mode. The aircraft will quit the autopilot mode and hovering at GPS mode when the flight is completed.

2.2.2 Route flight mode

There are three route flight modes in ground station as follows: Waypoint, click-to-fly and regional flight.

Waypoint mode

You can set waypoints under waypoint mode. TopXGun flight control system can support 128 waypoints at most.

⚠️ Waypoint cannot be deleted, dragged and operated when the aircraft is under autopilot mode.

Operation procedures of waypoint mode are described as follows:

Step1. Shift route flight mode to "waypoint" in the ground station software.

Step2. Set route. Methods to create, modify and delete the waypoint are as shown in Figure 3.

Table 3 Choose Route

Function	Operation
Add waypoint	Double left click in an appropriate location on the map to set the waypoint, and choose another location to set the next one.
Modify waypoint	Choose the waypoint on the map, and modify it by moving the mouse.
Delete waypoint	There are two methods as follows: ●Right click the waypoint you want to delete, then choose "delete current waypoint" or "delete all waypoints" in the menu popping up; ●Right click at any location on the map, and choose "delete current waypoint" or "delete all waypoints" in the menu popping up.

Step3. Submit waypoint. Right click at any location on the map, and choose "submit waypoint" in the menu popping up. Waypoint setting interface is as shown in Figure 4

Figure 4 Submit Waypoint

Step 4 Set parameters. Set the height, speed, direction and hovering time about the waypoint in the waypoint setting window. Click "set" to set waypoint parameters in batch, as shown in Figure 5.


Figure 5 Waypoint Setting

Parameters are as shown in Table 4.

Table 4 Waypoint Parameter Description

Parameters	Description

Parameters	Description
Longitude	The location of the longitude cannot be modified in the table.
Latitude	The location of the latitude cannot be modified in the table.
Height	The waypoint height, has range from -500 to 3000, accuracy is 0.1 and unit is meter.
Direction	In order to show the aircraft bearing at the waypoint, we set the head direction 0 at the start point. Clockwise turning angle is positive, with accuracy 1 and range 0-360°.
Speed	The aircraft speed at waypoint has range 0-20, accuracy is 0.1 and unit is m/s.
Hovering	The hovering time of the aircraft at waypoint has range 0-36,000, accuracy is 1 and unit is second.

Step5. Upload and execute. Click `Upload` in the waypoint settings interface, and the waypoint uploaded will turn to red. Click `Execute` when the upload is accomplished, and complete the flight path following tips.

Step6. Save waypoint. Click `Save` to save the waypoint in the waypoint setting window for the subsequent implementation of the same route when using the "load waypoint" function.

Click-to-fly mode

Target point can be directly assigned for the aircraft under the click-to-fly mode. Steps are as follows:

⚠️ The aircraft needs to be unlocked under GPS mode to perform the click-to-fly mode.

Step1. Shift route flight mode to "click-to-fly mode" in the ground station software.

Step2. Double click the target point on the map, and select "Yes" to perform the action in "warning" dialog box popping up, as shown in Figure 6.
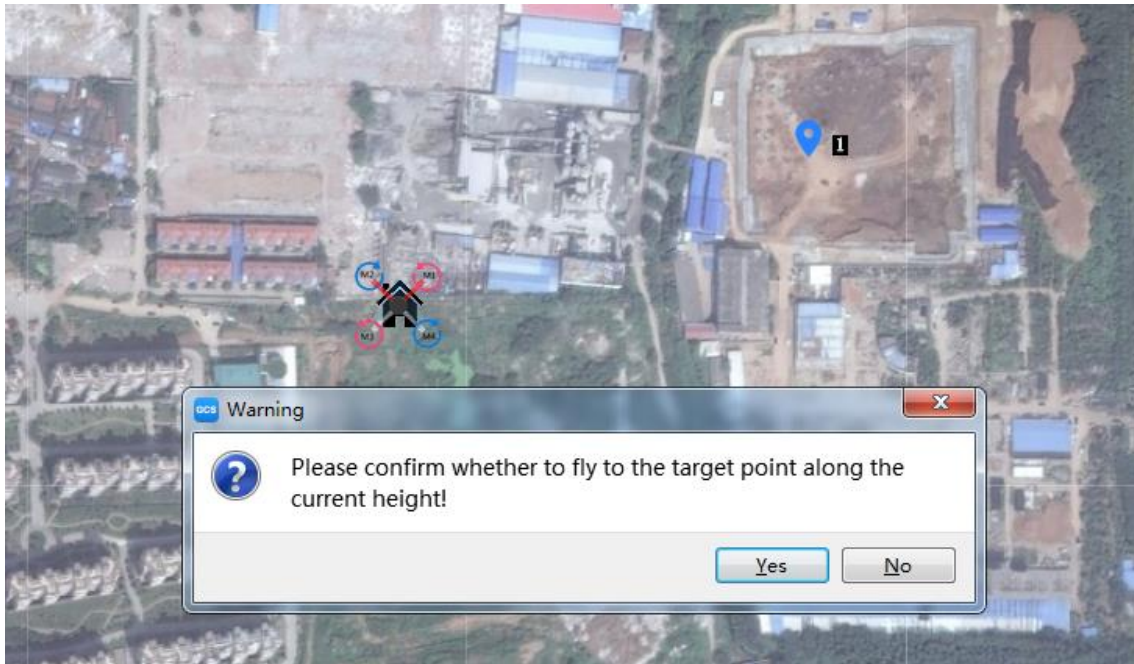
Figure 6 Click-to-fly Mode

Aircraft will be at 5m/s speed to the target point at current altitude. Use the remote controller to switch attitude mode, and the aircraft will enter into the GPS hovering mode when it reaches the target point.

Regional flight mode

Under regional flight mode, the aircraft can fly back and forth at a certain distance in specified region to cover the entire region. This is suitable for agriculture UAV operation.

Specific steps are as follows:

Step1. Switch route flight mode to regional flight mode, in ground station software.

Step2. Select area.

Select area with following two methods:

●Double click the left button at appropriate position to define top point, modify top point by selecting it and then moving the mouse.

●Right click the map, and then select "enter coordinates" in menu popping up, as shown in Figure 8. Enter top point longitude and latitude in the window, rounded to 7 decimals. Longitude scope is -180 to180, latitude range is -90-90.
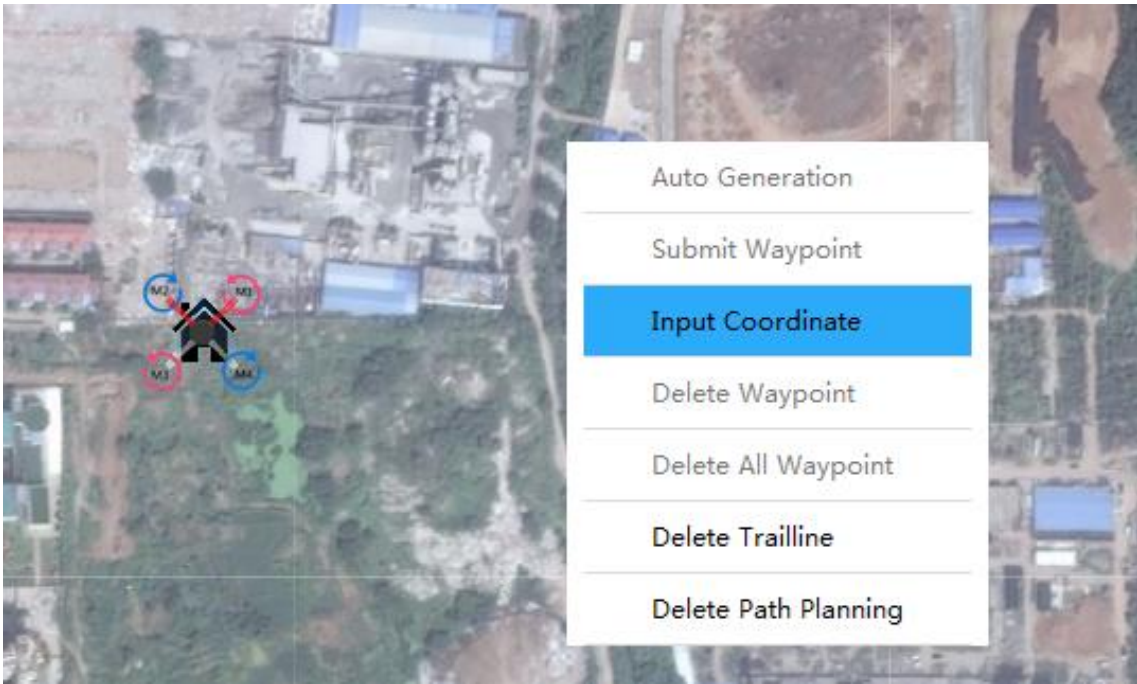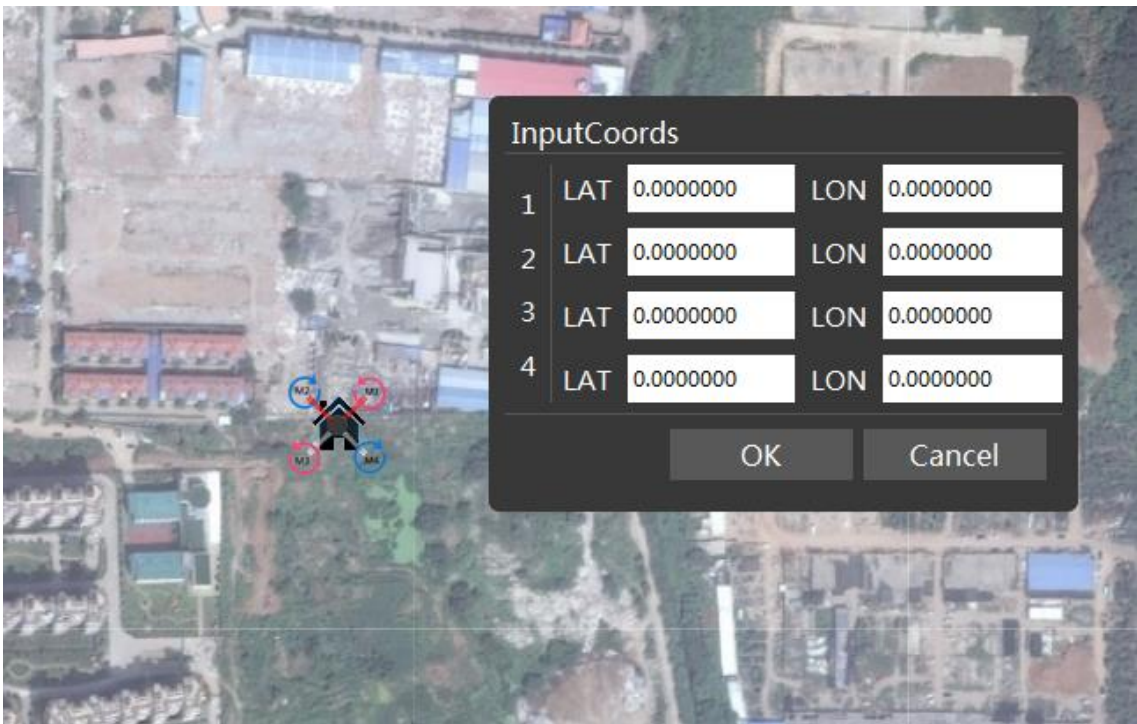
Figure 7 Region Set 1

Figure 8 Region Set 2

Step3. Plan route. Right click the map, and then select "automatically plan route" in menu popping up, as shown in Figure 9.
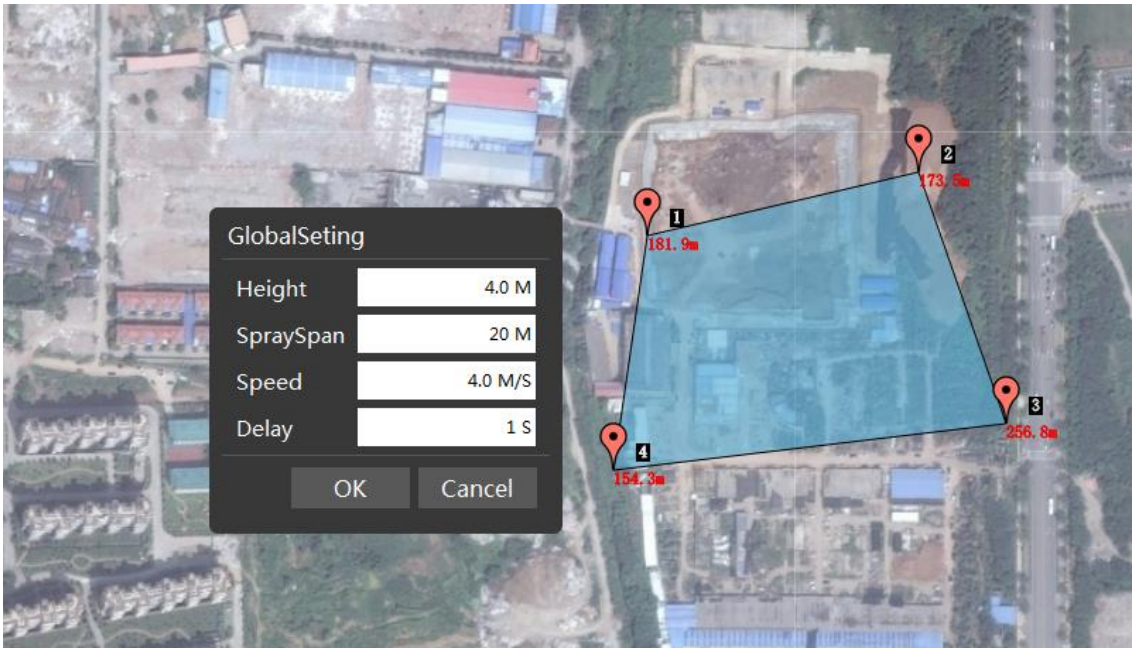
Figure 9 Region Set 3

Parameters are as shown in Table 5.

Table 5 Region Set

Parameters	Description
Height	Flight attitude, with range -500-3000, accuracy is 0.1 and unit is meter.
Spraying span	Aircraft flight distance, with range 0-30, accuracy is 1 and unit is meter.
Speed	The aircraft speed at waypoint has range 0-20, accuracy is 0.1 and unit is m/s.
Delay	Hovering time of aircraft at waypoint, with range 0-36,000, accuracy is 1 and unit is second.

Step4. Define waypoint. Complete setting in "default setting" window, click "ok", and then "waypoint setting" window pops up; refer to "Step 4" in "waypoint mode".

⚠️ Waypoint cannot be deleted, dragged and operated when the aircraft is under autopilot mode.

See "Step 2" in "waypoint mode" for waypoint modification/deletion methods.

Step5. Upload and execute. Click Upload in the waypoint settings window, and the waypoint uploaded will turn to red. Click Execute when the upload is accomplished, and complete the flight path following tips.

Step6. Save waypoint. In waypoint setting window, click Save to save waypoint for future using "load waypoint" function in executing the same waypoint.