AEE®

F50 A

Aircraft System

Professional · Advanced

Revolutionize · Realize

User's Manual

Please read this Manual carefully before use, and keep it handy for future reference.

Contents

Important Notice

AEE unmaned aircraft system combines multiple technologies to provide superior performance, but improer use this product will lead to serious damages. Please see the following statements :

* Do not use this product for any illegal activities. We are not responsible for any consequences caused by use this product for any illegal activities.
* This product must not be used in forbidden area. Shenzhen AEE Technology CO.,LTD is not liable for any consequences of using this product in forbidden area.
* To direct or indirect damages and injuries caused by using this product, Shenzhen AEE Technology CO.,LTD can accept no liability.
* Shenzhen AEE Technology CO.,LTD will not be responsible for the damages and losses caused by force majeure, such as lightning strike, ice storm, and etc.

Product Introduction

Thanks for choosing the unmanned aircraft system manufactured by AEE, boasting a globally unique vertical take-off and landing aircraft with quad rotors. With the integrated design based on the highest standards in the world and the professional remote control for airborne photography device, ground station control device, and miniaturized real-time monitoring recording, it can satisfy all requirements under different environments and missions. Stable and reliable, this system can be operated in a simple and flexible way, used for editing of waypoints on a 3D map, setting of air routes, real-time sending back such information as coordinates, flight attitude, speed and video. It can also meet the shooting requirements for multi-dimensional investigation and monitoring. The product is widely applied in such missions as military reconnaissance, anti-terrorism and riot control, security monitoring, emergency rescue and disaster relief, patrol and rescue, tracking and search, public security, traffic control, exploration and survey, and recording and evidence taking, and is favored by various departments and industries like army, armed police, public security, traffic police, fire control, land administration, electric power, communication, mining and geography.

Safety Precautions

* In the initial stage, please try to avoid operating it alone; it is suggested that an experienced person be on site to offer guidance for flying.
* It is forbidden to turn off the remote control and the ground station during flying; otherwise, unpredictable consequence may be caused.
* During flying, please make sure that only one aircraft is started; to avoid accidents, it is forbidden to simultaneously start two aircrafts.
* During flying, please make sure that the video and radio antennas have been properly installed to avoid influence on the flight and the video receiving distance or damage to the transmitter module inside the aircraft and remote control.

* Without authorization from SHENZHEN AEE TECHNOLOGY CO.,LTD, do not disassemble or modify AEE UAS products..
* During outdoor flying, the aircraft can be started only when the GPS signal strength indicator is greater than or equal to 6.

Forced take-off when the GPS signal strength indicator is lower than 6 may result in the following consequences:

a. When it is beyond the operating range, it may be impossible for the aircraft to go back to the take-off position;
b. When the remote control signals are jammed, it may be impossible for the aircraft to go back to the take-off position;
c. When switching the automatic flight mode, the aircraft may not hover at the current position;
d. When “One-key Go Home” is enabled, it may be impossible for the aircraft to go back to the take-off position;

* During servo checking and joystick calibration, please make sure that the power switch of the aircraft is in the OFF state, in order to avoid accidental take-off of the aircraft.
* Please keep away from running parts; when the aircraft propellers are running, do not touch and do keep away from any rotating part; especially, keep one’s head away from the propellers to avoid injury. Meanwhile make sure the aircraft away from small metal objects to avoid the danger may caused because they are adsorbed by the aircraft.
* Make sure there should be no person or obstacle within the radius of 5-10m around the take-off and landing point. Before operating the AEE UAS products, should make the aircraft in flight safety zone away from the crowd and be sure to pay attention to your personal safety and that of others.
* Keep away from humid environments; prevent water vapor from entering the aircraft which may cause damage to electronic components or result in unpredictable consequences.
* Please do not use this product in atrocious weather conditions like thundering and raining to ensure personal safety and aircraft safety.
* Keep away from heat sources, which may lead to aging, deformation or even melting and damage of thermoplastic materials of the aircraft.
* Do not fly when the wind force is above Level 4, in order to prevent the aircraft from being damaged or lost due to loss of control.
* For editing of waypoints, please make sure each waypoint is high enough in altitude (relative to the take-off position of the aircraft) to avoid intersection between the air route and mountains or buildings, which may result in collision and damage.
* If the map fails to be loaded when the ground station software is started, please close the software, connect to the network and restart the software; or make use of data management of Google Maps to restore map data.
* Under the precondition that network service is available at the ground station, if Google Earth fails to

download new map data, the user can first enter Google Satellite Map. After it is confirmed that Google Satellite can download new maps, enter Google Earth again to download new maps. If this problem still exists, please contact our Customer Service Department.

* When the remote control is used to control the aircraft, please make sure that the option of “Send joystick data” in the ground station software is NOT checked before take-off; when the ground station joystick is used to control the aircraft, please make sure that the remote control is in the OFF state before take-off.
* In order to avoid accidental damage of map files, please timely back up the map data after downloading.
* Please disable the function of auto clearing Internet Explorer in different types of antivirus software to prevent the map data from being deleted by mistake.
* For outdoor use, it is suggested to carry a 3G network card in case of absence of map in the existing map data or backup data.
* For the sake of safety of your life and property, please use the product strictly in accordance with this User’s Manual, and do not carry out improper operations.

Notice: Please strictly comply with the above safety precautions; any consequence resulted from incompliance shall be on your own account.

Charging

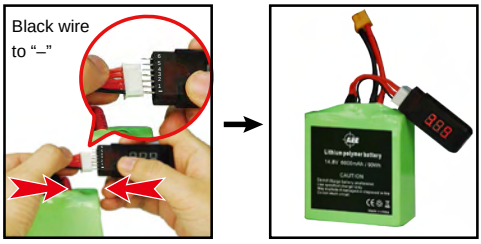
This product is equipped with a professional intelligent balance charger with built-in high-performance microprocessor and professional control software. This charger can realize simultaneous charging of four different sets of batteries.

Use a Battery Indicator to Detect the Battery Level

Prior to take-off, please first check the battery level of each device; in case of low battery level, charging is required.

Use a battery indicator to detect the battery level. When the battery voltage of the aircraft is below 14.8V, please charge the battery (the flight time will be shortened when the voltage is lower than 16.8V); when the battery voltage of the remote control is below 11.1V, please charge the battery.

Connect the battery indicator to the battery in the direction shown below.



Notice: The black wire should be connected to “– ” during connection.

After connection, the battery indicator first displays the total voltage, and then displays the voltage information of each battery cell in sequence: ALL (total voltage), No. 1, No. 2. No. 3, No. 4…

Precautions for Use of the Charger

1. During charging, do not put the battery near inflammable matters.
2. Charging should be carried out in a dry and ventilated environment at room temperature.
3. Put the battery on a nonflammable utensil, such as ceramic plate, for charging.

Specification of the Charger

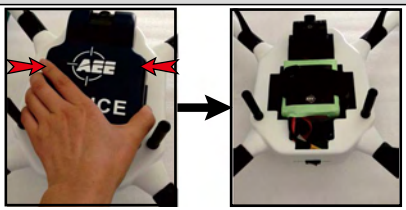
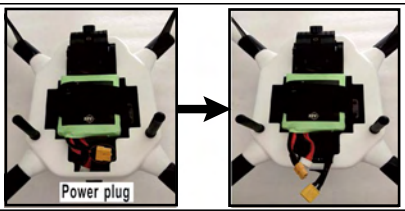
Specification	Parameter
AC input	100-240V (360-330W)
DC input	11-18Volt
Charging power	4×50W(200W)
Range of charging current	0.1-6.0A
Discharging power	4×5W(20W)
Range of discharging current	0.1-2.0A
Balanced discharging current of rechargeable battery pack	200mA/cell
Number of rechargeable lithium-ion cell	1-6 Cells
Net weight	1.73kg
Dimension	263mm×170mm×66mm

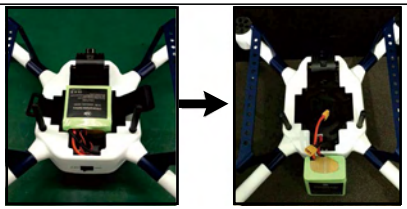
How to Use the Charger

1 Take out the Battery

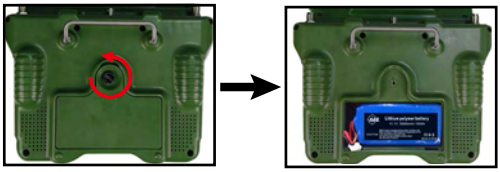
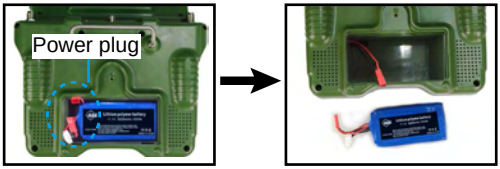
Please take out the battery before charging.

* Take out the battery of the aircraft:

Step	Illustration	Description
Step 1:		Hold the battery cover in the direction shown in the figure; apply force according to the direction of arrows to disengage the battery cover from the body and then remove it.
Step 2:		Disconnect the power plug.

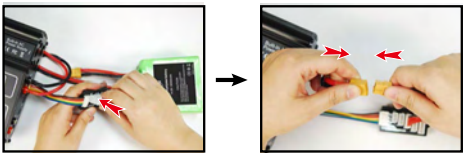
Step 3:		Loosen the tie and take out the battery.

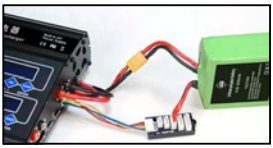
* Take out the battery of the remote control:

Step	Illustration	Description
Step 1:		Rotate to open the battery cover according to the direction of arrow shown in the figure, and then remove it.
Step 2:		Disconnect the power plug and take out the battery.

2 Connect the Battery to the Charger

* Connect the battery to the charger according to the steps shown below:

Step	Illustration	Description
Step 1:		Connect the two charger wires according to the figure, and pay attention to the polarity of terminals.
Step 2:		Select the charging interface corresponding to the number of the cells (2S, 3S, 4S, 5S and 6S); connect the power plug after connecting the charging interface.

Step 3:		Complete connection.
Step 4:	 	Connect the charger to AC 220V power supply with the supplied power cord; 4 LED indicators of the charger will be on and then you can set the parameters of the charger.

3 Set Parameters and Start Charging

After the battery is connected to the charger, set the parameters for the charger as follows:

Battery	Battery capacity	Range of current regulation	Recommended charging current	Voltage	Number of cells	Charging mode
Battery of remote control	5000mAh	0-3A	2.0-3.0A	11.1V	3S	CHARGE
Battery of aircraft	4000mAh	0-6A	3.0A	14.8V	4S	BALANCE
Battery of aircraft	6000mAh	0-6A	3.5A	14.8V	4S	BALANCE
Battery of aircraft	8000mAh	0-6A	4.0A	14.8V	4S	BALANCE

Set the charger according to the above table; the detailed operation method is as follows:

Charging aircraft battery:

1) Press BATT TYPE / STOP to select a battery type, and call out LiPo BATT; the screen displays:

.

2) Press START / ENTER for confirmation, and the screen displays: 

; then press DEC / INC / STATUS to select LiPo BALANCE, and the screen displays: 

.

3) Press START / ENTER again for confirmation, and the current values begins to pulsate:

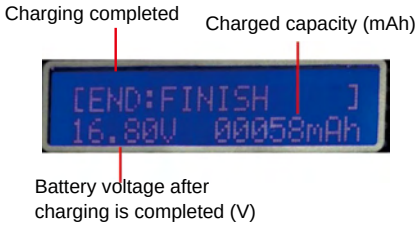
; press DEC INC STATUS at this moment to decrease or increase the current value; press START ENTER for confirmation after the current is adjusted to the proper value.

4) After confirmation of the current value, the voltage value begins to pulsate: 

; press DEC INC STATUS to select the corresponding voltage of the battery; press START ENTER for confirmation after the voltage is adjusted to the proper value.

5) After setting all parameters, hold START ENTER for 2 seconods, and the charger begins to detect the battery; after successful detection, press START ENTER to start charging, or press BATT TYPE STOP to cancel charging.

6) After charging is completed, the charger sends out sounds, and the screen displays the following information:



Charging the battery of remote control:

1) Press BATT TYPE STOP to select a battery type, and call out LiPo BATT; the screen displays:

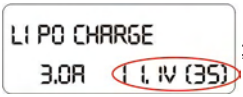
.

2) Press START ENTER for confirmation, and the screen displays: 

.

3) Press START ENTER again for confirmation, and the current values begins to pulsate:

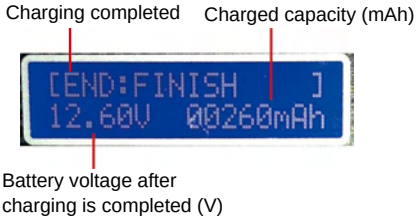
; at this moment press DEC INC STATUS to decrease or increase the current value; press START ENTER for confirmation after the current is adjusted to the proper value.

4) After confirmation of the current value, the voltage value begins to pulsate: 

; press DEC / INC (STATUS) to select the corresponding voltage of the battery; press START (ENTER) for confirmation after the voltage is adjusted to the proper value.

5) After setting all parameters, hold START (ENTER) for 2 seconods, and the charger begins to detect the battery; after successful detection, press START (ENTER) to start charging, or press BATT TYPE (STOP) to cancel charging.

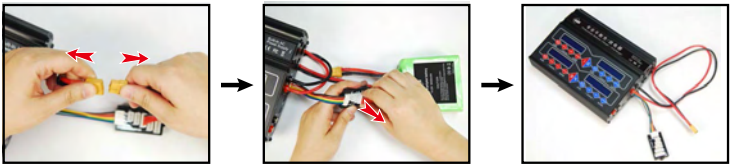
6) After charging is completed, the charger sends out sounds, and the screen displays the following information:



⚠ To avoid short circuit resulted from misoperation, DO NOT pull out the charger wires during charging.

4 Complete Charging

After charging is completed, please disconnect the battery from the charger in the sequence shown below:



First disconnect the power plug

Then pull out the charging interface

Finally pull out the charger wires

⚠ To avoid short circuit caused by accidental contact between the positive and negative connectors, which may further result in damage of the battery or other safety accidents, DO NOT pull out the charger wires from the charger before the power plug is disconnected.

Precautions for Use of Lithium Battery

1. Do not disassemble or restructure the battery;
2. Do not short-circuit the battery;
3. Do not use the battery near heat sources;
4. Do not drop the battery in water or get it wet;

5. Do not charge the battery near fire or in the sun;
6. Do not impact or drop the battery;
7. Do not use the battery when it is severely damaged or deformed;
8. Do not charge the battery in reverse polarity or over-discharge it (Reverse charge or over-discharge can cause the battery drum kits, leakage, batteries breakdown, or explosion, etc.) ;
9. Do not connect the battery in reverse polarity;
10. Any waste battery should be recycled in an environment-friendly way;
11. If the battery will be idle for a long time, the battery should be taken out and charged once every six months to 3.90±0.05V for storage, so as to maintain the battery performance and prolong its service life.

List of Components

The following components are included in the package of this product. Please check carefully at the time of purchase. In case of any missing component or damage, please feel free to contact us.

Main unit of aircraft: 2 sets 	Main unit of remote control: 1 set 	Main unit of ground control station: 1 set 	Charger: 1 set (including power cable, charger connecting wires, vehicle-mounted charger clamp.) 
Aircraft battery: 8000mAh &6000mAh &4000mAh 2pcs each 	Professional protection box for aircraft: 2pcs 	Battery indicator: 1pc 	Battery of remote control: 1pc (5000mAh) 
Propeller (4pcs/set): 4 sets 	Propeller holder (4pcs/ set): 4 sets 	Undercarriage (2pcs/ set): 4 sets 	Sunshade: 1pc 

Remote control strap: 1pc 	Video antenna: 2pcs 	Radio antenna: 2pcs 	AV output cable of remote control (optional): 1pc 
USB data cable (8-pin) of camera: 2pcs 	USB data cable (5-pin) of remote control: 1pc 	Wrench: 1pc 	Adaptor of ground control station: 1pc 
High-gain dual-band directional antenna: 1pc (including 2 feedback lines and 1 tripod) 	Vehicle-mounted charger clamp cable for ground station (optional): 1pc 	AV output cable for ground station (optional): 1pc 	Accessory box: 1pc 
CD-ROM: 1pc 	Instruction Manual: 1 copy 		

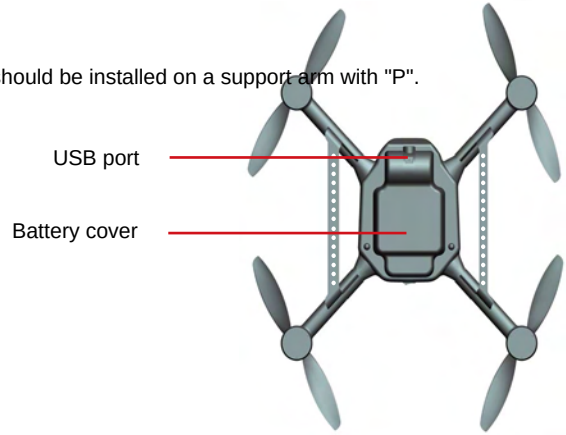
Notice: The accessories of actual products may vary slightly, and the above figures are for reference only.

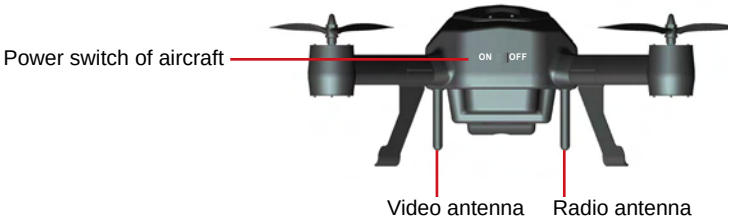
Aircraft

* The flight of the aircraft can be controlled through the remote control or the ground station; there are several flight modes available such as manual remote control, spot hover and route flight.
* The aircraft system integrates flight control software, data radio, image radio, control joystick and mission control buttons; thus, flight data and real-time images can be viewed conveniently during the flight, and real-time control of air route and mission of the aircraft can be realized.

Guide for Components of the Aircraft

A propeller with "P" should be installed on a support arm with "P".





Install Propellers

There are two clockwise propellers and two counter-clockwise propellers. The letter “P” on a propeller indicates it is a counter-clockwise propeller which should be installed on a support arm with “P”.

Wrong installation of clockwise and counter-clockwise propellers will inevitably result in errors in the aircraft lift system, further leading to unpredictable consequences.

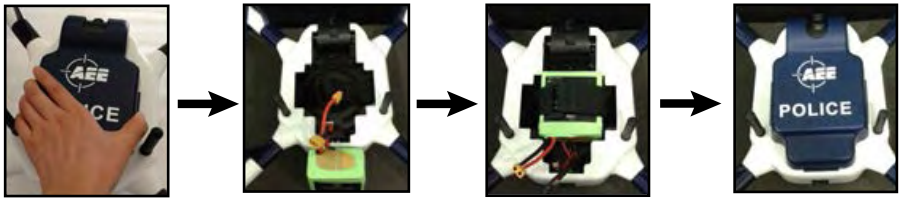
Place the propeller blades and propeller holders on corresponding motor shafts; use the wrench

() to clockwise tighten the propeller holders ().

A propeller with “P” should be installed on a support arm with “P”.

Install Battery

1. First remove the protective cover at the bottom of the aircraft: squeeze the two sides of the cover to remove the protective cover.
2. Take the battery out of the packing box, install it in the battery case at the bottom of the aircraft, and tighten it with a fixing strap.



3. After it is confirmed that the battery has been properly installed, connect it to the power interface to power up, install the protective cover.

Notice: Please make sure the power switch of the aircraft is in the OFF state during installation of the battery.

4. After completion of the above three steps, place the aircraft on the ground (a flat surface is recommended); then turn ON the power switch of the aircraft.

Notice: The aircraft will carry out self-checking for 3-5seconds after it is powered up; at this moment, please do not move the aircraft or operate the remote control (before self-checking, please make sure that the power switch at the aircraft tail is in the ON state); after self-checking is completed, if the course indication of the remote control coincides with the orientation of the aircraft nose, it indicates the self-checking is passed.

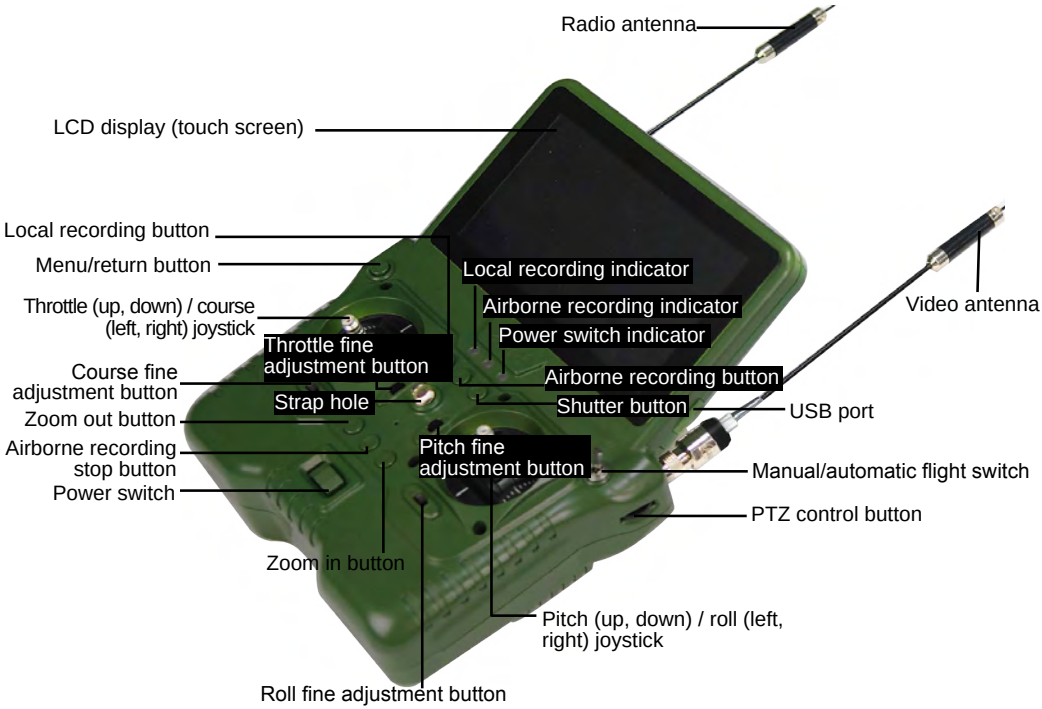
Preparations before Take-off

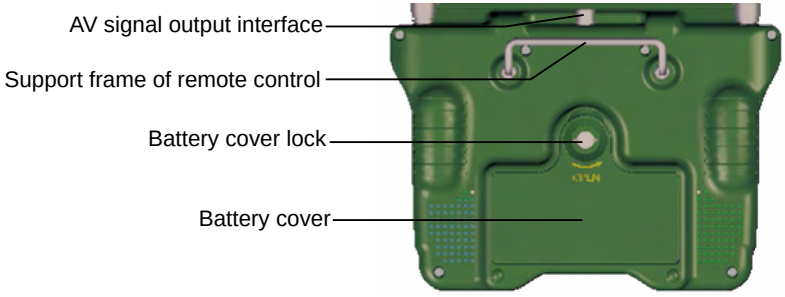
1. Remove the lens cap of the airborne camera.
2. Check the batteries of the aircraft and the remote control to see if the battery level is high enough (the recommended voltage for the aircraft is above 16V, and the remote control above 12V); in case of low battery level, please replace the battery.
3. Check the propellers of the aircraft to see if they are tightened.
4. Make sure that the manual/automatic flight switch of the remote control is in the manual flight mode.
5. Check the servo; in case of any anomaly (indication bars do not jump or indication is inaccurate during checking), please calibrate the joystick. (For servo checking and joystick calibration, please make sure the power switch of the aircraft is in the OFF state, in order to avoid accidental take-off of the aircraft.)
6. Turn off the power switch after the aircraft is placed at the take-off position; to ensure safety, there should be no obstacle within the radius of 5-10m around the take-off position.
7. Turn on the power switch of the aircraft; for outdoor flight, GPS satellite positioning is required; take-off is allowed only when the GPS signal strength indicator is greater than or equal to 6.
8. Before take-off, please make sure that only one aircraft is started; to avoid accidents, it is forbidden to simultaneously start two aircrafts.
9. Before take-off, please make sure that the video and radio antennas have been properly installed to avoid influence on the flight and the video receiving distance or damage to the transmitter modules inside the aircraft and the remote control.
10. When the remote control is used to control the aircraft, please make sure that the option of “Send joystick data” in the ground station software is not checked before take-off; when the ground station joystick is used to control the aircraft, please make sure that the remote control is in the OFF state before take-off.

Control the Flight with the Remote Control

The remote control is specially developed for AEE unmanned aircraft system to make it convenient for controlling the flight of the unmanned aircraft. The remote control can independently control the flight of the aircraft, and can simultaneously display the flight status of the aircraft and the real-time images from the airborne camera.

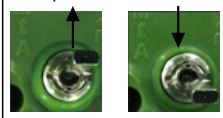
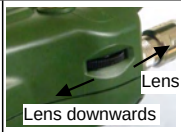
Guide for Components of the Remote Control and Description of Their Functions





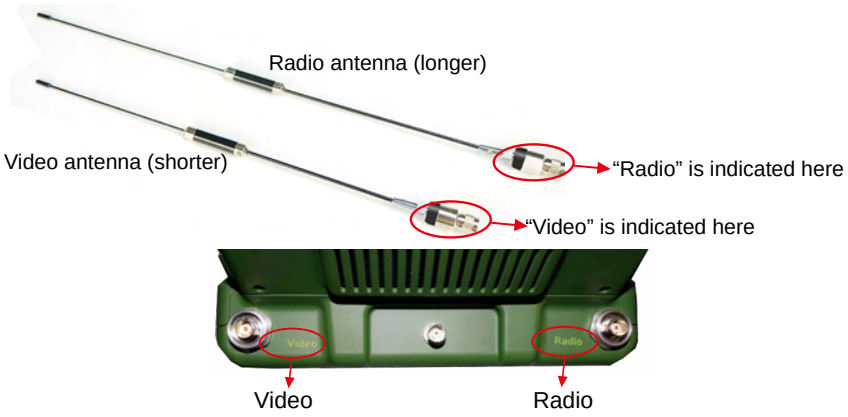
Description of Buttons

Name of button	Illustration	Description of function
Local recording on remote control		The remote control saves the video recording sent back by the aircraft to local memory. Press it to start recording, press it again to stop recording.

Airborne camera video recording		The airborne camera begins recording when it is pressed once.
Shutter		Press it to take a photo (during recording of the airborne device, the snapshot function is available in three resolution modes: 1080p/25f, 960p/25f and 720p/25f).
Stop recording		The airborne camera stops recording when it is pressed once.
Menu		Press “M” to enter the main menu of remote control. Long press “M” for 5 seconds to send the command to go home immediately; the aircraft will enter the go-home mode after receiving the command.
Zoom “+”		Zoom control of camera: zoom in.
Zoom “-”		Zoom control of camera: zoom out.
Manual/automatic flight switch		Turn upwards: Manual flight mode. Turn downwards: Automatic flight mode (GPS mode).
Power switch		Slide leftwards to turn it ON; slide it rightwards to turn it OFF.
PTZ control knob		The angle of the camera can be adjusted by turning this knob.

Preparations for the Remote Control

*** Installation of Antennas**



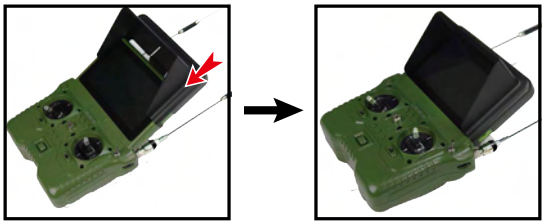
Install the antennas shown below in the corresponding positions of the remote control and clockwise tighten them.

Radio antenna corresponds to: Radio
Video antenna corresponds to: Video

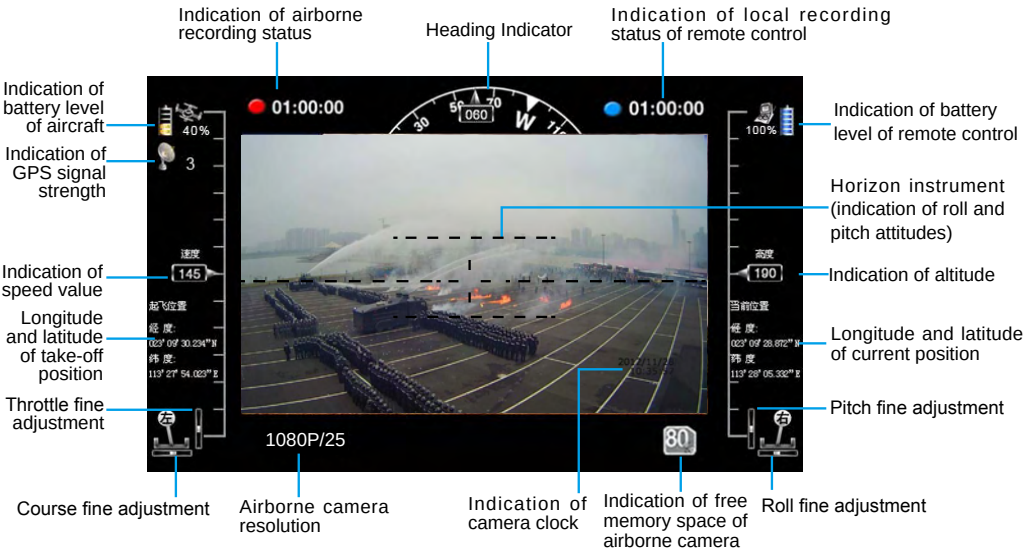
Notice: Please make sure that the video and radio antennas have been properly installed to avoid influence on the flight and video receiving distance or damage to the transmitter modules.

*** Installation of Sunshade**

The installation method is shown as follows:

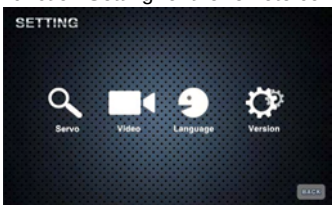


*** Screen on Power-on:**



Set Parameters on the Screen of the Remote Control

Press “M” to enter the interface of “Function Setting” of the remote control:



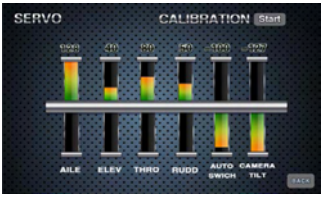
* Servo Checking

Check if the functions of joystick, flight mode switch and PTZ control knob on the remote control are normal through “Servo Checking”.

Notice: Servo checking should be carried out before take-off.

Here are the steps for servo checking:

1. Press “M” to enter the interface of “Function Setting” of the remote control.
2. Touch “Servo Checking” to enter the setting interface:



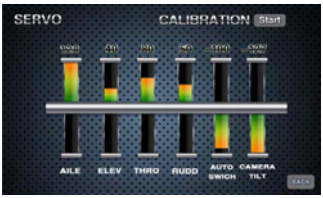
3. At this moment, turn the left and right joysticks by the maximum angle possible, toggle the flight mode

switch and rotate the PTZ control knob, and the relevant indication bars will pulsate correspondingly; the functions of roll, pitch, throttle, course, automatic flight switch and angle adjustment of airborne camera can be checked.

Notice: During servo checking, please make sure that the aircraft power switch is in the OFF state, in order to avoid accidental startup of the aircraft.

* Joystick Calibration

Touch “[Start]” for joystick calibration in the interface of “Servo Checking” in the above step; turn the left and right joysticks for 5-10 circles by 360° to enter the state of joystick calibration; indication bars of roll, pitch, throttle and course will pulsate correspondingly; click “DONE” to finish the calibration process. Carry out servo checking after completion of calibration; it is OK if servo checking shows normal result; otherwise, recalibration is required.



Notice: During joystick calibration, please make sure that the aircraft power switch is in the OFF state, in order to avoid accidental startup of the aircraft.

* Camera Setting

Touch “” to enter the interface of “Airborne Camera Setting” shown below: Video Recording Settings , Photo Shooting Settings , and Local Settings of Airborne Camera)

Video Recording Settings

1) Setting Image Resolution

PAL-system	1920 × 1080i 50f 16:9	1920 × 1080P 25f 16:9	1280 × 960P 25f 4:3	1280 × 720P 50f 16:9	1280 × 720P 25f 16:9	848 × 480P 100f 16:9

- Zooming is not supported in the mode of 848x480P 100f.
- Time indication is not supported in the mode of 1080I/50f.

2) Selection of Visual Angle

This device provides 3 options on visual angle (Wide visual angle "W" / Moderate visual angle "M" / Narrow visual angle "N"); the following is an example of an image under different visual angles in the preview mode:

Same scenery photographed at different angles

The above optional visual angles can be selected according to your preference and needs.

Notice: The selection of visual angle is supported only under the resolution mode of 1080P or 1080i.

3.) Setting Bit Rate

This device provides two options: High bit rate "H" and Normal "N" (when high bit rate is selected, the image quality will be higher, but the file size will be enlarged).

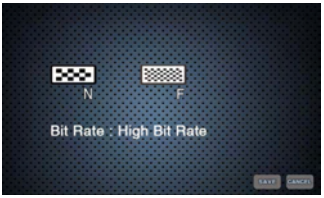
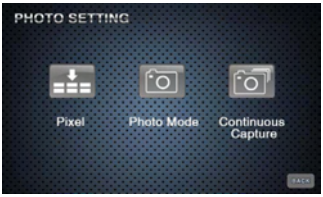


Photo Shooting Settings

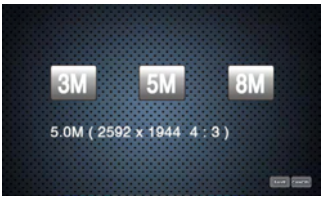


1)Image resolution of photo shooting

3.0M (2048×1536 4:3)

5.0M (2592×1944 4:3)

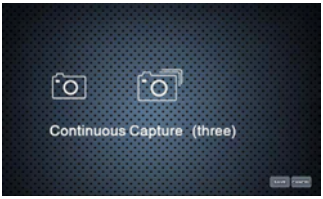
8.0M (3200×2400 4:3)



2)Selection of Shooting Mode:

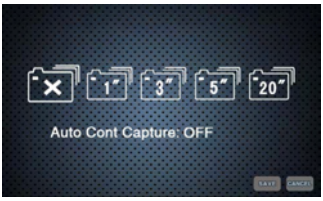
Single shooting: In the one shooting mode, the system will take one photo when “Shutter” is pressed once.

Continuous shooting (three): In this mode, the system will take three photos continuously when “Shutter” is pressed once.



3) Automatic continuous shooting mode

The time interval of automatic continuous shooting can be set as “OFF”, “1S”, “3S”, “5S” and “20s”. When “Shutter” is pressed, the system will take one photo at each time interval until “Shutter” is pressed again to cancel continuous shooting.



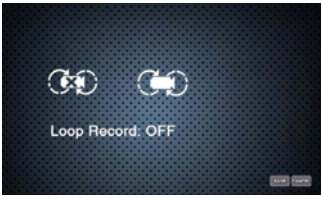
Notice: The continuous shooting (three) mode and the automatic continuous shooting mode cannot be enabled simultaneously.

Local Settings of Airborne Camera

Touch to enter the interface of “Local Settings of Airborne Camera”:

1) Loop Recording: ON, OFF

When “Loop Recording” is ON, recording is saved as a segment file by each 10 min; if the space of the memory card is not enough, the first recording file will be overwritten automatically.



Notice: During airborne recording, the function of loop recording is valid only when the free memory space of the camera is more than 200M.

2) Light Metering Mode

Average metering: use this mode when the luminance difference between the photograph subject and the background is relatively slight and steady.

Central area metering: It is the default mode, applying to scenes when there is certain luminance difference between the photograph background and the subject or the photograph subject relatively accords with the background.

Central spot metering: It applies to small-sized subject under extremely bright or dark background.

3) Formatting

The airborne camera can be formatted to remove all files in it. Make sure you do not need the data before formatting!

4) Restore Factory Settings

This operation will restore all settings of this device to the factory settings.

5) Date Setting

a. Touch “Date Setting” to enter the setting interface of “Time Indication on Image”:

b. Touch “▲” or “▼” corresponding to settings of “Year, Month, Day, Hour, and Minute”, to complete the settings of Year, Month, Day, Hour, and Minute.

c. Touch “Save” to complete setting.

Notice: When “Time Indication on Image” is ON, after “Save” is pressed to complete setting, date and time will be indicated at the bottom right corner of the video and photo; when “Time Indication on Image” is OFF, there will be no such indication. In the resolution mode of 1080I/50, date and time will not be indicated in the video and photo.

* Language Selection

1. Press “M” to enter the interface of “Function Setting” of the remote control.
2. Touch “Language Selection”.

· Language options: English

3. After selecting the desired language, touch “Save” to complete setting.

* Information of Software Version

Start up the Aircraft

* Start the Aircraft

Notice: During outdoor flight, please make sure that the figure of GPS signal strength indicator is greater than or equal to 6.

Start the aircraft in the following way:

Simultaneously turn the left and right joysticks to the directions shown below

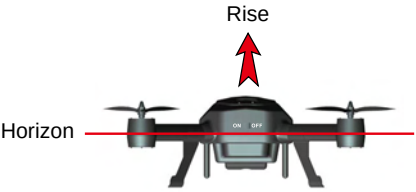
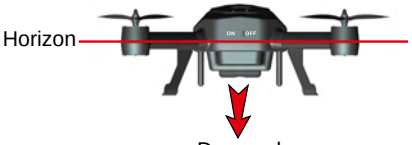
Turn the left joystick to the bottom left corner Turn the right joystick to the bottom right corner

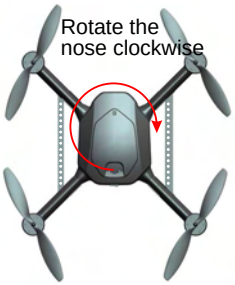
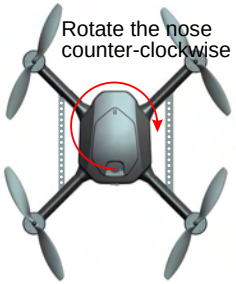
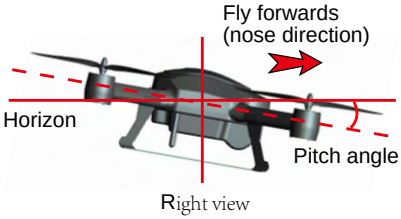
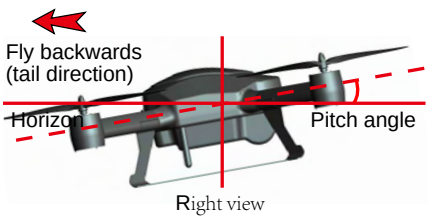
Immediately loosen the joysticks when the propellers begin to rotate, and the aircraft enters the startup state; turn the left joystick upwards, and the aircraft begins to climb upwards.

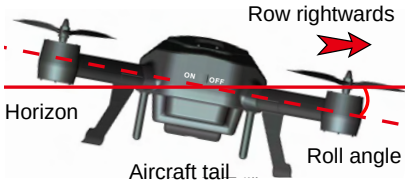
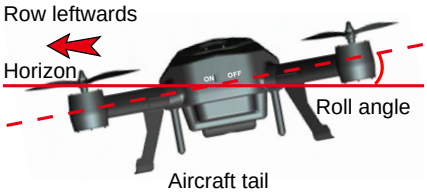
Direction Control

Directions of the aircraft are defined in the following figure:

See the following table for details:

Joystick	Attitude of aircraft	Illustration
 Turn the left joystick forwards, and keep the right joystick in the original position.	Climb Upwards The motor speed and the propeller speed increase. The climbing speed increases with the joystick amplitude increases.	
 Turn the left joystick backwards, and keep the right joystick in the original position.	Go downwards The motor speed and the propeller speed decrease. The descending speed increases with the joystick amplitude increases.	

 Turn the left joystick rightwards, and keep the right joystick in the original position.	Rotate the nose rightwards (rotate clockwise)	
 Turn the left joystick leftwards, and keep the right joystick in the original position.	Rotate the nose leftwards (rotate counter-clockwise)	
 Turn the right joystick forwards, and keep the left joystick in the original position.	Fly forwards The nose tilts downwards; the aircraft inclines forwards and flies along the nose direction. At this moment, it is needed to slightly push forward the throttle to adjust the flight altitude so as to realize horizontal flight of the aircraft.	 Right view
 Turn the right joystick backwards, and keep the left joystick in the original position.	Fly backwards The tail tilts downwards; the aircraft inclines backwards and flies along the tail direction. At this moment, it is needed to slightly push forward the throttle to adjust the flight altitude so as to realize horizontal flight of the aircraft.	 Right view

 Turn the right joystick rightwards, and keep the left joystick in the original position.	Fly rightwards The aircraft inclines rightwards At this moment, it is needed to slightly push forward the throttle to adjust the flight altitude so as to realize horizontal flight of the aircraft.	
 Turn the right joystick leftwards, and keep the left joystick in the original position.	Fly leftwards The aircraft inclines leftwards At this moment, it is needed to slightly push forward the throttle to adjust the flight altitude so as to realize horizontal flight of the aircraft.	

The throttle lever of the remote control controls the propeller speed; it can control the rising and descending of the aircraft. The throttle lever should be pushed gently, and fast change should be avoided. The right joystick of the remote control is the direction lever; the aircraft go leftwards, rightwards, forwards and backwards respectively when the right joystick is pushed leftwards, rightwards, forwards and backwards.

During manual flight, the forward motion direction of the aircraft can be corrected by combing the right joystick while operating the left joystick. When the aircraft is in the air, any unpredictable airflow change will cause drifting and autorotation of the aircraft, which breaks the original balance.

Go Home and Shut down the Aircraft

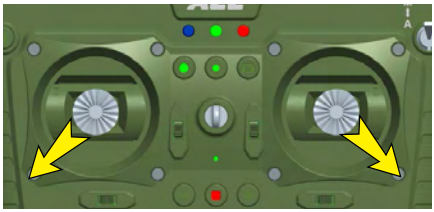
* One-key Go Hone

When the GPS signal strength indicator is greater than or equal to 6 during outdoor flight, long press the “M” button for 5s to send the command requiring the aircraft to go home immediately; after receiving the command, the aircraft will enter the go-home mode to return and land at the take-off position.

Notice: In the manual flight mode, 10s after the aircraft receives and executes the go-home command, you can turn the automatic/manual flight switch downwards and then upwards once to go to the manual flight control mode. During landing of the aircraft, please make sure that there is no movable obstacle or person within 5-10m around the landing position.

* Shut down the Aircraft

Shut down the aircraft in the following way:



Turn the left joystick to the bottom left corner Turn the right joystick to the bottom right corner

Notice: During flying of the aircraft, the above startup and shutdown operations are forbidden; or else, unpredictable consequences may be resulted in. When operation is completed, please timely turn off the power switch of the aircraft and take out the battery to avoid continuous consumption of the battery.

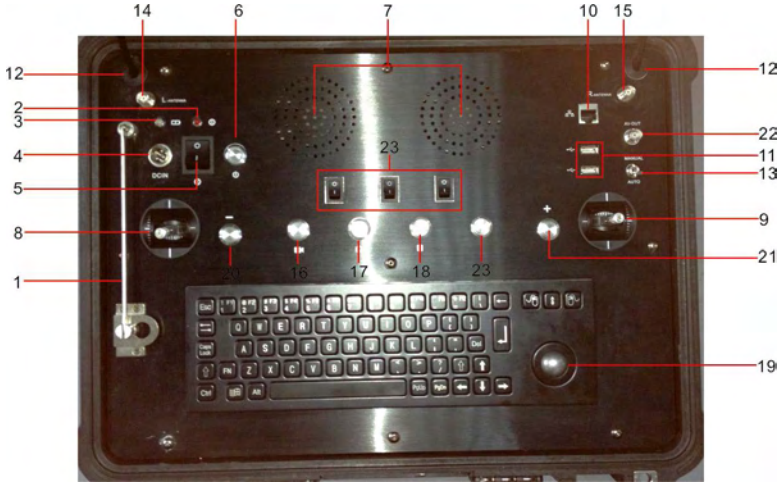
Control the Flight with the Ground Station

The ground control station (hereinafter referred to as the “ground station”) is one of the ground control devices for AEE unmanned aircraft system. Compatible with the main functions of the hand-held remote control, it allows you to easily edit waypoints on a 3D map, set air routes, view real-time information such as coordinates, flight attitude, speed and video sent back by the aircraft. With a built-in professional industrial computer, multi-mission processing can be realized. The aircraft can fly autonomously along the air route preset in the ground station software, and real-time videos and other information sent back by the aircraft can be received and saved.

Functions and Features of the Ground Station

* With the waypoint editing function, at most 100 waypoints can be added.
* Check the aircraft status in a real-time way, including such information as battery level, speed, altitude, longitude and latitude.
* Automatic control of take-off and landing.
* With the joystick control function, manual flight can be realized.
* Air routes can be set, enabling the aircraft to fly autonomously.
* With the built-in high-capacity battery, it can satisfy the requirement of long-time outdoor use.
* With the powerful information processing function, it can simultaneously display satellite maps and real-time videos of the aircraft.
* It has the reliable multi-level protection function.
* It can control the working status of the airborne camera.
* It can set the airborne camera.
* It is equipped with professional protection box.

Panel Layout and Interface Functions of the Ground Station



No.	Name	Function description
1	Support rod	It is used to support the screen panel when the ground station panel is open; it can be taken in when the panel is closed; use a screw to fix it.
2	Main power indicator	It will be on when the main power switch is turned on.
3	Charge indicator	It is red during battery charging and green when the battery is fully charged.
4	External DC power interface	Connect to an external power adapter to supply power to the system or charge the battery.
5	Main power switch	Turn on/off the main power.
6	Start Main Unit Button	Turn on/off the operating system of the ground station.
7	Cooling fan	It is used for heat dissipation of the ground station.
8	Left joystick	It is used for manual control of aircraft flight, including two channels, namely, yaw and throttle.
9	Right joystick	It is used for manual control of aircraft flight, including two channels, namely, roll and pitch.
10	Network interface	Connect to external network
11	USB	Connect to external USB device
12	Wiring sealing plug	Protect the connecting wires.
13	Auto/manual fly switch	Switch between manual fly and auto fly
14	Radio antenna interface	Transmit flight commands; receive flight attitude, sensor information, longitude and latitude, etc.
15	Video antenna interface	Receive real-time video signals of the aircraft
16	Airborne video recording button	Press the airborne camera once to start recording

17	Airborne photo shooting button	Press the airborne camera once to start photo shooting
18	Stop airborne recording button	Press the airborne camera once to stop recording
19	Keyboard and mouse	Carry out relevant operations of the industrial computer
20	Zoom “-”	Zoom control of camera: zoom out
21	Zoom “+”	Zoom control of camera: zoom in
22	AV interface	The airborne camera on the aircraft sends back video output in a real-time way
23	Reserved button	Reserved button (no function)

Preparations for the Ground Control Station

* Open and Fix the Top Cover

Open the top cover of the ground control station and use the support rod to fix it:

Open the top cover of the ground control station

Slip the support rod rightward and take it off

Rotate the support rod and press it into the hole

Slip the support rod leftward to fix it

* Installation of Antennas

Differentiation of antennas:

Radio antenna		Video antenna	
Metal antenna	High-gain dual-band directional antenna	Metal antenna	High-gain dual-band directional antenna
			

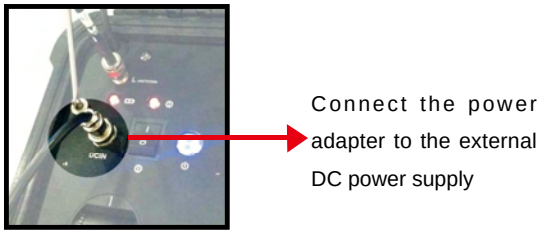
Connect the data communication antenna on the left side, and connect the video communication antenna

on the right side; clockwise rotate and fix the antennas after they are aligned with the corresponding interface:

For short-distance operation, it is suggested the metal antenna should be used; for long-distance control, it is suggested the high-gain dual-band directional antenna should be used.

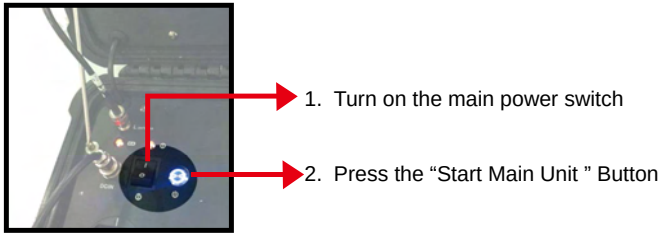
* Connect Power Adapter

Before use, please first check if the battery level of the ground control station is high enough. In case of low battery level, please use the power adapter to charge the ground station:



* Startup

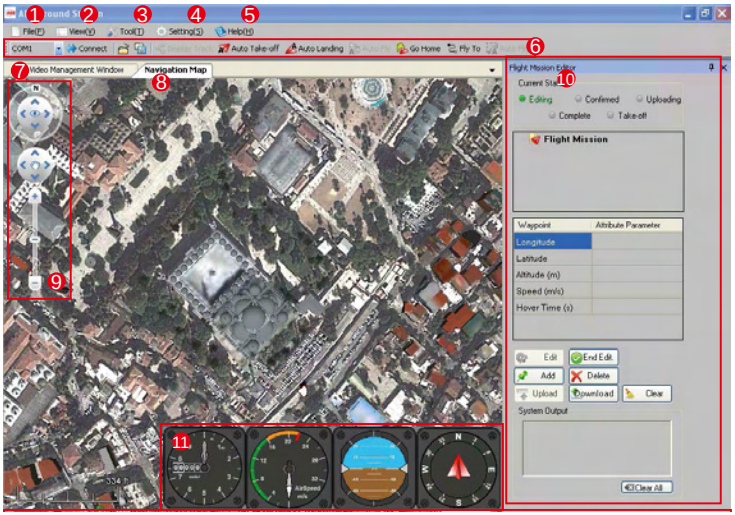
First turn on the main power switch, and then press the “Start Main Unit” Button to start the ground control station.



Notice: The default system is Microsoft Windows XP Professional (on/dev/sdal).

Introduction to Main Interfaces of the Ground Station Software

After startup, double-click the icon of the ground station software  to open the ground station software. The main interface of the software is as follows:



1. “File” Menu

- **Load Mission:** Load local-stored flight missions.
- **Save Mission:** Save the currently edited flight mission.

2. “View” Menu

Click the “View” pull-down menu to make settings corresponding to the content displayed in the interface:

- **Toolbar:** Show or hide the toolbar.
- **Instruments Display Bar:** Show or hide the instruments display bar.
- **Mission Editor:** Show or hide the mission editor.
- **Status Bar:** Show or hide the status bar.
- **Full Screen:** Display a map in full screen, or exit from the full screen mode.

3. “Tool” Menu

- **Joystick Data:** Ground station connects to joystick serial ports.

4. “Settings” Menu

- **Language Setting**: Chinese, English
- **Video Store Setting**: Storage paths of videos and screenshots can be selected.

5. “Help” Menu

6. Toolbar

Connect or close serial ports, load mission, save mission, display track, etc.

7. Video Management Window

   (Please see the section of “Functions of Video Management Window in Ground Station Software” for details.)

8. Navigation Map

   Display real-time maps.

9. Navigation Bar

   Zoom in, zoom out, change or move map locations.

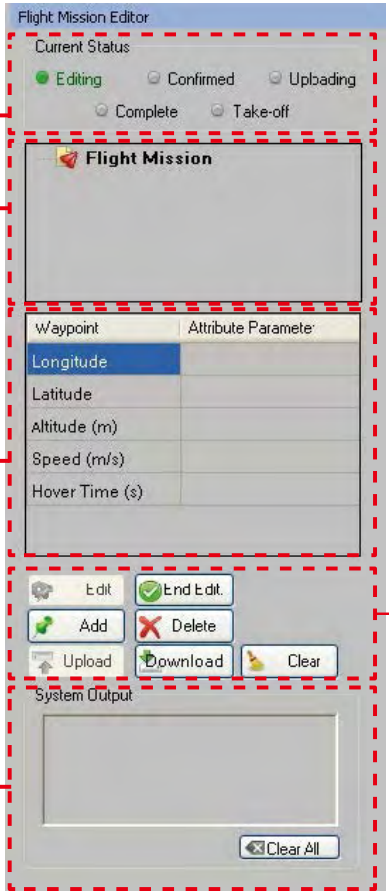
10. Flight Mission Editor

Green indicates the current status of the mission.

Waypoint list; the color of a waypoint icon changes to green when it is clicked, indicating this waypoint is selected.

Attributes of the waypoint selected can be edited: longitude, latitude, altitude, speed, and hold time.

Historical information of system action is displayed here. To clear historical information, please click “Clear All”.



- Click “Edit Waypoint” to reedit the mission that has been edited.
- Click “Finish Editing” to confirm the current mission; the color of air route changes to green.
- To add a waypoint, click “Add Waypoint”, and double-click the position where you want to add the waypoint on the map to add the new waypoint.
- Select the waypoint (green) you want to delete and click “Delete Waypoint” to delete this waypoint.
- Click “Upload Mission” to upload the current flight mission to the aircraft.
- Click “Download Mission” to verify if the mission is successfully uploaded.
- To delete the mission currently being edited or to open a new mission, click “Clear Mission”.

- Click “Edit Waypoint” to reedit the mission that has been edited.
- Click “Finish Editing” to confirm the current mission; the color of air route changes to green.
- To add a waypoint, click “Add Waypoint”, and double-click the position where you want to add the waypoint on the map to add the new waypoint.
- Select the waypoint (green) you want to delete and click “Delete Waypoint” to delete this waypoint.
- Click “Upload Mission” to upload the current flight mission to the aircraft.
- Click “Download Mission” to verify if the mission is successfully uploaded.
- To delete the mission currently being edited or to open a new mission, click “Clear Mission”.

Instruments Display Bar

Altitude indicator	Airspeed indicator	Attitude indicator	Heading indicator
			

Status Bar

Display such information as longitude and latitude of the aircraft, number of GPS satellite, and battery level in a real-time way; search, name and locate map data.

Execute Manual Fly Missions with the Ground Station

Flight missions can also be executed through manual operations with the ground station. The steps are as follows:

Start the ground station software

↓

Switch to the “Manual Fly” mode

↓

Power up the aircraft to receive satellite signals

↓

Connect serial ports and send joystick data

↓

Check before take-off

↓

Start up the aircraft

↓

Perform manual take-off

↓

Control aircraft flight with joysticks

↓

Shutdown the aircraft

↓

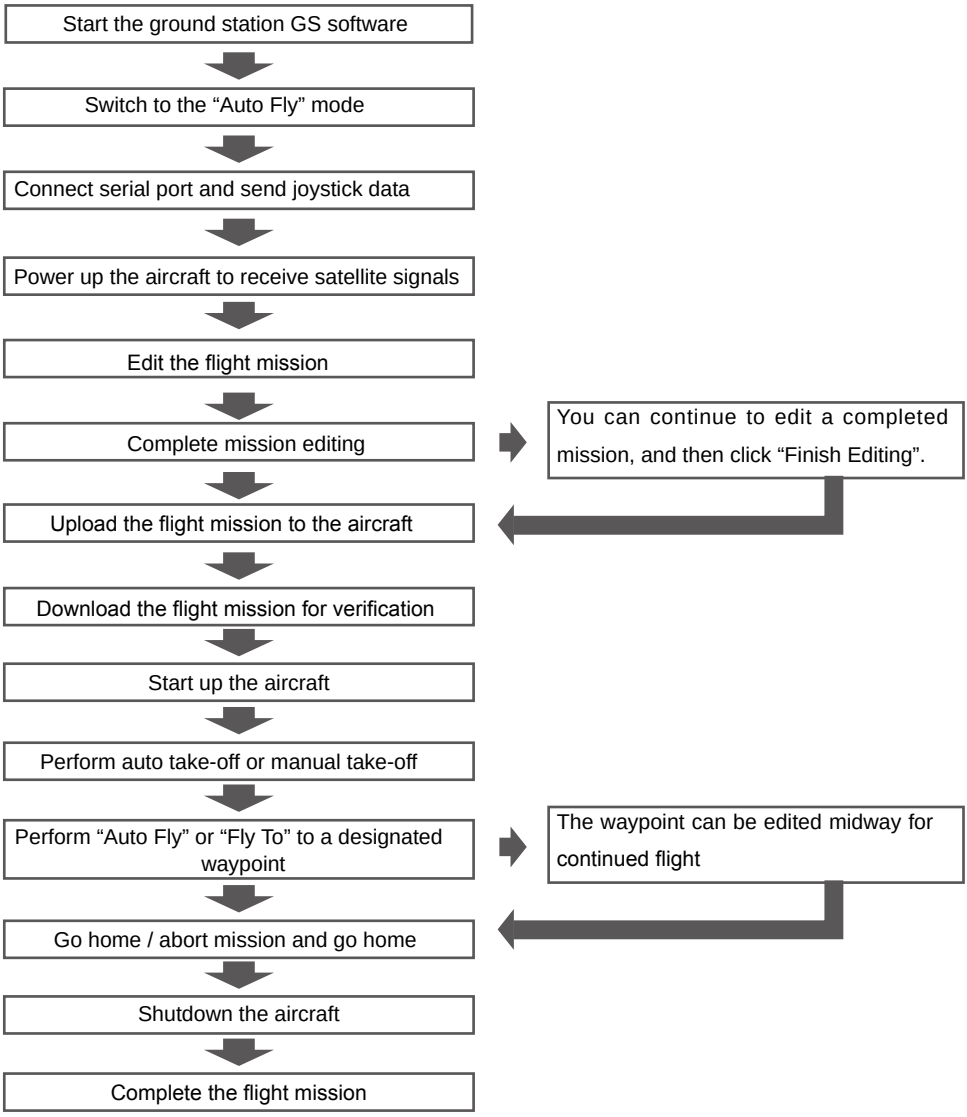
Complete the flight mission

For joystick control methods during manual fly, please see the instructions for manual fly with the remote

control.

Execute Auto Fly Missions with the Ground Station

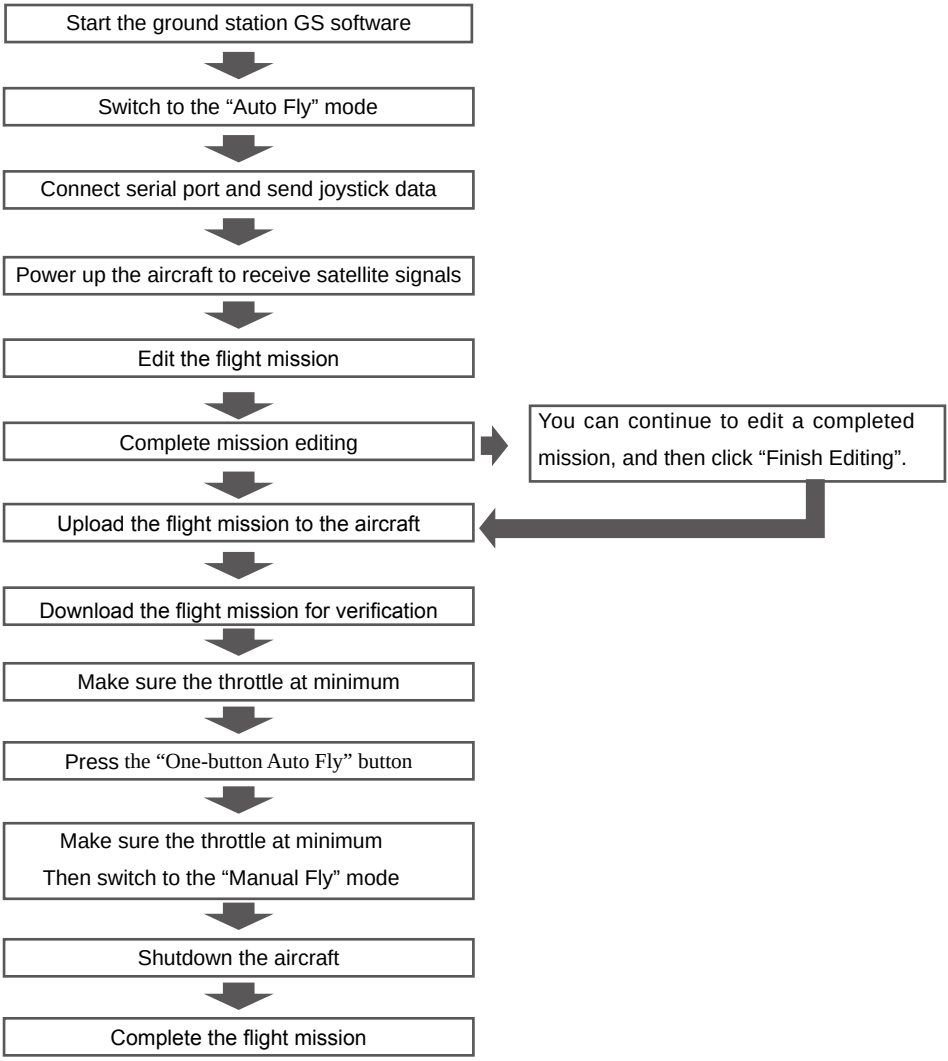
An auto fly mission can be executed according to the following steps:



Execute One-button Auto Fly Missions with the Ground

Station

An One-button Auto Fly mission can be executed according to the following steps:



1 Start the Ground Station GS Software (Hereinafter Referred to as the “Ground Station Software”), and Select the Map Type.

Please make sure maps have been downloaded before starting the ground station software. Double-click to open the ground station software, and the system will ask you to select a map type. Select the desired

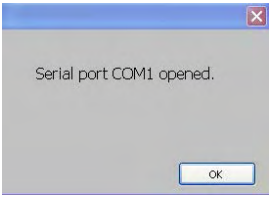
map type and click “OK”, and maps will be loaded automatically.

If maps cannot be loaded normally after the ground station software is opened, please restart the software, connect to the network and try loading again.

2 Connect Serial Ports

Connect serial port COM1 (ground station connects to the communication serial port)

Find [COM1 Connect] on the toolbar; please select serial port COM1, and click “Connect”. A dialog box showing “Serial port opened” will pop up on the screen.



Connect serial port COM2 (ground station connects to the joystick serial port)

The dialog box of “Joystick Data” (as shown below) will pop up through **Menu** –> **Tool** –> **Joystick Data**. Select serial port COM2 and click “Connect” to connect the joysticks which are used to control the aircraft.

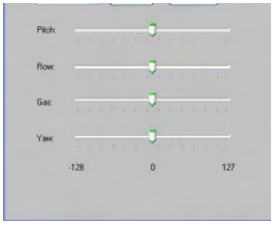
Check “Send joystick data”; the progress bars will have corresponding indications when the joysticks are turned..

Serial port COM2 is used to receive data from joysticks connected to PC and then send the data to the aircraft via serial port COM1. Therefore, before connection of serial port COM2, please confirm that serial port COM1 has been connected.

In case of any error in connection of serial ports, click “Close” on the toolbar and carry out reconnection.

Calibration

After connecting serial port COM2, calibrate the joysticks according to the following steps. The calibration function is mainly used to adjust the maximum, minimal and median values of the joysticks.



Click “Calibration”.

Rotate the left and right joysticks by 360° until the progress bars of 4 channels pulsate.

Push the left and right joysticks, and observe whether there is corresponding pulsation on the progress bar of each channel.

If the calibration is inaccurate, please repeat the above steps.

Important notice:

1. After successful connection of serial port COM2, the aircraft can be manually controlled with the ground station joysticks after the manual fly mode is switched to.
2. When the remote control is used to control the aircraft, please make sure that the option of “Send joystick data” in the ground station software is not checked before take-off; when the ground station joysticks are used to control the aircraft, please make sure that the remote control is in the OFF state before take-off.
3. For joystick calibration, please uncheck “Send joystick data”, to avoid unpredictable consequences caused by accidental take-off of the aircraft.

3 Power up the Aircraft to Receive Satellite Signals

After the aircraft is powered up, you can view the information received from the aircraft on the status bar of the ground station software, such as voltage, attitude, altitude, and number of GPS satellites. The flight mission can be edited only when the number of GPS satellites is no less than 6.

4 Edit Flight Mission

Positioning

Method 1: Add the map location information to the list according to the following steps:

Input place name | Click “Search” to load the map | Click “Add” to save the map data of the current view and add them to the list

After successful adding, you can select an added address from the list; the map will automatically locate to this address after the “Positioning” button is pressed.

Method 2: When the number of GPS satellite is no less than 6, you can directly click “Display Track”; at

this moment, the map will locate to the current position of the aircraft.

After the ground station software is started, the default position displayed on the map is the last added position.

As to undesired positioning information, you can also delete it by clicking “Delete” after selecting the location name.

The ground station software has the offline positioning function.

Notice:

1. Maps of Google Satellite and Google Earth for the same area are not universal; please add maps separately.
2. To use the offline positioning function, please download and back up maps in advance.

Add Waypoint

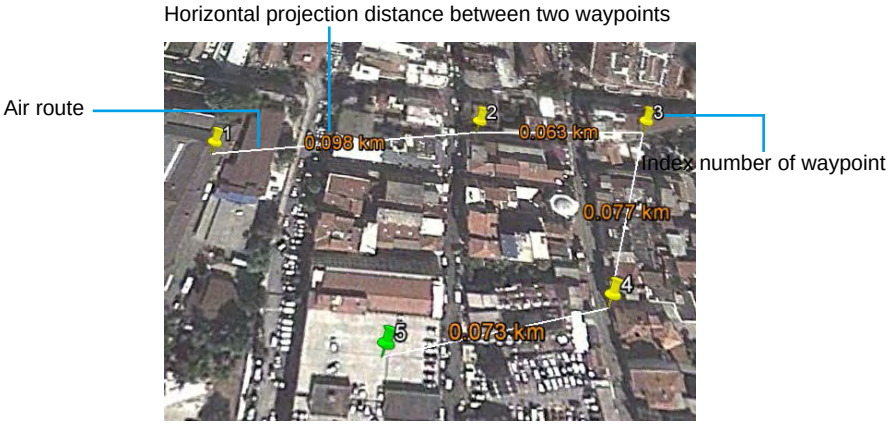
Method 1: Add a waypoint, please directly double-click the position where you want to add a waypoint on the map.

Method 2: Click [Add Waypoint] in the Flight Mission Editor, and then click the position where you want to add a waypoint on the map to add a waypoint.

It is better to add the first waypoint near home point to prevent the aircraft from colliding with obstacles due to excessive obliquity of the aircraft route during its ascending.

Add all the desired waypoints with the same method.

After adding the waypoints, you can view the following information of waypoints on the map:



Color of air route before editing is finished:

Red: Abnormal

White: Normal

Hidden air route: Abnormal

Notice: Only Google Earth hints abnormality in air route altitude; Google Satellite does not have such hint, so the air route altitude should be judged by yourself.

Edit Waypoint

After adding a new waypoint, you can continue to edit the waypoint.

Notice: After selection, the color of waypoint icon changes to green  , indicating this waypoint is selected and can be edited.

Change waypoint position:

Method 1: Use the left mouse button to drag the waypoint to the desired position.

Method 2: Edit longitude and latitude in the Flight Mission Editor. Input the desired longitude and latitude in the corresponding attribute values, then the waypoint will automatically move to the corresponding position.

Waypoint6	Attribute Parameter
Longitude	28.9677527257162
Latitude	41.013593355613
Altitude (m)	30
Speed (m/s)	3
Hover Time (s)	3

Change altitude, speed and hold time of waypoint

Input the desired figures in the corresponding attribute values to change the altitude, speed and hold time of the waypoint.

Notice: To edit the position and altitude of a waypoint, please make sure altitudes of all waypoints are applicable for the current terrain. Please see the description in the section of “Add Waypoint” for details.

5 Finish Task Editing

Click [Finish Editing] in the Flight Mission Editor to finish flight mission editing, and all waypoint projection lines change to green:

6 Upload Mission

After finishing waypoint editing, click [Upload Mission] to upload the current flight mission to the aircraft.

7 Download Mission

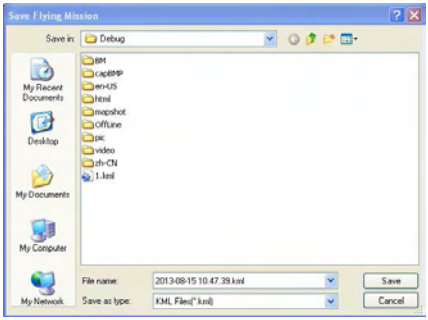
After the mission is successfully uploaded, click [Download Mission] to verify if the mission uploaded is correct; the following dialog box will pop up after “Download Mission” is clicked:

Select “Yes” to save the current flight mission; select “No” to exit without saving.

Save Flight Mission

After finishing flight mission editing, you can save this flight mission according to the following steps:

Step 1: You can save the currently edited flight mission through **Menu** —> **File** —> **Save Mission**, or the button  on the Taskbar. The following dialog box will pop up in the ground station software:

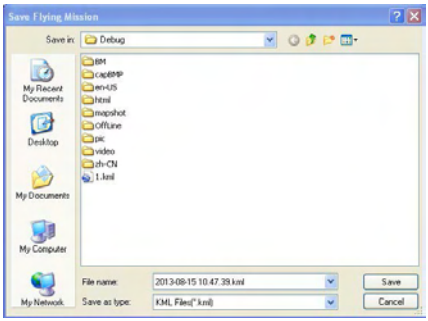


Step 2: After “Save” is clicked, the ground station software will automatically save the information of the current flight mission (including track, waypoint altitude, speed, hold time, etc.).

Flight missions edited with Google Earth are in .KML files; flight missions edited with Google Satellite are in .XML files.

To call a saved flight mission, follow the steps below:

Step 1: Load the local-stored flight missions through **Menu —> File —> Download Mission**. The following dialog box will pop up in the ground station software:



Step 2: Select the desired flight mission, click “Open” and the ground station software will automatically load the information of the selected flight mission.

After successful loading of the mission, you shall perform steps in 5, 6 and 7 in the ground station control software before the aircraft can execute the loaded flight mission.

8 Start the Aircraft

1) After successful connection of the ground station to joystick serial port COM2, check the option of “Send joystick data”.
2) Switch to the manual fly mode.
3) For the startup method, please see the description in the section of “Start the Aircraft with the Remote Control”.

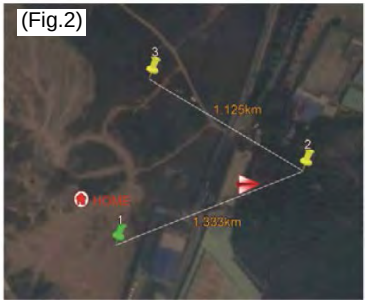
1) During outdoor flight, please make sure that the GPS signal strength indicator is no less than 6.
2) Check if the indications of the heading indicator and the attitude indicator are consistent with the current status of the aircraft; in case of any inconsistence, please contact us immediately.

9 Display Track / Clear Track

1) After starting the aircraft, click “Display Track” to display the real-time flight track of the aircraft during its flying along the air route (Fig. 1); if “Display Track” is not clicked, the real-time flight track of the aircraft will not be displayed (Fig. 2).
2) When “Clear Track” is clicked after track is displayed, the current real-time flight track of the aircraft will be cleared (Fig. 2).

(Fig.1)

(Fig.2)



10View Locking/Switching Function

After track display, the map interface will automatically enter the view locking state. If [Lock View] is clicked, the view will be unlocked and you then can move the map. Click this button again to lock up the view.

In the view locking mode, the map view will move as the aircraft position moves; in the view unlocking mode, the map view has no change.

11 Auto Take-off

1) Before take-off, first make sure the requirements on auto take-off are satisfied. See the instructions in the section of “Safety Precautions” for details.
2) After using the ground station to manually start the aircraft, turn the manual/auto switch of the ground station to the auto mode.
3) Click [Auto Take-off] on the toolbar; the aircraft will hover after ascending to an altitude of about 20m.

12 Auto Fly / Fly to the Designated Waypoint (Fly to)

1) Auto Fly

   Click [Auto Fly], and the aircraft will automatically fly along the preset air route; the aircraft will hover after reaching the last waypoint.
2) Fly to the Designated Waypoint (Fly to)

Select the waypoint you want to fly to in the Flight Mission Editor (the color of the selected waypoint is green); then click [Fly to] on the toolbar, and the aircraft will fly to this waypoint; after reaching this waypoint, the aircraft will hover.

Only one target waypoint can be added every time.

3) Edit Flight Mission in the Air

You can continue to edit the flight mission after the aircraft enters the hover state. The following operations can be realized:

a Continue to edit the flight mission; click [Edit Waypoint] to continue to add waypoints and edit waypoint information; click [Finish Editing] after editing is completed (at this moment, it is not needed to clear the flight mission; you can directly upload the current mission to overwrite the existing mission in the aircraft). Click [Download Mission] to ensure the mission is correct and then execute the action of [Auto Fly].

b The action of [Fly to] can be executed, as shown in Step 2 (at this moment, missions saved in the aircraft still exist).

c Click [Clear Mission] to clear the flight missions in the aircraft and the content of missions shown on the map; at this moment, if [Auto Fly] is clicked, the aircraft will stay in the hover state.

Before the aircraft executes the Auto Fly command, please first download the mission to verify if the flight mission uploaded to the aircraft is correct.

13 Go Home

If [Go Home] is clicked during flight or after the aircraft enters the hover state, the aircraft will automatically return and hover over the take-off position.

The altitude of the homeward course is the altitude of the last waypoint.

14Landing

Click [Auto Landing] after the aircraft returns, and the aircraft will automatically land vertically.

1) There might be minor difference between the landing position and the take-off position.
2) To avoid unpredictable consequences, do not randomly click “Auto Landing” in the course of flight.
3) To close the ground station, please first shut it down normally and then turn off the main power switch.

15One-button Auto Fly

Before flight, please first check if the requirements for One-button Auto Fly are satisfied (the throttle is in the lowest position; the Manual/Auto switch is in the Auto mode; at least one waypoint is uploaded), and refer to the descriptions in “Precautions”; Make sure ALL requirements for One-button Auto Fly are satisfied.

Place the aircraft in a horizontal posion (do not place the aircraft on a sloped ground for take-off); the “One-button Auto Fly” button will be lightened and become effective only after adding waypoints, uploading waypoint and downloading-waypoint-for-verification have been carried out in the ground station software. when the “One-button Auto Fly” button on the toolbar is clicked, the aircraft will fulfill the entire flight mission, including Startup the Aircraft, Auto Take-off, Route Flight, Go Home, and Landing.

1.The “One-button Auto Fly” button on the toolbar can be clicked only when the requirements for One-button Auto Fly are all satisfied; otherwise, the aircraft will not execute the command.

2.The aircraft should be placed horizontally to avoid unnecessary troubles.

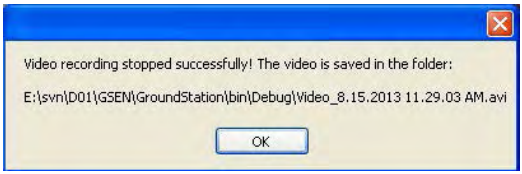
3.In the process of going home and landing, the status of the aircraft should be observed at all times; in case of any abnormality, switch to the manual control in time to ensure safe operation of the aircraft.

Video Management Window Function of the Ground Station Software

The aircraft starts automatic video recording after startup; enter the tab of Video Management Window of the ground station, then click [Preview] to view the real-time video sent back by the aircraft.

1 Local Video Recording

In local recording, the ground station saves the video recording sent back by the aircraft to local memory. Click “Local Video Recording” on the toolbar to start recording; after recording is finished, click [Stop] to end recording and save the video file to the ground station computer. The system will automatically pop up a dialog box indicating the save path of the video file:



2 Screenshot

Click [Screenshot] on the toolbar to capture the current screen and save the screenshot file to the ground station computer; the system will automatically pop up a dialog box indicating the image store path:

3 Zoom in / Zoom out

Click “Zoom in” / “Zoom out” to adjust the focal length of the airborne camera.

4 Airborne Video Recording

Click [Airborne Video Recording] button on the toolbar to start video recording of the airborne camera; during recording, the button will remain selected; click the button again to stop recording and it will bounce up.

5 Airborne Photo shooting (Support Snapshot)

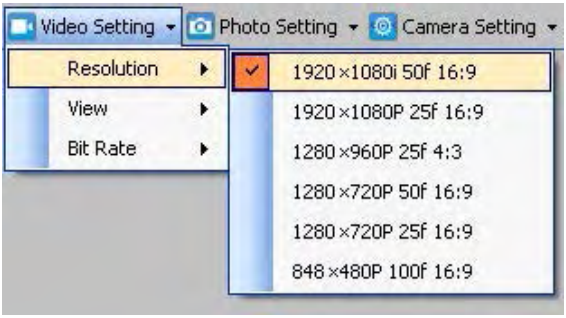
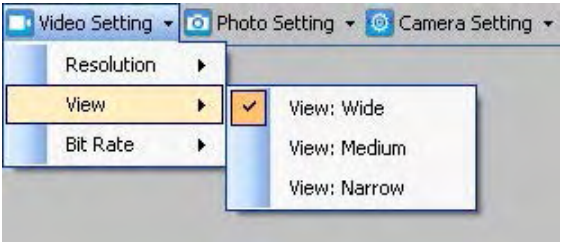
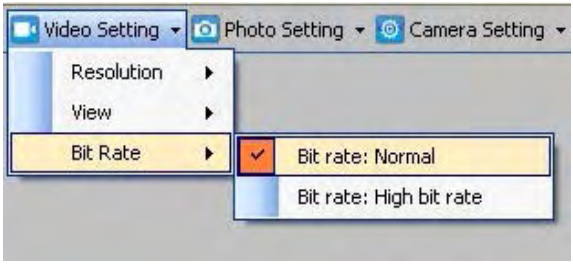
- Click [Airborne Photo Shooting] on the toolbar to take a photo.
- Click [Airborne Photo Shooting] during video recording to realize the snapshot function.

  Snapshot is not supported in the resolution modes of 1080i/50f, 720P/50f and 480P/100f.

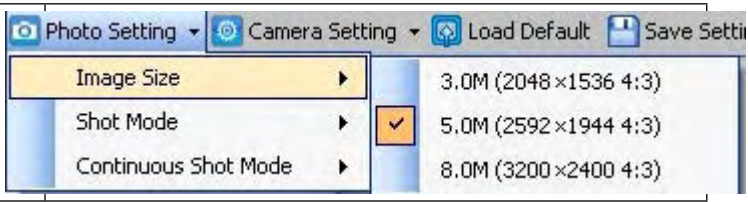
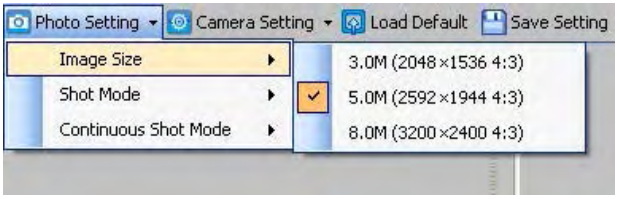
Notice: The functions of zoom in, zoom out, airborne video recording and photo shooting can also be realized via corresponding buttons on the ground station panel.

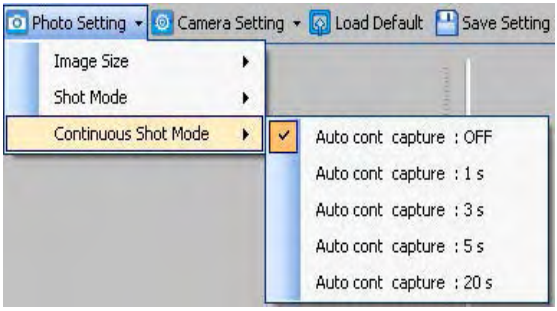
6 Video Recording Setting

Parameters of the aircraft camera can be set:

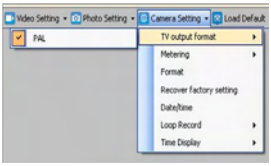
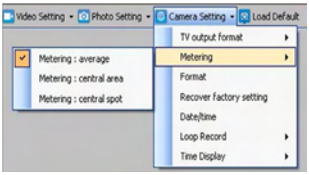
Resolution	
Visual Angle	
Bit Rate	

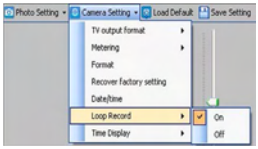
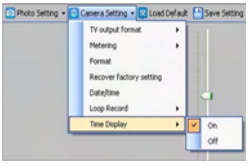
7 Photo Shooting Setting

Image Size	
Shot Mode	

Continuous Shot Mode	

8 Camera Setting

TV-out Format		Only PAL can be selected
Metering Mode		• Average metering: use this mode when the luminance difference between the photograph subject and the background is relatively slight and steady. • Central area metering: It is the default mode, applying to scenes when there is certain luminance difference between the photograph background and the subject or the photograph subject relatively accords with the background. • Central spot metering: It applies to small-sized subject under extremely bright or dark background.
Formatting		The airborne camera memory can be formatted to remove all files in it. Make sure you do not need the data before formatting!
Restore Factory Settings		This operation will restore all settings of this device to the factory settings.
Time Setting		Set the system time.

Loop Recording		When “Loop Recording” is ON, recording is saved as a segment file by each 10 min; if the space of the memory card is not enough, the first recording file will be overwritten automatically.
Time Indication		Show or hide time display.

9 Loading Setting

Click [Loading Settings] on the toolbar to load the current settings of the airborne camera.

10 Save Settings

Click [Save Settings] on the toolbar to save the current settings of the airborne camera.

Important notice: Settings will take effect only when [Save Settings] is clicked after a setting is modified.

11 Angle of Airborne Camera

The angle of the airborne camera can be adjusted within the range of 0-105°.

Map Backup

The ground station system adopts the data platforms of Google Earth and Google Satellite Map. During map browsing, the system will automatically save the data of browsed maps to the system so that you can view the browsed maps offline. However, the map storage capacity of Google Earth is limited (the maximum capacity of Google Earth is 2G and that of Google Satellite Maps is 1G). When the capacity of browsed map data exceeds this limit, the old map data will be lost.

In addition, data loss may be caused by misoperation, which will result in the failure of access to Google Earth data platform after the ground station system is opened.

To avoid loss of map data, data backup software is provided in the Ubuntu operating system. This software provides the following three functions:

1. Save map data; during use of the ground station, the user can save the map data according to area partition and date.

Note: The data backup file should not exceed the map capacity limit (Google Earth: 2GB; Google Satellite Maps: 1GB).

2. Restore map data; in case maps cannot be loaded due to data loss during use, if access to Internet is also not available, the user can enter this software to restore map data.
3. Delete: Delete undesired backup data.

Important notice: Before use of map backup, first open the ground station GS software in the Windows system, and make sure maps of Google Satellite and Google Earth have been downloaded and can be used.

The operation steps are as follows:

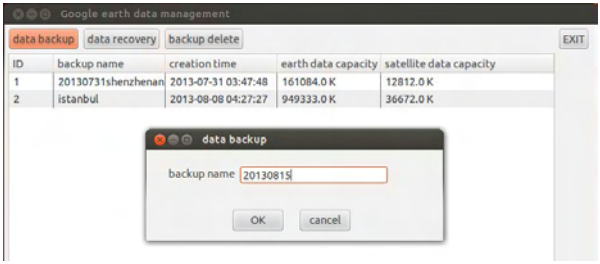
1 Start up and select to enter the Ubuntu system (see the following picture):

After opening the ground station system, select to enter the Ubuntu system in the “Select System” menu:

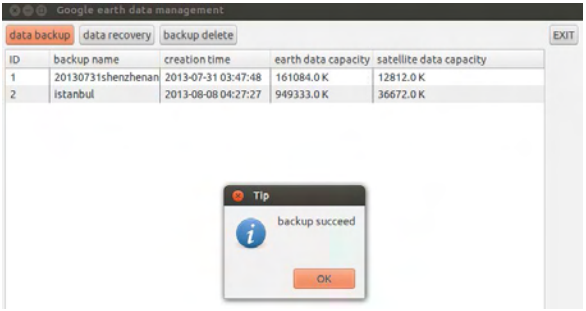
2 Double-click to open the Google Maps Data Management software: 

3 Backup operation:

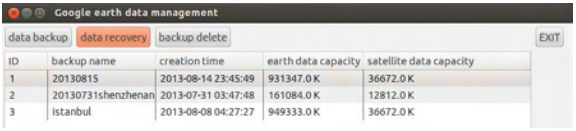
- First, open the ground station GS software in the Windows system, and make sure maps of Google Satellite and Google Earth have been downloaded and can be used.
- Then, go back to the Ubuntu system to open the Google Maps Data Management software.
- Click “Data Backup”, fill in the backup name, and click “OK” to save the last map data browsed in the ground station software. See the following picture:



The system will pop up a dialog box indicating successful backup:

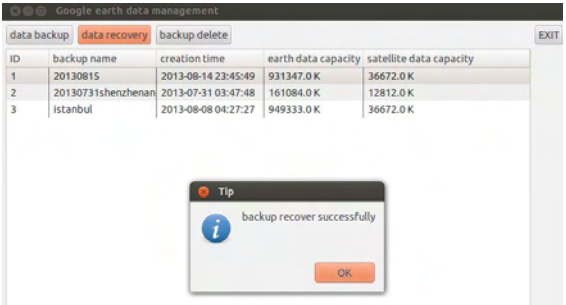


Generate backup data:



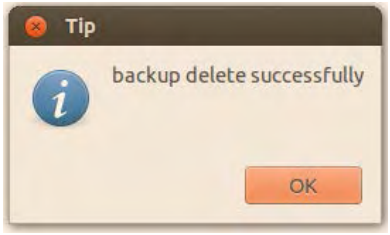
4 Data Recovery

Select the map data to be recovered (selected data is in orange background), and click “Data Recovery”; the system will pop up a dialog box indicating successful recovery:

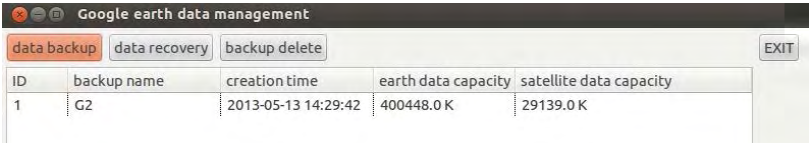


Before data recovery, please first back up data; otherwise, data recovery cannot be performed.

5 Delete Data: Delete data that have been backed up; select the backup data you want to deleted, and click “Delete Data”; the system will pop up a dialog box indicating successful deletion:



6 Exit from Google Maps Data Management: Click “Exit” at the top right corner of Google Maps Data Management software to exit the software.



7 Log out of the Ubuntu system, click at the top right corner of the screen to select “Shutdown”. Map backup editing is completed at this moment.

Video Files

After startup, the aircraft will automatically enter the recording state. The user can preview the video on the screens of the remote control and the ground station. When the aircraft is shut down, recording will be stopped and video files saved automatically.

Using a USB data cable, you can copy the video files in the aircraft to a PC for playback.

The real-time videos sent back by the aircraft can be saved to the memory of the remote control by pressing the “Local Recording” button of the remote control or the ground station.

For detailed operation methods, please refer to the section of “Description of Buttons” of the remote control and the ground station.

The USB data cable can be used to copy the video files in the remote control to a PC for playback.

Alarm Sounds

The remote control and Ground Station can make the following alarm sounds:

No	Working status	Sound definition (different in interval and length)
1	Level 2 alarm for low battery of aircraft	Beep beep --- beep beep --- beep beep… (fast) continuous
2	Level 1 alarm for low battery of aircraft	Beep beep --- beep beep --- beep beep… (slow) repeat once every 2min (approx.)

3	Level 2 alarm for low battery of remote control	Beep --- beep beep --- beep --- beep beep… (fast) continuous
4	Level 1 alarm for low battery of remote control	Beep --- beep beep --- beep --- beep beep… (slow) repeat once every 2min (approx.)
5	Level 2 alarm for low battery of ground station	Beep --- beep beep --- beep --- beep beep… (fast) continuous
6	Level 1 alarm for low battery of ground station	Beep --- beep beep --- beep --- beep beep… (slow) repeat once every 2min (approx.)

Remark: Upon Level 2 alarm for low battery of aircraft, it will automatically land at the current position rather than go home.
In case of Level 1 alarm for low battery of aircraft or Level 2 alarm for low battery of remote control and ground station, please cautiously decide whether flight can be executed (it is suggested that the aircraft shall return for replacement of the battery). Flight accident may be caused by low battery of the aircraft and remote control!

Specification

Description	Specification
Flight mode	Manual remote control, autonomous hover, autonomous route
No-load take-off weight	1.8KG
Maximum take-off weight	2.8KG
Endurance time	4000mAh: about 20min; 6000mAh: about 25min; 8000mAh: about 30min
Maximum cruising speed	60KM/H
Maximum remote control range	Using metal antenna: 2KM Using high-gain dual-band directional antenna: 6KM
Flight altitude (relative altitude)	1.5KM
Normal take-off/landing wind speed	Below Level 4
Working temperature	-20°C ~ +60°C (when it is below 0°C, pay attention to thermal insulation of the battery; the battery performance is better when it is above 0°C.)
Working humidity	0% ~ 95%RH
Storage temperature	-40°C ~ +85°C
Airborne camera	HD 1080P

Troubleshooting

Before test flight, please read the “Operation Instruction” first. If normal take-off fails, please perform troubleshooting according to the table below. If the problem still exists, please contact us immediately. To avoid unnecessary loss, please do not operate blindly!

Fault	Solution

Self-checking of the aircraft fails after it is powered up (the buzzer beeps all the time)	(1) Check the mainboard power switch of the aircraft to make sure it is in the ON (powered up) state (2) Check the battery of the aircraft to see if there is any poor contact
Speeds of four motors are obviously inconsistent with each other after startup (some run fast, while some run slowly)	(1) Make sure the aircraft is placed on a flat ground before take-off (2) Use the pitch and roll joysticks of the remote control to optimize take-off process.
The aircraft cannot be started after successful self-checking	Check the manual/auto switches of the remote control and the ground station to make sure they are in the manual state
Normal take-off fails when the throttle lever is pushed forward after the aircraft is started	(1) Check the four propellers of the aircraft to see if they are installed onto the motors properly as required (2) Check the power batteries of the aircraft to make sure the battery level is high enough.

Protection Mechanism

During flying in the manual mode, when it is beyond the operating range, the aircraft will enter the protection mode, and automatically fly back to the take-off position and land.

During flying in the manual/auto mode, when the remote control or the ground station is powered off, the aircraft will enter the protection mode, and automatically fly back to the take-off position and land.

In case of Level 2 alarm for low battery, the aircraft will enter the protection mode; at this moment, the aircraft will vertically descend to the ground (in case of an emergency, in the auto fly mode, you can switch to the manual mode to control landing manually; in the manual fly mode, switch to the auto mode and then to the manual mode to realize manual control of landing).

FCC Information and Copyright

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.

15.19 Labelling requirements.
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.

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