

# Pilot One Documentation

—— v5.3.0



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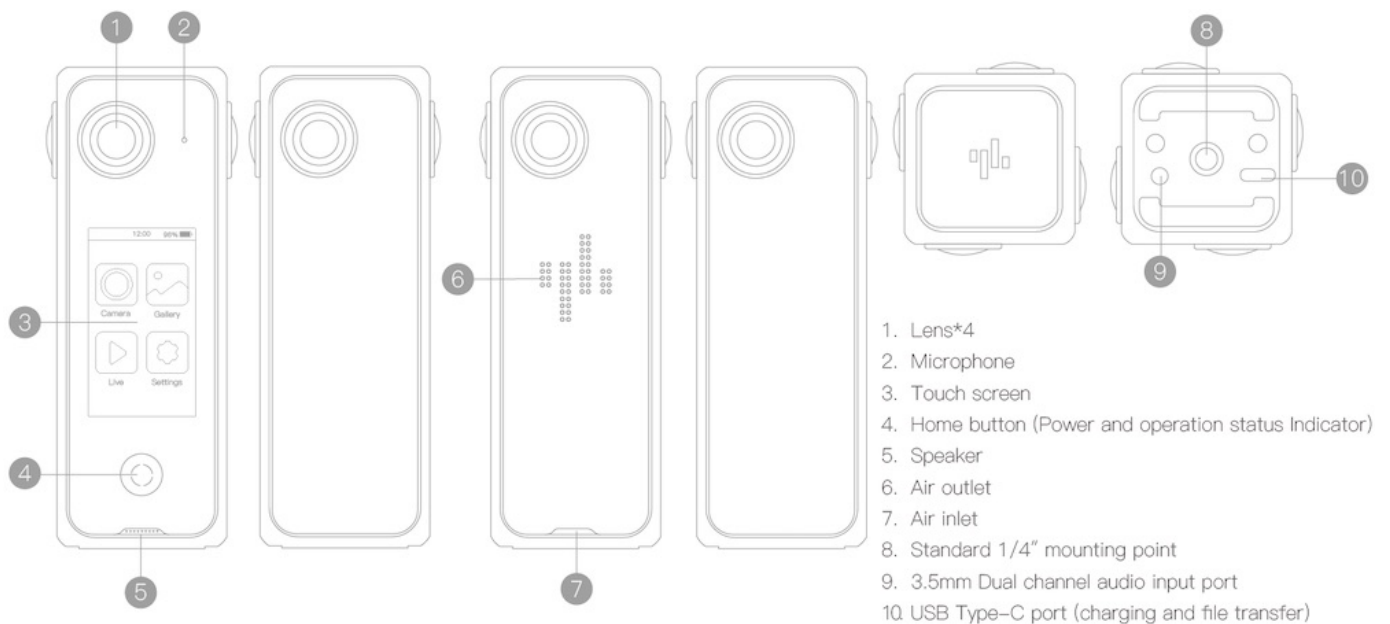
## Getting Started

The Pilot One is a 4-lens, 360-degree panoramic camera with 8K resolution for both photos and videos; the camera can stitch everything by itself, with no computer required. With a touch screen, what you see is what you get, with a simple experience like a mobile phone.

## Hardware Introduction

### Pilot One Camera

The various components and buttons on the camera body are as follows:



### GPS Dock

Pilot One does not have a built-in GPS module. We provide an external GPS Dock that can provide GPS signals for Pilot One.



**The USB Type-C port on the Dock is for power supply.**

**You can NOT access the internal camera storage by connecting the camera+Dock to a computer. To access the camera storage from a computer, do not use the Dock.**

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## Basic operation

Press and hold the Home button for 3 seconds to power on.

Tap each app icon to open the app;

In the application, press the Home button to return to the home screen;

Press and hold the Home button for 1 second to turn off the screen.

Press and hold the Home button for 3 seconds to power off.

**After entering each settings interface in the app, slide your finger from the left side to the right side of the screen to go back.**

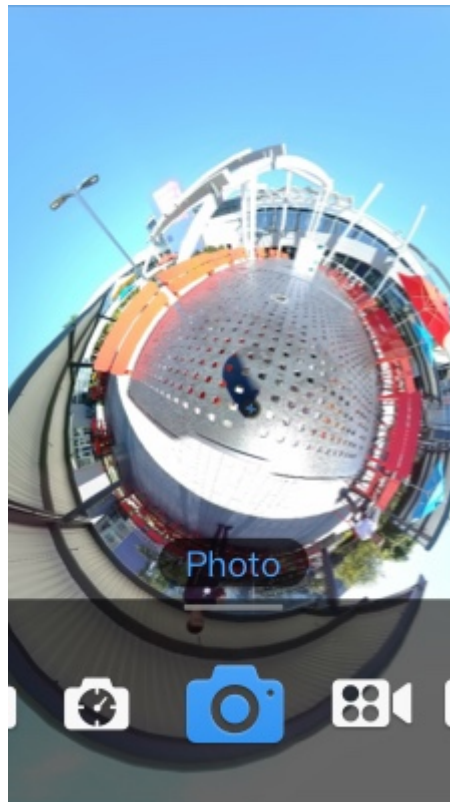
## Camera

The **Camera** is used to take 360 panoramic photos, videos and PilotTours.

The camera preview is automatically turned on when the **Camera** app is opened. Double-tap anywhere on the screen to change the preview mode. Preview modes are: Little Planet, Equirectangular, Fisheye, Rectilinear.

Default is the photo mode, tap the icon in the lower left corner, slide to change the shooting mode, the selectable modes are: Photo, Unstitched video, Stitched video, Time Lapse, PilotTour, Google Street View Video.

The lower right corner is the setting button for the current mode.



In Photo mode, The **HDR** button above the preview allows you to turn on the HDR function to improve the exposure quality of your photos.

## Camera Settings

Tap the Settings



button in the lower right corner of the camera to enter the photo/video settings UI. If it is in Photo mode, it is displayed as the photo setting; if it is currently in the video mode, it is displayed as the video setting.

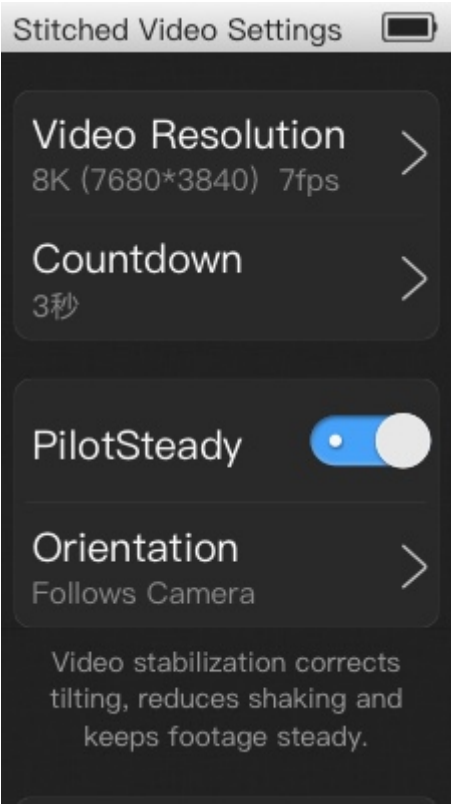
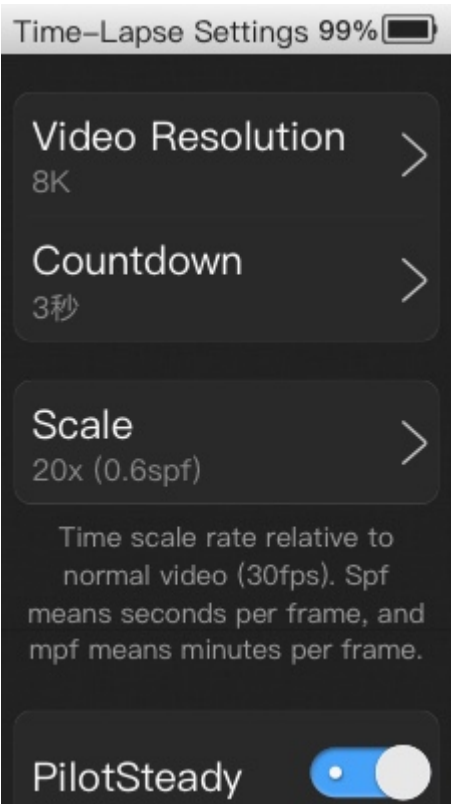
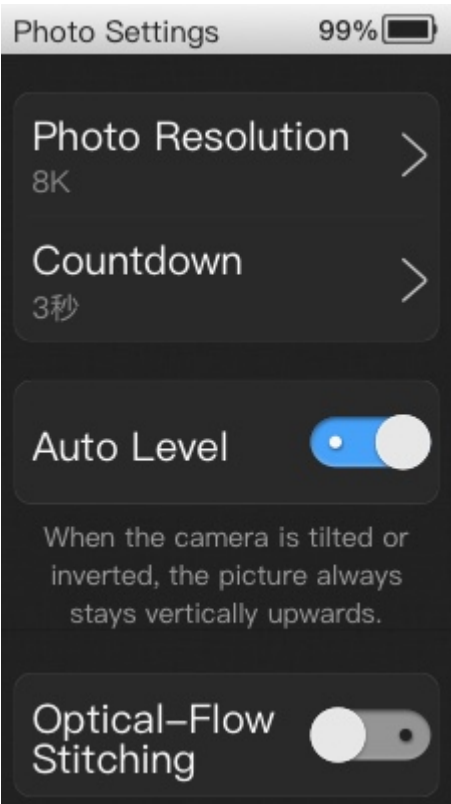


Photo settings include Resolution, Countdown, and Auto Level.

Unstitched Video settings include Resolution, Countdown, and PilotSteady. Recording produces unstitched video. The video can be stitched in the gallery, after the shot is finished. Stitched Video settings include Resolution, Countdown, and PilotSteady. Recording produces real-time stitched video.

Time Lapse settings include Resolution, Countdown, Scale Rate and PilotSteady.

Google Street View Video settings include Frame Rate, Countdown.

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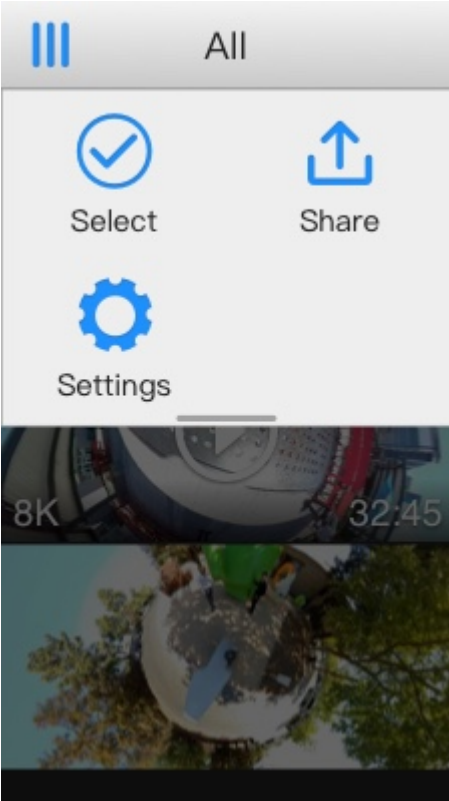
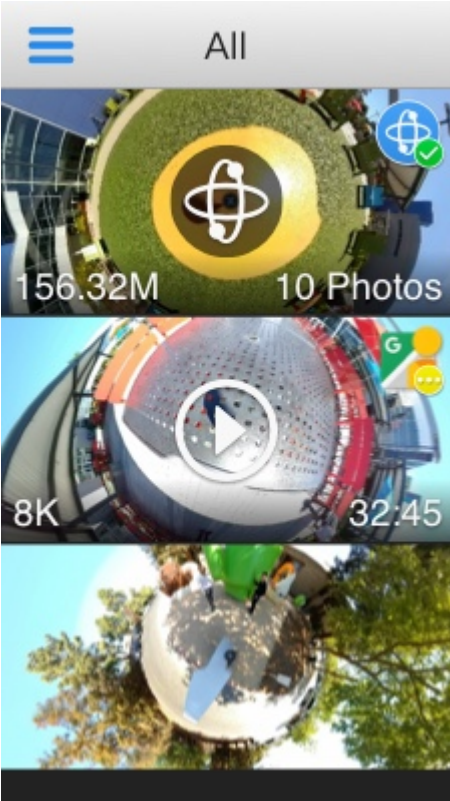
## Gallery

**Gallery** is used to view and manage photos and videos within the camera.

After entering the Gallery, Tap



or pull down the top bar to display options for selecting, sharing and setting. You can select multiple photos and delete them in batches. The photos are arranged in reverse order of shooting time.





Tap a photo/video to enter playback view. In playback view, double-tap the screen or tap the icon in the upper right corner to switch the view mode. View modes include: Little Planet, Equirectangular, Fisheye, and Rectilinear.

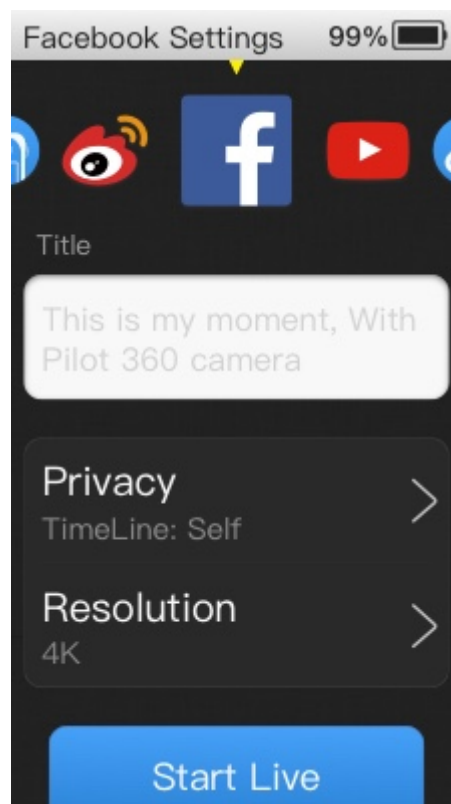
Tap the round arrows on the middle of the playback view to switch to the previous/next photo. The menu bar below has delete and view details. 8K photos can also be uploaded to Google Street View.

## Live Streaming

Pilot One's built-in Live app allows for panoramic live streaming on multiple platforms. Including: Facebook, YouTube, Weibo, RTMP server, and Self streaming in LAN.

In the Live, tap the LIVE button to enter the live broadcast platform selection. Tap the icon to select the platform, or swipe the icon to select the platform.

After each platform is authorized to sign in, set the title, definition, and privacy.



Tap to **Start Live** and enter the live broadcast status. The live time, current platform, and current definition are displayed in the UI.

Pilot supports multiple networks, including Ethernet, WiFi, and LTE. Choose the definition of the right live broadcast based on your network.

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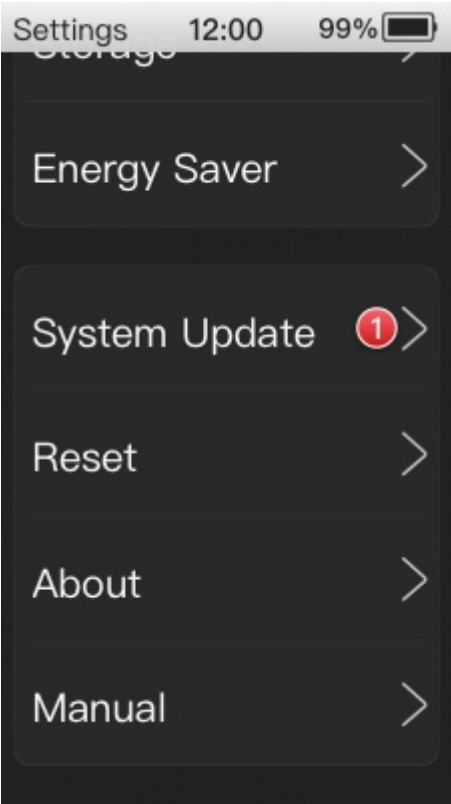
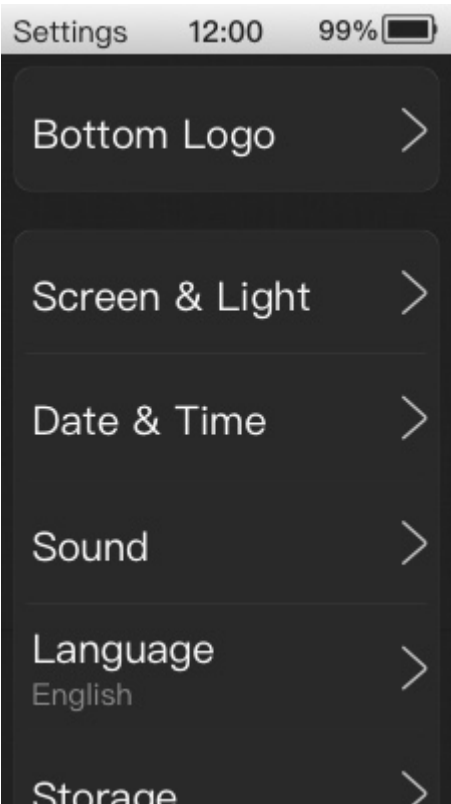
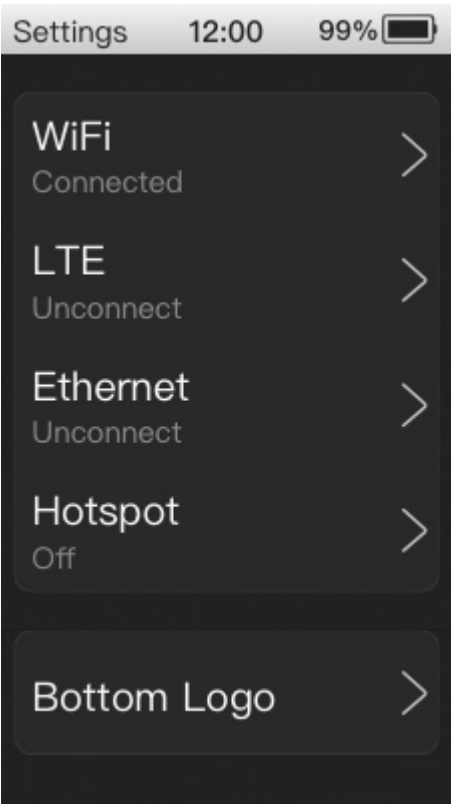
## Settings

Setting the networks of Pilot, system options, software information, etc.

Pilot supports multiple networks, including Ethernet, WiFi, and LTE. The Ethernet and LTE need to be connected to the Dock, and the network cable and SIM card are inserted into the Dock.

In **About** – **Device Name** The name of the Pilot can be modified. You will see this name when the Mobile app connects to the Pilot or creates a hotspot.

Pilot OS can be downloaded and updated via the network. When a new version is found, the settings icon in Launcher displays the notification badge. To ensure safety and Auto Level, please update the Pilot OS in time.



## Mobile Control

Pilot Go can remotely control the camera and view even manage Gallery.

Download the official mobile app: [Pilot Go](#)



After installing Pilot Go, make sure the phone and Pilot are in the same wireless network.

1. Connect an identical WiFi;
2. Pilot builds a hotspot and the phone connects Pilot hotspots;

**In the same WiFi**, Pilot Go also supports scanning QP Code in Pilot

[Settings](#) - [About](#) - [Device Name](#) , directly connected to the Pilot.

After the Pilot Go is connected to the Pilot, you can control the camera via the app.



Tap **Gallery** in Pilot Go to view and manage the Gallery of Pilot. You can download photos from your Pilot to your phone and share to social platforms.

## Mobile control Pilot shooting

After the Pilot Go is connected to the Pilot, the screen of the Pilot picture on the main interface will light up and there will be a prompt sound. Tap **Enter Pilot** in Pilot Go to control Pilot One. When the Pilot is controlled, the screen will display “Mobile Control...” .

Control camera photos and videos in Pilot Go, the interface and operation are same as Pilot.



## Mobile management photos in Pilot

Tap the



icon of Pilot Go to view and manage the Pilot One Gallery. You can select and delete photos/videos, or you can download photos/videos to your phone locally.

The top left corner of the photo/video cover has a badge to indicate the current state:



: Already downloaded to the phone. After disconnecting from Pilot, you can still view, delete, and share.



: Downloading. Blue is the download progress.



: The phone cannot be viewed. This is usually because the video size is too large or unstitched.



## Share to social media

Pilot Go can share panoramic photos/videos to various social platforms.

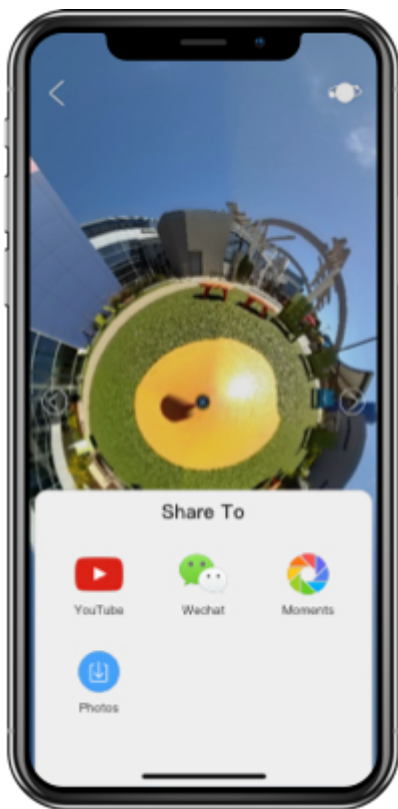
Open a photo/video in the **Gallery** and tap the Share  button below. After

choosing a social platform, you can share it.

Currently supported platforms are:

Photo: Weibo, WeChat, mobile photo album.

Video: YouTube, WeChat, mobile photo album.



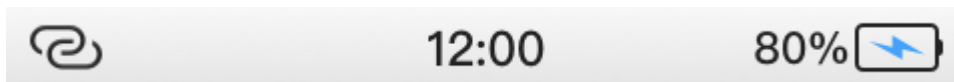
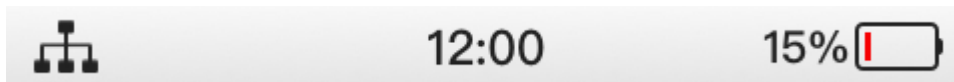
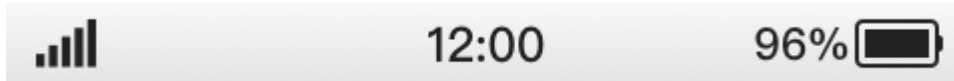
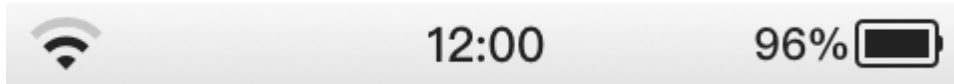
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## Connect Network

Pilot One supports a variety of networks, including: WiFi, LTE, Ethernet. When three types of networks exist at the same time, the Ethernet is preferred, then WiFi, and finally LTE.



When connected to the network, the current network type is displayed in the upper left corner of the system top bar.



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## WiFi

The process of connecting the WiFi is the same as that of the mobile phone. Open **Settings** - **WiFi** , enable WiFi, and select a WiFi to connect.

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## LTE

The Pilot **Dock** is required to connect the LTE network. Insert the LTE SIM card into the slot of the **Dock** and connect the **Dock** to the Pilot camera. Wait a moment, then you can use the LTE network.

Open the **Settings** app. If you have connected to LTE, the **LTE** option in the menu will be displayed as **Connected** , otherwise it will be displayed as **No SIM Card** . If the **No SIM Card** is displayed all the time, please check if the SIM card in the **Dock** is plugged in.

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## Ethernet

The Pilot **Dock** is required to connect to a Ethernet. Plug the cable into the **Dock** and connect the **Dock** to the Pilot camera. Wait a moment, you can use the Ethernet.

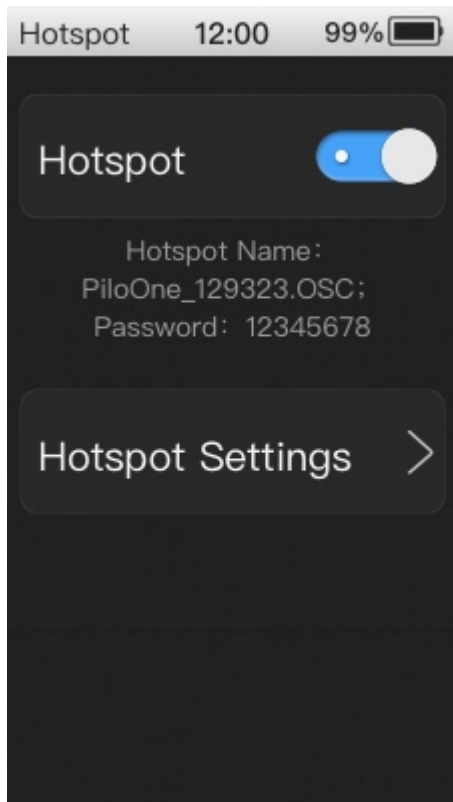
Open the **Settings** app. If you are connected to a Ethernet, the **Ethernet** option in the menu will appear as **Connected** , otherwise it will appear as **Unconnected** . If the **Unconnected** is displayed all the time, please check if the network cable in the **Dock** is plugged in.

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## Hotspot

Pilot can make its own wifi hotspot. Go to **Settings** - **Hotspot** , and open the hotspot. The system will create a hotspot, the default password is: 12345678. You can change your password in the **Hotspot Settings** .

WiFi will be automatically disabled when the Hotspot is turned on. When there is a LTE or Ethernet, Pilot will create hotspot based on LTE or Ethernet. This way the Pilot and the devices connected to the Pilot hotspot can access the Internet. When connecting LTE and Ethernet at the same time, Pilot will use the Ethernet to create a hotspot.



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## Connecting to a computer

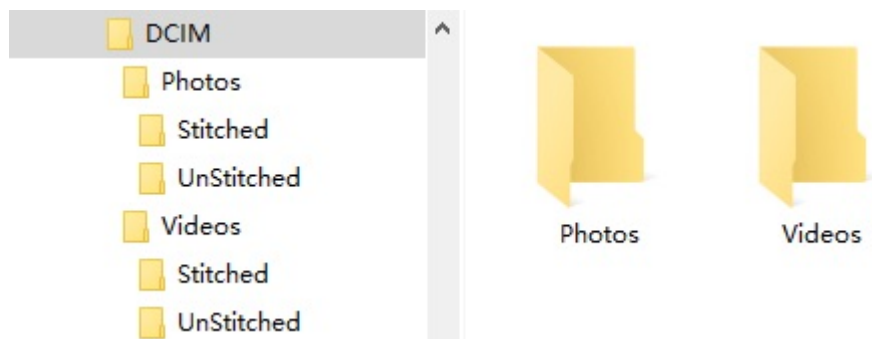
The Pilot can be connected to a computer to copy files. Pilot supports Windows PC and Mac.

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### Windows PC

Connect the Pilot to your Windows computer using the included Type-C cable. An external hard drive called “Pilot One” will appear in My Computer. This hard drive is the internal file of Pilot.

The storage path for photos and videos is `DCIM`, and there are two folders `Stitched` and `Unstitched` in the photo and video folders. `Stitched` stores stitched files; `Unstitched` stores unstitched fisheye files, and fisheye files can be post-processed with tools on the PC.



## Mac

Connecting a Mac to Pilot requires third-party tool: [OpenMTP](#) or [Android File Transfer](#)

[OpenMTP](#) is a free and open source transfer tool with no restrictions on file size.

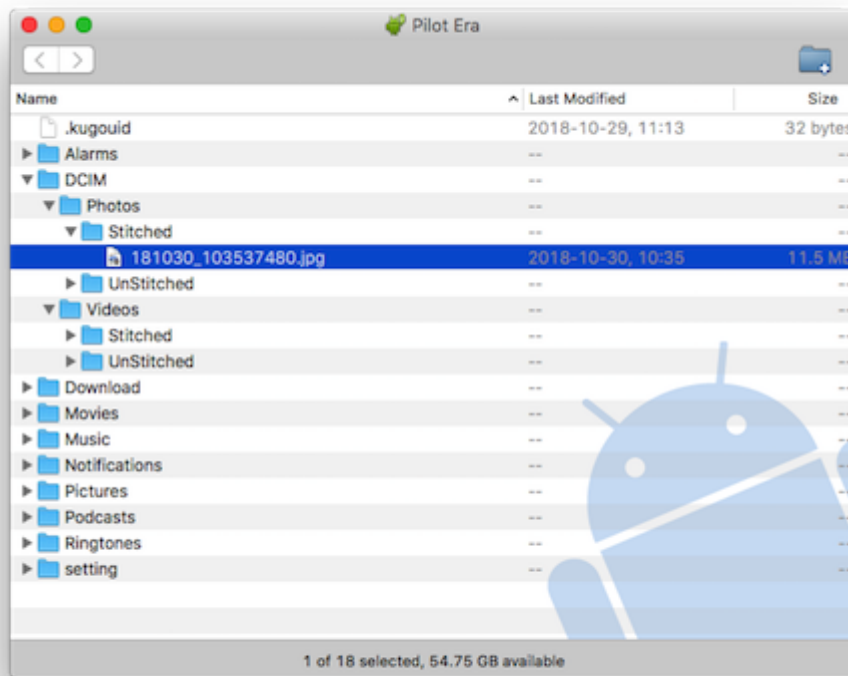


If the file size does not exceed 4GB, you can also choose [Android File Transfer](#). It's a free, lightweight transfer tool that's quick and easy to use.




Connect the Pilot to your Mac using the included Type-C cable. Open OpenMTP or Android File Transfer and it will automatically connect to and open the files inside Pilot.

The storage path for photos and videos is **DCIM**, and there are two folders **Stitched** and **Unstitched** in the photo and video folders. **Stitched** stores stitched files; **Unstitched** stores unstitched fisheye files, and fisheye files can be post-processed with tools on the Mac.



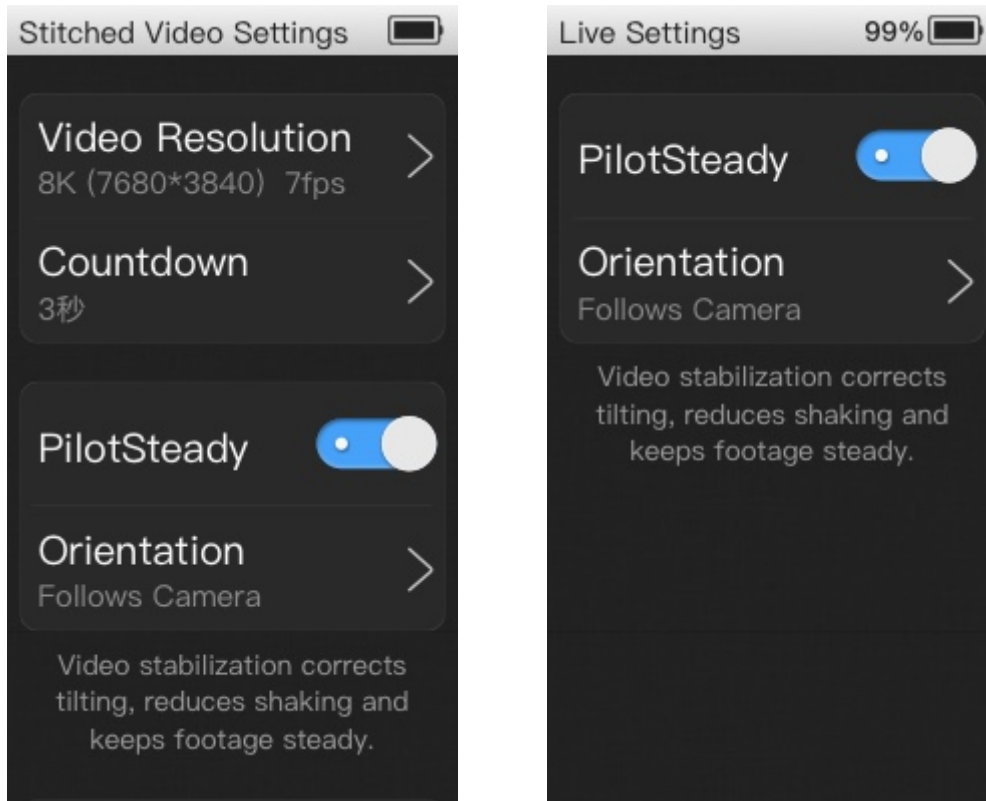
## PilotSteady

PilotSteady is a technology that keeps video footage stable and reduces shake. Turning this feature on when shooting a sports scene or moving a live stream will have a better effect. PilotSteady is supported by the **Camera** recording RealTime stitching video and unstitched video, as well as **Live** streaming.

Enable video PilotSteady as follows: Turn on the **Camera**, select real-time stitching video or unstitched video,  - **PilotSteady**, turn on .

Enable live streaming PilotSteady as follows: Turn on **Live** streaming -  -

**PilotSteady**, turn on.



PilotSteady has two orientations: Fixed, Follows Camera.

If you choose Fixed, the orientation of picture is always fixed regardless of how camera rotates or moves. If you choose to Follows Camera, the orientation of picture will change with camera.

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## Professional Mode

For professional photographers, Pilot offers a professional mode. You can adjust more parameters when taking photos and videos.

There is a Pro button



in the upper right corner of preview to turn the professional photo mode on and off. When the professional photo mode is turned on, ExposureTime/ISO/EV/WB/StitchingFocus can be adjusted in the preview.

Photo mode support : ExposureTime, ISO, EV, WB, StitchingFocus, HDR.

Video mode support : ISO, EV, StitchingFocus.



## HDR

The HDR switch is directly above the preview. Tap **HDR** to turn HDR on and off. HDR generated photos with lighter and darker details.

When shooting in HDR, 3 shutter sounds will sound. During this time, try to keep the camera stable and do not move objects, otherwise the image will be blurred. The time to generate a photo after turning on HDR is longer than the normal mode.

Pilot supports several HDR modes: Auto, Sunny, Cloudy, Indoor. The default is Auto mode. In a specific scene, if the Auto mode is overexposed, choose the HDR mode corresponding to the scene - the result may be better.

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## ExposureTime (S)

ExposureTime can be set to: Auto, 1/3200, 1/1000, 1/500, 1/100, 1/50, 1/15.

When the ExposureTime is set to Auto, the icon has the word "Auto";

When the ExposureTime is set to non-Auto, the icon does not have the word "Auto". **The ISO adjustment range is now larger and EV are not available.**

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## ISO

When ExposureTime is Auto, the ISO can be set to: Auto, 50, 100, 200, 400, 800, 1600.

When ExposureTime is manually, the ISO can be set to: 100, 200, 600, 800, 1600, 3200.

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## EV

EV is used to adjust the exposure brightness of the picture. It can be set between -4 and 4.

**When ExposureTime is manually, the EV is invalid and cannot be adjusted.**

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## WhiteBalance (WB)

WhiteBalance is used to adjust the hue of the picture. Pilot supports settings: Auto, Sunlight, Cloudy, Incandescent, Fluorescent.



## Improve stitching effect

In an indoor environment, objects in the scene are closer to the camera lens; In an outdoor environment, objects in the scene are farther away from the camera. The difference in scenes requires setting the stitching parameters to achieve the best stitching effect.

In order to adapt to different scenes, Pilot can adjust the **Stitching Focus**. Open the **Camera** -



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to adjust the stitching focus and see the changes in the stitching effect

in real time.



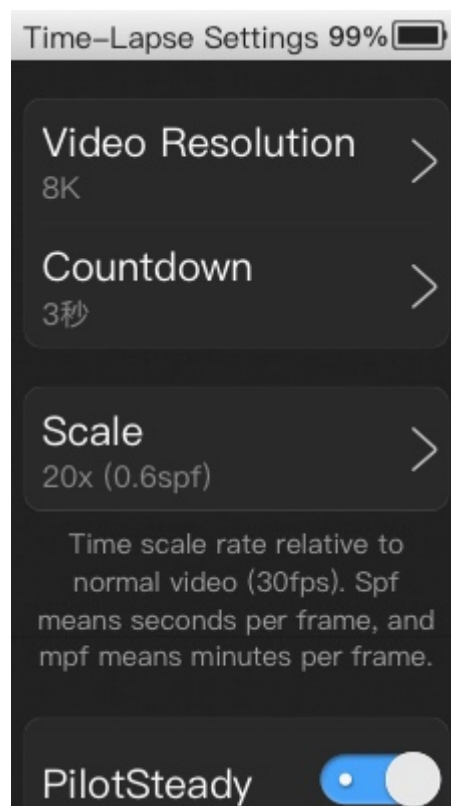
## Time Lapse Photography

Pilot supports Time Lapse mode. Turn on the **Camera** , adjust to the Time Lapse mode, and the icon  lights up.

Normal video records 30 frames per second, and if you want to reduce the time by 10 times, then record 3 frames per second. That is, 0.33 second per frame. You can select time **Scale Rate** in the Time Lapse settings. Pilot offers up to 10 Scale Rates to choose: 10x, 20x, 50x, 100x, 200x, 500x, 1000x, 2000x, 5000x, 10000x.

When recording, the screen displays the recording time and the length of the actual video. The recording button has a blue progress bar that rotates, and one revolution per turn indicates that one frame has been recorded.

Time-lapse photography will eventually generate a real-time stitched 30fps video.



## In-camera stitching videos

The original fisheye video recorded by Pilot can be stitched directly in the Gallery. The original fisheye video has a



badge in the upper right corner of the cover.

In the original fisheye video playback interface, tap the



button to start stitching. The stitching time is generally twice the length of the original video. The original fisheye video playback interface in the stitching will show the progress, and there is also a progress prompt on the cover of the photo list. The video in the stitching cannot be deleted. Pause the stitching or stitching is completed, it can be deleted.




When the Pilot enters the Camera, Live, Gallery play video, etc., the video stitching will pause. It is recommended to stitching the fisheye videos when idle.

**Note that when the video stitching is started, the photo stitching will be paused. After the video stitching or video stitching is paused, the photo stitching will continue automatically.**

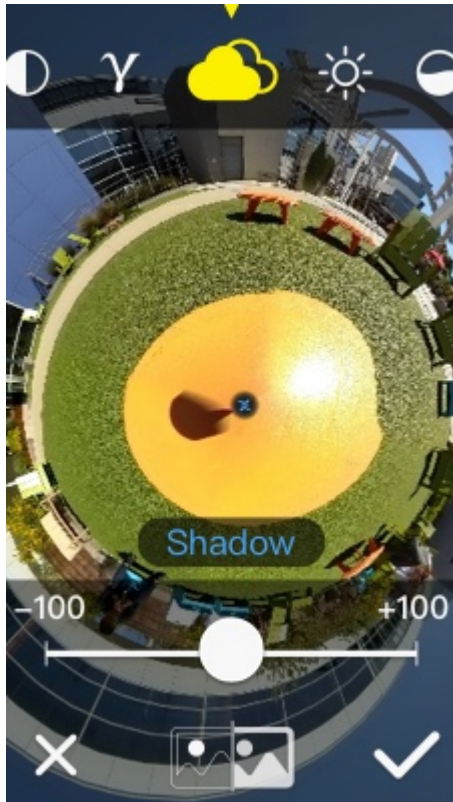
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## Adjust Photos (beta)

Pilot supports editing the effects of photos in Gallery.

Open a photo, tap the  button on the bottom right, and select **Adjust Photo** to enter adjust mode.

You can adjust the Brightness, Gamma, Shadow, Highlight, Saturation and Temperature of your photos. After the adjustment is complete, tap Finish to save to the photo.



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## PilotTour

Pilot comes with a high-precision positioning algorithm, which is based on vSLAM + IMU and can calculate the camera's own trajectory and position.


PilotTour is based on the positioning algorithm, taking a series of photos, and then generating a tour effect.

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## Shooting PilotTour

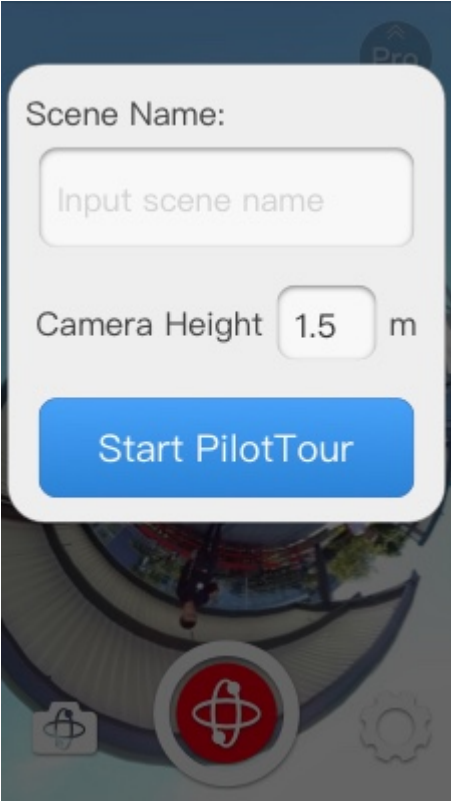
**Before shooting, make sure that the ambient light is bright enough and the scene is rich enough. A dark environment, an open environment, or a monotonous picture environment will reduce the positioning accuracy.**

Open **Camera** and select the shooting mode. Swipe to the far left and  light up,


indicating that you have entered PilotTour mode. Tap  to start shooting . Input a scene name and the height of Pilot from ground, then the calibration prompt box will pop up.

Tour Calibration is the process by which the program recognizes the surrounding environment to calculate the position. Please move the camera slowly up, down, back, forth, left, and right. The movement range is preferably greater than 50cm. After 3 ~ 5 seconds, the prompt will disappear automatically. If the calibration prompt box does not disappear, it means calibration has not been completed, usually because the scene facing the camera is single or too empty. You can continue to move the camera up, down, back, forth, left, or right in another direction. Or stop calibration, and start roaming again in another place.






After the calibration, you can take pictures. Taking a picture, move the camera to the next position and continue taking pictures. **Do not move too fast, otherwise it will affect the positioning accuracy, please control within 2m / s.**


Click  to stop shooting. A PilotTour file will be generated in **Gallery**, which can be uploaded to PilotTour Server.

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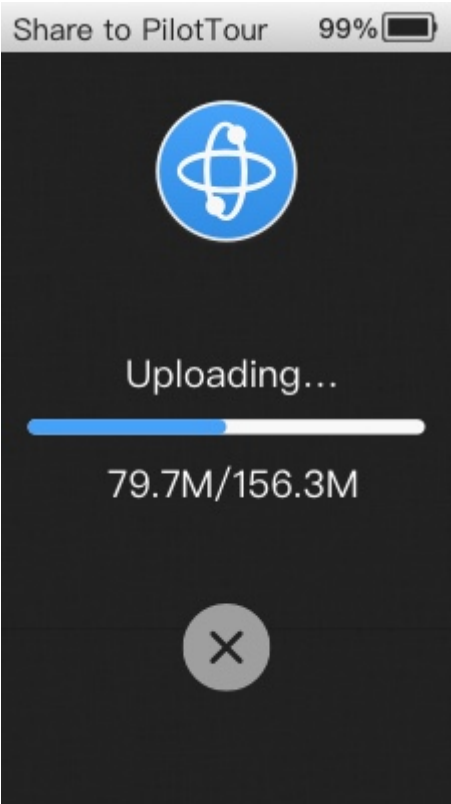
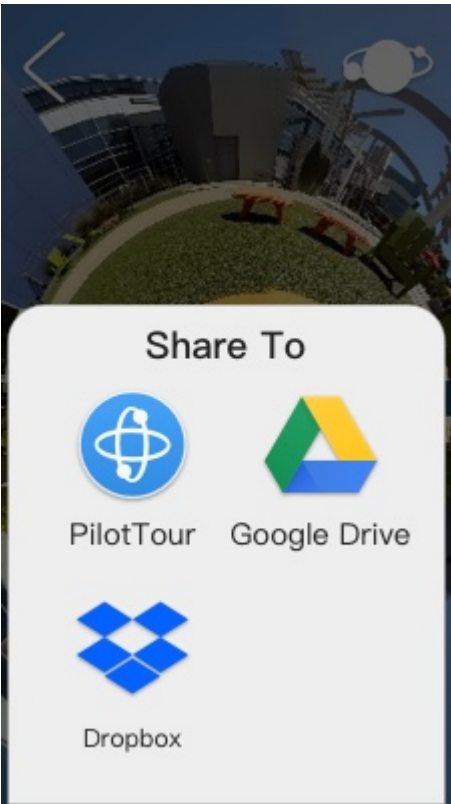
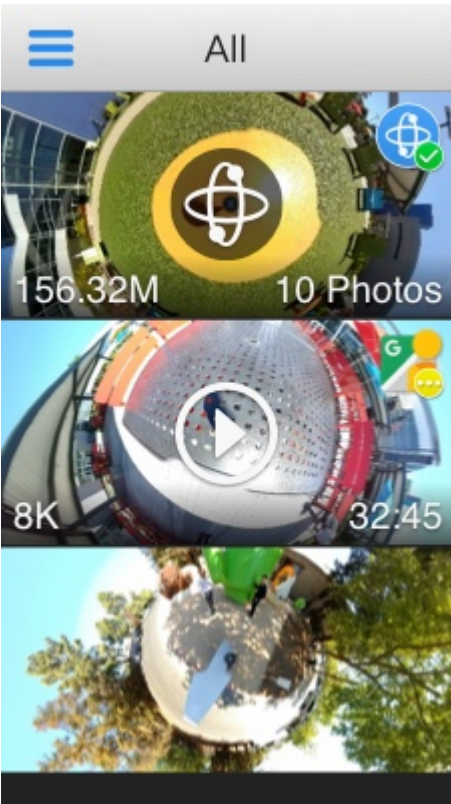
## Upload PilotTour

Before uploading PilotTour, please make sure you have registered Pilot ID. If you have not, please open this link <https://accounts.labpano.com/reg>.

Open the **Gallery**, and PilotTour files are marked  in the photo list. Open the

PilotTour file, touch the upload button , and choose to PilotTour. After sign in to Pilot ID, you can upload to PilotTour server.





Supports breakpoint resume when uploading roaming files. If the upload process interrupts the network or cancels the upload, the progress will be automatically saved, and the upload will start from the saved progress next time.



After the upload is complete, PilotTour Server will take a while to analyze and processing, It will take 5-6 seconds per photo. After the processing is completed, the corner mark turns green.

## View PilotTour

After PilotTour file is uploaded, you can view the PilotTour on the official website or Pilot Go app.

## View on Webside

Please sign in to the PilotTour webside <https://accounts.labpano.com/login>. The page will display all your PilotTour lists. The processed PilotTours can be viewed and shared.

Click  to view, click  to share the link, you can also embed the link in your own webpage.

Scene	Photo Num	Upload Time	Status	Operations
 booth	14	2020-01-09 10:36:32	Done	  


☒ Link

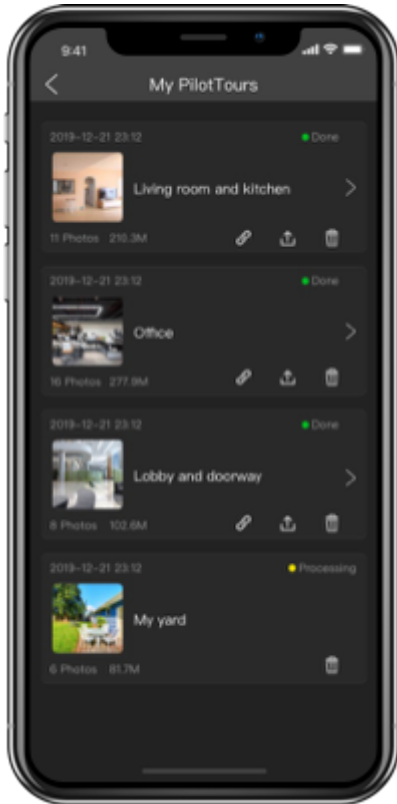
☐ Embed

<http://tour.labpano.com/pano/2001095e1691ad73371028389308>

Copy Link

## View on Pilot Go

**Pilot Go** app can also view PilotTour. Open **Pilot Go** -  - **My PilotTour**, you can view and manage all your scenes.



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## Taking Google Street View

Pilot supports taking Google Street View photos/videos and uploading them directly.

**Pilot One does not have a built-in GPS module, please plug in the GPS Dock before shooting Google Street View.**

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## Take a photo of Street View

In the photo mode, there is a GPS icon



in the upper left corner of the preview. The icon lights up to indicate that there is a GPS signal, and the icon is off indicating that there is no GPS signal currently.

Google Street View photos require 8K resolution with GPS information. So first set the photo

size to 8K,  - Photo Size - 8K (8192\*4096) , and then confirm that there is currently a

GPS signal. The photos taken in this way can be used for Google Street View.

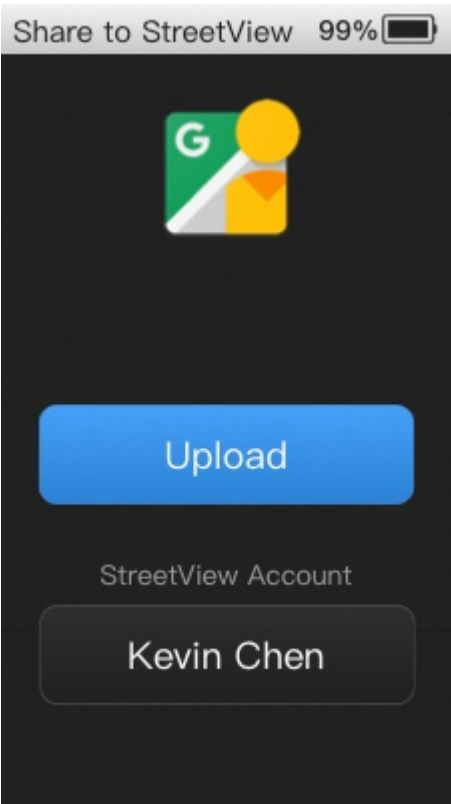
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## Upload photo to Street View

First you need to have a Google account, and make sure Pilot is connected to the internet.

Then enter the Gallery and open a stitched 8K size photo. Tap the  button below the

interface to enter the process of uploading to Google Street View. If you don't sign in to your Google account, Pilot will ask you to sign in first. After you sign in, it will start uploading photo.



Pilot supports batch uploading photos to Google Street View. In the photo list UI, Tap

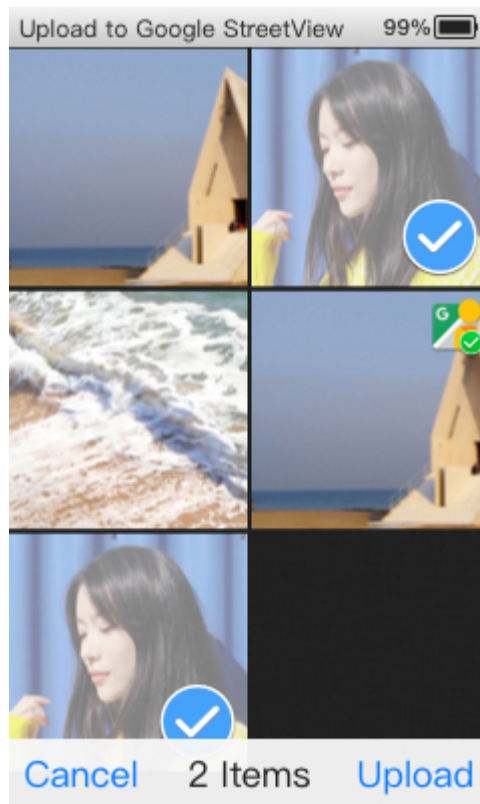
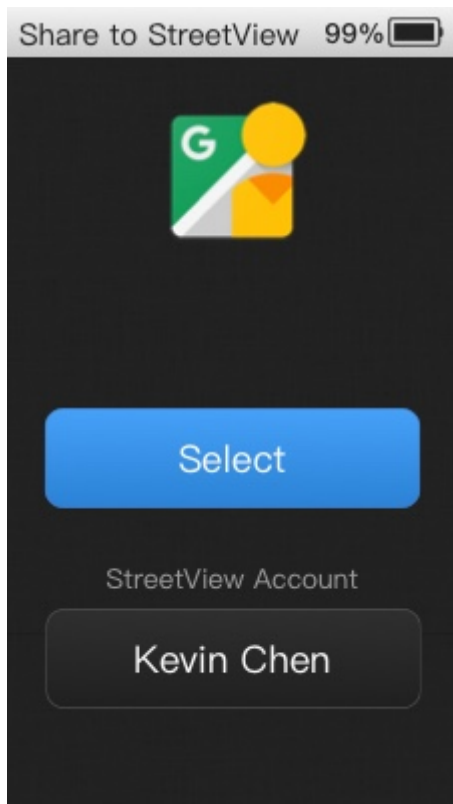


or pull down the top bar, tap the share button



, share to Google Street

View. Tap **Select**, Pilot will filter out the photos that can be uploaded, and the uploaded photos will have a Street View icon in the upper right corner. Select the photos you want to upload, and tap **Upload**.



## Take a Video of Street View

Google Street View Video is an 8K 7fps Real-Time stitching video with GPS data.

Turn on the **Camera** and turn to the recording of Google Street View Video mode, the icon



lights up.

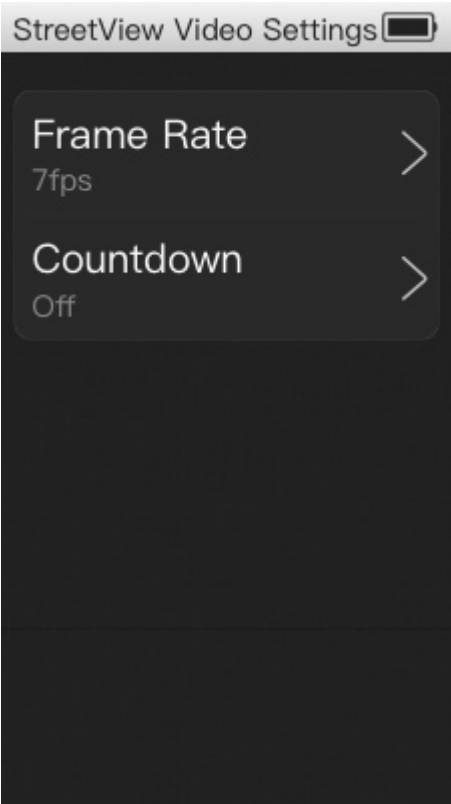
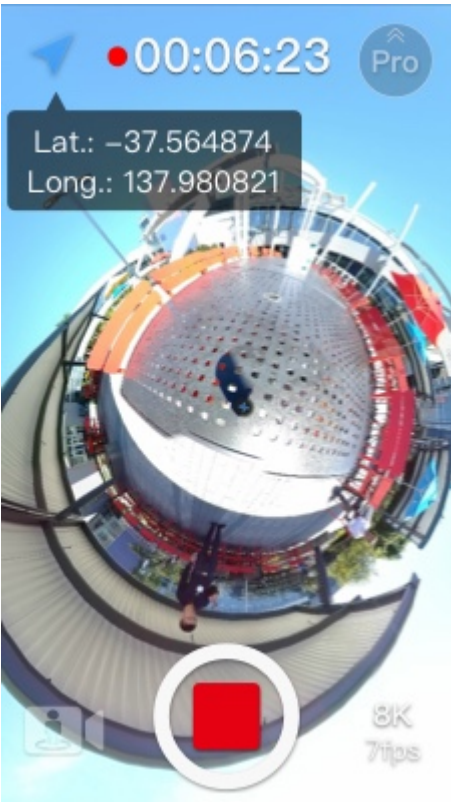
In Street View Video mode, there is a Google Street View icon directly above the preview. There is a GPS location icon



in the upper left corner of the preview. The icon lights up to indicate that there is a GPS signal, and the icon is off indicating that there is no GPS signal currently. Tap the GPS icon to pop up the latitude and longitude information. When there is a GPS signal, you can record Street View Video. The recording process is the same as normal video recording.

You can set the frame rate of Street View video. There are 7fps, 2fps, and 1fps to choose.




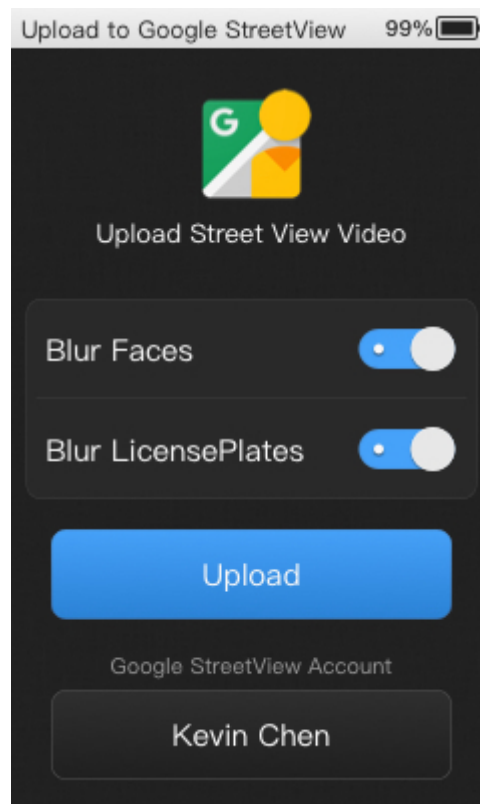


After the recording is complete, upload Video to Google Street View in the Gallery .



## Upload Video to Street View

First you need to have a Google account to make sure the Pilot is connected to the internet. Go to the **Gallery** and open a Street View Video. There is a current status icon at the top of the interface. If it is not uploaded, touch the upload button  below the interface to enter the process of uploading to Google Street View. If you are not logged in, Pilot will ask you to log in to your Google account first. You can set whether to blur the faces or license plates before uploading.



Support for resumes when uploading Street View Video. If the upload process is interrupted, the progress will be saved automatically, and the next time you start uploading from the saved progress.

After the Street View Video upload is complete, Google Street View takes a while to analyze the processed files. After processing is completed, open the Street View Video again, and the result of the file will be displayed at the top of the interface. Since Google Street View Video cannot be modified, there is no need to upload it again, regardless of success or failure.



After processing is complete, you can choose to delete it from the Street View server when deleting local Street View Video.

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## Control Pilot with Street View App

Pilot supports Google Street View App to control the shooting of Street View photos. (This is at a much lower frame rate than the in-camera 7FPS capture - it's only one photo every few seconds.)

First, open the Pilot hotspot. The hotspot name defaults to Pilot\_XXXXXXX.OSC. Then connect the mobile phone wifi to the Pilot hotspot and open the Street View app to control Pilot.

All applications that follow the [OSC](#) protocol can control Pilot like Google Street View through Pilot's hotspot connection.

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## Share

Pilot's [Gallery](#) can share photos and videos to social media. Currently supporting Street View, Google Drive, Dropbox and YouTube.

You can select a social media to share a single file by tapping the button

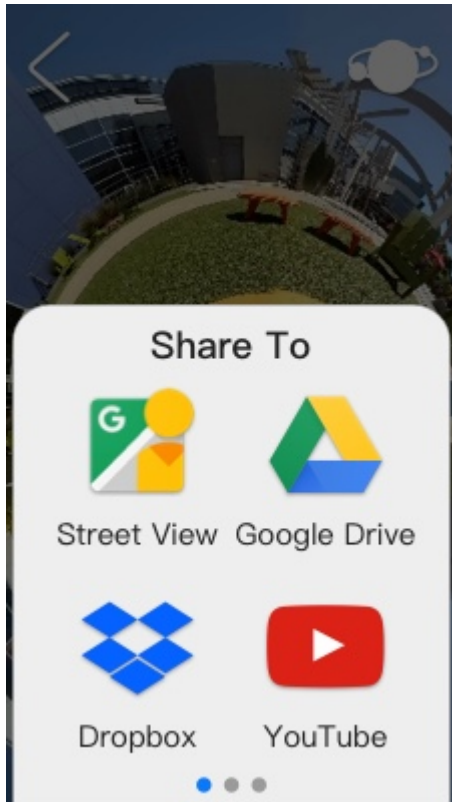


on the photo/video playback interface.

Also, on the [Gallery](#) homepage, Tap  or pull down the top bar, tap the button



below to select a social media for multiple file sharing.



## Bottom Logo

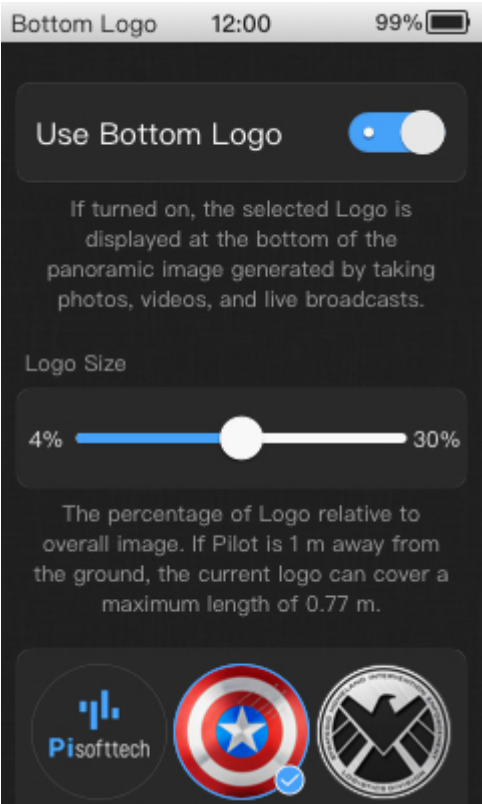
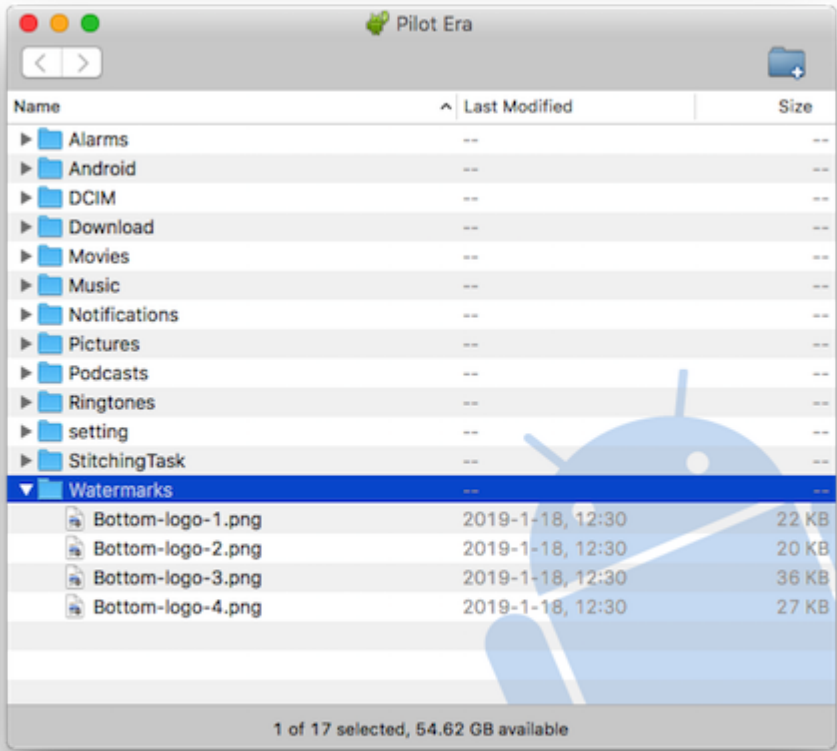
There is a dead corner at the bottom (nadir) of the panorama photo/video, which is usually covered with a blend transition or with a logo image.

The Pilot can adjust the proportion of the Logo relative to the overall image. Minimum 4%, maximum 30%. The larger the logo, the larger the area covering the bottom. If the Logo ratio is  $x$  % and the center of the Pilot lens is  $h$  meters from the ground, the formula is as follows:

$$1 \quad \text{Logo coverage length} = \tan(\pi * x/100) * h * 2$$

Pilot can choose whether to use the Logo image to cover the bottom dead corner, you can use your own Logo image to cover the bottom.

First, connect the Pilot to your computer. Copy your Logo images to the `Pilot One/Watermarks/` directory. Then open Pilot, `Settings` - `Bottom Logo`, the logo image will be displayed in the UI. Select one, then shoot/record/live, The resulting image will use the new bottom logo.



**The bottom logo image requirements: 512 \* 512 pixels, png format, the size does not exceed 1M. Images that do not meet the requirements are not available.**

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## Power Consumption

The Pilot One uses a 7200mAh high-capacity battery that can continuously record for more than 3.5 hours. Standby time can be more than 30 hours.

When the Pilot is in working, it consumes more power. According to the power consumption, the order from the largest to the smallest is:

1. Recording Video.
2. Live Streaming.
3. Stitching videos and photos.
4. Camera preview.
5. View photos and videos in Gallery.

If you want to save power, make sure the Pilot is not in operation.

The battery can last longer with the following settings:

1. **Settings** - **Energy Saver** - **Auto Power Off** Turn on, Pilot will shut down after being idle for a period of time.
2. **Settings** - **Screen & Light** Screen brightness adjust to minimum.
3. **Settings** - **Screen & Light** - **Screen Timeout** set to 30 seconds.
4. **Settings** - **Energy Saver** - **Radiator Fan** set to Auto or Always Off.

When the battery charge is less than 20%, it will indicate that the battery is low. When the battery is less than 1%, Pilot will automatically shut down.

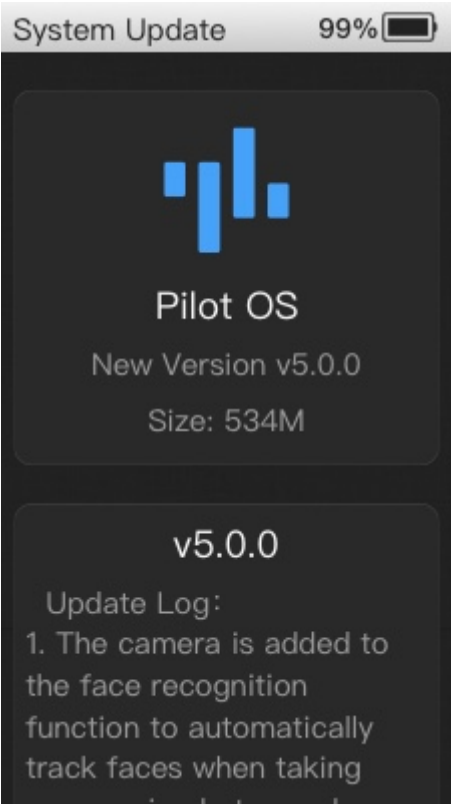
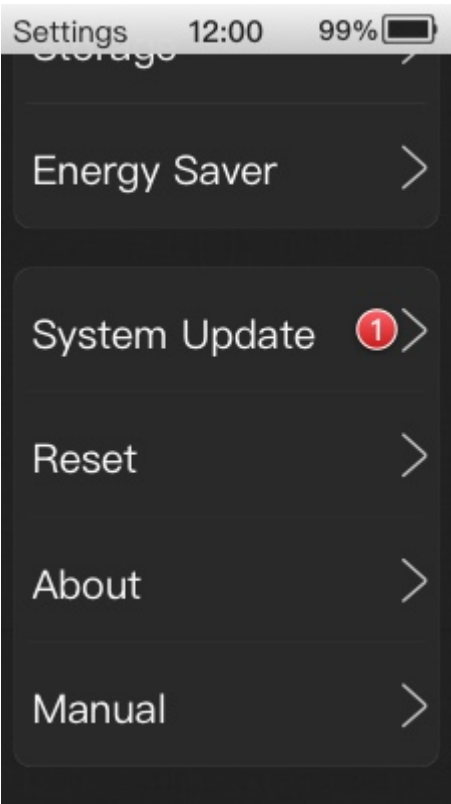
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## Upgrade Pilot OS

Pilot's built-in operating system is based on Android, users can upgrade Pilot OS over the network.

When a new version of the Pilot OS is released, the **Settings** icon of the launcher will have a red badge. Go to **Settings** - **System Update**, which will display the new version number, size, update content and more. Tap the **Download** button to download. After the download is completed, tap the **Install** button and the system will automatically install the upgrade.





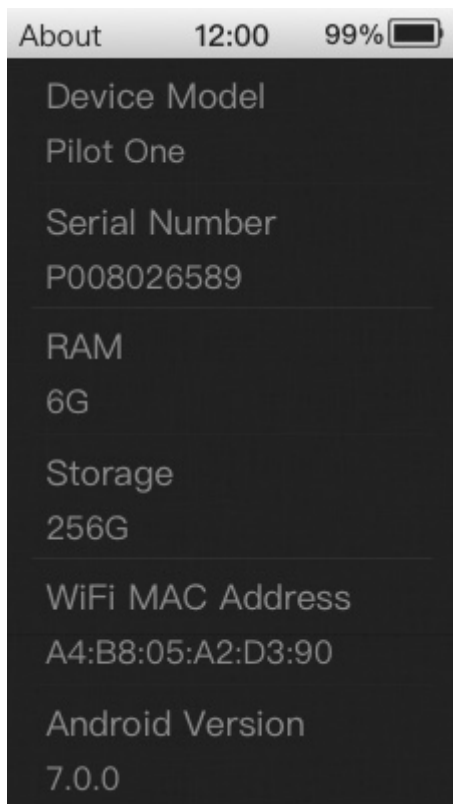
**We will update Pilot OS frequently to improve the functionality and experience of the Pilot, please keep it up to date.**

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## Serial number

Each Pilot has a unique serial number. The serial number can be used for troubleshooting and support services.

You can view the serial number in the **Settings** app, open the **Settings** - **About** , the serial number will be displayed below.



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## Reset

The Pilot can be restored to factory settings in **Settings** - **Reset** . You can only reset the settings, or you can erase settings and data. After the reset, the Pilot will restart. Then enter the Setup Wizard.

