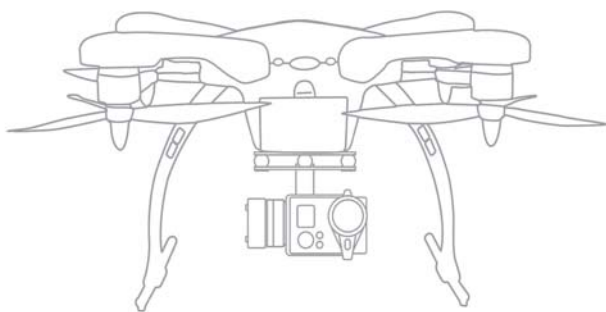


# GHOST DRONE

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## ADVANCED MANUAL



# **Aviation Restrictions**

Please refer to relevant regulations of the International Civil Aviation Organization, local airspace control and UAV management rules. Otherwise it may incur liabilities for violation of laws or regulations. Once this product is used, it will be assumed that the user has acknowledged and accepted all the contents of this statement.

Users will be held accountable for their actions or any direct or indirect consequences caused by incompliance with the aviation restrictions of this manual.

# Contents

<b>Reminder</b> .....	02
<b>Reading Instructions</b> .....	03
• Symbols	
• Suggested Use	
• Video	
<b>GHOST Basic</b> .....	04
• Introduction	
• Parts List	
<b>Preparation</b> .....	06-22
• Battery	
• G-Box	
• GHOST	
• Propeller	
• Prop guard	
• Gimbal	
• Landing Gears	
• Camera	
• GHOST APP	
• Voice Package	
<b>GHOST APP</b> .....	23-26
The interface	
<b>Flight</b> .....	27-28
• Pre-flight Examination	
• Flight Environment	
• Flight Safety	
• Caution during Flight	
• After-sales	

# Reminder

## Black Box

Each GHOST drone contains a black box which records all flight information and working parameters of the engine, which is used for flying tests and accident analysis.

## Operation

Please be careful when using the GHOST. The product contains sensitive electronic components. Fall, damage or exposure to water may break the GHOST.

## Modification/Mounting

If you need to modify GHOST or mount other devices on GHOST, please consult our customer service. Users will be held accountable for any consequences caused by modification or mounting without permission.

## Repair

Please do not disassemble or try repairing the GHOST, which may cause damage to the GHOST or even injure yourself. If it is broken, malfunctions or gets exposed to liquids, please contact EHANG or its authorized dealers.

## Battery

Please do not dismantle, squeeze, strike, burn, drop or tread on EHANG batteries. Avoid short circuit or exposing the battery terminal to metals. Do not use the battery at a temperature above 60 degrees Celsius. Please use the original GHOST charger. Please store the battery out of children's reach and keep it dry.

## Storage

If GHOST and its parts are left idle for a while, please take out the battery and store it in a dry, dark environment free from dampness, molds and electromagnetic interference (EMI).

# Reading Instructions

## Symbols



Do not operate



Attention needed



Tips

## Suggested Use

EHANG has a video and the following instructions teaching users how to operate GHOST in order to make sure that you have a pleasant experience with our product.

1.Video

Website: [www.ghost-drone.com](http://www.ghost-drone.com)

2.Disclaimer

Website: [www.ghost-drone.com](http://www.ghost-drone.com)

3.Quick-start Manual: [To help you start easily and quickly](#)

4.GHOST Aerial Advanced Manual: [To provide detailed instructions](#)

## Video

Please visit our website [www.ghost-drone.com](http://www.ghost-drone.com) to learn how to use GHOST from the video.






# GHOST Aerial Plus

## Introduction

GHOST is a quadcopter completely controlled by a smartphone APP. It is equipped with an advanced flight controller and the intelligent mobile device can provide functions of flight directing, BVR flight and following. It is easy to operate. With GHOST, flying is no longer a privilege.

## Parts List

Please check the contents of the box before using.

Number	Item	Picture
1	GHOST (with two pairs of propellers and four prop guards)	
2	G-Box (with charging cable)	
3	Battery and battery charger (with two charging cables)	
4	Gimbal and camera	
5	Landing gear, screwdriver, and eight 2.0 screws	

# Preparation

## 1. Battery

Please make sure the following devices are fully charged before using GHOST.

Battery



G-Box



### 1.1 About the Battery

It is a charge-discharge, lithium polymer battery specially designed for GHOST products, with a capacity of 5400mAh, cell voltage of 11.1v and an XT60 connector. The battery must be charged with the original charger provided by EHANG.



Battery



Charger

### 1.2 Charging

- **Battery type:** LiPo
- **Charging:** The indicators of 1S, 2S and 3S are the number of batteries being charged; 1A, 2A and 3A are the current. The higher the value is, the faster the battery will be fully charged.
- **State:** When the red indicator is on, the battery is being charged. When the green indicator is on, the battery is fully charged.




# Preparation

## 1.3 Put in the Battery

Put GHOST on level ground and connect it to battery cable. When the flicker frequency is lowered (5 seconds per flicker), push the battery into the compartment in the right direction and make sure the battery is tightly stuck. Close the cover and keep a safe distance (5 meters). Connect your smartphone to G-Box through Bluetooth, which makes it easier to unlock the smartphone APP and avoids unlock failure.



 If the battery is not tightly stuck, there will be poor contact with power source or failure to obtain battery information, which may affect flight safety or cause unsuccessful take-off.

## 1.4 Attention Needed

- 1) Please examine if there is any tear, damage or deformation on the battery;
- 2) Battery temperature is high immediately after use. Don't start charging until the battery cools down to room temperature;
- 3) Do not leave the battery charged unattended. If abnormal charging situation occurs, please stop charging the battery at once; if you cannot attend the battery, remove the battery from the charger in case of unpredictable danger;
- 4) Do not place or charge the battery in the sun. Temperature higher than 35℃ might damage the battery or affect its performance;
- 5) Store the battery out of children's reach. Please keep the battery away from source of water and fire;
- 6) Avoid storing fully charged battery. It is suggested to use the battery within 24 hours after it is fully charged; if you determine not to use the battery for a long period of time, keep its electric voltage between 11.4V and 11.6V (single cell between 3.8V and 3.85V) ;
- 7) Do not apply external force on the battery; do not drop the battery from high places;  
do not disassemble or modify the battery;
- 8) Please replace the battery with new one if it bulges;
- 9) Please do not charge the battery for over three hours.



# Preparation

## 2. G-Box

### 2.1 About G-Box

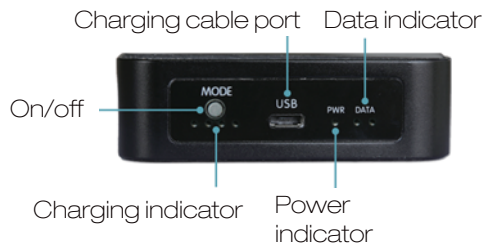
G-Box is a communication device specially designed for GHOST products. Each GHOST is equipped with one G-Box; Without G-Box, you cannot use GHOST APP on your smartphone to control the GHOST; please keep the G-Box in good condition.



G-BOX



USB cable



On: Tap the ON/OFF button

Off: Long press the ON/OFF button until the PWR light is off

Charging: Four indicators flicker in turn

Fully charged: Indicator on far left flickers; the other three are on



- After it is fully charged, connect G-Box and smartphone APP through Bluetooth on your smartphone.



# Preparation

## 3.GHOST

### 3.1 About the GHOST

GHOST (without Gimbal and camera) has a built-in GHOST flight controller and can move forwards, backwards, left, right, up and down, rotate or fly to a certain point or make other movements controlled by a smartphone APP. It can be easily controlled and is highly stable.



### 3.2 LED Indicators

- 1) There are red and blue indicators; Red indicates forward and blue indicates backward;
- 2) Blue indicator is on when GHOST is searching for GPS satellite;
- 3) Blue indicator stays on. Takeoff requires 6 or more available GPS satellites.
- 4) When red indicator is on: It flickers before take-off, indicating the GHOST is in normal state; it flickers during flight, indicating there is something wrong with electricity consumption and you must pay attention to low battery;
- 5) Red indicator stays on when GHOST is unlocked or during flight.



# Preparation

## 4.Propellers

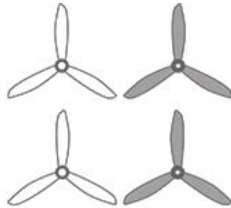
GHOST is equipped with 8-inch, 3-blade, co-rotating and counter-rotating propellers. Please visit our website to purchase the propellers if necessary.

### 4.1 About the Propellers

Pictures of the propellers and the supporting tools (Notice: grey part indicates the back sides of GHOST and parts)



GHOST drone



Right propeller × 2  
Left propeller × 2



Cushion × 4



Nut × 4



Screw-driver

### 4.2 Install Propellers

1) Identify front and back ends: R indicates right propeller. L indicates left propeller. The character can be found on the propeller's rim on the front end. No character on the back of propellers.

Left



Back

Front

Right



Back

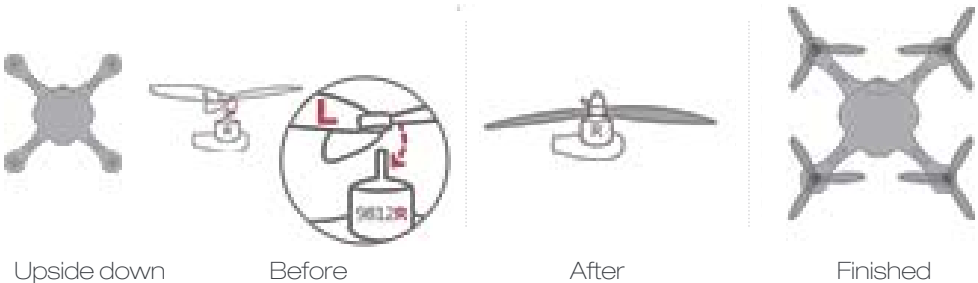
Front

# Preparation

2) Assemble propellers: Pick the cushion in the red circle and fit it in the small holes on the backside of propellers respectively.



3) Install propellers: Keep GHOST upside down. The propeller should be placed on the motor with propeller's front ends (with character) facing downwards. **L** propeller should be fixed to the **R** motor and **R** propeller to **L** motor; fasten the nuts at the back.



**Notice:** Please press the propeller with your left hand, tighten the nut with your right hand, and fasten the nut with a screwdriver (follow similar techniques to disassemble propellers).

## 4.3 Matters Needing Attention

- 1) Please check whether propellers are installed correctly and tightly before flight;
- 2) Please check whether blades are intact; replace with new ones if there is damage or aging;
- 3) Keep away from rotating blades and running motor in case of injury;
- 4) Please use original 3-blade, co-rotating and counter-rotating propellers provided by EHang to achieve optimal flight experience.

# Preparation

## 5.Prop Guard

GHOST prop guard is made of intensified compound materials. Its lightness contributes to better and safer flight, and protects the blades from strike.

### 5.1 Installation and Disassembly

Installation: Place the prop guard on GHOST and screw it down with three 2.0 screws.

Disassembly: Unscrew the three screws fastening the prop guard and take the prop guards down.



## 6.Gimbal

GHOST Gimbal is anti-knock and anti-shake.

### 6.1 Gimbal Parameters

Weight: 178g

Precision:  $\pm 0.09^\circ$

Working voltage: 7V to 17V

Maximum angle: Roll angle  $\pm 55^\circ$  Pitch angle  $-180^\circ$  to  $+60^\circ$

Balance angle: Roll angle  $\pm 45^\circ$  Pitch angle  $-90^\circ$  to  $+30^\circ$

Supporting cameras: EHANG motion camera, Gopro3, Gopro3+ and Gopro4

# Preparation

## 6.2 Installation

**Step 1 Assemble the camera:** Use 1.5 long screws to fasten the camera brace to the camera and 1.5 short screws to connect the camera (such as GoPro) to the lower seat of Gimbal. (Notice: Parts must be fastened with screwdriver).



Gimbal



Lower seat of Gimbal



Camera



Camera prop guard



1.5 long screws



1.5 short screws



Finished

**Step 2 Install the upper seat of Gimbal:** Put the GHOST upper seat upwards, use 2.0 screwdriver to fasten the upper seat to GHOST and cover the upper seat with buffer balls.



Gimbal upper seat



2.0 short screws



Buffer balls



Finished

# Preparation

**Step 3 Connect the upper/lower seat:** Connect the upper and lower seat with buffer balls.

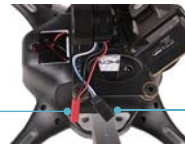


Finished

**Step 4 Wiring (very important):** Pay attention to the colors of cable ends and make sure each one is connected to the right color or there may be damage to the Gimbal.



GHOST red plug  
GHOST black plug



Gimbal red plug  
Gimbal black plug



Connect to the red plug  
GHOST red cable to Gimbal  
red cable  
GHOST black cable to Gimbal  
black cable

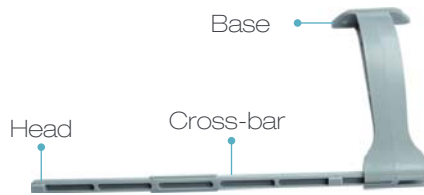


Connect to the black plug  
GHOST red cable to Gimbal  
blue cable  
GHOST black cable to Gimbal  
white cable

# Preparation

## 7.Landing Gear

**Assembly:** Assemble the landing gear; pay attention to the direction in which the cross-bar is installed; the finished landing gear is as follows:



Assembly



Seen from the bottom



Seen from the front side



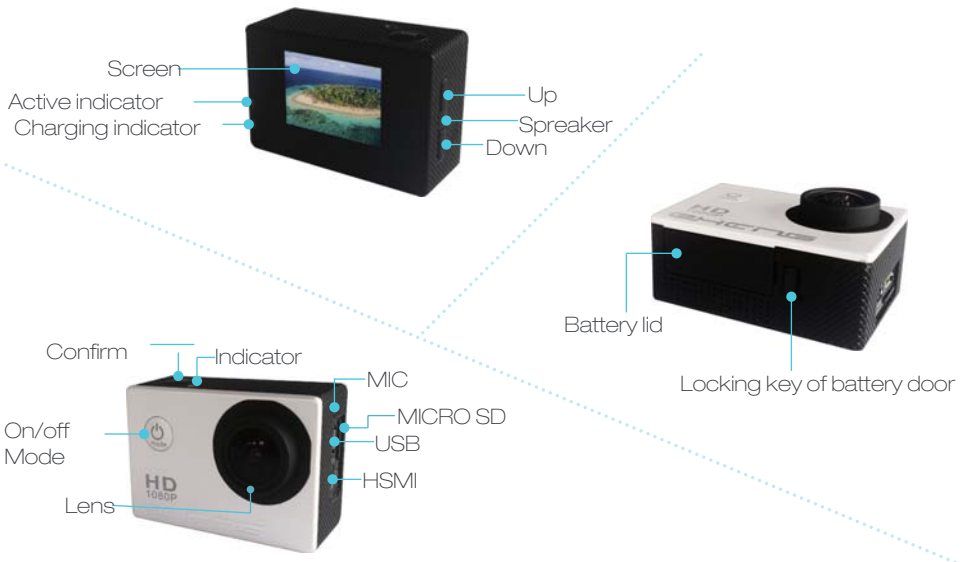
# Preparation

## 8.EHANG Motion Camera

### 8.1 Features

- Filming
- Ultra-HD screen to play and replay your videos
- Dismountable battery to extend its service life
- Filming while being charged
- Filming while being plugged in
- 12 Megapixel HD wide-angle lens
- HDMI HD output
- Web camera
- Memory card support maximum of 32G
- Video definition supported: 1080P/ 720P/ WVGA
- MOV filming
- Shooting modes: Stop-motion and continuous capture
- Lock during video recording
- Mini size

### 8.2 Camera



# Preparation

## 8.3 How to Use the Camera

### 1) Insert Micro SD card

**Notice:** Please use qualified Micro SD card; format it on computer into exFAT32k; neutral card may not function.

### 2) Install and take battery out

- 01 Draw the lid downwards and open it;
- 02 Put the battery in the camera according to symbols of cathode and anode, there are arrows pointing how you should insert the battery;
- 03 Push the lid and take the battery out;




### 3) Charging

- 01 Plug it to computer or power adapter to charge;
- 02 Plug it to a car charger to charge;
- 03 Film while charging (set it at car mode from the function menu);
- 04 Charge when turned off;
- 05 Current should be kept within 1000mA or it may cause damage;

### 4) Turn on/off the camera

There is ON/OFF button on the front side (tap to turn it on; long press to turn it off and you can see GOODBYE on screen);

### 5) Mode swapping

After turning it on, tap the ON/OFF button to film/ take a picture/ replay or convert modes.  is for filming;  is for taking a picture. The symbols are on the top of screen.  is for replaying. The last is for the function menu.

### 6) Charging

- 01 Filming and image setting;  
During filming, there is a symbol on top left corner of screen; tap "CONFIRM" to start filming; during filming, is flickering; tap "CONFIRM" again to stop filming; the symbol on top left disappears.
- 02 Photographing and settings;  
Turn it on and you can see mode selection; when there is on top left corner of the screen, you can take a picture; tap "CONFIRM" to take pictures: stop motion/ self-timer (2/5/10 seconds)/ continuous capture;
- 03 Save and play;  
Use USB cable to move the videos to your computer; you can also take the Micro SD card out and read the data on a computer with a card reader.



**Notice:** After crash, take the battery out and put it back again to restore.

# Preparation

## 8.4 Camera parameters

Items	Parameters
Operating system	Windows XP/Vista or Above/Win7/Mac OS 59.27*41.13*29.28
LCD	1.5LTPS
Lens	170° A+ high-resolution wide-angle lens
Language	Simplified Chinese/ Traditional Chinese/ English/ German/ French/ Spanish/ Italian/ Portuguese/ Russian/ Japanese
Filming	1080P (1920*1080) 30FPS, 720P (1280*720) 60FPS, VGA (848*480) 60FPS, QVGA (640*480) 60FPS
Filming format	MOV
Compressed format	H.264
Resolution	12M/8M/5M
Memory card	Micro SD
Picture mode	Shot motion/ self-timer (2/5/10 seconds)/ continuous snapper
Light source frequency	50Hz/60Hz
USB	USB2.0
Power supply	5VIA
Battery capacity	900mAh
Power consumption	400mA@4.2V
Maximum time for filming	1080P/ 70 minutes
Time for charging	About 3 hours



Parameters may be upgraded or changed. Specifications might defer contingent upon real products.

# Preparation

## 9.GHOST APP

GHOST APP is specially designed as an operating system for GHOST on a smartphone. Download GHOST APP and you can control the flight on a smartphone without a RC transmitter. All functions on the transmitter are now realized by "One-click command" to make flight easy and pleasant.

### 9.1 GHOST APP Downloading

Download GHOST APP

You must use GHOST APP to use GHOSTAerial/ Aerial Plus. You can download the application in the following manners:

01: Visit [www.ghost-drone.com](http://www.ghost-drone.com) to download EHANG GHOST APP (Pic 1).

02: Download GHOST APP from Google Play/ APP Store (Pic 2).

03: Visit downloading page on our website, connect your smartphone to computer and tap "One-click Setup" button (Pic 3).

Smartphone: iPhone 4S (IOS 6.0 and above), Android 3.0 and above, iPad 3 (IOS 6.0 and above).



# Preparation

## 9.2 APP Interface Instruction

**Step1 :** Enter start-up page and start the APP.



**Step2 :** With Bluetooth on, it will search for devices automatically and get connected.



**Notice:** You will see the following page if you log in for the first time before you take step 2.



## 9.3 Voice Notice

The voice notice warns about “Battery Level”, “Low battery. Please return” and “Error” in case communication is lost or the GHOST crashes due to low battery or operation error. EHANG should not be held accountable for accidents that could have been avoided by following the voice notice.

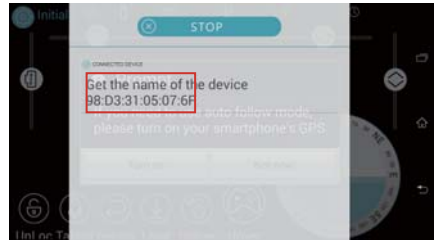
# Preparation

## 9.4 APP-Bluetooth

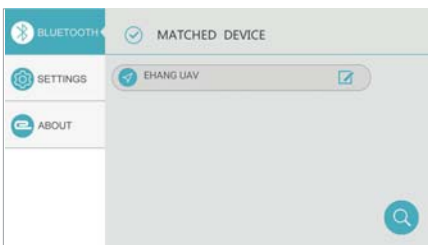
**Step1:** Tap the Initial button on top left corner to turn to setup page.



**Step3:** When new Bluetooth device is detected, tap to get connected.



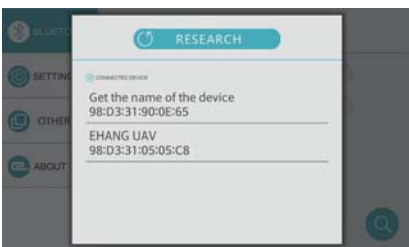
**Step2:** Connected Bluetooth devices will be shown on this page. Tap "SEARCH" button on bottom right corner to search for new devices.



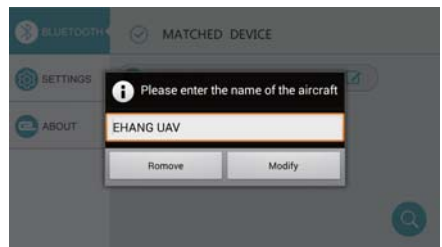
**Step4:** New Bluetooth device is added.



**Notice:** If you want to cancel the search, tap the button to cancel.



**Step5:** Tap the button on the right to rename the new Bluetooth device.

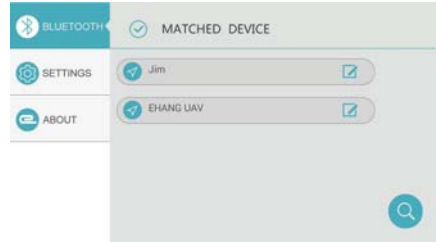


# Preparation

**Step6 :** Type in the new name and tap “MODIFY”.

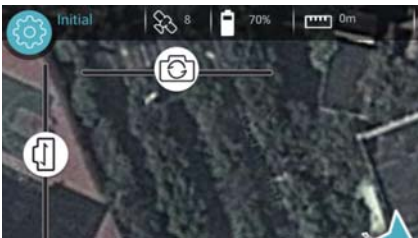



**Step7 :** Bluetooth device is renamed.



## 9.5 Remove Bluetooth Pairing

**Step1 :** Tap “INITIAL” button on top left corner to turn to Bluetooth setup page.



**Step2 :** Tap “” button on the right to turn to Bluetooth editing page.



**Step3 :** Tap “REMOVE” to remove Bluetooth pairing.



**Step4 :** Bluetooth pairing is removed.



# Preparation

## 9.6 Model

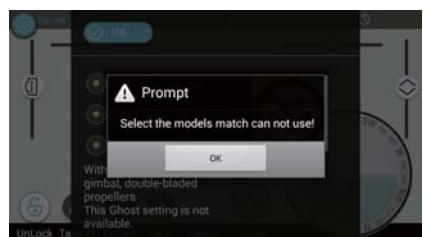
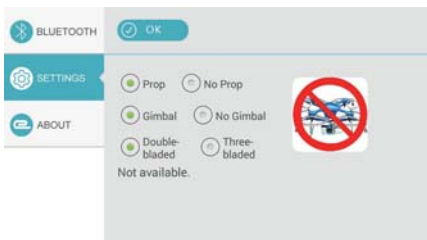
- After APP installation and Bluetooth pairing is completed, turn to the page on the left. GHOST setting page will pop up



- If you choose correctly, you will see “GHOST parameters set”; it turns to APP operation page; if you need to reset, tap “⚙️” button on top left corner and choose GHOST settings(if with a certain model recommended, you must proceed based on the GHOST actually used).

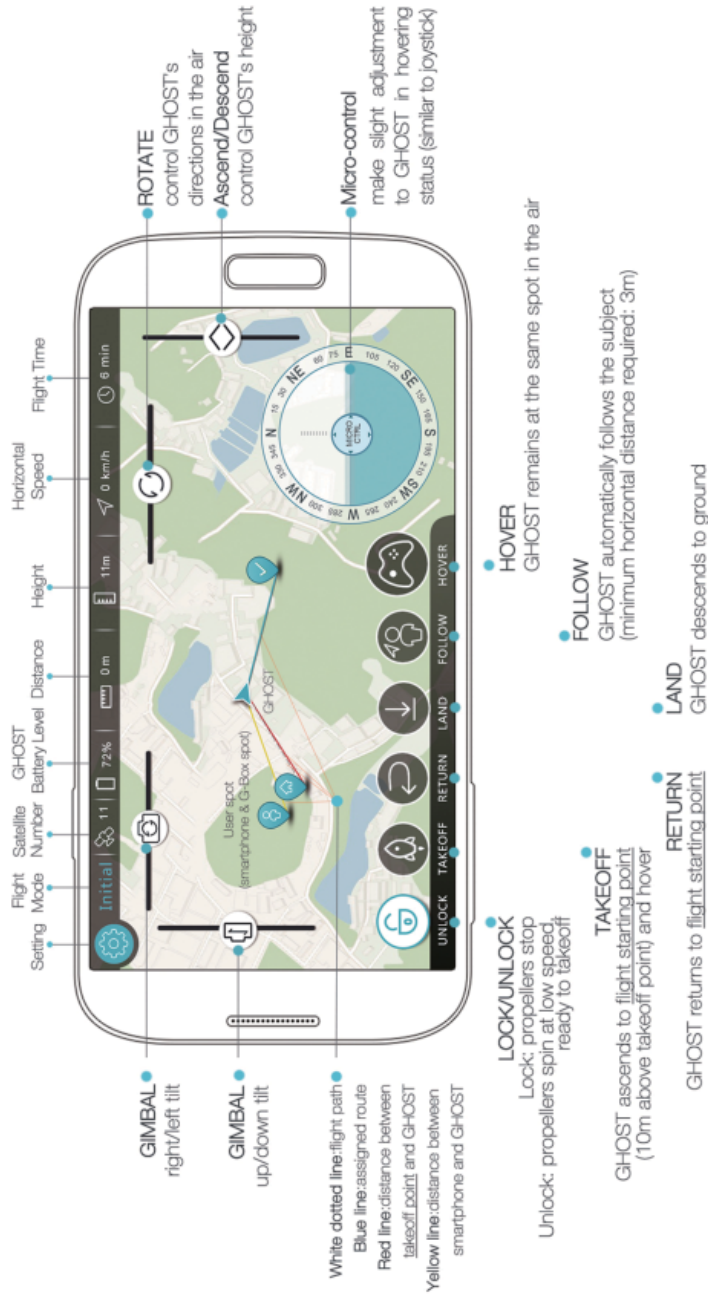


-  Notice: If you choose incorrect settings, you will see warning “Not available”. In such case, tap “CONFIRM” and reset.





# GHOST APP INTERFACE

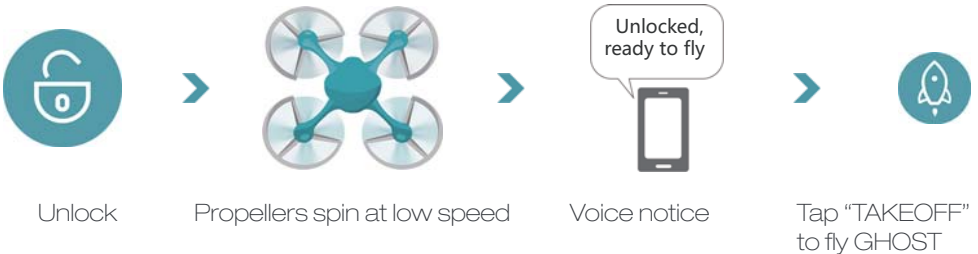


**Notice:** Flight starting point: 10m above the takeoff point

The map above is for indicative purpose only. The actual map may differ. Buttons can't be used when in grey.

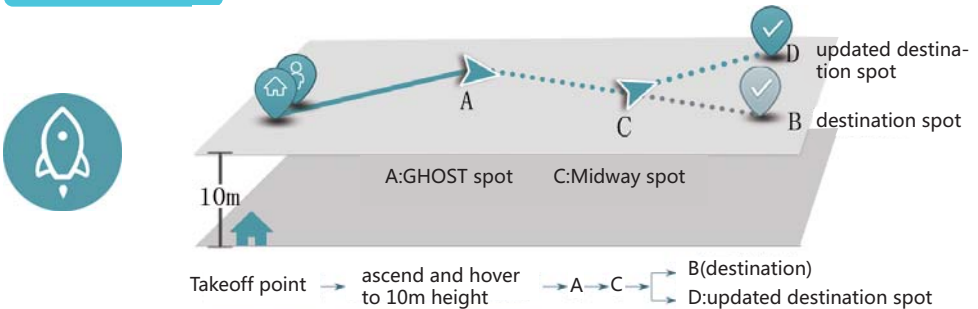
# GHOST APP Function

## 1.Unlock



- GHOST will beep if flight command is not received in three minutes and thirty seconds. This is a normal notice. You can tap "UNLOCK" and "TAKE-OFF" to fly GHOST or unplug the battery to extinguish this notice.

## 2.Takeoff



- When satellite reaches 6 or above, GHOST can take off normally. When user's smartphone connects to Internet, the interface will display the positions of user and GHOST on the GPS map.
- See picture above: A is GHOST's spot. Click any destination (B) on the map to direct GHOST to B (from A to C to B). If the destination is updated in midway, GHOST will fly from current spot C to the updated destination D (from A to C to D).

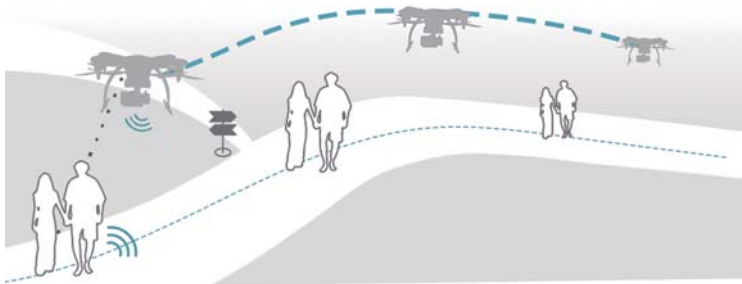
## 3.Hover



- Tapping "Hover" in any status will terminate the previous command and keep GHOST hovering.
- Ascend/Descend is not available during flight.
- Estimate the height of barriers to avoid crashing.
- Micro-control is available only in hovering status.

# GHOST APP Function

## 4.Follow



Tap "FOLLOW" to keep GHOST following you wherever you go and recording every amazing moment!

- GPS on smartphone is required to activate this feature.
- Available only in HOVERING status.
- At minimum 3m (up to smartphone GPS accuracy) horizontal distance from the user (smartphone and G-Box), GHOST begins to follow the user automatically. The farther apart GHOST is from the user, the faster GHOST flies (maximum speed: 49mph).
- To stop, user should lower his/her pace gradually. Do not stop immediately (or GHOST will fly over the user at high speed as it has no brakes). To terminate auto following, tap any available button on screen.
- Investigate surroundings before using auto following (GHOST cannot automatically dodge).
- While climbing, adjust GHOST's height accordingly (GHOST cannot automatically adjust height). It is recommended to fly GHOST at a height higher than the user.

## 5.Return

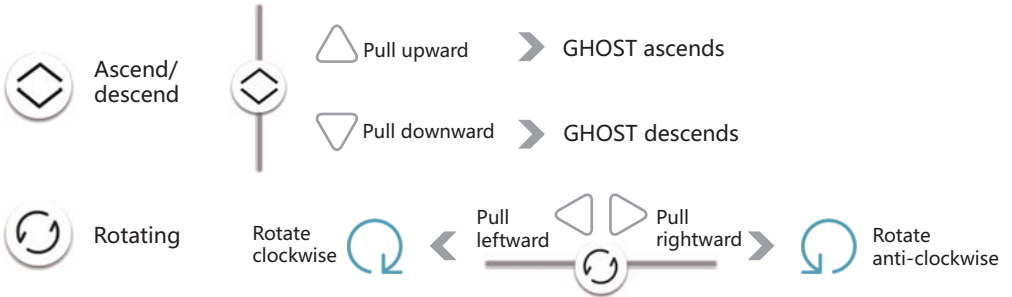


- 1  $\geq 15m$   
GHOST directly returns.
- 2  $\leq 15m$   
GHOST 2.scends to 15m and returns .

- Two situations of return: GHOST's height is over 15m; GHOST's height is less than 15m.
- Heights in this illustration are the vertical distance above takeoff point.



# GHOST APP Functions and How to Use GHOST APP

## 6.Ascend/Descend/ Rotating




Height control is only accessible in hovering status. During flight, the height control bar is hidden on right side of the APP interface.

## 7.Follow

-  Horizontal sidebar: Gimbal tilts right and left (no automatic reposition after release)
-  Vertical sidebar: Gimbal tilts upward and downward (no automatic reposition after release)

## 8.Land

-  GHOST locks automatically five seconds after landing.

## 9.Micro-control

-  Micro-control enables accurate landing.



GHOST will move horizontally. Red lights mark the front, blue lights mark the rear. Drag the virtual compass to the destination spot and release to direct GHOST to the destination.

# Flight

After installation is completed, choose a proper environment for flight based on the following standards.

## 1.Flight Environment

- 1.1 GHOST might experience errors due to poor signal when flying too high or in an environment with dense buildings. It is suggested that you choose an open area to fly GHOST to reduce drifting mistake.
- 1.2 Please stay away from barriers, crowds, high-tension lines, trees and water.
- 1.3 Do not fly GHOST in restricted airspace as stipulated by laws and regulations.
- 1.4 Please stay over 200m away from complex electromagnetic environment (such as a place with a signal tower or base station) in case of takeoff failure or crash due to intense electromagnetic interference (EMI).
- 1.5 Do not fly GHOST in extreme weather including high temperature, snow, strong wind (over scale 5) and heavy fog.

## 2.Pre-flight Examination

- 2.1 Check whether G-Box and battery are fully charged.
  - 2.2 Check whether propellers are installed correctly.
  - 2.3 Check whether motor starts normally after unlocking.
- Please contact EHang dealers or customer service in case of any trouble during installation or use.

## 3.Flight Safety

- 3.1 Make sure that there is a minimal of 5m distance between you and GHOST. Please stay away from dangerous obstacles such as barriers, crowds and high-tension lines. Please be a responsible flyer.
- 3.2 During the flight, keep GHOST within your sight to avoid accidents caused by oversight of surroundings.
- 3.3 Children must be accompanied by professionals when operating GHOST.
- 3.4 GHOST aerial must operate without prop guards and equipped with landing gear; put GHOST upside down on a cotton cloth to avoid scratching.

# Flight

## 4. Caution during Flight

- 4.1 Limit the distance between G-Box and the smartphone to 5m or less (holding in hand is recommended). Communication will lose beyond the limited distance.
- 4.2 Ascend/Descend is only accessible in hovering status. During flight, the Ascend/Descend signal is hidden on the right side of APP interface. Height control is only accessible in hovering status. During flight, the height control bar is hidden on right side of the APP interface.
- 4.3 It is normal for the battery level to rise again after landing. It is not advisable to launch your GHOST when battery level is less than 30%. It is best to fly GHOST with a fully charged battery.
- 4.4 Please tap "HOVER" immediately in times of emergency. If GHOST fails to hover, please ensure your own safety before attending to GHOST.

## 5. After-sales

- 5.1 GHOST products are guaranteed by after-sales service (please see details on after-sales card).
- 5.2 Visit our website: [www.ghost-drone.com](http://www.ghost-drone.com) to learn more about APP updates, newsletters, product development progress and after-sales service. EHANG will be at your service.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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 to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The device meets RF Exposure requirements without any restriction.

