Insta360

Pro

User Manual

English

目录

Chapter 1 Preparation for Basic Shooting

1.1 Base preparation

- 1.1.1 Know the camera
- 1.1.2 Introduction to official accessories
- 1.1.3 Selection and formatting of storage media
- 1.1.4 Camera debugging
- 1.1.5 Connection mode of camera
- 1.1.6 Download official software
- 1.1.7 Selection of tripod

Chapter 2 Photographing

2.1 Preparation before photographing

- 2.1.1 [Beginner] Preparation of photography
- 2.1.2 [Beginner] Selection of accessories for shooting
- 2.1.3 [Advanced] Selection of advanced accessories for photographing
- 2.1.4 [Advanced] Preparation of special photographing scene (aerial photography)

2.2 Production

- 2.2.1 [Beginner] Shooting mode screen and settings
- 2.2.2 [Advanced] Shooting in special format (Raw, HDR, Burst, super-resolution)
- 2.2.3 [Advanced] method for aerial-shooting panoramic picture

2.3 Post-Production

- 2.3.1 [Beginner] Photo stitching by Stitcher
- 2.3.2 [Advanced] How to stich Super Resolution photo with Burst photo
- 2.3.3 [Advanced] Stitching by third party software, such as PTgui, etc.
- 2.3.4 [Advanced] Color matching and modification of Photoshop panorama

2.4 Distribution

- 2.4.1 [Beginner] Fast acquisition of real-time stitching images and sent to SNS
- 2.4.2 [Beginner] Insta360 Player
- 2.4.3 Introduction of VR helmet for photo playback (about VR glasses)
- 2.4.4 Create simple VR roaming (about platform presentation)

Chapter 3 Video Recording

3.1 Preparation before shooting

- 3.1.1 [Beginner] Setup for recording preparation
- 3.1.2 [Beginner] Selection of accessories for shooting
- 3.1.3 [Advanced] Selection of Advanced accessories for video recording
- 3.1.4 [Advanced] Recording equipment
- 3.1.5 Using H2N and SSD together on V203 Firmware
- 3.1.6 [Advanced] Introduction of stabilizer
- 3.1.7 [Advanced] Special scene shooting preparation (aerial photograph)

目录

3.1.8 [Advanced] Create and set logo for real time stitching

3.2 Production

3.2.1 [Beginner] Shooting Mode Screen and Settings

3.2.2 [Advanced] Recording panoramic sound

3.2.3 [Advanced] Panoramic delay and High speed Photography

3.2.4 [Advanced] Panoramic aerial photography

3.3 Post-Production Stage

3.3.1 [Beginner] Video stitching by Stitcher

3.3.2 [Beginner] Video Frame Rate Adjustment and Optical Flow Interpolation

3.3.3 [Beginner] Timelapse image sequence stitching

3.3.4 [Beginner] Stitching Box Tutorial

3.3.5 [Beginner] Introduction to Premiere cc 2018 Editing

3.3.6 [Beginner] Introduction to FCPX Editing

3.3.7 [Beginner] Quick editing of official plugins on premiere

3.3.8 [Beginner] Application of LUT

3.3.9 [Advanced] Stitching by third-party software of Mistika VR, AutoPano Video

3.3.10 [Advanced] Other panoramic plugins and their attribute applications

3.3.11 [Advanced] Post production of panoramic sound

3.3.12 [Advanced] Mending Sky for Aerial Photography

3.3.13 [Advanced] Erasing Tripod for Ground Shoot

3.4 Distribution

3.4.1 [Beginner] Insta360 Player

3.4.2 [Beginner] Introduction of CrystalView 8K, the panorama player

3.4.3 [Beginner] Introduction to other players (Gopro VR Player & PotPlayer)

3.4.4 [Advanced] Upload to various VR platforms

3.4.5 [Advanced] Introduction of VR headset for photo playback (about VR glasses)

Chapter 4 Live-streaming

4.1 Preparation before shooting

4.1.1 [Beginner] Basic preparation for shooting

4.1.2 [Beginner] Selection of accessories for live-streaming

4.1.3 [Beginner] Connection and Stitching Calibration before live-streaming

4.1.4 [Intermediate] Preparation of 4G network Live-streaming (Outdoor live-streaming)

4.1.5 [Intermediate] OBS Computer forwarding push for live-streaming

4.1.6 [Advanced] How to add or edit logo for live-streaming

4.2 Shooting stage

4.2.1 [Beginner] Live Interface and parameter setting

4.2.2 [Beginner] Push mode: internal push, server push, HDMI output

4.2.3 [Beginner] Live-streaming while storing

4.2.4 [Beginner] External audio setting

4.2.5 [Intermediate] Indoor live-streaming scheme

目录

4.2.6 [Intermediate] Outdoor Live-streaming scheme

4.3 Distribution

4.3.1 [Beginner] YouTube live-streaming

4.3.2 [Beginner] Facebook live-streaming

4.3.3 [Beginner] Weibo live-streaming

4.3.4 [Intermediate] Charging platform live-streaming, Utovr (Arcvideo, Tencent Cloud, etc.)

Chapter 5 Street view

5.1 Preparation before shooting

5.1.1 Basic preparation for Street view

5.1.2 Introduction of shooting accessories for special street view

5.2 Production

5.2.1 Parameter setting of car mounted shooting of street view

5.3 Post-Production

5.3.1 Upload street view through Stitcher

5.4 Distribution

5.4.1 Watch street view content via Stitcher

Chapter 6 Manual Exposure, Curve Adjustment, Customize, Template and QR Code

6.1 [Advanced] Manual exposure and curve adjustment

6.2 [Advanced] Customize and template

6.3 [Advanced] Generating QR codes for camera recognition

Chapter 7 Common Problems

7.1 Common camera problems

7.2 Common problems for Insta Pro app

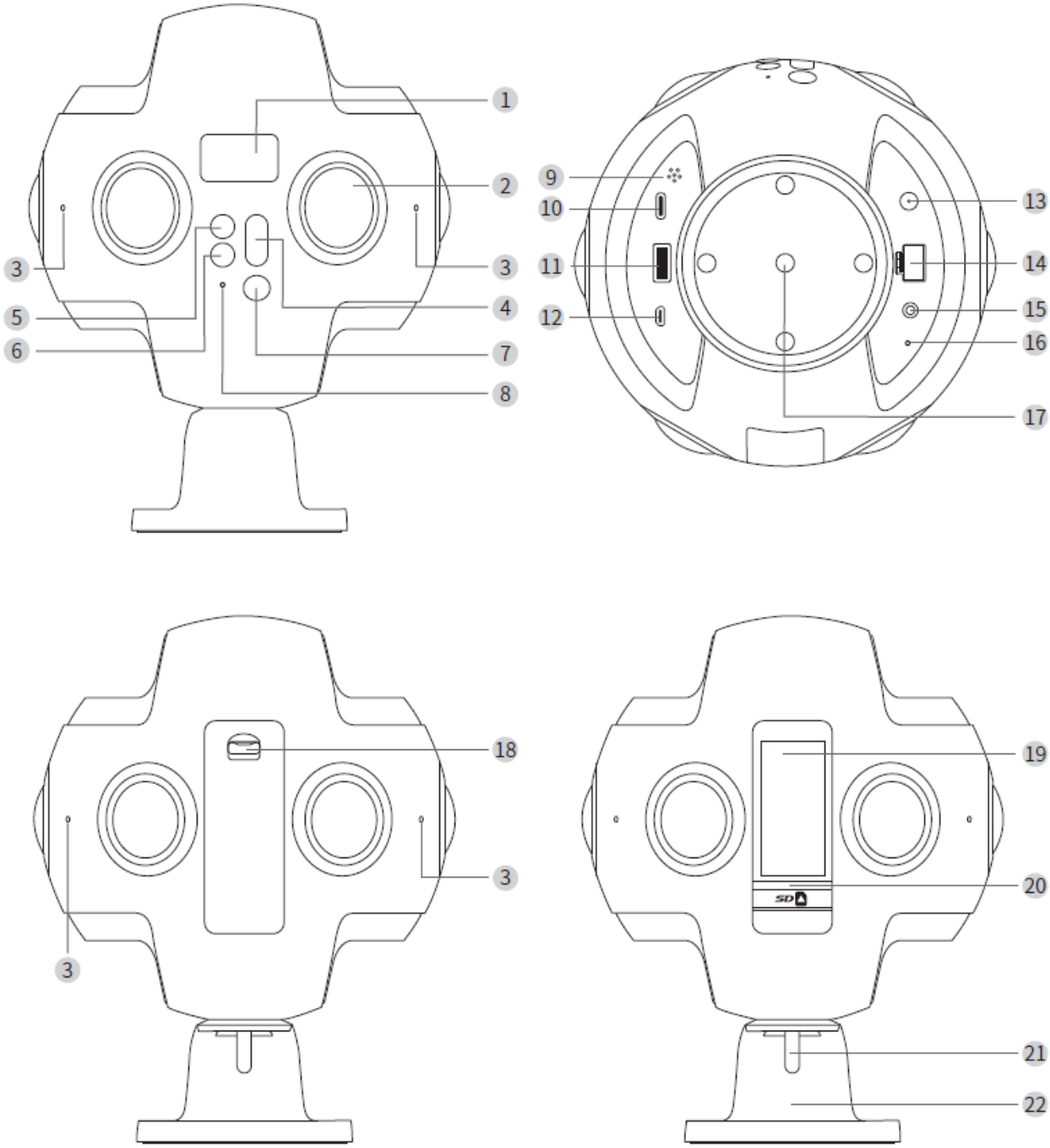
7.3 Common problems for Insta360 Pro Stitcher

7.4 Other common problems

7.5 Error message summary

7.6 Official technical support and Forum

1.1.1 Know the camera



1. OLED display
2. Lens
3. Microphone/Operation status indicator
4. Switch key
5. Return key
6. Setting key
7. Power/Enter key
8. Power indicator
9. Speaker
10. USB Type-C port
11. USB 3.0 port
12. HDMI 2.0 Type D port
13. DC Power port
14. LAN port
15. 3.5mm Audio input port
16. Reset pinhole
17. Standard 1/4" bolt
18. Battery hatch release
19. Battery slot
20. SD card slot
21. Bolt
22. Fixed base

Specification parameter

Specification	**parameter**
Lenses	6×200°F2.4 fish-eye lenses
Maximum resolution of single-lens photograph	4000×3000
360°panoramic photo shooting	Real-time Stitching / Post-Processing Stitching, 7680*3840（8K）at the maximum.
360°panoramic video recording	Real-time Stitching in the camera, 3840×1920@30fps（4K）at the maximum. Post-Processing Stitching, 7680×3840@60fps（8K）at the maximum.
360°3D panoramic photo shooting	Real-time Stitching / Post-Processing Stitching, 7680×7680（8K 3D）at the maximum.
360°panoramic video recording	Real-time Stitching in the camera, 3840×3840@24fps（4k）at the maximum. Post-Processing Stitching, 6400*6400@30fps（6k） at the maximum.
File format	Photo：JPG，RAW Video：MP4
Storage support	SD card over V30 speed level/USB3.0 mobile HDD that meets the SD official standards(SSD mobile HDD is recommended)
Power and endurance	5100mAh removable battery（endurance time about 50min） 12V/5A power adapter （Continuous recording for several hours at room temperature）
Port performance	Standard USB3.0 Standard USB Type-c HDMI 2.0 Type D port Standard network port 1/4fixed tapped hole
Audio recording	Built-in Mic×4 External 3.5 standard audio input port
Power	12V/5A

Specification	parameter
Camera weight (containing battery)	About 1.25kg
Camera size	Sphere diameter of 143mm

1.1.2 Introduction to official accessories

1. Insta360 Pro main engine

2. Silicone lens cover

3. Pro special battery × 1 (continuous using for about 75 minutes, takes about 2. 5 hours to charge when shutdown)

4. Power adapter

5. Network cable（1meter）

6. USB ethernet card

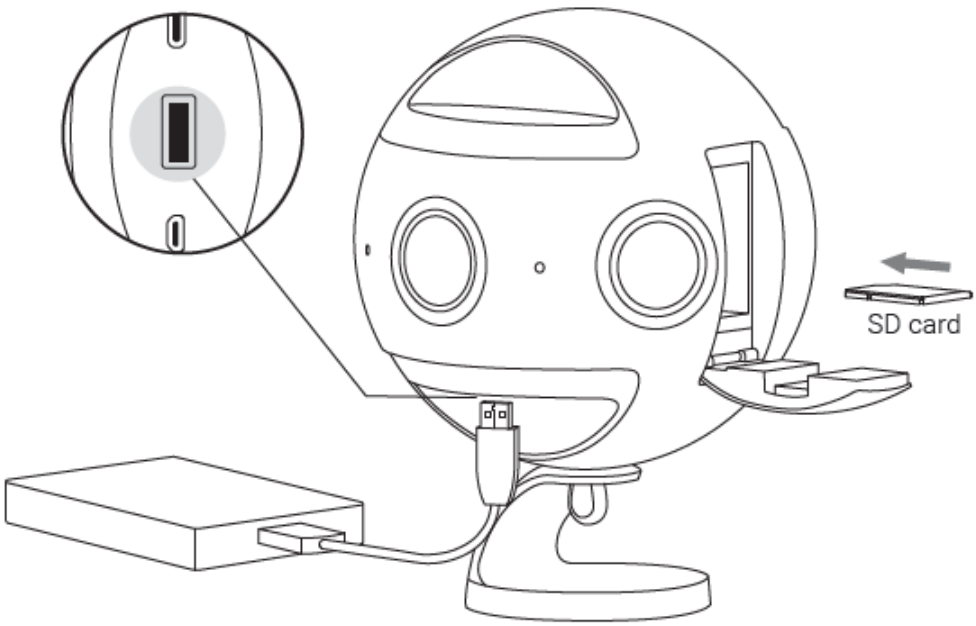
7. Type-C USB cable

8. Shoulder strips
9. Flight case（net weight, size 419 × 330× 181mm）
10. Serial number (each Pro has a separate serial number that can be queried at the diagram position and in camera settings)
11. Instructions

Note: according to international aviation regulations, if you check in your luggage, please remove lithium batteries and carry them around.

1.1.3 Selection and formatting of storage media

Insta360 Pro supports two types of storage, including built-in SD card and external hard disk, which is convenient for different users in different shooting scenes.



Selection and notes for SD card

Insta360 Pro supports UHS-I SD card with the read-write speed level of V30 and above.

It is recommended to purchase SanDisk SD card (JD.com purchase link, Amazon purchase link), note that:

① To choose Extreme Pro instead of Extreme card;

② V30 mark is a must. Although some high-speed cards have high read-write speed per second, it is only the description of the single lens storage state, which cannot meet the writing speed of the continuous input of 6 lens.

③ Please make sure the format of the card is exFat, if not, it should be formatted as exFat.

No V30 sign

Not the level of Extreme PRO

Correct example

In addition, Pro has no maximum capacity limit for SD card. When using 8K quality for shooting, you can estimate storage space by referring to one-minute material ≈2G.

Selection and attention of hard Disk

1. The camera supports to use USB 3.0 or faster SSD solid state HDD (SSD solid-state hard drives are recommend for customers primarily shooting videos). ExFat is recommended for hard disk file format, and there's no limitation on capacity. Samsung T5 SSD hard disk (JD.com purchase link, Amazon purchase link) is recommended.

2. When inserting hard disk and SD card simultaneously, the shooting contents will be stored directly into HDD by default.

3. When a new storage device is inserted, the camera will prompt for speed detection when the recording is initiated for the first time, and only when the speed is up to the standard can the recording be normally carried out. Please note that the detection will take a few minutes, so please reserve the detection time in advance.

Remove memory card or hard disk

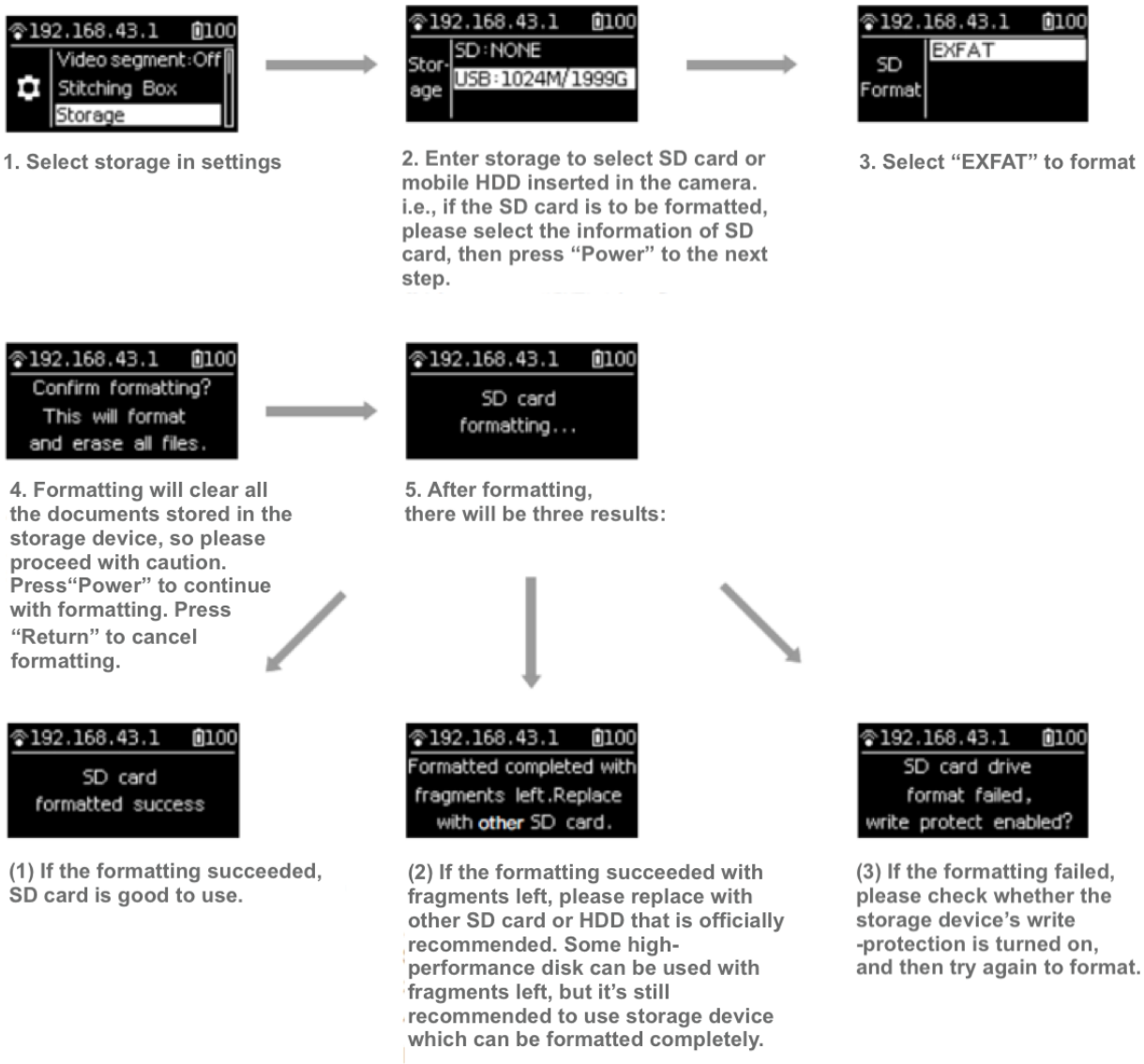
After shooting, wait until the camera screen displays "Ready" before pulling out storage devices.

How to use camera to format a SD card or hard disk

1. Frequent recording of high-resolution video will lead to accumulation of data fragments generated by multiple files, affecting the card speed. So, it is recommend to periodically format storage devices, especially before important shooting.

2. Pro has feature of standby formatting and is easy to operate. Using Pro camera to format saves hours and is more completed than using computer software. It is strongly recommended to use the camera to format storage devices.

3. Detailed operation steps are shown below.



About card speed test

Because Insta360 Pro requires high read / write speed for storage, camera provides a card speed test function for preventing your recording process from being shut down due to misuse of improper storage devices. Typically , you will encounter in two situations:

1. It is your first time to use storage devices in your camera. Perhaps, it is your newly purchased SD card or SSD borrowed from friends. You need to have a card speed test before video recording.

   You can select "storage management" in the app main menu (Fig. 1) to test or you can record directly, and the camera will force you to enter the interface for card speed test (Fig. 2).

2. When you format your card or hard disk, the camera will regard it as a "new" storage device and requires a speed test, which can refer to Fig. 2 below.

Fig.1: speed test in storage management (album)

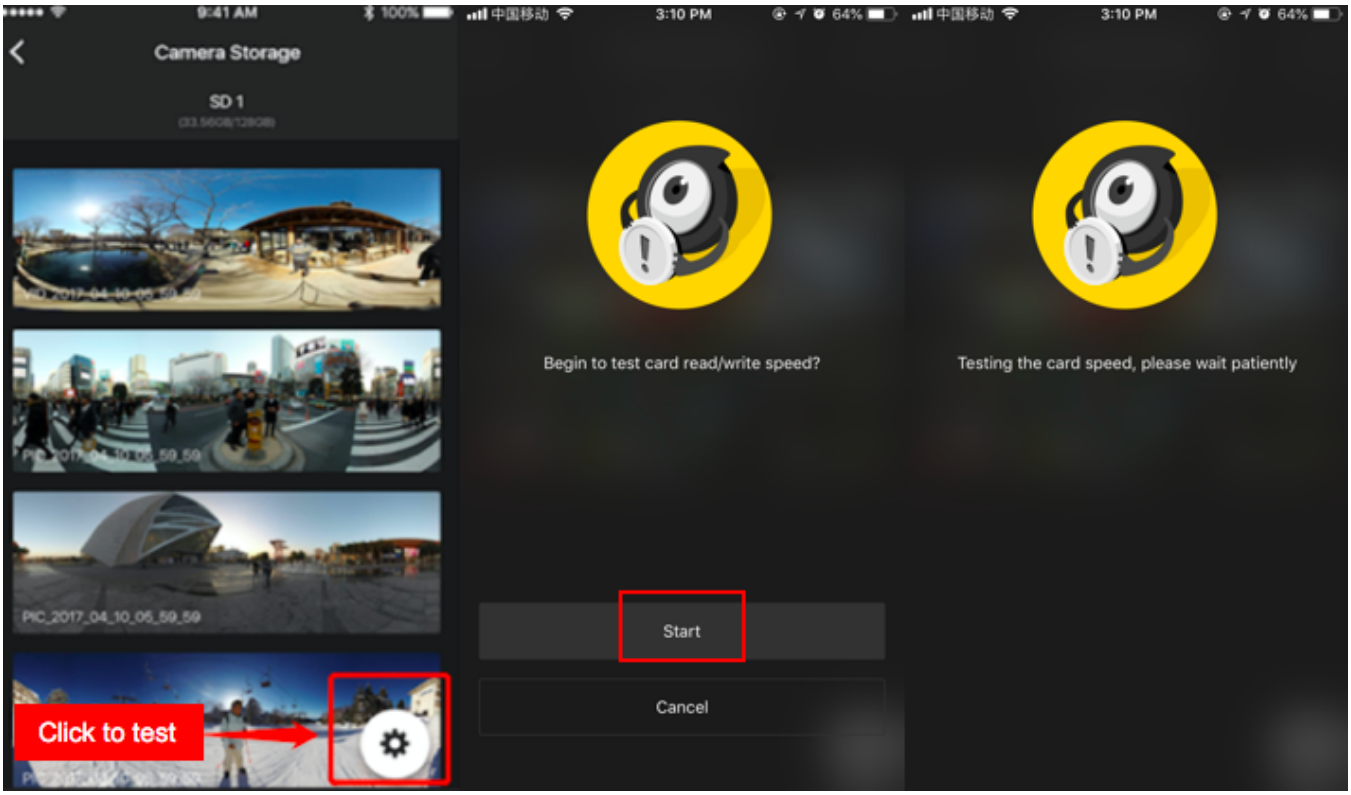
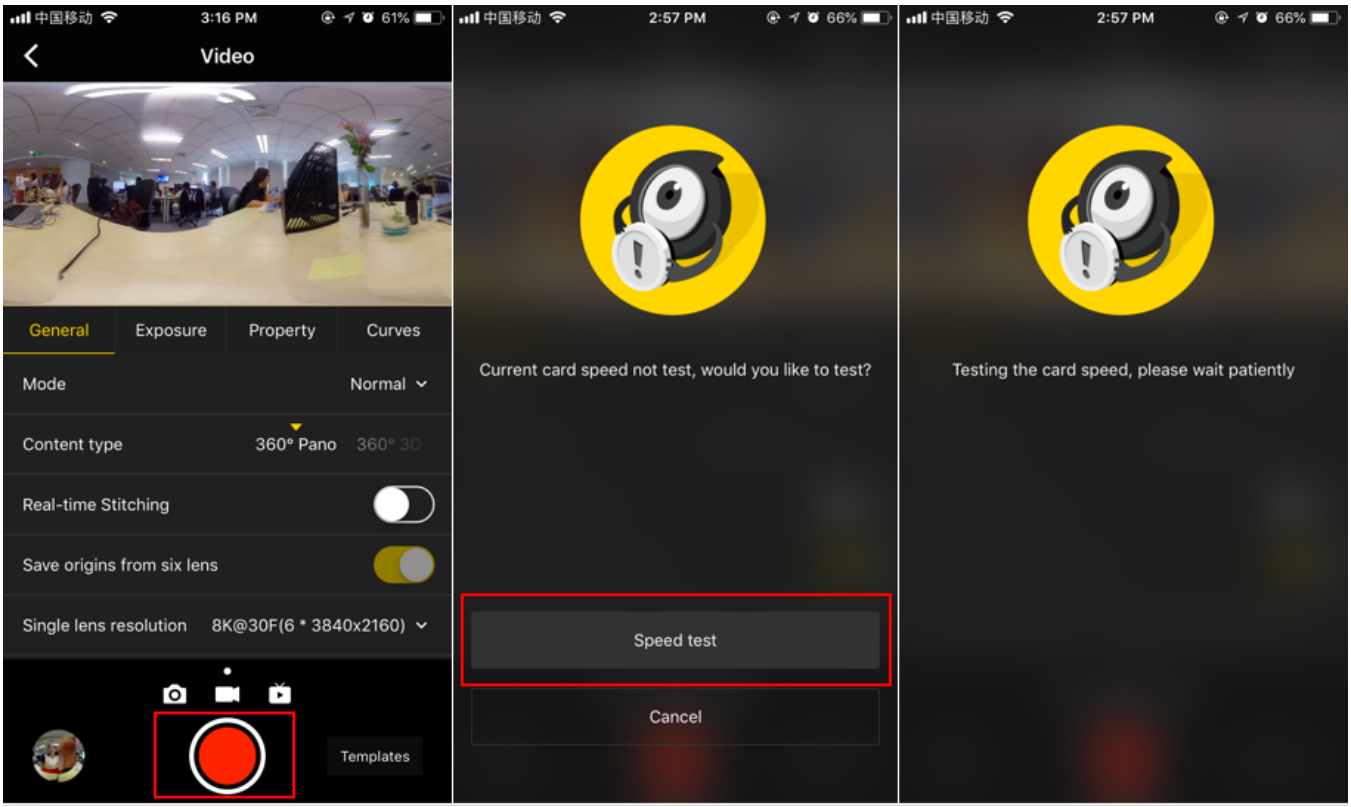


Fig. 2: direct video testing



Note: regardless of either way, card speed test usually takes about 2 minutes. Please follow up filming time and rhythm, prepare ahead of time to avoid filming delay.

1.1.4 Camera debugging

When we get Insta360 Pro camera, before starting your professional panorama experience, please learn some necessary knowledge first.

Lens protection and cleaning

Insta360 Pro is a six-eye panorama camera, whose fish-eye wide-angle lens is parallel to one lap of the camera itself. Because of protruding shape, please be careful during use and shooting lest and avoid grinding or unnecessary damage.

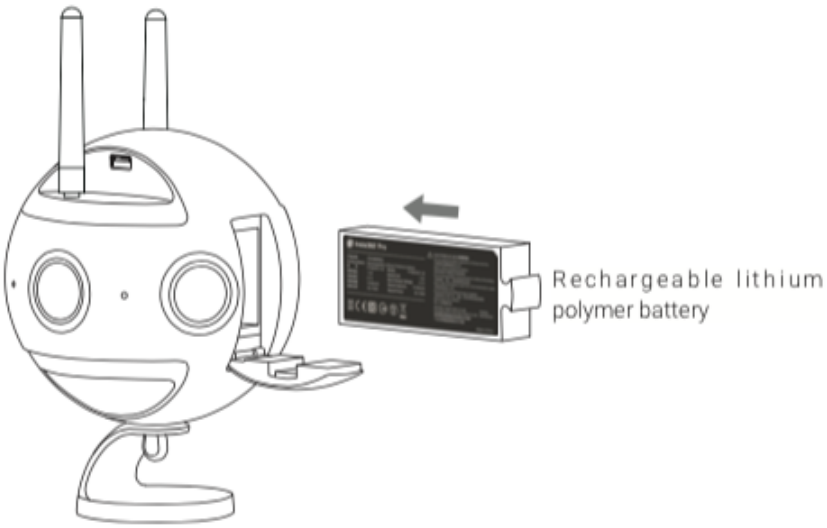
The camera is equipped with rubber protective jacket for lens. When normally packed or in working non-shooting status, please use protective jacket to possibly minimize lens damage risk.

It is also easy to leave fingerprint on convex lens, so we've equipped the camera with camera cloth. Please keep the camera clean, avoid any stain that impacts quality and stitching effect.

About power supply and electricity quantity

For panoramic photography, electricity guarantee is important. Insta360 Pro provides two types of power supply. You can use multiple batteries or connect directly to the power supply at suitable locations to extend camera usage time.

For details please refer to the following information.



Power adapter: The camera adopts12V 5A power adapter with DC interface.

Battery type and duration:the camera uses 5100 mAh replaceable battery. Without Wi-Fi, the battery life is about 75 min. To fully charge a battery takes about 2.5 hours.

Charging with power off

When the camera is not fully charged, the red power indicating lamp will go on. When the camera is fully charged, the green power indicating lamp will go on.

Charging with power on

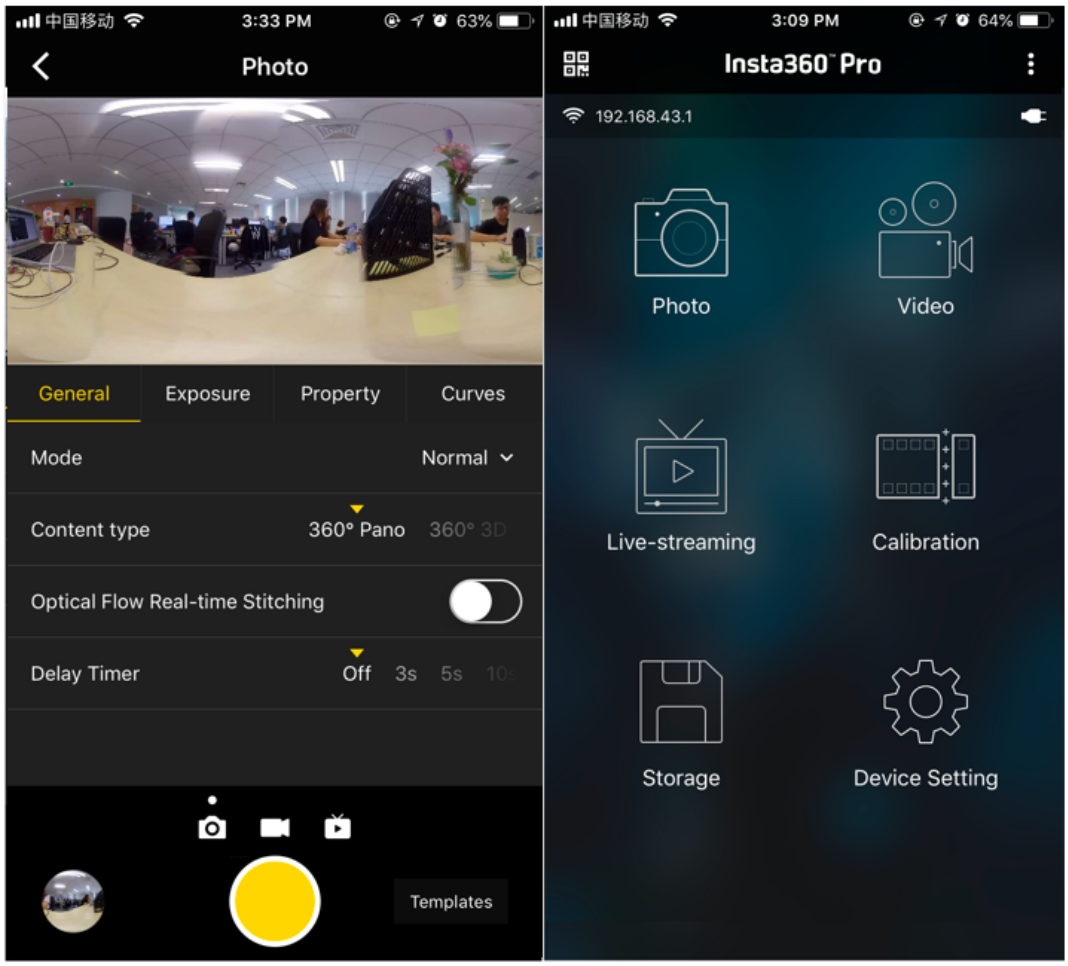
When the electricity quantity of the camera is below 10%, the red power indicating lamp will go on until the low-point protection is enabled or the camera is shut down upon exhaust of electricity;

When the electricity quantity of the camera is between 11% and 20%, the yellow power indicating lamp will go on;

When the electricity quantity of the camera is between 21% and 100%, the white power indicating lamp will go on;

When the camera operates, the work indicating lamp will be in the same color as the power indicating lamp. Refer to the section about camera operation instructions for the flashing description of the work indicating amp.

Tip: With WiFi connection, Pro preview mode consumes more power, so please try to return to the homepage when standby (as shown in the figure)



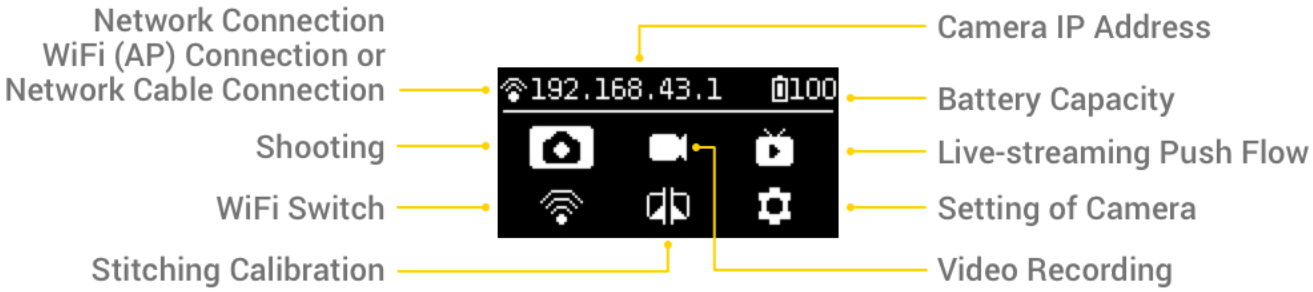
Preview page
More power electricity consumption

Homepage
Less power electricity consumption

About stitching calibration

Insta360 Pro machine stitching is accurate and fluent, but due to differences between specific shooting scenes such as distant view and close range, or when surrounding environment structure is special, the splicing effect may vary. So users who find that real-time stitching isn't satisfactory enough when previewing or trying to shoot, can calibrate cameras in this method (especially illustrated here that this feature makes sense for users who use machine stitching and live online. If you use external software for stitching, you can skip this feature). There are two ways to operate, either on camera or app respectively.

1. Stitching calibration of Pro in the camera

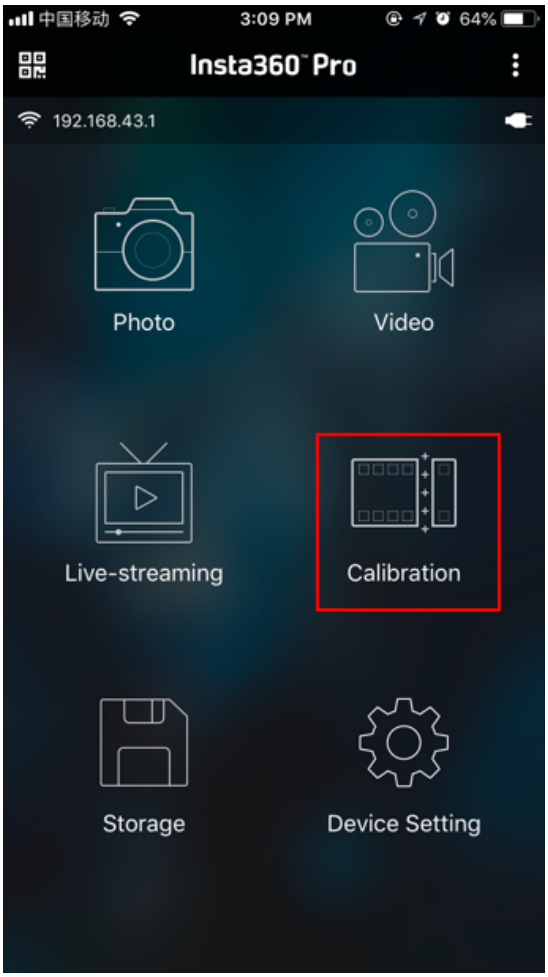


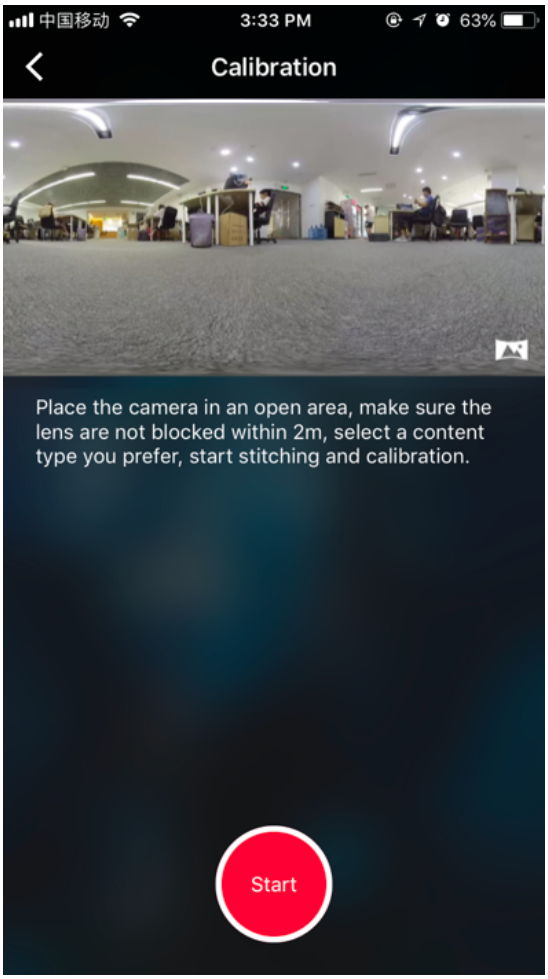
(Camera function navigation menu)

(1) After starting the camera, on the menu navigation homepage, click Calibration (stitching calibration) in meddle of line 2.

(2) After starting this function, please place the camera in an open place and ensure that there is no shelter within 2m of the camera radius including the user himself or herself. Then press the power button, and the camera will automatically conduct stitching effect calibration based on current scene.

2. Stitching calibration in app





(Operation interface of stitching calibration in app)

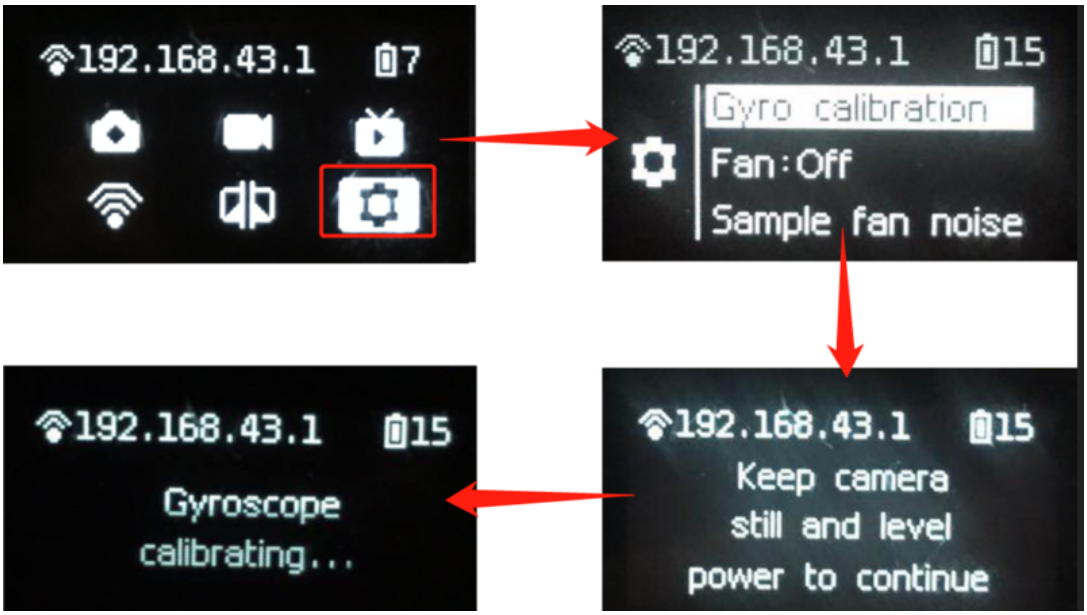
(1) Connect the phone or PC to control app of Pro via Wi-Fi, and finds "stitching calibration" option on the menu interface;

(2) Click to enter into the operation interface and ensure that camera is placed in an open environment and there is no shelter 2 meters around, and then click "Start" , there will be prompt when stitching completed.

About Gyro calibration

Gyro calibration can be performed for the first time using cameras which ensures that camera functions are as accurate as possible. Please first place Insta360 Pro on horizontal desktop or ground, on the function navigation menu, click

settings on the lower right to find "Gyro calibration", and complete operation based on prompt (as shown in the figure).



1.1.5 Connection mode of camera

Insta360 Pro provides a variety of camera connection modes, which can be divided into three types, namely, Farsight, wired connection, and Wi-Fi connection. It can be connected to a computer, iPad or mobile phone, for the remote control of the camera. Among them, the wired connection is achieved through network cable or local area network (LAN). It is strongly recommended that the camera be remotely controlled through Farsight, which enjoys the most stable signal and the farthest communication distance.

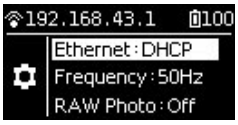
If there is no Farsight device, Wi-Fi connection is more convenient and commonly used. The mobile app provides two ways of camera connectivity: LAN connection and AP hotspot connection of camera. Each of these two ways has its own characteristics. Hotspot connection is convenient and fast, and the connection distance is usually 5m ~ 10m, which is suitable for outdoor and quick preview; however, if the LAN is stable enough and the signal coverage area is large, the LAN connection can be preferentially selected, for the safety range of the connection between the person and the camera is larger in theory.

These different connections are described in more details below:

1. **Farsight connection**

   (1) Install antennas onto the Farsight's transmitter and receiver respectively.

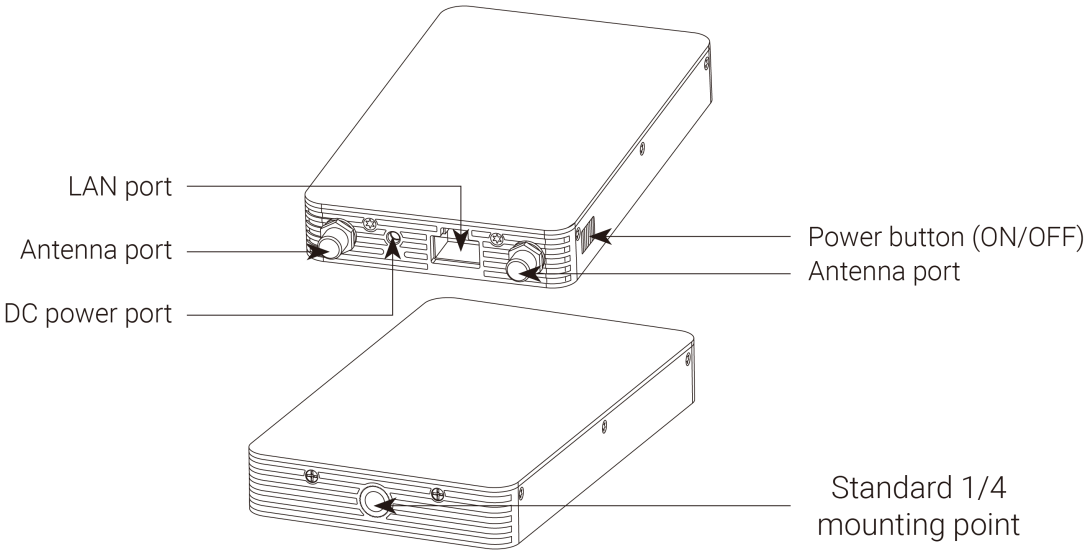
   (2) Go to the Pro camera Settings, set Ethernet to DHCP.



   Please also turn off AP (Wi-Fi) on the camera.

(3) Turn on the camera and Farsight transmitter. It takes 15 seconds to start after transmitter is on.

(4) Connect the transmitter with Pro camera via network cable. Waiting for the display of IP address of 192.168.100.XXX on top of camera screen, which represents a successful connection between camera and Farsight transmitter. If no required IP shows after waiting for a long time, please replug the cable until the displayed IP address meets the requirement. The transmitter can be fixed on tripod with a clip given by the factory.

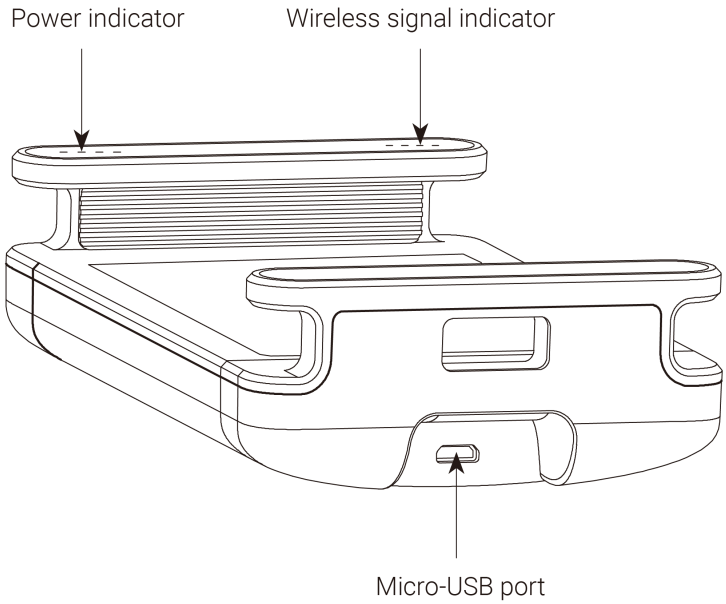


(Farsight transmitter)

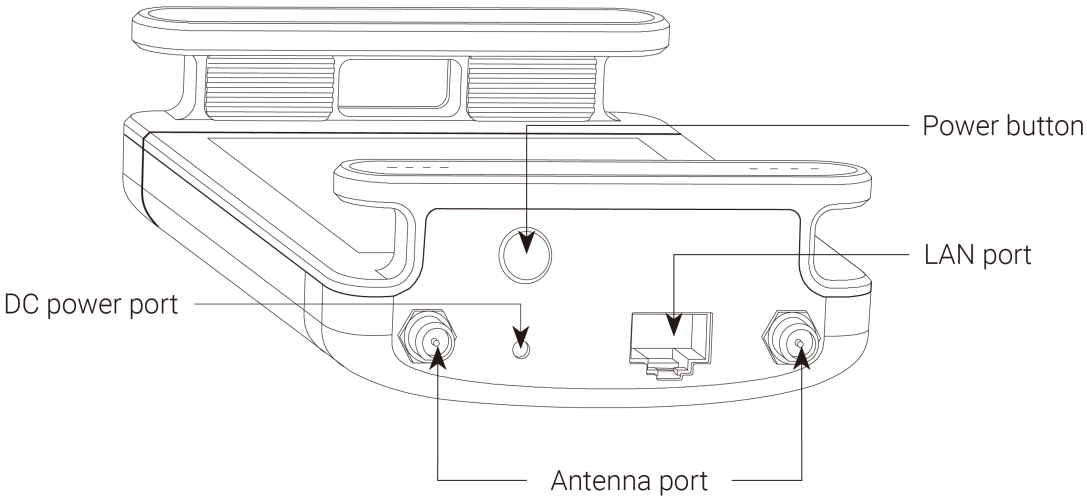
(5) Turn on the receiver, and connect the phone / iPad to the receiver through USB cable. Take iOS as an example. Wait about 15 seconds or so, the phone / iPad settings (generally in system settings menu) will show "Ethernet" option, click to enter the interface of Ethernet settings. Set "conFig. IP" to automatic, and confirm whether the IP address is also 192.168.100.XXX. In most Android devices, there is no "Ethernet" option. The set-up is ready after connecting your devices to the receiver via USB cable. (please refer to the Compatibility List below for the supported Android devices)

If there is no required IP available after waiting for a while, replug the USB cable and reconnect until the desired IP address is displayed.

If you want to connect the receiver to your computer, please use network cable to connect. After connecting, set the computer network to DHCP, which can automatically obtain the IP address assigned by the receiver.

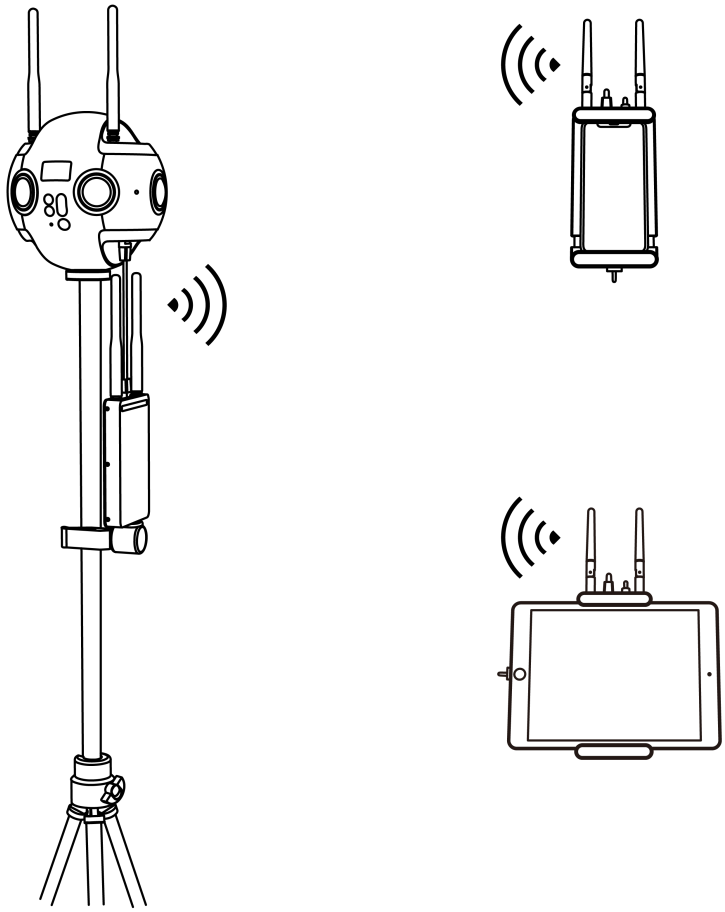


(Farsight receiver - Micro USB port)



(Farsight receiver — antenna interface)

(6) Please ensure the IP address displayed on top of the camera screen and that assigned to the receiver is 192.168.100.XXX. It represents a successful communication of Farsight. At this point, open the control app on the device connected by the receiver, which can be connected by inputting the IP address displayed on top of the camera screen. If the receiver connects to a computer, you can also complete the connection by inputting the IP address displayed at the top of the camera screen in the connection interface of the camera's controlling client Insta360 Pro software.



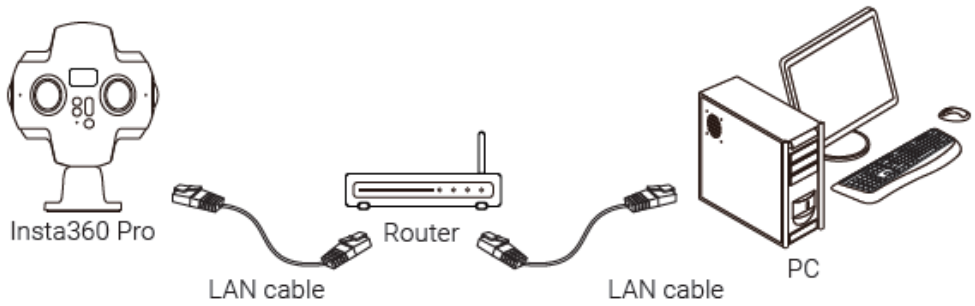
(7) Compatibility List of Farsight receiver (devices added continuously)

Device	System
Huawei P9	Android 7.0+
Huawei P10	Android 7.0+
Huawei Mate9	Android 8.0+
Huawei Mate10	Android 8.0+
Huawei Honor V10	Android 8.0+
Samsung Galaxy S8	Android 8.0+
Samsung Galaxy S9	Android 8.1.0+
Google Pixel 2	Android 8.1.0+
Moto X Pro	Android 5.0.2+
iPhone & iPad	iOS 10.3+

2. **Wired connection -- DHCP mode**

(1)Adjust the Ethernet connection mode of Pro to be the DHCP, connect the Pro to the router through the Ethernet cable, and the PC and the Pro need to be in the same LAN, so the PC can be connected to the router through the Wi-

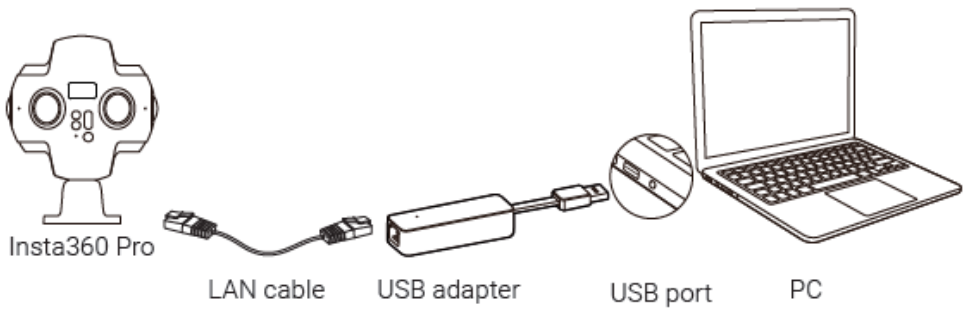
Fi or the Ethernet cable.



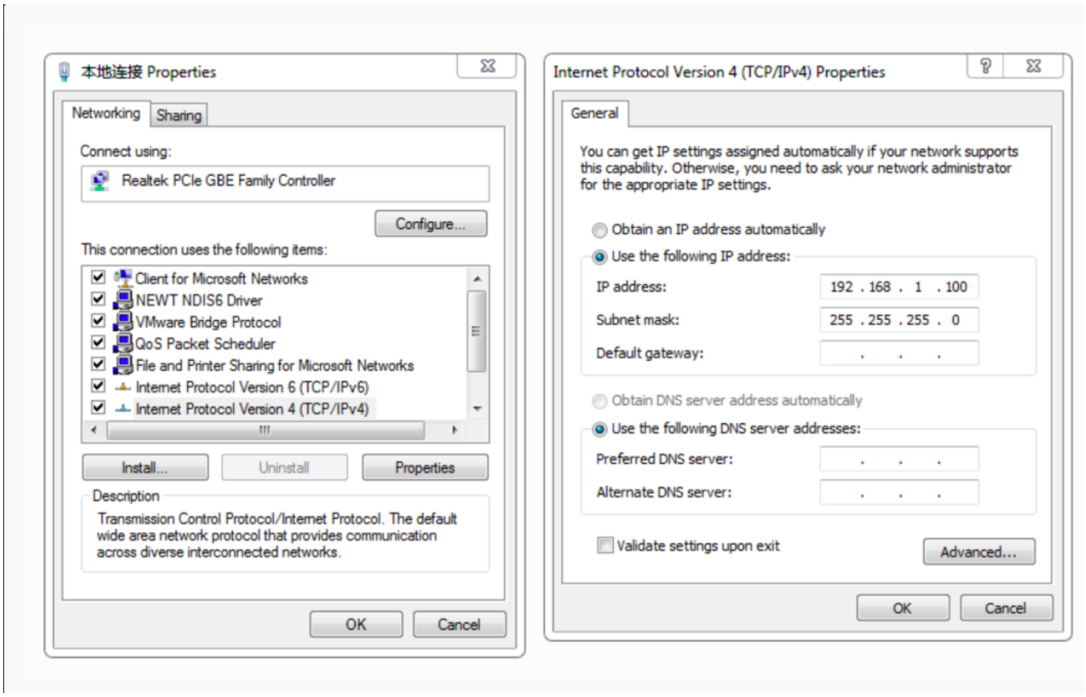
(2) Open the Pro app at the client terminal, input to the IP address displayed on the camera OLED screen to connect the app to the camera.

3. **Wired connection -- Direct mode**

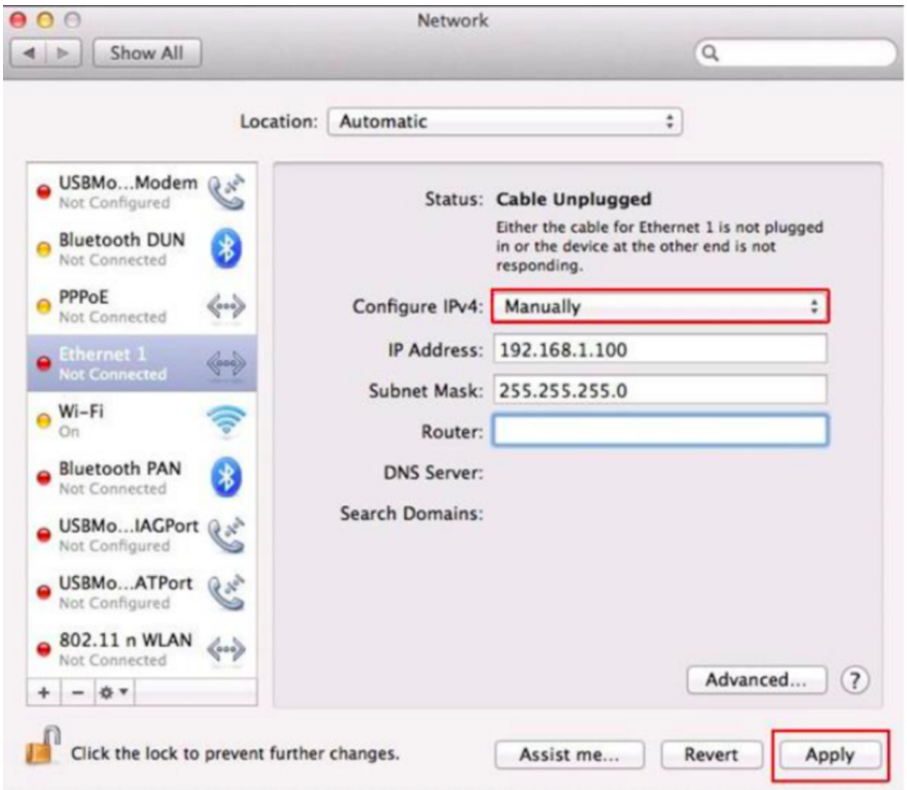
(1) Adjust the Ethernet connection on the Pro to be “Direct”, connect the Pro directly to the computer through an Ethernet cable.



(2) In this mode, the login address of Pro is 192.168.1.188. The static / solid IP address of computer needs to be set to 192.168.1 network segment. It is recommended to set as 192.168.1.100 with the subnet mask of 255.255.255.0.



(IP configuration Interface for Windows)



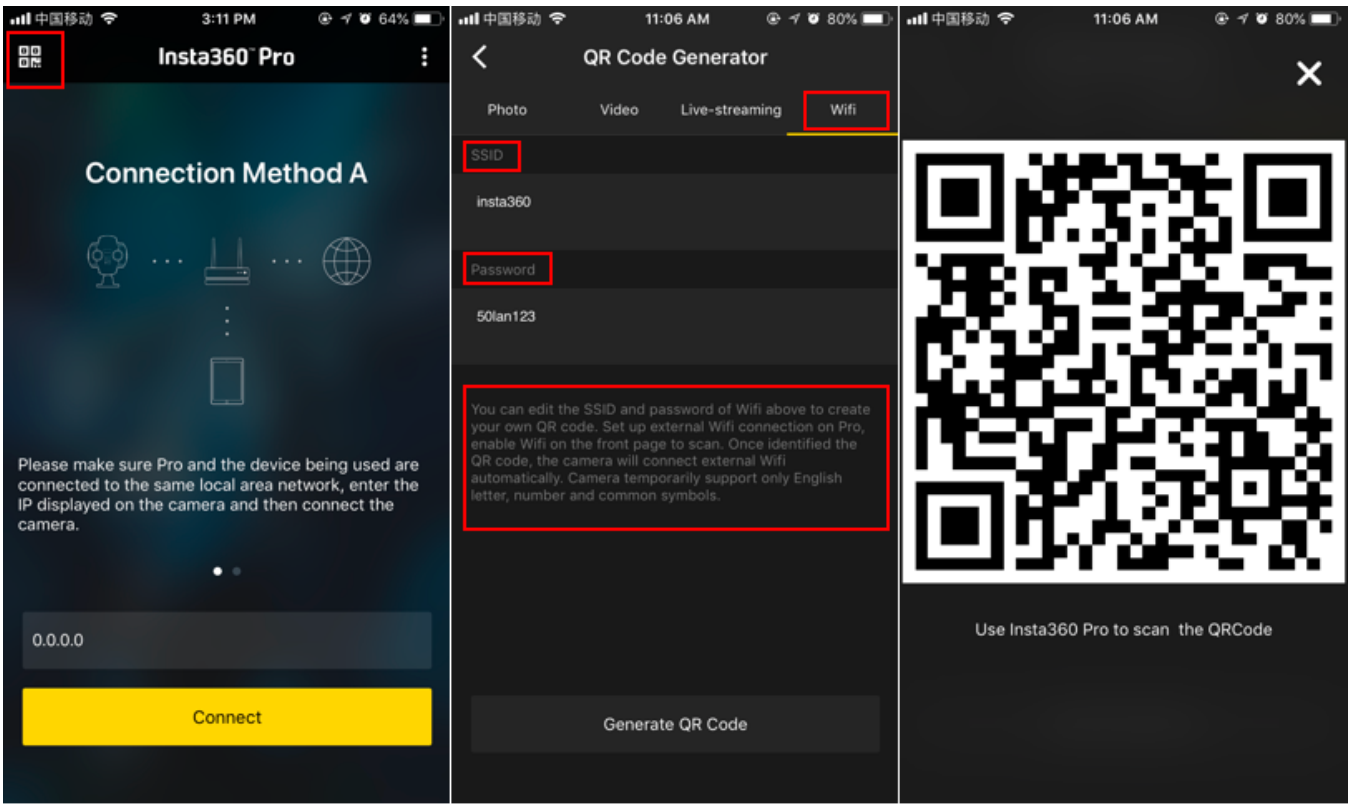
(IP configuration Interface for Mac OS)

(3) Open the client's app, input 192.168.1.188 to connect the app to the camera.

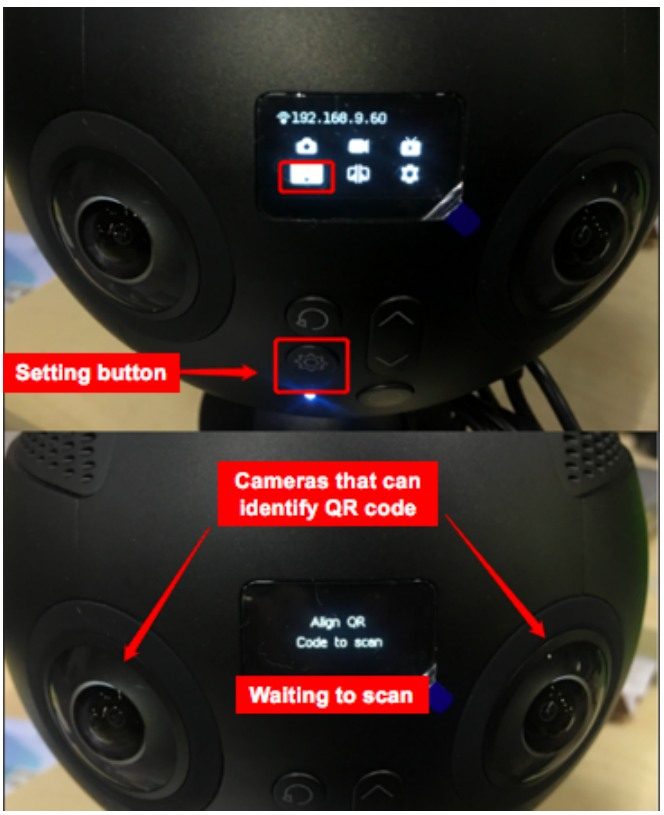
4. **Wireless connection -- Wi-Fi connection**

(1) First, please make sure that the Wi-Fi mode is “Wi-Fi”.

(2) Open app, find the entry to "QR code generator" entry in the top left corner of the homepage, click enter, and find the Wi-Fi content interface at the rightmost, and fill in the same LAN SSID and password with LAN (Note: for LAN name, the camera temporally only supports the recognition of half-angled English letters, numbers and common symbols), and then generates and obtains the QR code.

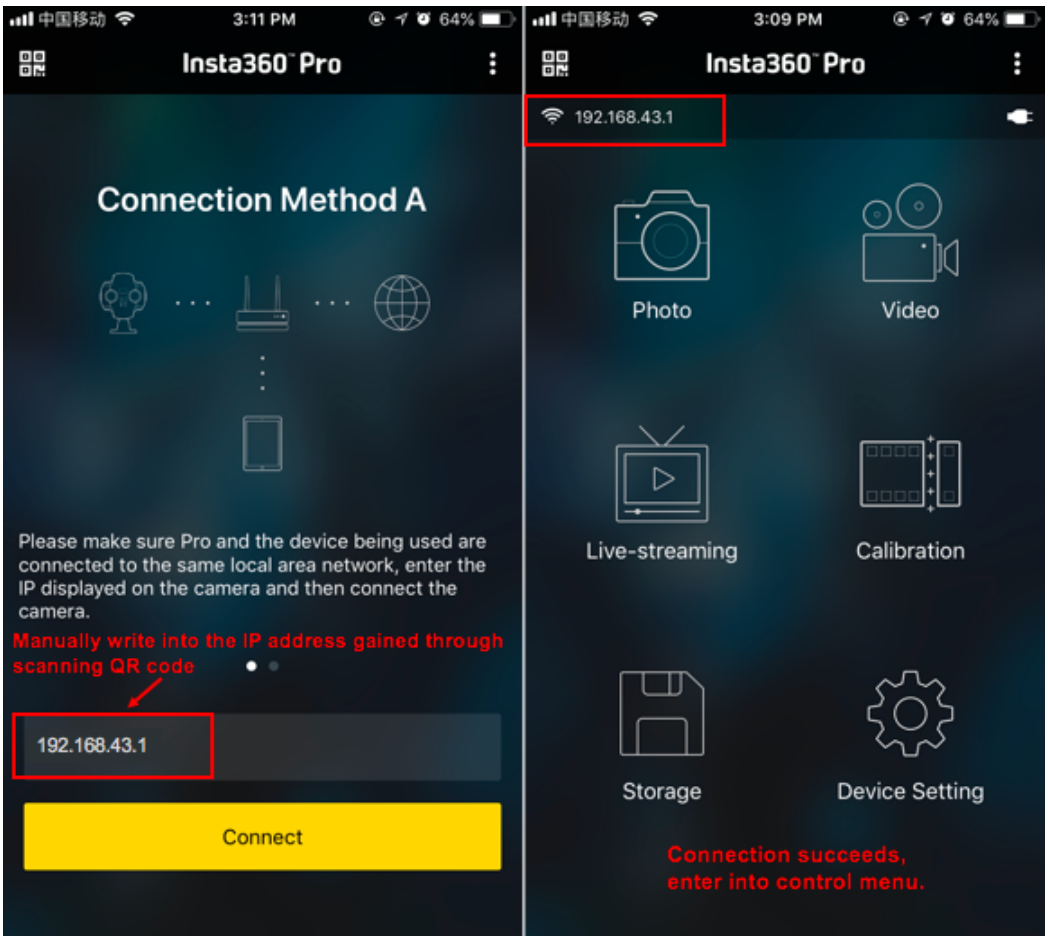


(3) On the camera navigation menu, after selecting the Wi-Fi icon, click the "set" button, the camera will prompt you to provide the QR code, into the "waiting to scan the code state".



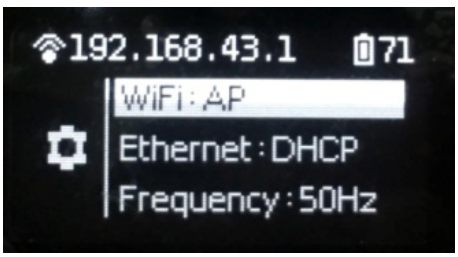
(4) Lens on both sides of the camera screen have the code scanning function. Please put the QR code you just get towards any one of the lens, about 5cm~ 10cm, when you hear the successful prompt sound of the camera, it means QR code scanning completed, and the camera screen will display the corresponding IP address.

(5) Select connection method one on the app, fill in the IP address displayed on the camera screen, and then click on the connection, then it will turn to the functional menu.

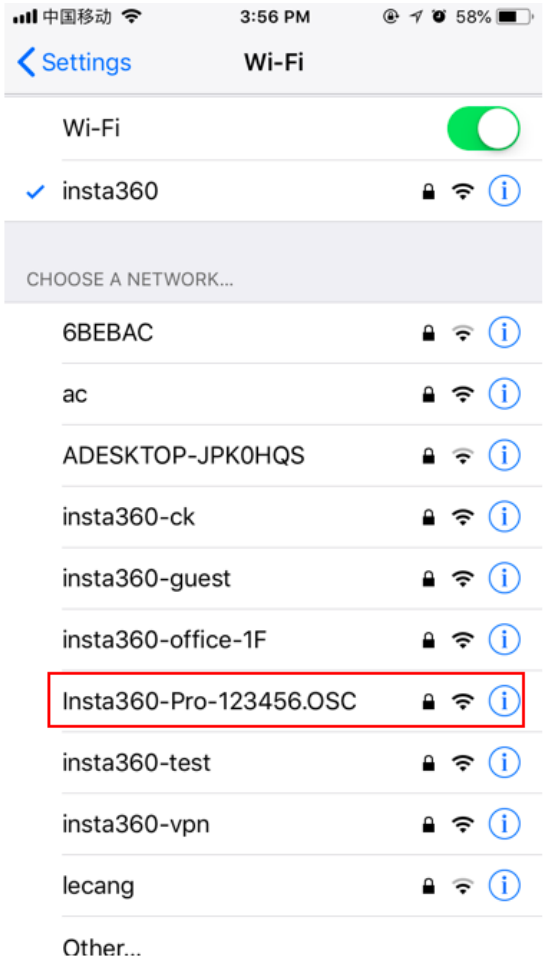


5. **Wireless connection -- AP connection**

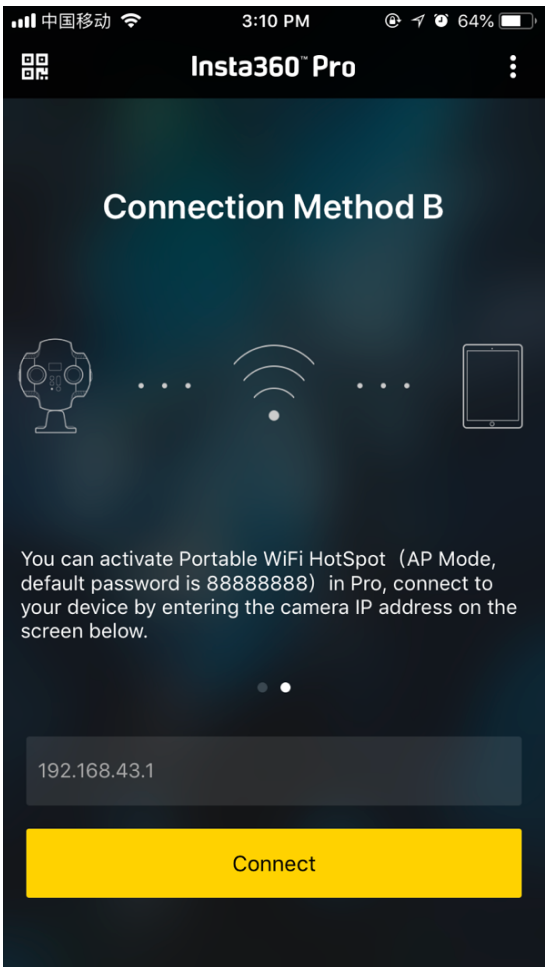
(1) First, change the Wi-Fi mode as “AP”;



(2) Open your client device to search nearby Wi-Fi hotspots, and find the Wi-Fi AP hotspots named “Insta360-Pro-XXXXXX”. Click to input 88888888 (repeat eight for 8 times) to connect.



(3) When the connection completes, open Pro app, and select "Connection Method B". Click "Connect".



1.1.6 Download official software

As a technology company dedicated to developing global panoramic imaging technology and building open ecology and convenient product experience, Insta360 provides abundant software for users and panoramic enthusiasts of Pro series cameras. From controlling operations, stitching, to viewing, regardless of mobile phone or computer, there are corresponding software for your choice. **The following software is compatible with Pro / Pro 2 camera.**

Insta360 Pro Camera control app

The controlling app of professional panoramic camera, Insta360 Pro, helps you remotely control Pro/Pro 2 via Wi-Fi connection to realize the shooting, recording and live streaming function of the camera. Moreover, you can adjust various parameters settings, look back filming materials, stitching calibration, viewing information etc. Real-time preview allows you to adjust to best lens anytime, and help you get panoramic photos or video works in a professional and quick way.

App Store

Android

Windows

Mac OSX

(app compatibility requirements)

Insta360 Pro STITCHER

Use Insta360 Stitcher to quickly and easily stitch camera footage taken by Insta360 Pro/Pro 2.

Windows

Mac OSX

What computer configuration can run Stitcher's stitching function smoothly? According to Stitcher's requirements for hardware coding and decoding ability, it is recommended to use computers meeting the standards below:

CPU: CPU for i7 6700K or higher performance

Memory: 8GB or larger

Graphics card: GTX980 or graphics card of higher performance such as NVIDIA, AMD graphics card

Hard disk: it is recommended to use a solid state drive

Operating system: it is recommended to use Windows 8, OSX 10.10 or higher system

For computers with configuration lower than the above standards, they can run the software but might encounter some problems. Try to use a computer that reaches the above standards.

Insta360 Pro FIRMWARE

Camera firmware

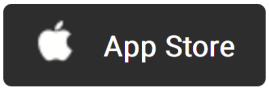
The Insta360 Pro camera firmware ensures that the Insta360 Pro runs efficiently. Please update to the latest version for the optimal experience.

How to upgrade firmware?

Download

Insta360 Moment CrystalView 8K Player

Insta360 Moment supports the playback of all videos and photos from Insta360 apps and files in CrystalView format.



1.1.7 Selection of tripod

Standard 1/4 inch tapped hole is at the bottom of Insta360 Pro. The camera supports the combination with tripod, stabilized holder, flying camera and vehicle sucker, among which tripod is the most frequently used in many scenes. Usually, in order to avoid shooting photographer and shooting content with certain vertical angles, we must require tripod to assist especially during night, sunrise, sunset and in weak light environments, or we need to shoot with long exposure, delay etc. , in which cases, one cannot hold cameras. Here are suggestions for choosing a tripod matching Pro.

1. Mounting point on the tripod holder has two types: 1/4 inch and 3/8 inch. The tripod with 1/4 inch tapped hole can match with the Pro. Most SLR cameras and some camera tripods are of the size, so you have a wide range of choices for tripods on the market.

2. When choosing tripod, one should first consider whether it is stable, and try to choose professional brand or have a try personally to select the suitable one.

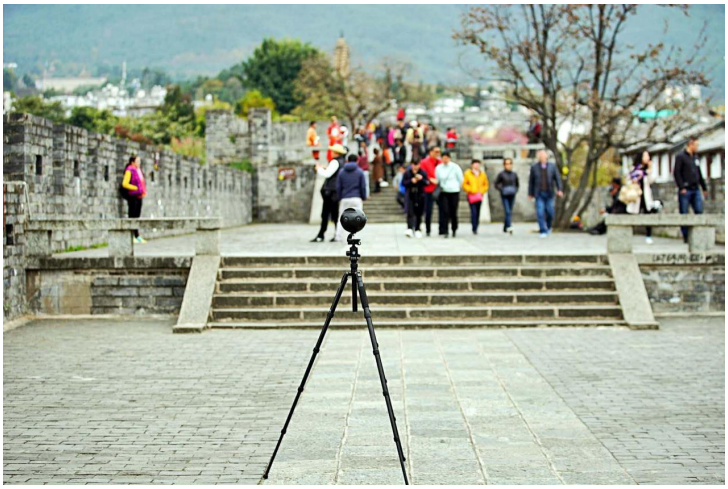
3. Panoramic video always simulates a first-person point of view. The distance of Pro base to lens is about12 cm, so please select tripod with a height above 160 cm.

4. Panorama video also needs bottom stitching. It’s not recommended using a tripod with direction adjusting handle.

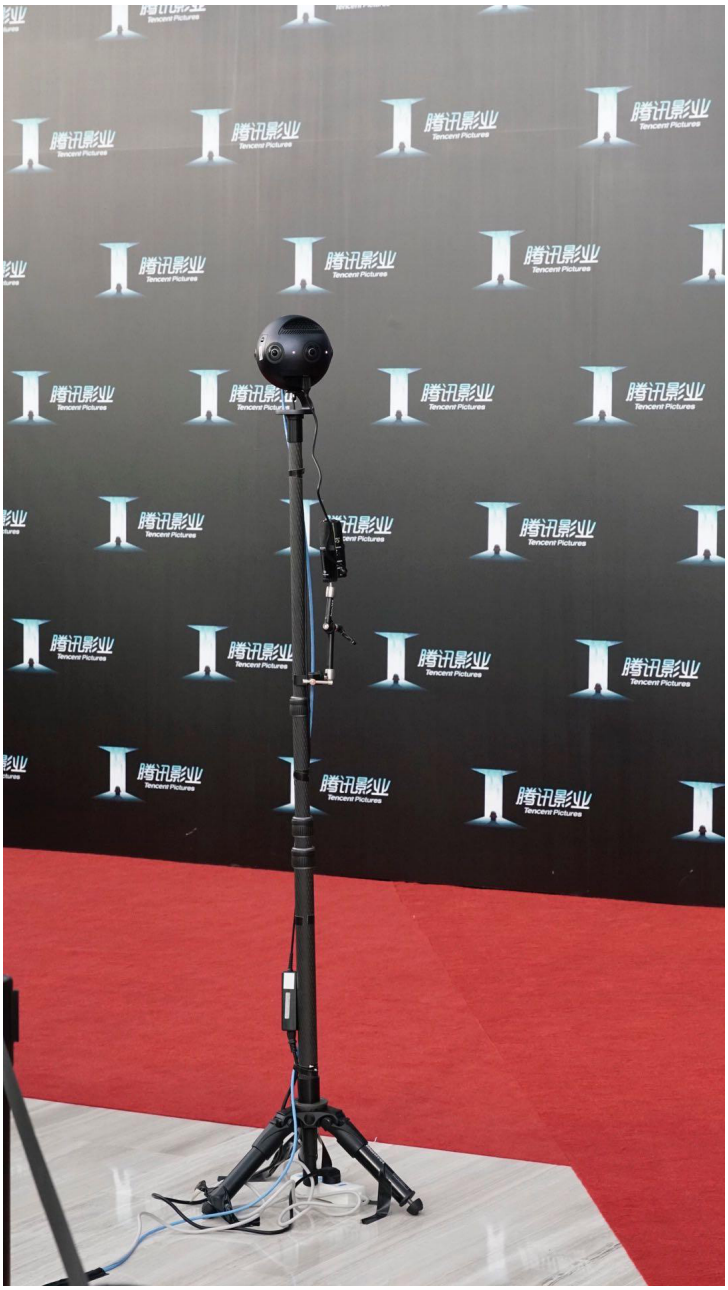
5. Shooting of scenery theme may give priority to single unipod. Unipod occupies a much smaller area than tripod, which is easier to erase in post editing. In panoramic videos, if we look down at our feet, we often find that there is a place that is unnatural or covered with LOGO of the producer, which actually hides the unipod position.

6. If the subject is mainly recording activity or there are many uncontrollable people on the scene, a tripod which is more stable should be chosen to avoid person collision and camera damage.

Do not select tripod with handle



SIRUI Tripod



Manfrotto Monopod

2.1.1 [Beginner] Preparation of photography

Before shooting photos, camera's battery level, format and capacity of storage devices must be checked, environment safety for shooting should be confirmed, and suitable bracket and accessories must be selected.

Storage medium: make sure that the format is exFAT before shooting, in case your shooting will be delayed due to the unsuitable format. Selection and formatting methods for storage media are described in 1.1.3.

Battery power: Pro's battery can be used for about 75 minutes when fully charged. When moving to take photos, one can prepare several spare batteries.

Gyro calibration: before shooting, one can check the preview scene through the camera controlling device of Insta360 Pro to determine whether it needs to have camera calibration. Please see 1.1.4 for detailed method.

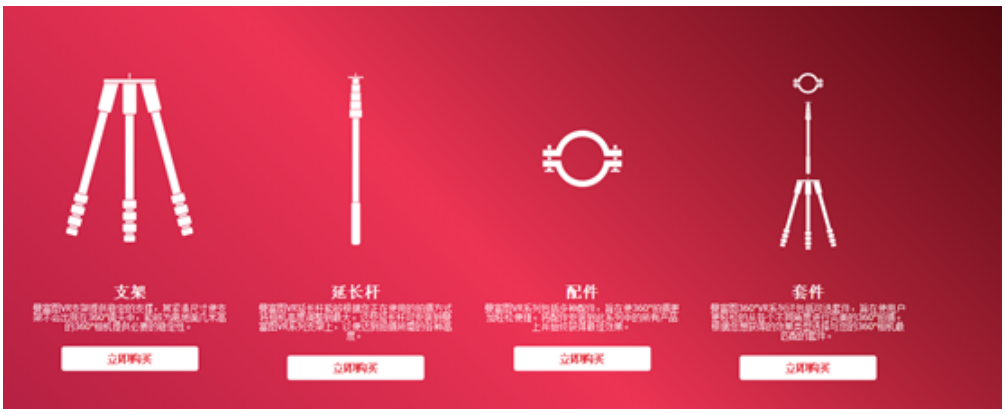
Stitching calibration: if only carrying out post stitching, no camera stitching calibration is needed; if real-time stitching and better preview are needed, one can choose stitching calibration. When there is obvious changes in shooting environment, e.g. from indoors to outdoors, one should have stitching calibration once again. Calibration methods for stitching are described in detail in 1.1.4.

You can manipulate cameras by Insta360 Pro client terminal that supports all the platforms, and the connection operations are described in detail in 1.1.5.

Certainly, you can also take photos without connecting to other devices. The camera has 5s shooting delay by default for standalone use. If additional settings are needed, you can use customize function to save settings so that camera will automatically adopt settings specified last time when starting to have next shoot. The detailed method is described in 6.2.

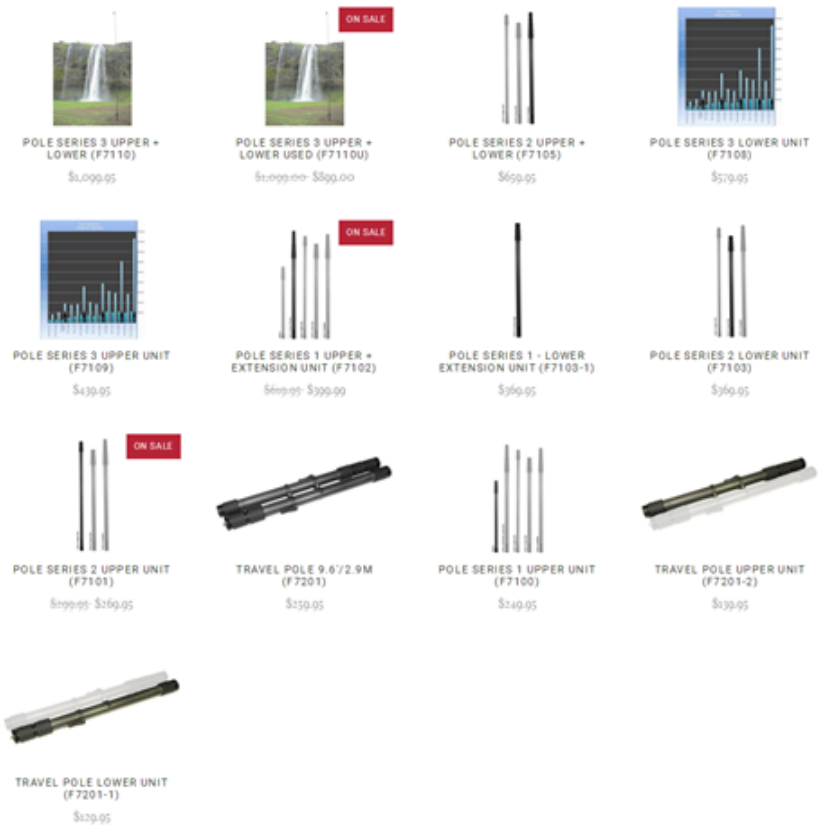
2.1.2 [Beginner] Selection of accessories for shooting

When shooting panoramic view, we should try to reduce the area of bottom bracket as far as possible for convenient post editing. In this sense, Manfrotto VR series products are relatively safe, portable, convenient shooting bracket, which can be regarded as reference for purchase.



https://www.manfrotto.cn/collections/supports/360-virtual-reality

Nodal Ninja Panoramic Photography Equipment series can be selected for overseas brands.



http://shop.nodalninja.com/carbon-fiber-poles/

2.1.3 [Advanced] Selection of advanced accessories for photographing

Suction mount. Pro has a weight of 1225g. Please select suction mount with large suction force for single-lens camera, which is relatively more stable and reliable.

2.1.4 [Advanced] Preparation of special photographing scene (aerial photography)

Aerial panoramic photos:

Unmanned aerial vehicles choose unmanned aerial vehicles with large load capacity, such as DJI S 900, M 600 etc.

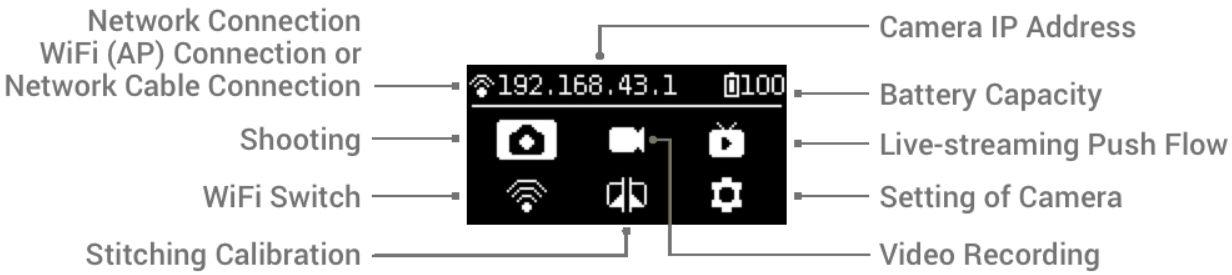
No stabilizer is needed for shooting so you can select a straight bar to connect Pro. You can select unipod straight bar with changeable length or a short rod with fixed length.

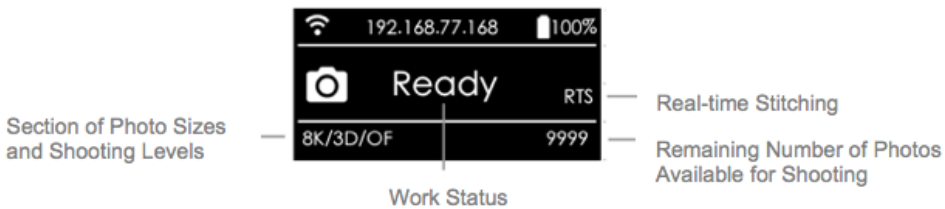
A long rod needs to add spherical pan-tilt at the joint to facilitate takeoff.

2.2.1 [Beginner] Shooting mode screen and settings

Standalone Use

1. Shooting Mode Screen





2. Operation Instructions

(1) Select the shooting mode from the camera menu, press the POWER key to confirm entering such mode. After the camera completes the preparation, the Ready state will be displayed.

(2) When the shooting mode is in Ready state, press UP and DOWN keys to switch over the sizes for shooting.

(3) When the shooting mode is in Ready state, press POWER key and you can take a photo as per the current size. If the real-time stitching level is needed after the photo is taken, the camera will enter the processing state. After processing is done, the photo will be saved, and then, the camera will be switched to shooting READY state.

A 5s countdown is needed in each shooting. During the countdown, the work indicating lamp will flash continuously, accompanied by sound prompt. Be sure to keep away from the camera within the 5s to avoid affecting the shooting effect. There will be a sound prompt after the shooting is done successfully.

3. Specification and level for shooting

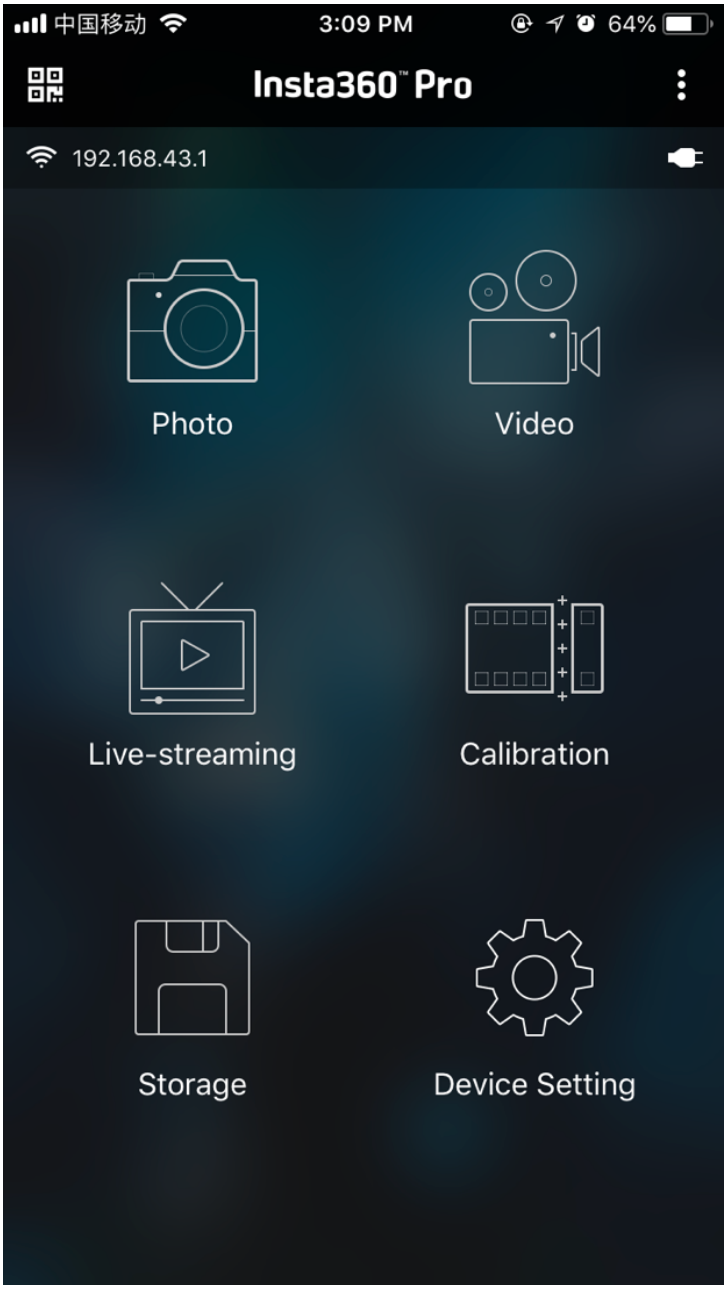
Shooting Specification	**Explanation**
8K/OF RTS	Shoot and store 8K panoramic original photos and real-time optical flow stitching photos.
8K/3D/OF RTS	Shoot and store 8K 3D panoramic original photos and real-time optical flow stitching photos.
8K	Shoot and store panoramic original photos. 8K panoramic or 8K 3D panoramic photos can be made in post-production.
HDR	Shoot and store HDR original photos. 8K panoramic or 8K 3D panoramic HDR photos can be made in post-production.
RAW	Shoot and store RAW original photos. 8K panoramic or 8K 3D panoramic photos can be made in post-production.
Burst	One key shoot and store 10 groups of original photos. 10 8K panoramic / 3D panoramic photos can be synthesized through post-production, and one 12K super-resolution panoramic photo can also be made through post-production.

Shooting Specification	Explanation
Customize	Camera customized options allow users to quickly select parameters saved last time when using app manipulation or QR code scans. Details of usage are shown in Chapter 6, 6.1.2.

Use app for shooting

- **Shoot photos with app (take the interface of iOS app as an example)**

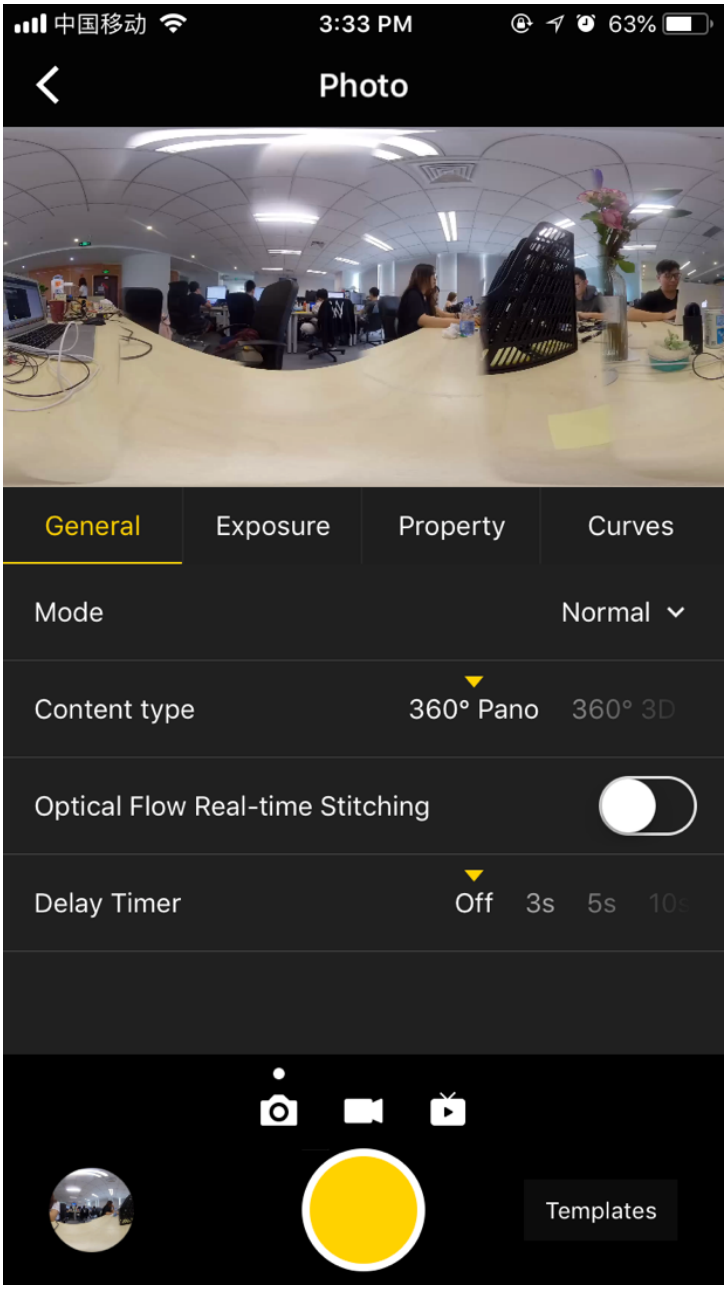
The camera provides access to the following functions: photo, video, live-streaming, calibration, storage and device setting



Click to enter shooting mode, app will automatically load preview stream and get ready to shoot after completion. Open gyroscope for stabilization. With the button on, the camera's real-time stitching function can store pictures and will automatically correct according to gyroscope data.

Note that this feature cannot take effect when recording real-time stitching content or live-streaming of 3D. Click VR preview button to switch to preview under VR glasses mode. Press to close preview screen (save electricity after closing,

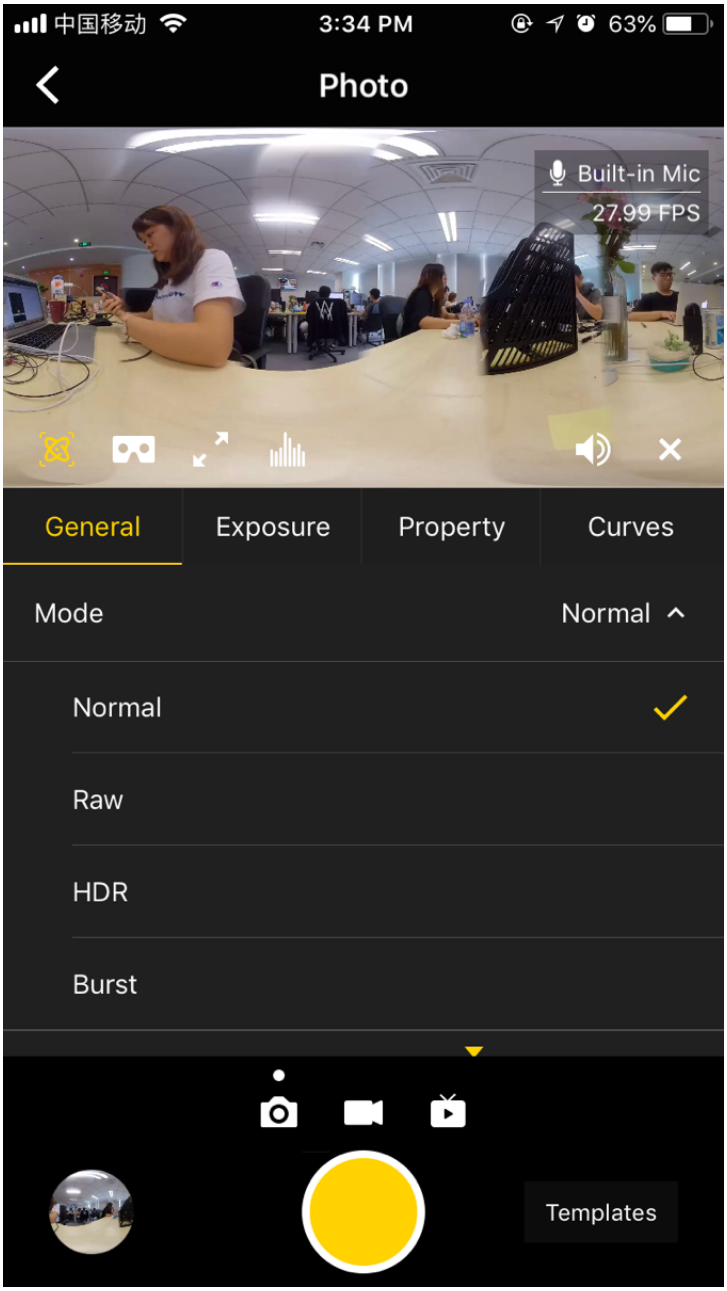
and touch to preview again).

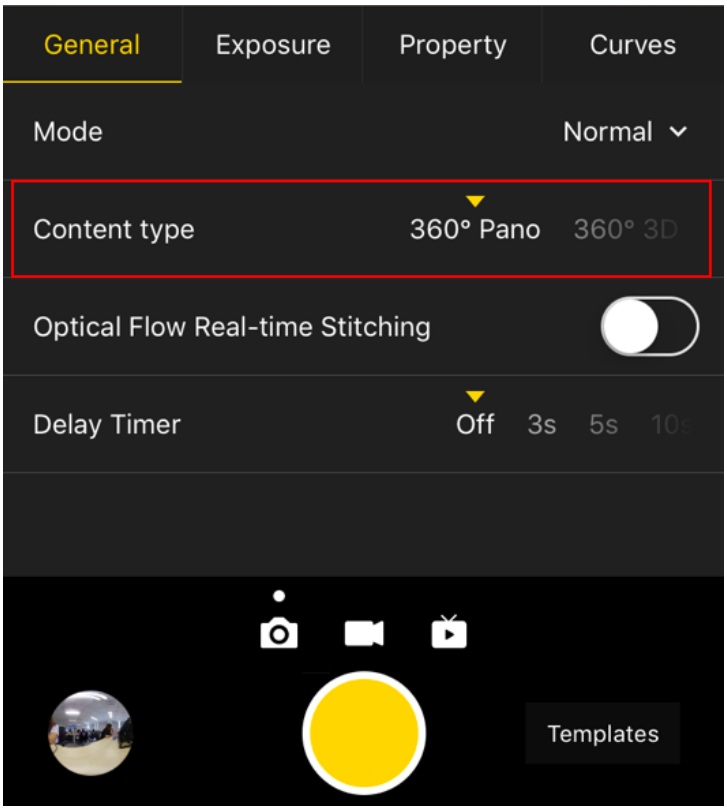


General (Basic settings for photo)

General	Options	Explanation	Post-production
Mode	Normal, RAW, HDR, Burst	Normal, HDR, Burst, can store JPG original photos of 4000x3000 of 6 lenses. RAW stores DNG original photos of 4000x3000 of 6 lenses. Panoramic / 3D images with maximum resolution of 8K can be synthesized in Stitcher.	DNG files can be tinted by software such as Photoshop. 3 panorama photos of different exposure can be exported in post production of HDR, and then use Photoshop and other software to synthesize HDR photos.
Content Type	360° Pano 360° 3D	Associated with the type of video content that is stitched in real time.	Panorama photo or 3D photo can also be composited through Stitcher.

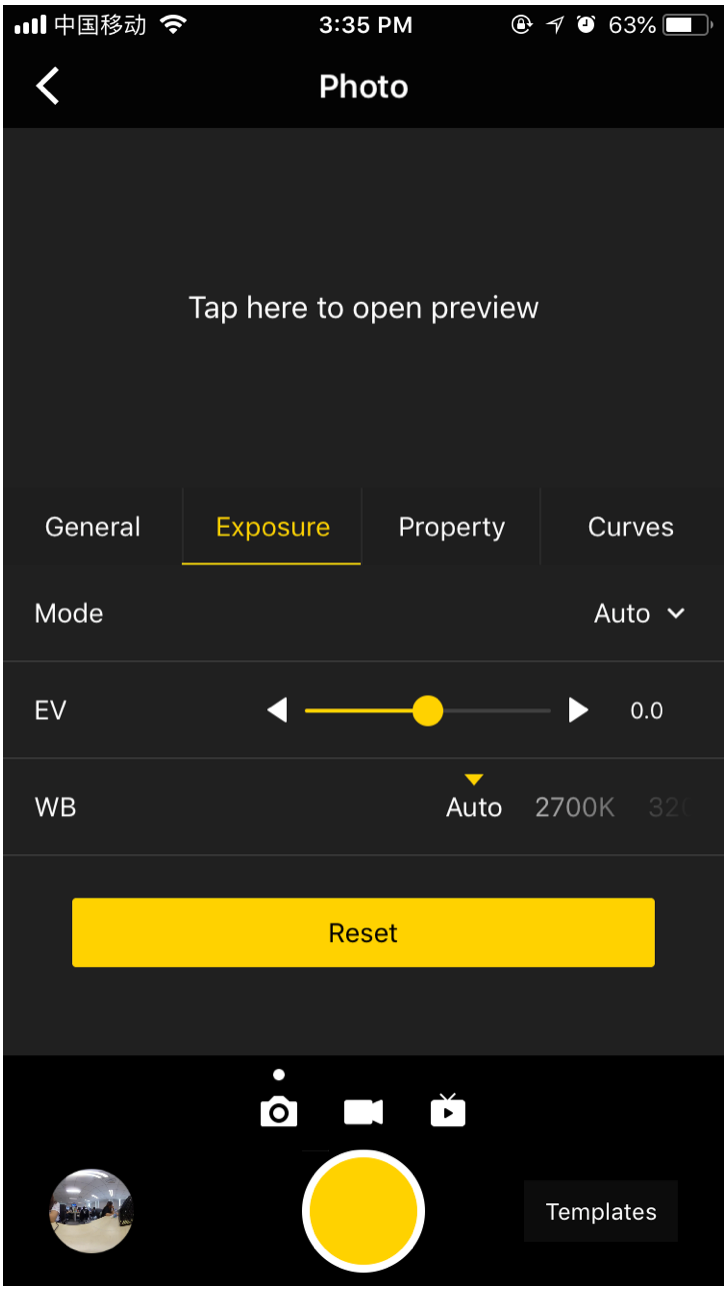
General	Options	Explanation	Post-production
Optical Flow	Turn-on: use optical flow algorithm. Turn-off: use template stitching	Under Normal mode, optical flow algorithm takes time to stitch a 360 °Pano or 360 °3D in real time, simultaneously preserving 6-lens original images. The whole real-time stitching process takes certain time (camera status is Processing) and then enters the next shoot after stitching completed.	When shooting under RAW, HDR, Burst, there is no optical flow real-time stitching options. The camera only stores original photos from 6 lenses. Users can use Stitcher for stitching.
Delay Timer	None，3S，5S，10S	Cameras will shoot after countdown is over.	
Reset			

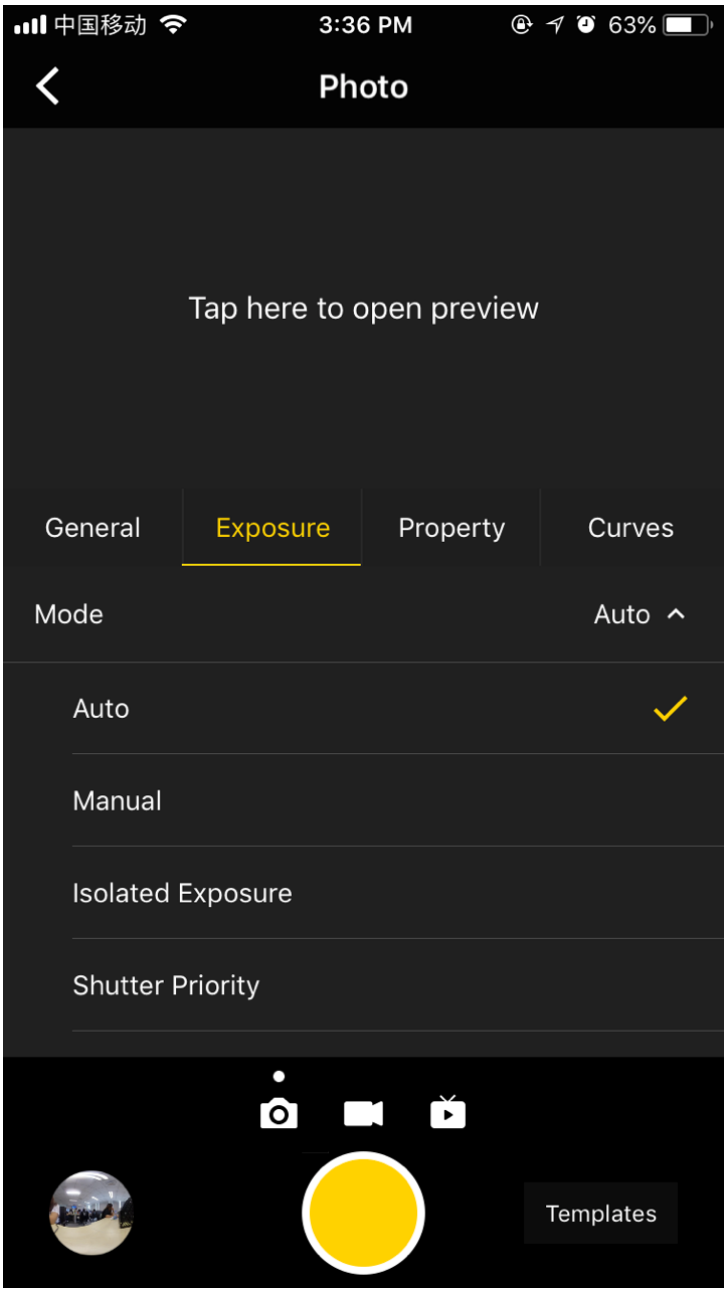


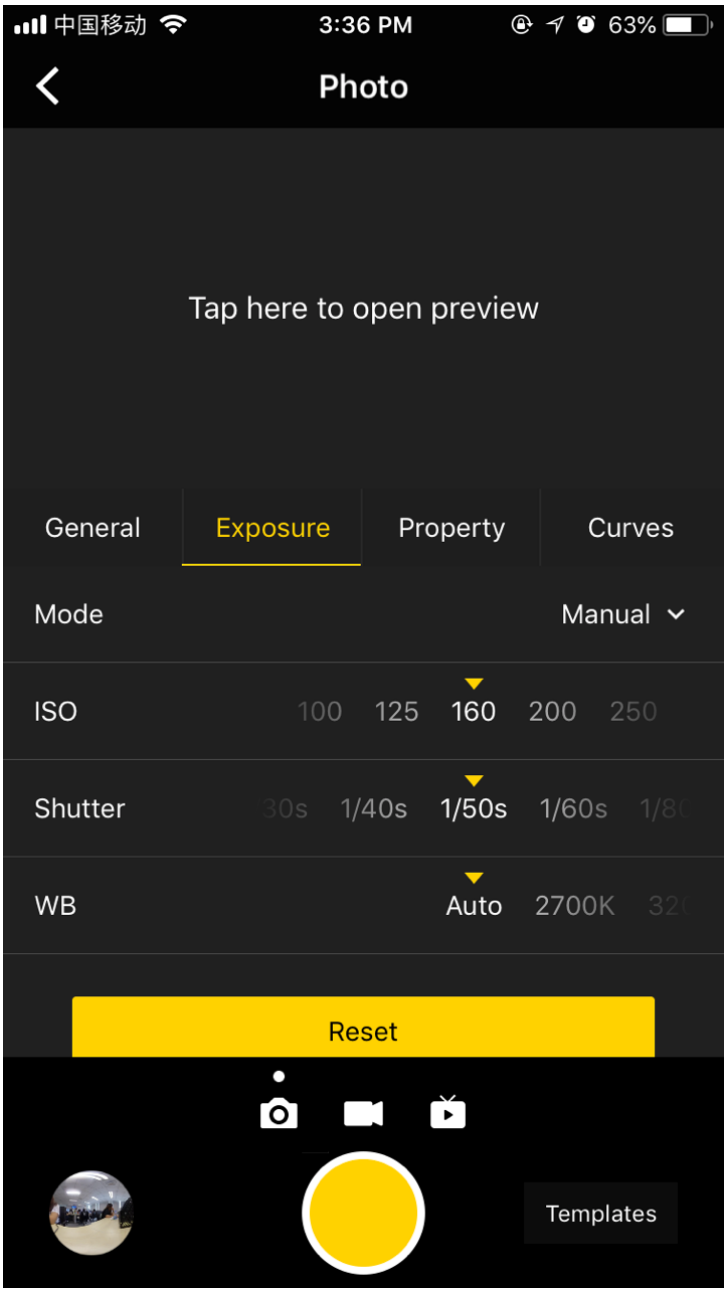


Exposure:

Exposure:	Options	Explanation
Auto	It can adjust EV, white balance	In the Normal shooting mode, the range of EV is -5 ~ 5. The range of adjustable EV values in HDR mode is -3.9 ~ 3.9
Manual	ISO range： 100 ~ 6400 Shutter speed range： 1/2s ~ 1/8000s for ordinary Shutter, 1s ~ 60s for Long Shutter WB levels： Auto （auto white balance), 2700K, 3200K, 4000K, 5000K, 6500K, 7500K	
Isolated Exposure	Six lenses will expose independently and automatically, to adjust EV, white balance	Isolated Exposure is suitable for shooting scenes with sharp light and shade contrast, such as shooting bright windows and indoor scenes, bright scenes but darker seats in the audience.
Shutter first	Shutter parameters can be set manually; other parameters are automatically matched by camera	
ISO first	ISO can be set manually; other parameters are automatically matched by camera	
Reset		

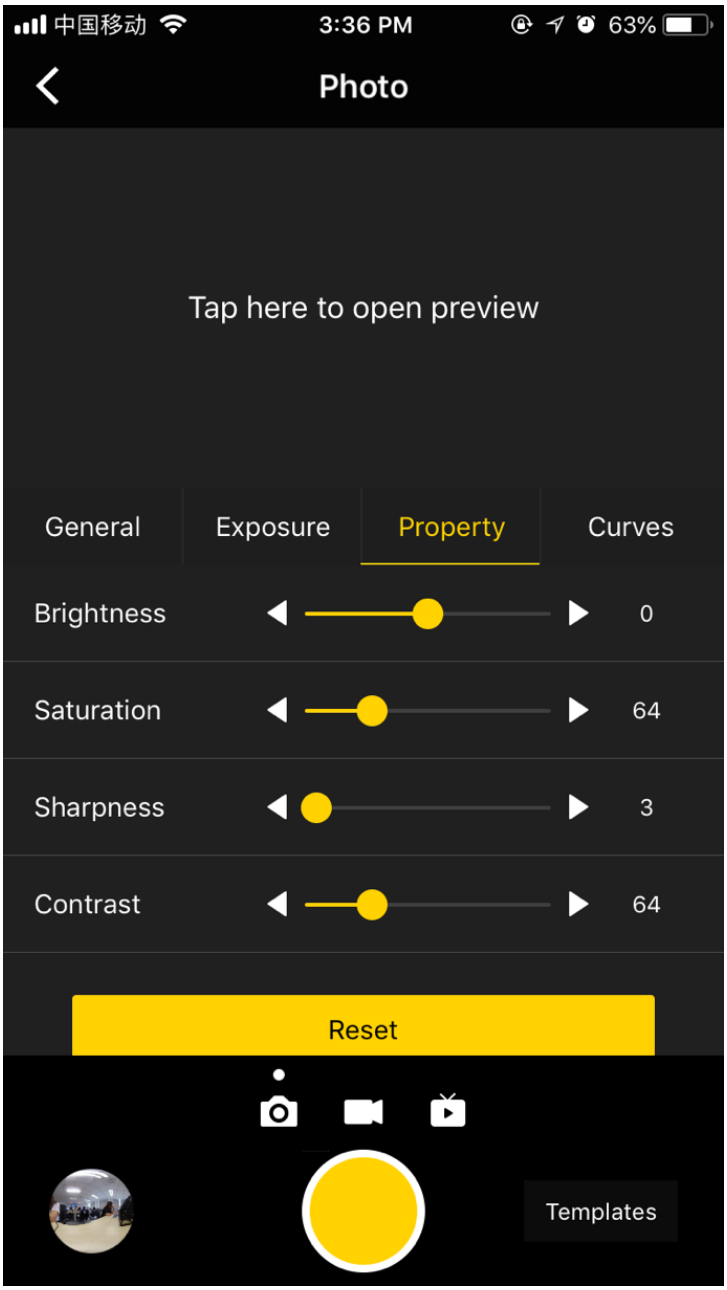

中国移动
3:35 PM
63%
Photo
Tap here to open preview
General
Exposure
Property
Curves
Mode
Auto
EV
0.0
WB
Auto
2700K
Reset
Templates


中国移动
3:36 PM
63%
Photo
Tap here to open preview
General
Exposure
Property
Curves
Mode
Auto
Auto
Manual
Isolated Exposure
Shutter Priority
Templates

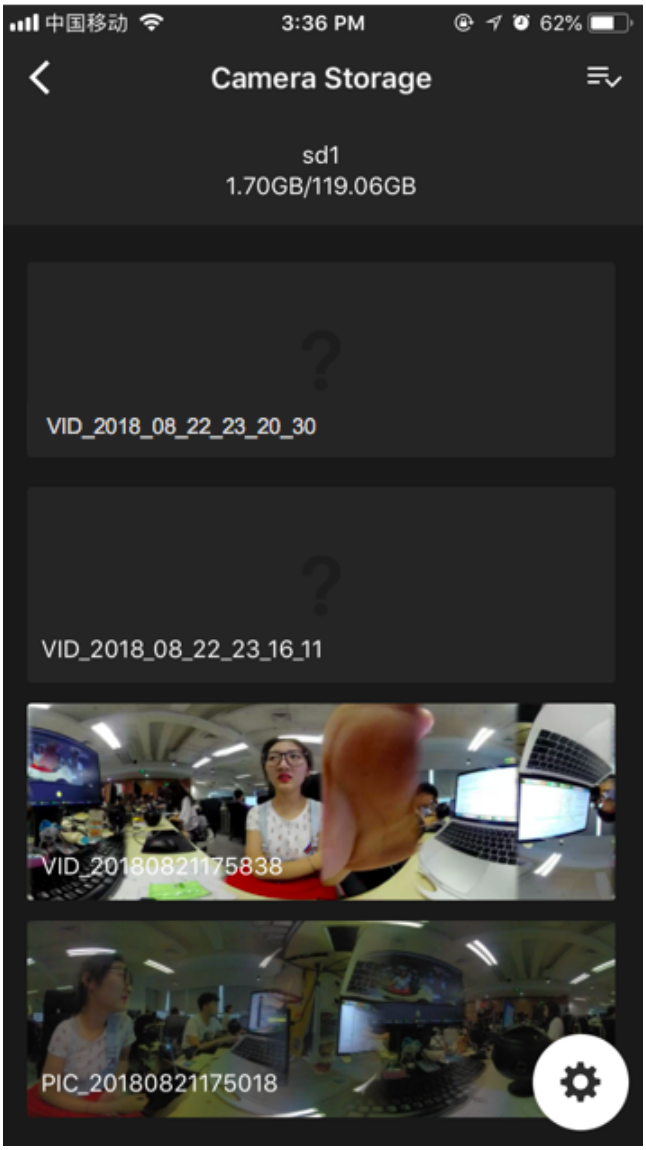


Property

Property	Options	Explanation
Brightness	-255 ~ 255	Note: Property settings generally do not modify, especially sharpness, which may cause noise increase after modification.
Saturation	0 ~ 255	
Sharpness	3 ~ 6	
Contrast	0 ~ 255	
Reset		



After shooting the desired contents using the mobile app, you can enter the storage management album through the shortcut entry in the lower left corner, to access the file folders containing the shot contents just now and from history. Except for those in the HDR, RAW, Burst or Timelapse mode, all the materials may be previewed, which is helpful for the user to locate a material quickly. Users can view individual material file via client terminal and download pictures to mobile phones. However, most of the material files are larger in volume, plus a camera's performance of downloading and playing is relatively weak, so it is recommended that users should use a computer to view and manage the shot materials.



With the storage management function, you can view the capacity of the storage device currently configured to the camera. And you can also click the gear icon in the lower left corner to test the speed of the storage device.

- **Precautions for shooting**

In mobile AP connection, it may cause unstable connection due to crowd density, and shelter, etc.

Pro is not waterproof so it cannot be photographed underwater nor does it recommend photographing in rainy weather.

Optical flow stitching algorithm is designed to detect each pixel between frames. And if no similar point is found in adjacent images, ripples will be generated at moving objects or lens seams. For example, in front of wallpaper of fine vertical stripes are reflective glass or stainless steel railings.

Therefore, we should try to avoid these situations and place the camera in the scene with details that are rich but non-repetitive.

Safe distance: the safe distance of optical flow stitching is 50cm. The safety distance between template stitching is 1.5m and safe distance should be considered in camera’s position.

2.2.2 [Advanced] Shooting in special format (Raw, HDR, Burst, super-resolution)

Photo of Normal mode

RAW is to store photos shot by 6 lenses to be the most primitive DNG images, which can be synthesized into 8K / 3D panoramic photos later, saving the details of images to the maximum. When using Raw to shoot, it is recommended to use with high image quality requirement and in the environment with large light difference. And Photoshop might be needed for post-production as well.

HDR is to consecutively shoot three-group photos of different exposure, to form a photo with high tolerance through AEB. It is recommended to use HDR in still environment with large light difference.

Burst Burst is to shoot 10 groups of photos. The continuous capture is carried out based on the camera shutter speed, so the shutter speed is 1 / 10s to the minimum. 10 continuous captured photos can be exported. This mode can be used in taking group photos and static scenes.

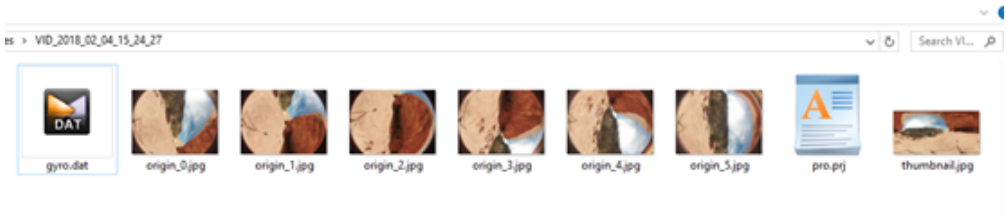
For Burst super-resolution shooting, if you want to synthesize 12K super-resolution image in post-production, you need to shoot in static environment, because the 10 photos taken by continuous shooting are limited by shutter speed and shooting intervals, and the camera cannot continuously capture in a high speed. Moving characters or objects will cause ghosting on the synthetic images. Concrete results are shown in 2.3.2 .

2.2.3 [Advanced] method for aerial-shooting panoramic picture

Under Timelapse mode, by setting the interval time, you can continuously take photos. After shooting, you can use Insta360 Stitcher for stitching and exporting in batches, and then to select the appropriate pictures.

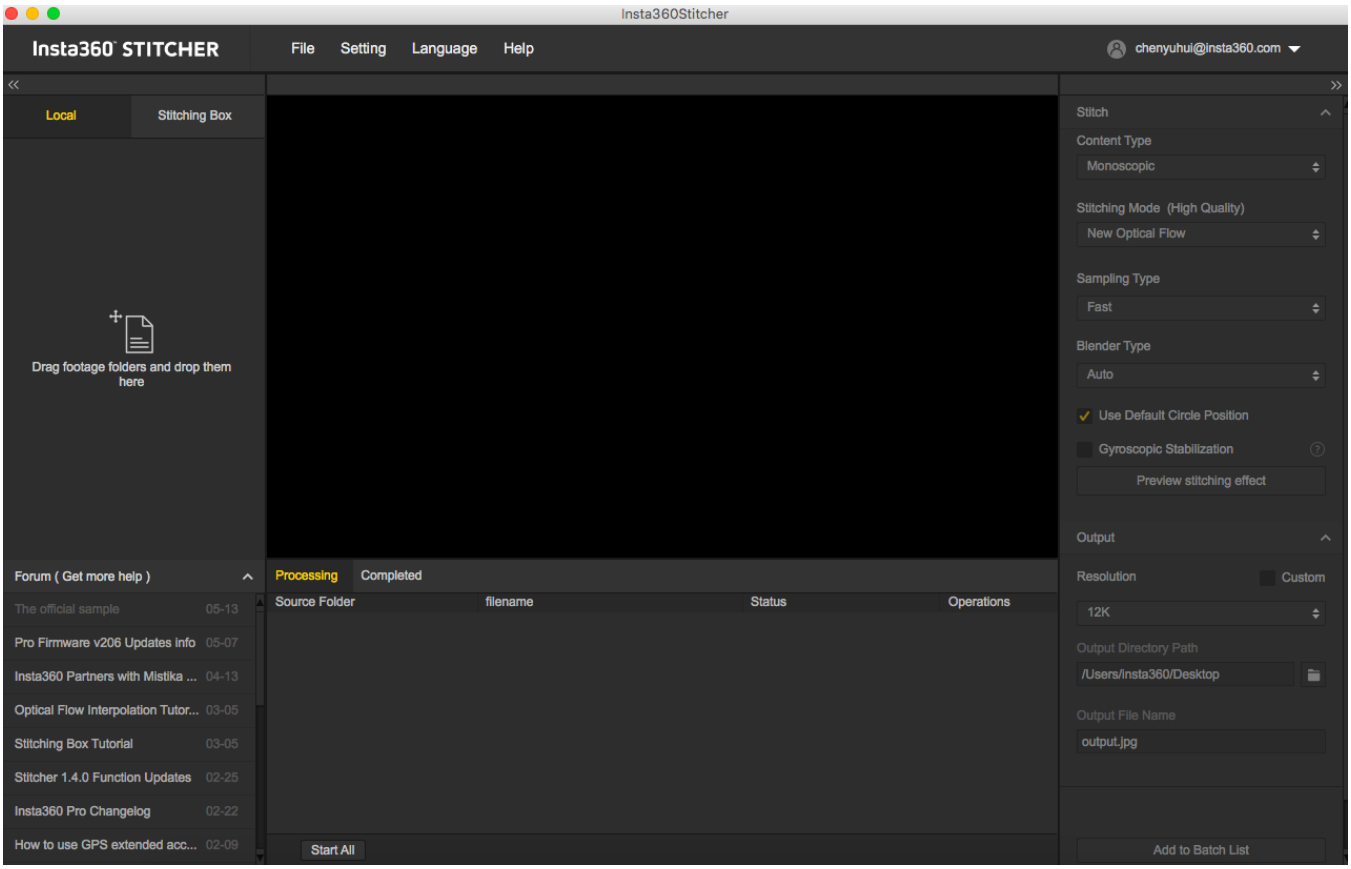
2.3.1 [Beginner] Photo stitching by Stitcher

1. Format of Photo Files



- Photos are stored as jpg or dng formats.
- Each shot creates a folder containing all description files (gyro.bat and pro.prj) as well as photos.When the camera opens up gyroscope, it generates a file called gyro.bat.
- origin_*.jpg sequences are original files captured by each independent lens for later stitching. Resolution is 4000x3000, which can be stitched into panoramic photos of 7680x3840 or 7680x7680 3D panoramic photos.
- thumbnail.jpg is a preview photo of 1920x960.

2. Stitcher interface introduction



- On the top is the menu bar: File, Settings, Language, Help. You can find functions of file import, google street view upload, log display, preference settings (hard soft decoding) , hardware performance test, language settings, log upload, etc.

- On the left is a list of files. You can drag folders directly to import files. Stiching Box refers to using Pro's own function for stitching. For more details, please refer to 3.3.4

- Pro's official forum is shown at the bottom left, which provides latest software information, tutorials, technical discussions, feedback and suggestions to Insta360.

- In the middle is real time monitor window, supporting the playback of the file in any lens.

- Below is task status bar, where you can see the stitching process and check what has been done.

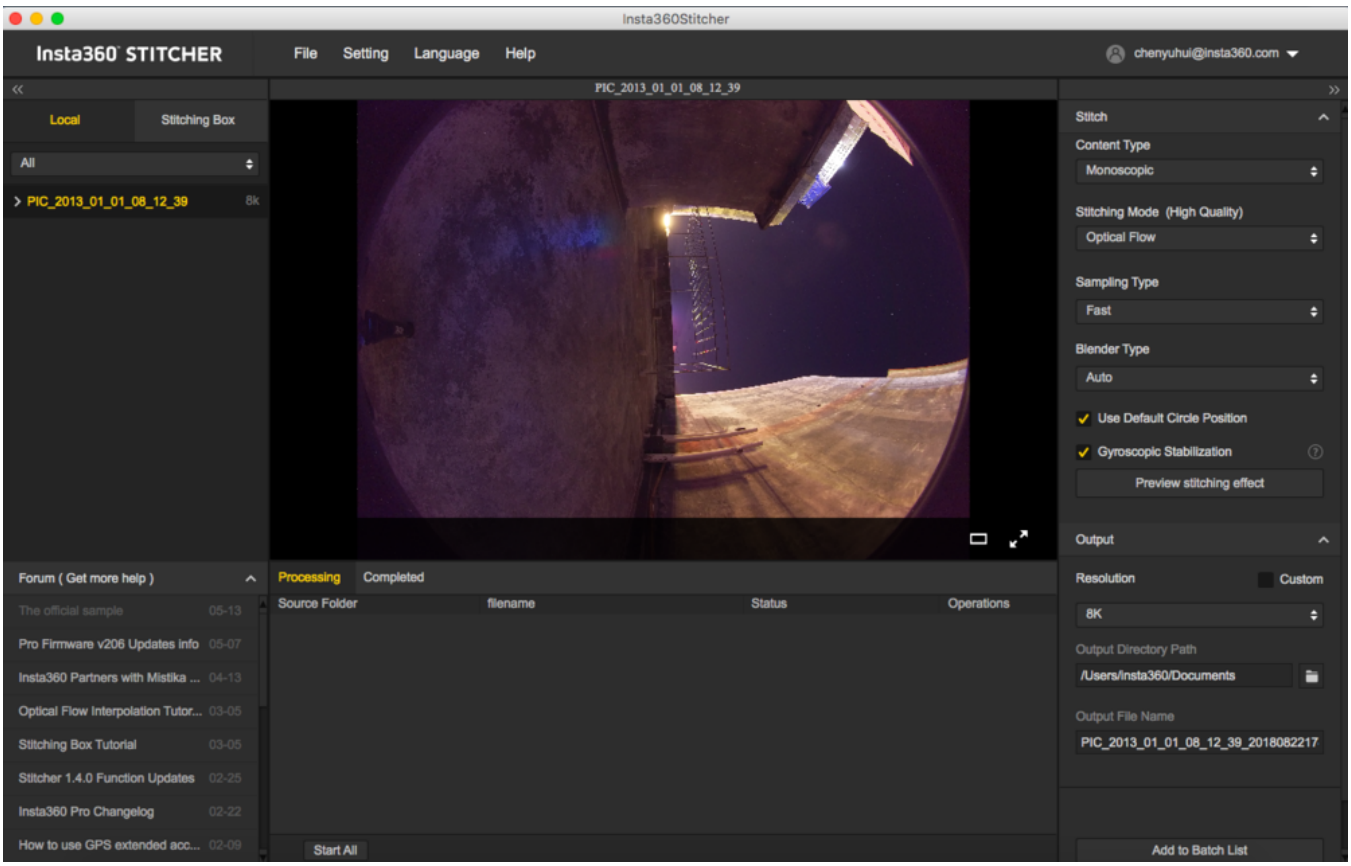
- In the upper right is stitching setting area, where you can set up stitching Content Type (Monoscopic and Stereo) and Stitching Mode (optical flow and template stitching).Sampling type and Blender Type generally have default settings. Default Circle Position is used to optimize stitching at top of the frame and under dark conditions.

- The lower right corner is output settings, where you can set the exported resolution, output directory path and output file name.

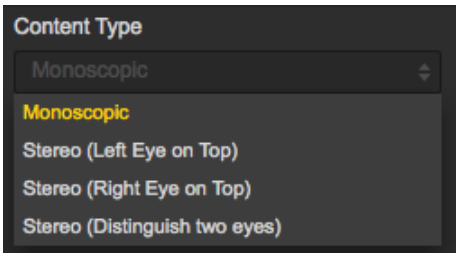
- Stitching effect preview is for you to check the stitching effect of various play modes, manually adjust main angle of stitching, optimize stitching at top of the frame, make color correction, etc.

3. Stitching step

Import a picture folder



Content Type can be Monoscopic, Stereo (Left Eye on Top), Stereo (Right Eye on Top), Stereo (Distinguish two eyes).

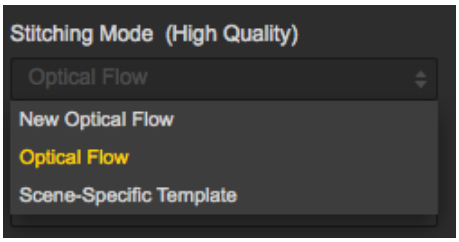


For Stitching Mode, you can select new optical flow and optical flow to calculate new template according to current picture.

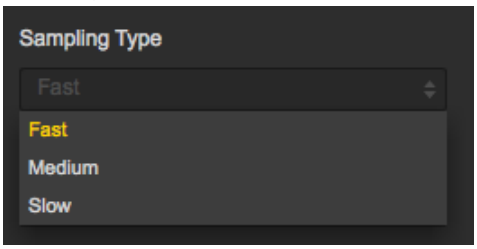
Optical Flow: basic optical flow algorithm, general stitching speed.

New Optical Flow: an increase of nearly 3 times of stitching speed on original basic optical flow but few scenes can achieve less stitching effect than basic optical flow. It is suggested to try basic optical flow and compare effects when you feel dissatisfied about the stitching effect of new optical flow.

Scene-specific Template: speed is fastest but it is not optical flow stitching, so it has limited effect when there's parallax error and in near distance.



As for Sampling Type, if the camera is still static then three sampling types are not very different from each other. If the camera is moving, sampling with slower speed can obtain better image quality which is commonly used in video stitching.

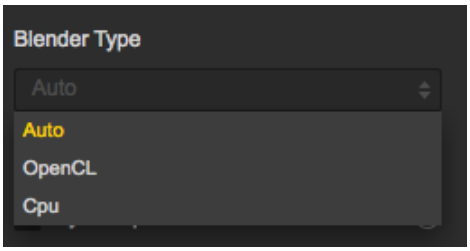


Blender Type is generally automatically chosen by the computer.

CUDA: if the computer use NVIDIA graphics cards, you have to select NVIDIA CUDA technology to enable hardware acceleration.

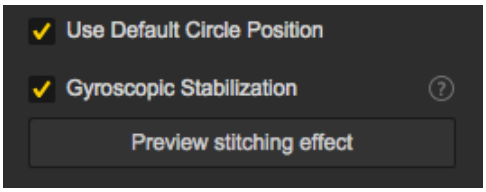
OpenCL: if the computer doesn't use NVIDIA graphics cards, we also provide hardware acceleration through OpenCL.

CPU: non hardware acceleration, pure CPU computing.

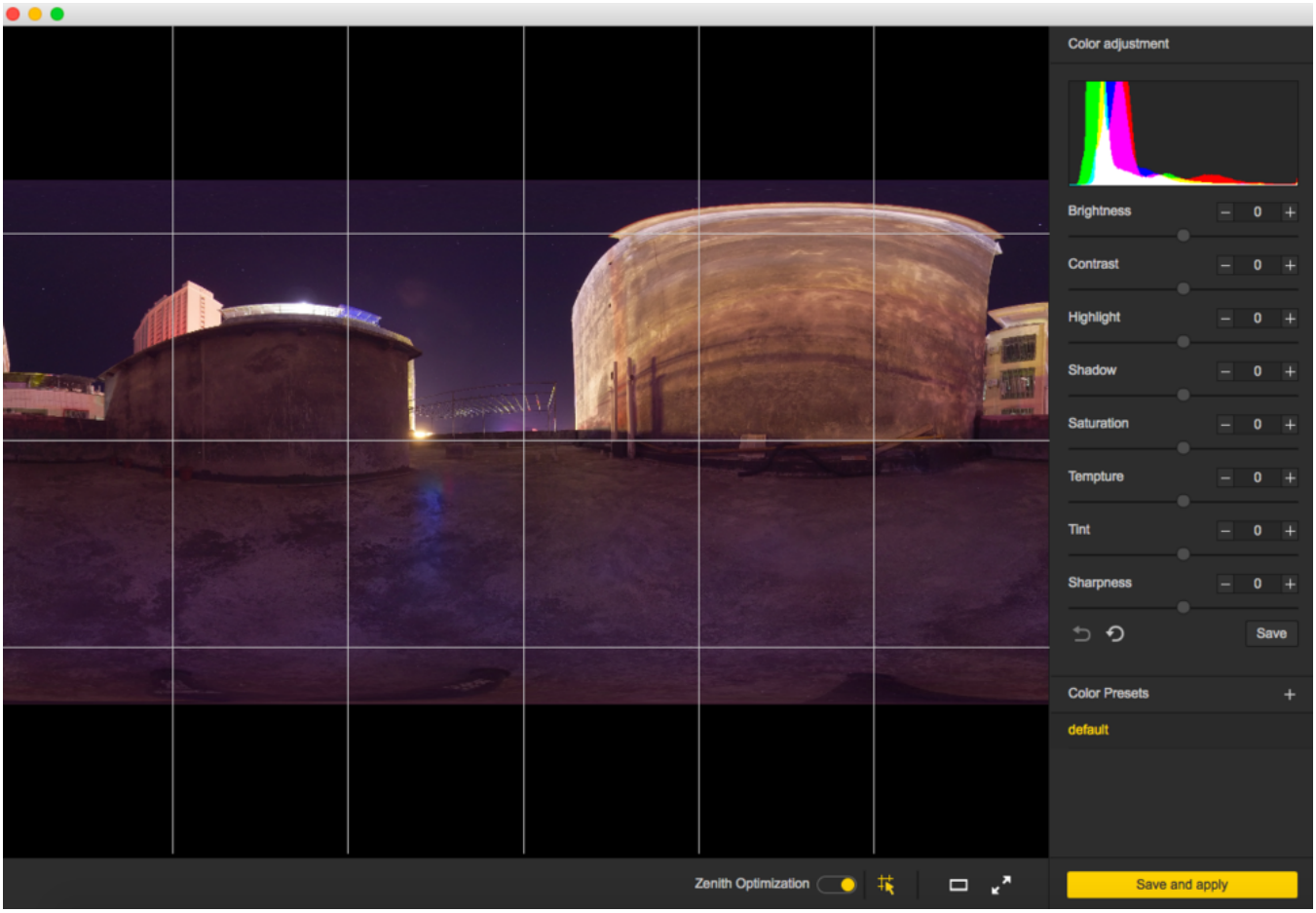


Using default circle position option for some scenes with shelter at top and scenes under dark conditions will help improve stitching effects.

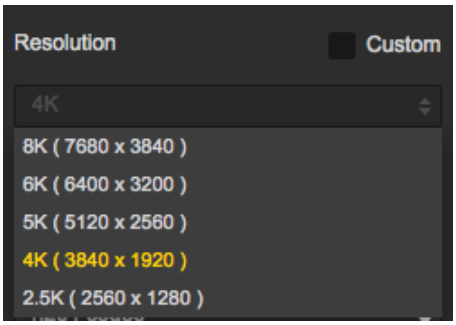
Gyroscopic stabilization can make screen automatically keep horizontal when exporting 2D panoramic photo.

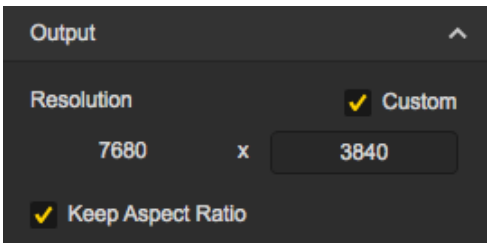


Stitching effect preview is an important step in which you can adjust screen level, center angle of view, and make simple color correction. Zenith Optimization function can optimize scenes with regular lines at top, such as air conditioning exhaust vents on the ceiling.

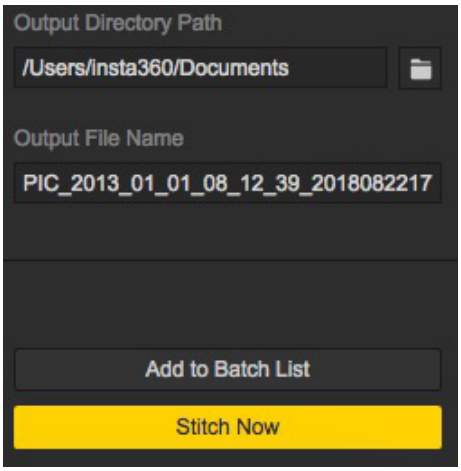


Resolution can be customized in output settings except the preset ones.





Output directory path and output file name can be set. When setup completes, you can add to batch list for pending processing or stitch immediately.



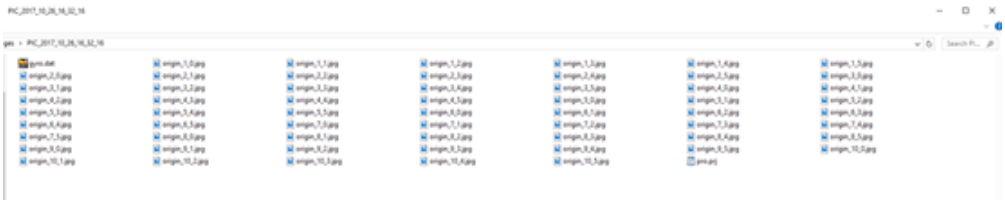
Progress is shown in taskbar. After stitching completes, you can open folder to view stitched photos.

4. Stitching of special shots

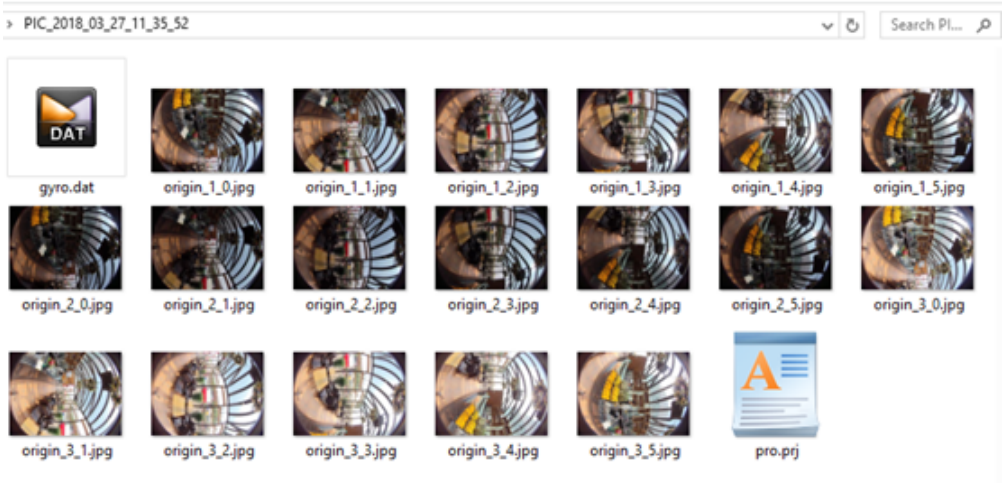
Raw: DNG is an image taken with Raw, and it saves the most original information, which gives lots of room for post-production. It requires stitching in Sticher first. After completion of stitching, synthetic panoramic images of DNG format can be processed in Photoshop for post-production and exported panorama photos in jpg format.

Burst mode: files of Burst mode are 10 groups of original photos, can be stitched and exported 10 panoramic photos. You cannot preview stitching effect of the photos when stitching. After stitching completes, it will generate 10 photos,

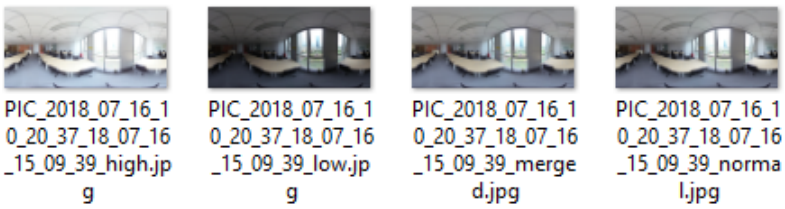
named output_*.jpg



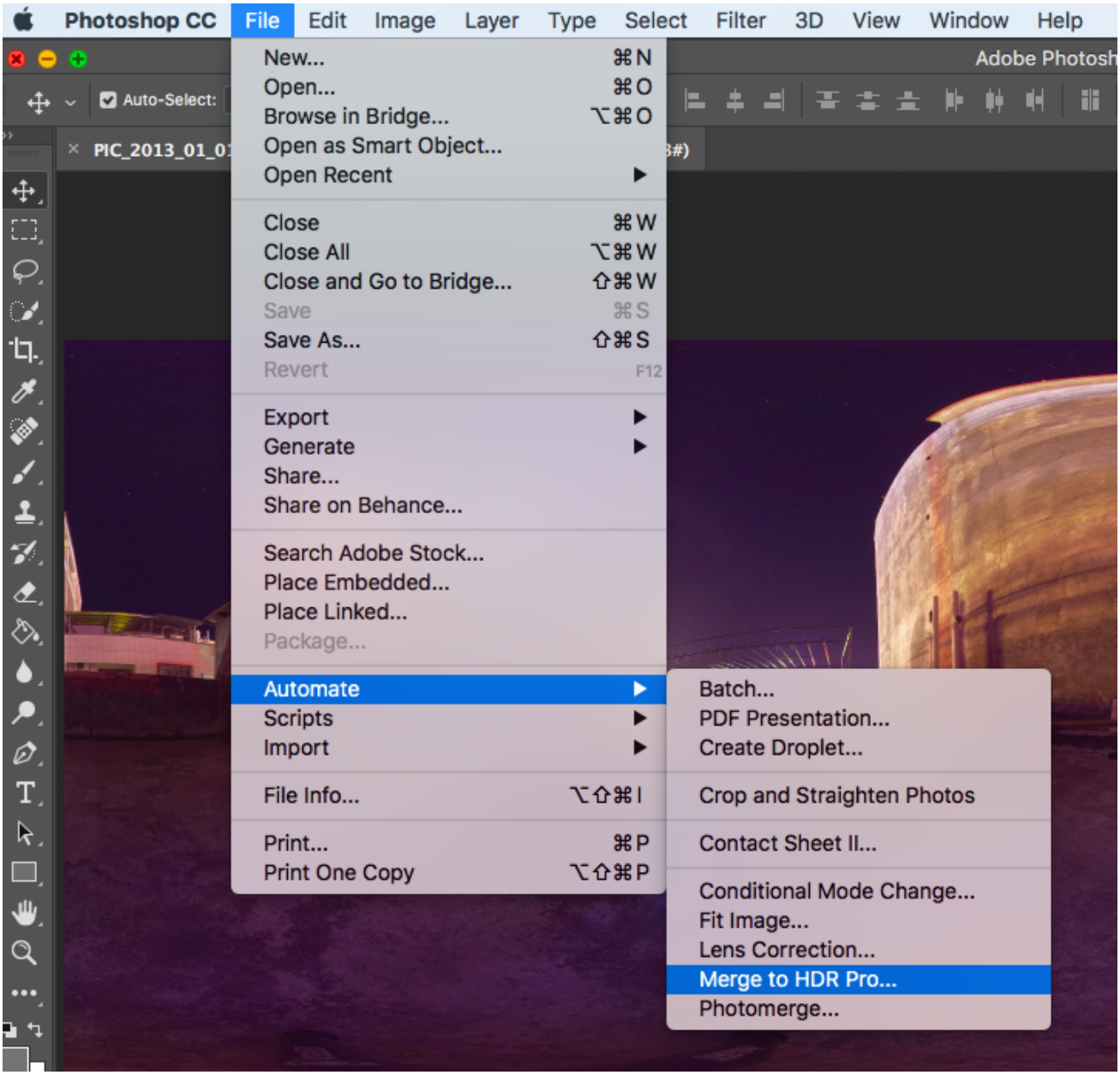
HDR mode: photos taken under HDR mode are three groups of original photos with different exposures. After stitching, a photo with a higher dynamic range will be generated. Three panoramic photos with different exposures are also generated. You can import them into other softwares to synthesize HDR images.

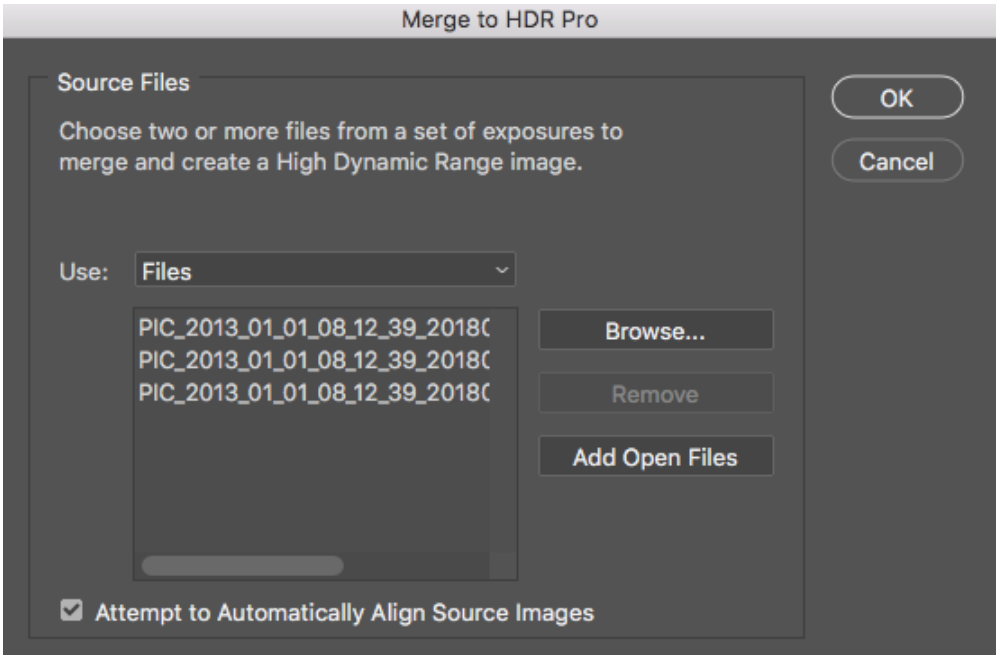


The following are the output of four photos, including high, low, normal and merged.



Methods for creating HDR images by using Photoshop:


Photoshop CC
File
Edit
Image
Layer
Type
Select
Filter
3D
View
Window
Help
New... ⌘N
Open... ⌘O
Browse in Bridge... ⌥⌘O
Open as Smart Object...
Open Recent
Close ⌘W
Close All ⌥⌘W
Close and Go to Bridge... ⇧⌘W
Save ⌘S
Save As... ⇧⌘S
Revert F12
Export
Generate
Share...
Share on Behance...
Search Adobe Stock...
Place Embedded...
Place Linked...
Package...
Automate
Scripts
Import
File Info... ⌥⇧⌘I
Print... ⌘P
Print One Copy ⌥⇧⌘P
Batch...
PDF Presentation...
Create Droplet...
Crop and Straighten Photos
Contact Sheet II...
Conditional Mode Change...
Fit Image...
Lens Correction...
Merge to HDR Pro...
Photomerge...
Auto-Select:


Merge to HDR Pro
Source Files
Choose two or more files from a set of exposures to merge and create a High Dynamic Range image.
OK
Cancel
Use: Files
PIC_2013_01_01_08_12_39_2018(
PIC_2013_01_01_08_12_39_2018(
PIC_2013_01_01_08_12_39_2018(
Browse...
Remove
Add Open Files
Attempt to Automatically Align Source Images

Timelapse stitching will be introduced in 3.3.3.

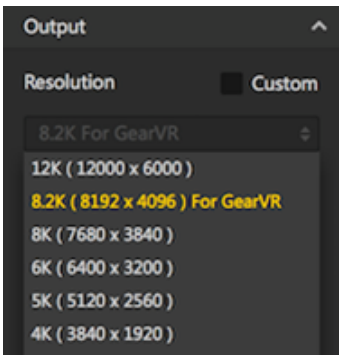
2.3.2 [Advanced] How to stich Super Resolution photo with Burst photo

Photos shot on Pro in Burst mode of 8K resolution can be exported to 12K photo with Super Resolution function. This function was developed to enhance the quality of still shooting. For best results, please use this function in a setting where movement is limited. This will diminish the possibility of moving objects creating undesirable stitching effects or shadows.

Steps:

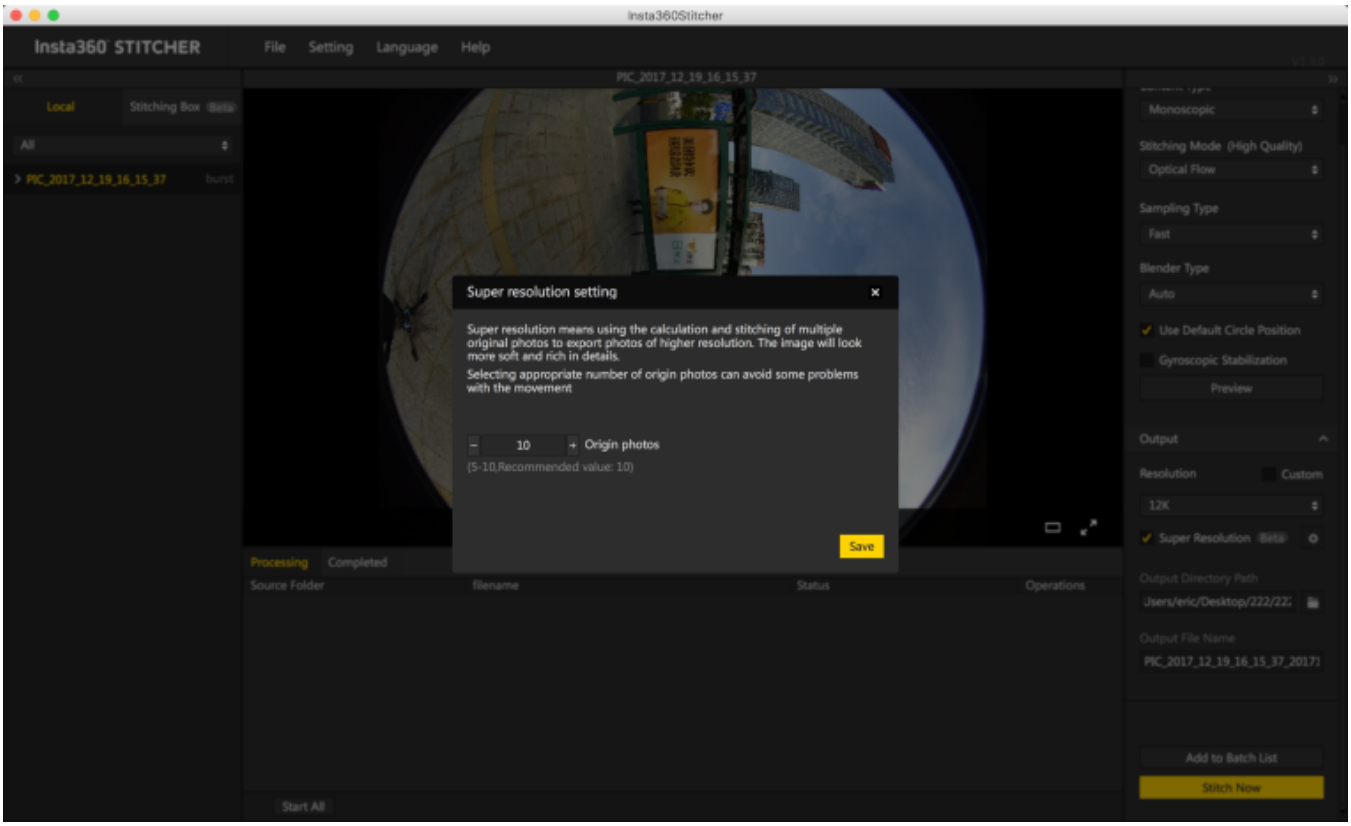
1. Import the burst photos in to Insta360 Stitcher. The "Super Resolution" option will be shown in the sidebar on the right.

2. Choose the "Super Resolution" option, and the highest resolution will increase by two grades, 8.2K for the best GearVR effect and the other 12K. The default Super Resolution is 8.2K.



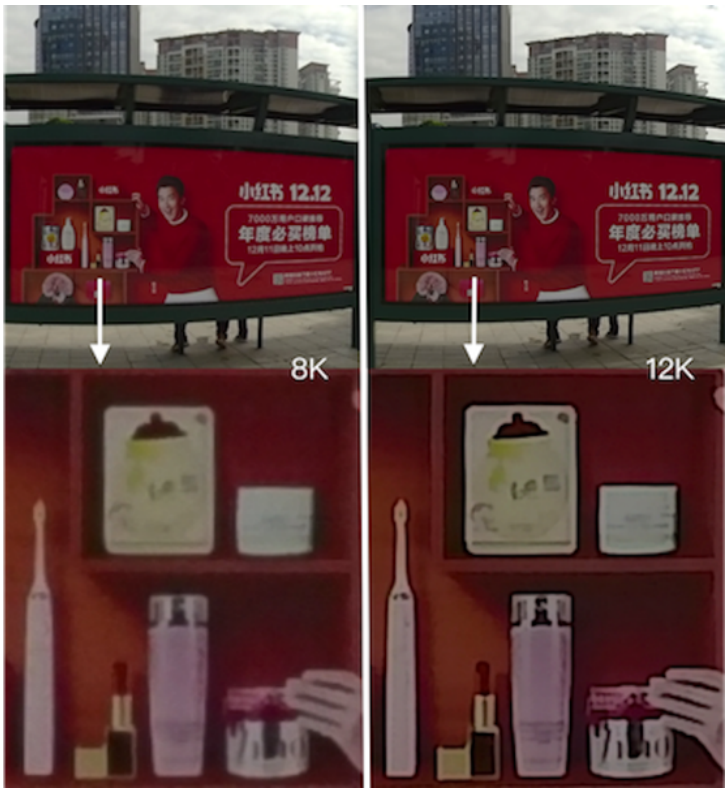
3. If the super resolution function is used for the first time, the setting of origin photos for super resolution is required. Please select an appropriate number of origin photos. The range should be 5 to the recommended value.

   If the image quality is not good, please adjust the number of origin photos to avoid some problems with the movement.



4. Save the intended value in "super resolution setting". Create a task to export (original photos are the 8K bursts), and one 12K resolution photo will be produced.

Compared to the 8K original photo on the left, the 12K super resolution photo on the right shows details with greater sharpness.



Tips: To attain the best super resolution image results, please make sure photos be taken in stationary. The more static the camera stays during shooting, the more clear the image will be. It has been proved that photo shot in an environment with minimal interruptive movement will achieve great image quality.

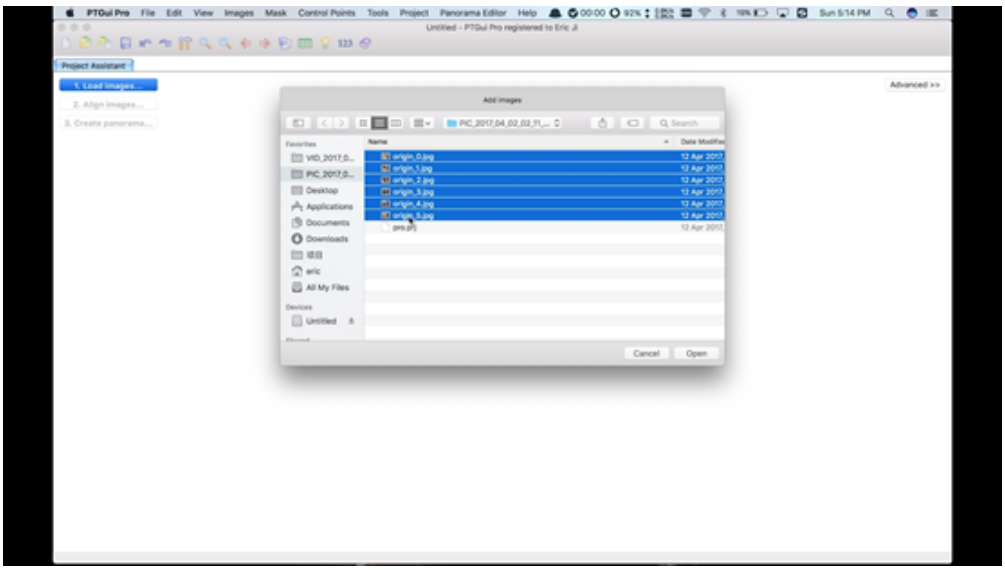
Check out the following demonstration video for more details: https://v.qq.com/x/page/j05295y87ns.html?start=13

2.3.3 [Advanced] Stitching by third party software, such as PTgui, etc.

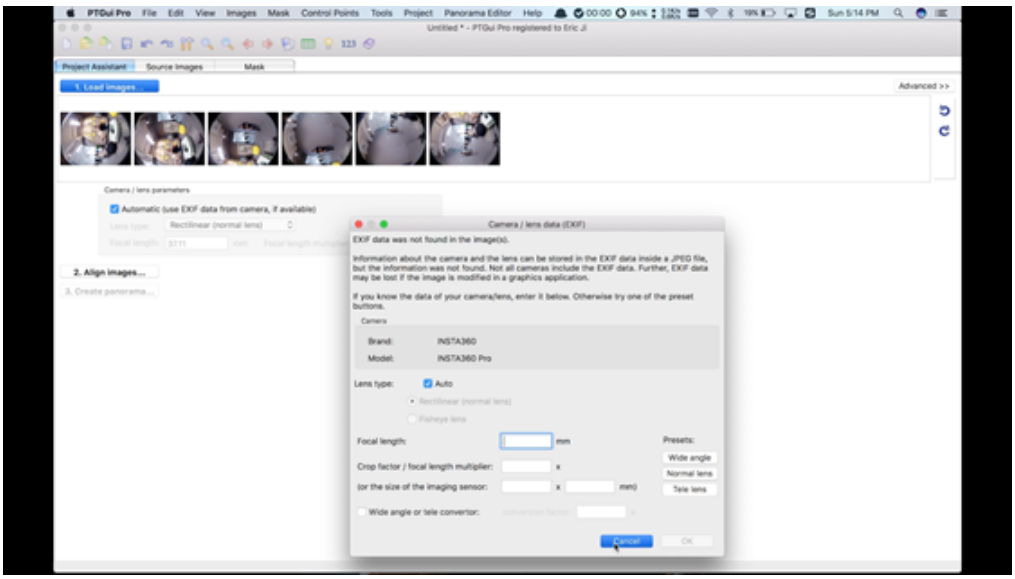
The original images of 6 lens are saved for every shoot, so we can put them together with third party stitching software, taking PTgui, Autopano Giga, Mistika VR as examples here.

1. PTgui stitching preservation template

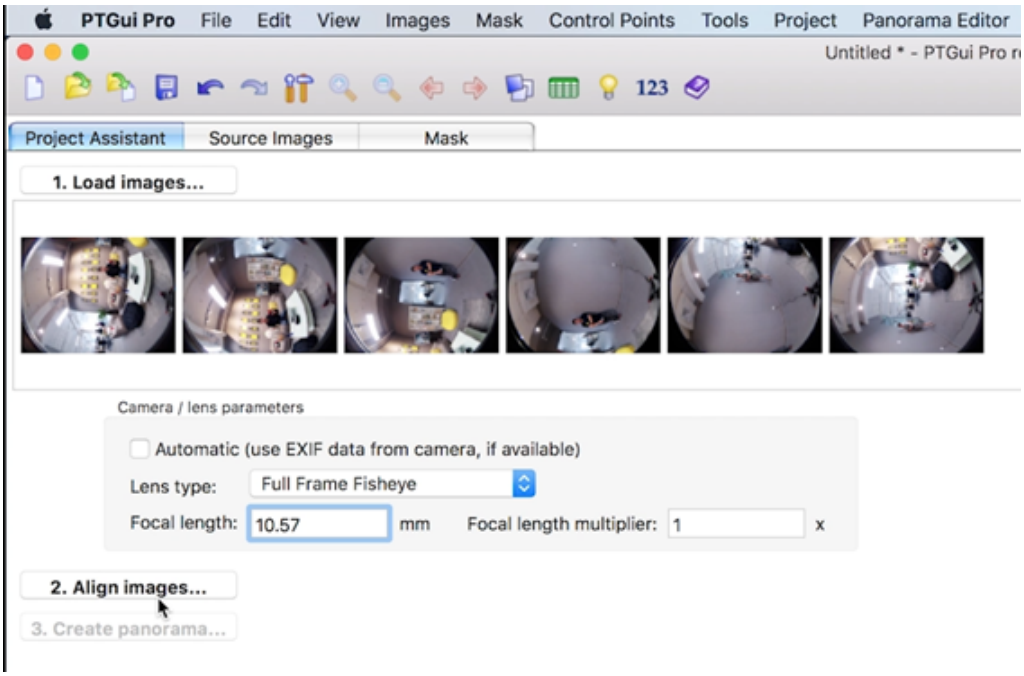
Load images-import 6 original pictures



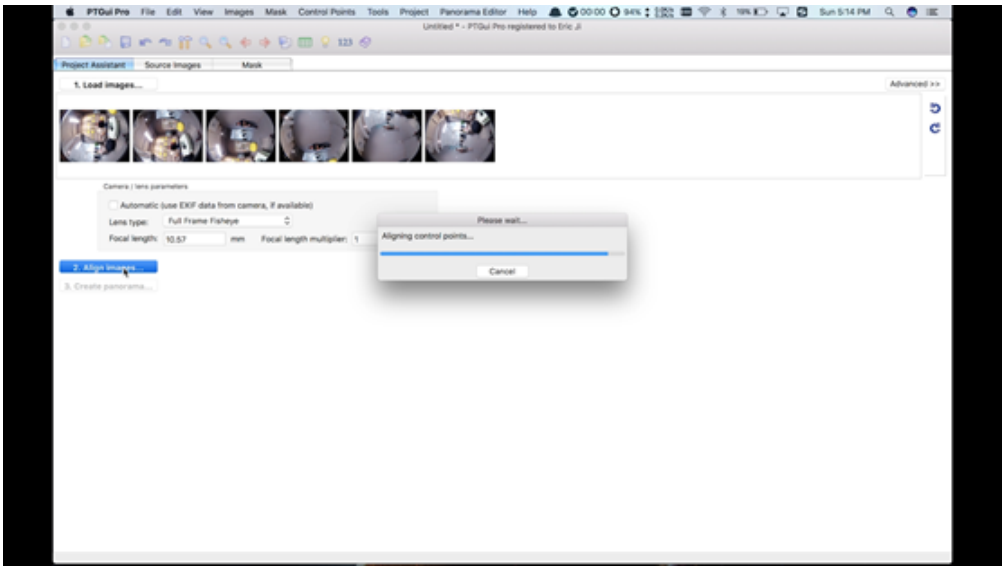
Skip camera/lens setting



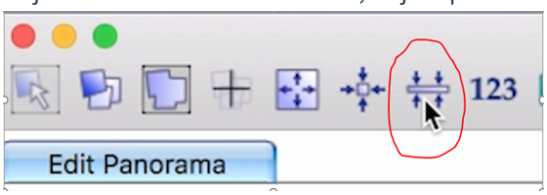
Select lens type as Full Frame Fisheye, setting Focal length for 10.57.

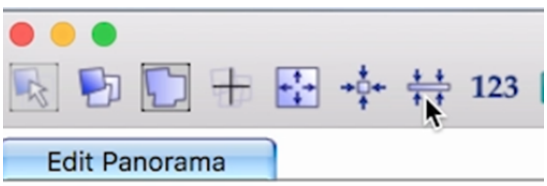


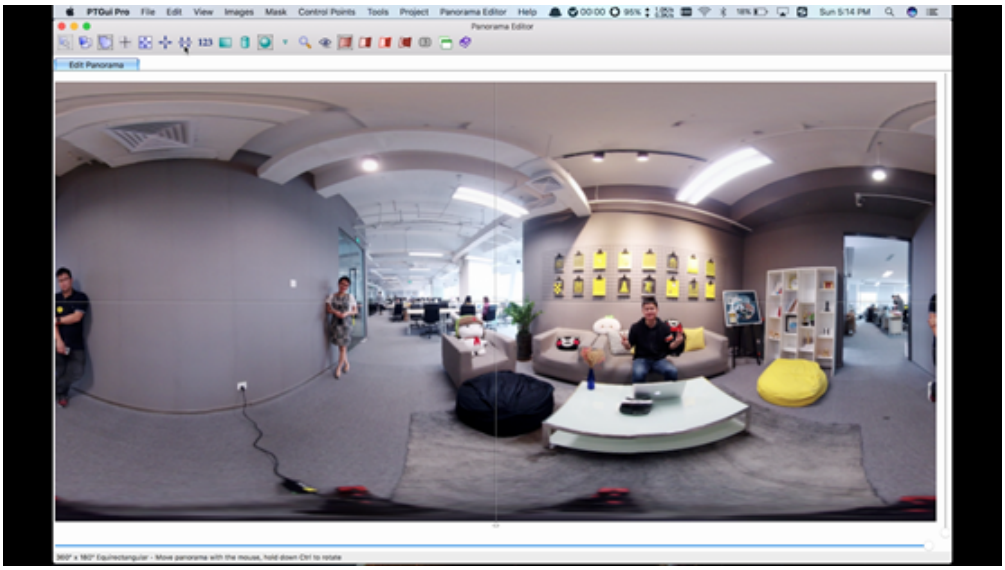
Click Align images for stitching analysis



Adjust level in Panorama Editor, adjust pictures accurately, etc. Detailed method refers to PTgui official tutorial.



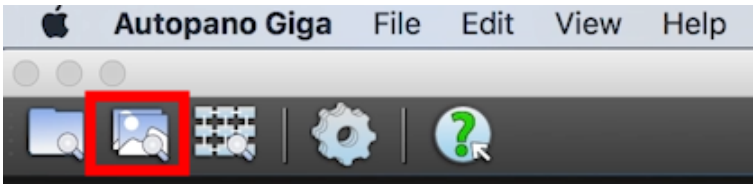


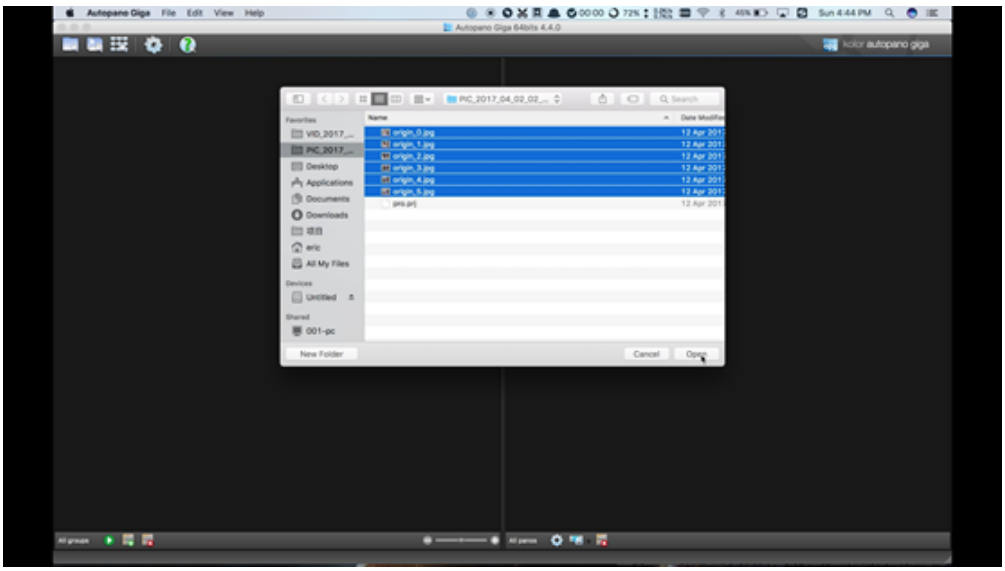


"File-Save as templates" is to save it as pts template files for subsequent use; "Create panorama" can export jpg panorama images.

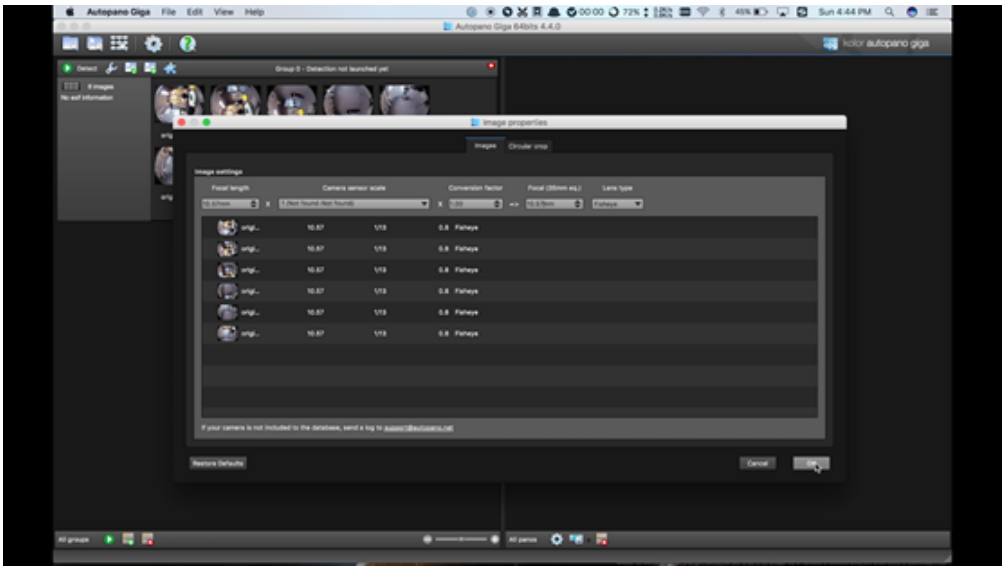
2. Autopano Giga

Open Autopano Giga, click icon to import original images of 6 lens.

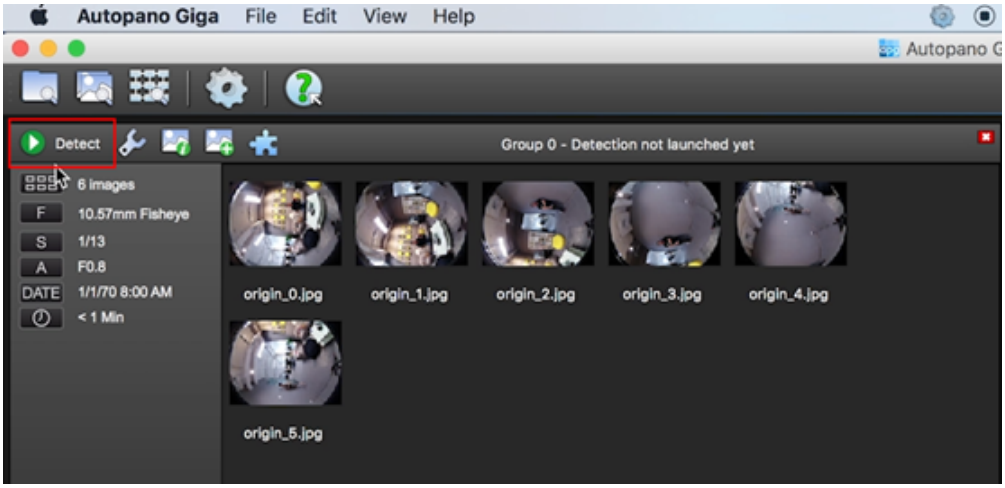


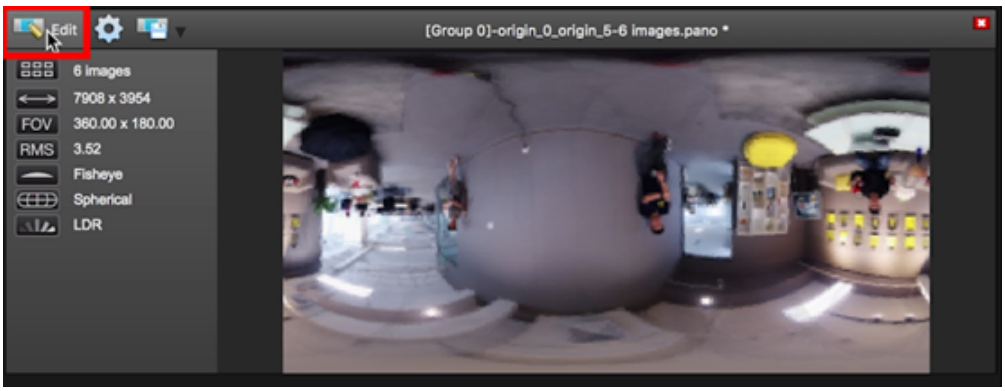


Analyze images, click icons to open "Image settings", modify "Lens type" to be "Fisheye", "Focal" for 10.57mm, click on "OK" to confirm.

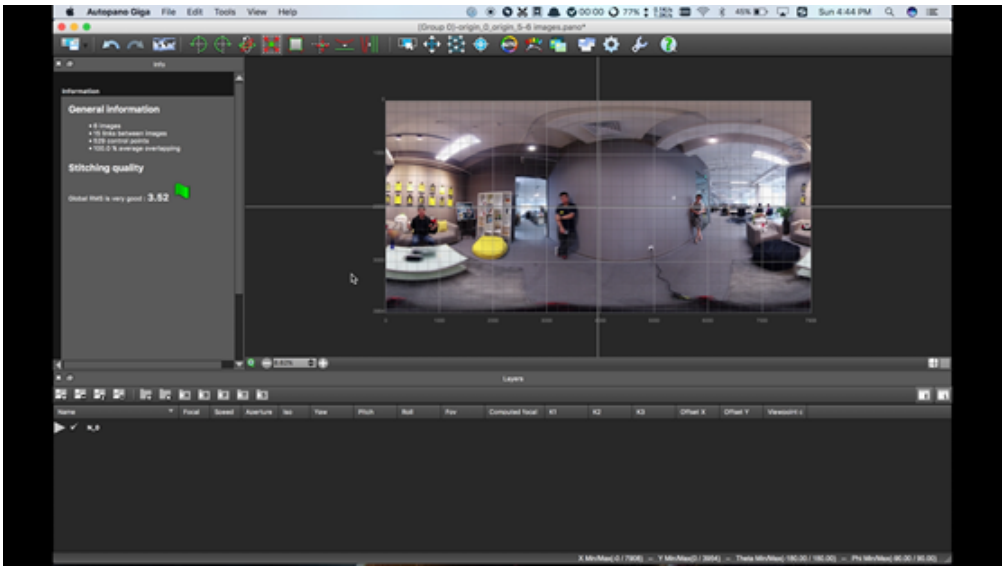


Select "Detect" icon on upper left corner to analyze stitching, select "Edit" after analysis, enter the editing interface.



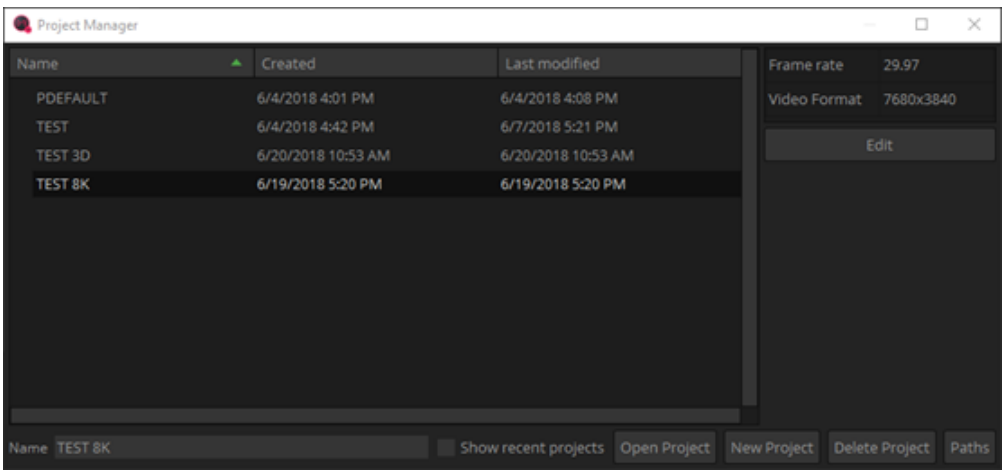


Details can be adjusted in editing interface. Refer to Autopano Giga official tutorial for detailed methods

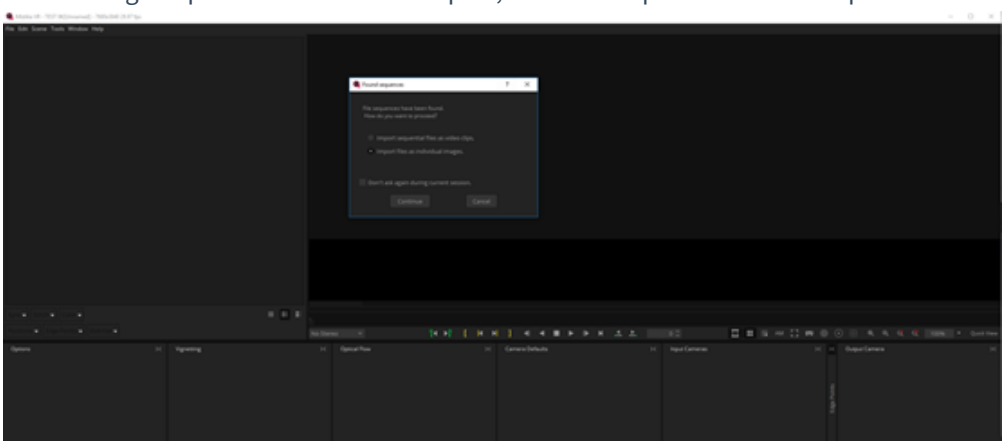


3. Mistika VR stitching panorama

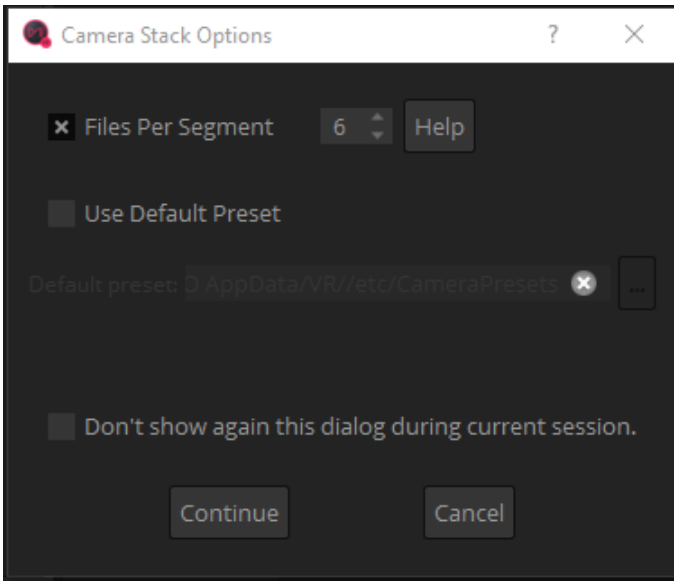
Since the resolution of Mistika VR rendering is consistent with settings in engineering Project, you should set the required resolution beforehand in Project. Here we chose to build a project of 8K.



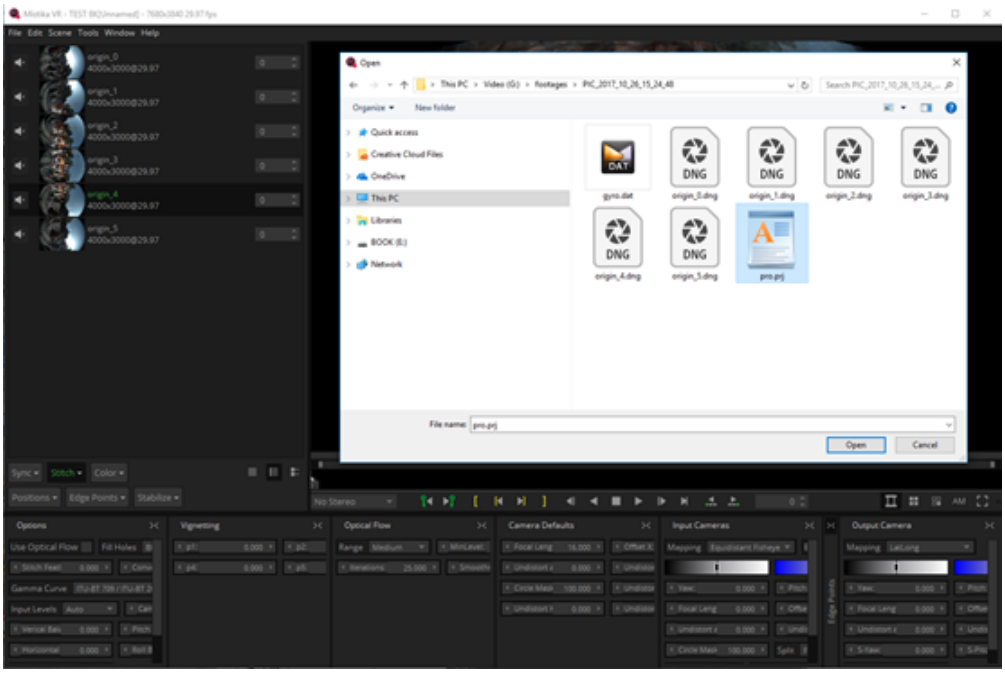
Choose original pictures of 6 lens to import, select to import as individual picture



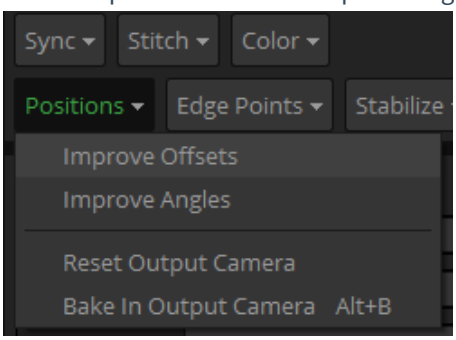
Select Files Per Segment as 6. Select Continue to complete import.



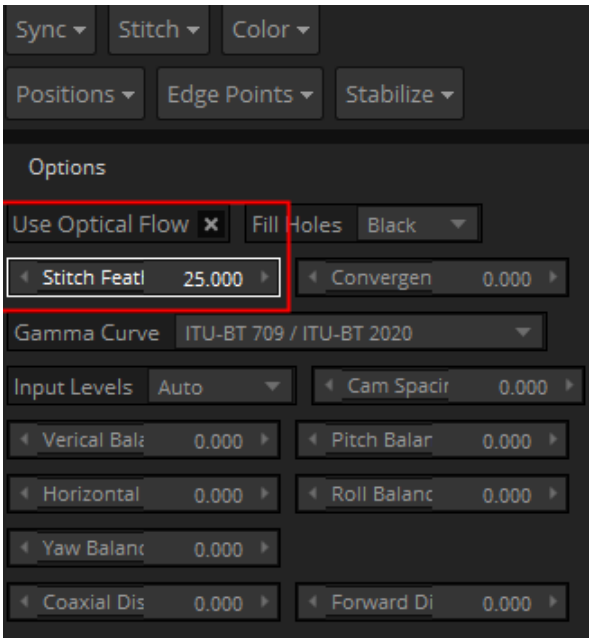
Select "Import Stich" in Stitch drop-down box to find the picture folder, import pro.prj files, refer to Insta360 Pro's engineering description file to automatically stitch into a panorama picture.



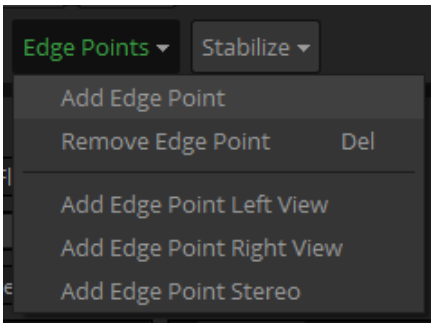
Select improve offsets and improve angles in the Position drop-down box to enhance stitching.



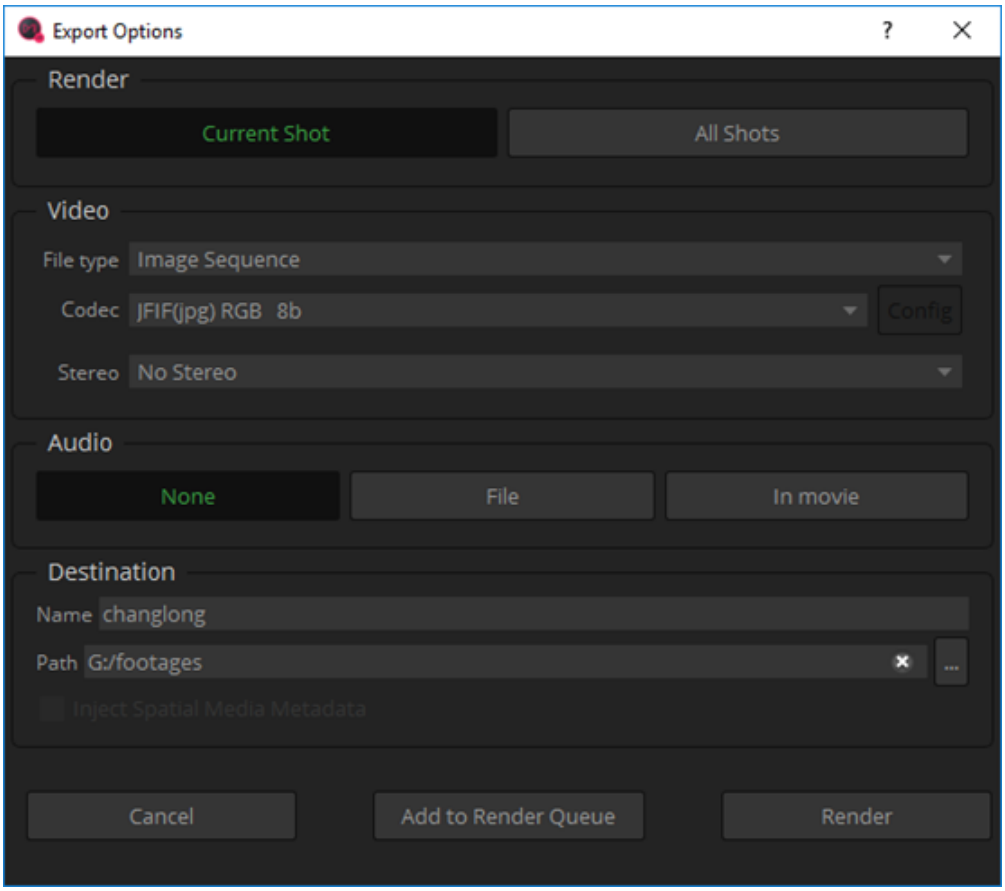
Option chooses optical flow stitch, Use Optical Flow, set Stich Feature as appropriate value and the larger the more overlap parts there will be. The value is generally 8-20.



We found that there were characters whose heads were not perfectly stitched so we chose to edit edge points to avoid header stitching. In this case we add "Edge Point" to camera 5, camera 1 , camera 3, avoiding header stitching of five characters. Other fine tuning stitching methods refer to Mistika VR official tutorials.

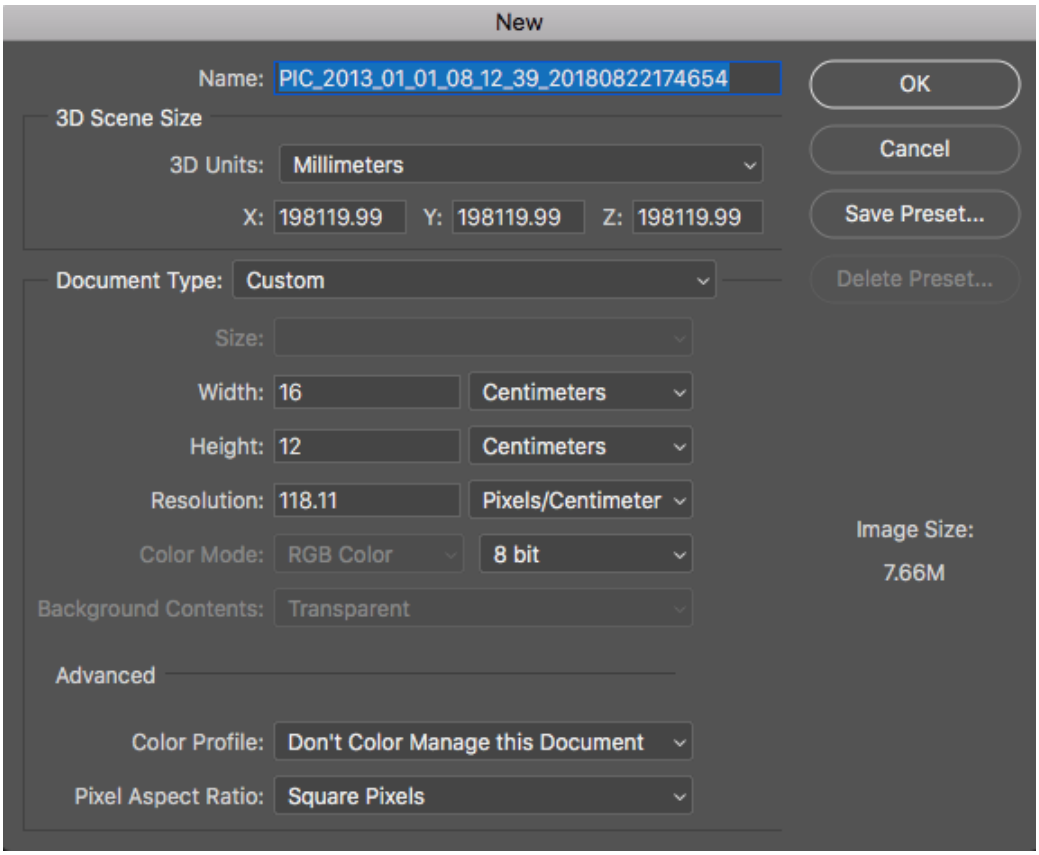


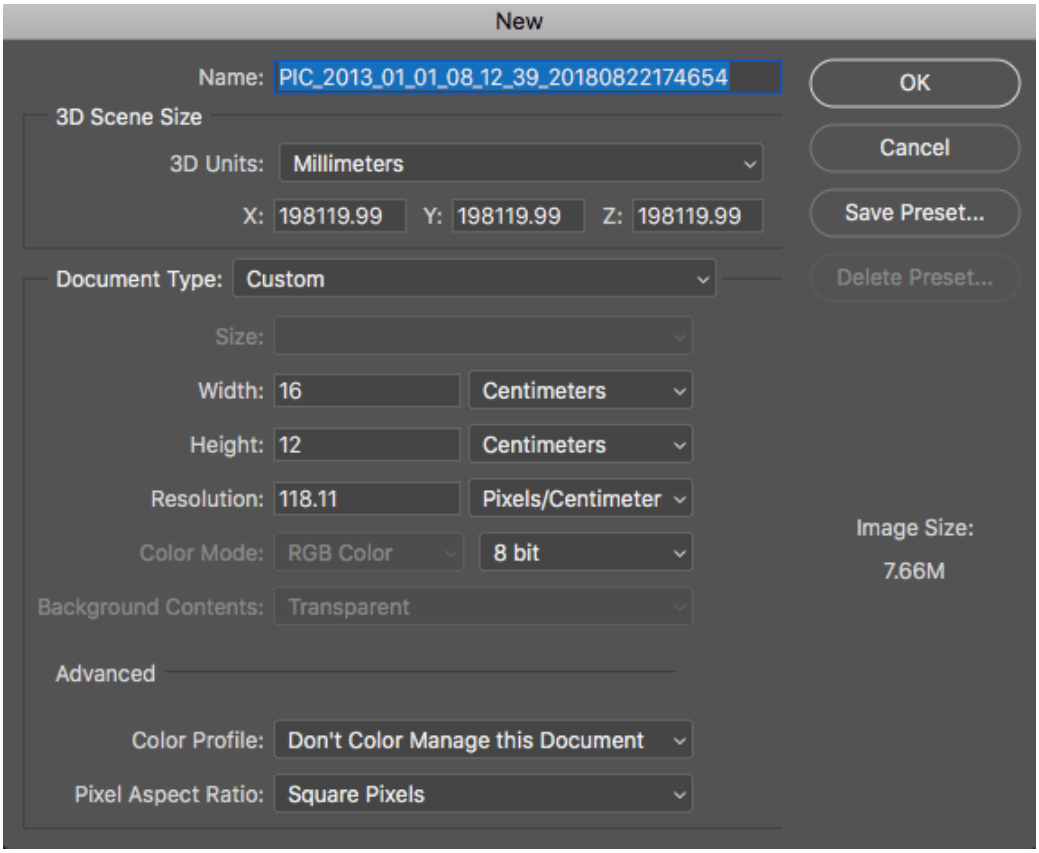
Render and export jpg or TIFF files that save the maximum information, continue to modify in other modifications software.



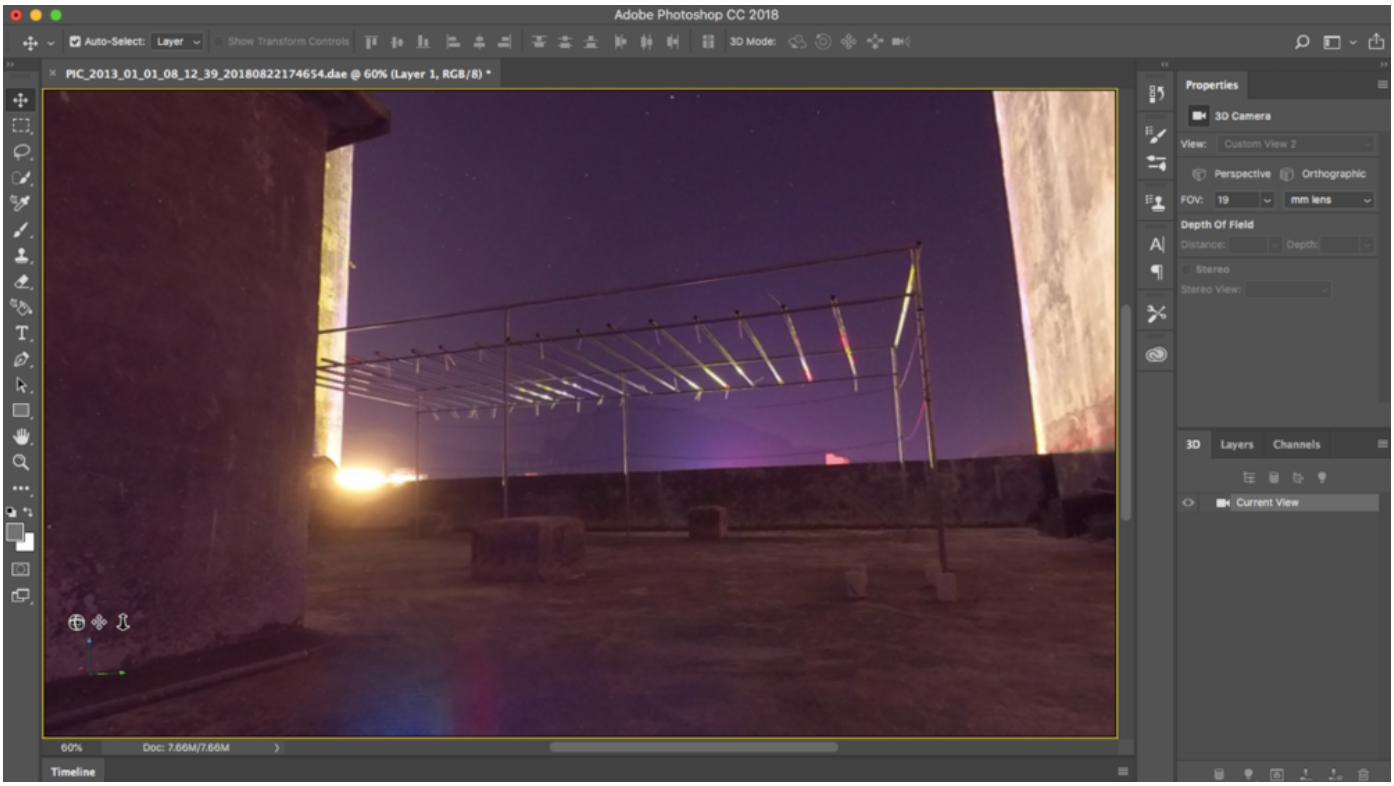
2.3.4 [Advanced] Color matching and modification of Photoshop panorama

The latest version of Photoshop cc 2018 has supported panoramic editing. Here is a brief introduction to the basic workflows. Open Photoshop, select Spherical Panorama from top menu bar, import panorama. Confirm height and width pixels to be 7680 x 3840.

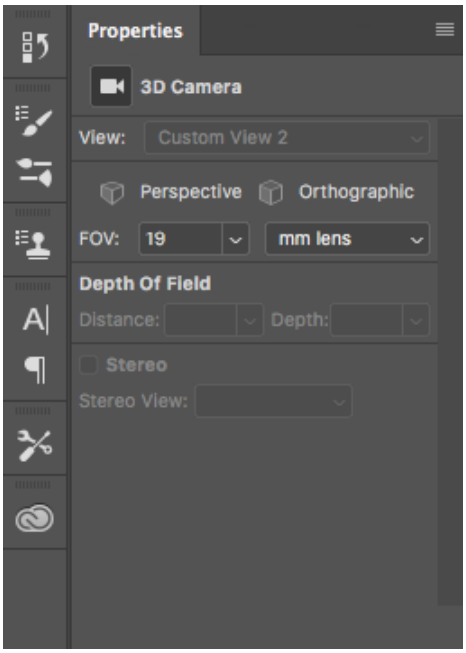

New
Name: PIC_2013_01_01_08_12_39_20180822174654
OK
3D Scene Size
Cancel
3D Units: Millimeters
Save Preset...
X: 198119.99 Y: 198119.99 Z: 198119.99
Delete Preset...
Document Type: Custom
Size:
Width: 16 Centimeters
Height: 12 Centimeters
Resolution: 118.11 Pixels/Centimeter
Image Size:
Color Mode: RGB Color 8 bit
7.66M
Background Contents: Transparent
Advanced
Color Profile: Don't Color Manage this Document
Pixel Aspect Ratio: Square Pixels


New
Name: PIC_2013_01_01_08_12_39_20180822174654
OK
3D Scene Size
Cancel
3D Units: Millimeters
Save Preset...
X: 198119.99 Y: 198119.99 Z: 198119.99
Delete Preset...
Document Type: Custom
Size:
Width: 16 Centimeters
Height: 12 Centimeters
Resolution: 118.11 Pixels/Centimeter
Image Size:
Color Mode: RGB Color 8 bit
7.66M
Background Contents: Transparent
Advanced
Color Profile: Don't Color Manage this Document
Pixel Aspect Ratio: Square Pixels

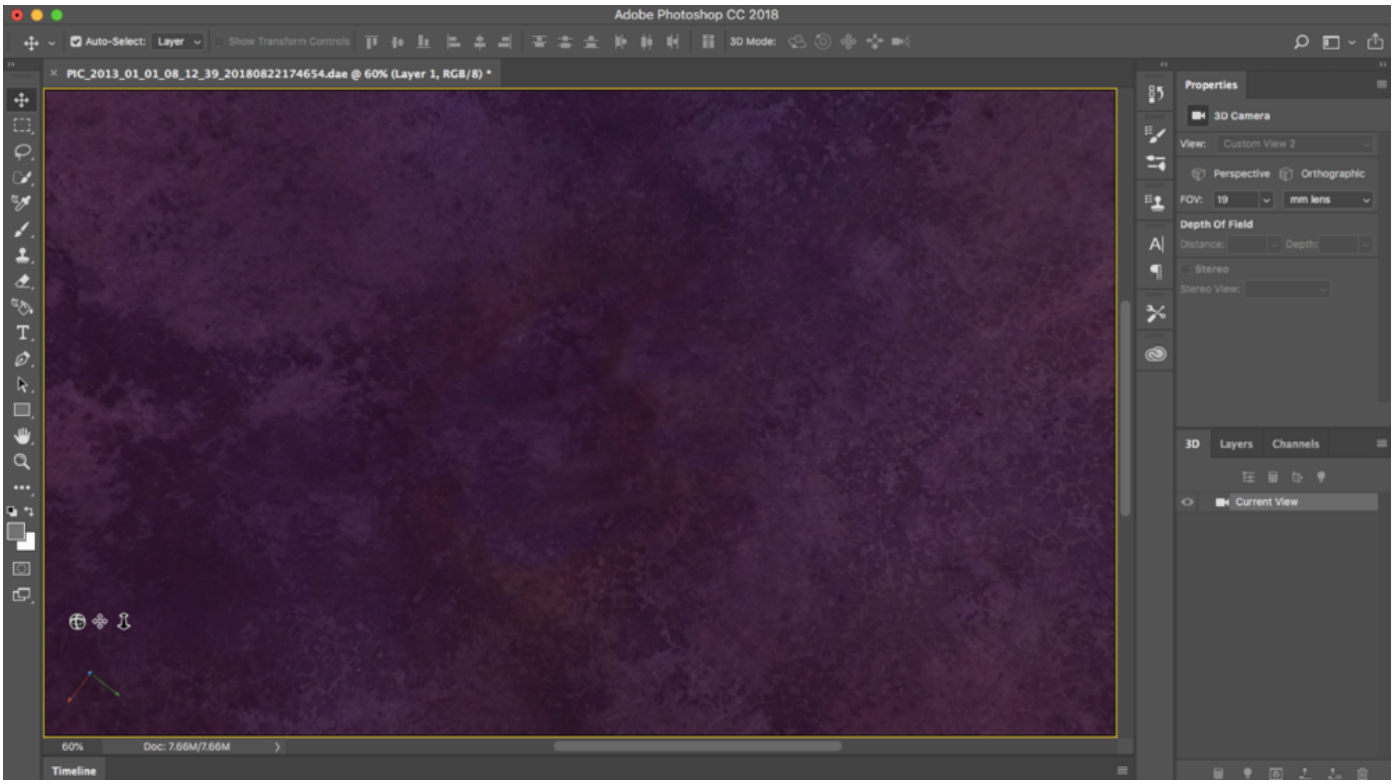
You can drag mouse to view from different angles in 3D interface.



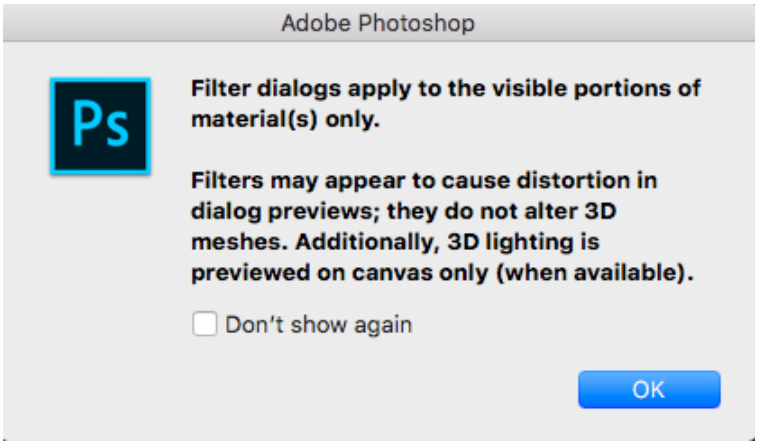
The angle value can be modified in the camera property of 3D and change field angle size. 8 millimeters is the view angle of panoramic view on Facebook by default. So we can easily modify picture details at a specific point of view.



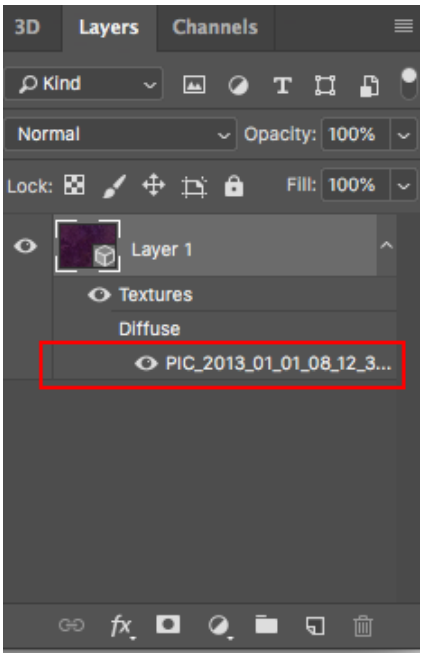
Adjust view to bottom, use imitation seal, patch, stain wipe tools, to remove tripod at the bottom.

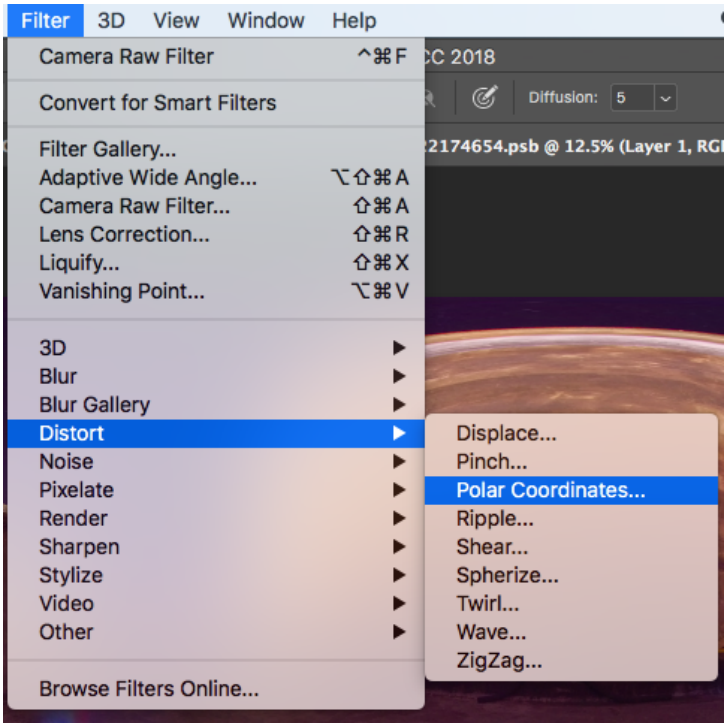


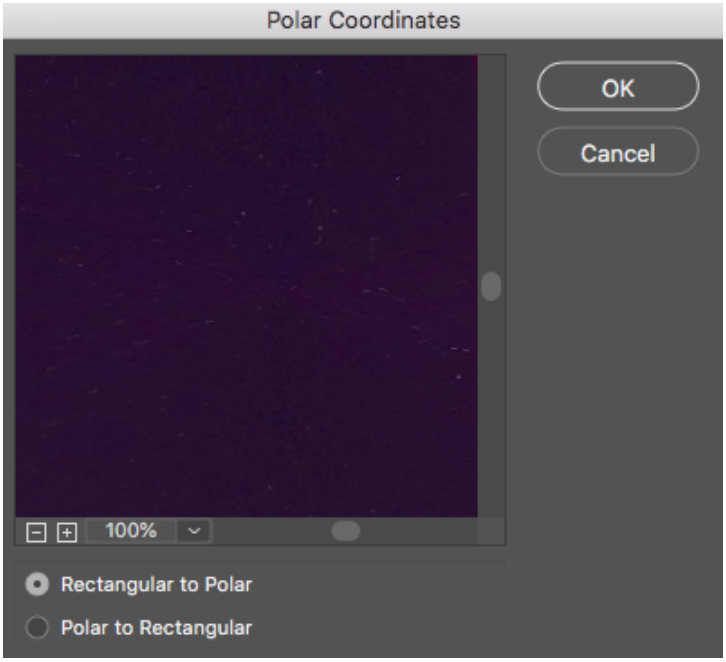
Because filters can only apply to visible parts, if you want to modify the overall color, you can use "adjust" in the camera workspace, to directly modify picture's overall exposure, color etc.



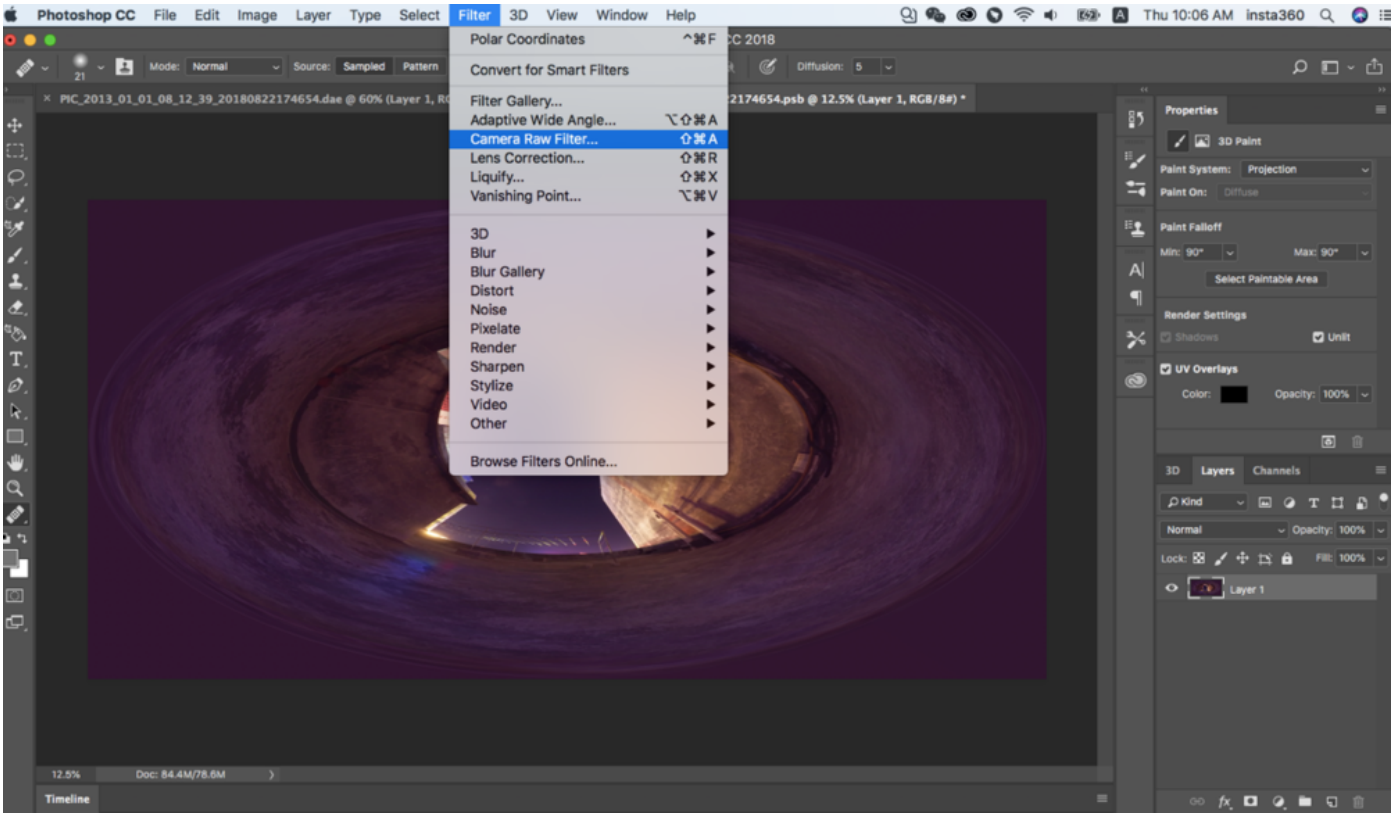
Another way is to double click on filename, to open smart layer, convert polar coordinates into spherical shape, and then use Camera RAW to mix color to avoid producing transition seams.

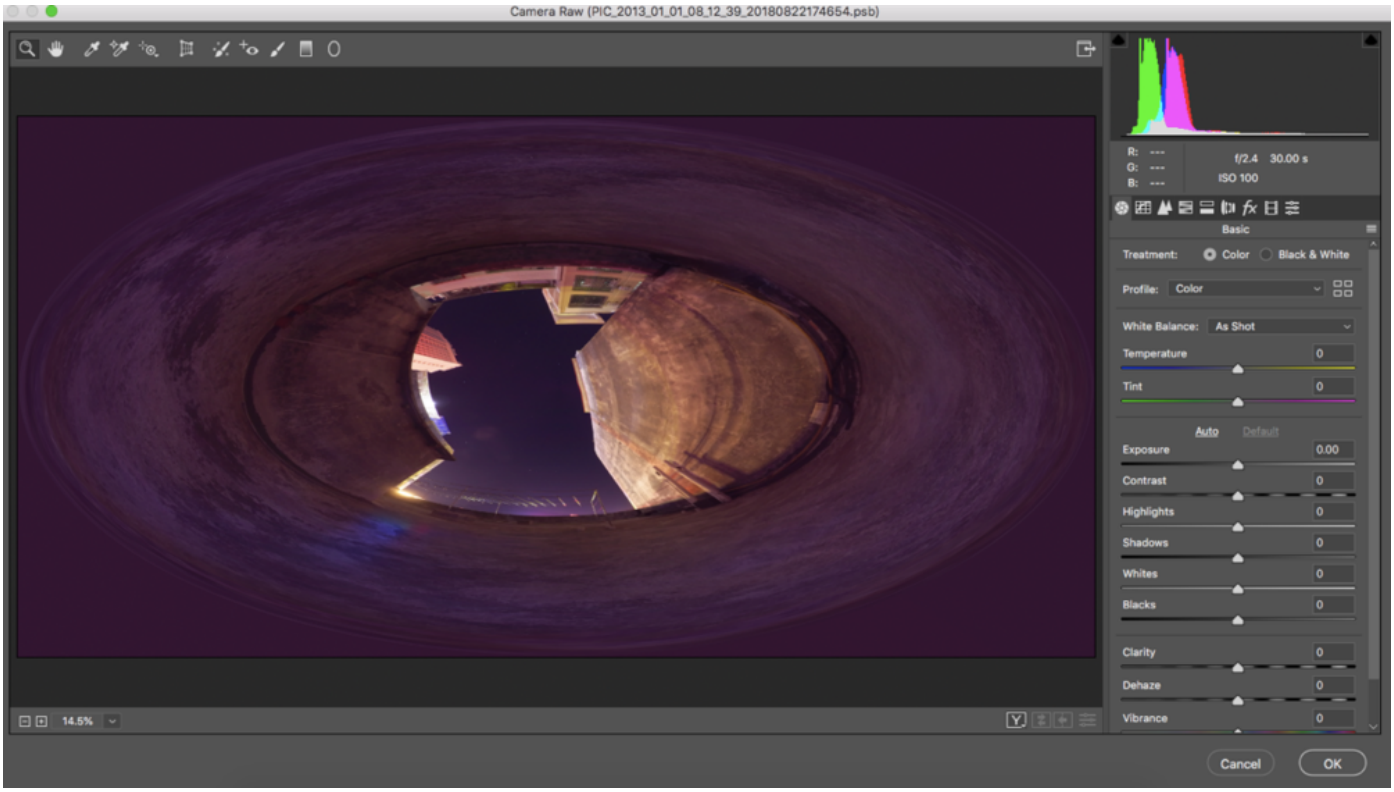

3D
Layers
Channels
Kind
Normal
Opacity: 100%
Lock:
Fill: 100%
Layer 1
Textures
Diffuse
PIC_2013_01_01_08_12_3...


Filter
3D
View
Window
Help
Camera Raw Filter ^⌘F
Convert for Smart Filters
Filter Gallery...
Adaptive Wide Angle... ⌥⇧⌘A
Camera Raw Filter... ⇧⌘A
Lens Correction... ⇧⌘R
Liquify... ⇧⌘X
Vanishing Point... ⌥⌘V
3D
Blur
Blur Gallery
Distort
Noise
Pixelate
Render
Sharpen
Stylize
Video
Other
Browse Filters Online...
Displace...
Pinch...
Polar Coordinates...
Ripple...
Shear...
Spherize...
Twirl...
Wave...
ZigZag...
CC 2018
Diffusion: 5

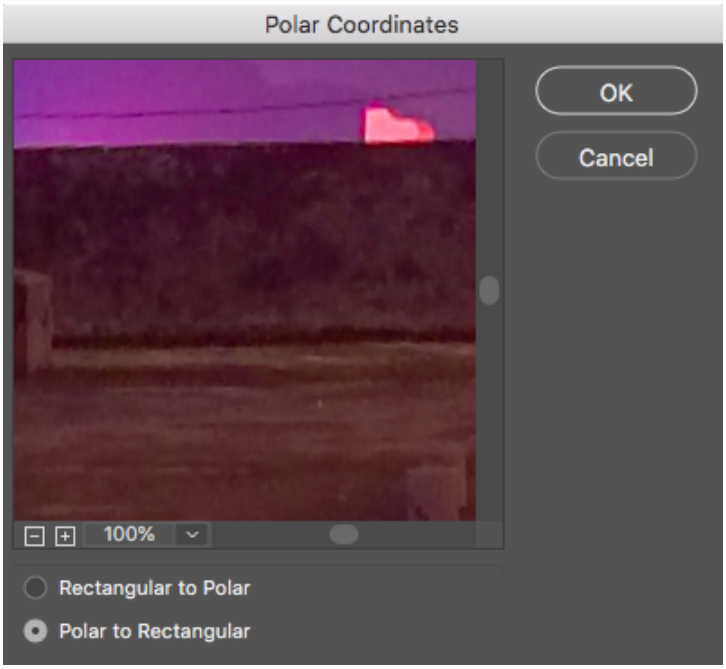


Open camera raw filter for color grading

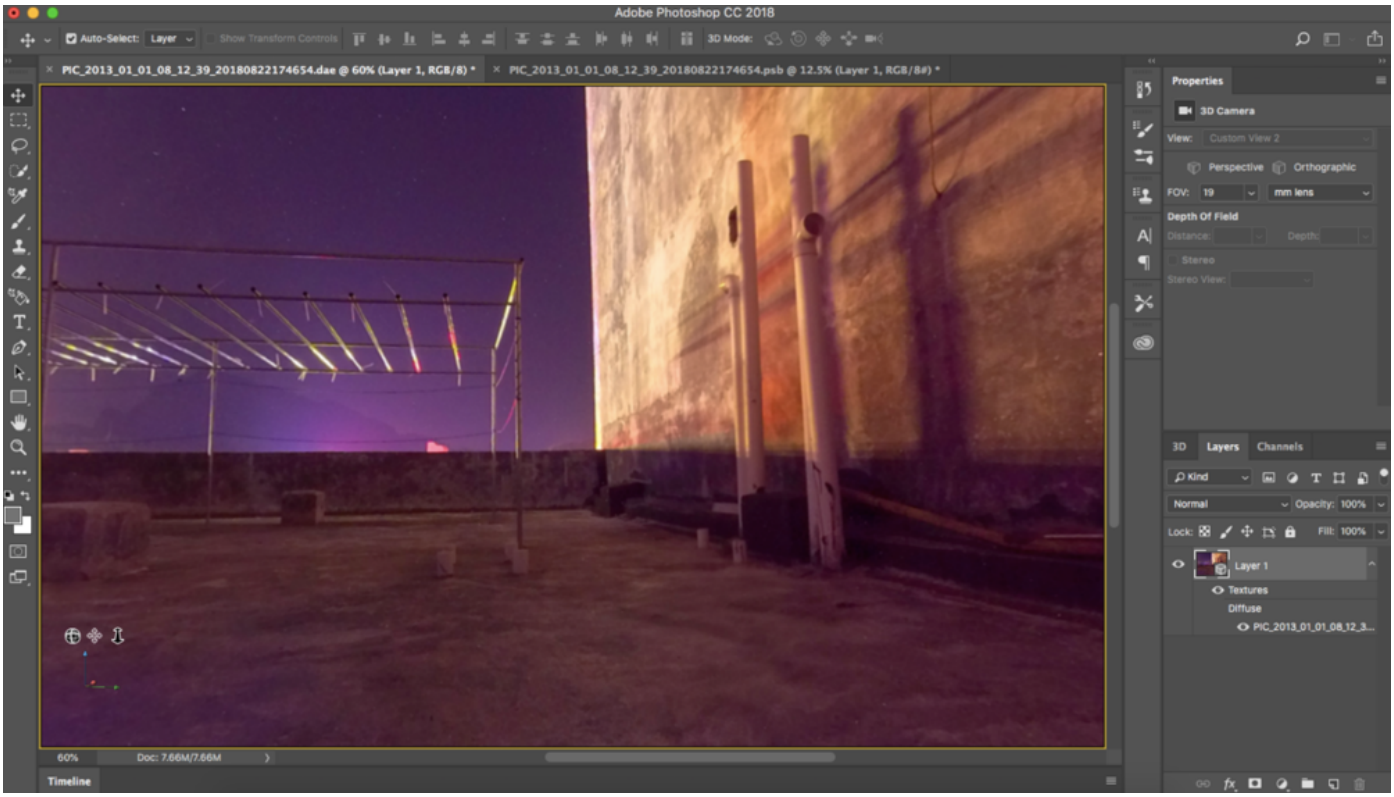




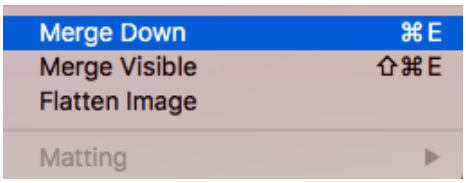
Once again, we apply polar coordinate effect to return to the rectangular of 2:1.



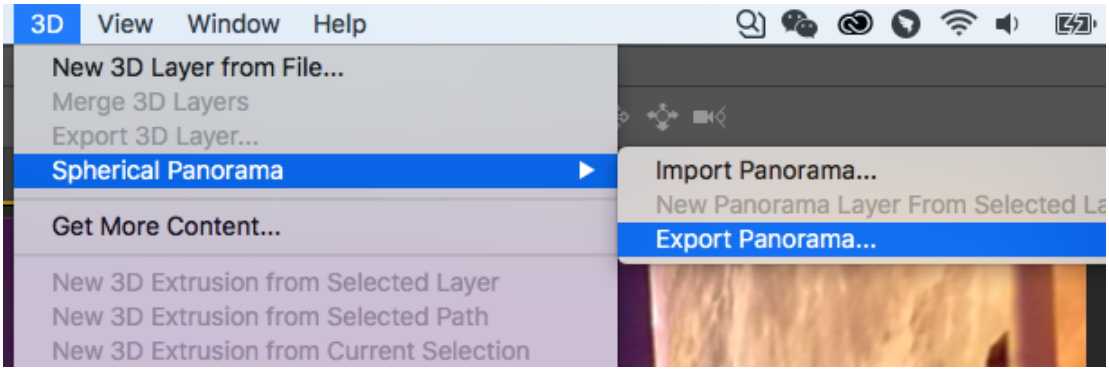
Back to the workspace of spherical panoramic images, we see that images have shown perfect color correction results.



You can also automatically adapt text into 360 sphere automatically by adding text into image, adding new text layer, applying "merge down".



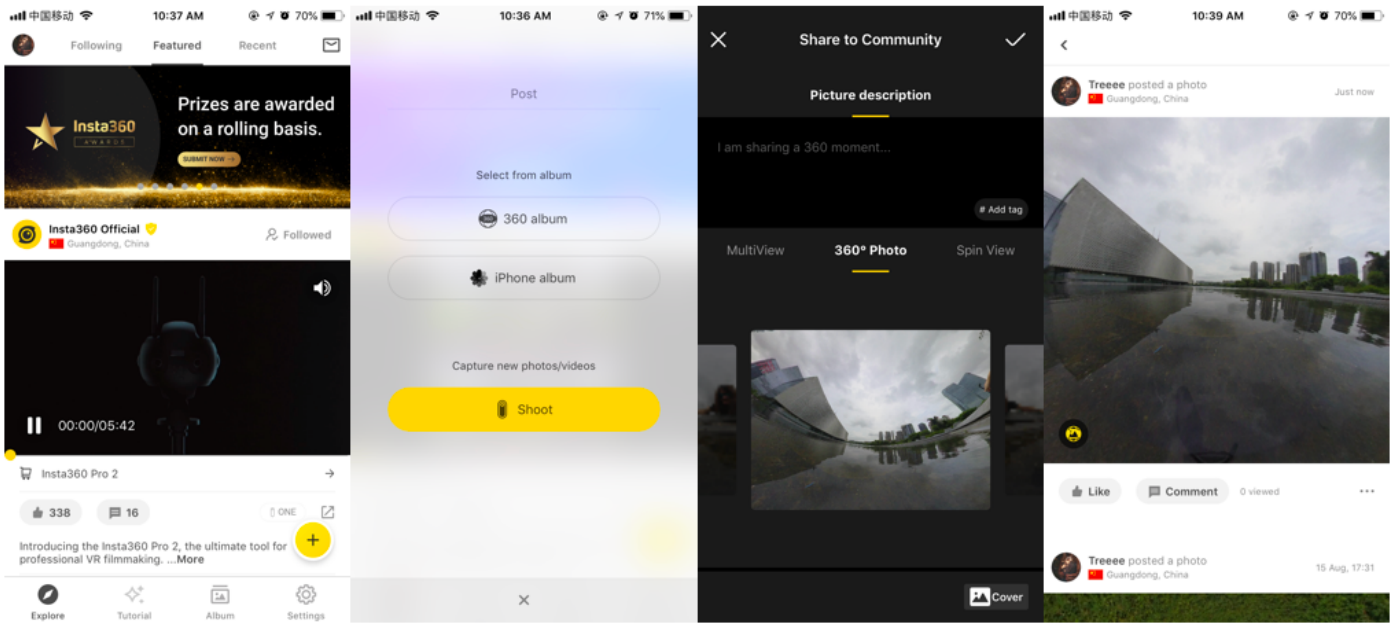
When exporting, using "export panorama" from the 3D menu to correctly save into panoramic image, which has been written into panoramic Metadata and can be uploaded directly to those platforms supporting panorama.



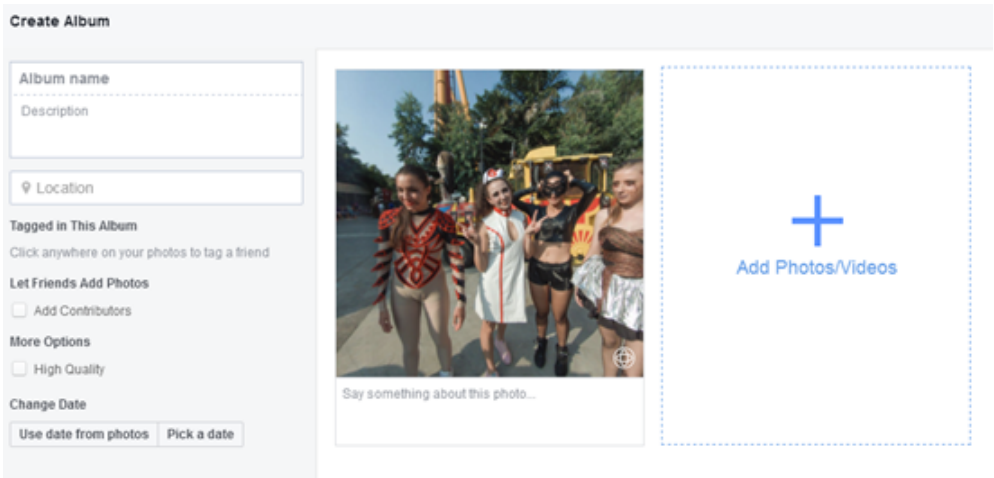
2.4.1 [Beginner] Fast acquisition of real-time stitching images and sent to SNS

Insta360 Pro can choose real-time stitching while shooting, to stitch into panorama picture of 360 degrees. Through app or Insta360 Pro desktop control terminal, you can download stitched panorama, quickly upload to Facebook, Weibo platform, etc. Please note that to upload a panoramic picture of 2:1, the metadata information of panorama must be written into file.

Insta360 panorama community, Insta360 consumer-grade products, including Insta360 ONE, Insta360 Nano, Insta360 Air mobile client, all of which support uploading panoramic images from mobile photo albums. Take Insta360 ONE app as an example, after download panoramic images via Insta360 Pro app to mobile photo album, open Insta360 ONE app to select iPhone albums, select panoramic images saved in mobile albums to share panoramic images into the community.

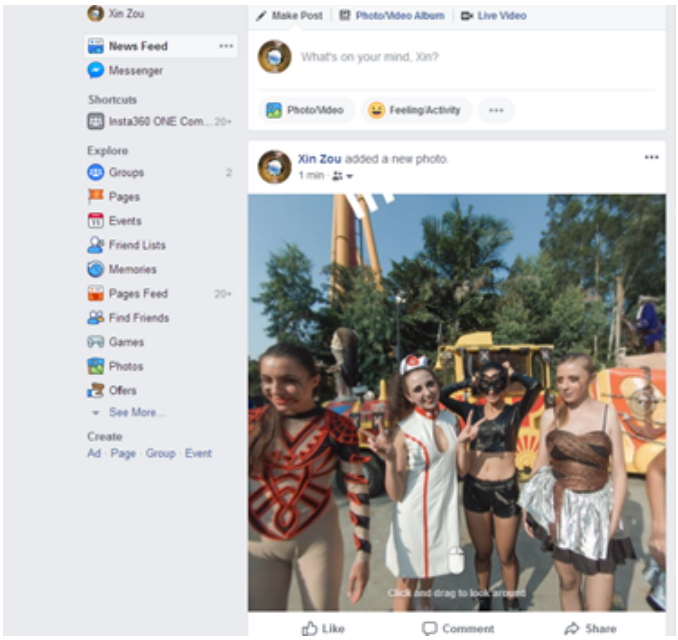


Facebook can add images directly like ordinary images on computer ends. When images are identified as 360 photo, panoramic icon will appear at lower right corner of preview.



Mouse over the panorama icon, click "Select Starting View" to modify the first view point of your picture.

Next, directly release, and you can see panoramic images on timeline.



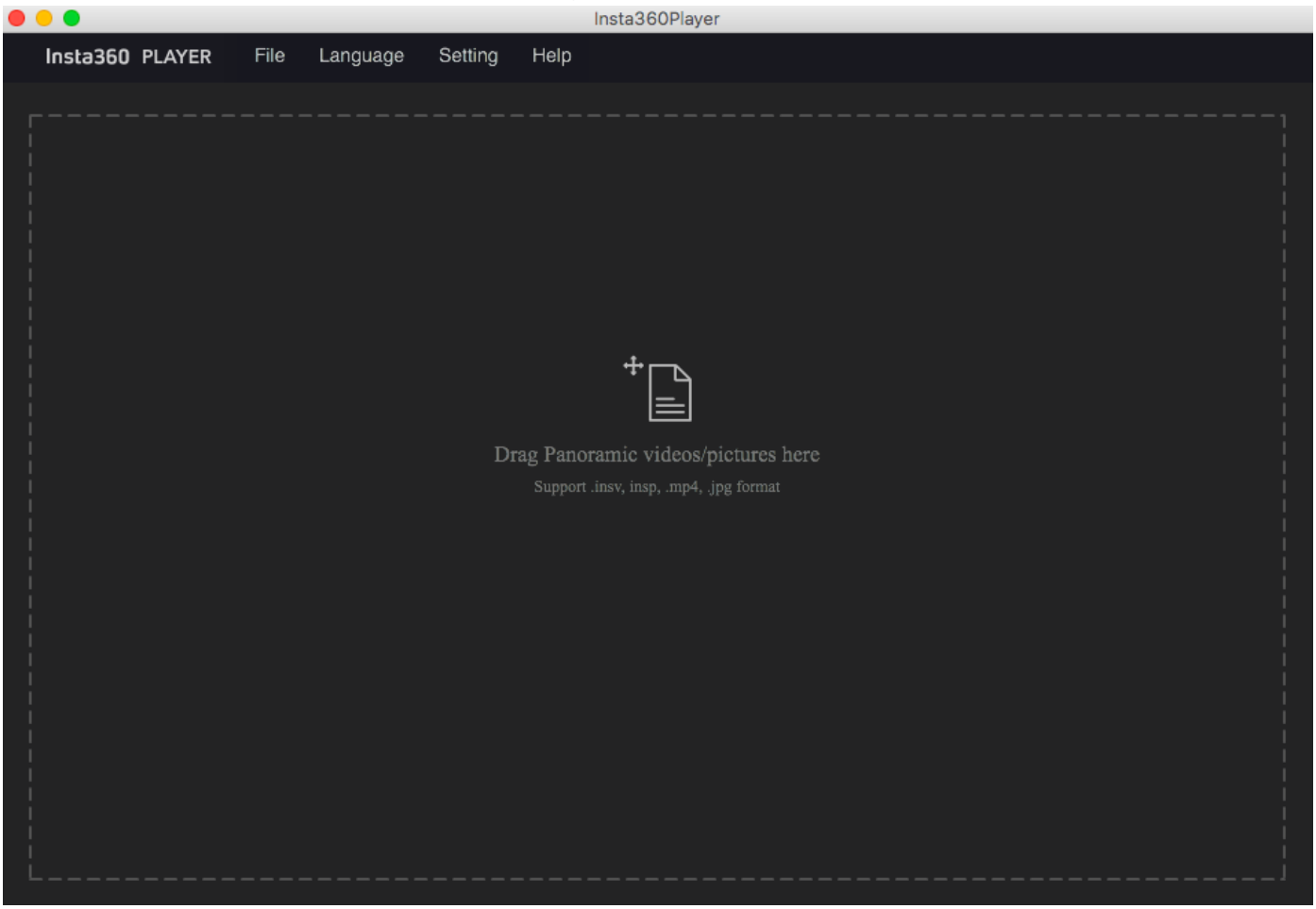
Weibo doesn't support uploading panoramic images from PC end, but the app for Insta360 panoramic camera supports uploading panoramic images to Weibo. Take Insta360 Nano app as an example.

Press import button at the upper right corner of photo album, select the panoramic picture in mobile photo album to introduce panoramic pictures into app album. Click to enter picture, and then click upper right corner to share, in this way you can choose pictures to share on Weibo. After sharing, you can see the uploaded panorama in Weibo time line. Please note that Weibo clients must be installed in advance on mobile phones and bind community accounts before sharing pictures.

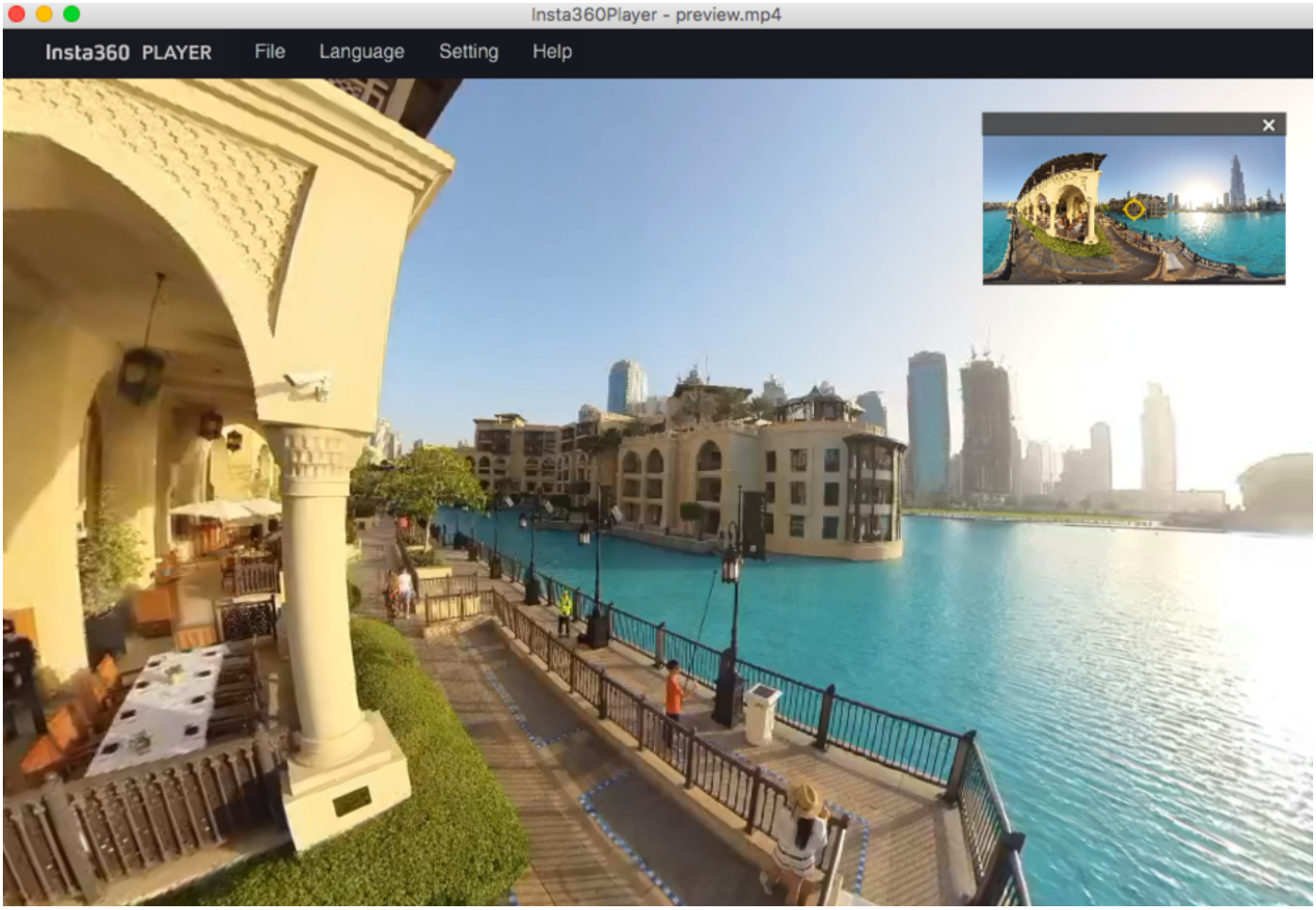
2.4.2 [Beginner] Insta360 Player

Insta360 Player supports to play the content of Insta360 panoramic camera and supports the play of standard panoramic videos and images with the ratio of 2:1, supporting various platforms.

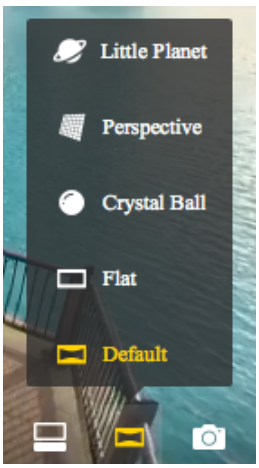
Take Mac as an example. The desktop version of Insta360 Player supports photos and videos in insp, insv, mp4, jpg formats. Currently, videos only support those of 2:1, general panorama videos below 4K, and do not support 3D videos.



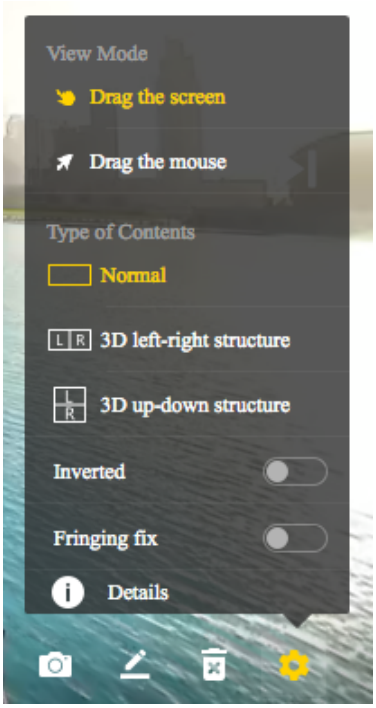
Import a panorama, you can drag mouse to view panoramic view. Preview small window is at the upper right corner.



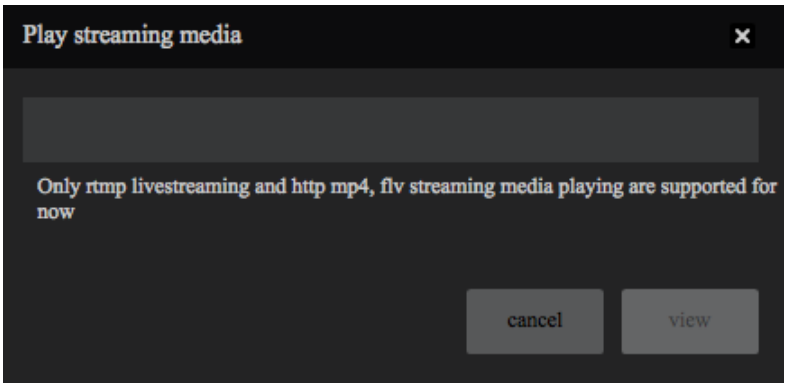
Playback mode can choose Little Planet, Perspective, Crystal Ball, Flat, Default (fish eye).



View Mode and Type of Contents can be set in Settings.



Files in navigation menu bar can choose to play streaming media, and streaming media support viewing panoramic live.

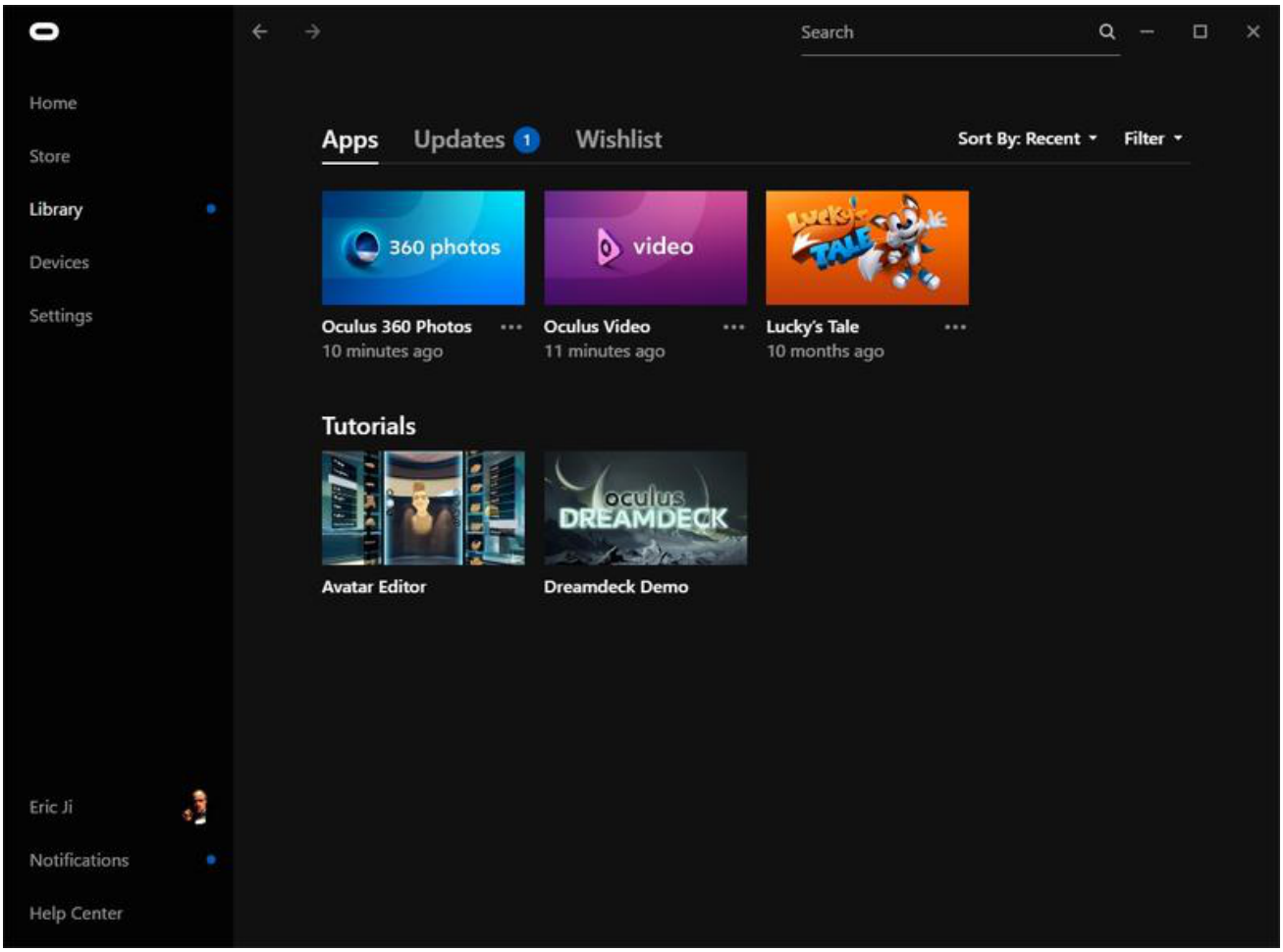


2.4.3 Introduction of VR helmet for photo playback (about VR glasses)

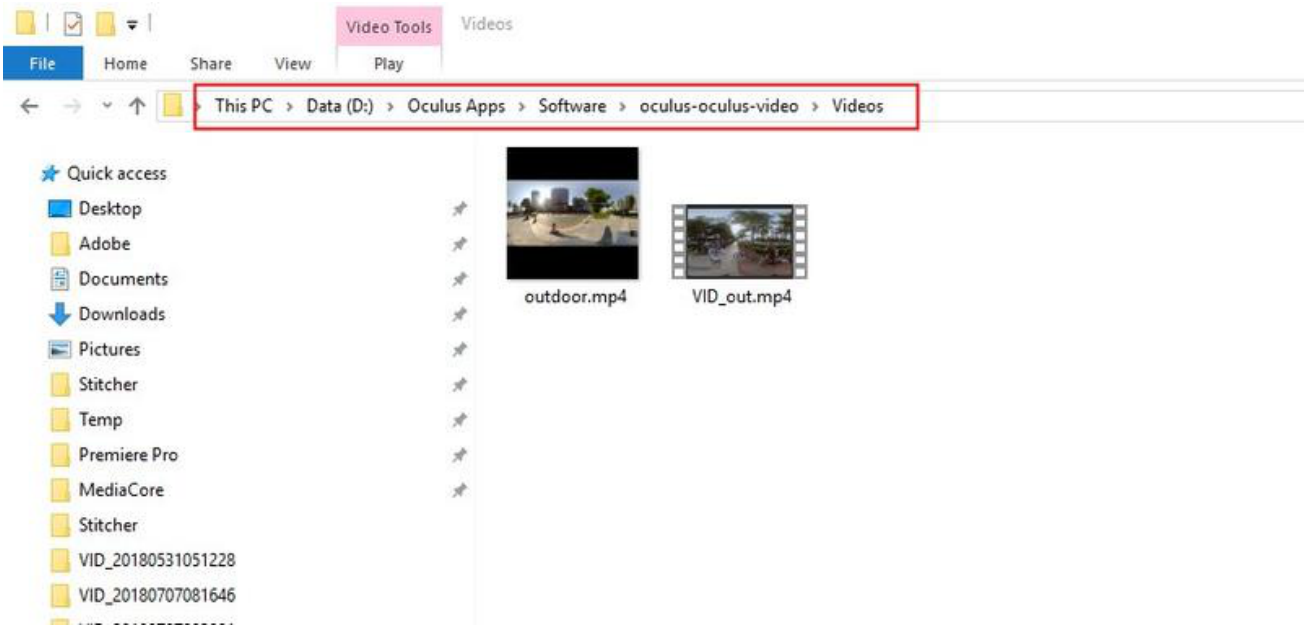
Almost all the VR headsets currently support panoramic photos and videos. A few VR headsets can view panoramic live via specific players. We will illustrate how to import panoramic content into these devices by using three different types of VR head devices, including Oculus Rift CV1, GearVR+S9, Oculus Go.

- **Import content in Oculus Rift CV1**

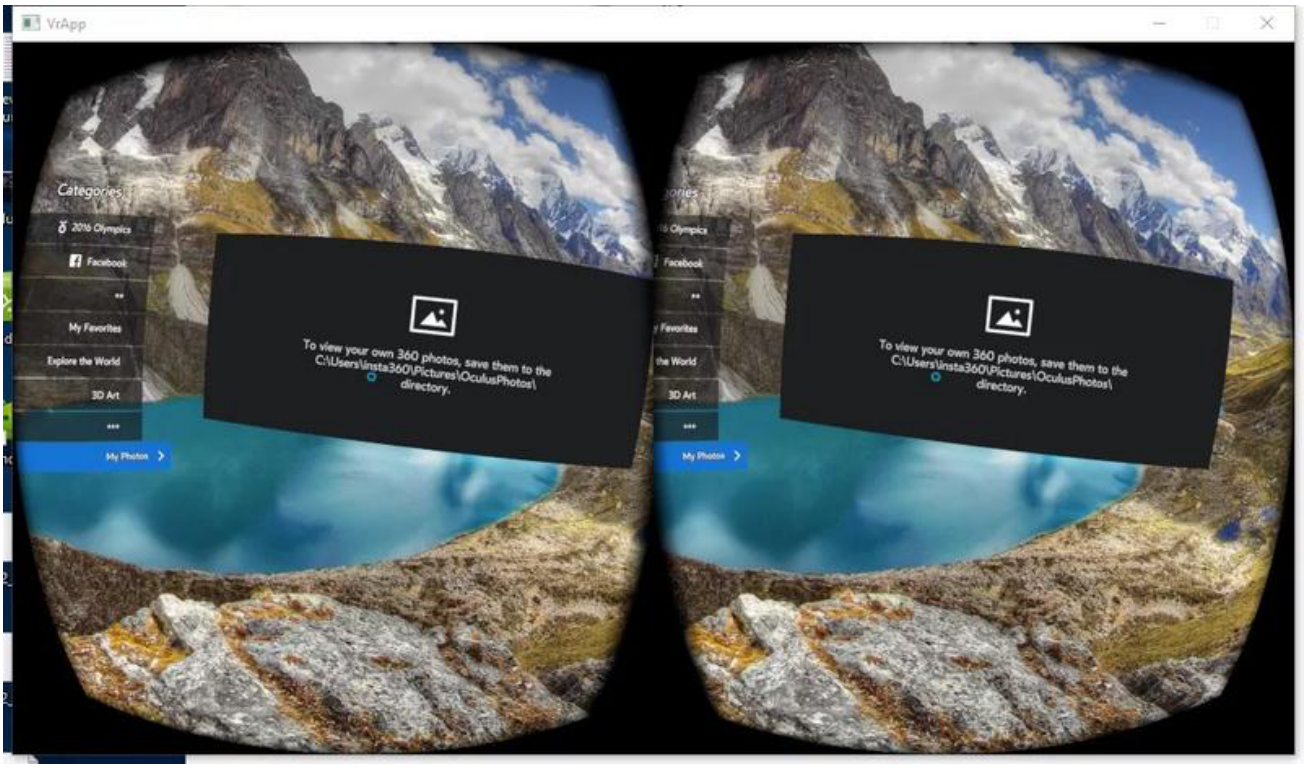
    1. On your computer connected to Oculus Rift CV1, open Oculus application interface, search for and install two applications, including Oculus Video and Oculus 360 Photos.



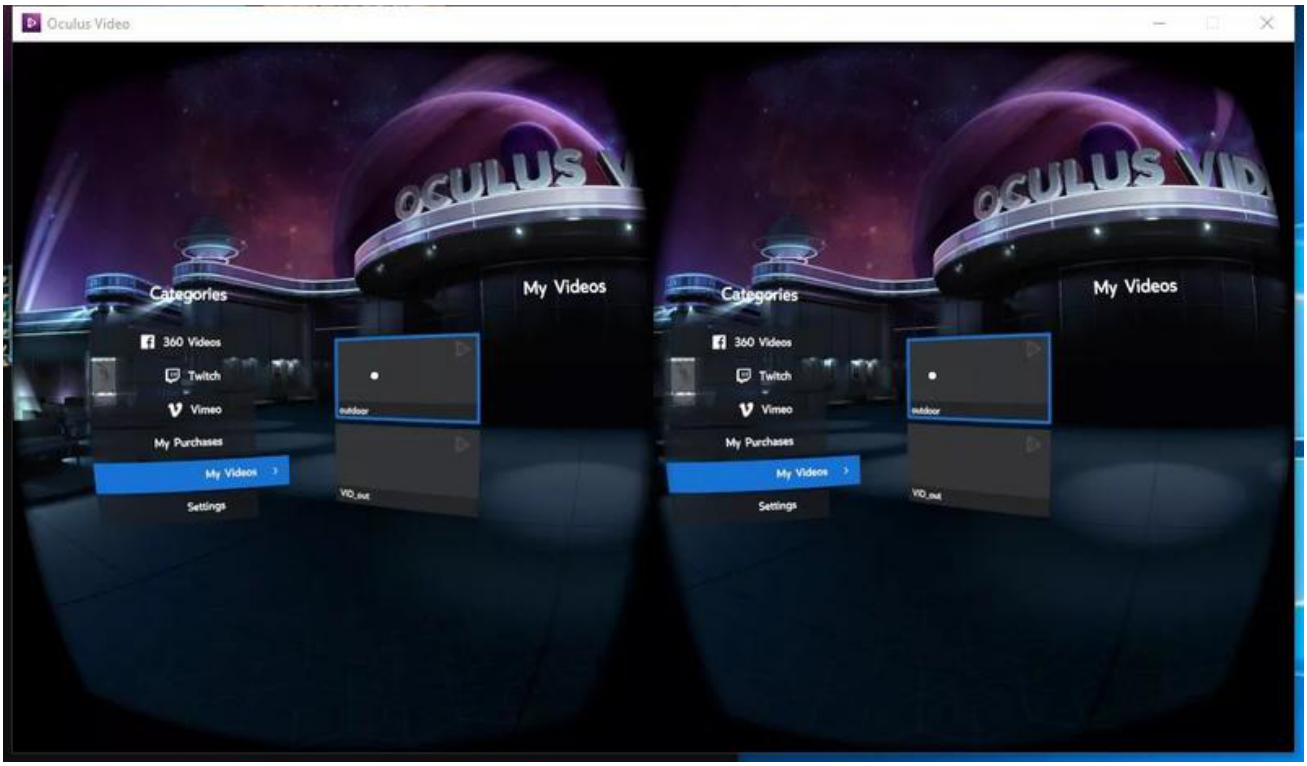
2. After installing two applications, create a new “Videos” folder under the Oculus apps installation directory /Software/oculus-oculus-video, and copy the panorama video you want to play to this folder directory.



The default photo path for 360 Photo is “C: \ Users\ Username\ Pictures\ OculusPhotos\” , so you can import the panorama photos to be played below this path.



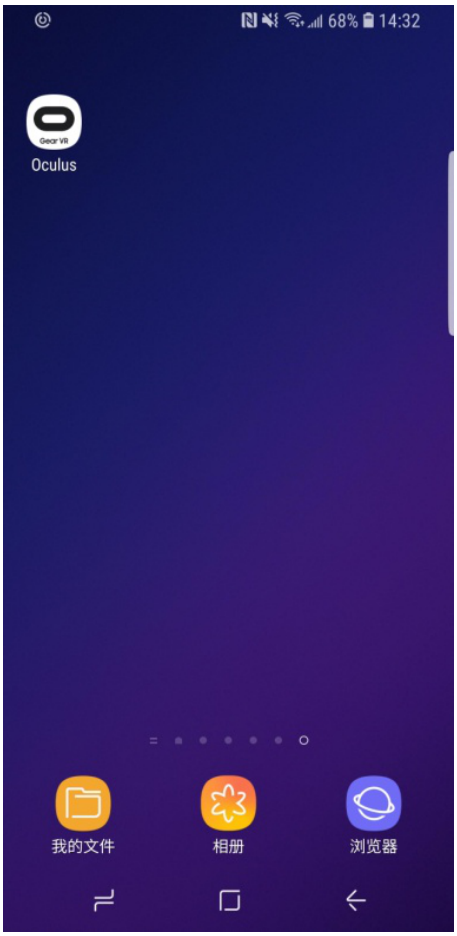
Wearing Oculus Rift CV1, open Oculus Video and Oculus 360 Photos in the screen displayed, and see videos and photos imported just now in the My Videos and My Photos categories respectively.

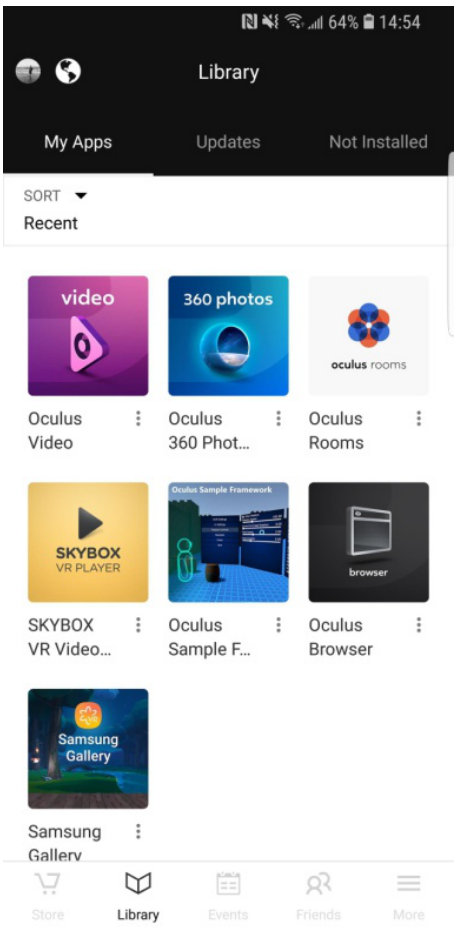


3. Currently there is no application that supports broadcasting rtmp streaming on this platform.

- **Import content in GearvR machine**

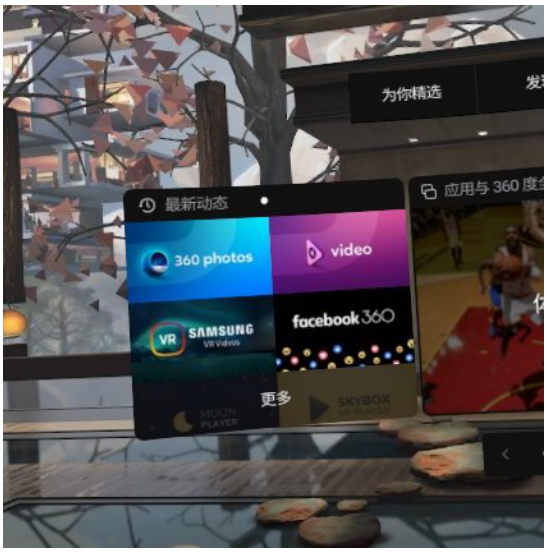
1. Install Oculus Home applications in matched Samsung mobile phone with GearVR. And install download Oculus 360 Photos, Oculus Video on this application platform.





2. Import the panorama photos and videos you want to play in your phone’s storage directory under / Oculus / Pictures / or / Oculus / Movies/.

3. Insert mobile phone into GearVR to watch, operate GearVR headset to open 360 Photos or 360 Video in VR and finds My Photos or My Videos menu to watch what has just been imported.



4. Currently, GearVR supports panoramic video with resolution less than 4096x2048 and 3D panoramic video of 4000x4000. Photo resolution is unlimited.

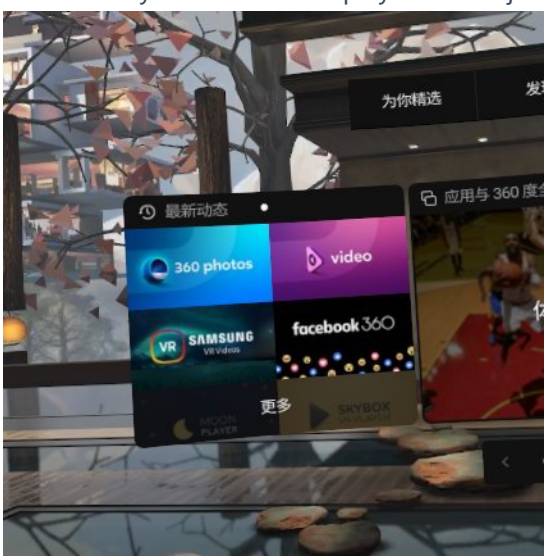
5. Currently, there is no application that supports broadcasting rtmp live streaming on this platform.

- **Import content in Oculus Go**

1. Install Oculus Home applications on your phone with Oculus Go account settings. Download and install Oculus 360 Photos, Oculus Video on this application platform. After downloading, these two applications will be installed directly into Oculus Go.

2. Connect Oculus Go to your computer and import your panorama photos and videos into Oculus Go storage directory under / Pictures / or / Movies /.

3. Open Oculus 360 Photos or Oculus Video in the VR by operating the Oculus Go headset, and you can find My Photos or My Videos menu to play what has just been imported.



4. Currently, Oculus Go supports panoramic video with resolution less than 4096x2048 and 3D panoramic video of 4000x4000. Photo resolution is unlimited.

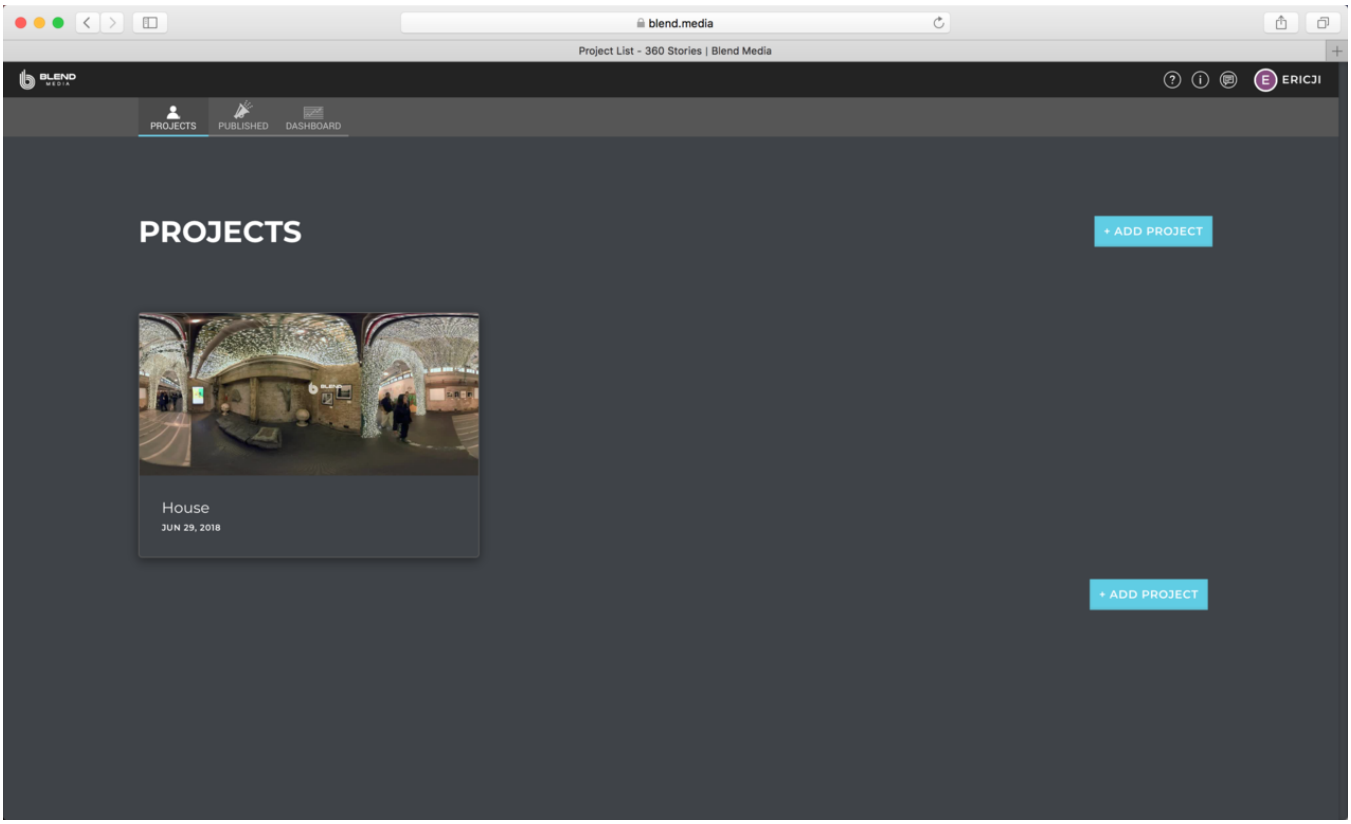
5. Currently, there is no application that supports broadcasting rtmp live streaming on this platform.

2.4.4 Create simple VR roaming (about platform presentation)

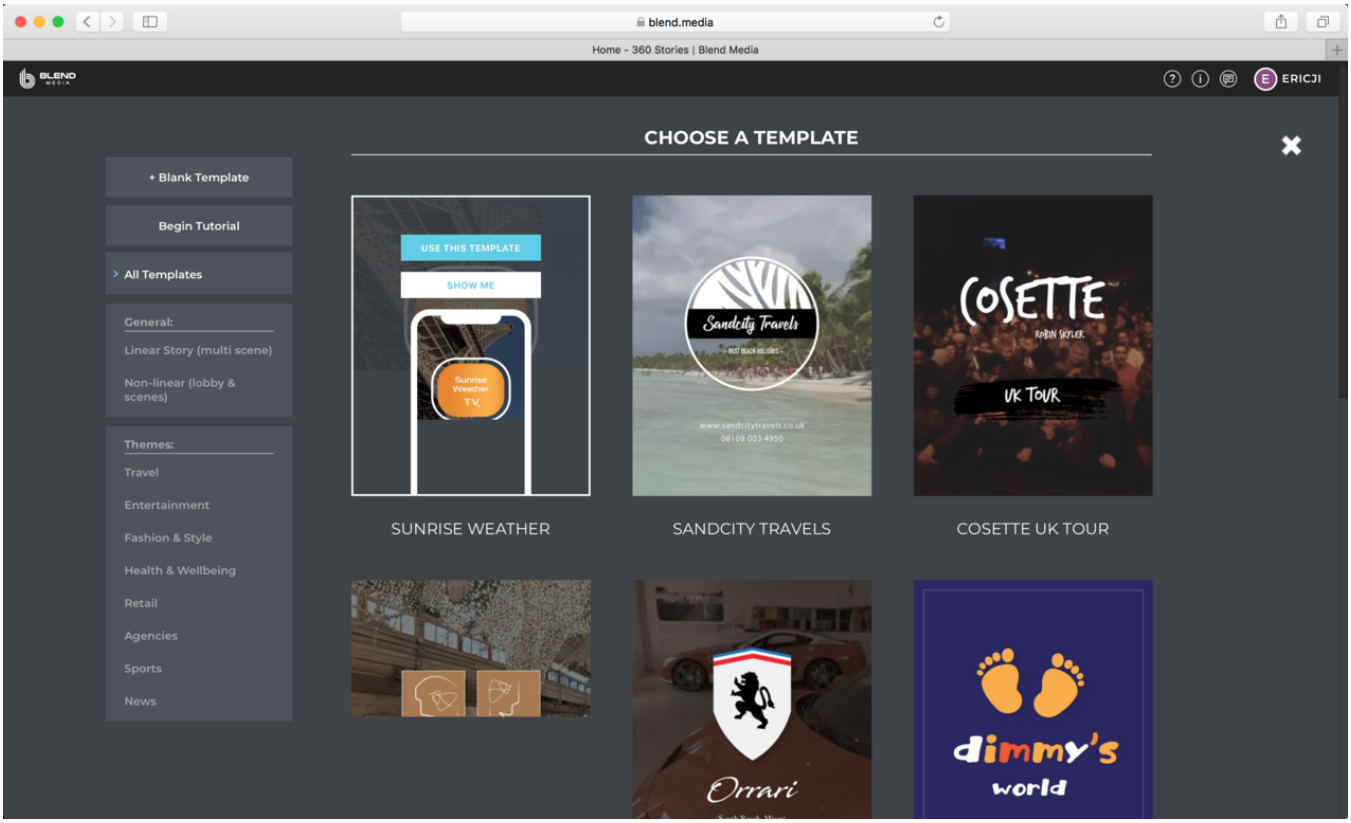
(Recommend overseas users to use) Blend Media is a platform that uploads high quality panoramic content quickly and shares panoramic roaming.

1. Login https://blend.media, to register and login to the account on this platform.

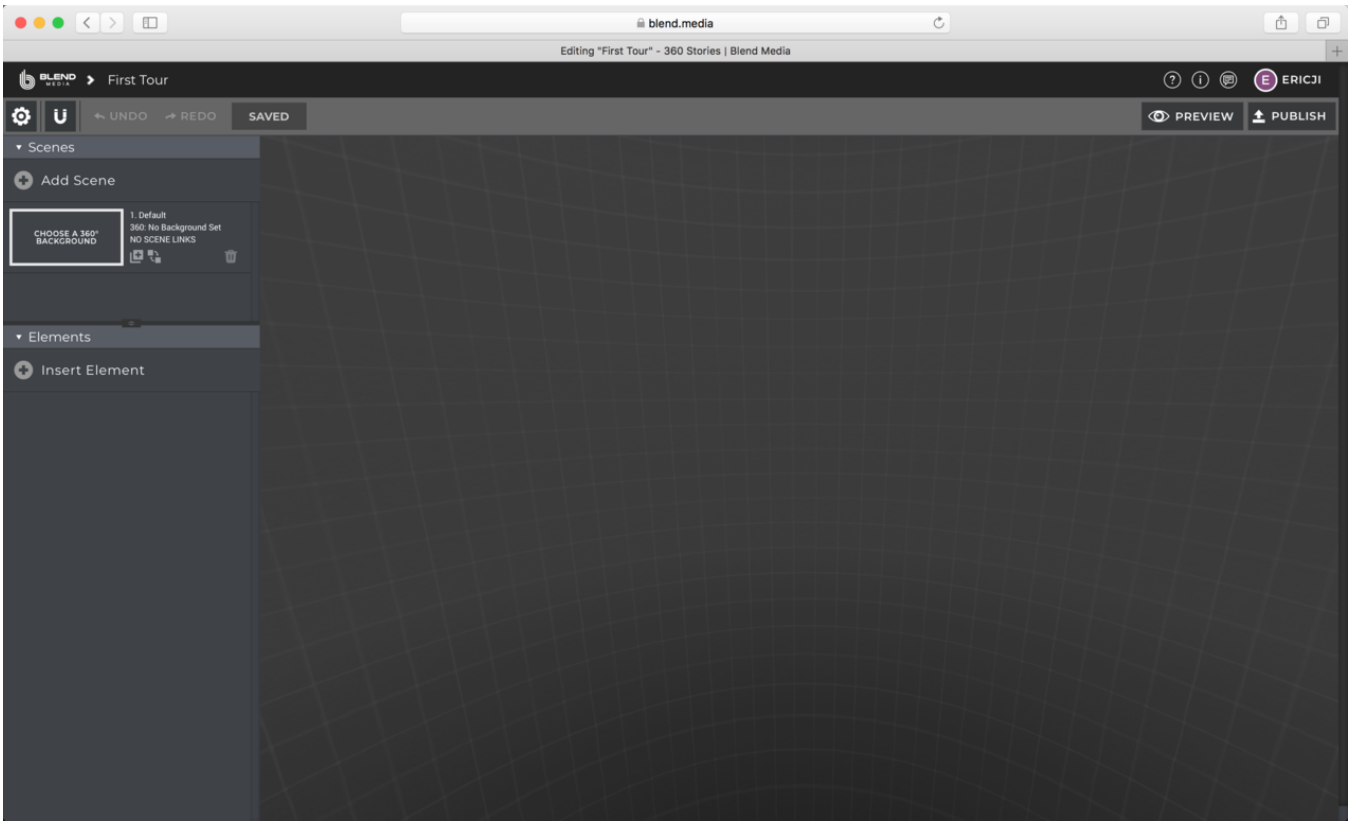
2. Once logged in, you will enter the edit management interface and click "ADD PROJECT" to create a new project.



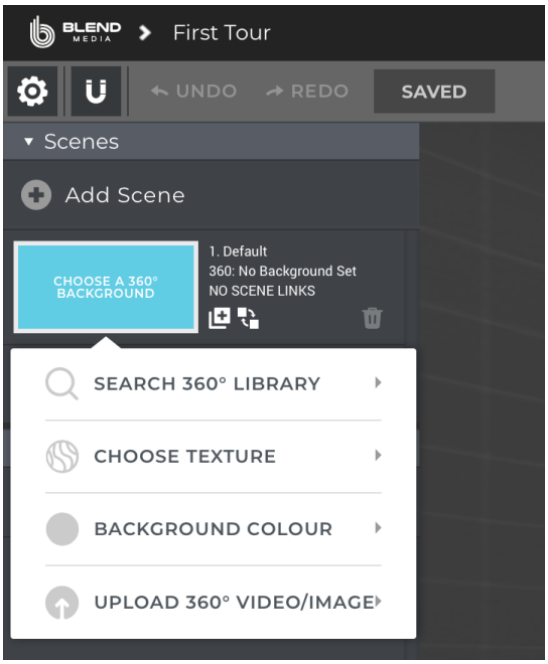
3. Platforms offer many initial templates that can be selected such as roaming around to enjoy landscapes, watching auto show and roaming around in rooms etc.



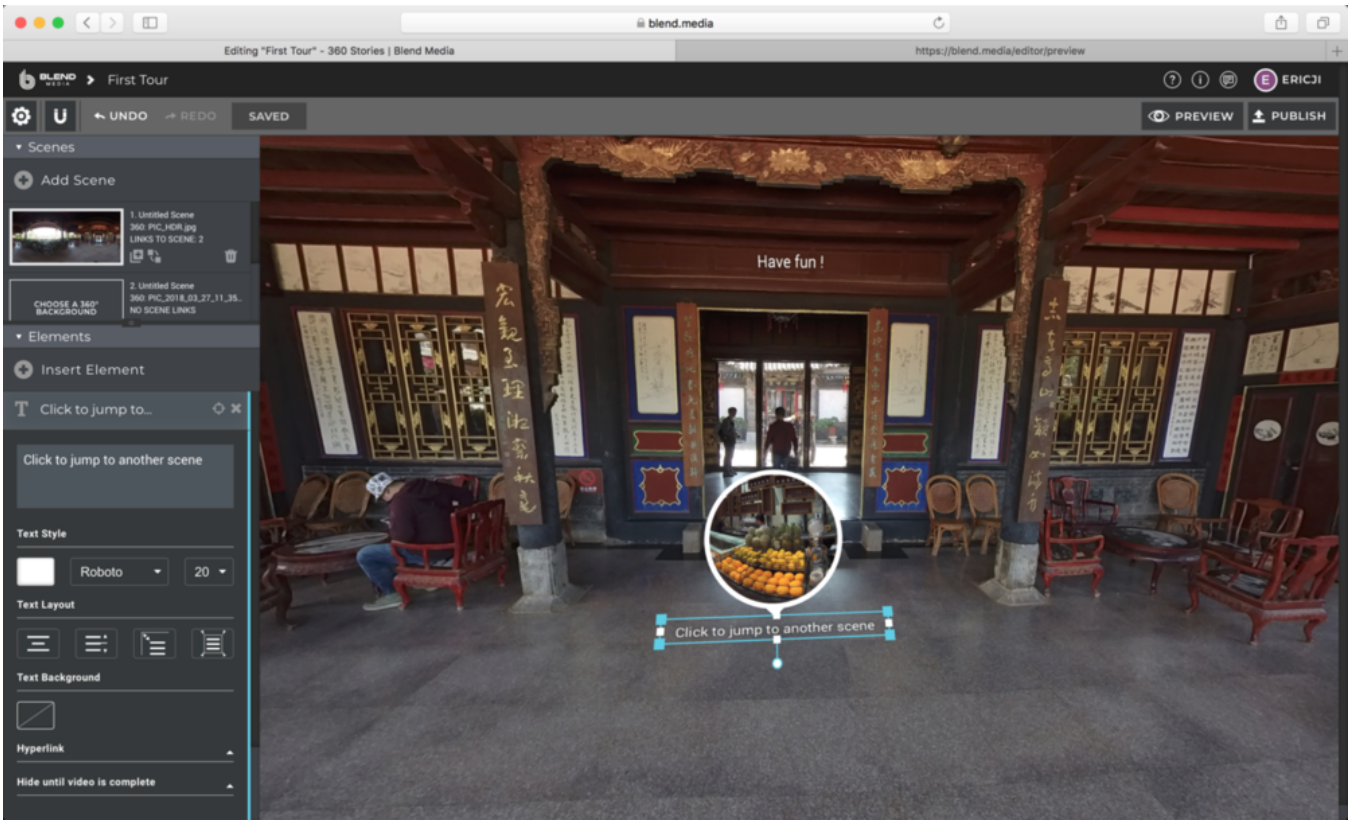
4. If you don't have a favorite template, click "Blank Template" on top left to create a blank template. Enter into the edit interface of the template after creation:



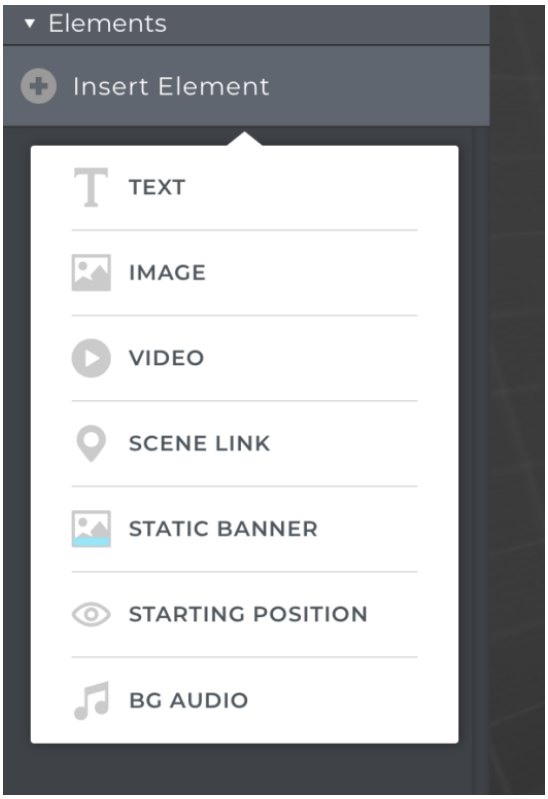
You can add multiple Scenes on the upper left, namely each scene in roaming. After adding a scene, specify upload panorama photos or panoramic videos for this scenario, and complete settings such as background color, basic texture, etc.



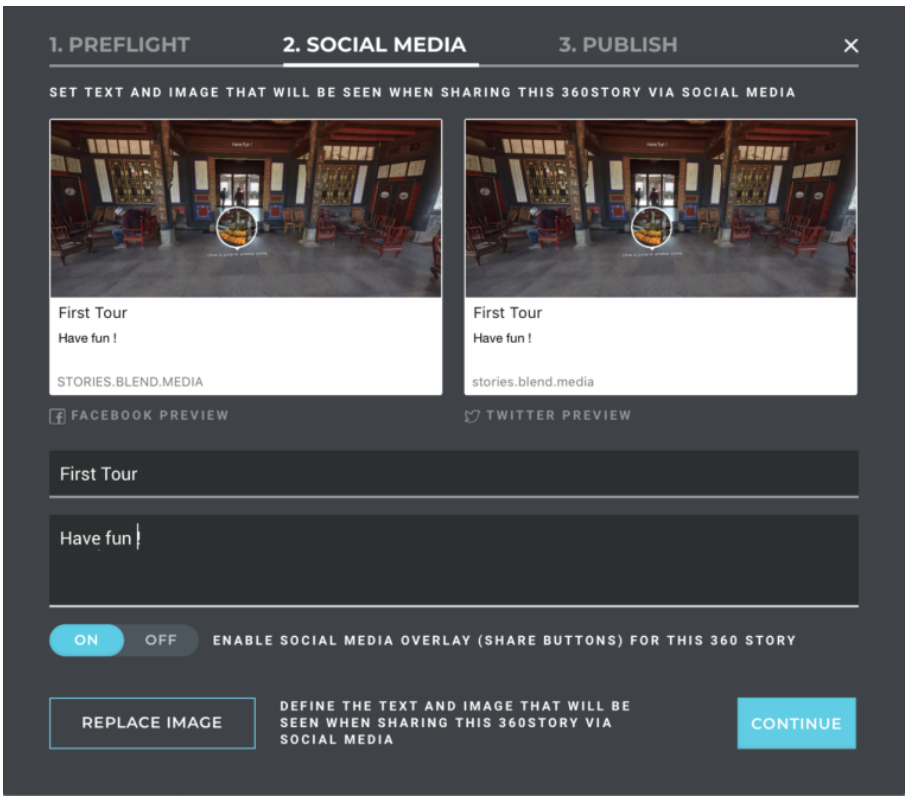
5. After adding a scene, we click on a scene, and then we can preview this scenario in the preview panel on the right side.



In one scene, you can operate on element panel below at bottom left, to add text, image, video, scene link, static banner, starting position, BG audio and other additional elements.



6. After adding different elements to different scenarios, connect these scenarios with jump links. After completion, click "release" on top right corner, the program detects whether there are problems with making roaming and if there are no problems detected, it can be shared on social platforms. Currently, it only supports Facebook and Twitter.



3.1.1 [Beginner] Setup for recording preparation

Before shooting videos, camera's battery level, format and capacity of storage devices must be checked, environment safety for shooting should be confirmed, and suitable bracket and accessories must be selected.

Storage medium: make sure that the format is EXFAT before shooting, avoiding delay if starting format isn't suitable. Selection and formatting methods for storage medium in detail: 1.1.3

Battery: Pro's battery can last for about 75 minutes if fully charged. Generally, when moving to record, several spare batteries can prepared on demand. You can also take external mobile power supply (12V 5A) for shooting.

Gyro calibration: preview before shooting to determine if camera calibration should be performed first and the calibration method is described in detail in 1.1.4.

Stitching calibration: if only carrying out post stitching, no camera stitching calibration is needed; if real-time stitching and better preview are needed, one can choose stitching calibration. When there is obvious changes in shooting environment, e.g. from indoors to outdoors, one should have stitching calibration once again. Calibration methods for stitching are described in detail in 1.1.4.

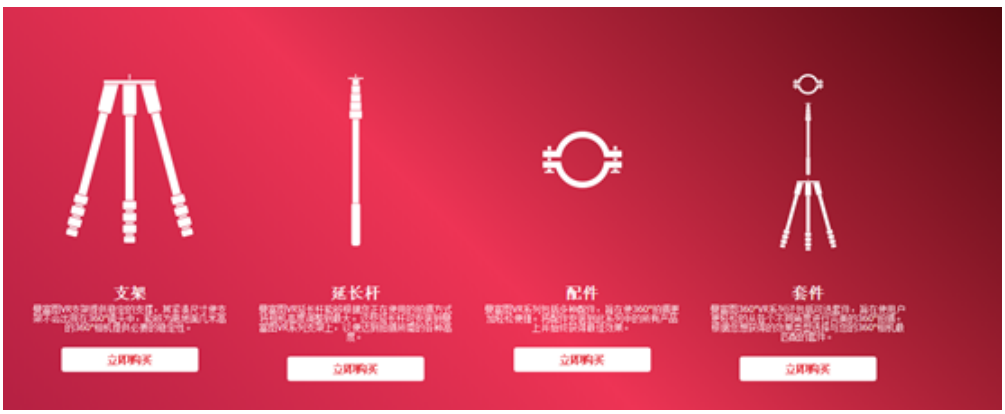
Network connection instructions: you can use mobile phone or laptop computer to control your video recording. Remote control distance depends on signal interference condition of site. Generally, it can be operated around 10 meters.

You can manipulate the camera by Insta360 Pro client terminal that supports all the platforms, and connect methods are described in detail in 1.1.5.

Certainly, you can also record videos without connecting to other devices. Enter video interface, after it displays Ready, click on confirmation button to begin recording, click on it again to end recording.

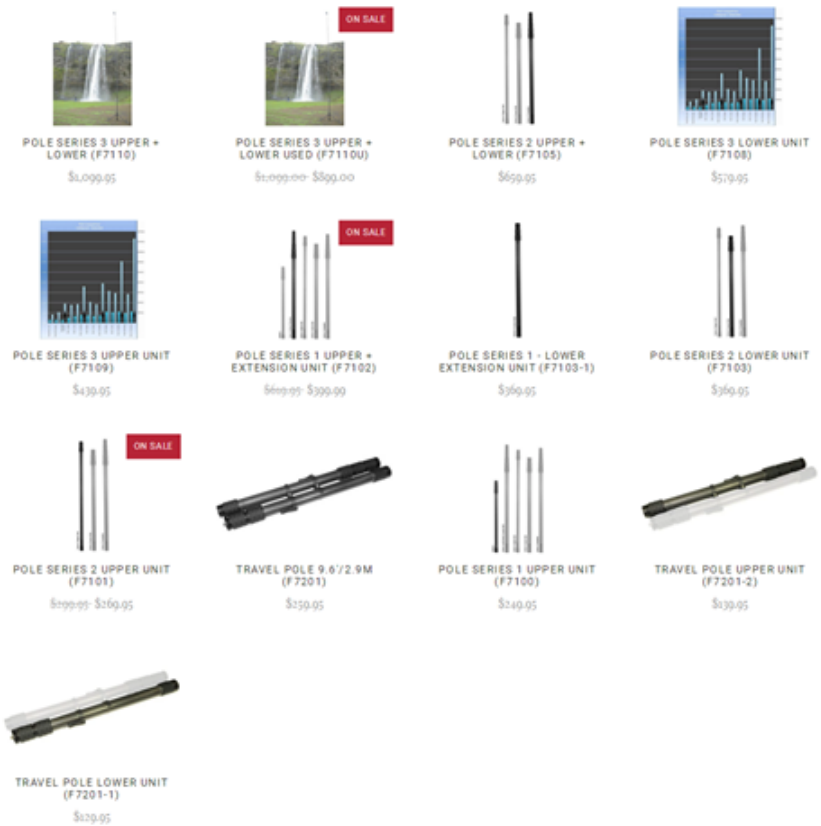
3.1.2 [Beginner] Selection of accessories for shooting

We should try to reduce the area of bottom bracket as much as possible, to make it convenient for post production. Stable bracket should be selected to avoid shaking and unstable videos. Therefore, Manfrotto series products, which are relatively safe, portable, convenient, and easy to operate, can be used as purchase reference for shooting support.



https://www.manfrotto.cn/collections/supports/360-virtual-reality

You can select Nodal Ninja Panoramic Photography Equipment series for overseas products.



http://shop.nodalninja.com/carbon-fiber-poles/

Independent straight camera pole. A straight camera pole can be used to lift the camera in motion shot so as to extend shooting angle, achieving low-altitude aerial effect and overlooking attribute. The pole of unipod or straight camera pole series of Manfrotto can be selected.

3.1.3 [Advanced] Selection of Advanced accessories for video recording

Suction mount. Pro has a weight of 1225g. Select suction mount with large suction fore for single-lens reflex camera, which is relatively stable and reliable.

Mobile shooting cars. Video shooting cars are generally expensive. You can rent one, which is relatively cost effective.

Body-worn pole, panoramic selfie tool that free hands.

https://www.sailvideosystem.com/collections/best-for-360video

3.1.4 [Advanced] Recording equipment

Although Insta360 Pro can record panoramic sounds, external audio devices are still needed if it requires higher sound quality or wireless audio recording. Here we'd like to explain the application of two devices.

Accessories, magic arm, connecting accessories

Zoom Handy Recorder H2n.

Pro firmware above 203 supports recording panoramic sound through USB external port connecting to H2N audio recording device. Please update firmware to latest version before use.

https: //www.youtube.com/watch?v=njep5CO3w3g

Recorded panoramic sound will be consistent with Pro itself, both following Ambisonic standard. It can be exported via Stitcher, uploaded to Facebook, Youtube and other platforms supporting this standard, so as to experience panoramic sound attribute.

Method of recording panoramic sound by using H2N

1. As shown in the picture, one side of H2N input interface and one side of the Pro should be kept in the same direction, then the space direction of recorded panorama will be consistent with the direction of each space of the Pro panorama screen.

2. Connect H2N with Pro via USB cable to set up USB panoramic sound recording mode of H2N, then operate Pro for normal video recording and broadcast live. Before you use it, please ensure that the firmware of the H2N program has been updated to the latest version. Select the 4ch mode so that tape recorders can record spatial audio.

MENU->REC->REC FORMAT->WAV48kHz/24bit;

MENU->REC->Spatial Audio->ON, to open spatial audio

3.1.5 Using H2N and SSD together on V203 Firmware

When using the latest firmware (V203), if you need to use both SSD and H2N while recording or live-streaming, please pay attention to the order of connecting these devices.

1. Power on the camera, connect to camera control app. Enter preview interface to ensure it's able to acquire image.

2. Please firstly connect the USB hub with Pro.

3. Then connect other device, and make sure that your connect H2N at last. Please notice that H2N needed to be boot and set before connection.

SONY UTX-B03+URX-P03 wireless mic package+sound card

Connect tuner to Pro and install the transmitter on recording people.

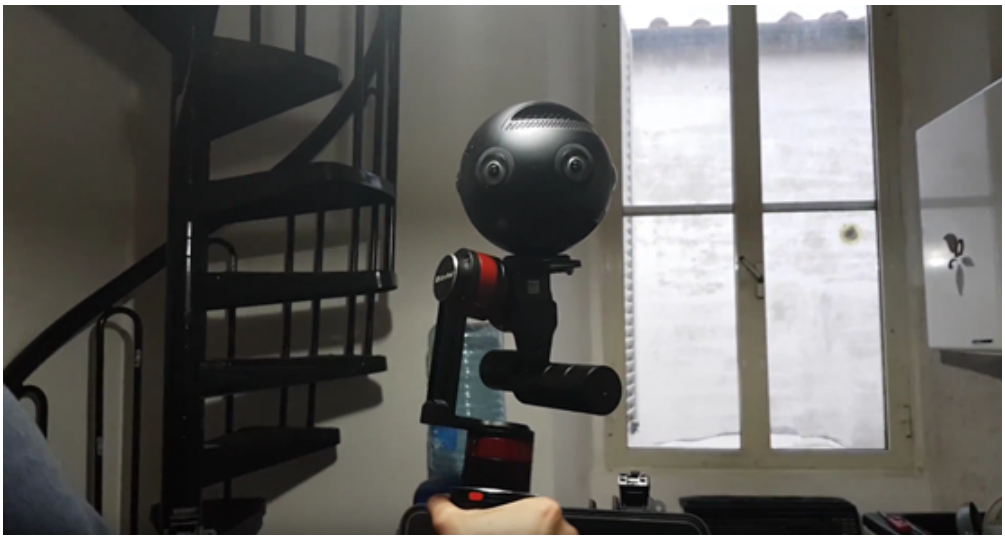
3.1.6 [Advanced] Introduction of stabilizer

MOZA Guru 360 Air

https://www.youtube.com/watch?v=e0hL9VqhHwQ&t=38s

WenPod Tarzan-G

https://www.youtube.com/watch?v=JWV5dX7Lf6U



3.1.7 [Advanced] Special scene shooting preparation (aerial photograph)

Aerial panoramic video:

Drones should choose those with larger load capacity such as DJI S 900, M 600 etc. Phantom series cannot mount, while the mounting of Inspire series has high risk.

Because camera must be kept stable as much as possible to record, although Insta360 Pro has gyroscope stability, it still needs us to debug the equipment before shooting and make sure to hold the camera still.

You can still use the installation mode of photographing photos so you can choose a straight pole to connect Pro. The straight pole can be selected according to the need. Unipod straight pole with changeable length or short pole with fixed length can be selected.

Straight camera poles need to add spherical pan-tilt at joint to facilitate takeoff.

Insta360 Pro can output image signals via mini HDMI OUTPUT interface and connect to Farsight of UAV so that real-time images of Pro can be transmitted to remote controller for monitoring. Moreover, if hardware devices allow, panoramic aerial live broadcast can be realized.

Pro can also be used for aerial photography with panoramic stable pan-tilt, such as MOZA Guru 360 Air, WenPod Tarzan-G.

3.1.8 [Advanced] Create and set logo for real time stitching

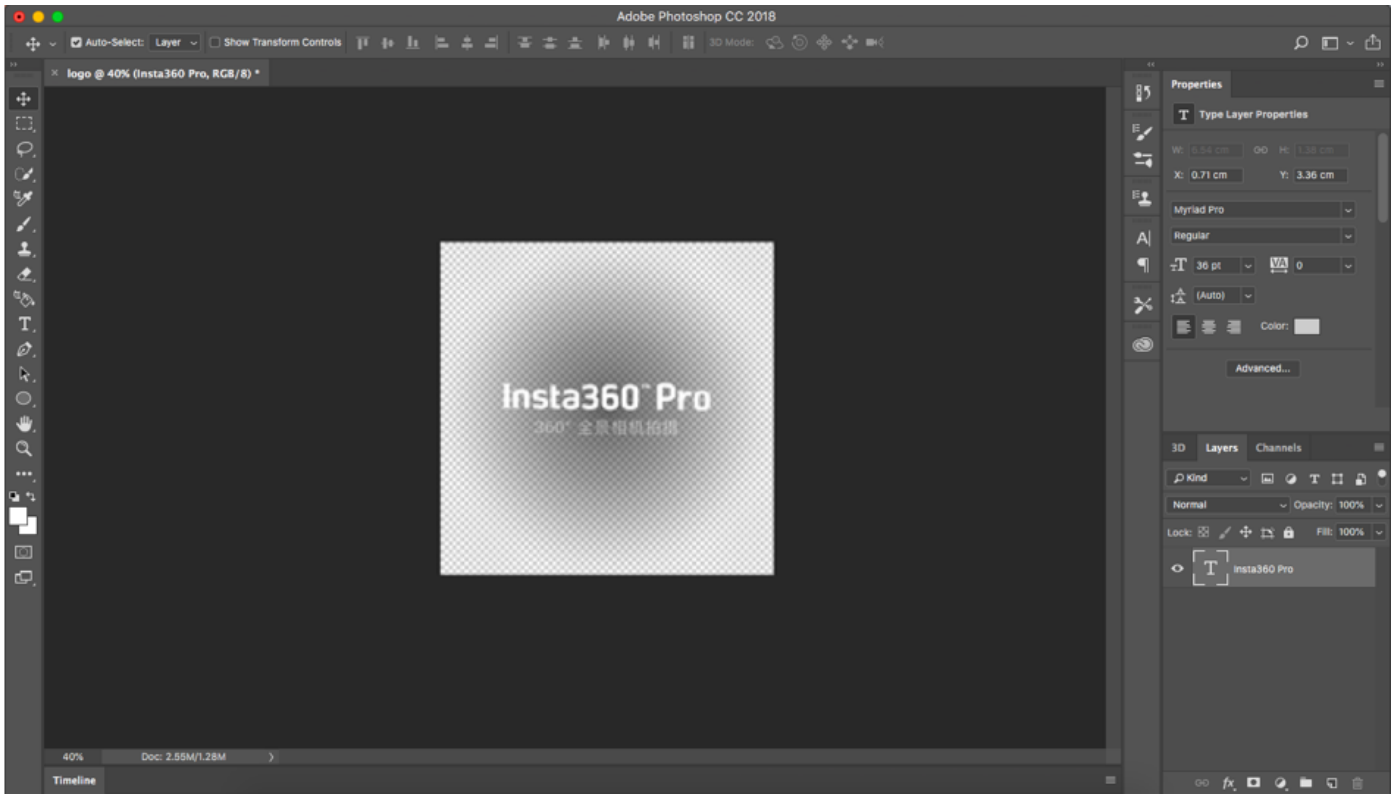
Please enable 'Bottom Logo' in camera setting.

Name the Logo as “_logo.png” and save it to current SD card or mobile hard disk.

Turn on the camera to view the preview or take a real-time stitching content, the logo you saved will automatically be cut into round shape to cover the watermark at the bottom.

The aspect ratio of “_logo.png” should be less than 50%. With the width fixed, the radius of the bottom logo will increase as you increase its height. Recommended resolution: 2000px*150px

Tutorial:



Methods for making logo:

Open Photoshop and import a transparent logo in png format.

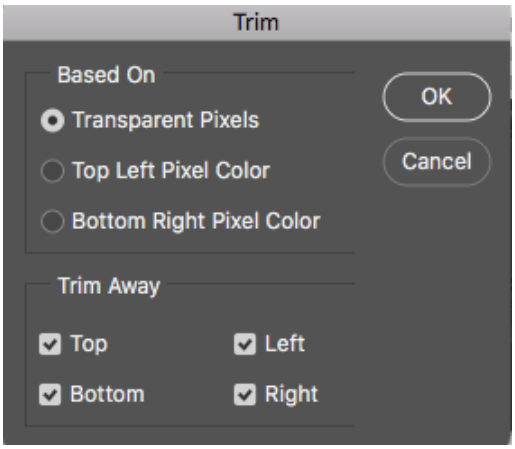
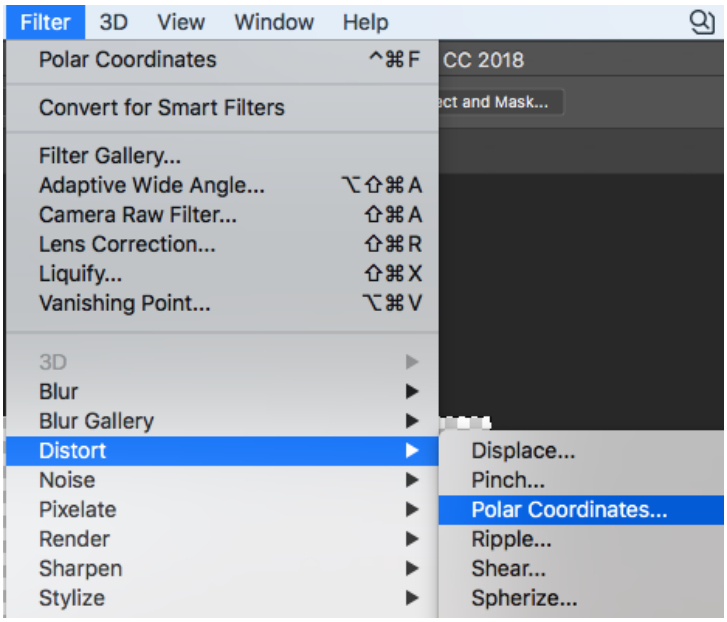


Image-Trim, select transparent pixels, cut off redundant pixels.



Distort - Polar Coordinates - Polar to Rectangular.

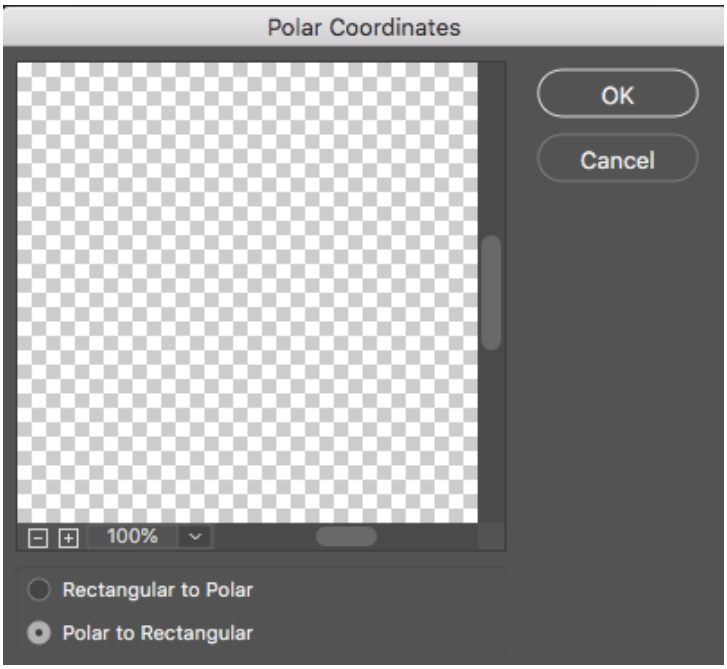


Image Rotation – 180°

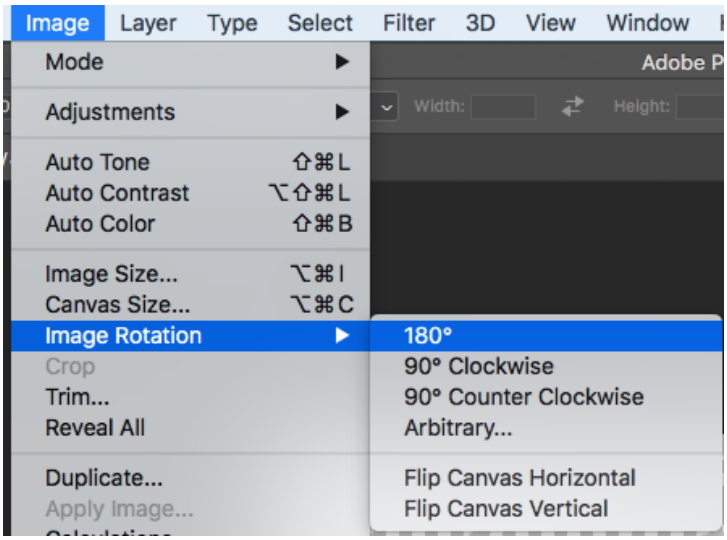
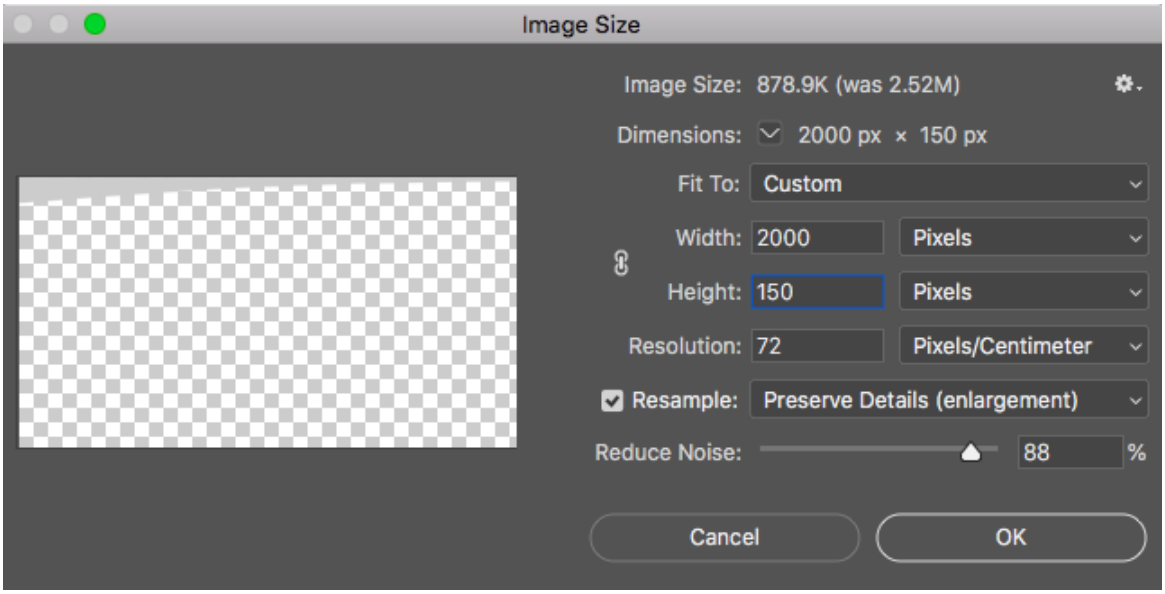


Image-Image Size, modified to 2000 * 150.

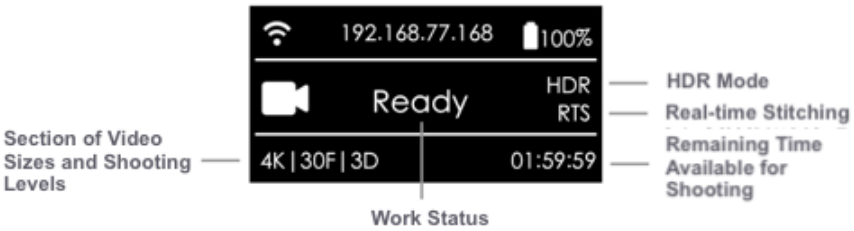


Save as _ logo.png and store it in the root directory of the SD card.

3.2.1 [Beginner] Shooting Mode Screen and Settings

- **Camera Standalone Use**

1. Video Mode Screen

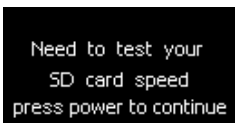


2. Operation Instructions

① Select the video mode from the camera menu, press "POWER" key to confirm entering such mode. After the camera completes the preparation, the video recording READY state will be displayed.

② When the video recording mode is in video recording READY state, press UP and DOWN keys to switch over the size levels for recording.

③ When the video recording mode is in video recording READY state, press POWER key and you can start the recording as per the current size. Note: If the storage device is used for the first time, the speed testing is required. The video recording proceed smoothly only after the speed is ensured to meet the standard.



④ To stop recording video, please press POWER key again. If the real-time stitching level is needed after the video is shot, the camera will enter the processing state. After processing is done, the storage will be carried out, and then, the camera will be switched to video recording READY state. The work indicating lamp will be flashing until video shooting is done. If the flashing lamp affects the shooting environment, it can be turned off in the camera settings. Once the video is shot and saved, a sound will be made for indication

3. Recording specifications and levels

Recording Specifications	Explanation
8K/30F8K/30F	Record and store original video, 8K panorama video at the maximum can be stitched in post production. 3D video cannot be stitched.
8K/5F	Shooting Google street view is detailed in chapter 5
6K/30F /3D	Record and store original video, 6K 3D panorama video and 6K panorama video at the maximum can be stitched in post production.
4K /120F	Record and store 120-frame original videos, 4K 120-frame panorama video can be stitched in the post production.
4K/60F/3D	Record and store 120-frame original videos, 4K 120-frame panorama video can be stitched in the post production.
4K/30F RTS	Record and store original videos, real-time stitching for 4K 30-frame panorama videos.
4K/24F/3D RTS	Record and store original videos, real-time stitching for 4K 3D panorama videos.
Customize	Camera customize option allows the user to quickly select the parameters saved by the application the last time it was manipulated by using app or scanning QR code. See chapter 6, 6.2 for details of use.

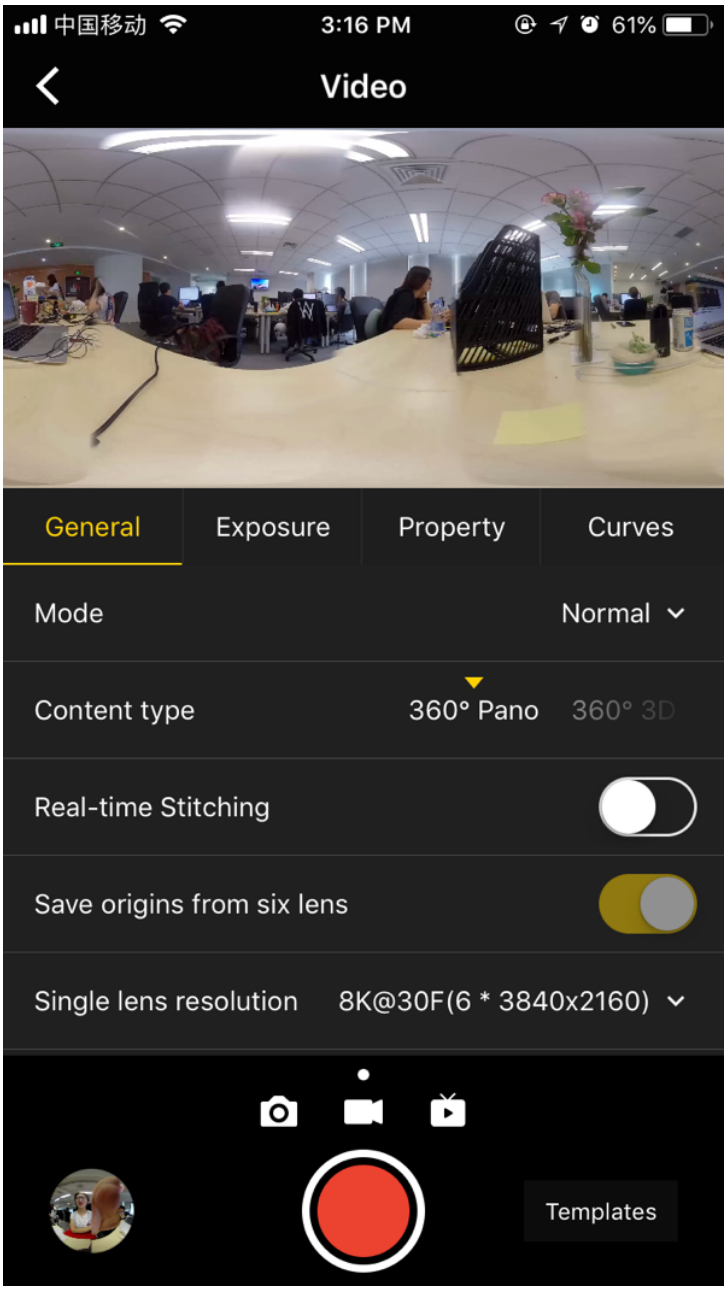
- **Control camera to record through app**

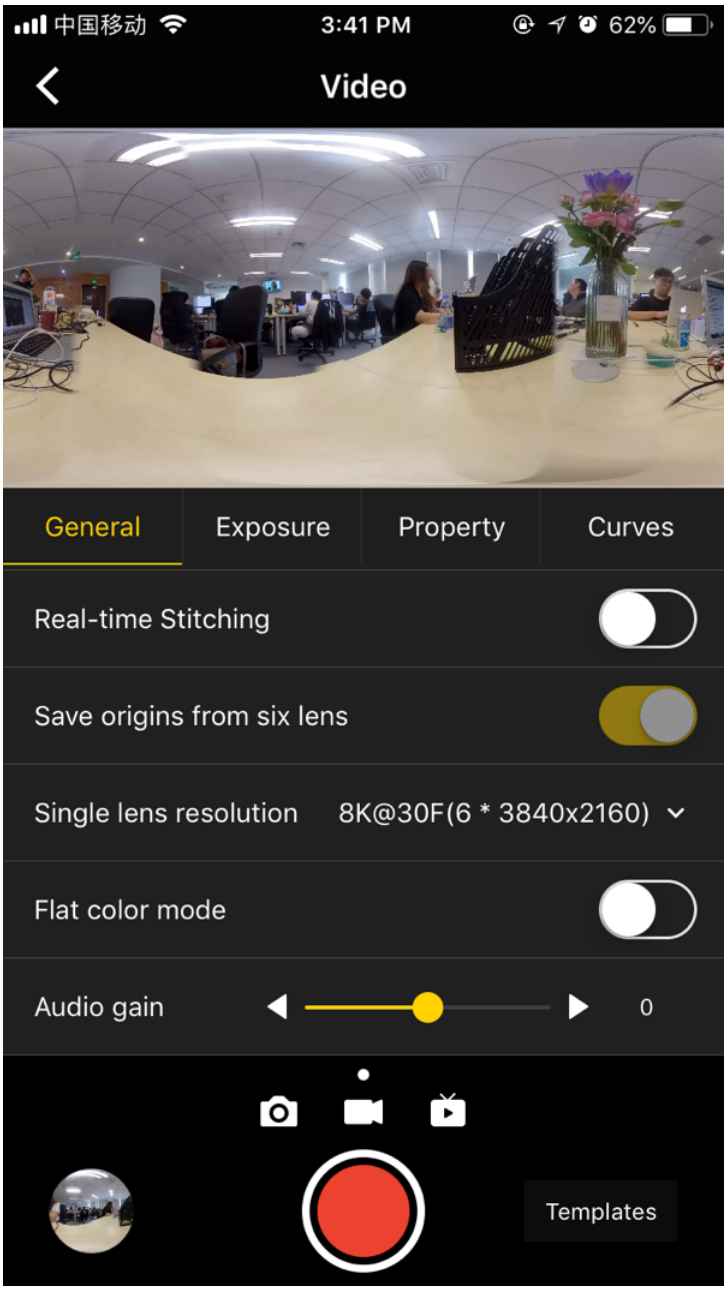
1. Record through app (take the interface of iOS app as an example)

Click to enter shooting mode, app will automatically load preview stream. After completion, it will carry on corresponding shooting. During shooting, the preview screen has a frame rate of 1 FPS. Turn on gyroscope stabilization. When the button is on, videos stored by the camera's real-time stitching function will automatically correct according to gyroscope data.

Please note that this feature cannot take effect when photographing real-time stitching content or live-streaming of 3D. Click to switch to preview effect with VR glasses. Close preview screen button (save electricity after closing) and touch to preview again.

Open app and make video settings:

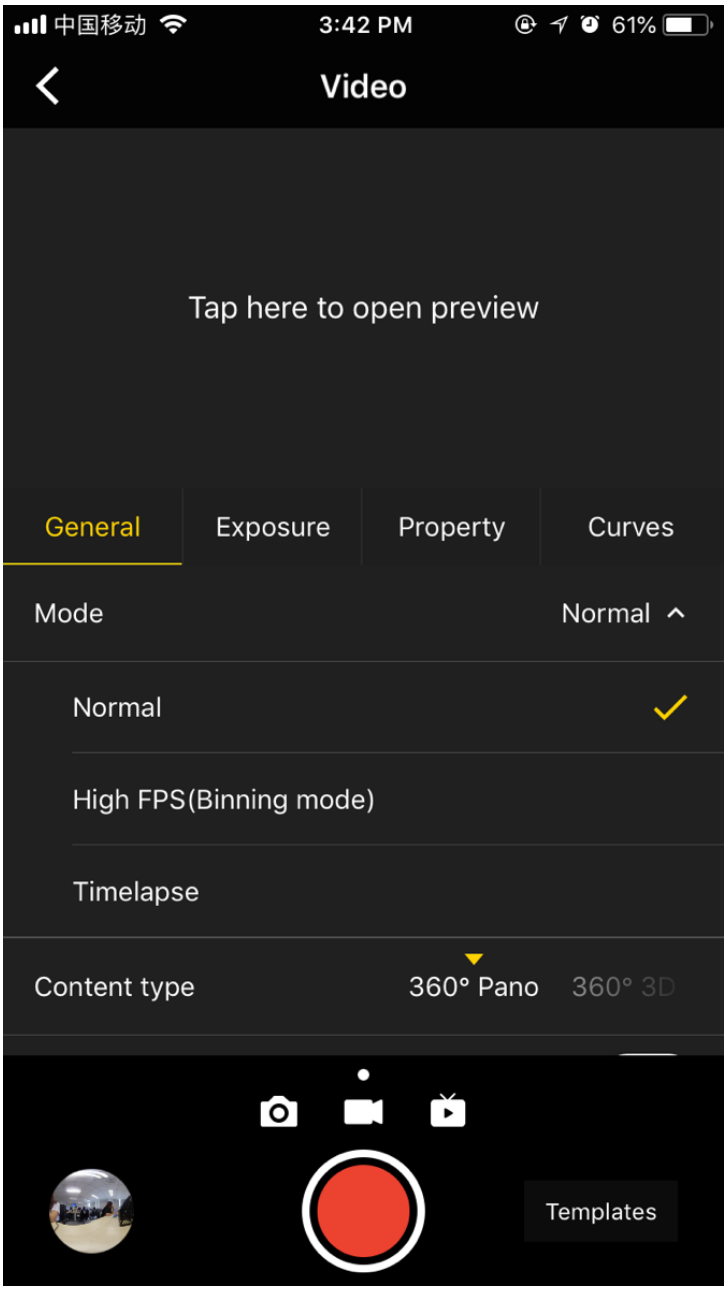

中国移动
3:16 PM
61%
Video
General
Exposure
Property
Curves
Mode
Normal
Content type
360° Pano
360° 3D
Real-time Stitching
Save origins from six lens
Single lens resolution
8K@30F(6 * 3840x2160)
Templates

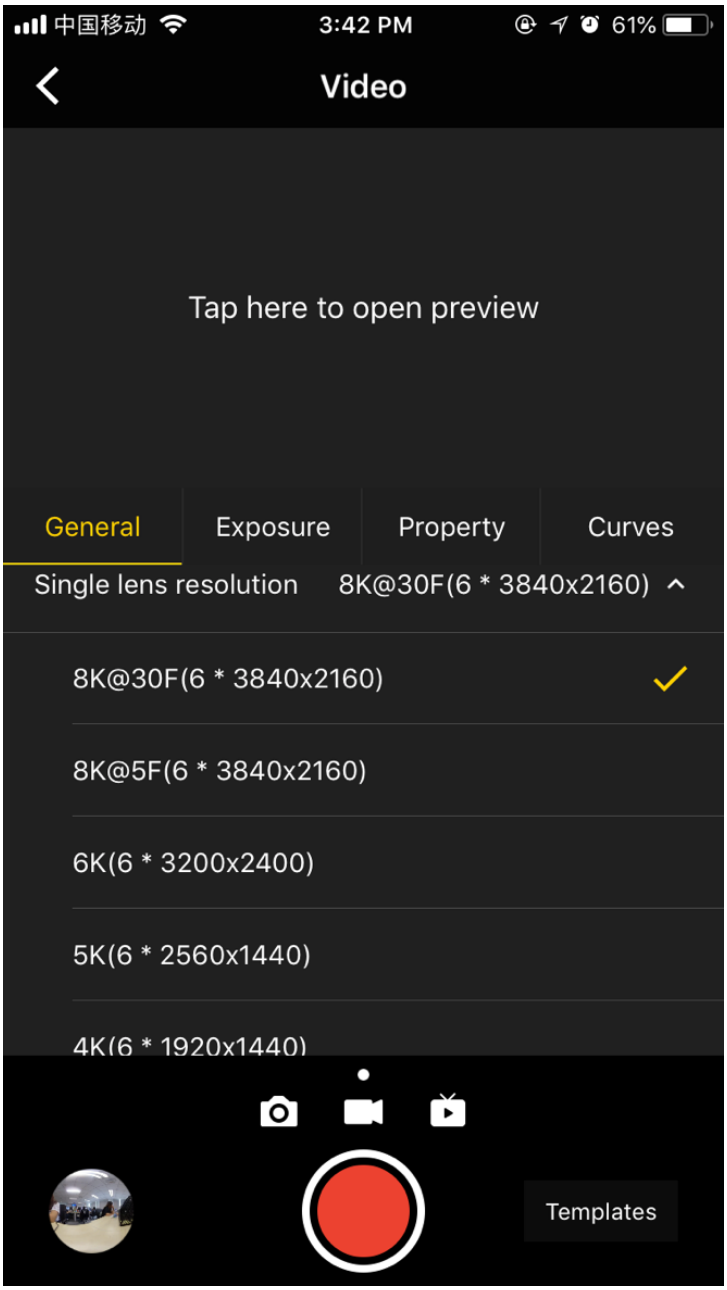


General (basic settings for recording):

General	Options	Explanation	Post-production
Mode	Normal, High FPS（Binning, high-frame rate mode）, Timelapse	High frame rate mode, because of Binning technology, its quality is slightly inferior than ordinary shooting video. The interval length of delay photography must be set above 2s, while interval time is 1s longer than Shutter time. For example, setting interval is 2s, Shutter can be set to 1s at minimum.	In addition to the Normal mode, which can use real-time stitching, other modes need to use Stitcher for post-production.
Content Type	360° Pano 360° 3D	Associated with the type of video content of real-time stitching. There is no 3D option if shooting 8K and 4K120-frame content.	According to the original film type of 6 shoots, there are no 3D options except for 8K and 4K120-frame content.

General	Options	Explanation	Post-production
Real-time stitching	Real-time Stitching options (not optical flow stitching). It is turned off by default. If turned on, video resolution needs to be set for real-time stitching storage.	The camera should be calibrated before use. The maximum resolution of the real-time stitching shall not exceed 4K. When shooting moving objects and people, the result of real-time stitching can not be optimal.	If the original 6-lens video is stored, the user can use Stitcher for later stitching.
Save origins from six lenses	Used with real-time stitching	When opening real-time stitching, you can only choose to store 5K （6*2560x1440） 4K（6*1920x1440）	6*1920x1440 original film can be stitched into 3840x3840 3D video 6*2560x1440 original film can be stitched into 5120x2560 general panoramic video.
Single lens resolution	8K@30F（6*3840x2160） 8K@5F（6*3840x2160） 6K（6*3200x2400） 5K（6*2560x1440） 4K（6*1920x1440）	After you turn on the option to store the original video, you can select the maximum video resolution for each lens recording.	Through Stitcher mosaic synthesis, later mosaic will be affected by the resolution of the original film, 3840x2160, 2560x1440 can not splice 3D video.
Flat color mode	Close by default	Color mode with large post-production space, similar to the Log function, can download the official LUT for fast color palette.	After stitching, you need to use software such as Premiere or FCPX to load LUT. Method of use please refers to 3.3.8
Audio gain	-30 ~ 30, 0 by default	Only works for built-in microphones.	2 methods for optimizing built-in mic recording effects: 1. fan sampling, 2. turn off the fan.
Reset			

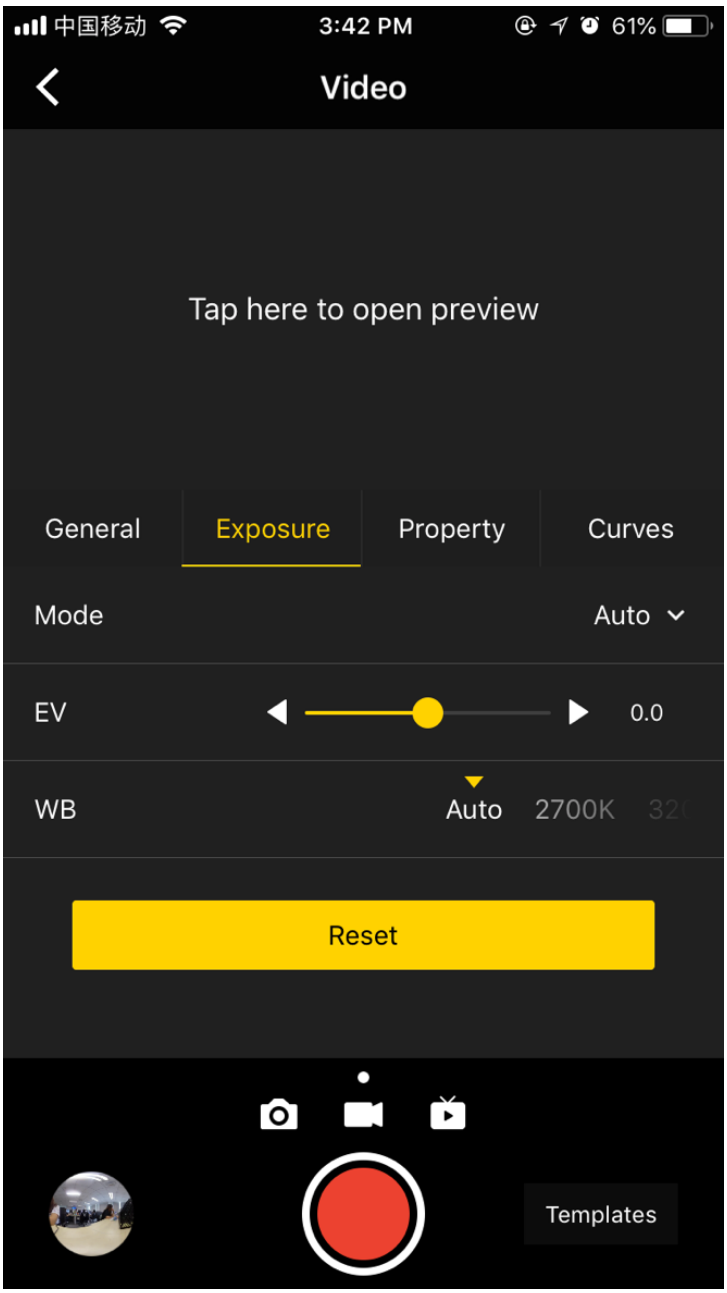

中国移动
3:42 PM
61%
Video
Tap here to open preview
General
Exposure
Property
Curves
Mode
Normal
Normal
High FPS(Binning mode)
Timelapse
Content type
360° Pano
360° 3D
Templates

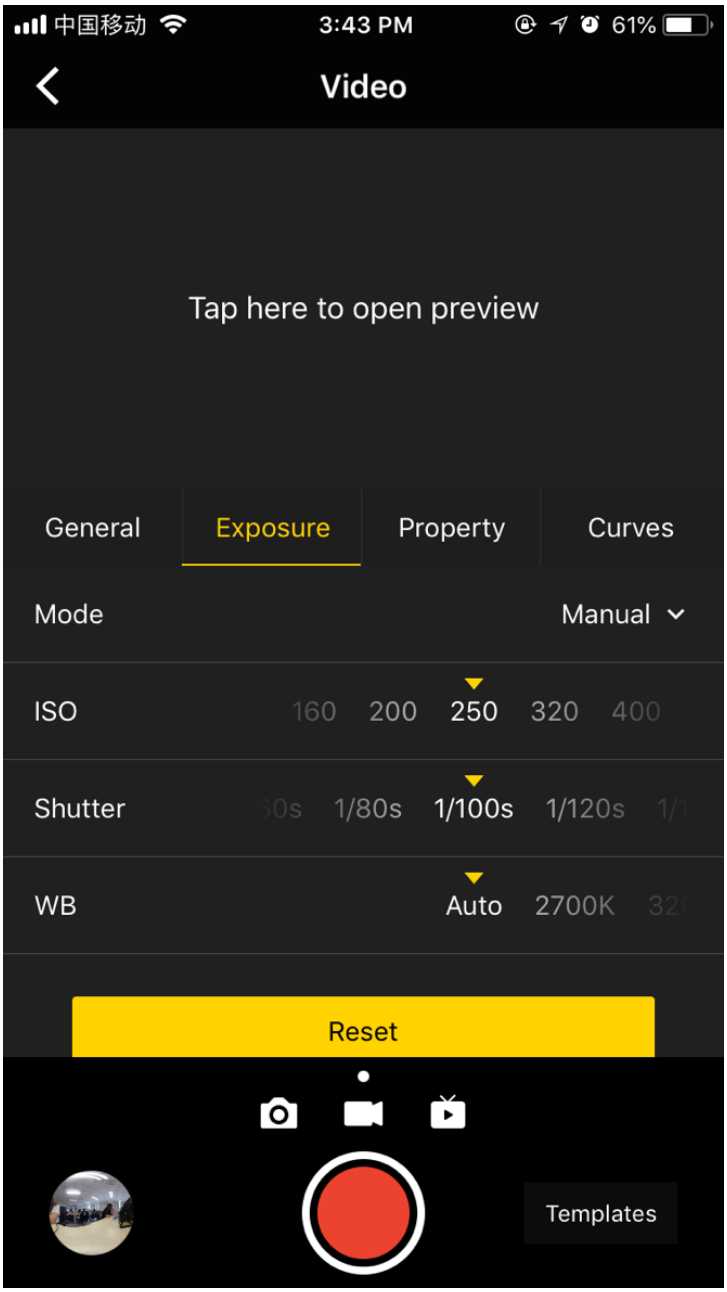


Exposure

Exposure：	Options	Explanation
Auto	It can adjust EV, white balance	Under the shooting of Normal, the range of EV is-5 ~ 5. Under HDR mode, the adjustable EV range is Under the shooting of Normal, the range of EV is-5 ~ 5.
Manual	ISO range： 100 ~ 6400 Shutter range： 1/30s ~ 1/8000s for ordinary Shutter, WB levels： Auto （auto white balance）, 2700K, 3200K, 4000K, 5000K, 6500K, 7500K	The normal video shutter speed is set at 1 / 50s. In special cases, the shutter speed can be adjusted in conjunction with the ISO in order to obtain the correct exposure.

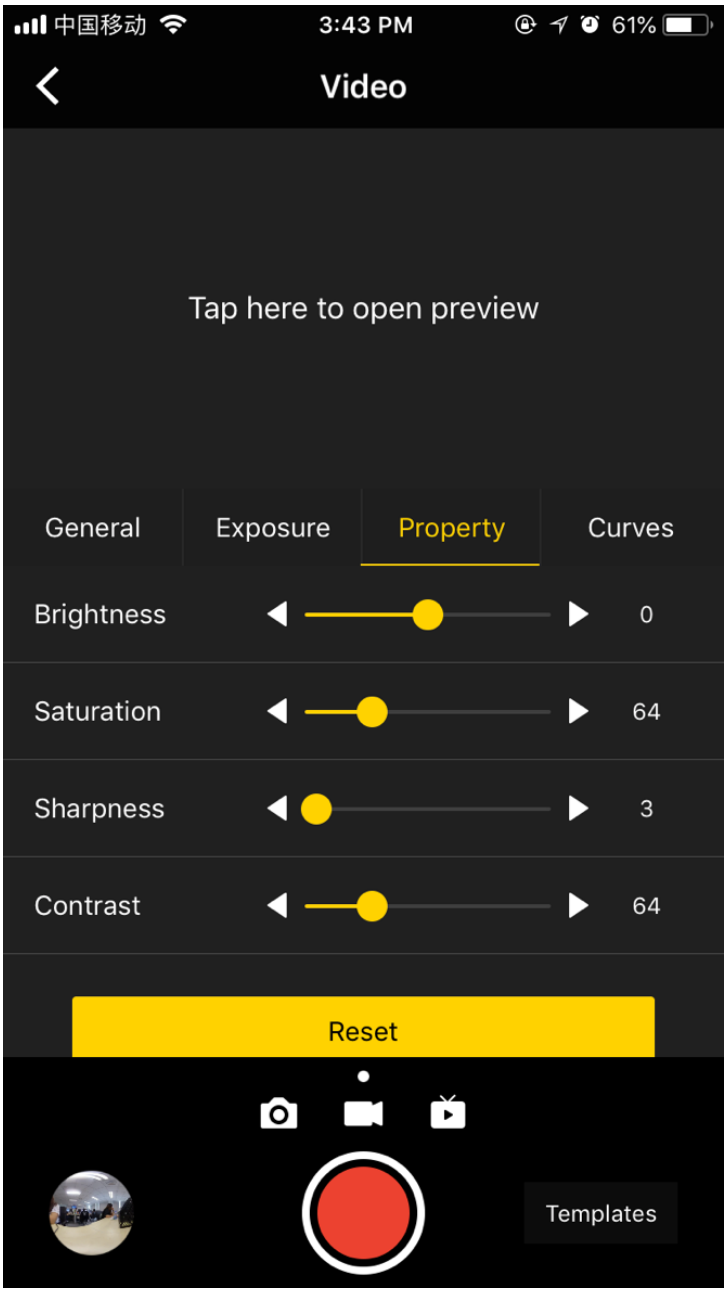
Exposure：	Options	Explanation
Isolated Exposure	Each lens is automatically exposed separately, with adjustable EV, white balance. Optical flow stitching can be done via Insta360 Stitcher later, which enables smooth transitions for color difference between each lens.	Isolated Exposure is suitable for shooting scenes with sharp light and shade contrast, such as shooting bright windows and indoor scenes, bright scenes but darker seats in the audience.
Reset		





Property

Property	Options	Explanation
Brightness	-255 ~ 255	Note: Property settings generally do not modify, especially sharpness, which may cause noise increase after modification.
Saturation	0 ~ 255	
Sharpness	3 ~ 6	
Contrast	0 ~ 255	
Reset		



2. Precautions for shooting

In mobile AP connection, it may cause unstable connection due to crowd density, and shelter, etc.

Pro is not waterproof so it cannot be photographed underwater nor does it recommend photographing in rainy weather.

Optical flow stitching algorithm is designed to detect each pixel between frames. And if no similar point is found in adjacent images, ripples will be generated at moving objects or lens seams. For example, in front of wallpaper of fine vertical stripes are reflective glass or stainless steel railings.

Therefore, we should try to avoid these situations and place the camera in the scene with details that are rich but non-repetitive.

Safe distance: the safe distance of optical flow stitching is 50cm. The safety distance between template stitching is 1.5m and safe distance should be considered in camera's position.

Considering the effect of viewing through VR headset, it is suggested that camera lens height should be equal to an adult height when recording video of people, and the distance between a character and an object should be 1.5m ~ 2m.

Since the 3D video does not have gyroscope calibration function, when shooting videos, one should ensure camera is held level, and it is recommended to use stabilizer when holding the camera to shoot.

3.2.2 [Advanced] Recording panoramic sound

Make sure that H2N settings are correct before recording sounds.

1. As shown in the picture, one side of H2N input interface and one side of the Pro should be kept in the same direction, then the space direction of recorded panorama will be consistent with the direction of each space of the Pro panorama view.

2. Connect H2N with Pro via USB cable to set up USB panoramic sound recording mode of H2N, then operate Pro for normal video recording and broadcast live. Before you use it, please ensure that the firmware of the H2N program has

been updated to the latest version. Select the 4ch mode so that tape recorders can record spatial audio.

MENU->REC->REC FORMAT->WAV48kHz/24bit;

MENU->REC->Spatial Audio->ON, to turn on spatial audio

3. After successful setup, the interface displays SPACIAL AUDIO, and then press red function key to begin recording. LED screen shows real-time sound waveform, silver control knob on the right can adjust gain.

3.2.3 [Advanced] Panoramic delay and High speed Photography

When shooting Timelapse, please note that interval length must be set above 2s while the interval is at least 1 second longer than Shutter speed. For instance, if the interval is set at 2s, the Shutter speed may be set to 1s to the minimum.

When shooting High FPS video of high frame rate, because it is the implementation of Binning technology, the image quality is slightly inferior than ordinary shooting video. This model is suitable for shooting high-speed motion or scenes that need post adjusting to be fast or slow. For Content Type, regardless of 360°3D or 360°Pano, each path can store original film of 1920x1440@120FPS. Stitcher can be used to synthesize 3840x3840@120fps 3D video or 3840x1920@120FPS 2D panoramic video.

3.2.4 [Advanced] Panoramic aerial photography

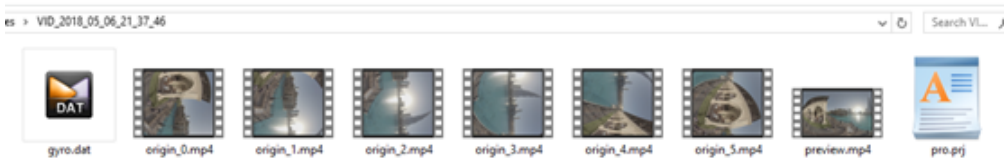
During panoramic aerial photography, smooth flight is required and the aircraft itself should reduce unnecessary cornering and shifting speed. Through HDMI, you can use Farsight monitor to check real-time pictures. Panoramic aerial photography usually uses 2D screen, because 3D video has no obvious effect when the distance is relatively far.

Panoramic aerial photography is chosen under sunlight or when sunrise or sunset light is better.

Aerial photography of night scene has decreased image quality, because the shiner is far away from the camera.

3.3.1 [Beginner] Video stitching by Stitcher

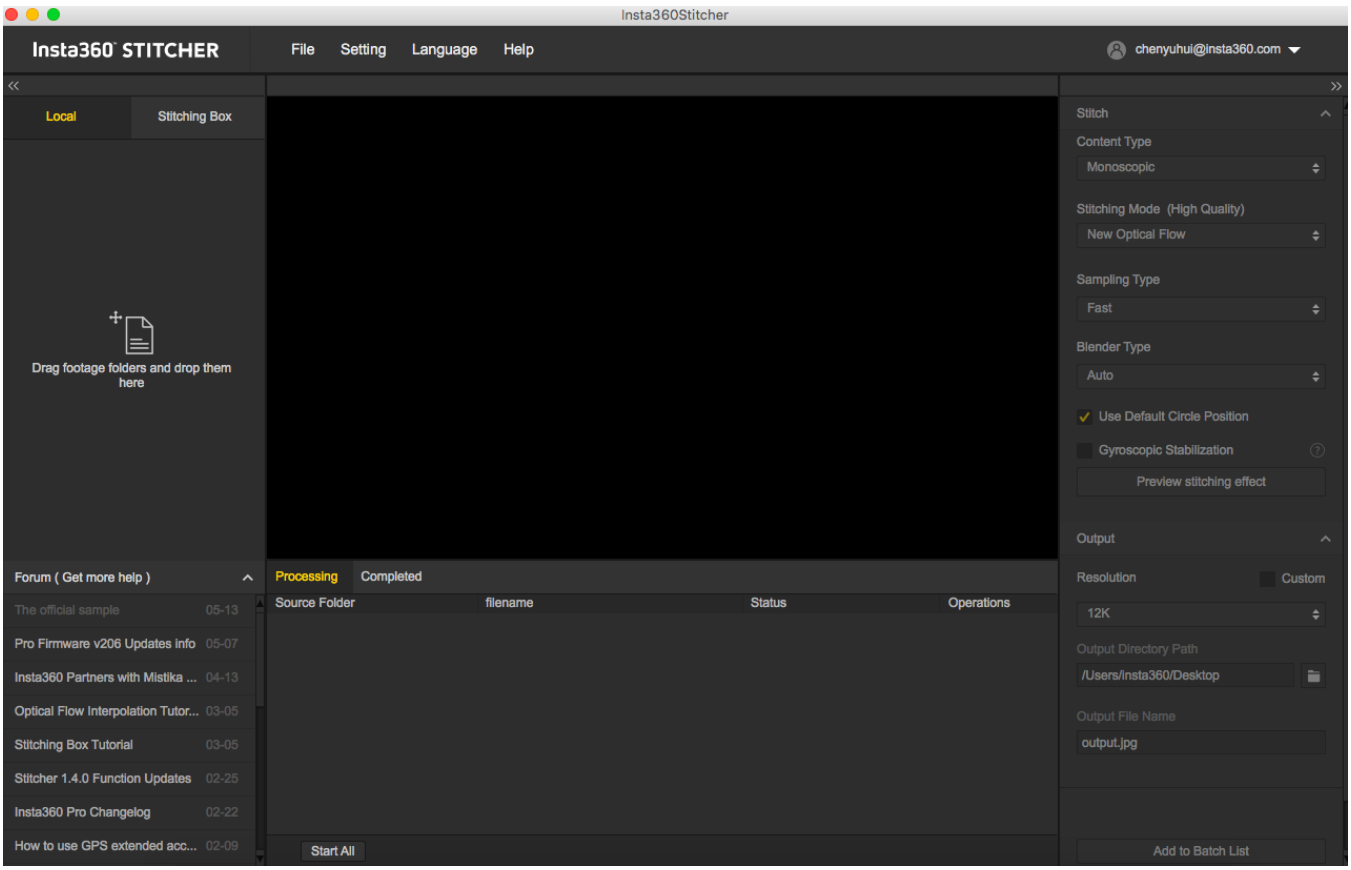
1. Recognize format and storage format of photo files



- Video is stored as MP4 format, encoded by H.264.
- Each shoot creates a folder containing all description files (gyro.bat and pro.prj) as well as video files. When the camera opens up gyroscope, it generates gyro.bat files.
- origin_*.mp4 sequences are original files captured by each independent lens for post stitching. Resolution 3840 * 2160 can stitch 8K panoramic video at the maximum, resolution 2560 * 1440 can stitch 4K panoramic video, and resolution 3200 * 2400 can stitch 6K3D video and 6K panoramic video at the maximum.

- Preview.mp4 is a preview file of 1920 * 960 with frame rate of 1 fps, which can be used as a later timeline reference.
- Audio files recorded inside the camera have been reduced noises by algorithm and two audio channels are stored separately in both origin_0.mp4 and origin_1.mp4. Finally panoramic sounds can be obtained via Stitcher stitching.
- If real-time stitching is performed, then audio and video will be merged into the pano.mp4 file.

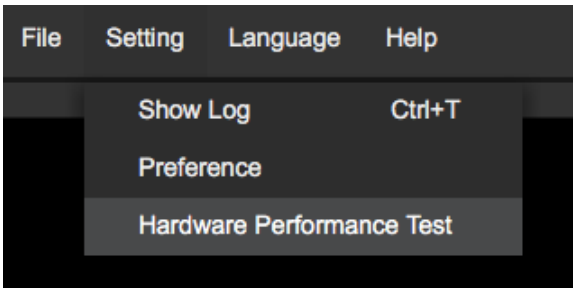
2. Stitcher interface introduction

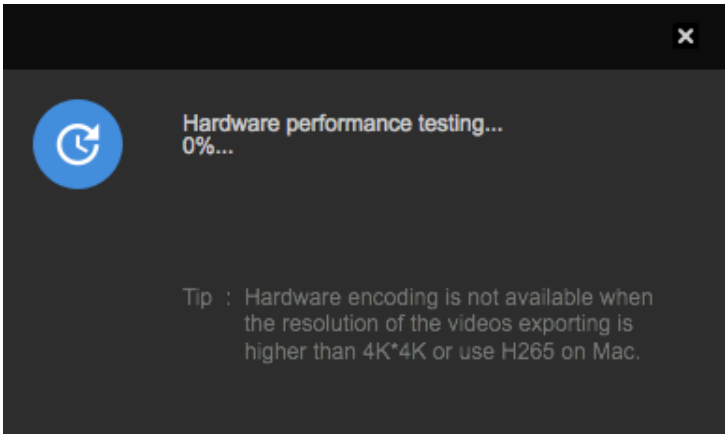


- On the top is the menu bar: File, Settings, Language, Help. You can find functions of file import, google street view upload, log display, preference settings (hard soft decoding) , hardware performance test, language settings, log upload, etc.
- On the left is a list of files. You can drag folders directly to import files. Stitchingbox refers to using Pro's own function for stitching. And the operating mode is described in detail in 3.3.4
- Pro's official forum is shown at the bottom left, which provides latest software information, tutorials, technical discussions, feedback and suggestions to Insta360.
- In the middle is real time monitor window, supporting the playback of the file in any lens.
- Below is task status bar, where you can see the stitching process and check what has been done.
- In the upper right is stitching setting area, where you can set up stitching Content Type (Monoscopic and Stereo) and Stitching Mode (optical flow and template stitching).Sampling type and Blender Type generally have default settings. Default Circle Position is used to optimize stitching at top of the frame and under dark conditions.

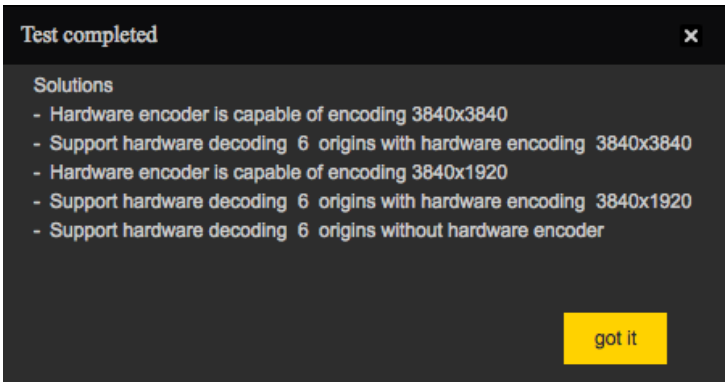
3. Hardware performance testing

Because video stitching has high requirements on computer performance, it is suggested that speed test should be carried out first before using Stitcher. Select hardware performance test in the settings, and the test will take a while.



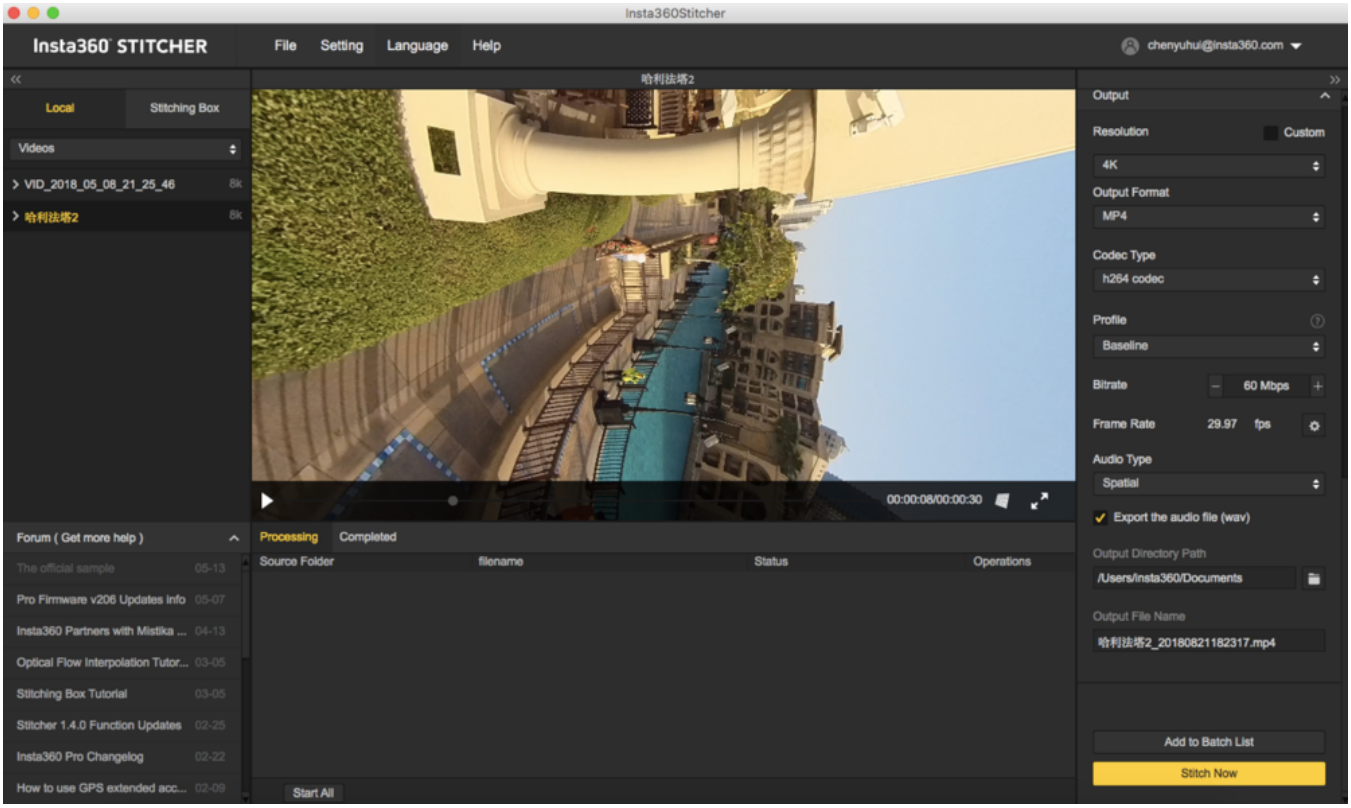


After testing, results for computer performance will be provided for your reference.

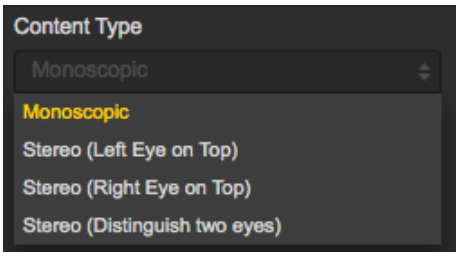


4. Stitching step

Import a video folder



Content types include Monoscopic, Stereo (Left Eye on Top) and Stereo (Right Eye on Top).

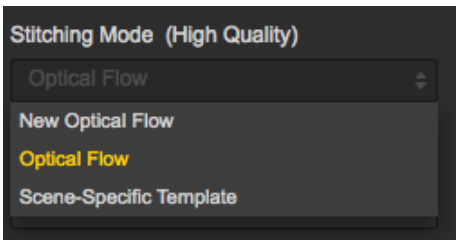


For Stitching Mode, you can select new optical flow and optical flow to calculate new template according to current picture.

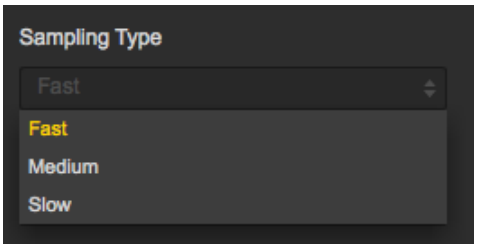
Optical Flow: basic optical flow algorithm, general stitching speed.

New Optical Flow: an increase of nearly 3 times of stitching speed on original basic optical flow but few scenes can achieve less stitching effect than basic optical flow. It is suggested to try basic optical flow and compare effects when you feel dissatisfied about the stitching effect of new optical flow.

Scene-specific Template: speed is fastest but it is not optical flow stitching, so it has limited effect when there's parallax error and in near distance.



As for Sampling Type, if the camera is still static then three sampling types are not very different from each other. If the camera is moving, sampling with slower speed can obtain better image quality which is commonly used in video stitching.

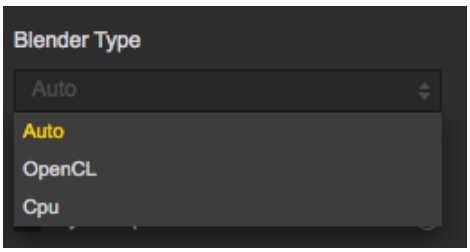


Blender Type is generally automatically chosen by the computer.

CUDA: if the computer use NVIDIA graphics cards, you have to select NVIDIA CUDA technology to enable hardware acceleration.

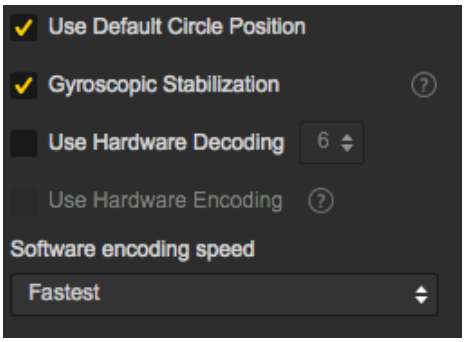
OpenCL: if the computer doesn't use NVIDIA graphics cards, we also provide hardware acceleration through OpenCL.

CPU: non hardware acceleration, pure CPU computing.



Using default circle position option for some scenes with shelter at top and scenes under dark conditions will help improve stitching effects.

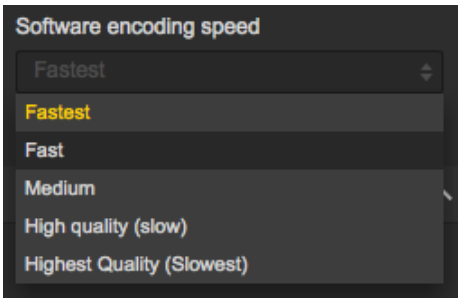
Gyroscopic Stabilization can make screen keep horizontal automatically when exporting 2D panoramic photo, but the stitching of 3D video does not support Gyroscopic Stabilization. Please choose hardware decoding and hardware coding based on the resolution and computer performance of the video. Hardware decoding is not supported when the resolution of exported video is higher than 4K x 4K or using the H265 encoding on MAC.



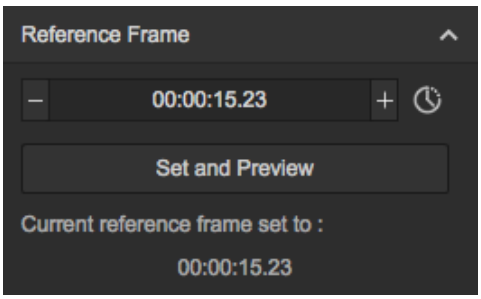
Software encoding speed means the higher encoding speed you choose, the faster the stitching is, but quality details may lose.

For example, for some static scenes, fast encoding speeds can also get good quality, but mosaic may appear for fast encoding of moving scenes in terms of screen details. This requires users to make choices according to content scenarios, stitching quality and stitching speed.

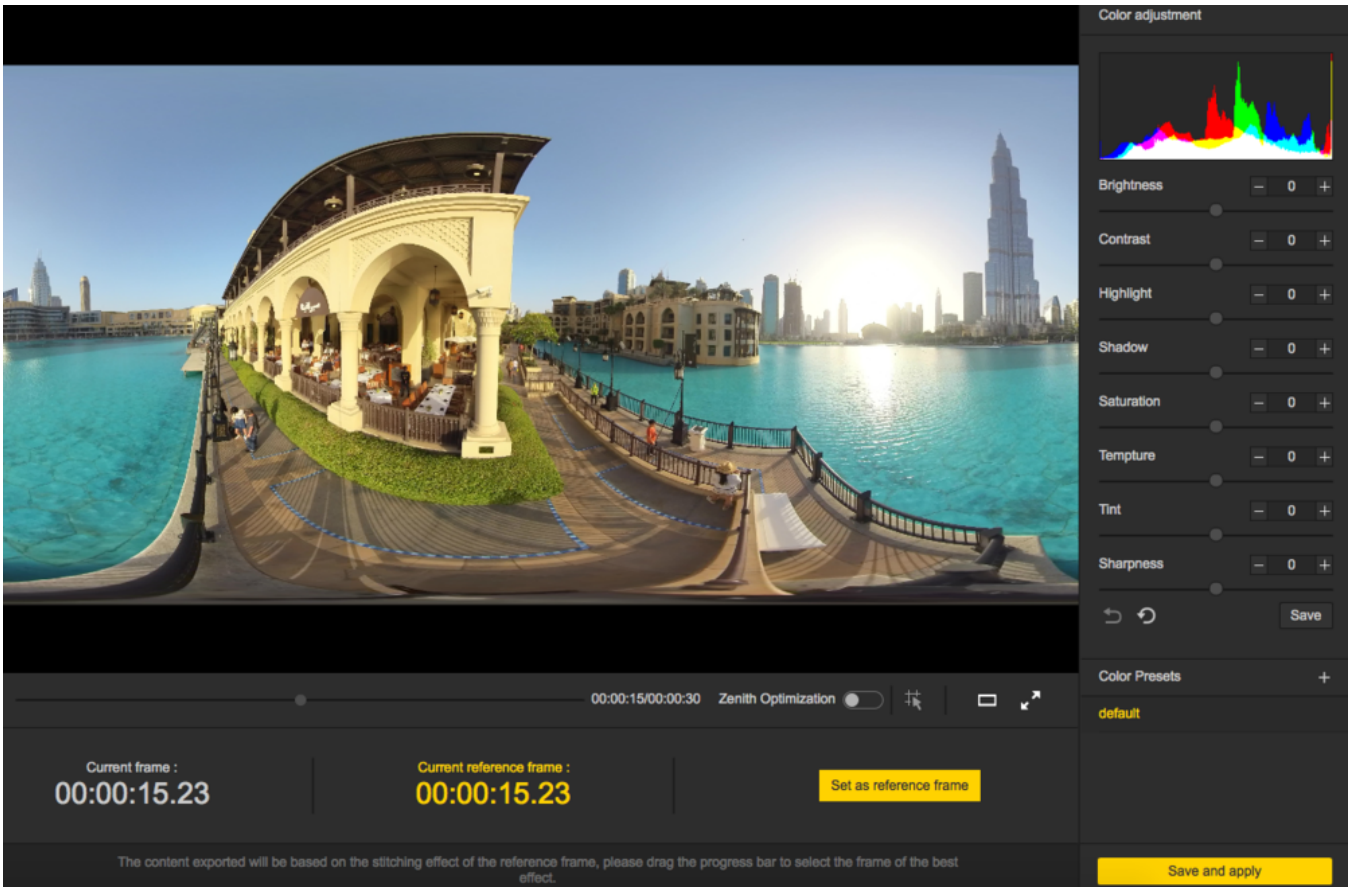
Please note that if you select Cuda or OpenCL hardware acceleration, there is no software encoding speed option because it uses hardware coding in these modes.



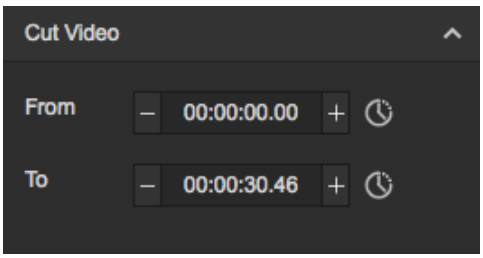
Setting reference frame in video stitching is especially important. Stitcher applies the stitching parameters of the selected reference frame to to the whole stitching process.Therefore, when selecting a reference frame, one should select the frame in time interval of output time which should be at important moment of the video, such as the moment when the camera is at the closest distance between characters, or setting one frame as key frame in high-proportion scene, like scenery shooting.



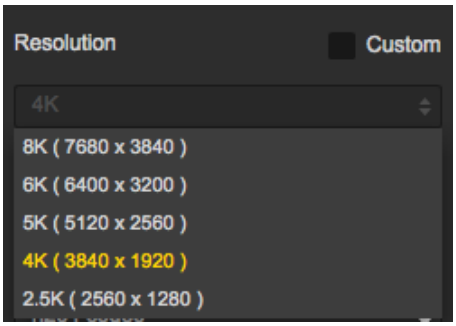
When preview stitching effect, you can change reference frame, adjust screen level, center angle of view and make simple color correction. Zenith Optimization function can optimize scenes with regular lines at top, such as air conditioning exhaust vents on the ceiling. Please note that there is no function of adjusting screen level and center angle in 3D video stitching.

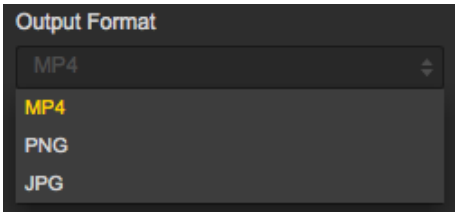


Selecting time periods that need to be exported can save time and computer resources to export valid snippet, which is convenient for post editing.



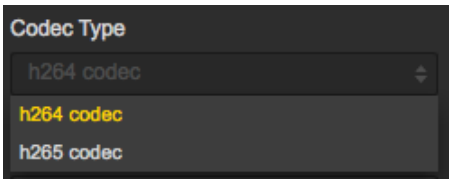
Resolution can be customized except for preset resolutions.





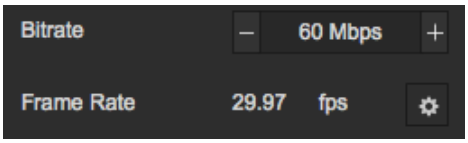
Stitcher supports coding of both H264 and H265. H265 encoding has better quality and need less storage space, but it

is not well supported by many VR player and editing software. Especially when editing the video, H265 encoding has high requirements on hardware.

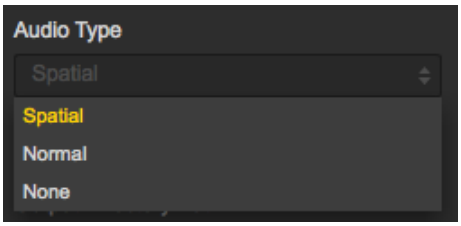


Profile is an optional configuration parameter for H264 encoding. The higher the compression ratio of Baseline, Main and High, the higher the requirement on the decoding performance of players.

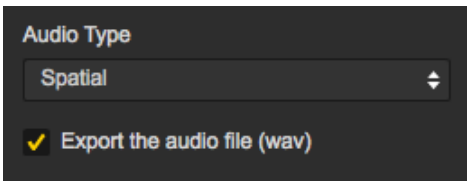
Generally speaking, Stitcher can automatically match preset bitrate, based on resolution settings. 60 Mbps is recommended for 4K 2D panorama, while 120 Mbps for 4K 3D panorama.



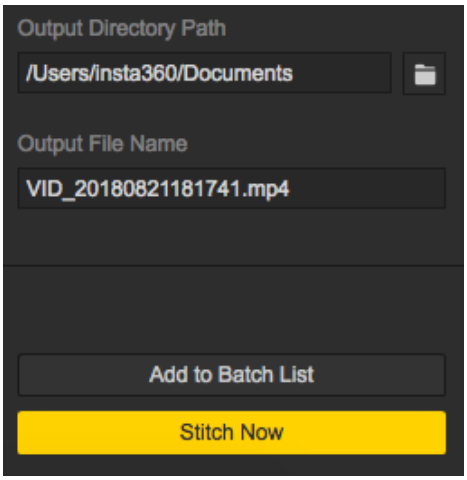
Audio type: if Spatial audio is selected, the video will have 4 sound tracks. If Normal audio is selected, there will be only stereo orbit.



You can also choose to export audio files separately.



Output directory path and output file name can be set. When setup completes, you can add to batch list for pending processing or stitch immediately.



The stitching process can be checked in stitching taskbar. During the process of panoramic video stitching, stitching can also be terminated, and the software will automatically save the parts already stitched.

3.3.2 [Beginner] Video Frame Rate Adjustment and Optical Flow Interpolation

Previously, exported video retained its original framerate, and did not allow any manual framerate changes in the Insta360 Stitcher. For example, a video shot with 8K at 30fps must be exported as 30fps. If framerate changes were needed, users were required to use third-party software to process. Now insta360 Stitcher supports videos being exported with the desired framerate.

We have provided a "output framerate" option for optical flow interpolation, which allows the framerate to be increased by two times during video export. For example, a 120fps video can be exported as a 240fps video, while 60fps can be exported as a 30fps video as well. Video with higher framerate (60~90fps) can make people less dizzy when watching it in a VR headset.

Comparison of 30fps video and 60fps video:
https: //v.qq.com/x/page/k0522okimwd.html?start=2

The video tutorial below can give you a detailed instructions on how to use optical flow interpolation.
https: //v.qq.com/x/page/m0529cvzvvw.html

3.3.3 [Beginner] Timelapse image sequence stitching

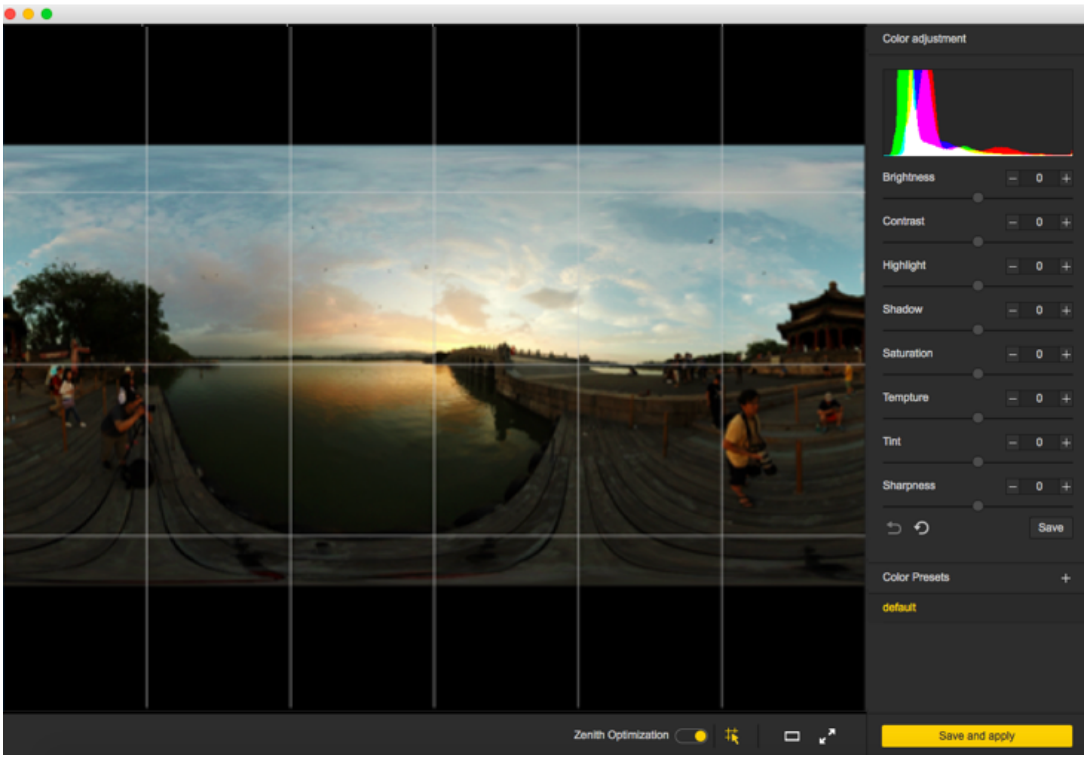
Photos taken by Insta360 Pro are saved in a folder named PIC_* in the form of a photo group sequence.

Insta360 Stitcher can be used to splice up a panoramic image sequence of 8K at maximum.

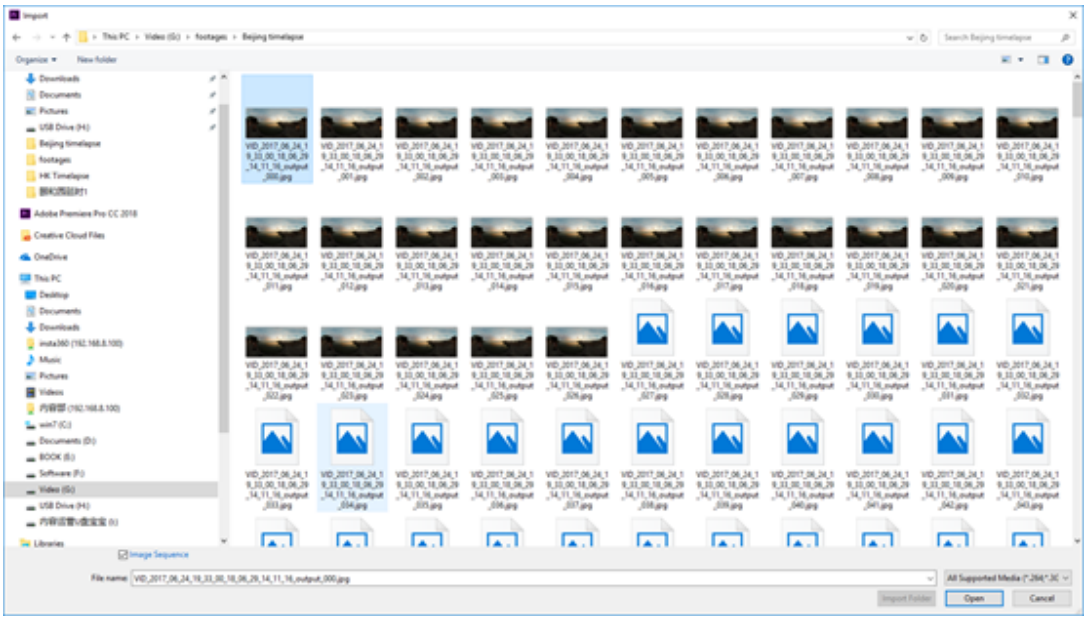
For example, we imported a timelapse panoramic file of 605 groups, and set tp export 8K 2D panoramic photos. It took around 12 minutes. And eventually we exported 605 panoramic photos in the folder: G:\footages\Beijing Timelapse

CCaution! When exporting timelapse shooting photos, Gyroscopic Stabilization cannot be applied, otherwise ghosting will occur in the photo.

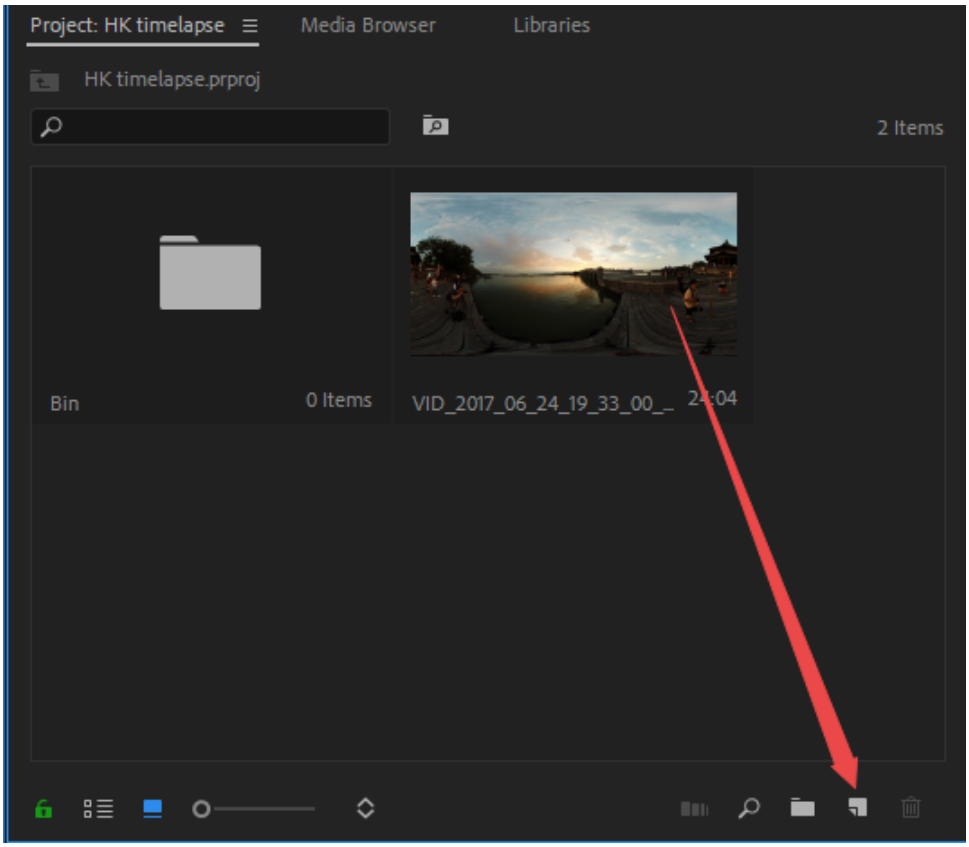
In the stitching preview interface, we adjust the center position of screen to be 17 Arch Bridge use reference line to adjust level, save and apply the current effect.



Open Adobe Premiere CC2018, import by sequence.



Create a new sequence and set the resolution to 7680x3840



Because it is processing timelapse project with higher-resolution, which has high requirement on computer configuration. Occurring lag during the process is normal. If the screen flashes, other software can be used to remove flicker in timelapse photo, such as **LRT (Lightroom Timelapse); or DE: Flicker.**

DE:Flicker plugin supports After Effects, smoothly removes flickering parts, and automatically retains image details so that the entire photo becomes smooth and natural. It will not only repair flicker caused by artificial light sources but also repair other objects that cause flicker even though these flickering objects exist at different rates.

DE: Flicker includes the following 3 filters:

DE: Flicker High Speed, often used to deal with flicker generated during high speed shooting.

DE: Flicker Timelapse, often used to deal with flicker generated during timelapse shooting.

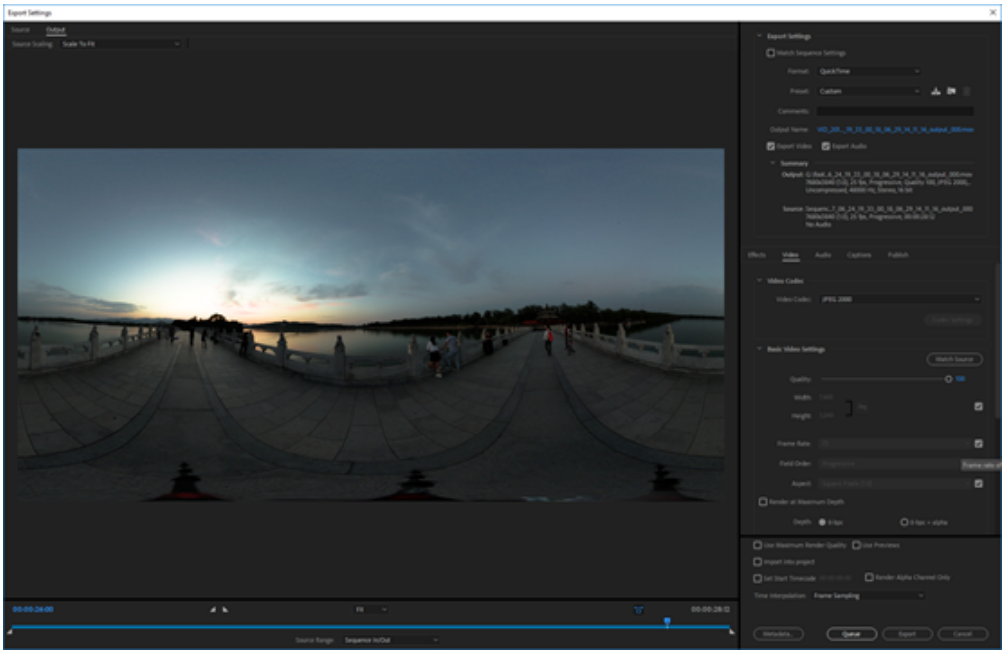
DE: Flicker Auto Levels, automatically analyzes screen attributes such as color, brightness, etc., and automatically removes flicker.

In editing software, materials are stitched together and exported after color correction.

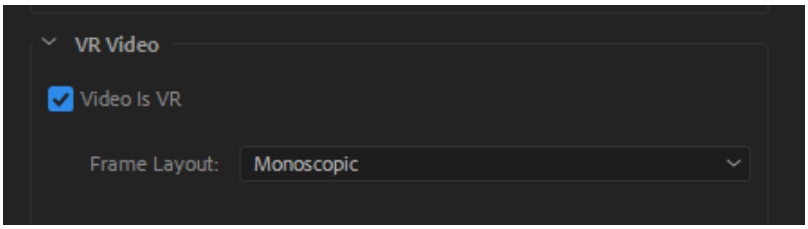
Due to resolution limitation of H264 encoding, MP4 video of 4096x2048 can be exported to the maximum. If a video of higher resolution are required, it needs to be exported into other formats.

For example, QuickTime format, select GoPro CineForm as encoder, or HEVC format.

You can export videos of 7680 x 3840.



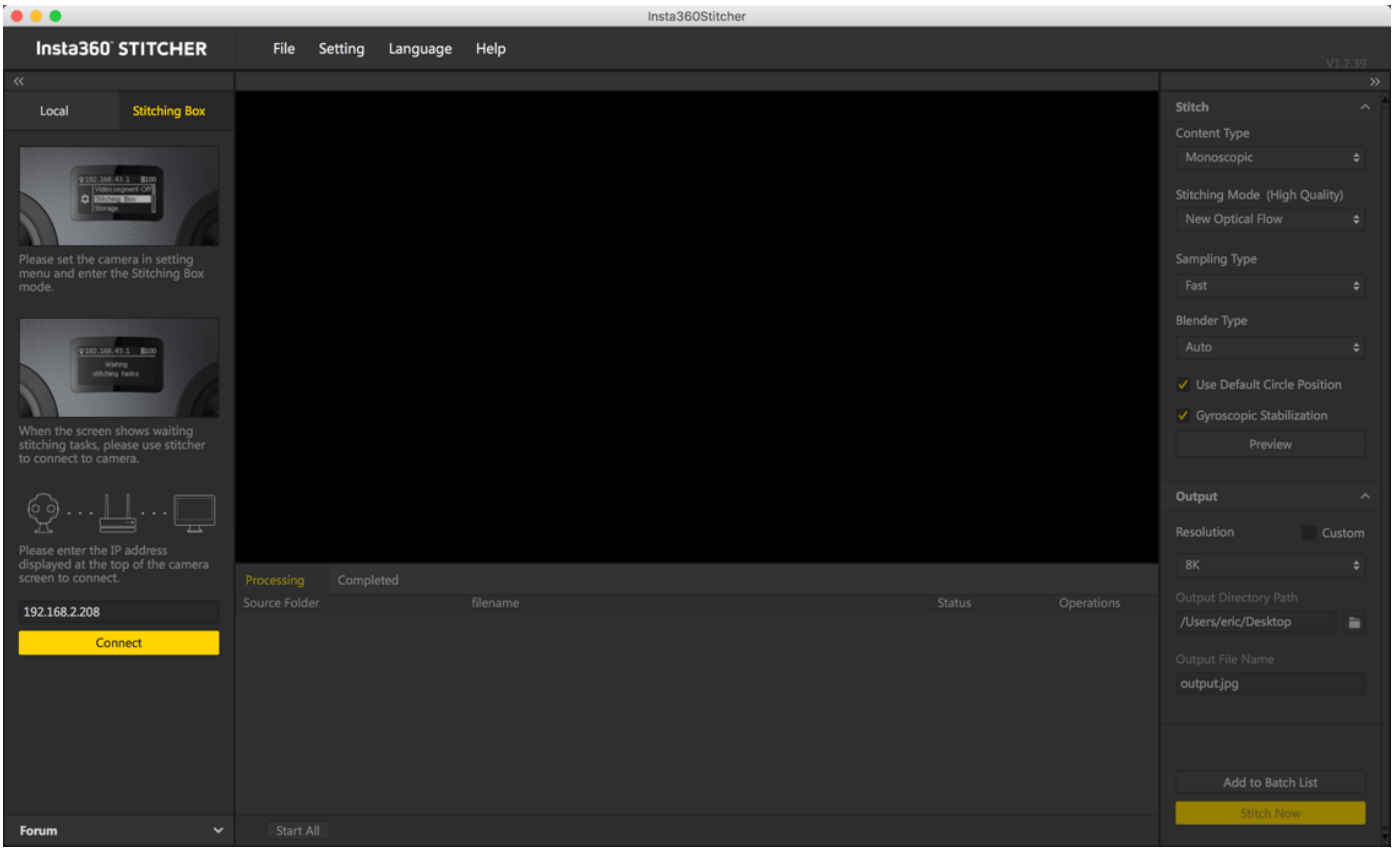
Note that this video needs to be set as VR panoramic video, in which way, Metadata panorama information can be written into the video.



3.3.4 [Beginner] Stitching Box Tutorial

This function needs to connect Stitcher directly to insta360 Pro. The camera will stitch the tasks and save them to SD card once they are completed, which will not affect computer's performance.

Here is the basic tutorial of Stitching Box:



1. Please connect the camera in Stitcher under the "stitching box" panel.

2. After successfully connection, files from the camera's SD/USB hard drive will be shown. Add files to the list to be stitched. The stitching will be completed within Insta360 Pro hardware, which will not occupy space or affect computer's performance.

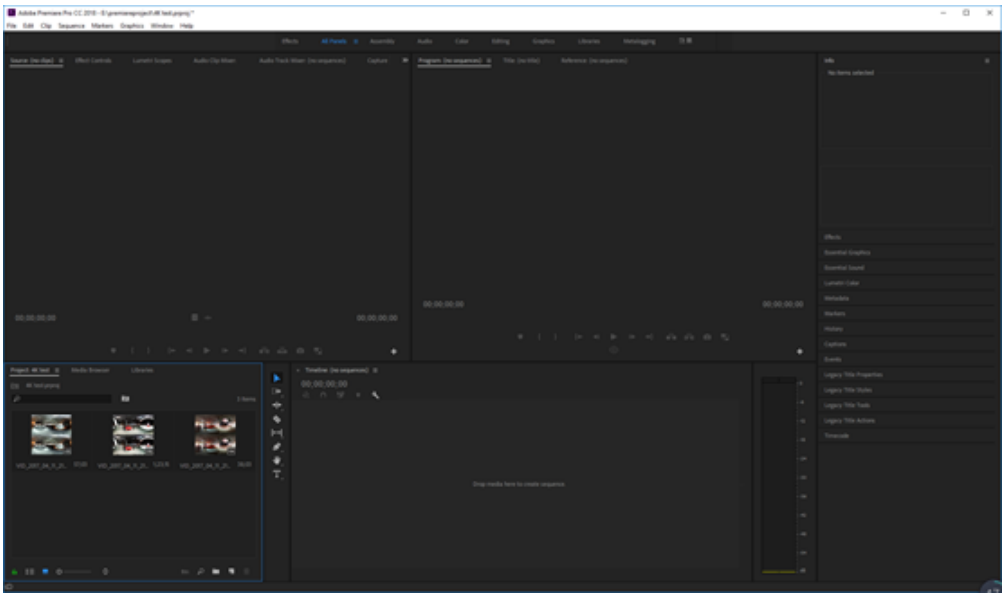
3. Stitching Box (stitching within camera) now only supports basic functions including stitching of photos (except for Raw) and videos. Other functions such as optical flow interpolation and super resolution can now be used only on the computer via stitching software. These new functions will gradually be added to Stitching Box through future updates.

The following video will be a tutorial in details teaching your how to use Stitching Box:
https: //v.qq.com/x/page/v0529b2eyeh.html

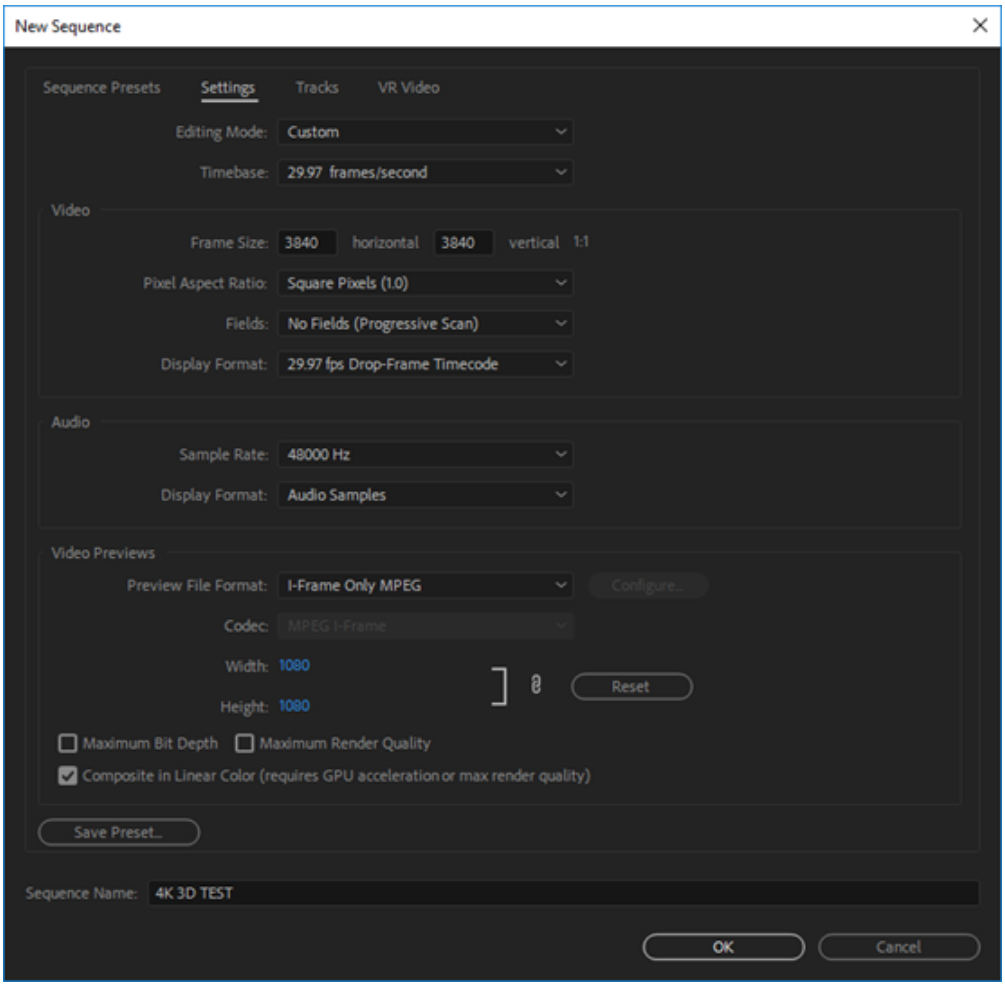
3.3.5 [Beginner] Introduction to Premiere cc 2018 Editing

Premiere CC 2018 has built-in immersive video effects and turns. Here is to introduce the process of editing with Premier 2018 CC as an example.

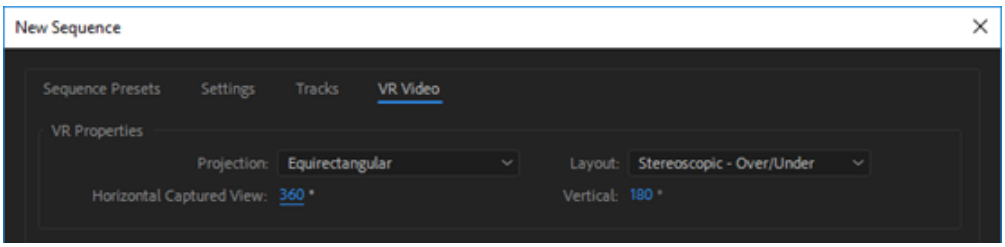
Add a new project of 4K test, and import several sections of material.



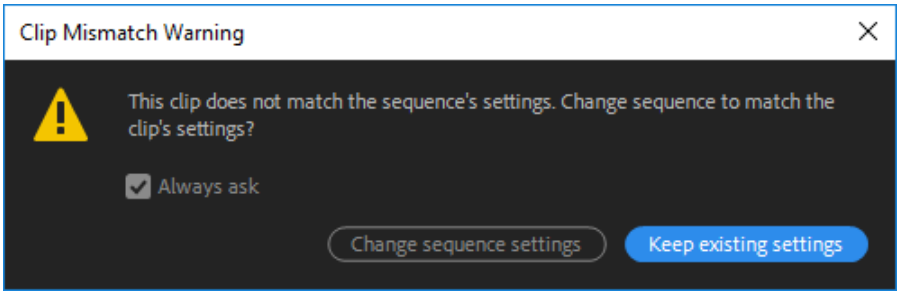
The new sequence is set to 3840x3840, which is to edit 4K3D project, so resolution should be set to 1: 1. If it is 2D panorama video, the ratio should be set to 2: 1, typically 3840x1920 resolution in majority.



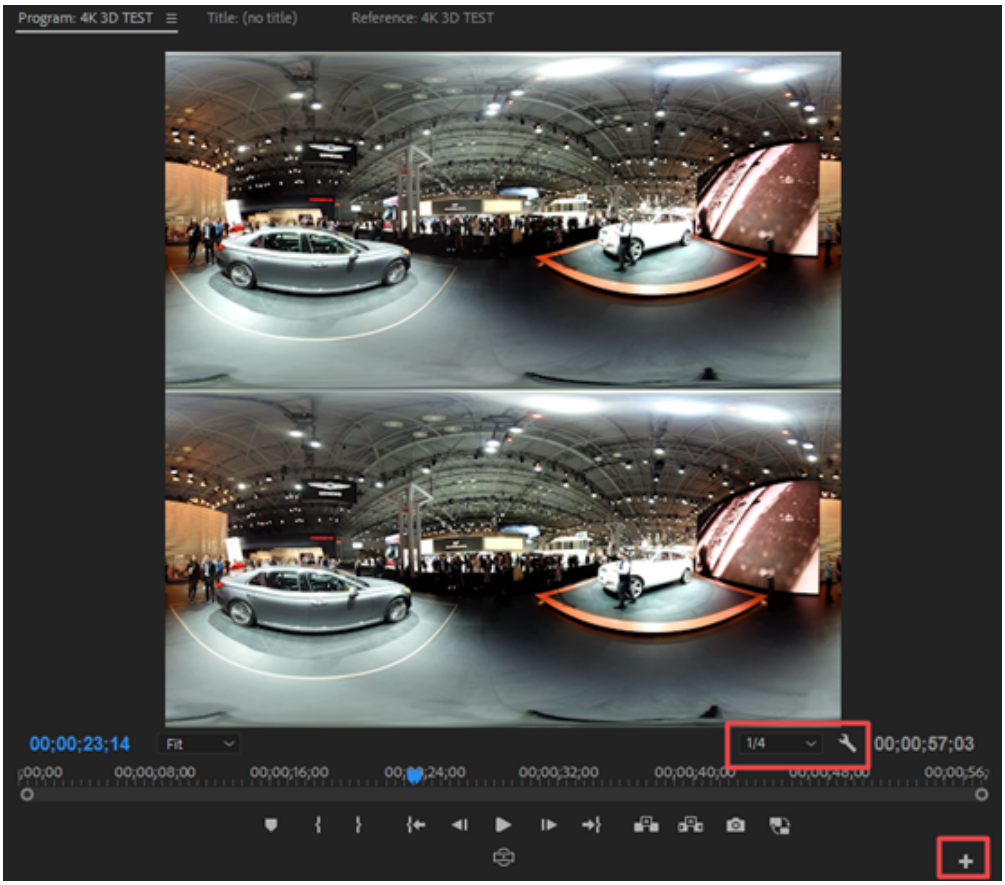
Set the video as VR Video, and select layout to be upper and lower 3D mode.

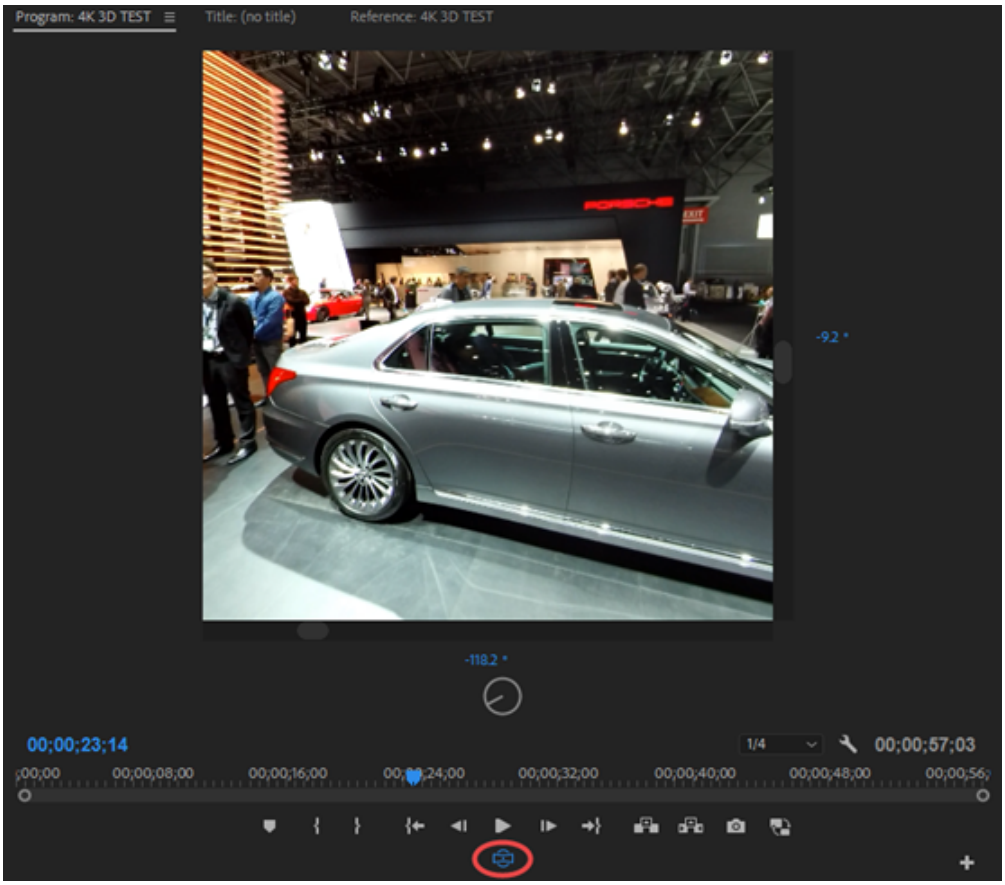


Select “keep existing settings” when you encounter setup mismatch warning.

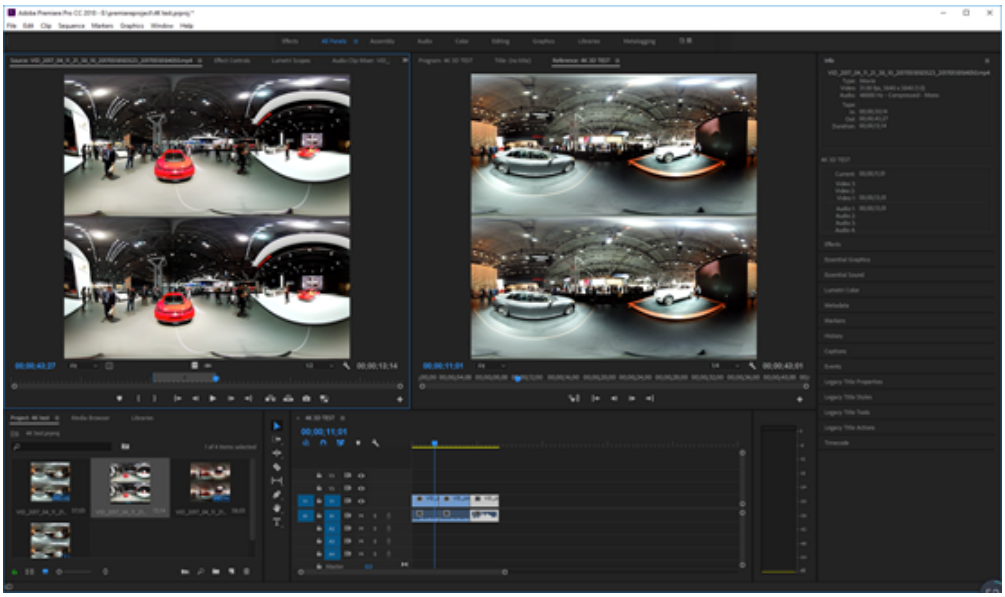


For fluent preview, the recommended preview definition is 1/4. Among shortcut buttons, there is a VR mode that can preview panoramic images quickly.

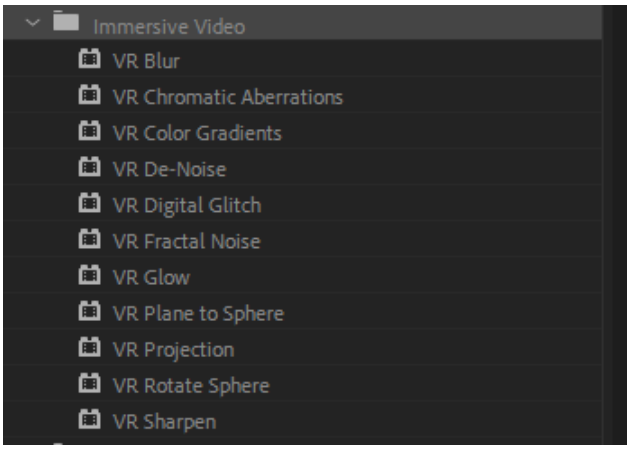

Program: 4K 3D TEST
Title: (no title)
Reference: 4K 3D TEST
00;00;23;14
Fit
1/4
00;00;57;03
;00;00
00;00;08;00
00;00;16;00
00;00;24;00
00;00;32;00
00;00;40;00
00;00;56;


Program: 4K 3D TEST
Title: (no title)
Reference: 4K 3D TEST
-92 °
-118.2 °
00;00;23;14
1/4
00;00;57;03
;00;00
00;00;08;00
00;00;16;00
00;00;24;00
00;00;32;00
00;00;40;00
00;00;48;00
00;00;56;

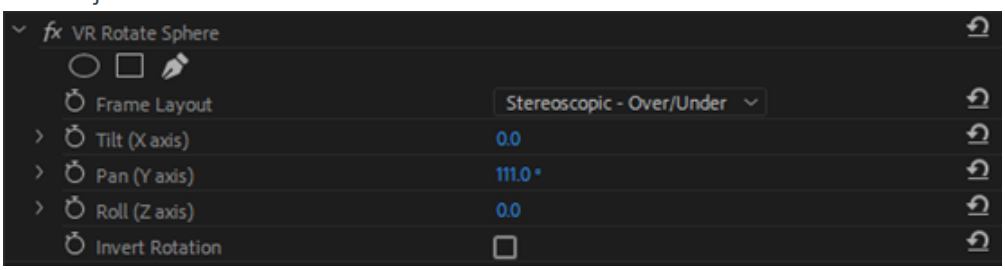
Clip material on timeline;



Immersive video effects are built into Premiere CC 2018, with 11 effects available in Effects-Immersive Video.

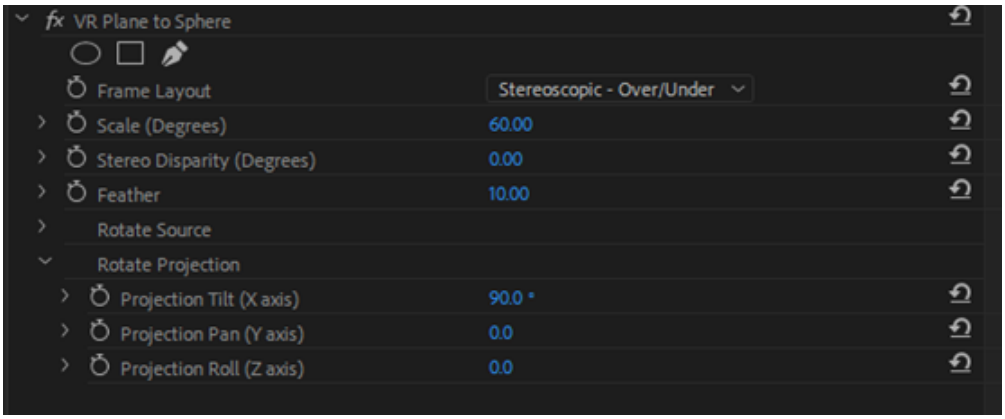


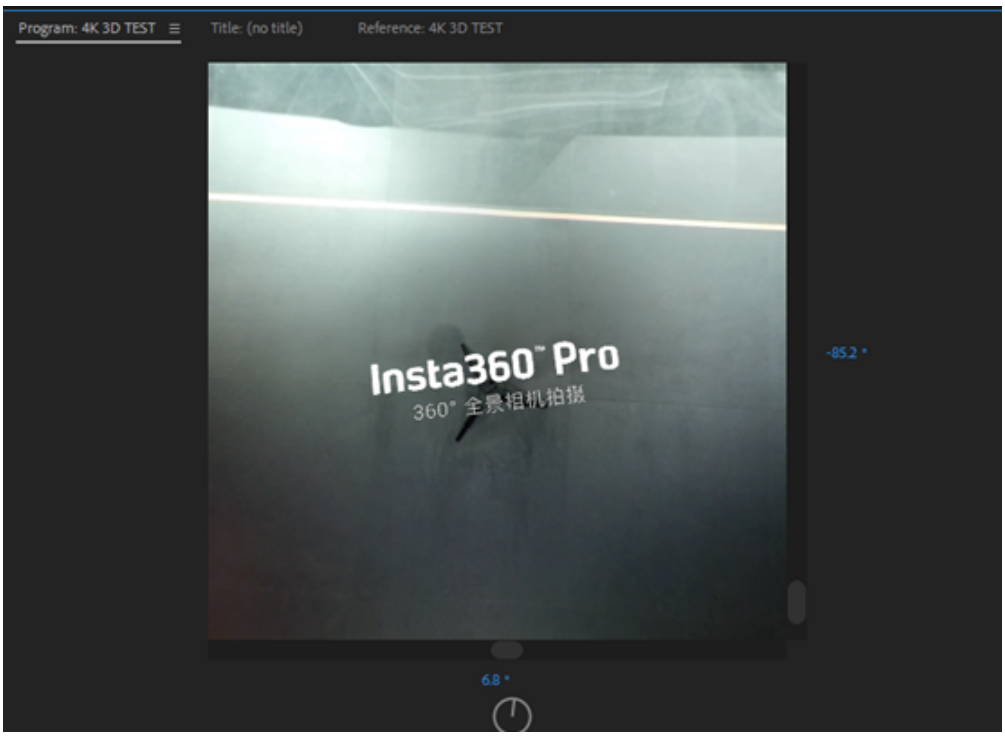
One of the most commonly used is the VR Rotate Sphere, which can change the direction of the panoramic X, Y, Z axis, so as to adjust the center and level of the screen.



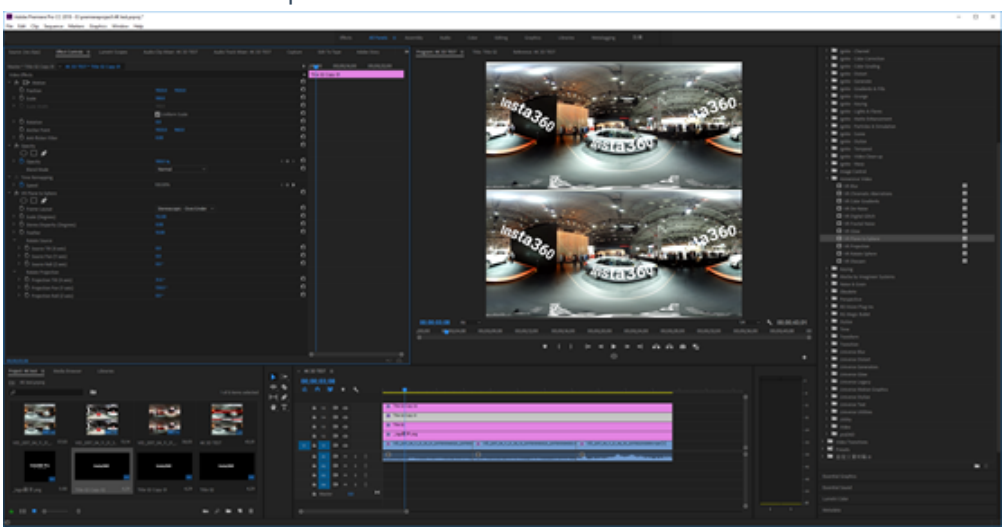
VR Plane to Sphere, can add plane text, pictures, video, etc., to the panoramic video, and automatically adapt to spherical distortion.

Add a circular LOGO to the fodbox, apply the VR Plane to Sphere effect, and select Stereoscopic-Over/Under to add a bottom logo to both the upper and lower of the 3D image.



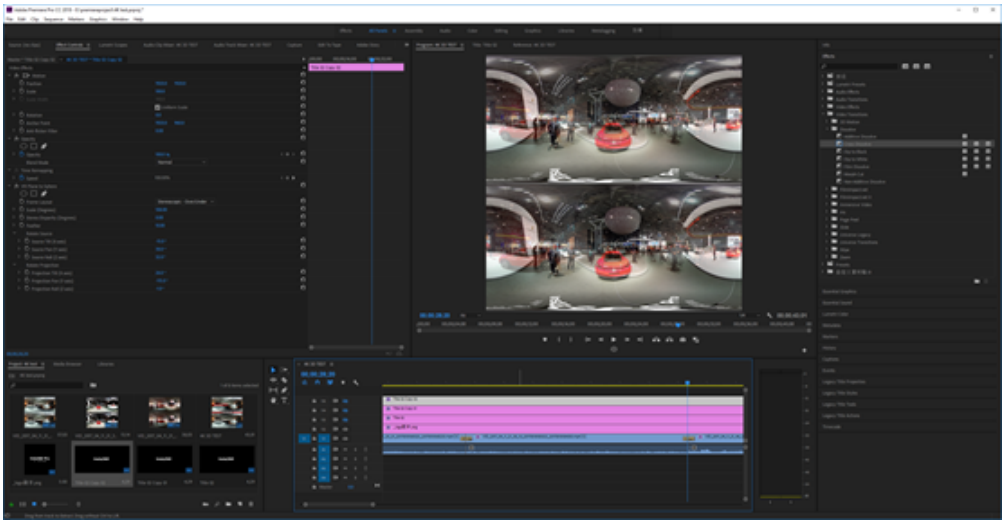


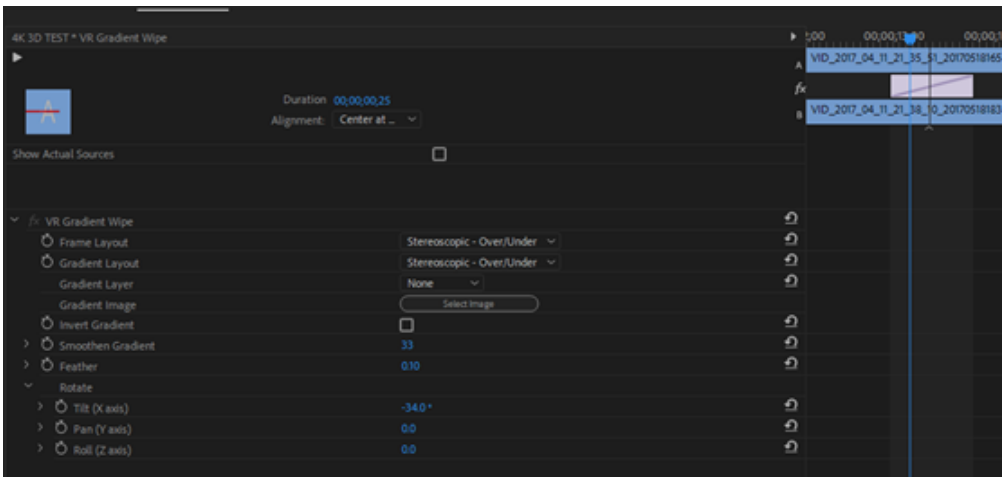
Create a new text title, apply the VR Plane to Sphere effect, copy 2 layers, adjust the attribute, and you can put the text in all directions inside the sphere.



Video Transition-Immersive Video, has 8 kinds of transition attributes. Only dissolved transition field in Premiere can be applied in the panorama, and the other transition attributes cannot be adapted to suture at both ends.

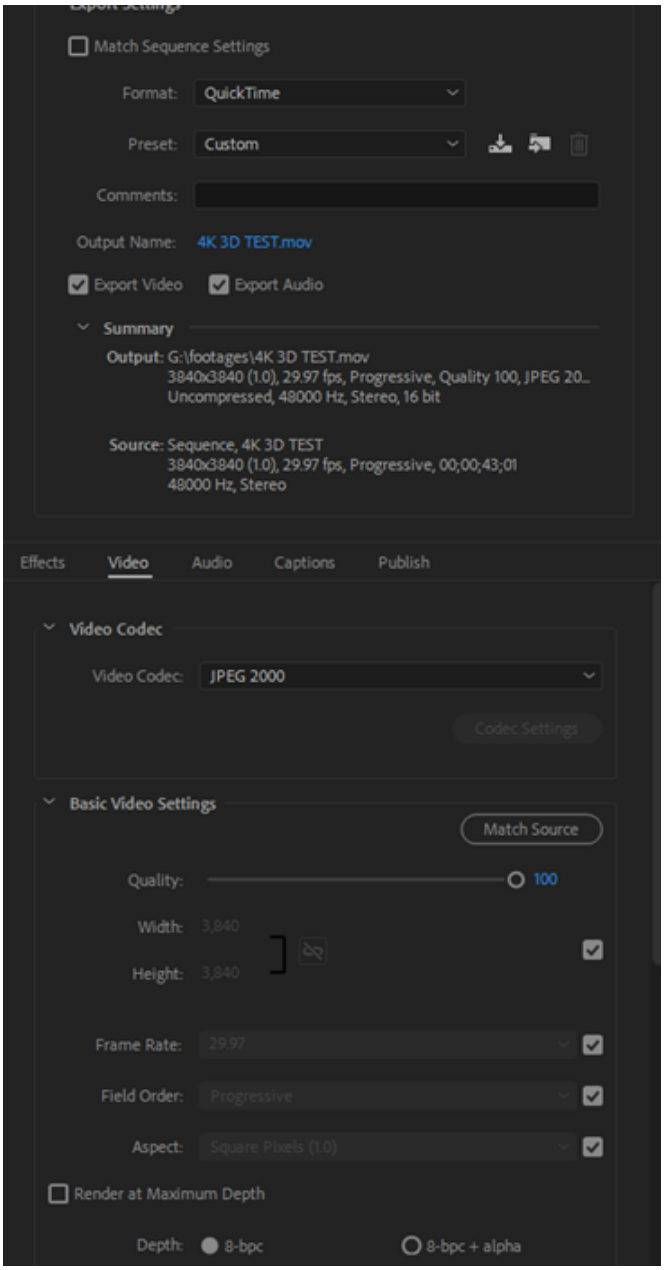
Add transitions to the middle of the three pieces of material, you can see that the entire picture is excessive, the two ends of the suture also fit well.





When editing is complete, you can export the video. Please note here that, due to the resolution limitations of the H264 encoding, you can only export panoramic MP4 videos up to 4096x2048, or panoramic 3D videos up to 2304x2304.

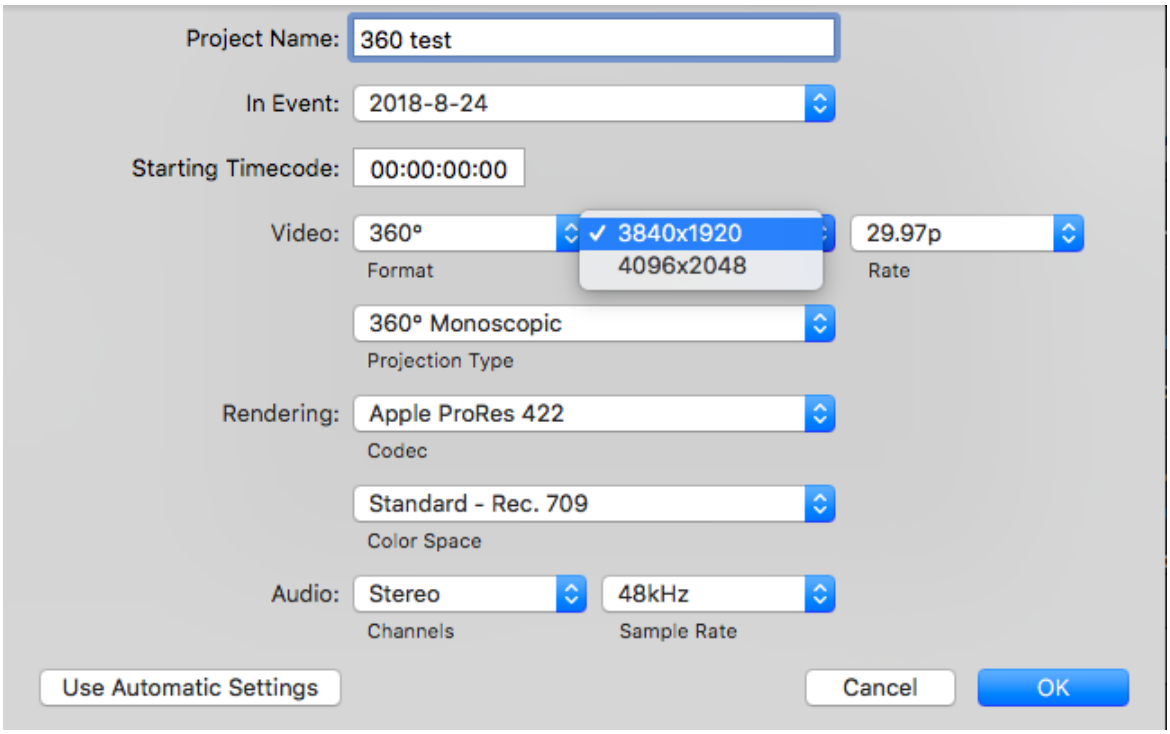
So, if we need more high-resolution video, we choose another encoding format to export. QuickTime, or HEVC format is recommended here.



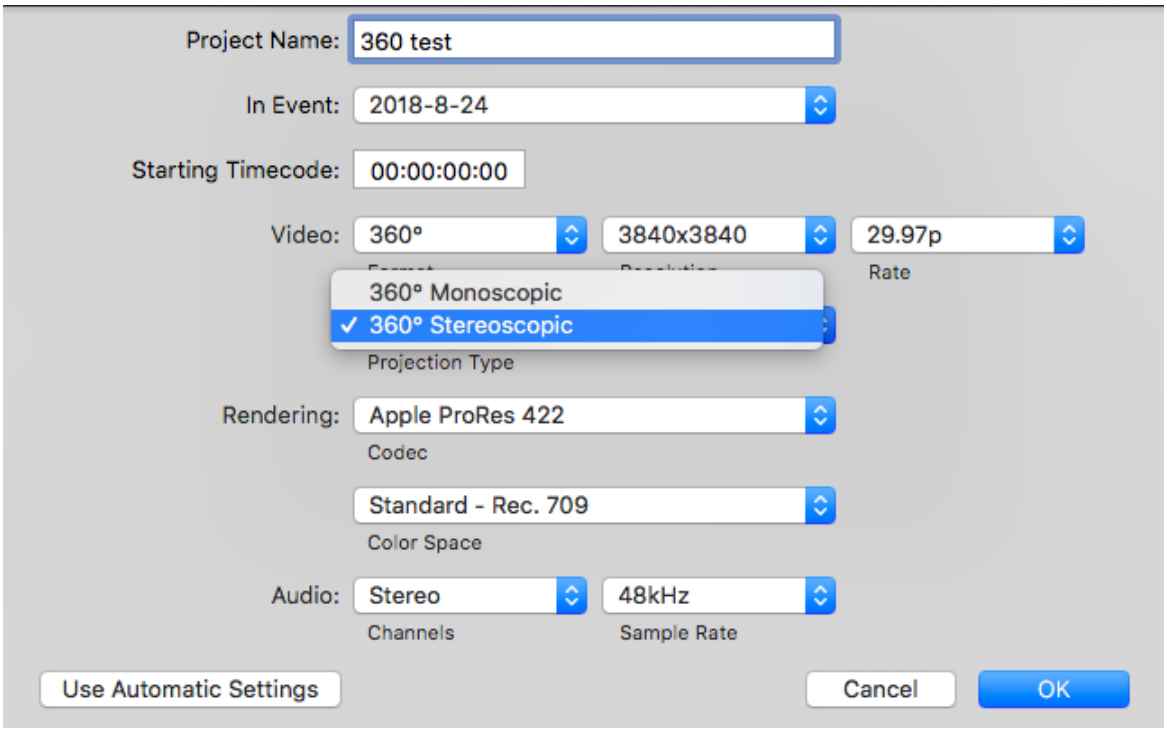
3.3.6 [Beginner] Introduction to FCPX Editing

Versions after Final cut Pro 10.4 have started optimizing support for VR clips and adding some panoramic attributes, while the current version only supports 4K panoramic and 4K3D panoramic clips.

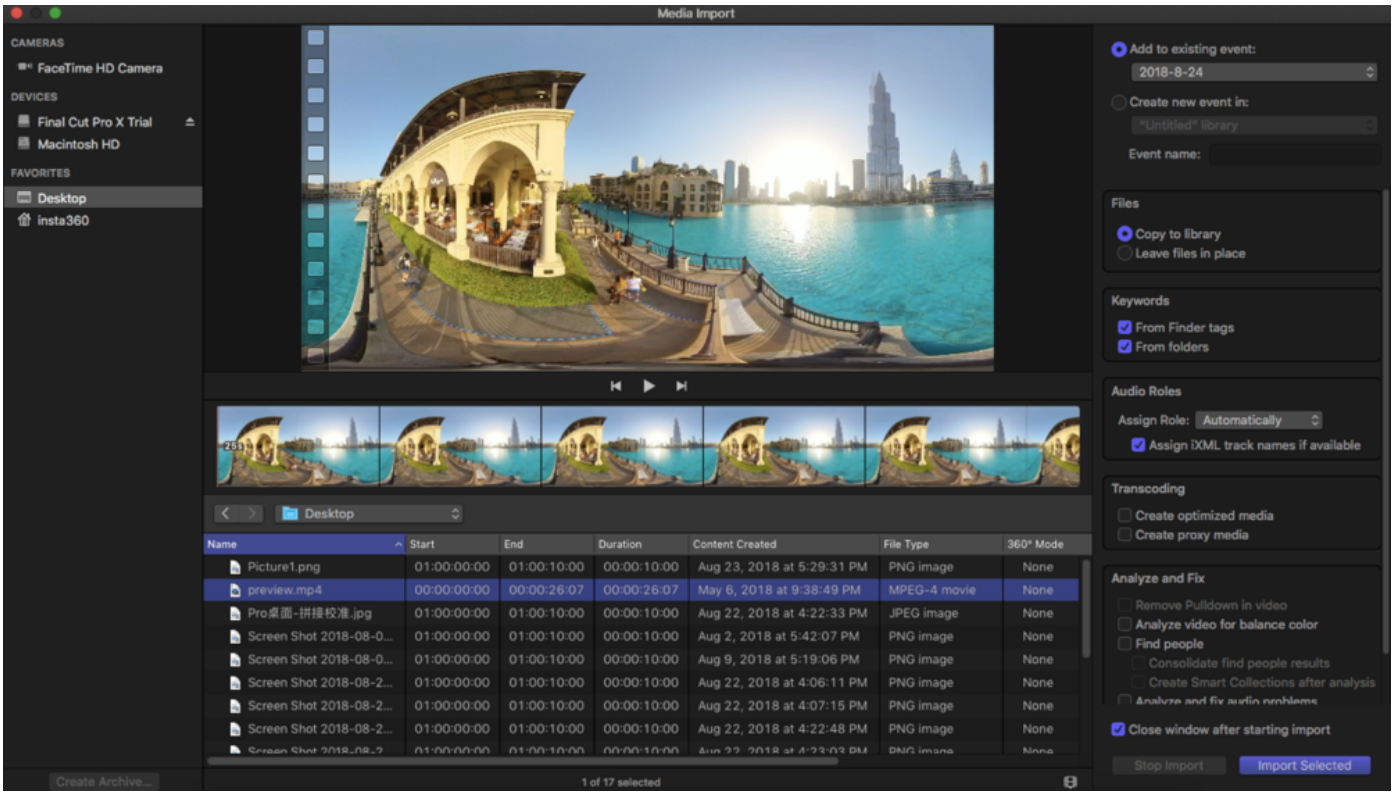
Open FCPX to create a new repository, or create an event in an existing repository, and you can directly select 360 video format, and there are two options for resolution, including 3840x1920 and 4096x2048.



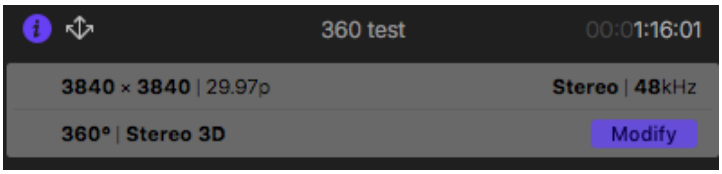
The projection type has two options, including 360 monoscopic view and 360 stereoscopic. If you choose to establish 3D panorama, namely 360 stereoscopic, you have two options for resolution, including 3840x3840 and 4096x4096.

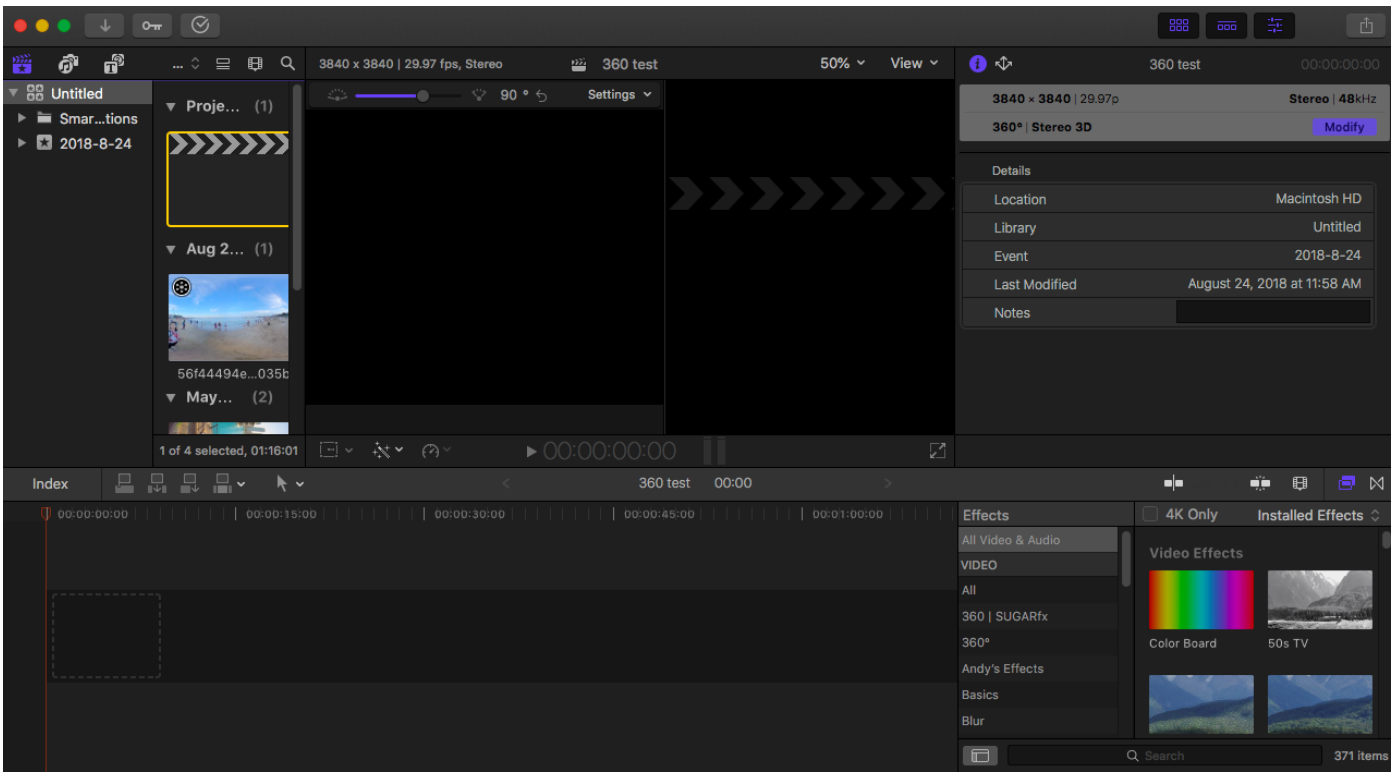


After creating a 3840x1920 event, select Import Resource File.

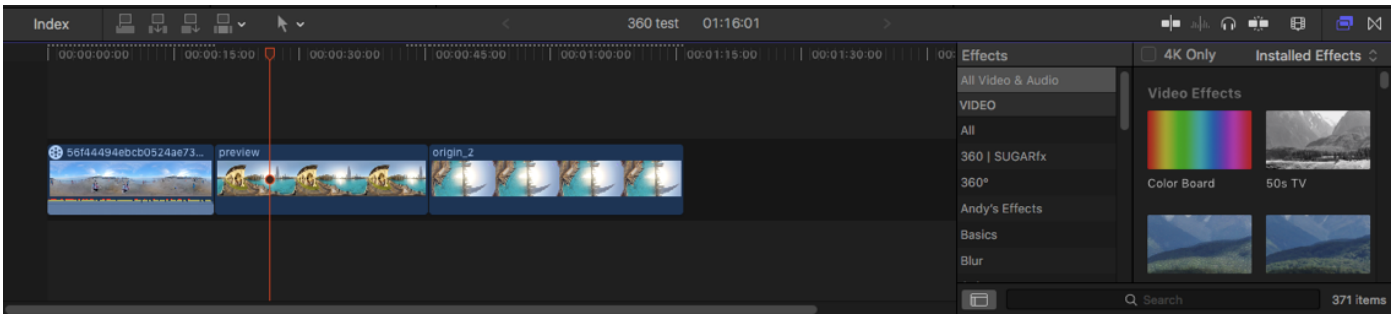


In the FCPX section, three panoramic videos are imported, with panoramic attribute icons in the upper left corner of the video. The upper-right item property shows that this is a 360-degree video project.

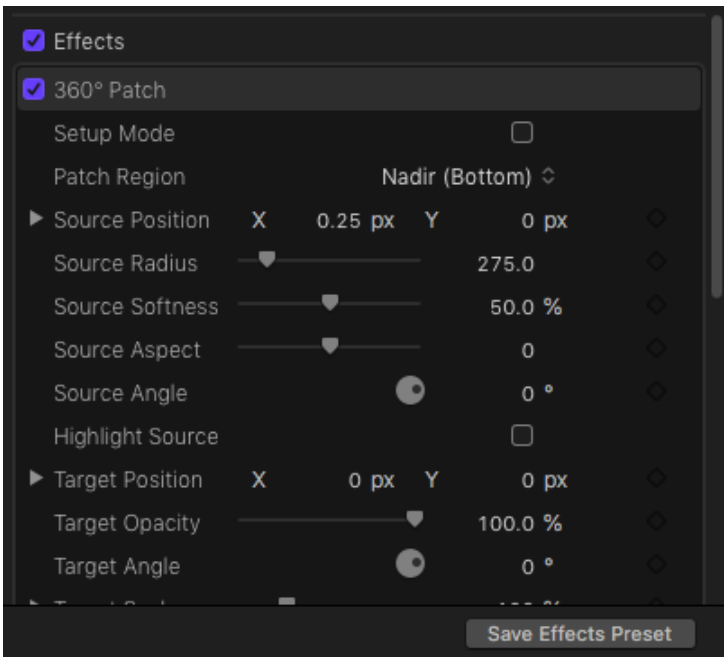




Add video clips to the timeline for editing, and you can see some of the FCPX built-in 360 attributes in the attributes bar on the right.

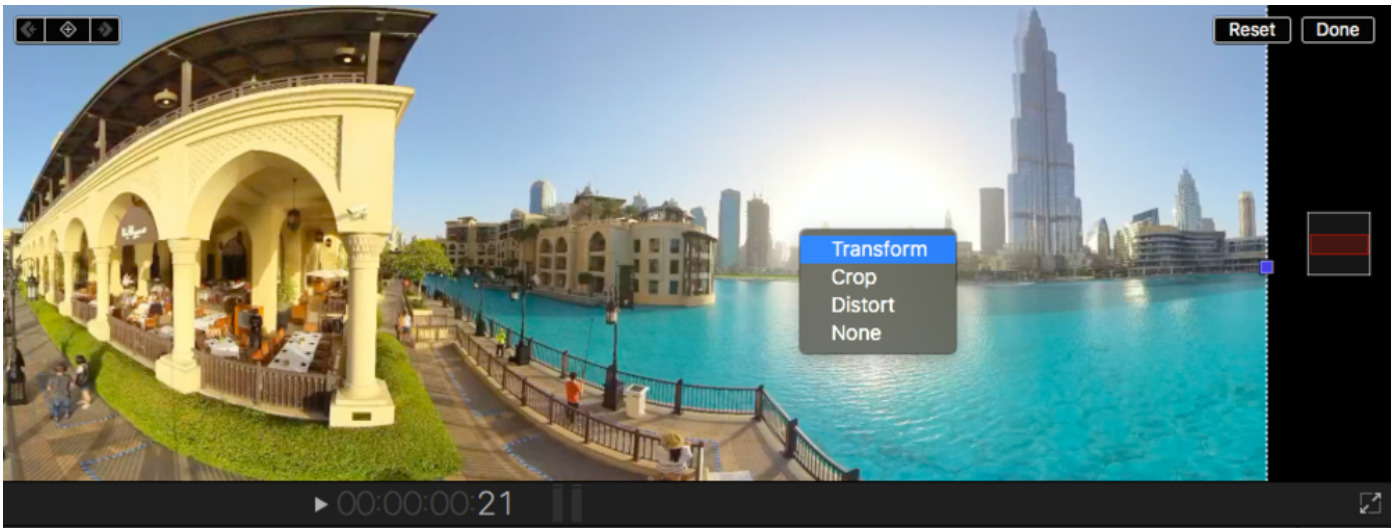


The use of attribute 360 patching allows for a simple patching, which is a very practical attribute.

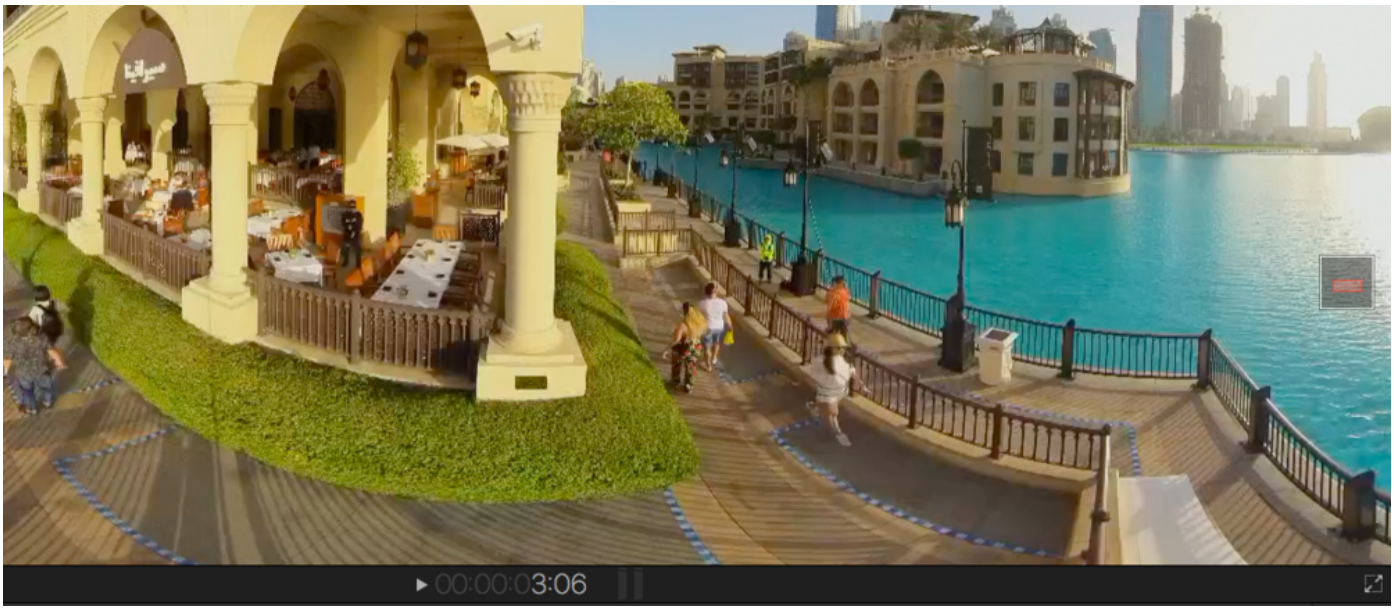


In addition, there are some panoramic video halo, blur, sharpening and other attributes that can be added according to you own needs.

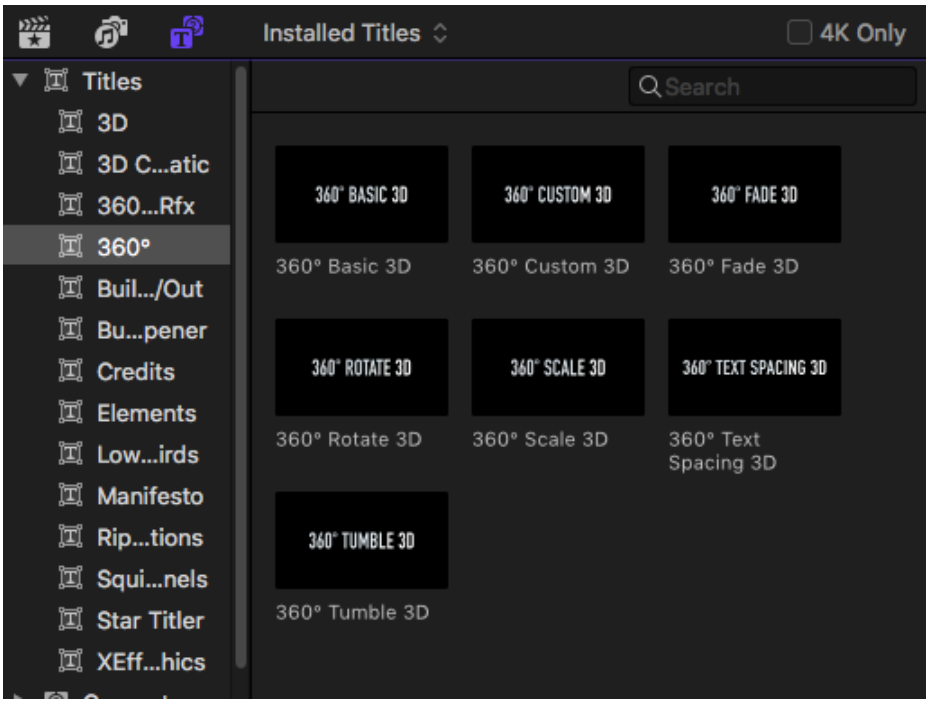
On the main clip display window, right-click for reposition, which changes the main view of the panoramic video.



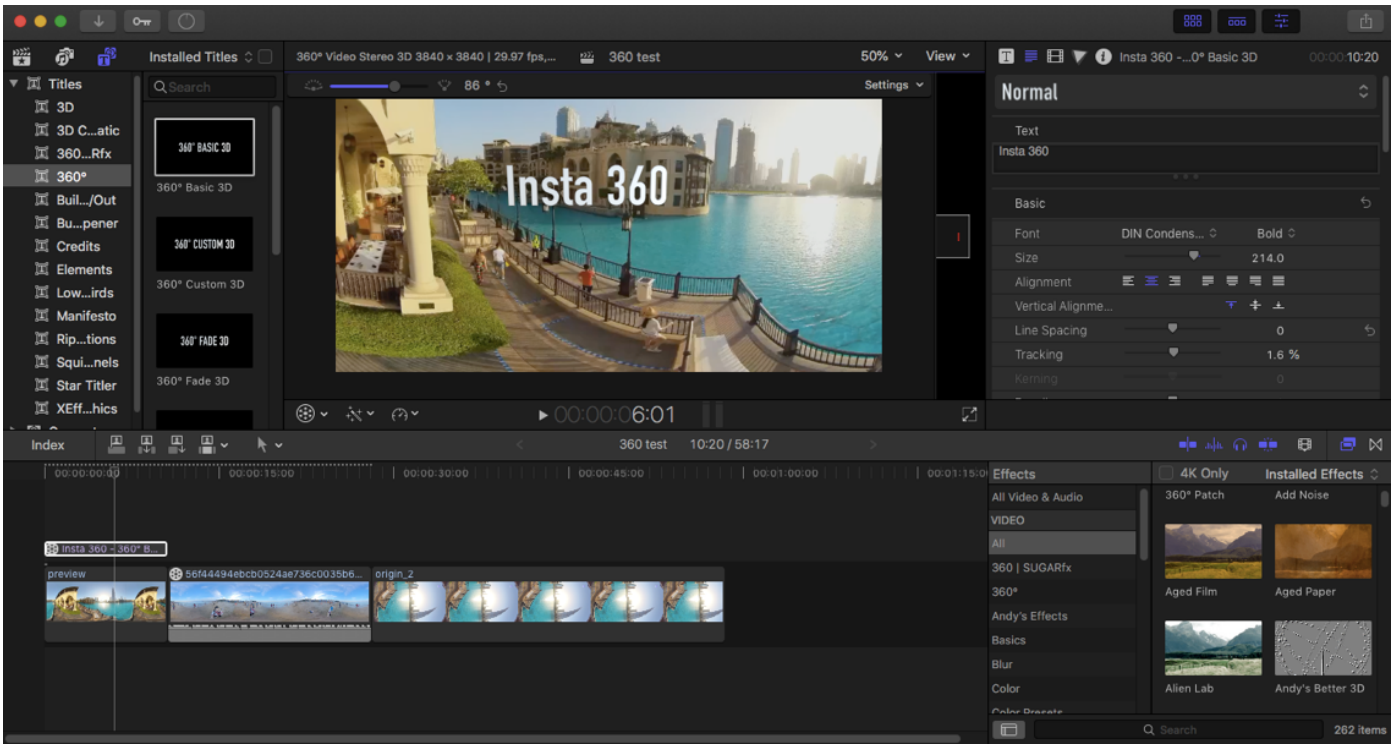
Press and drag the mouse to center the characters, and can add key frames, so that the screen can freely change the angle of view according to the event.



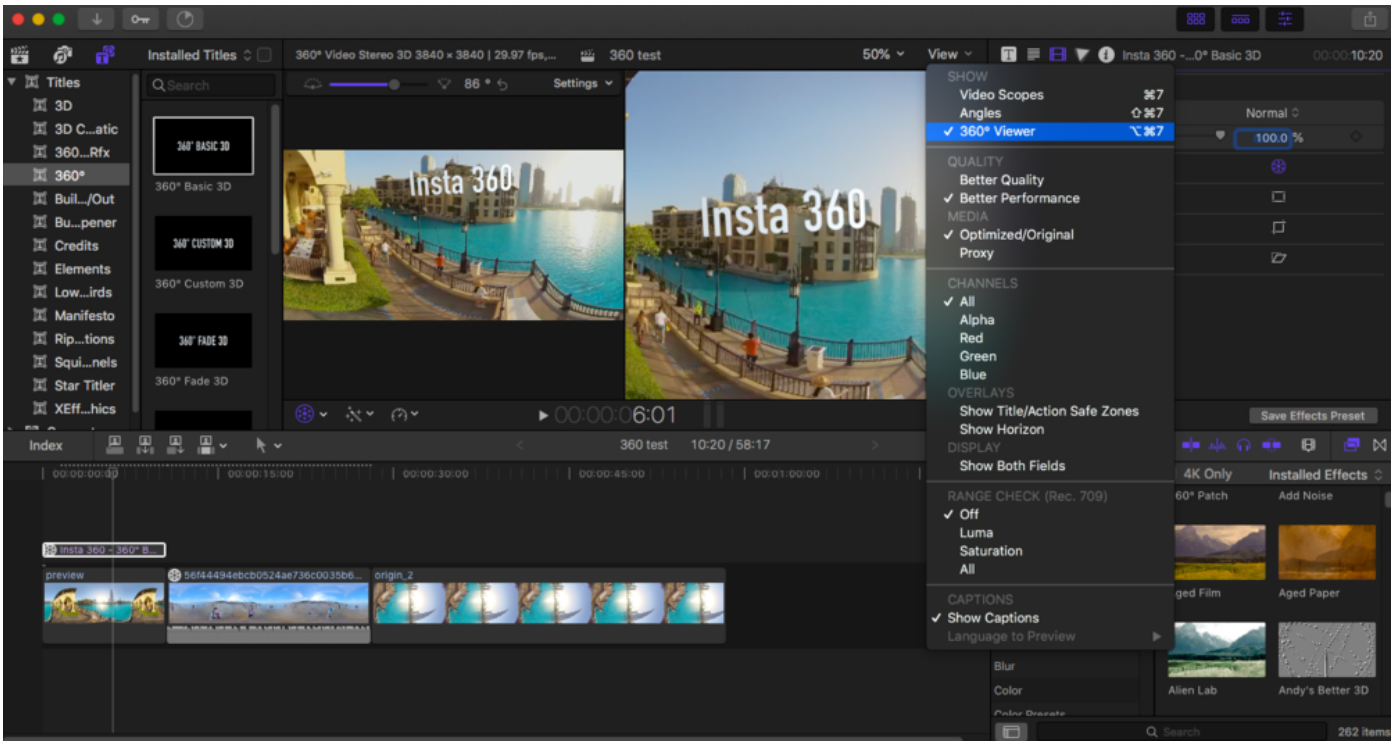
In the caption tool area, FCPX has built in 7 kinds of 360 caption presets, which can adapt to the spherical distortion of panoramic video.



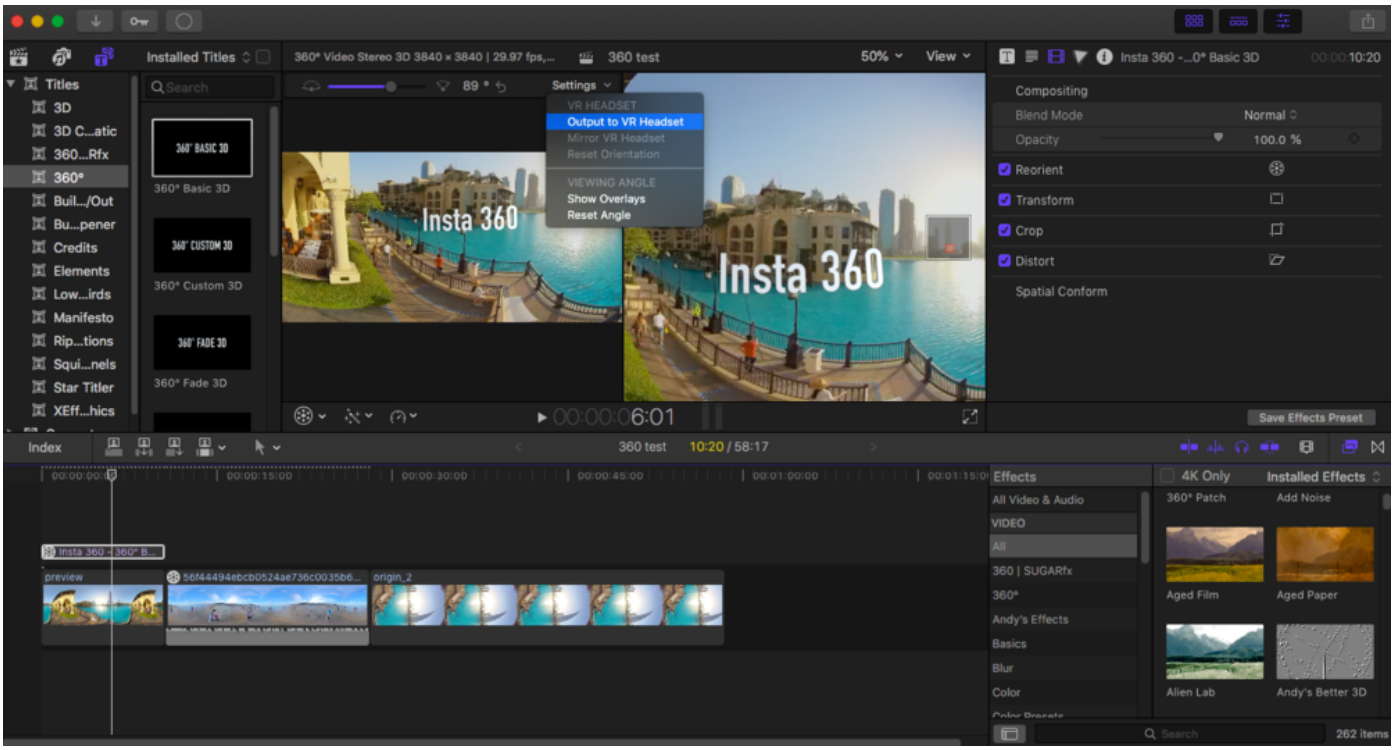
A 360 basic 3D caption is added to the position of the starting segment, MY360 WEDDING. You can modify the font size in the caption property, and so on.



Open the display of 360 Viewer, you can press and drag in video window in the left to preview from any angle.



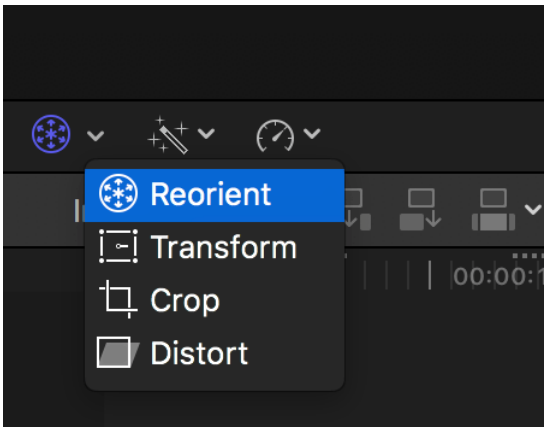
In the settings you can turn on the output to the VR header display, such as HTC VIVE, for a more vivid real-time view.



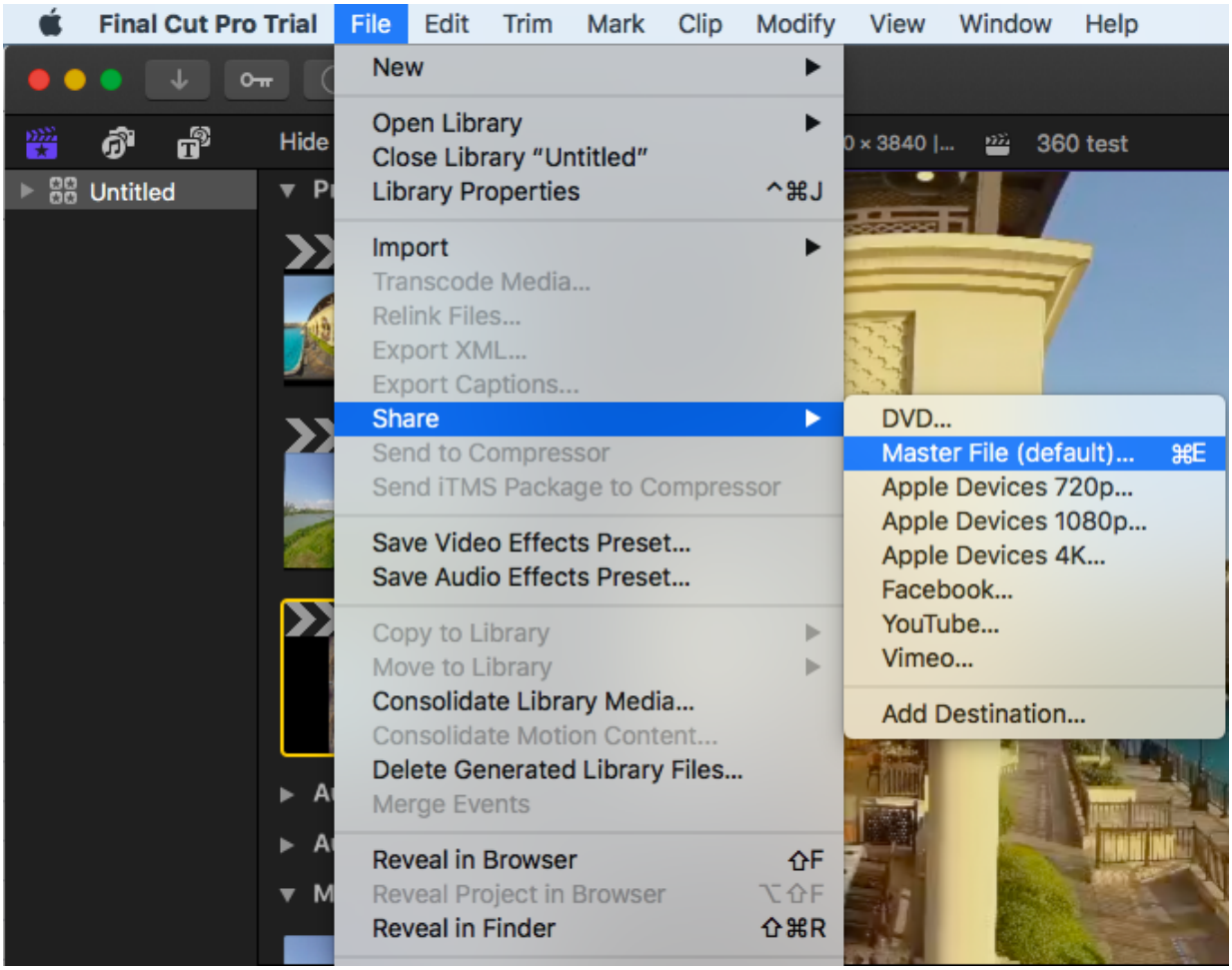
Put any graphic, still image, or video in a 360-degree project, add a flat material, such as an logo signature, to the timeline, and you can see that the 360 transform is turned on automatically. Resize and reposition to perfectly fit the 360

°scene.

In addition, in non-360 projects, you can also add 360 panoramic material, activate the direction, and you can set the X, Y, Z axis and view size in direction window in the right to record the screen, turning the panorama into 2D images.



Finally export.



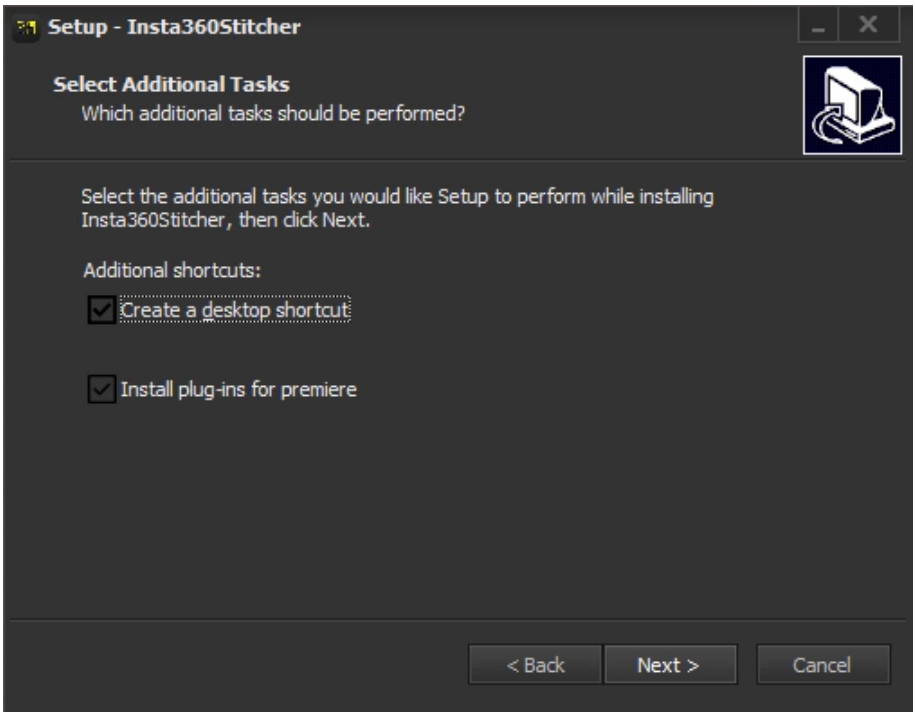
3.3.7 [Beginner] Quick editing of official plugins on premiere

Premiere plugin can be installed for Insta360 Stitcher version 1. 7. 0 and above. The plugin can help directly import Pro video to edit and export in Premiere. It supports Premiere CC Pro017 / 2018.

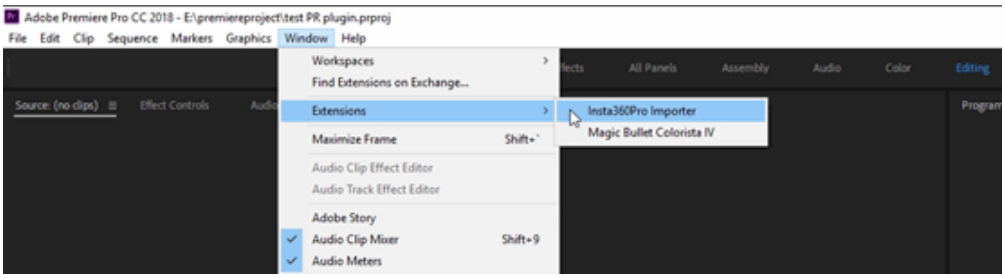
Download link: https: //www.insta360.com/download/insta360-pro?inspm=6f8b88.d9d6a3.0.0

When installing Stitcher, if you come to “Select Additional Tasks” interface, you will see an additional “Install plug-in for premiere” option, which is checked by default. Click next to continue the installation. This plugin is compatible with Premiere Pro CC 2017 / 2018. Please note that you must close Premiere during the installation of Stitcher, or else the

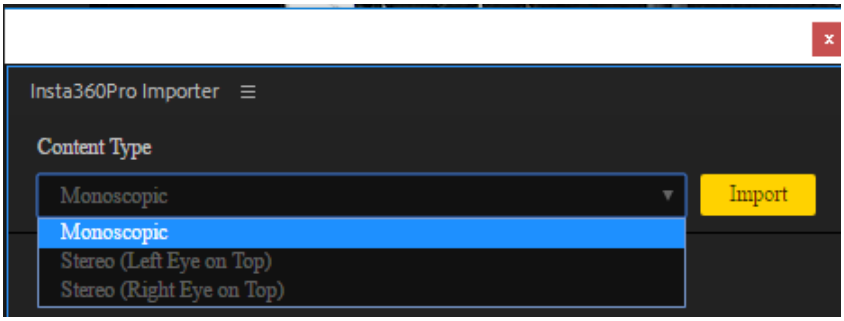
plug-in installation will fail.



When this version of stitcher is installed, open Premiere and start the plugin by clicking “window”->“Extensions”->“Insta360Pro Importer” in the top menu of the new project.

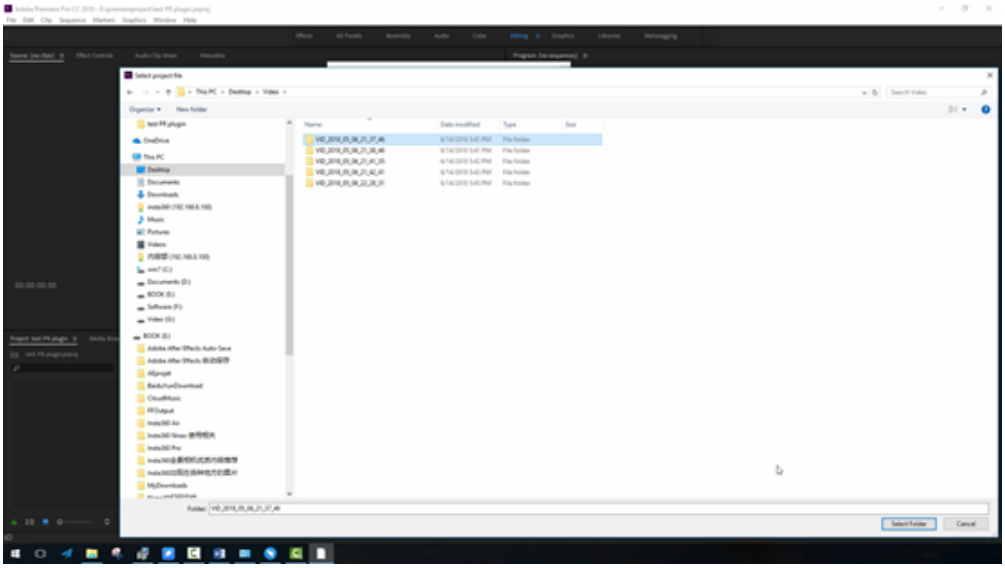


Click on the Import icon to import the folder where the original video is located. Before importing Insta360 Pro original video material, the plugin needs to select content types, such as “Monoscopic”, “Stereo (Left Eye on Top)”, and “Stereo (Right Eye on Top)”. The current version only supports importing video files, not images.

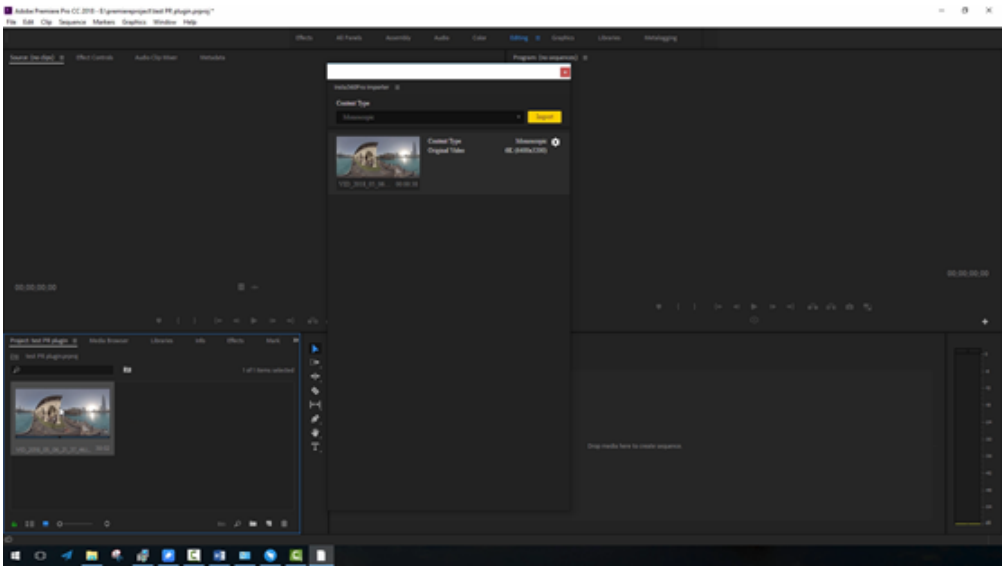


Note that the folder path should be the disk path, not the shortcut path. For Insta360Pro video material, material with the original single-lens proportion of 16: 9 can only choose Monoscopic when imported, material with the original single-lens proportion of 4: 3 can choose one from three arbitrarily when imported. It is supported to import multiple folders at the same time for each import, but any video material that does not match the content type will be ignored. (For example, when you choose to import a “Stereo (Left Eye on Top)” video, if you select an 8K material with a single-lens proportion

of 16: 9, the video will not be imported.)

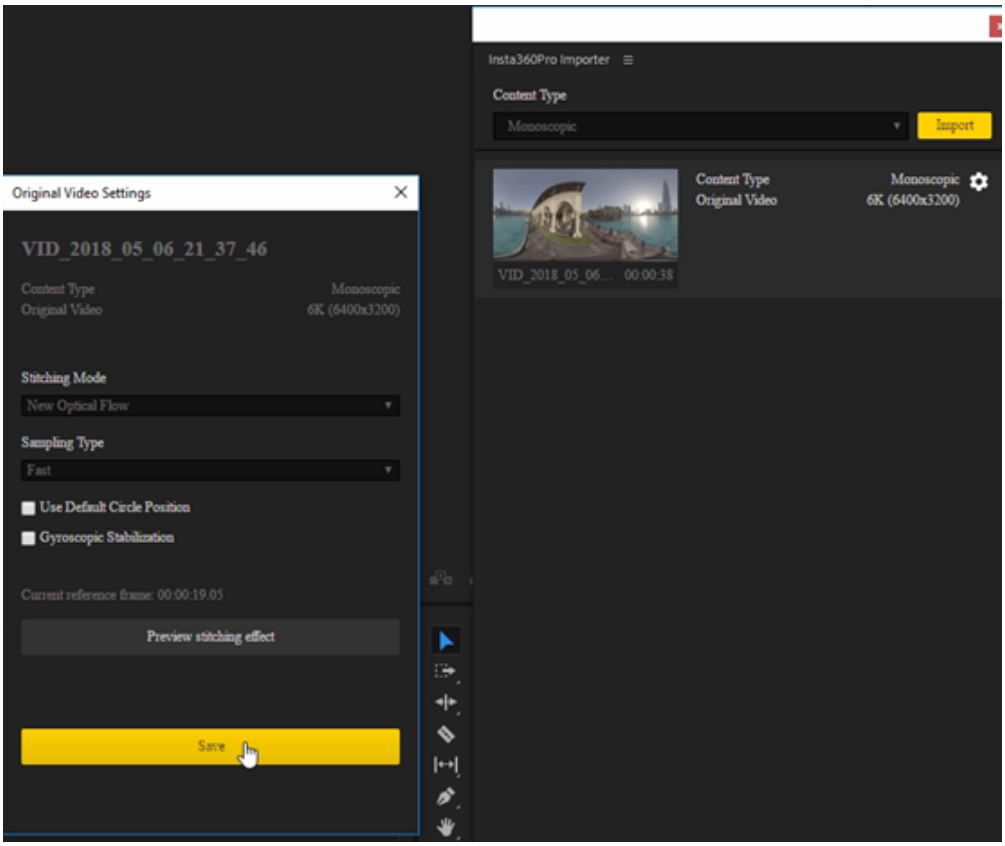


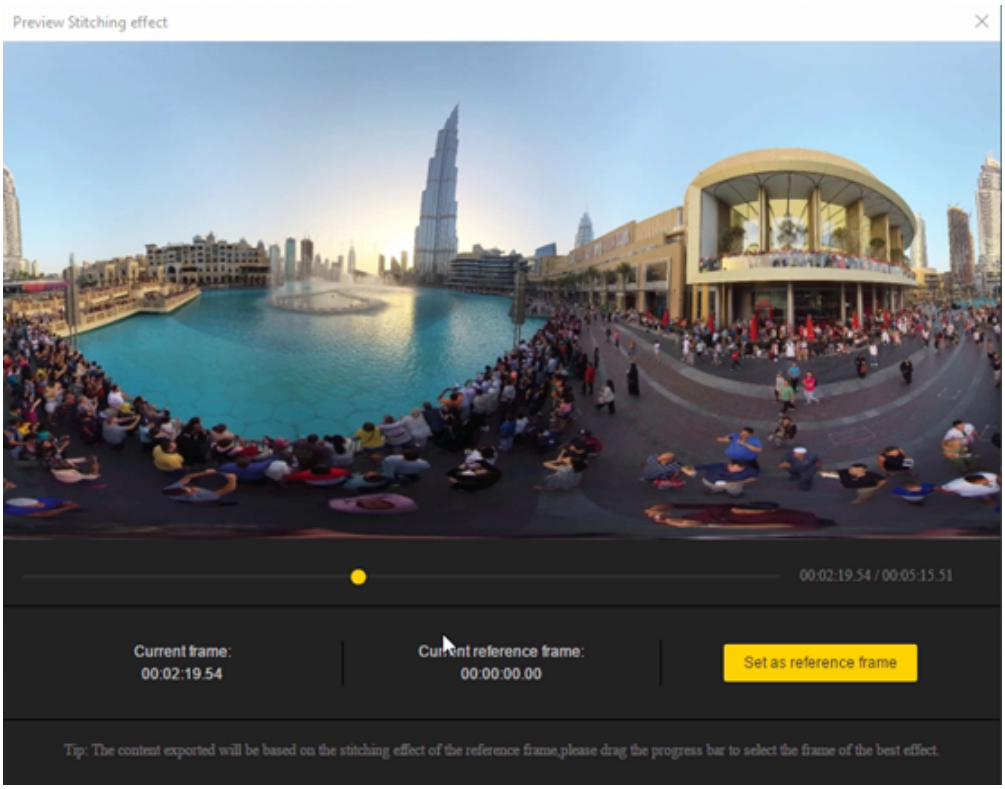
Clicking Import to import an 8K video folder. The source material area at the bottom left of premiere would immediately show the original video material, and has already shown the stitched attribute, the video material will be added to the timeline, and we found that when the video was played, the button for associated proxy video was turned on by default. This is exactly the plug-in mechanism. When importing the original video of 8K resolution will generate a fast proxy, and the generation of the fast proxy file does not consume performance and time.



Click on the stitching settings, video stitching attribute can be adjusted and previewed. Like desktop software Stitcher, you can choose a different Stitching Mode, sampling Type, use Default circle Position, and Gyroscopic Stabilization. Here the settings will be automatically invoked when the video is finally exported, and ultimately will be stitched and exported together with the video rendering. The speed of the stitching export is the same as that of the stitcher, and both of them

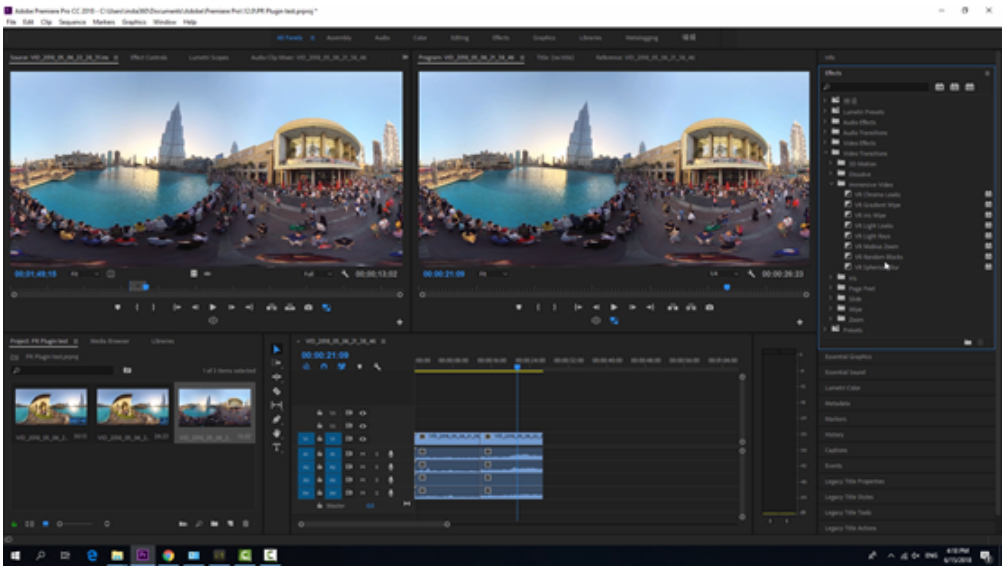
can accelerate the export of the hardware.



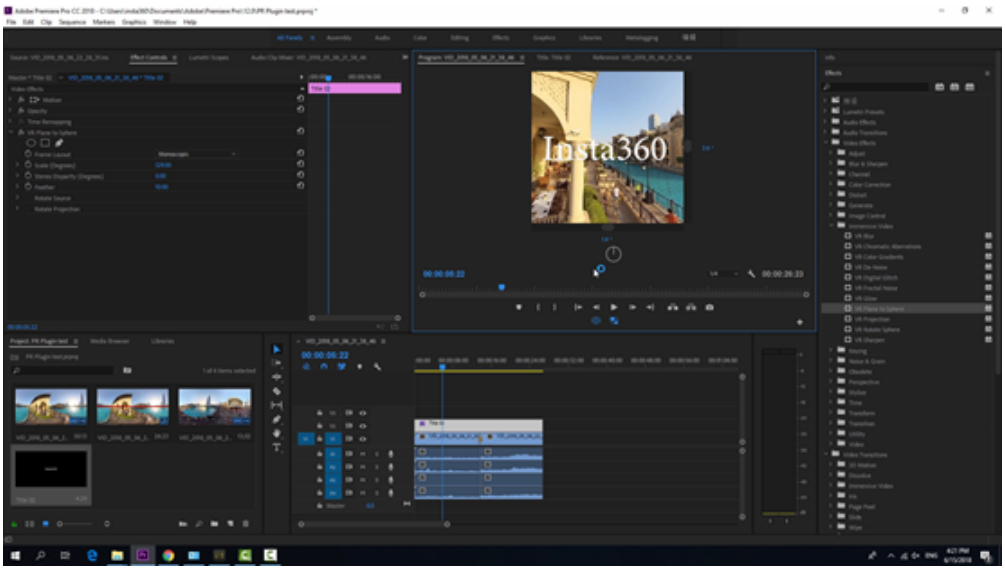


As a result, panoramic video is processed efficiently, multiple video folders can be imported in batches, and we use Premiere for quick editing and export. In accordance with methods described in 3.3.5, we can create a new sequence of clips and edit the video directly on the timeline. Since we are editing 8K video, the playback of the video at this time

depends on the performance of the computer. High-performance computers can play at the rate of 3fps per second.



According to the methods described in 3.3.5, we can add transition, text and so on. When we export the video, it will automatically render the video stitching and export, which greatly saves the stitching time.



3.3.8 [Beginner] Application of LUT

For videos shot in Flat color mode, you can use Premiere, DaVinci and other post-software to load this default LUT.

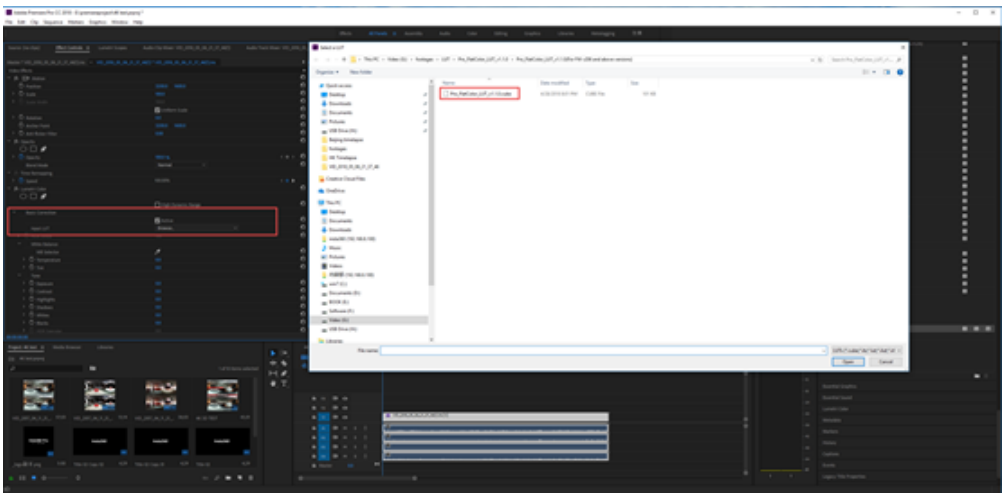
(Download at http: //static.insta360.com/software/Pro/LUT/Pro_FlatColor_LUT_v1.1.0.zip?inspm=77c1c2.6947c3.0.0)

Applicable to firmware v206 and later versions of Flat color video LUT.

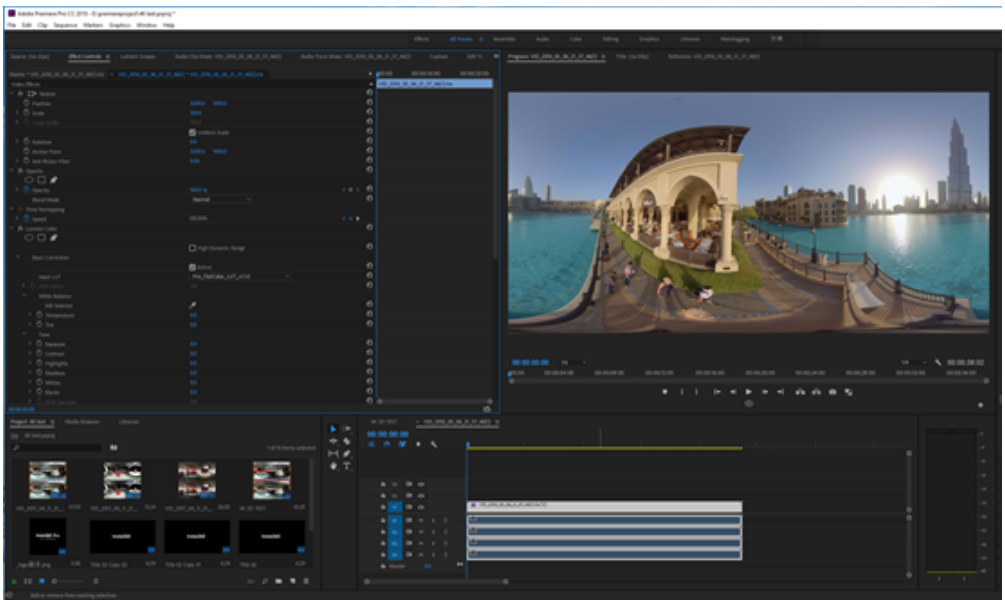
Support AfterEffects, Premiere, DaVinci, Final cut, Photoshop, Lightroom and other mainstream color matching software.

Download and extract Flat Color LUTs v1.1.0.zip to get two LUT files, one is before firmware version 165 and the other is after firmware version 206.

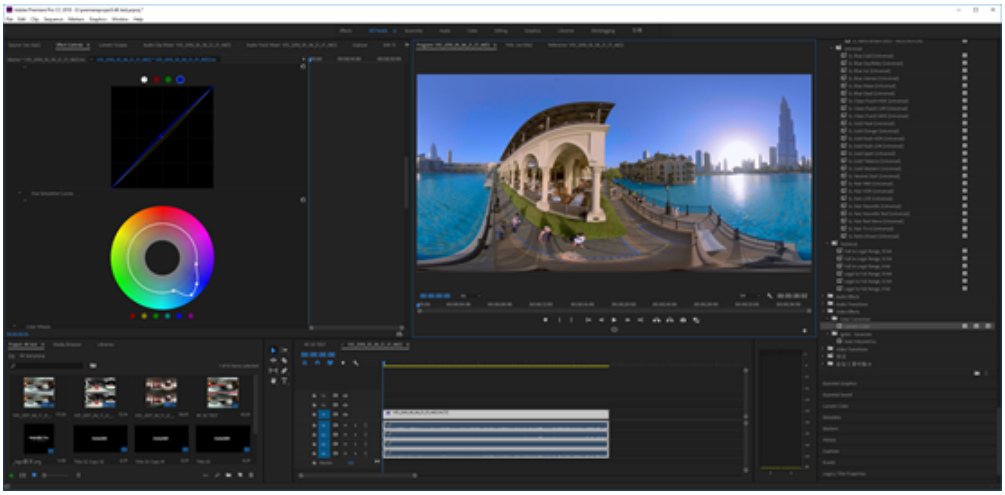
Open the Premiere, import file shot by using Flat Color mode, add the effect Lumitri Color, select Input LUT, to import the local LUT file.



After the video automatically loads the LUT, the color adjustment is automatically restored.



On this basis, we can further carry out color matching, to obtain satisfactory results.



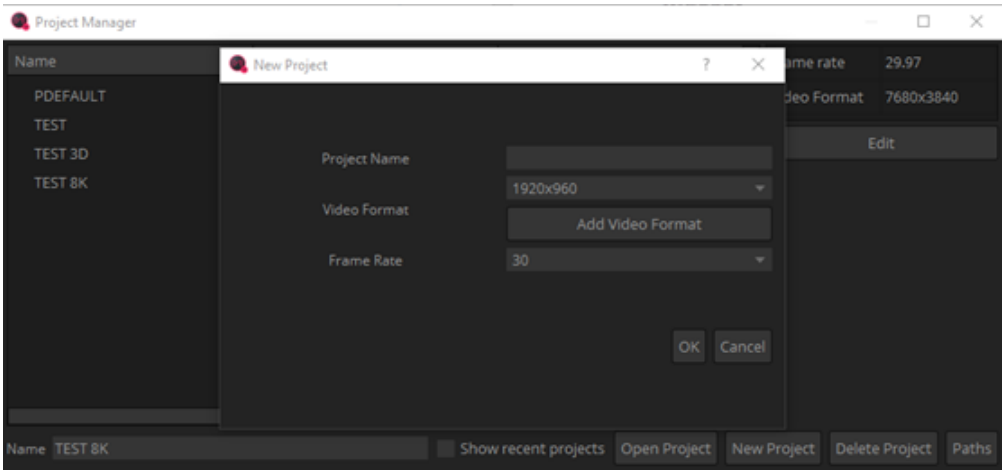
3.3.9 [Advanced] Stitching by third-party software of Mistika VR, AutoPano Video

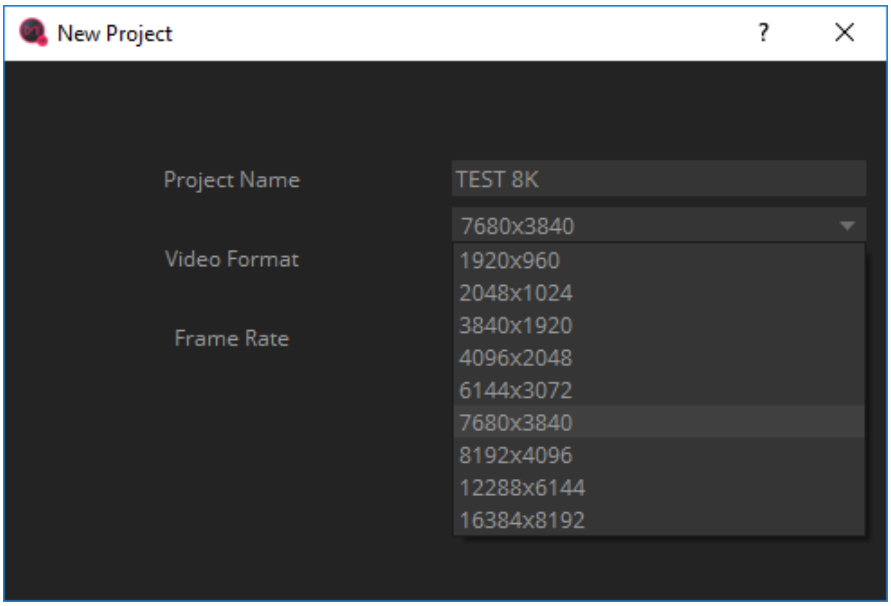
- **Mistika VR video stitching**

Mistika VR official tutorial https: //vimeo.com/channels/1242739

Mistika VR purchase link https: //www.sgo.es/mistika-vr/

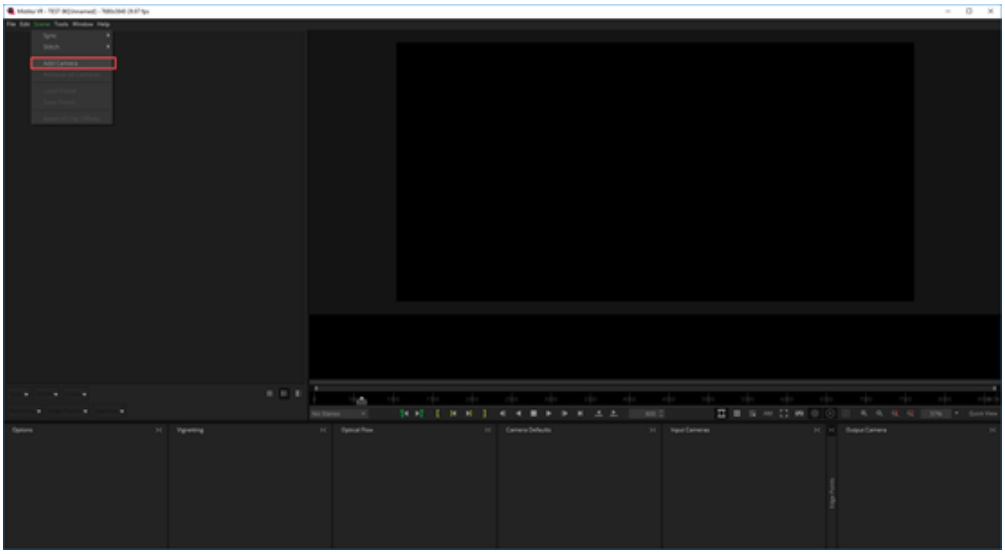
Open Project manager to select New manager, all the resolution of Mistika VR must be set in advance in the project. In this way, it will allow you to export at the desired resolution. Select here to set Video Format to 7680x3840.

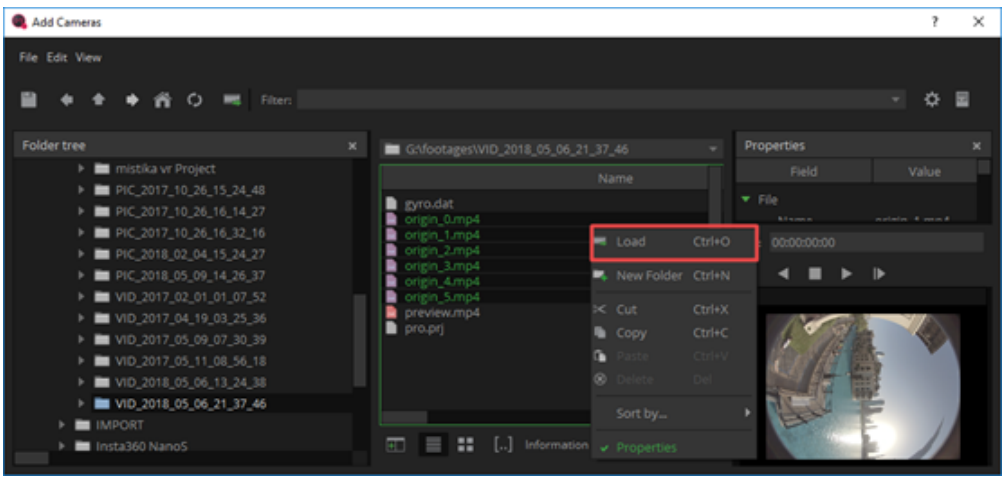




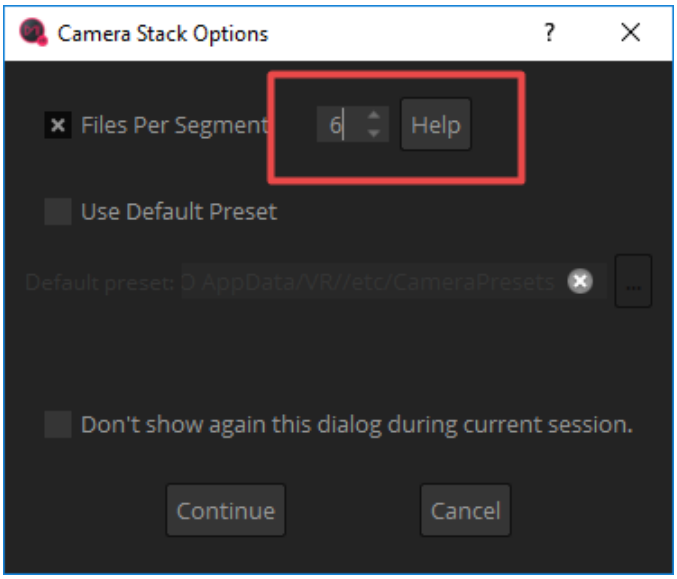
File import method 1:

In the top menu bar, select Scene->Add Cemaras, to open the material preview window, find the material path, check the six-lens file names, right click to select Load.

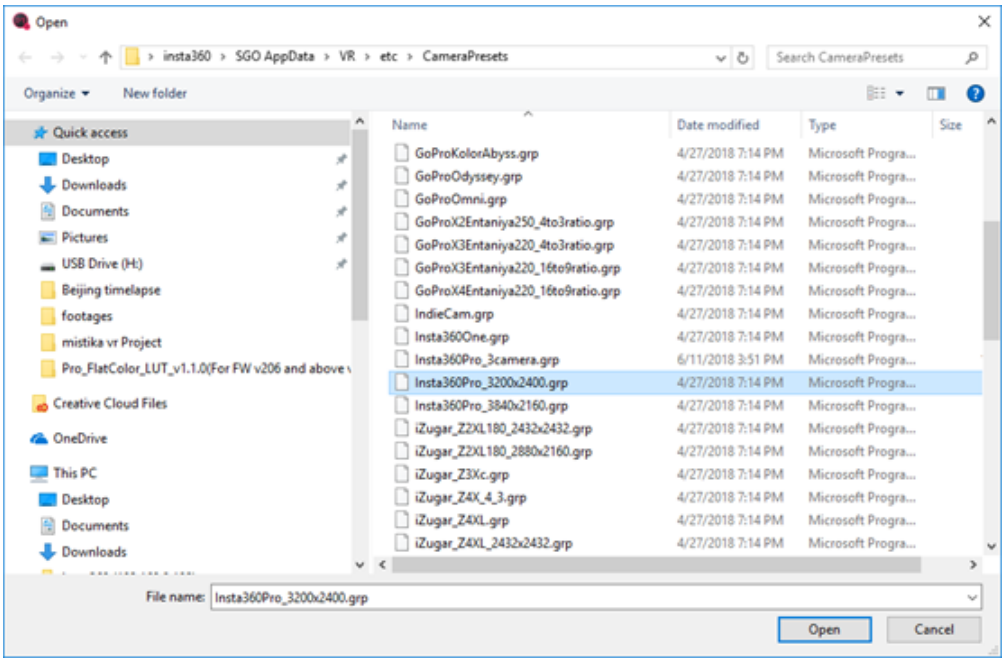




As for the method of file selection, File Per Segment can be set to 6 because this is the material of six lens.

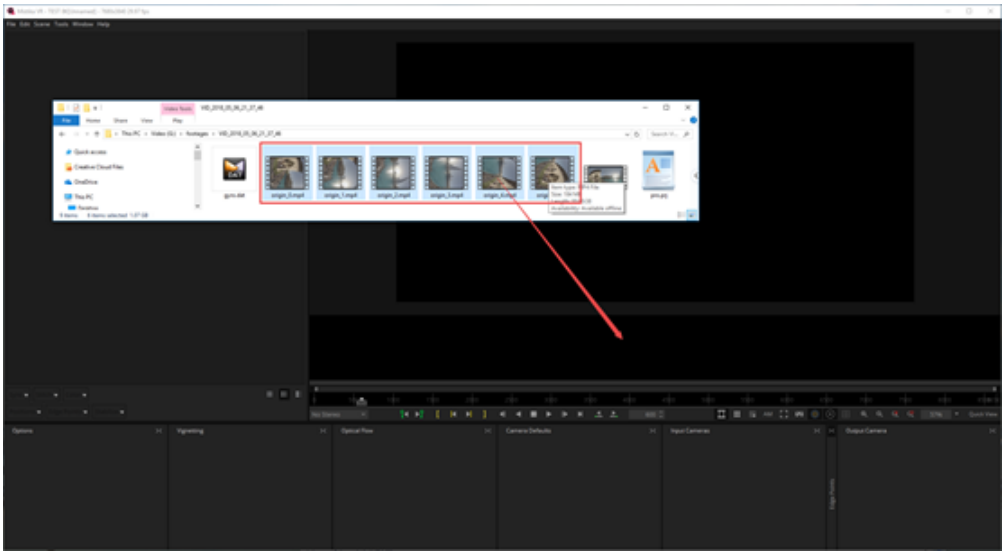


You can also choose “Use Default Preset” , to use preset quick stitching, and find the appropriate shooting settings of Insta360Pro_3200x2400.grp in the folder, because the material was shot in 6K3d mode, with a resolution of 3200x2160 for each shoot. If the material is shot in 8K mode, you should select Insta360Pro_3200x2400.grp.

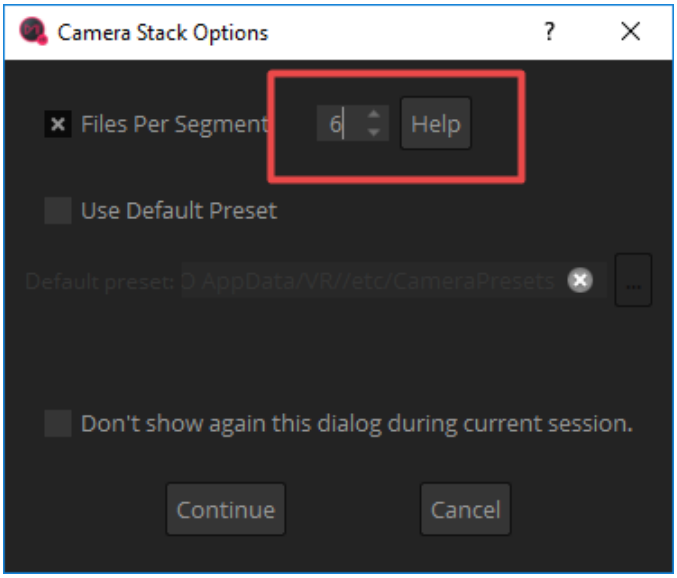


File import method 2:

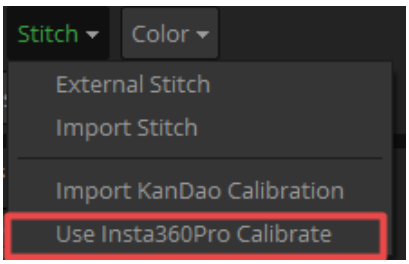
Select six-lens material directly from the folder and drag them to Mistika VR's main interface.

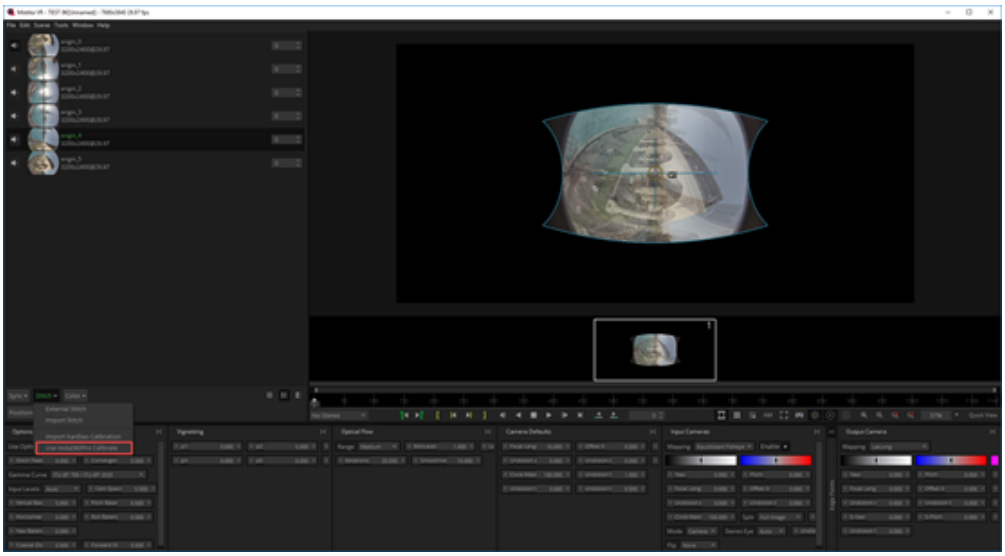


As for the method of file selection, File Per Segment can be set to 6 because this is the material of six lens.

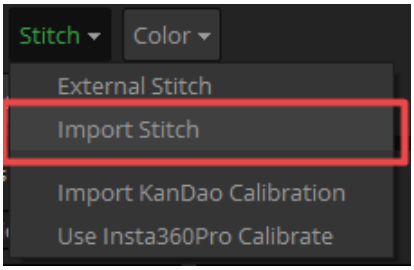


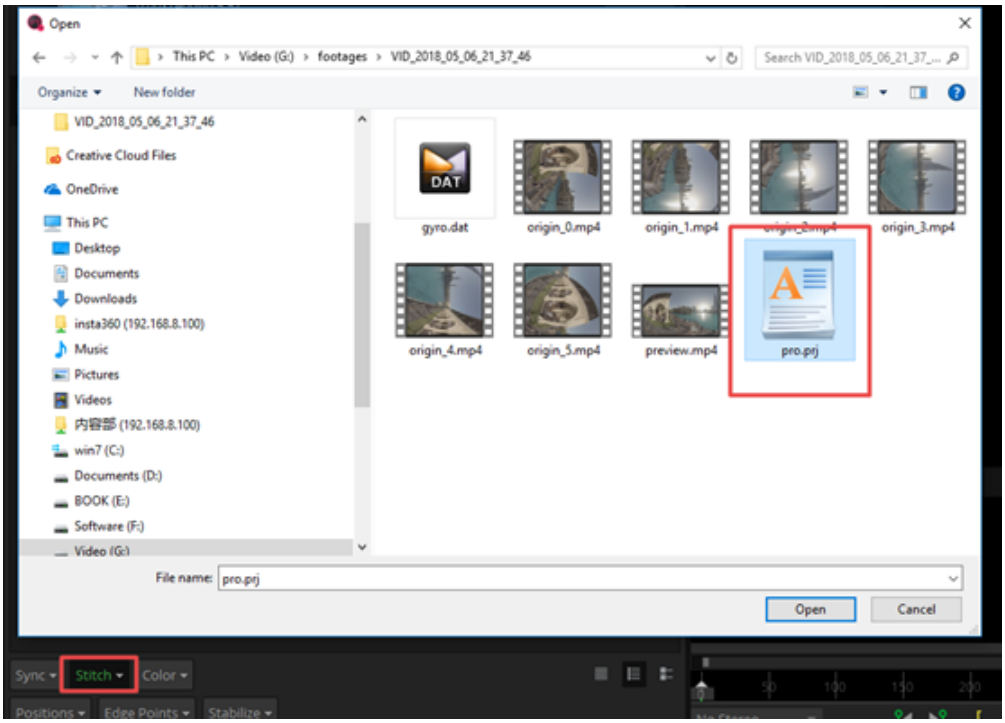
After the import, you can quickly stitch by using Stitch->Use Insta360Pro Calibrate.





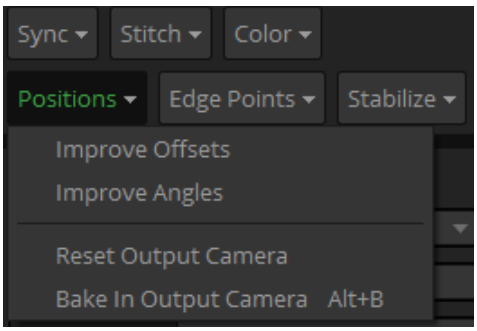
Import Stitch can also be used to import pro.prj files saved when shooting the material for fast stitching.



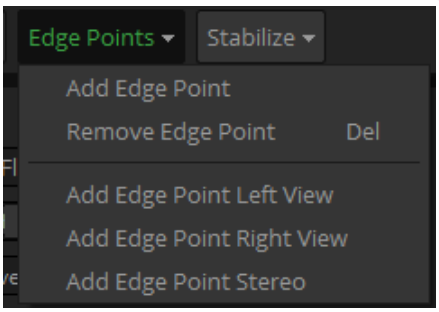


This is the result of quick stitching. The following describes the functionality and settings of the various windows at the bottom.

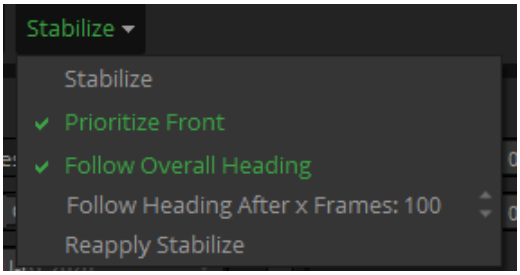
Optimize the parameters of stitching in Positions. Generally, choose “Improve Offsets” and “Improve Angles” once for each.



Add boundary protection points in Edge Points to avoid stitching of key objects and people.

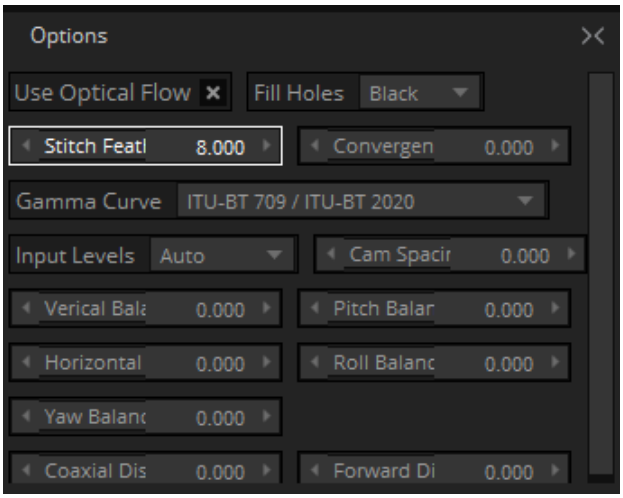


Click once on “Stabilize” to stabilize the video. The stability depends on the amplitude and speed of jitter, and this feature has better anti-shake effect in terms of walking jitter.

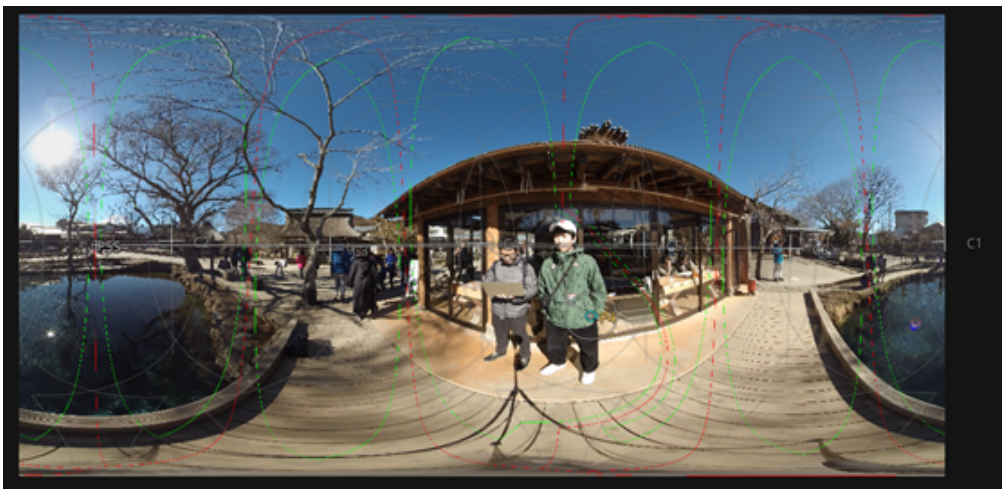


In Options, select Use Optical Flow, set 8-25 for Stitch Feature generally.

Convergence means parallax. In 3D mode, the parallax should be set to 60.

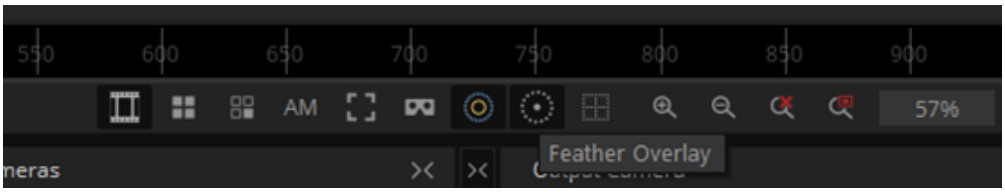


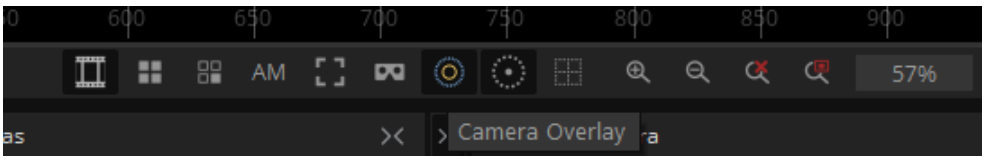
Generally after these steps, most of the material can be stitched well and exported. But there are also times when you come across a handful of tricky material, such as people's face. So we add Edge Points, to offset the stitching edges to protect the characters.



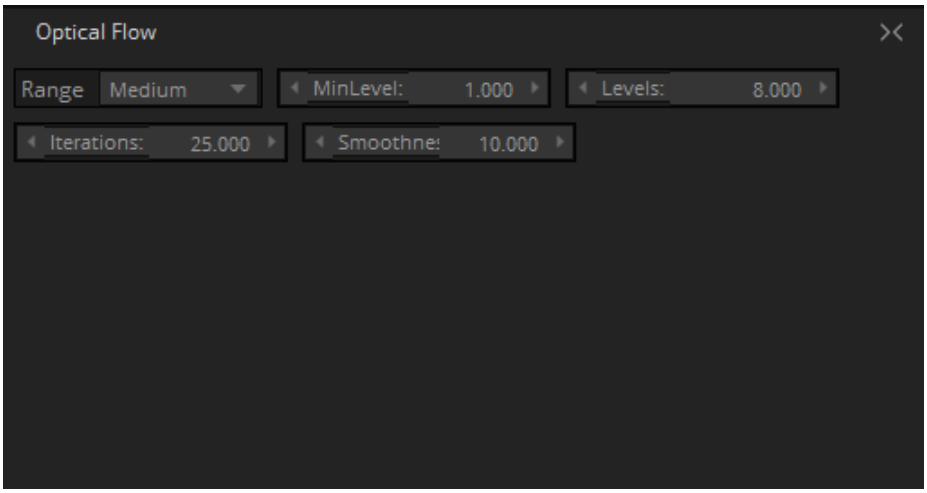
Note that Feature Overlay and Camera Overlay should be turned on in the playback window.

Look at the lens and stitching edges.

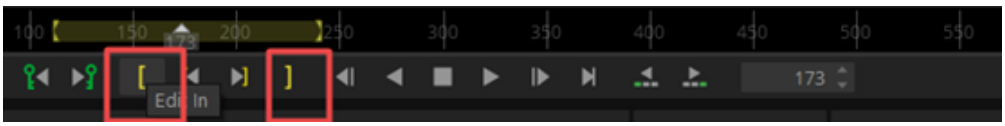




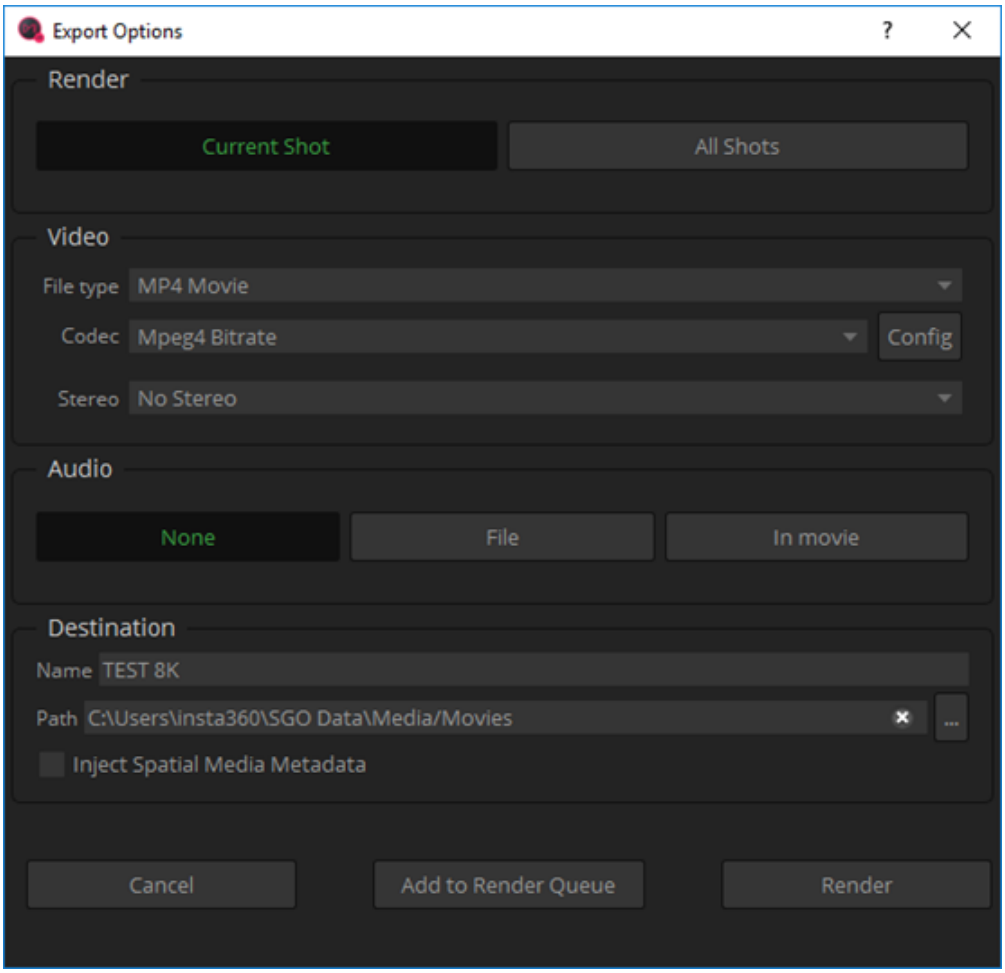
In addition, you can add options in Optical Flow to adjust the depth of optical flow stitching.



Use the time interval for sequence settings of edit in and out tool, so that the segment exported is corresponding to the selected time interval.

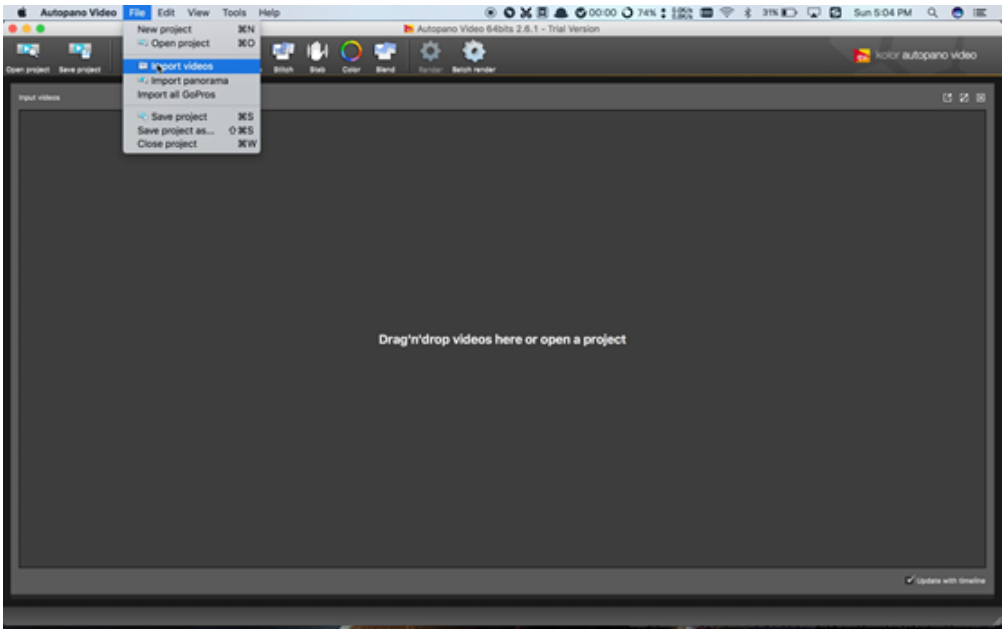


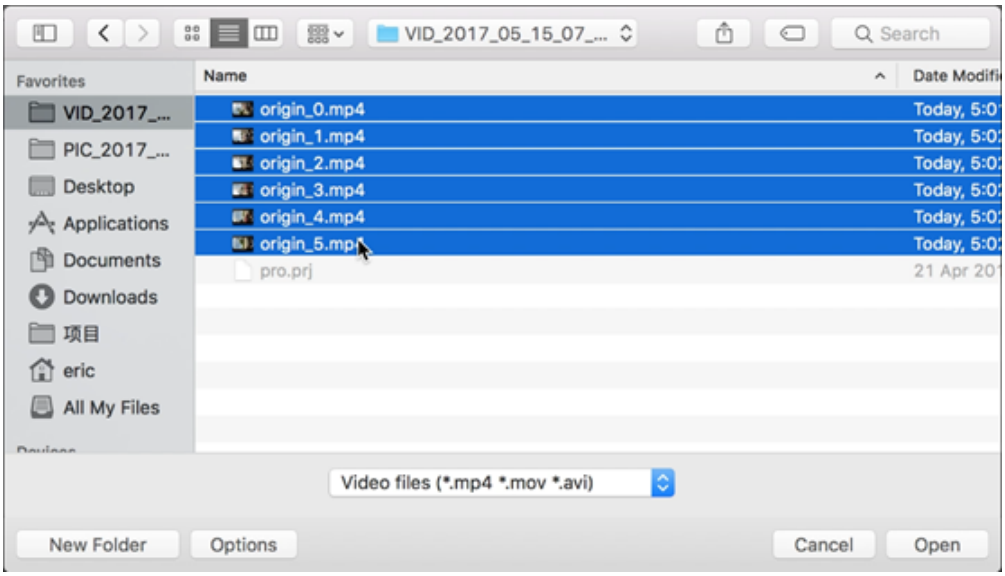
File->Render, to open the Export Options interface, which can be exported after rendering, and select settings when exporting audio files such as no audio, independent audio files, and audio in movie.



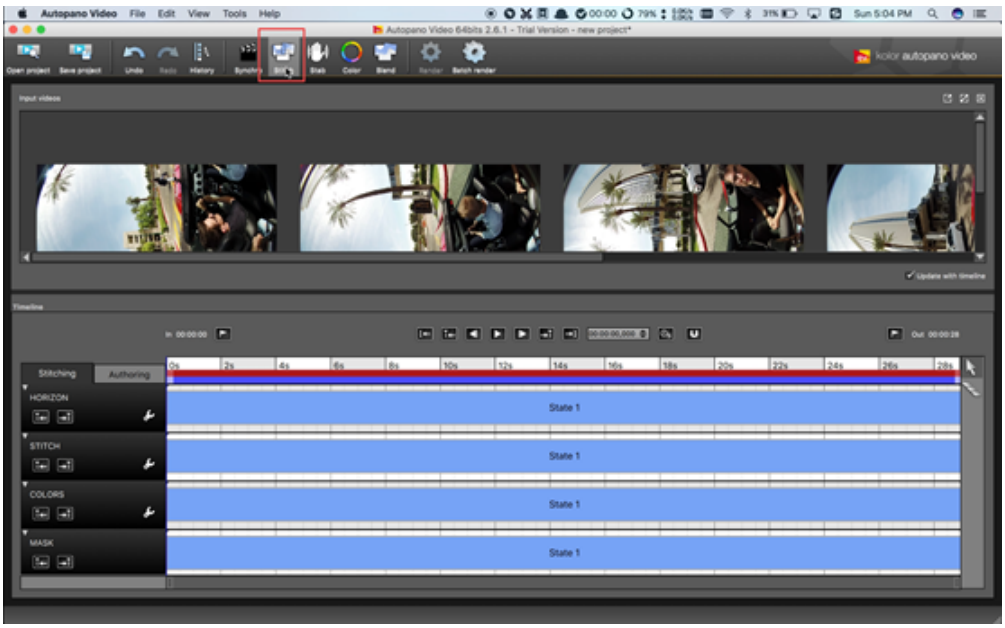
- **AutoPano Video stitching**

Open AutoPano Video, import videos.

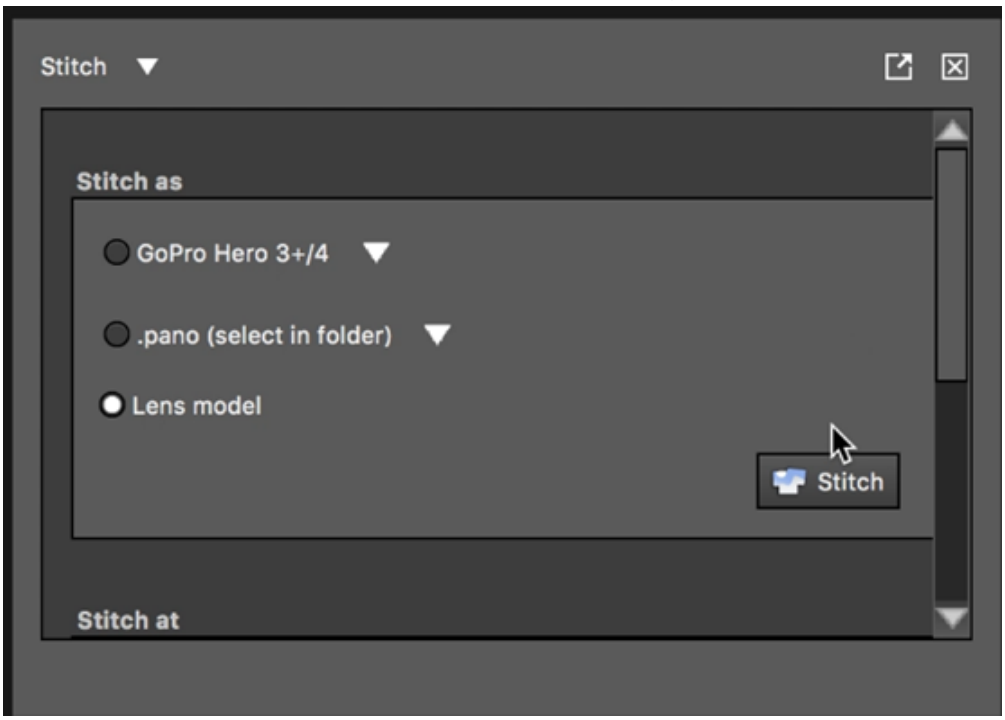


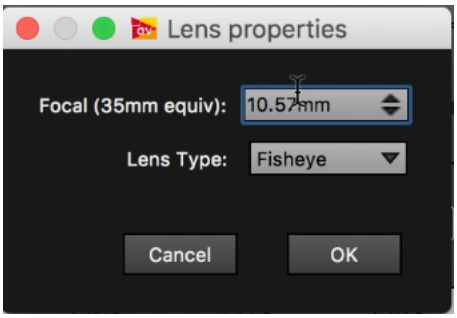


Select Stitch for quick stitching.

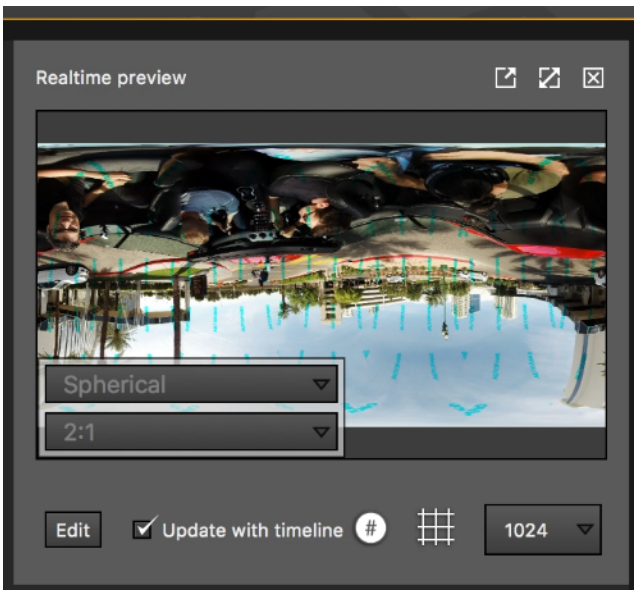


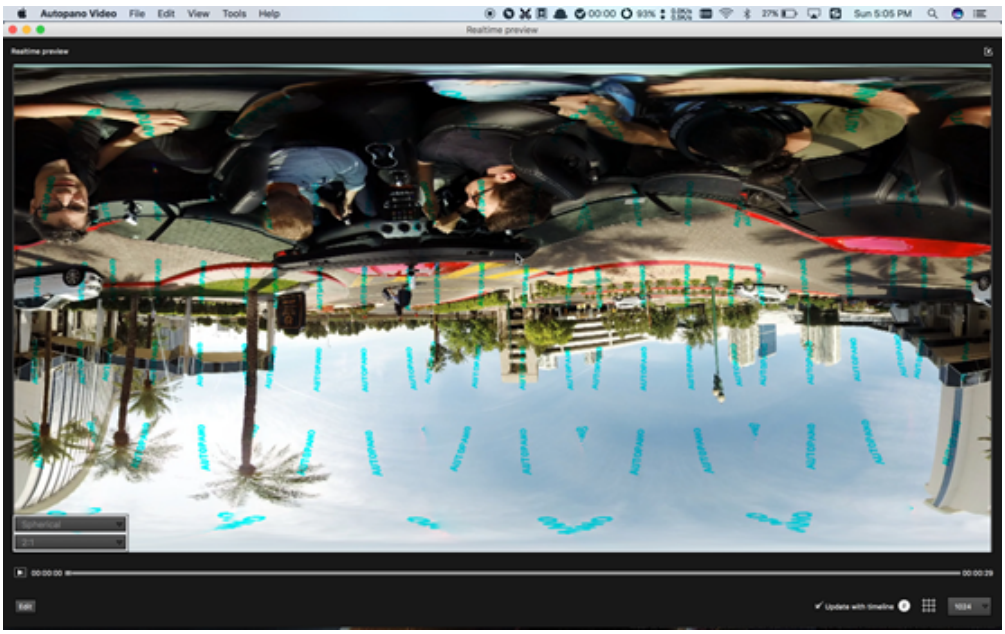
Press Stitch button, set Lens properties, 10.57 for focal length, Fisheye for lens type.





Adjust the lens in Realtime preview. You can also turn on the Auto pano Giga for more detailed tuning.





3.3.10 [Advanced] Other panoramic plugins and their attribute applications

1. Mocha VR

Used for tracking stabilization, removing aircraft, etc., image matting.

2. Gopro VR Plug-ins

Gopro VR Plug-ins promoted by Gopro is a plugin application available for Adobe premiere and After Effect. It supports to import panoramic video, edit it by 360 degrees, or record panoramic video on the screen.

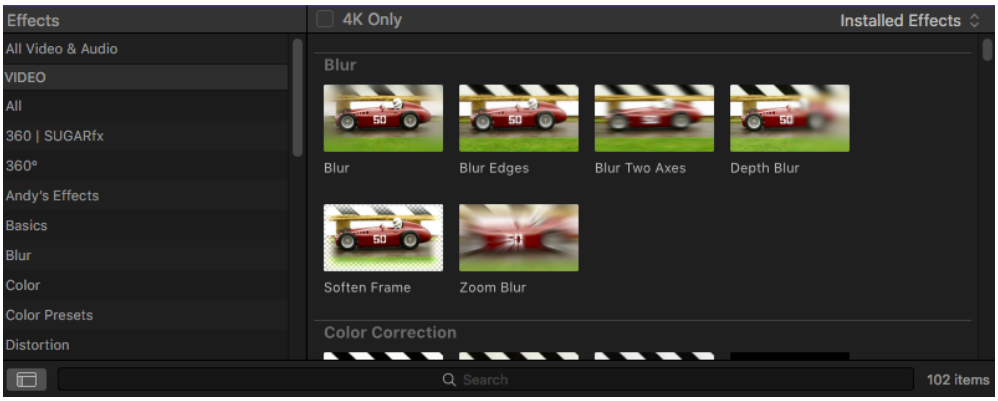
3. FxFactory

Introduction to other 360 plugins.

FxFactory is an app store with a lot of plugins. Its plugins are popular on FCPX, and there are also some plugins for 360 video. Each plugin has a free instructional video.

Dashwood 360 toolbox is a plugin that runs on mac, introduced in 2016, and is now available for free download.

https: //fxfactory.com/info/360vrtoolbox/

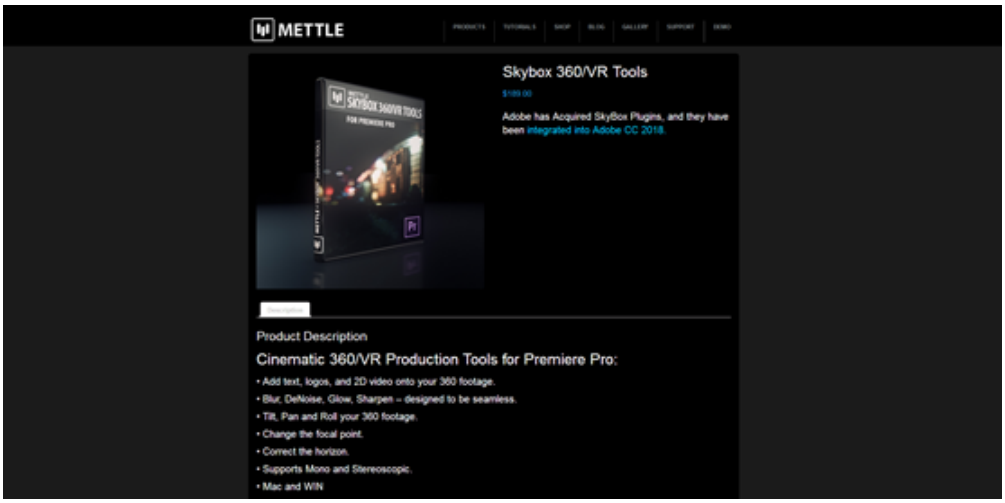


https: //fxfactory.com/info/360effects/

https: //fxfactory.com/info/revolve360/

4. Skybox 360/VR Tools

https: //www.mettle.com/product/skybox-360vr-tools/



3.3.11 [Advanced] Post production of panoramic sound

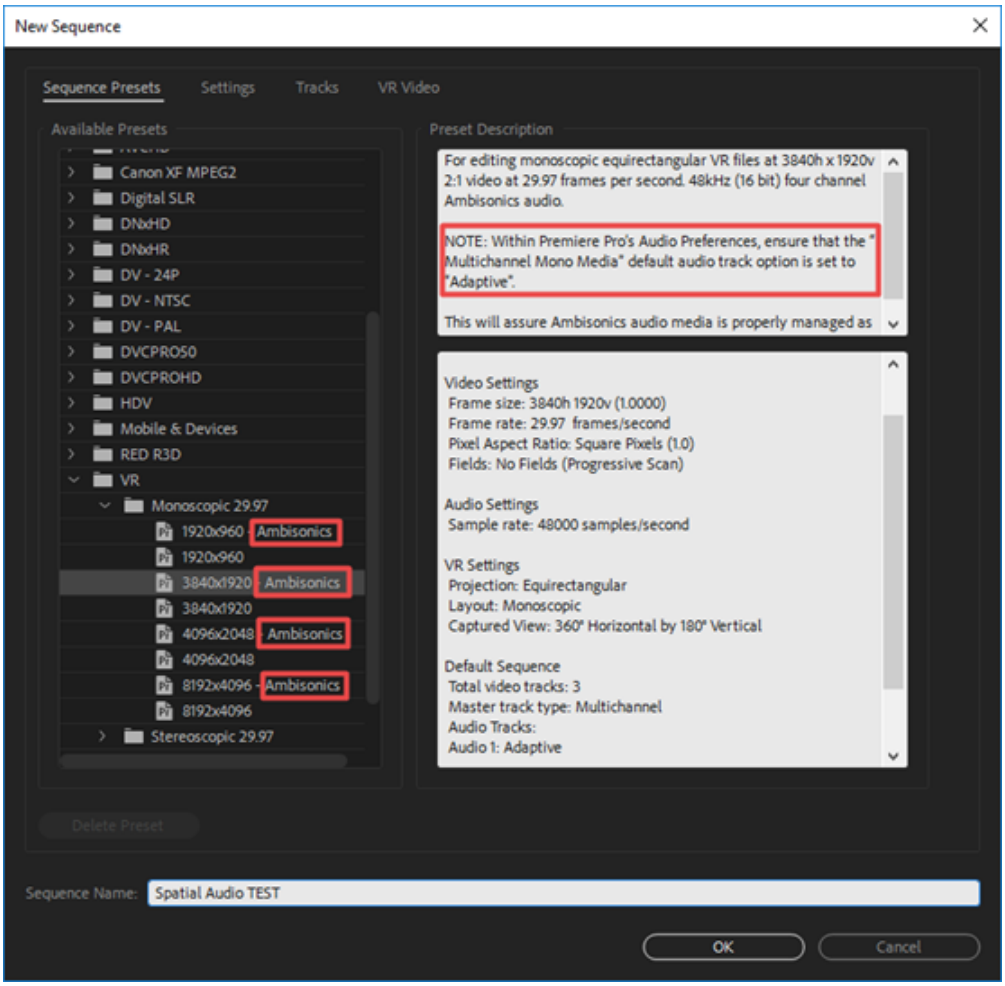
The introduction of YouTube's requirements on the panoramic audio and video format standards.

https: //support.google.com/youtube/answer/6395969?co=GENIE.Platform%3DDesktop&hl=en

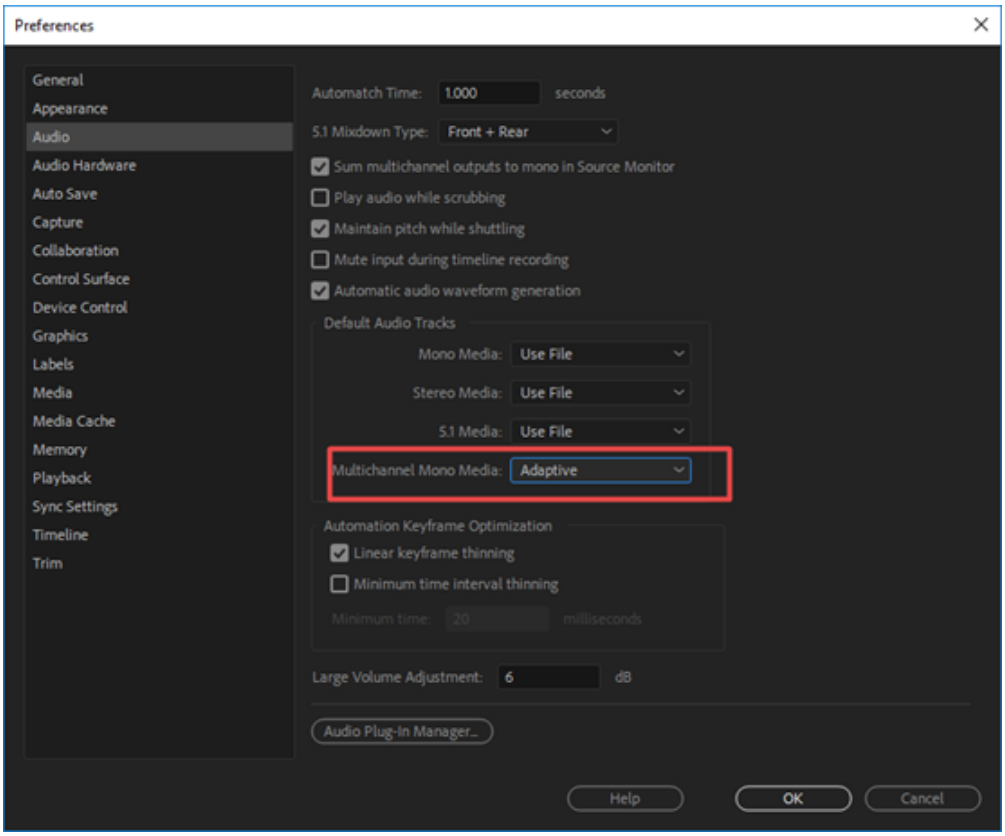
The panoramic sound files shot by Insta360 Pro directly support this requirement.

Open Premiere CC 2018, create a new sequence, and select the preset with the Ambisonics option under VR, as explained in NOTE on the right:

For editing monoscopic equirectangular VR files at 3840h x 1920v 2: 1 video at 29.97 frames per second 48 kHz (16 bits) four channel Ambisonics audio.
Note: Within Premiere Pro's Audio Preferences, ensure that the "Multichannel Mono Media" default audio track option is set to "Adaptive".
This will assure Ambisonics audio media is properly managed as an adaptive multichannel media.

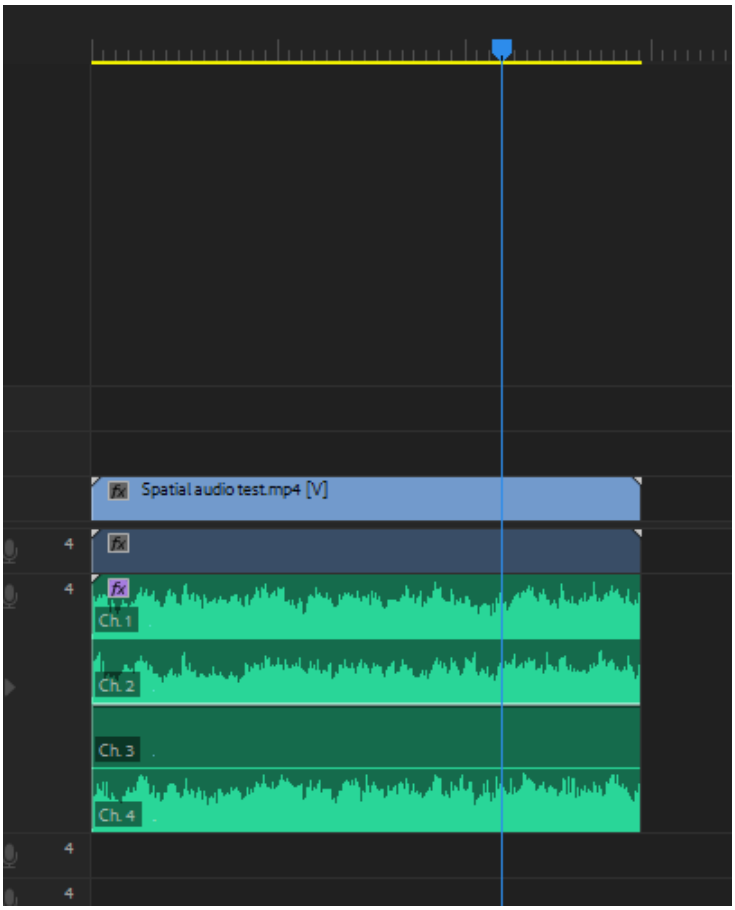


Set Multichannel Mono Media as Adaptive in Audio preferences.

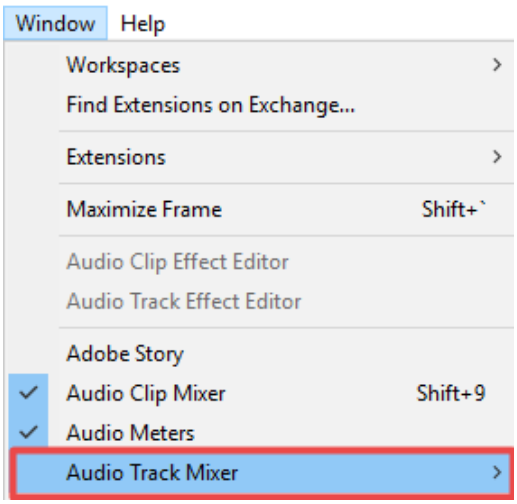


Note that the Insta360 Stitcher allows you to choose to export the WAV sound file with panoramic sound when exporting, so that it can apply Ambisonics effect and be edited in a separate sound track using Premiere. Import video file and audio

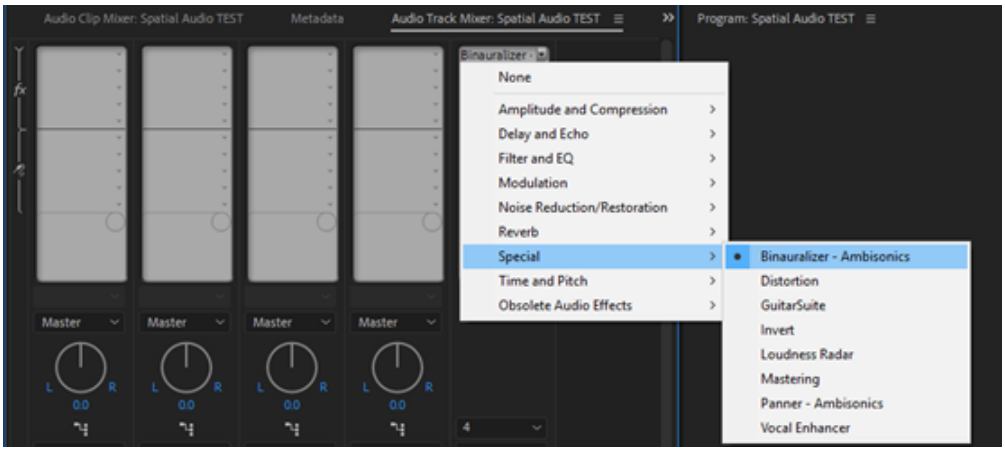
file (Spatial audio file of H2N or sound file exported by Insta360 Stitcher) respectively, synchronize, complete synchronization and then proceed to the next step. During editing, all panoramic tracks should be on the same track, and the panoramic track should not be shared with other types of sound.



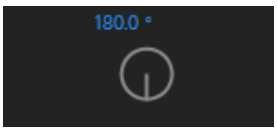
Open the Audio Track Mixer

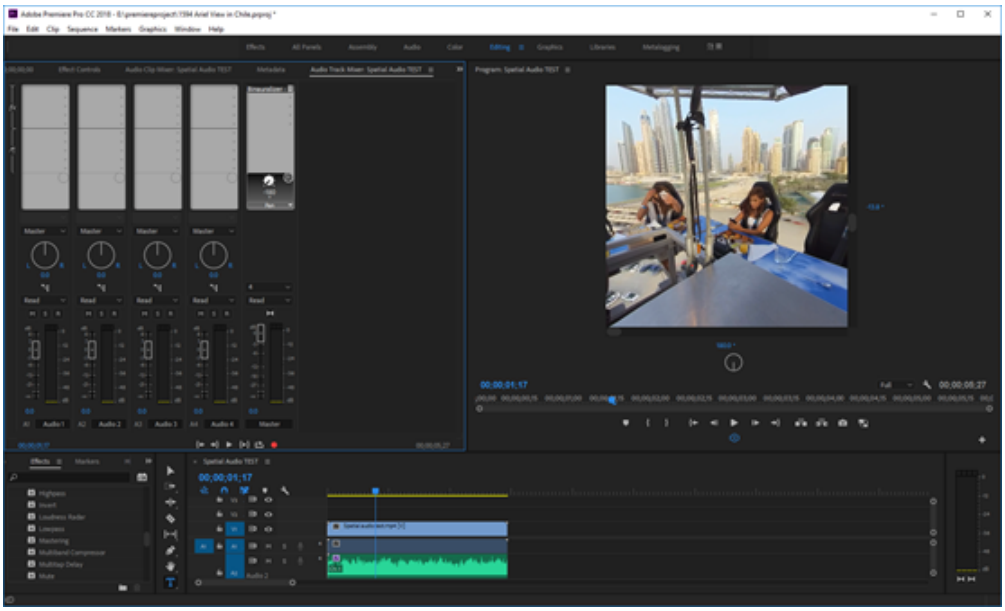


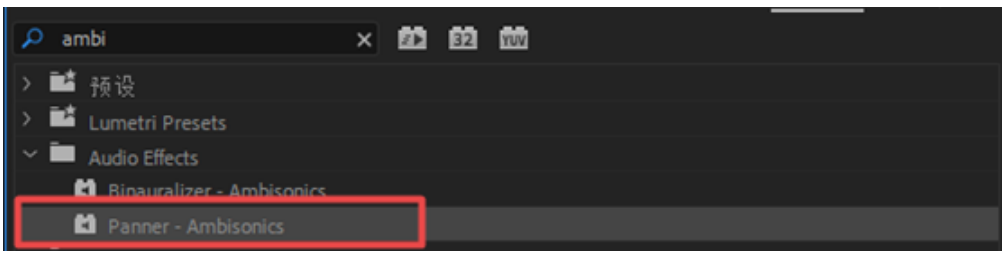
Open Binauralizer-Ambisonics to preview the sound effect, make sure that the direction of the sound matches the orientation of the video screen. Please note that the effect must be turned off when exporting the video.



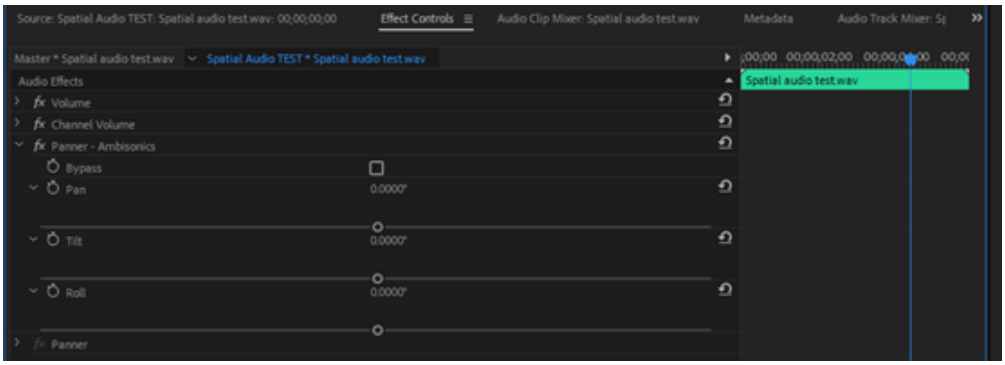
Rotate the angle and preview the video to make sure the sound matches the image.



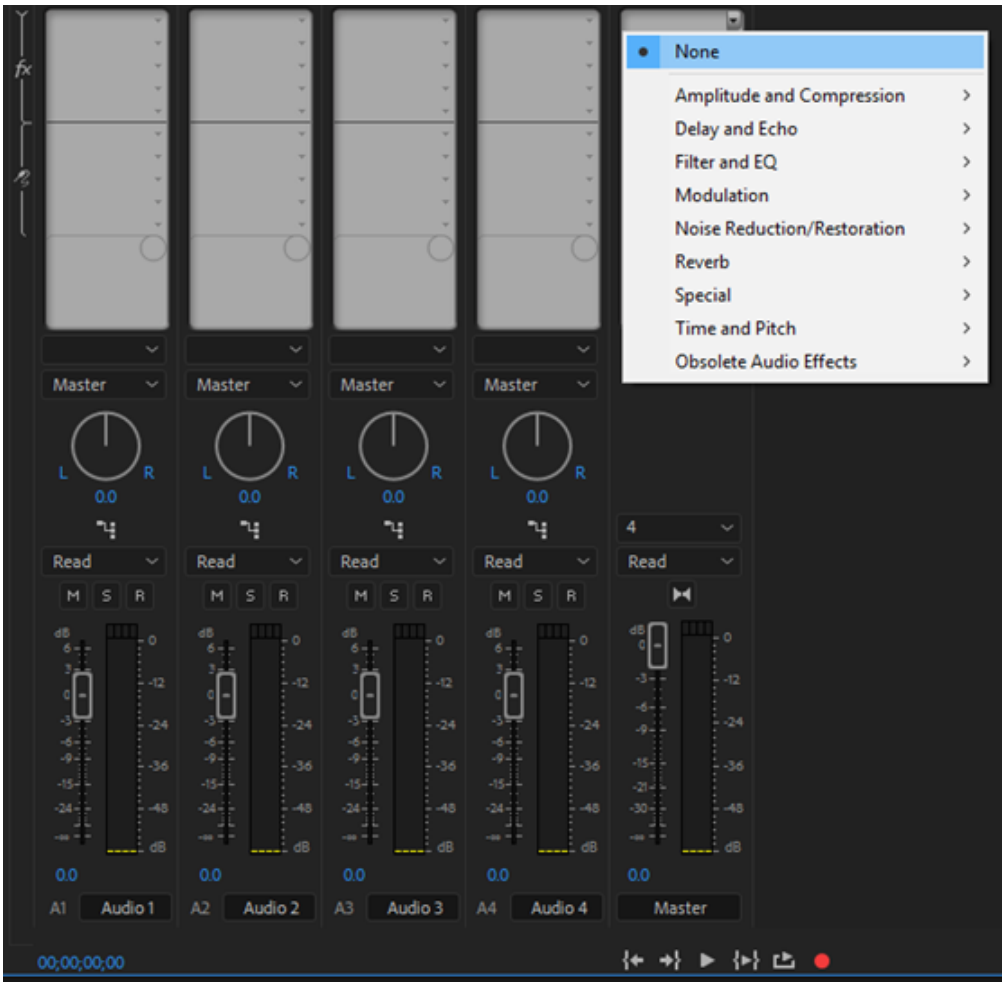




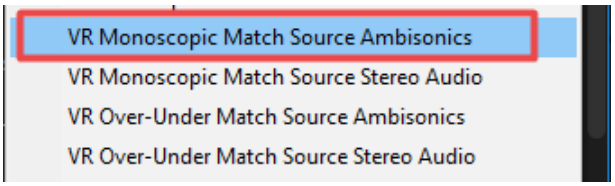
If you encounter a mismatch, you can use the sound direction editing effect, Panner-Ambisonics, to add the effect to the panoramic sound track.



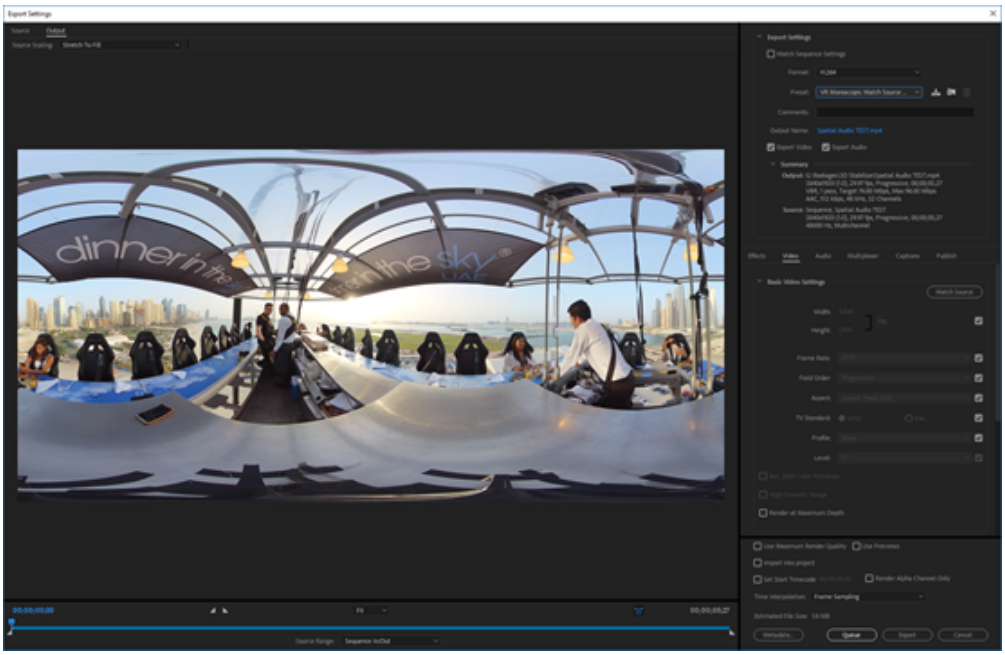
When you turn on the sound effect, you can adjust the three directions, Pan, Tilt and Roll. After adjusting and matching video direction, remember to turn off Binauralizer-Ambisonics before exporting the video.



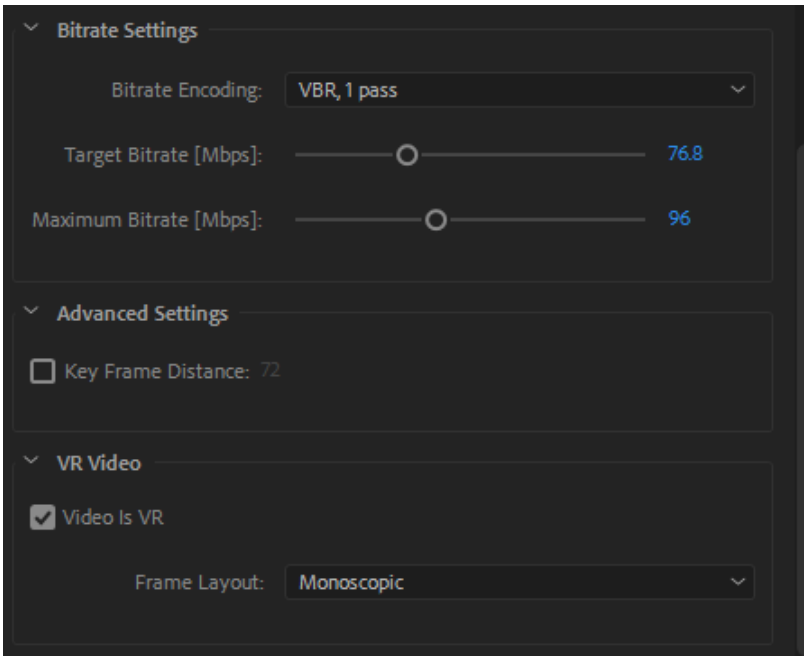
Press Ctrl+M to export. Make preset conform to the video project in the export interface, in which case is the VR Monoscopic Match Source Ambisonics.



Check whether the other settings are consistent with the sequence settings, H264 encoding.

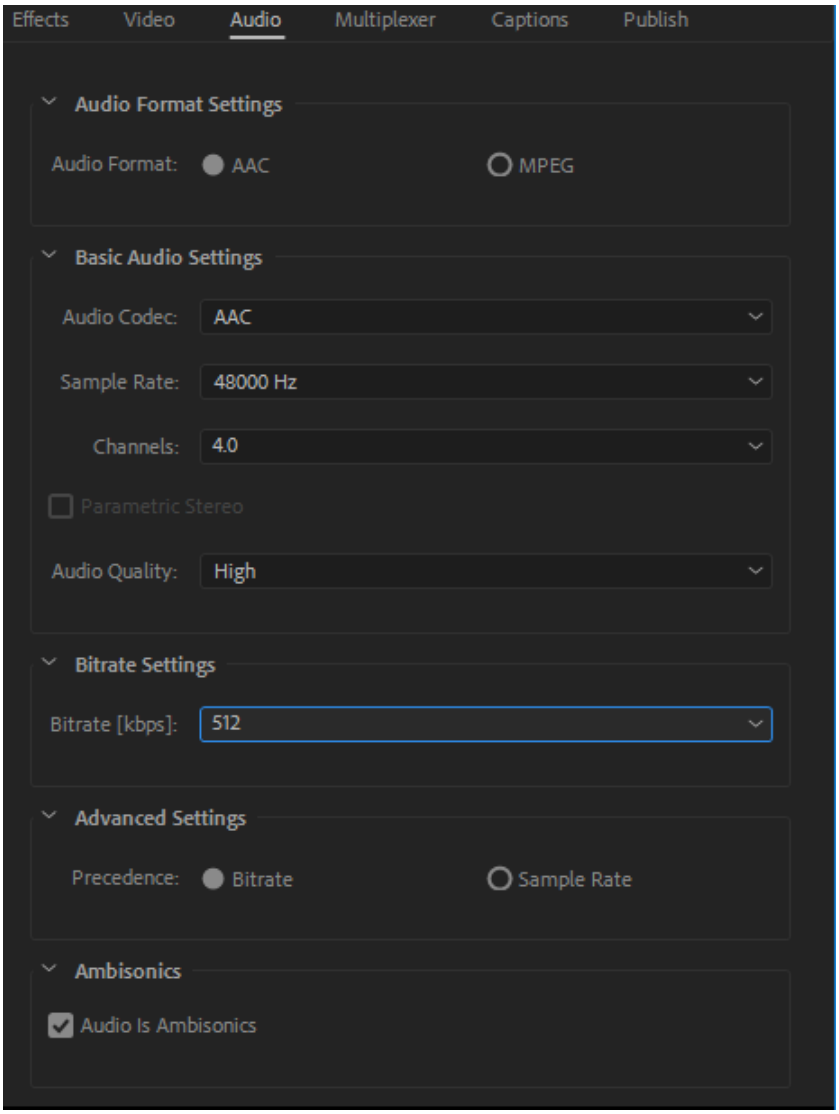


Select appropriate bitrate based on the resolution. 4K video is recommended to use bitrate above 40 Mbps. Confirm to select "Video is VR" and “Monoscopic”.



Confirm AAC audio format is chosen in Audio. Sample Rate is 48000 Hz. 4.0 for Channels, 512 kpbs for Bitrate. Select

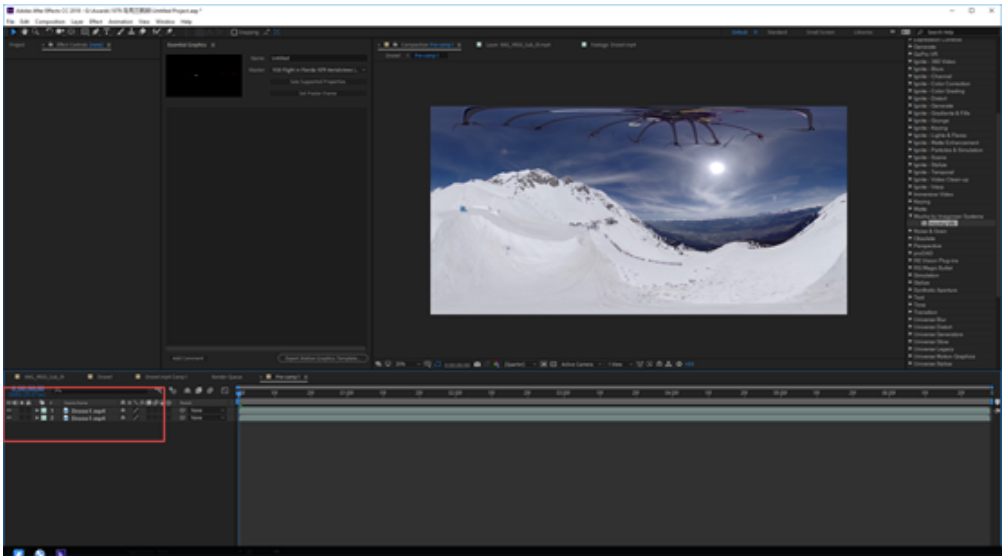
"Audio is Ambisonics". These settings are consistent with standard requirements.



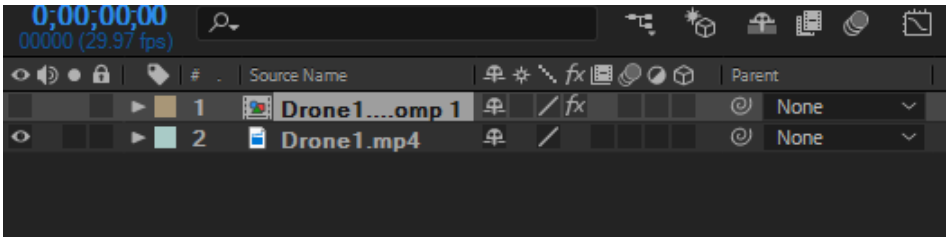
3.3.12 [Advanced] Mending Sky for Aerial Photography

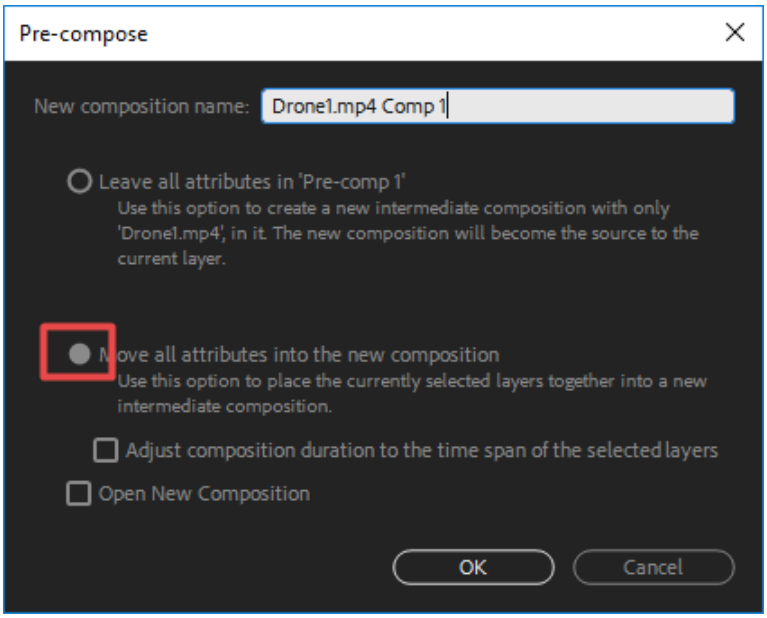
Use mocha VR, UAV basically fixed position for aerial photography.

Open AE, create new composition, and copy a video layer.

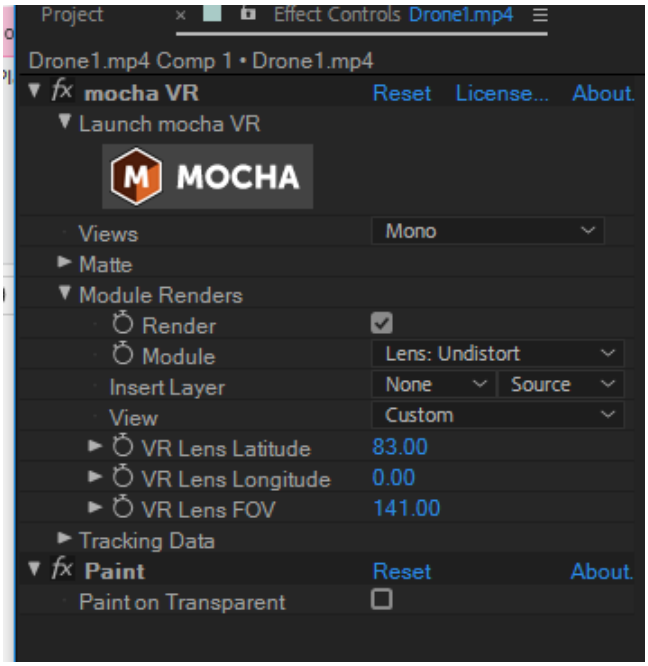


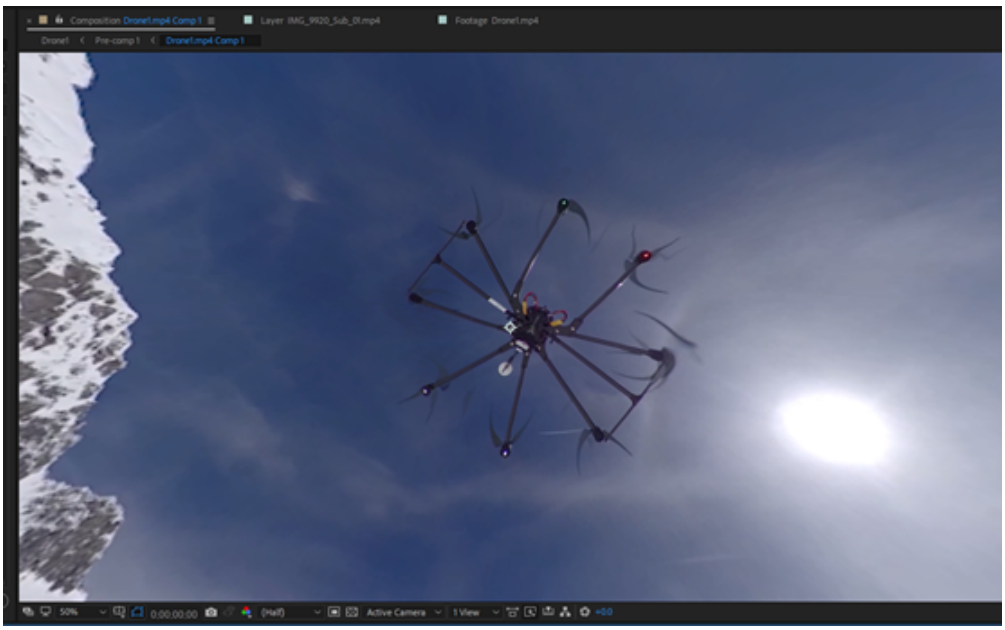
In the previous layer video, add Mocha VR effect and pre-synthesize this layer as Drone1.MP4 Comp 1. Check “move all attributes into the new composition”.



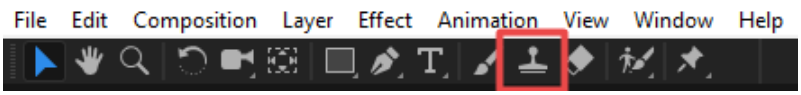


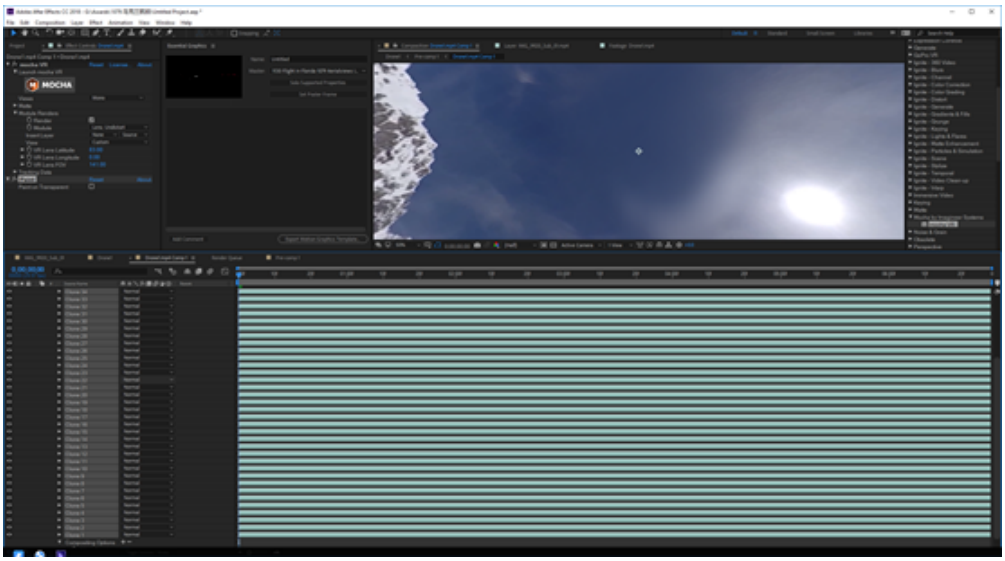
Enter new pre-comp, Drone1.MP4 Comp 1, set Mocha VR, open Render, select Module as Lens: Undistort, modify Lens Latitude and FOV, allowing drones to zoom into appropriate sizes in the window.



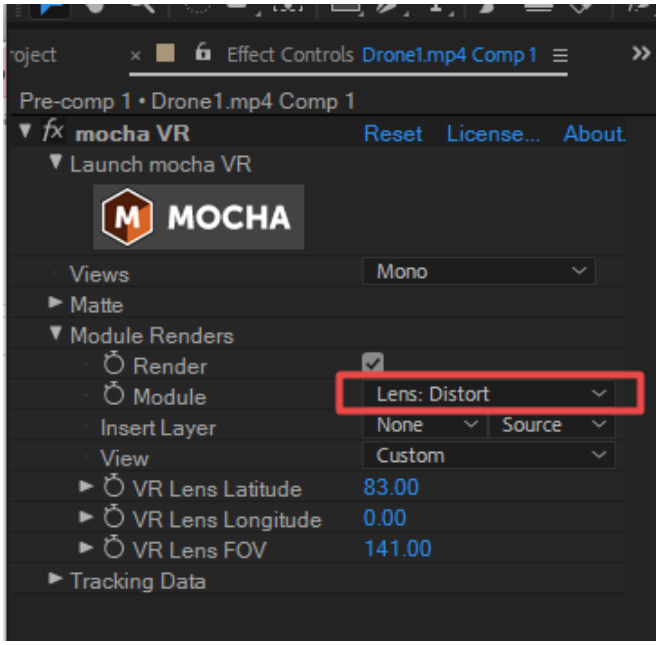


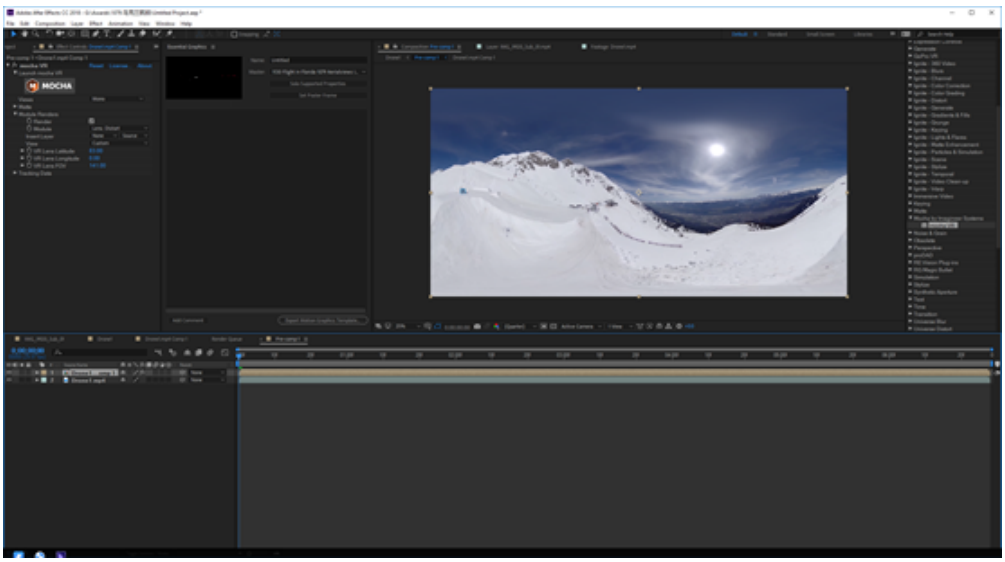
Wipe off drones using seal tools. The method is the same with PS.





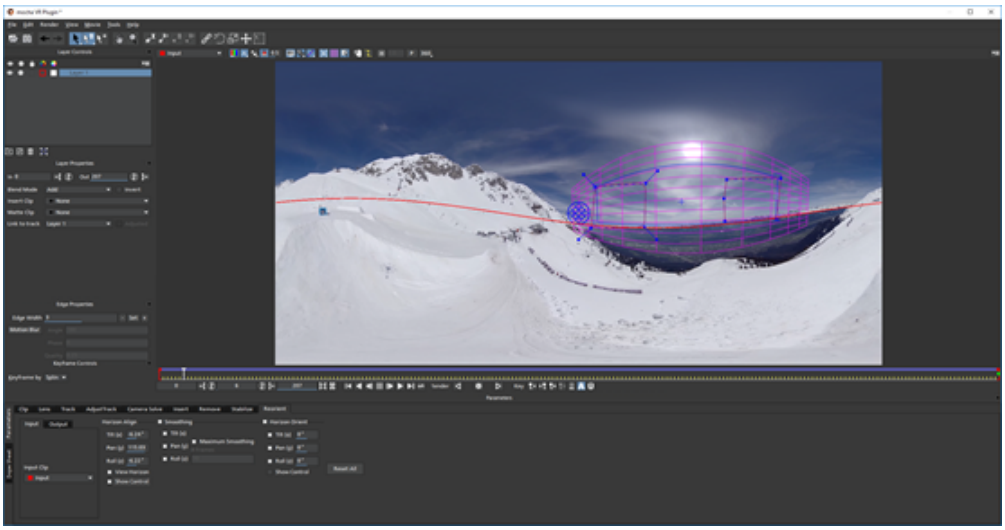
After erasing, copy this Mocha VR effect to the Pre Comp 1. Modify Module as Lens; Distort.

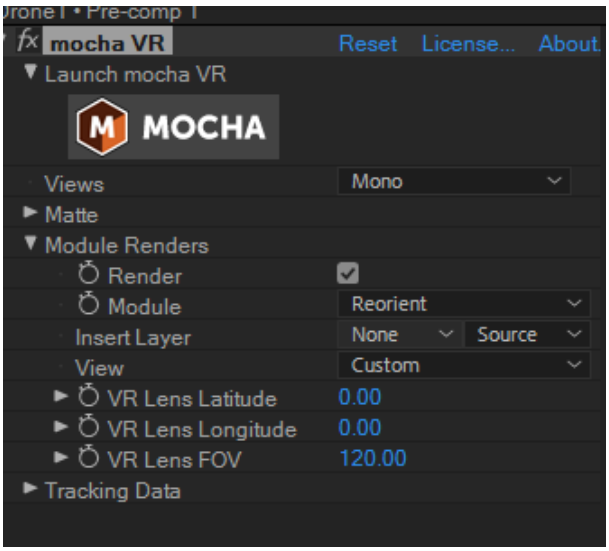




This has completed simple drone remove.

If you need to stabilize simultaneously, Pre Comp 1 should be pre-composited and Mocha VR should be added. Since many attributes and composition have been added earlier, the calculation speed of this step will be slower.



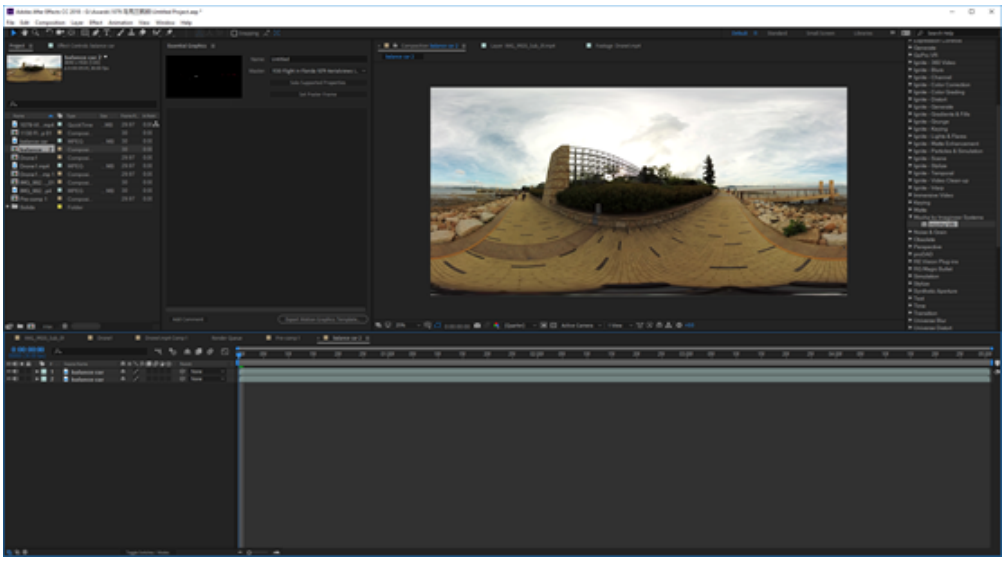


3.3.13 [Advanced] Erasing Tripod for Ground Shoot

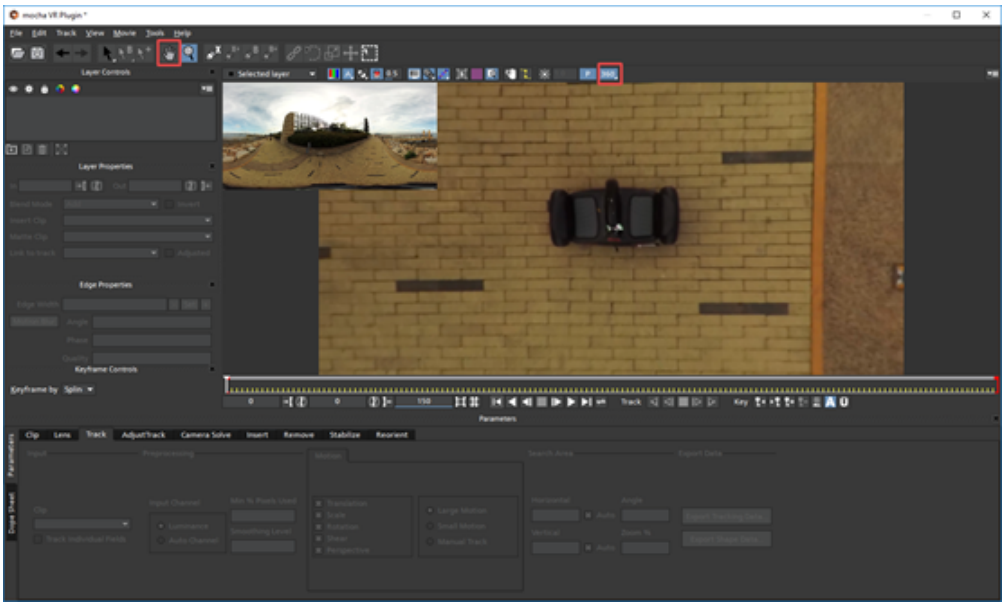
Move to wipe balance car at the bottom.

Create a new layer of composition and copy a layer video.

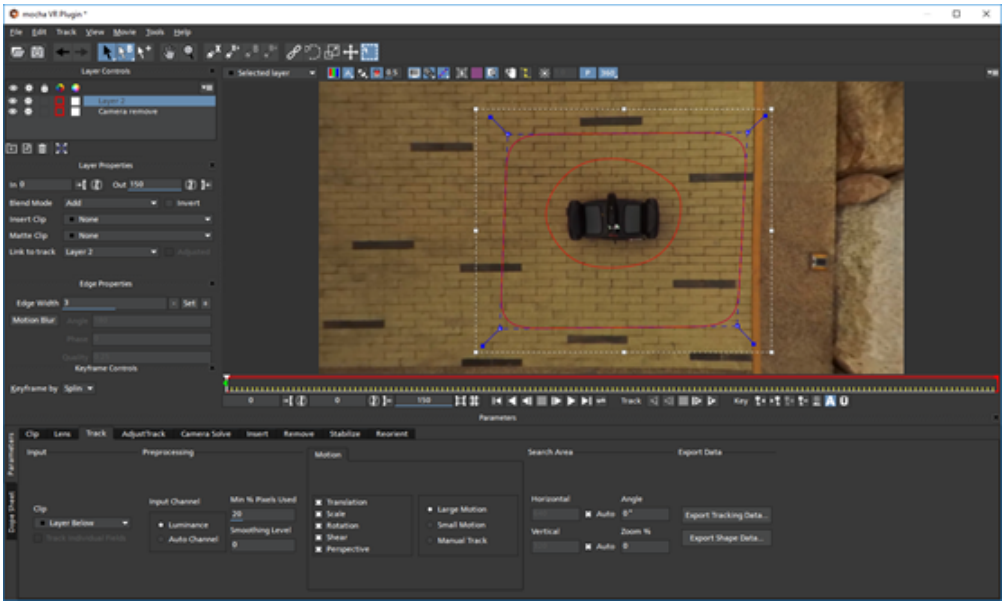
Add Mocha VR attribute to upper video.

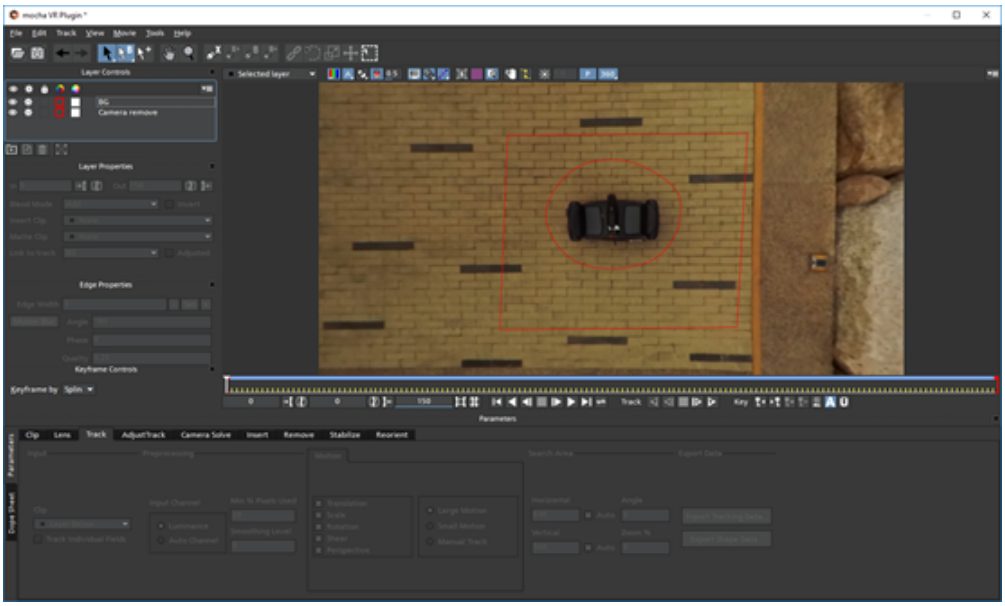


Open Mocha VR, Open 360 mode, move perspective to balancing car at the bottom.

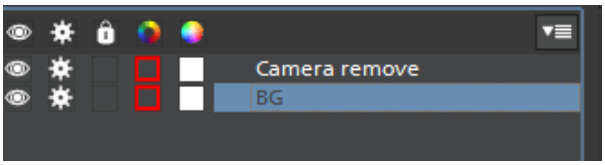


Use pen tool to create two tracking layers, one is balance car, named camera remove, to loop balance car, and another named BG track, to circle a larger square area.

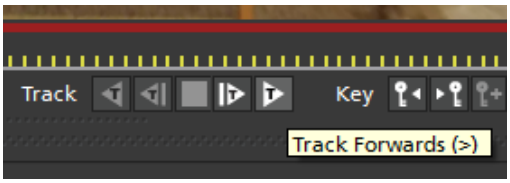


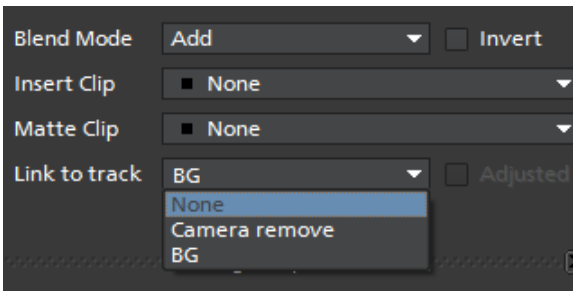


Move the BG layer behind the Camera remove layer.

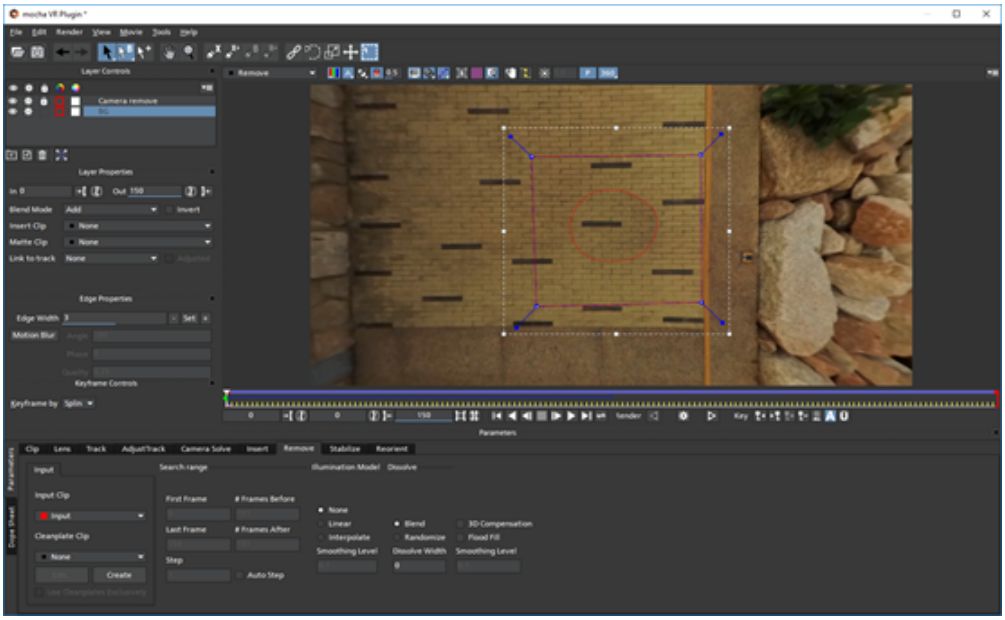


Both layers must be selected to track and finally select None for “Link to Track”.

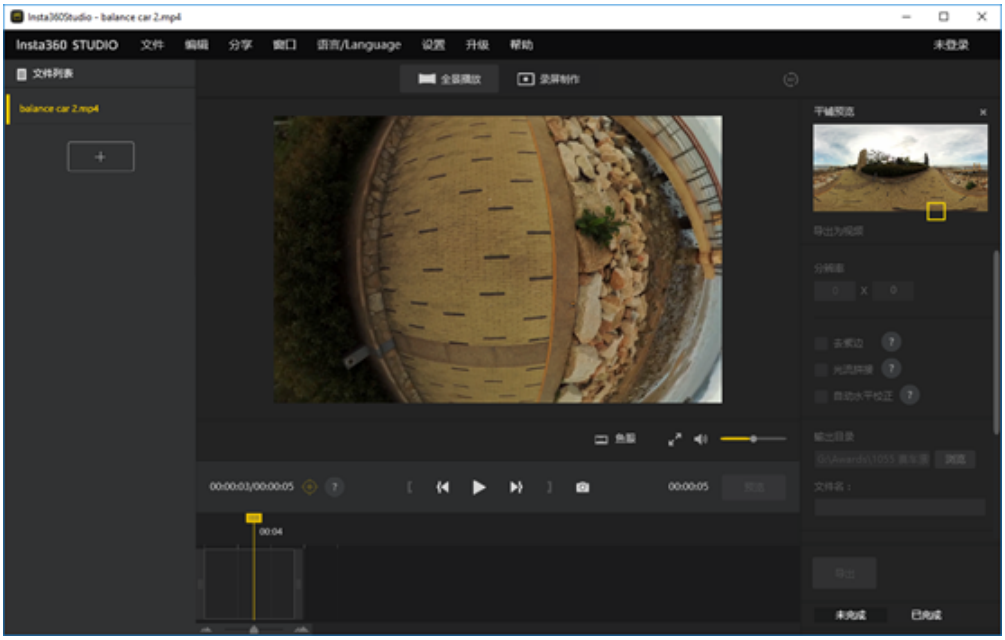




Clicking on “Render current frame” below preview window to view the effects of current frame.



After saving, render and then export. The rendering time is related to computer configuration and the resolution and duration of video clip. And finally viewing effect in panoramic player.

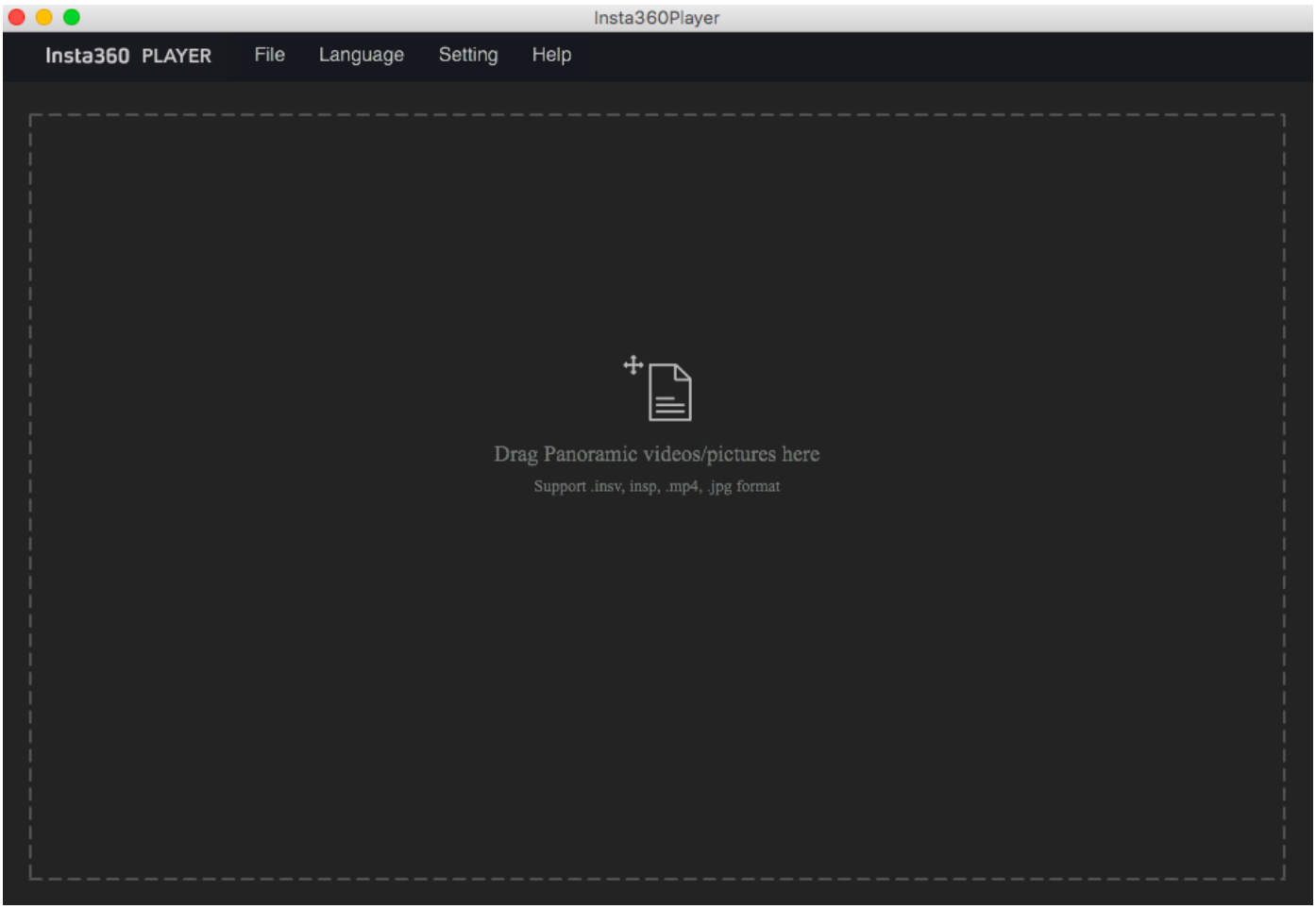


3.4.1 [Beginner] Insta360 Player

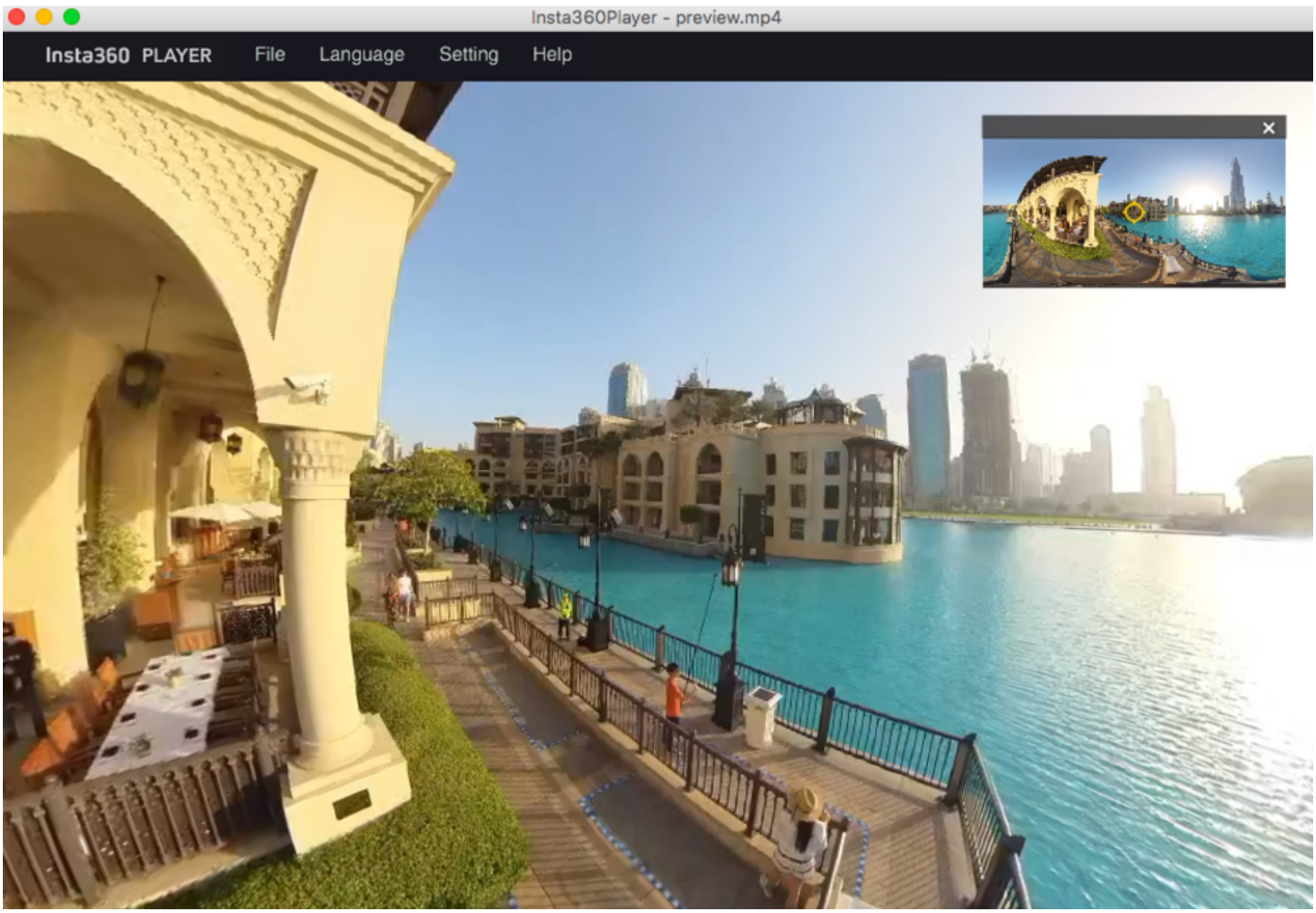
Insta360 Player supports playing all the videos recorded by Insta360 cameras, and also supports all standard 2:1 360 videos and images with a 2:1 ratio.

Take macOS High Sierra as an example.

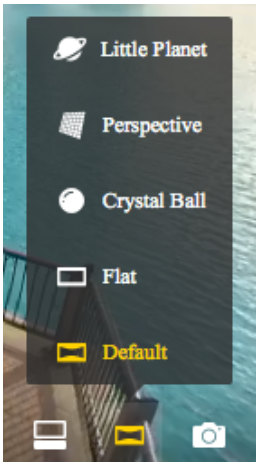
The desktop version of Insta360 Player supports photos and videos in insp, insv, mp4, jpg formats. Currently, video playback only supports those of 2: 1, panorama videos below 4K, and does not support 3D videos.



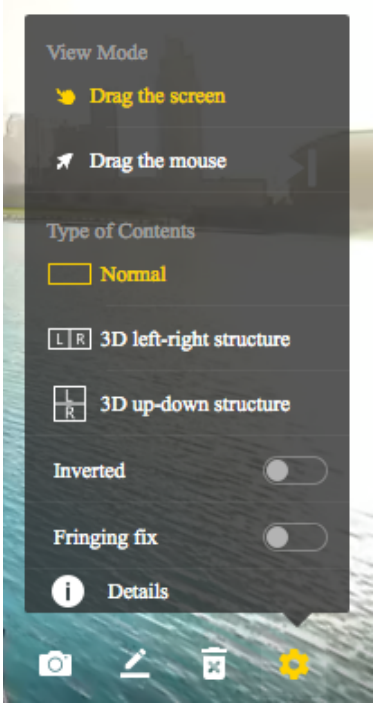
Import a 4K panoramic video. And drag mouse to view panoramic images. The upper right corner is a preview widget.



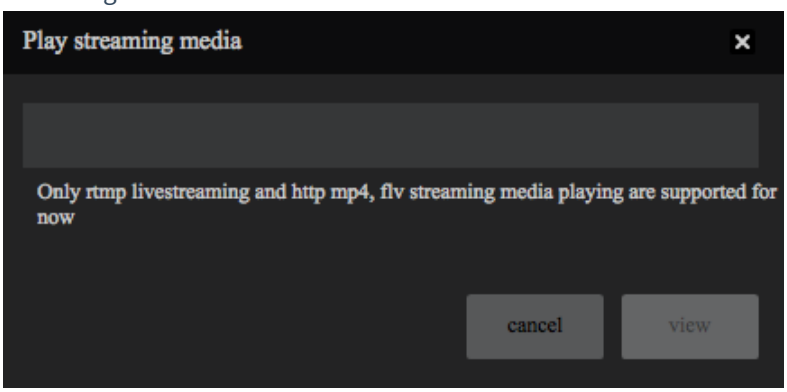
Playback mode can choose Little Planet, Perspective, Crystal Ball, Flat, Default (fish eye).



View Mode and Type of Contents can be set in Play Settings.



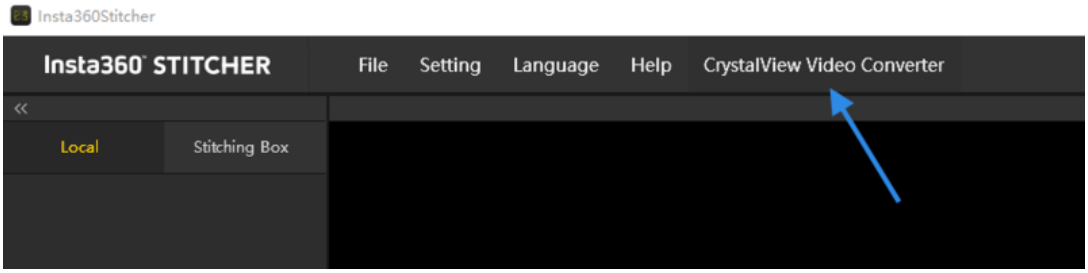
“Play Streaming Media” can be chosen in Files in navigation menu bar. Panoramic live-streaming is supported in streaming media.



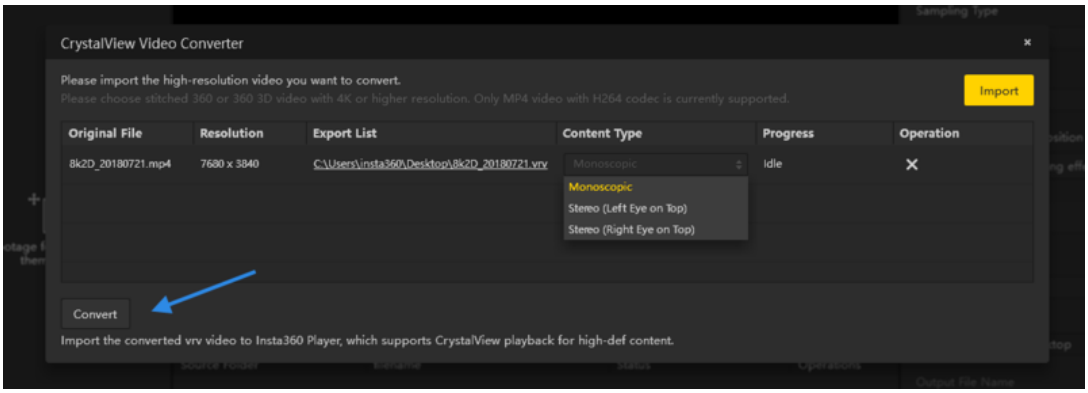
3.4.2 [Beginner] Introduction of CrystalView 8K, the panorama player

Currently, the maximum video resolution that mobile phones can play is 4K, while CrystalView player is a brand-new playing technology launched by Insta360, which can play panoramic video with up to 8K resolutions on mobile phones. You need to convert video into special CyrstalView format via Stitcher, and then import it into CrystalView player to watch super high resolution panoramic video.

1. Firstly, open Stitcher (only Windows system is supported currently, version 1.8.0 and above), click "CrystalView Video Converter" feature on top bar, click "Import" on top right corner to select video you want to convert. Currently it only supports MP4, mov videos with H264 encoding, and the resolution must reach 5760 * 2880 (6K) or above.



2. Each video imported appears on the task list below. Before conversion starts, you can click on items for more settings, such as export directories, content types (original version is 3D or 2D). After setting up these information, click on the "Convert" button below and wait for the completion of video conversion.



3. Import the converted videos into players supporting playback in CrystalView format. Supported players include Insta360 Moment player on Android, iOS, GearVR and Oculus Go platform.

   Here are ways for each player to import content:

Android Insta360 Moment player:

1. It is recommended to use Snapdragon 835, Exynos 8895, Qilin 970 or Android devices of higher performance CPU to run this player. (Mi 6 / Mix2 and advanced types, Samsung S8 and advanced types, Huawei mate 10 / P20 and advanced types)

2. Connect your Android phone with your computer by using tools such as Android Transfer to import vrb files that have been converted in computer into your Android phone directory under the Insta360Moment/.

3. Reopen the Insta360Moment app, refresh the content list and click on newly added content to play.

iOS Insta360 Moment player:

1. IOS devices using A11 and above are recommended to run this player. (iPhone 8 and higher models). Open iTunes software on your computer and connect your computer with your iOS device.

2. Select to enter your iOS device at the iTunes interface.

3. Locate the IMPORT folder of Insta360Moment under the "File Sharing" directory.

4. Create a folder called "IMPORT" on your computer and copy the converted vrb file into this directory.

5. Copy the "IMPORT" folder that has been added new content to iTunes, under "File sharing" directory of Insta360Moent/IMPORT, to replace with the folder. Content that has been added can no longer be added again.

6. Reopen Insta360 Moment app, refresh the content list and click on newly added content to play.

GearVR Insta360 Moment:

1. Currently, it is recommended to use Snapdragon 835, Exynos 8895, Samsung mobile phones of higher performance CPU to run this player. (Samsung S8 and advanced types)

2. Install Oculus Home on Samsung phones and download Insta360 Moment in app store, click open to run the app.

3. Connect your Samsung phone and computer by using tools such as Android Transfer to import converted vrb files on the computer into your Samsung phone under the directory of Insta360Moment/.

4. Click on Insta360 Moment in Oculus Home, insert Samsung phone according to hints and install it into GearVR to play.

Oculus Go Insta360 Moment:

1. Search Insta360 Moment in app store on Oculus Go, click open to run the app.

2. Connect your Oculus Go with computer by using Android Transfer tools, and import converted vrb files to nsta360Moment/ under Oculus Go directory.

3. Open Insta360 Moment in Oculus Go, refresh content list click on newly added content to view.

Compatibility List

Platform	CPU Model (support expanded continuously)	Phone Model (devices added continuously)
Samsung GearVR	Snapdragon 845	Galaxy S9/S9+ Galaxy Note9
	Snapdragon 835	Galaxy S8/S8+
	Exynos 8895	Galaxy S8/S8+

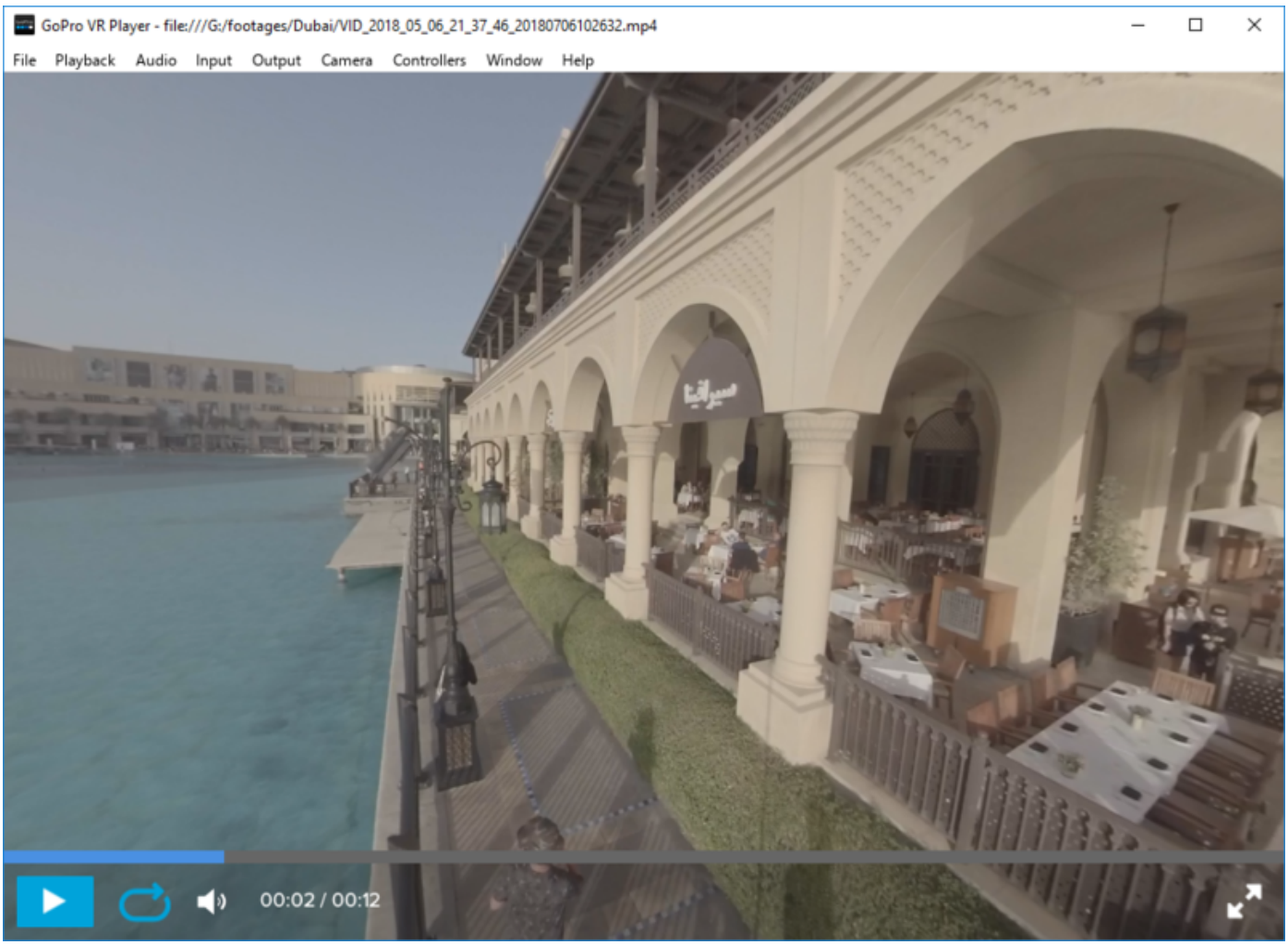
		Galaxy Note 8
	· The Exynos 9810 CPU on Galaxy S9/S9+ and Galaxy Note9 doesn't use standard CPU architecture. The performance of Exynos 9810 is not stable enough to support the playback of 8K video. Problems such as video lag and fragments may occur. Therefore, it's not recommended to play 8K video on devices that use an Exynos 9810 CPU.	
iOS	A11	iPhone X iPhone 8 iPhone 8 Plus
	A12	iPhone XS iPhone XS Max iPhone XR
Android	Snapdragon 845	Galaxy S9/S9+/Note 9 Xiaomi 8 Xiaomi MIX 2S One Plus 6 OPPO Find X Google Pixel 3/Pixel 3 XL
	Snapdragon 835	Galaxy S8/S8+/Note8 Xiaomi 6 Xiaomi MIX 2 One Plus5/5T Google Pixel 2/Pixel 2 XL
	Exynos 8895	Galaxy S8/S8+ Galaxy Note 8
	· The Exynos 9810 CPU on Galaxy S9/S9+ and Galaxy Note 9 doesn't use standard CPU architecture. The performance of Exynos 9810 is not stable enough to support the playback of 8K video. Problems such as video lag and fragments may occur. Therefore, it's not recommended to play 8K video on devices using an Exynos 9810 CPU, however, 6K video is supported.	
	Kirin 970	HUAWEI Mate 10 HUAWEI Mate 10 Pro HUAWEI Mate 10 Porsche Design Honor V10 HUAWEI P20 Honor 10 Honor Note 10
	Kirin 980	HUAWEI Mate 20 HUAWEI Mate 20 Pro Honor Magic 2
OculusGo	· Oculus Go uses a Snapdragon 821 CPU. Its performance is not stable enough to support the playback of 8K video. Oculus Go gets hot while playing 8K video, which may cause issues such as video lag and fragmenting. Therefore, it's not recommended to play 8K video on the Oculus Go, but it can be used to play 6K video.	

3.4.3 [Beginner] Introduction to other players (Gopro VR Player & PotPlayer)

Since Insta360 Player has resolution limits, it can only play general panorama video of H264 encoding below 4K. If panoramic video is exported to be other formats, other players need to be used to play. Currently, desktop player of Gopro Player PotPlayer and PotPlayer support panoramic video well.

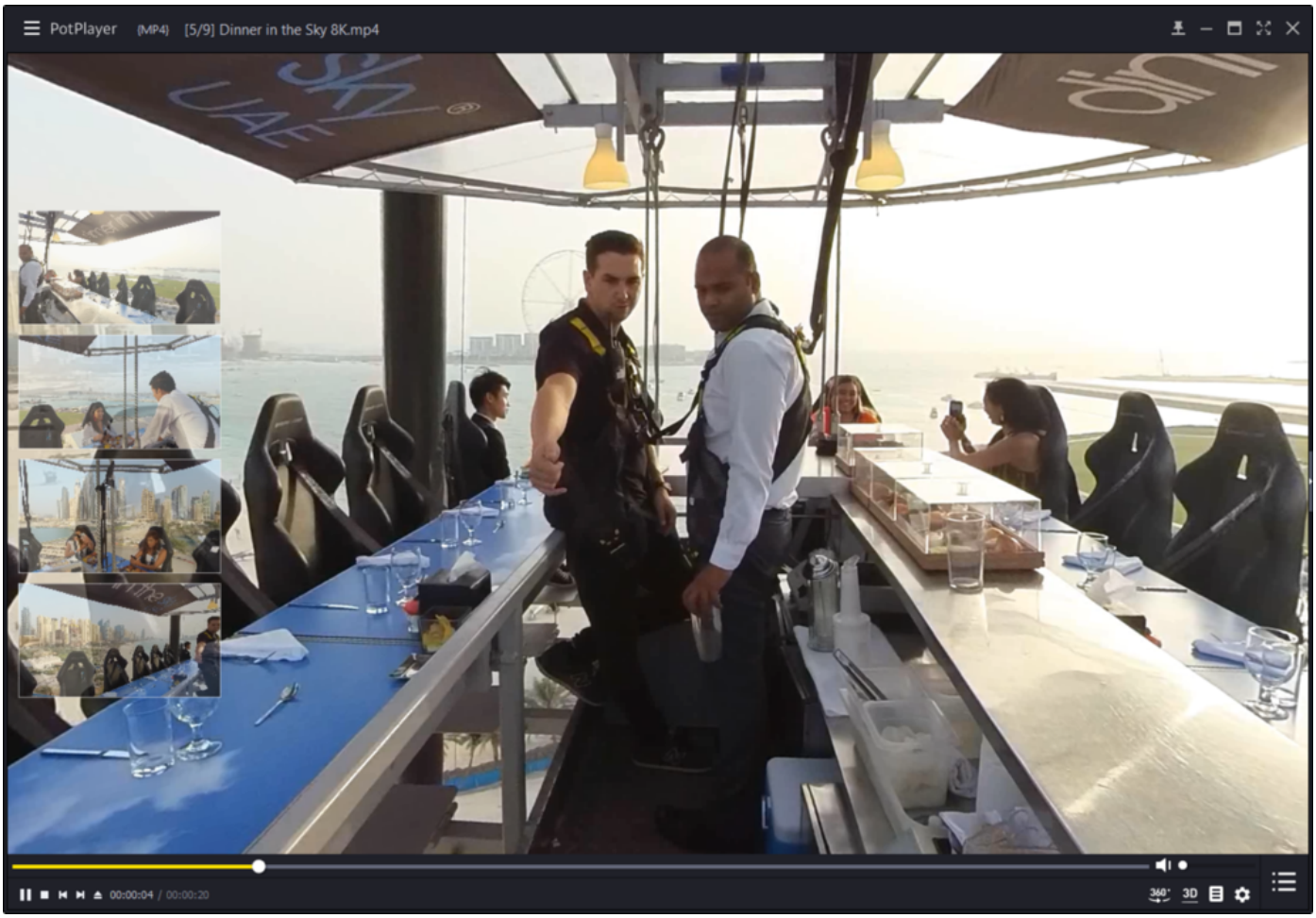
Gopro VR Player supports OS X and Windows.

http: //www.kolor.com/gopro-vr-player



Windows can also use PotPlayer to play.

http: //potplayer.daum.net/?lang=zh_CN



3.4.4 [Advanced] Upload to various VR platforms

Currently most video platforms have supported uploading panoramic videos, including Youku iQIYI, Tencent video , and VR content platform, UtoVR, VeerVR, etc.

However, it is worth noting that some platforms do not support 3D video, and some have requirement on the video minimum resolution. Please refer to the specific description of videos that are supported.

Support for viewing on PC: Youku, iQIYI, UtoVR, VeerVR.

Supporting mobile terminal: Youku, iQIYI, Tencent Video, UtoVR, VeerVR

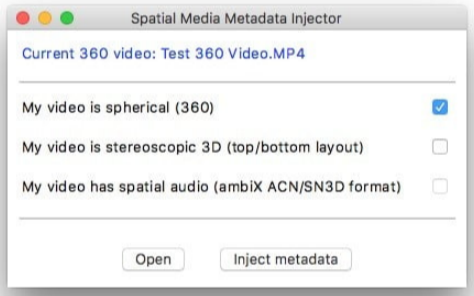
Overseas platforms are represented by YouTube, Facebook and Vimeo, support VR video.

YouTube upload instructions: https: //support.google.com/youtube/answer/6178631?hl=en

YouTube supports uploading panoramic videos, 3D videos, panoramic videos with panoramic views.

To upload panoramic video to YouTube must write Metadata including panoramic information into the video in advance. If it is rendered and exported from clipping software, such as Premiere, you must check VR settings when you exporting.

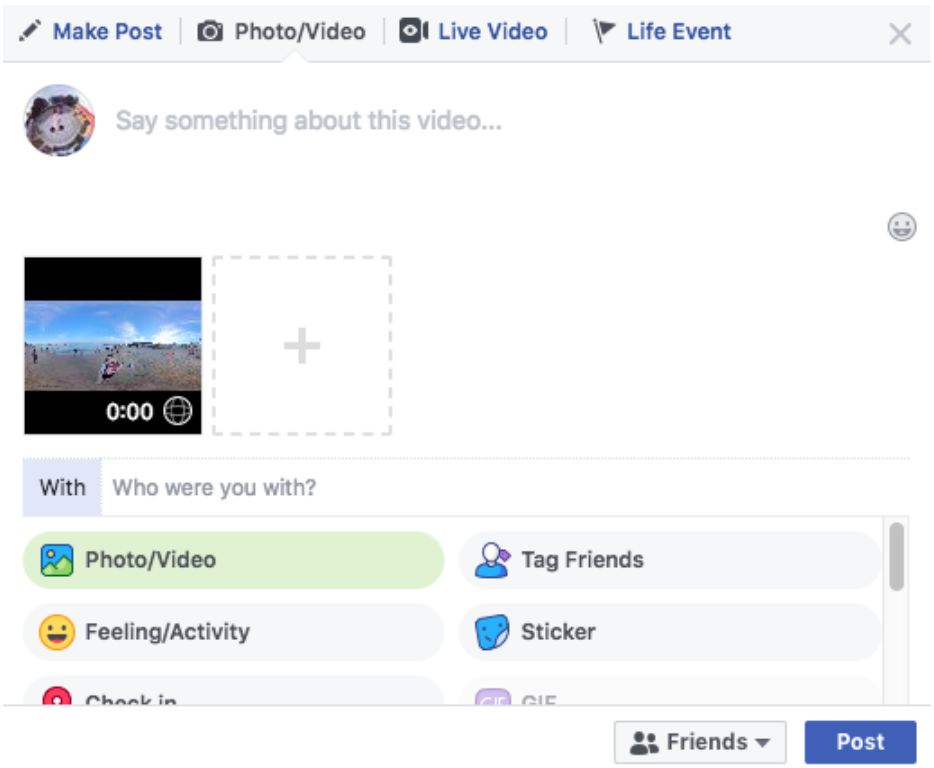
This allows you to directly upload the video without writing Metadata through Spatial Media Metadata Injector.



Facebook upload instructions:

https: //www.facebook.com/help/828417127257368

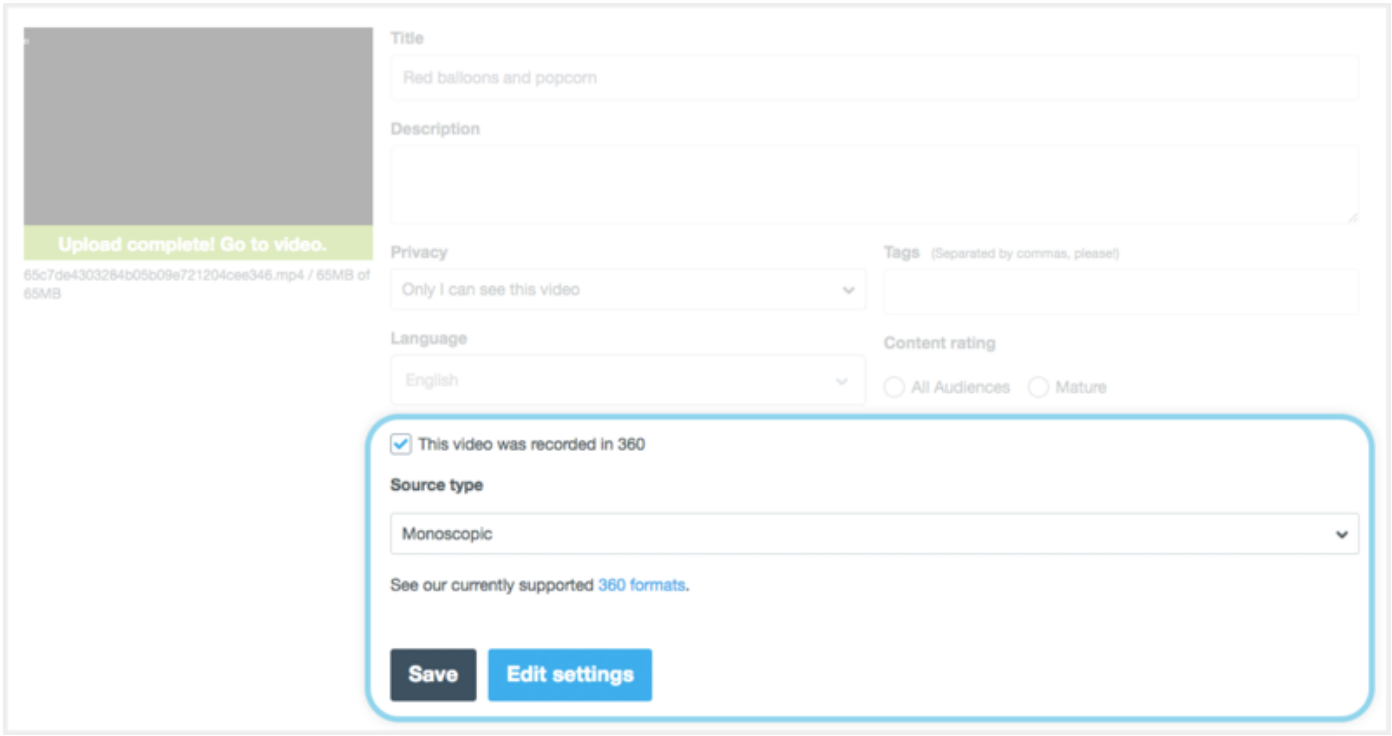
To upload panoramic videos onto personal homepage of Facebook, you write Metadata including panoramic information in the videos in advance. If you have already exported the video by using the VR mode in the editing software, you can upload the panoramic video like other videos.

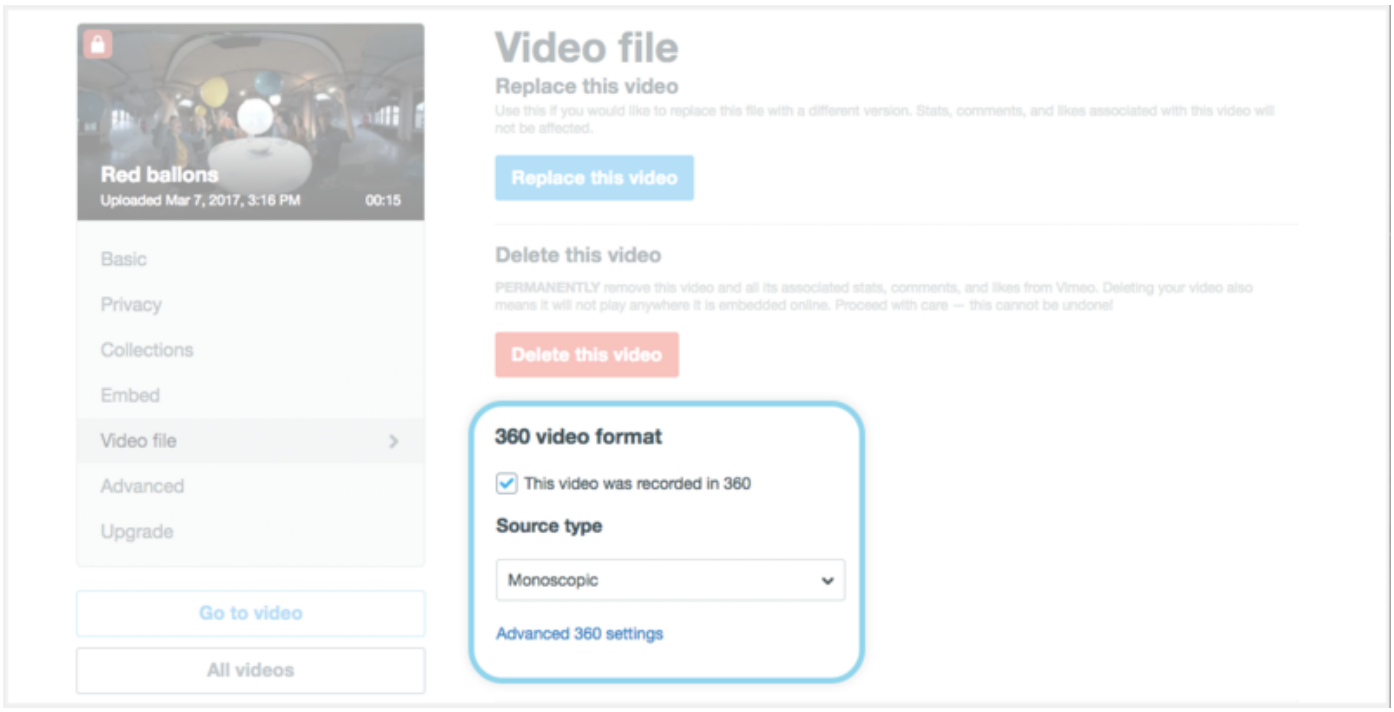


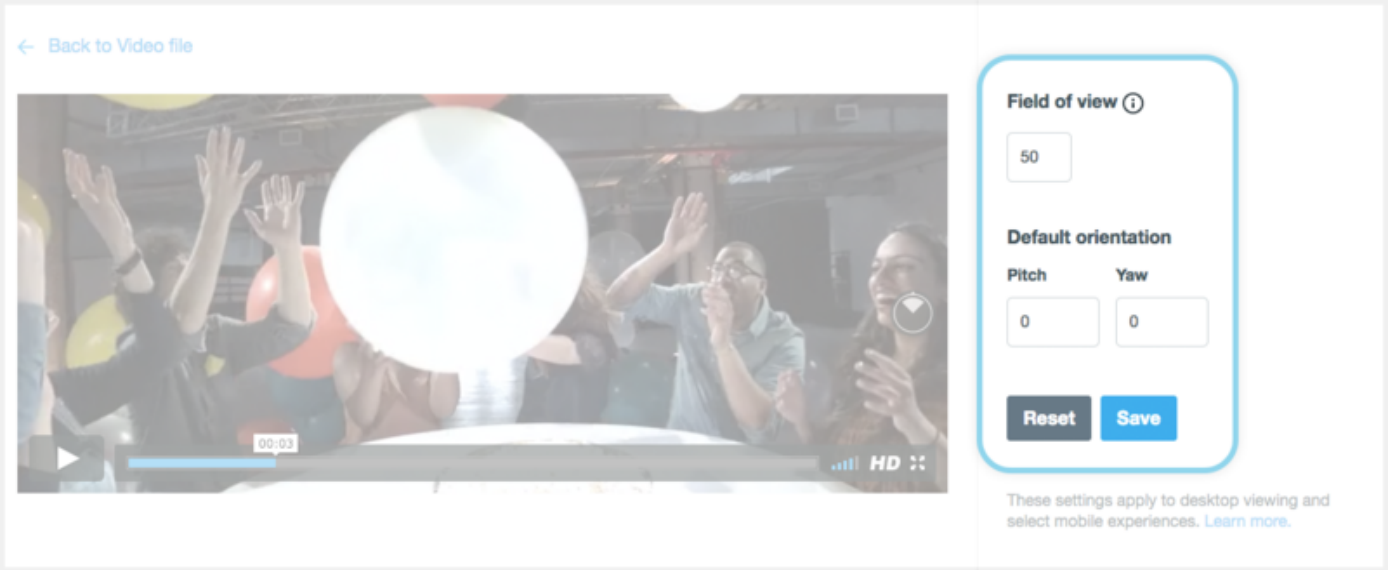
Vimeo upload instructions:

https: //help.vimeo.com/hc/en-us/articles/115001877167-Uploading-360-video

Vimeo can upload panoramic videos with Metadata the same as Youtube, and can have 360 settings after upload. There are also more humanized functions such as setting up fov, first view etc.


Upload complete! Go to video.
65c7de4303284b05b09e721204cee346.mp4 / 65MB of 65MB
Title
Red balloons and popcorn
Description
Privacy
Only I can see this video
Tags (Separated by commas, please!)
Language
English
Content rating
All Audiences
Mature
This video was recorded in 360
Source type
Monoscopic
See our currently supported 360 formats.
Save
Edit settings


Red ballons
Uploaded Mar 7, 2017, 3:16 PM
00:15
Basic
Privacy
Collections
Embed
Video file
Advanced
Upgrade
Go to video
All videos
Video file
Replace this video
Use this if you would like to replace this file with a different version. Stats, comments, and likes associated with this video will not be affected.
Replace this video
Delete this video
PERMANENTLY remove this video and all its associated stats, comments, and likes from Vimeo. Deleting your video also means it will not play anywhere it is embedded online. Proceed with care — this cannot be undone!
Delete this video
360 video format
This video was recorded in 360
Source type
Monoscopic
Advanced 360 settings

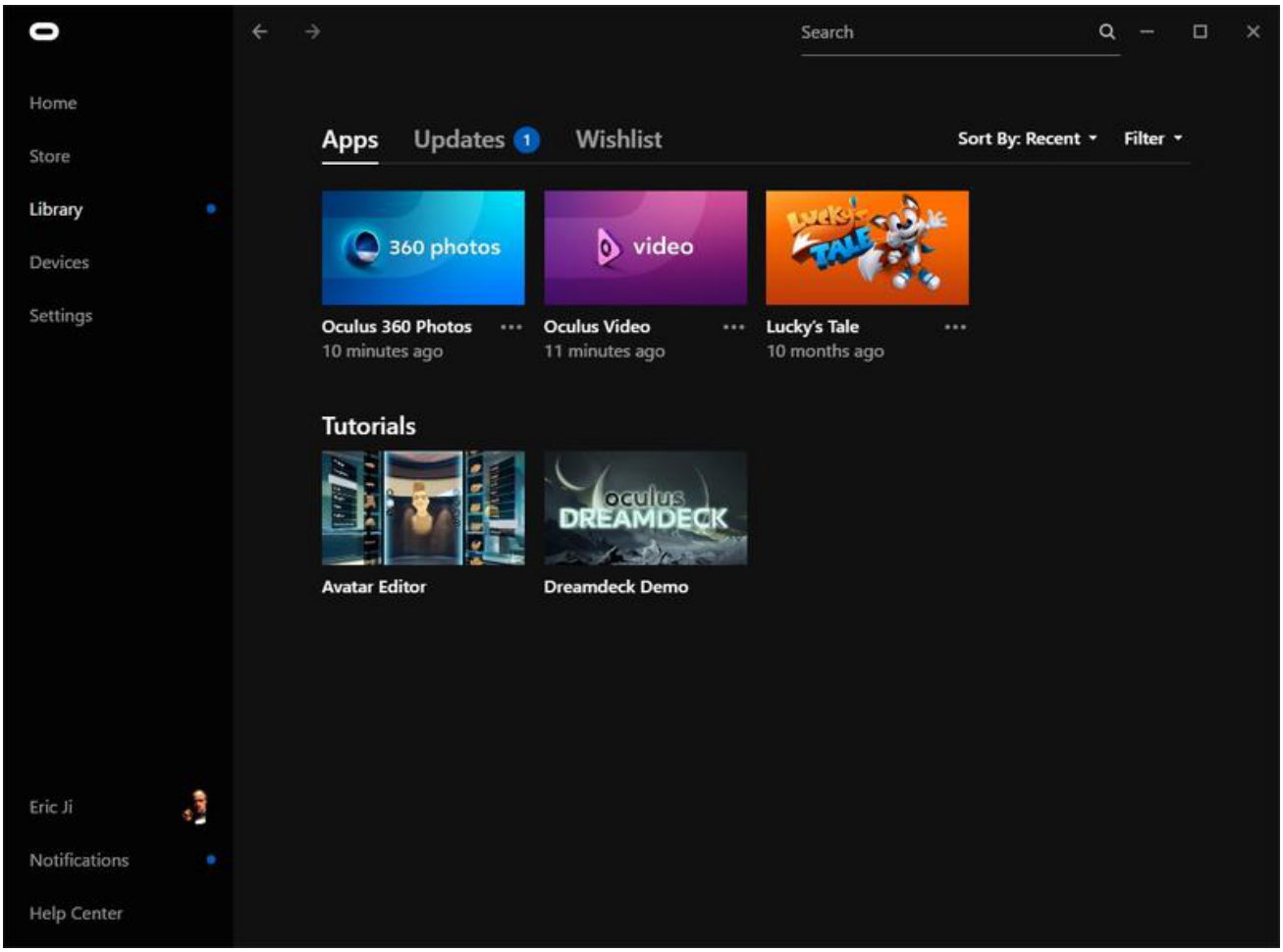


3.4.5 [Advanced] Introduction of VR headset for photo playback (about VR glasses)

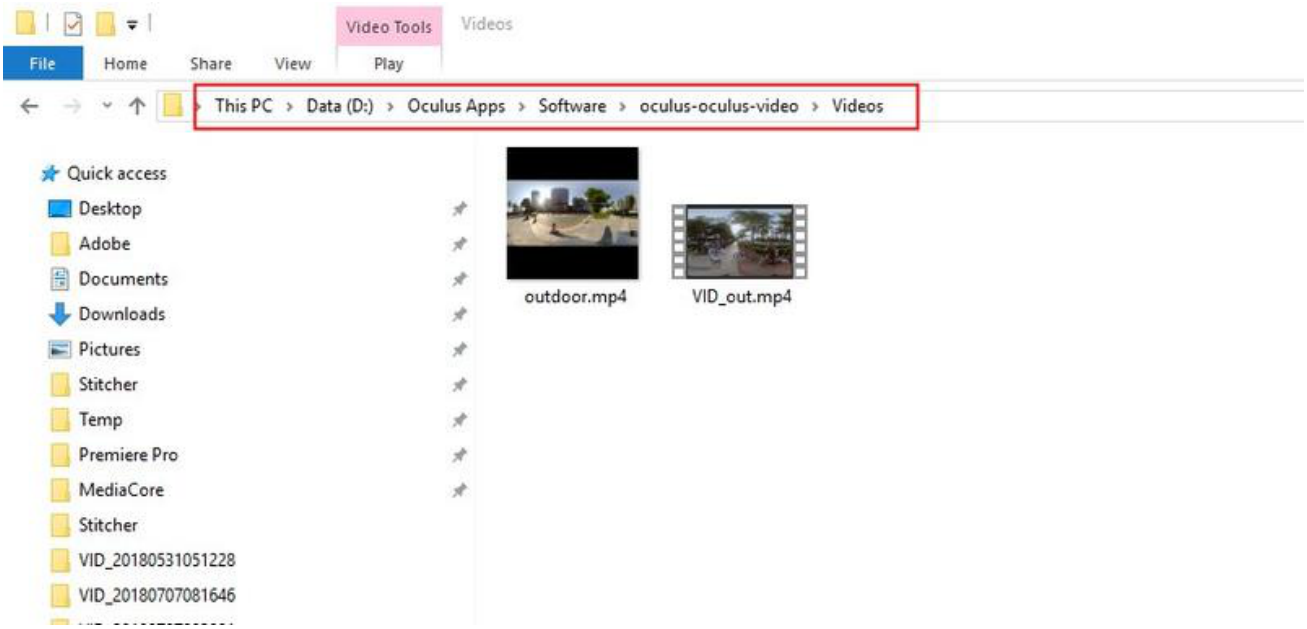
Almost all the VR headsets currently support panoramic photos and videos. A few VR headsets can view panoramic live via specific players. We will illustrate how to import panoramic content into these devices by using three different types of VR head devices, including Oculus Rift CV1, GearVR+S9, Oculus Go.

- **Import content in Oculus Rift CV1**

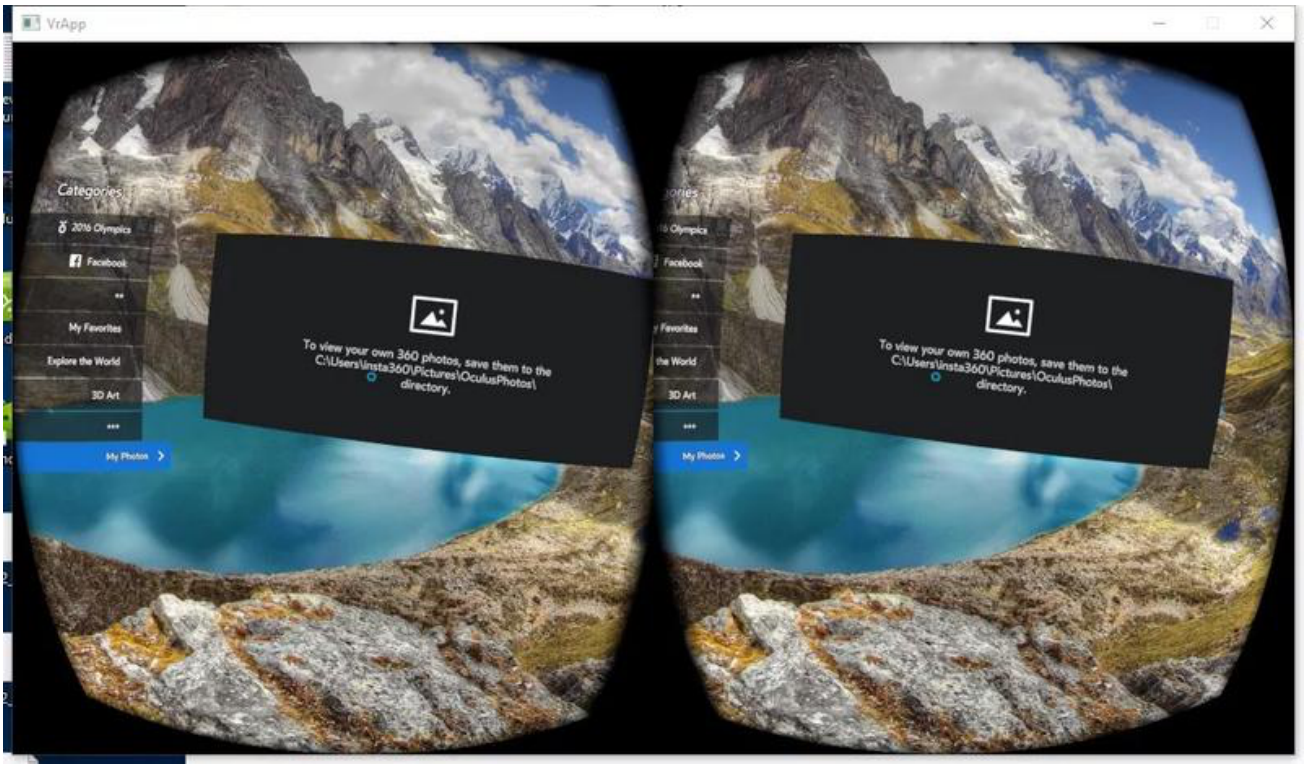
    1. On your computer connected to Oculus Rift CV1, open Oculus application interface, search for and install two applications, including Oculus Video and Oculus 360 Photos.



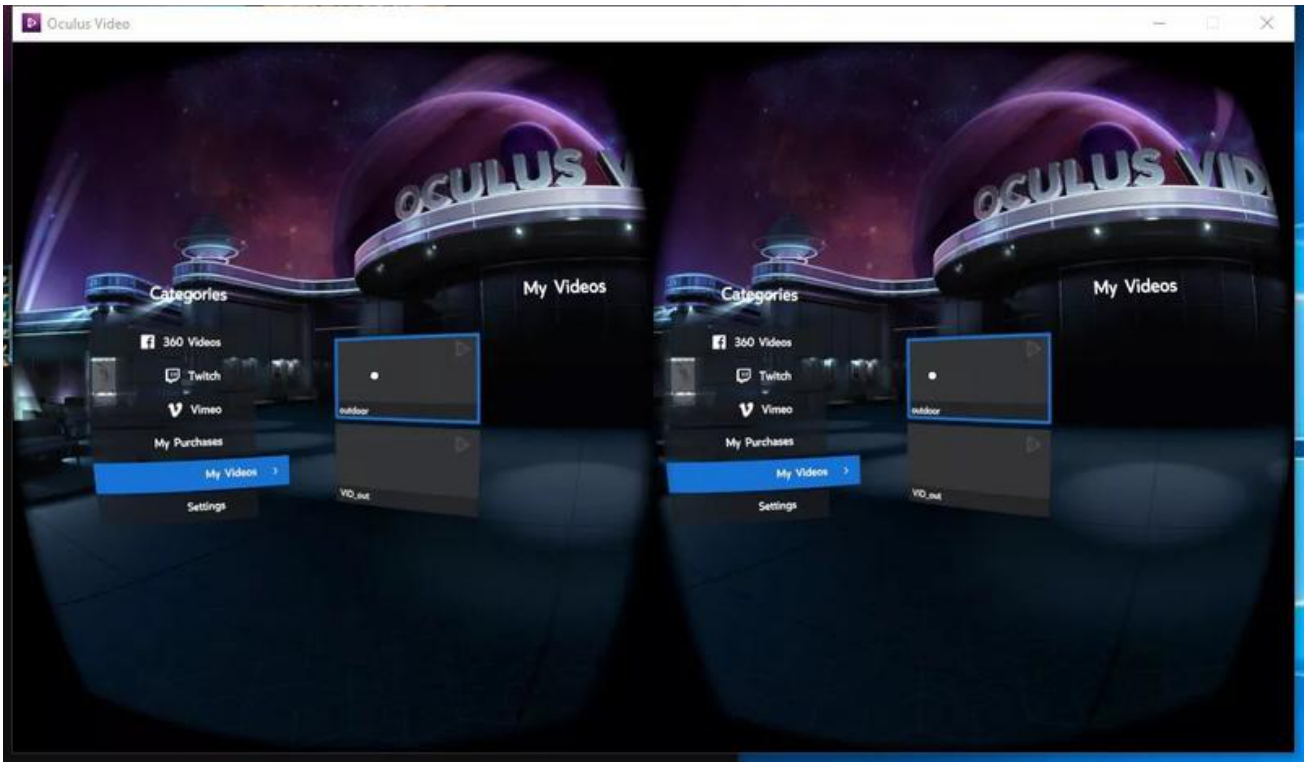
2. After installing two applications, create a new “Videos” folder under the Oculus apps installation directory /Software/oculus-oculus-video, and copy the panorama video you want to play to this folder directory.



The default photo path for 360 Photo is “C: \ Users\ Username\ Pictures\ OculusPhotos\” , so you can import the panorama photos to be played below this path.



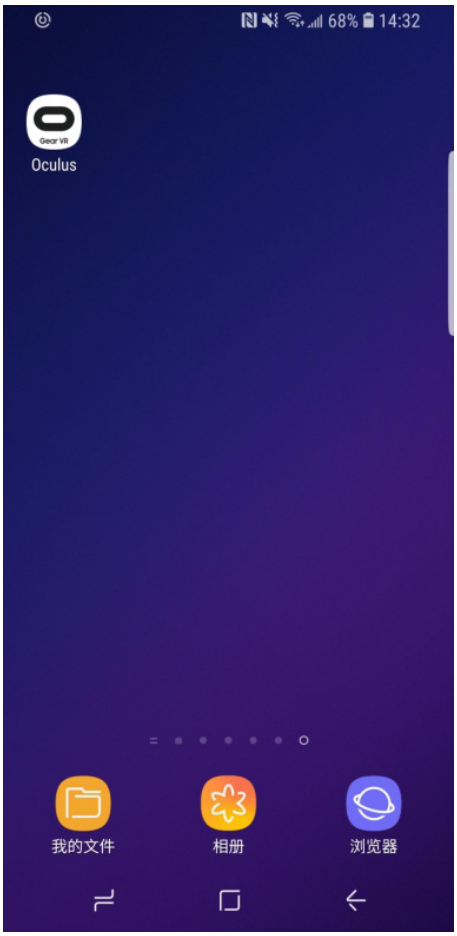
Wearing Oculus Rift CV1, open Oculus Video and Oculus 360 Photos in the screen displayed, and see videos and photos imported just now in the My Videos and My Photos categories respectively.

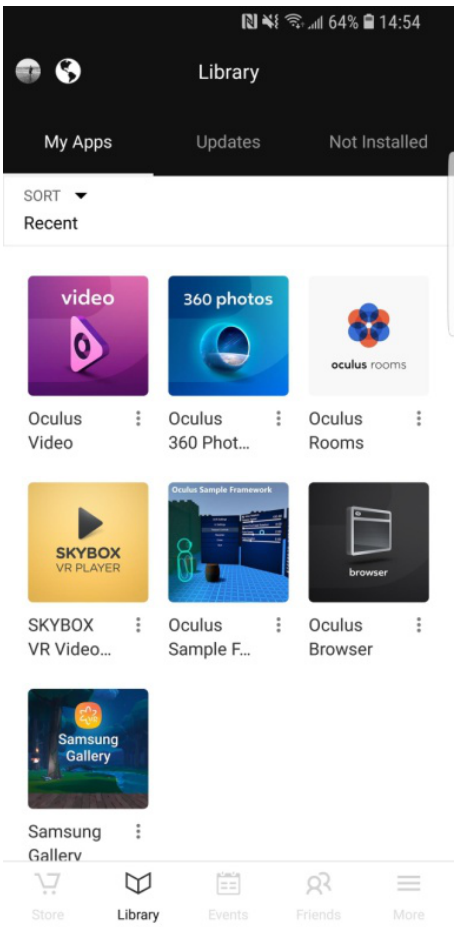


3. Currently there is no application that supports broadcasting rtmp streaming on this platform.

- **Import content in GearvR machine**

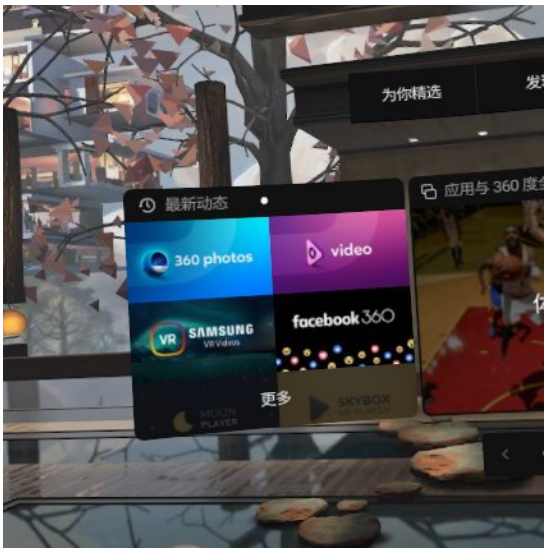
1. Install Oculus Home applications in matched Samsung mobile phone with GearVR. And install download Oculus 360 Photos, Oculus Video on this application platform.





2. Import the panorama photos and videos you want to play in your phone’s storage directory under / Oculus / Pictures / or / Oculus / Movies/.

3. Insert mobile phone into GearVR to watch, operate GearVR headset to open 360 Photos or 360 Video in VR and finds My Photos or My Videos menu to watch what has just been imported.



4. Currently, GearVR supports panoramic video with resolution less than 4096x2048 and 3D panoramic video of 4000x4000. Photo resolution is unlimited.

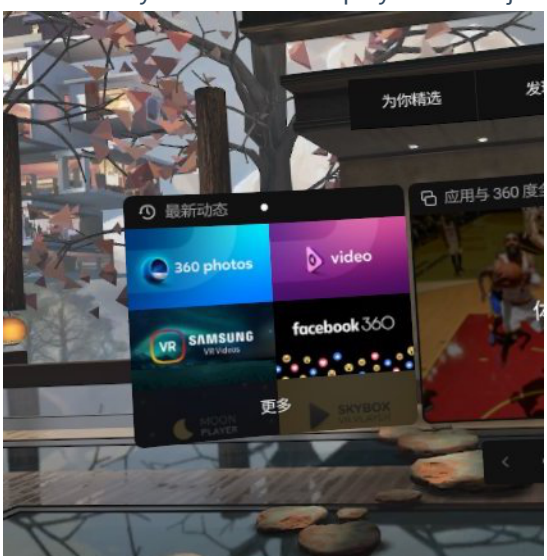
5. Currently, there is no application that supports broadcasting rtmp live streaming on this platform.

- **Import content in Oculus Go**

1. Install Oculus Home applications on your phone with Oculus Go account settings. Download and install Oculus 360 Photos, Oculus Video on this application platform. After downloading, these two applications will be installed directly into Oculus Go.

2. Connect Oculus Go to your computer and import your panorama photos and videos into Oculus Go storage directory under / Pictures / or / Movies /.

3. Open Oculus 360 Photos or Oculus Video in the VR by operating the Oculus Go headset, and you can find My Photos or My Videos menu to play what has just been imported.



4. Currently, Oculus Go supports panoramic video with resolution less than 4096x2048 and 3D panoramic video of 4000x4000. Photo resolution is unlimited.

5. Currently, there is no application that supports broadcasting rtmp live streaming on this platform.

4.1.1 [Beginner] Basic preparation for shooting

1. Insta360 Pro
2. Tripod
3. Recording equipment
4. Computer or mobile phone
5. Multi interface router
6. Cable and power supply equipment
7. 4G router (optional)

4.1.2 [Beginner] Selection of accessories for live-streaming

1. Choice of tripod: recommend to use tripod special for VR with 1/4 port.
2. Recording equipment: H2N, 3.5 mm port microphone, USB port microphone, mixer, wireless microphone.
3. Manipulating device: computers with cable interface or adapter cable interface, phones installed with Insta360 Pro app.
4. Network: exclusive network line of 20 megabytes above.
5. Wireless Network card: with network port. (Note: the network speed may slow down when there are many people around.)

4.1.3 [Beginner] Connection and Stitching Calibration before live-streaming

Connection:

Connect your computer or mobile phone to Insta360 Pro in the same LAN, and here is how to connect:

1. Connect via cables:

   (1) Connect external network to router.

   (2) 2 Lines are separated from the router, with one connecting to Insta360 Pro, and the other connecting the computer (if external network connection succeeds, IP address on Insta360 Pro will not appear as either 0.0.0.0 or 192.168.43.1, otherwise, the connection fails).

   (3) Input IP address displayed on Insta360 Pro to complete the connection.

   (4) Complete settings for your live-streaming.

2. Wireless connection of router:

   (1) Connect external network to the WIFI router.

   (2) Separate one network cable to connect Insta360 Pro (if external network connection succeeds, the IP address on Insta360 Pro will not appear as either 0.0.0.0 or 192.168.43.1, otherwise, the connection fails.)

   (3) Connect a mobile phone or computer via WIFI to the WI-FI router that has connected to Insta360 Pro. Input ID address displayed on Pro for connection.

   (4) Complete settings for your live-streaming.

3. 4G Wireless card connection:

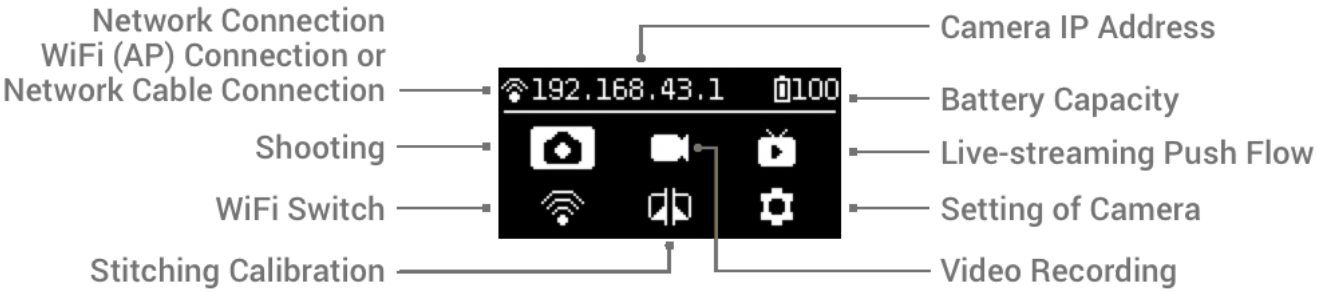
   (1) Connect the 4G router via cable to Insta360 Pro (if external network connection succeeds, IP address on Insta360 Pro will not appear as either 0.0.0.0 or 192.168.43.1, otherwise, the connection fails).

   (2) Connect a mobile phone or computer via WIFI to the 4G Wireless card that has connected to Insta360 Pro. Input ID address displayed on Pro for connection.

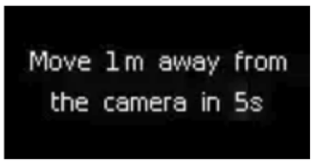
   (3) Complete settings for your live-streaming.

Stitching Calibration:

Camera's internal stitching effect depends on specific shooting scene. For example, cameras‘ shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)

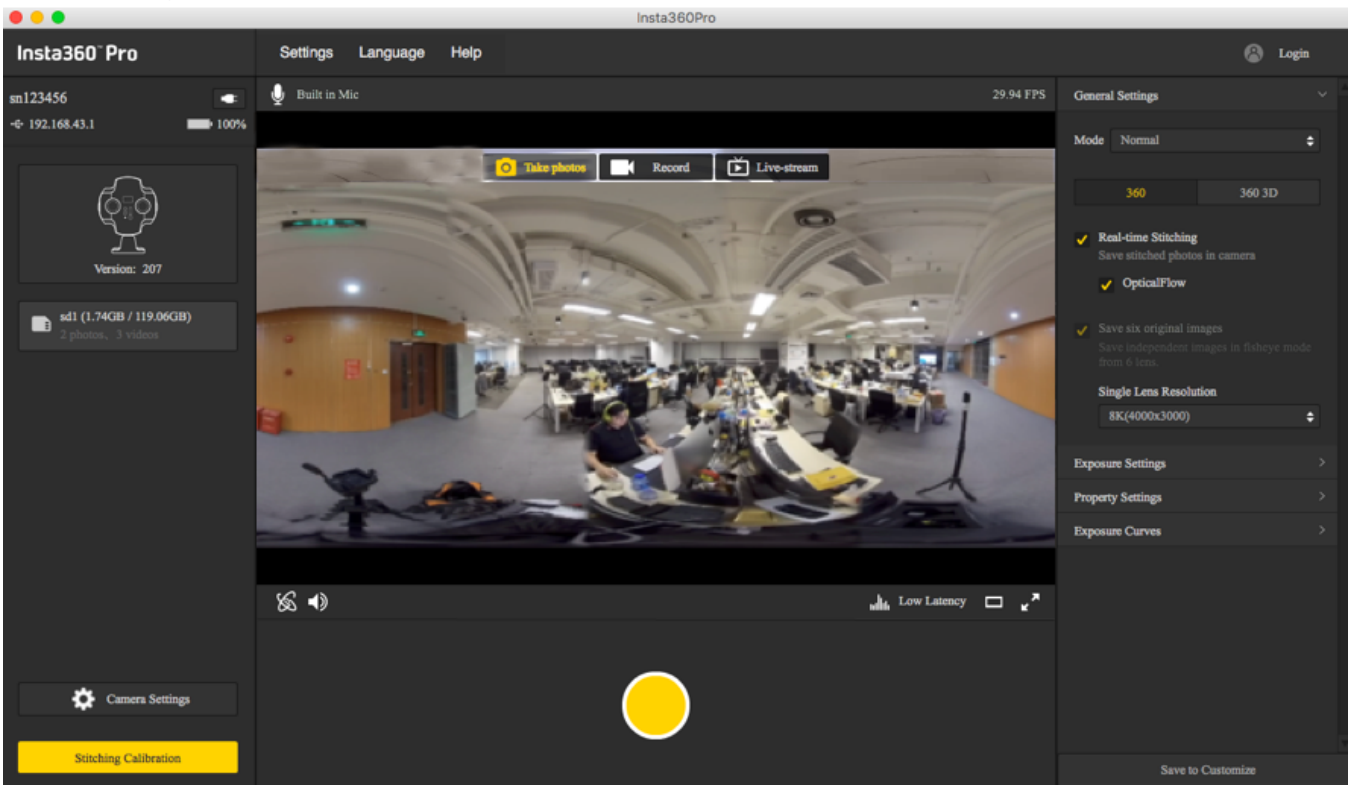


Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

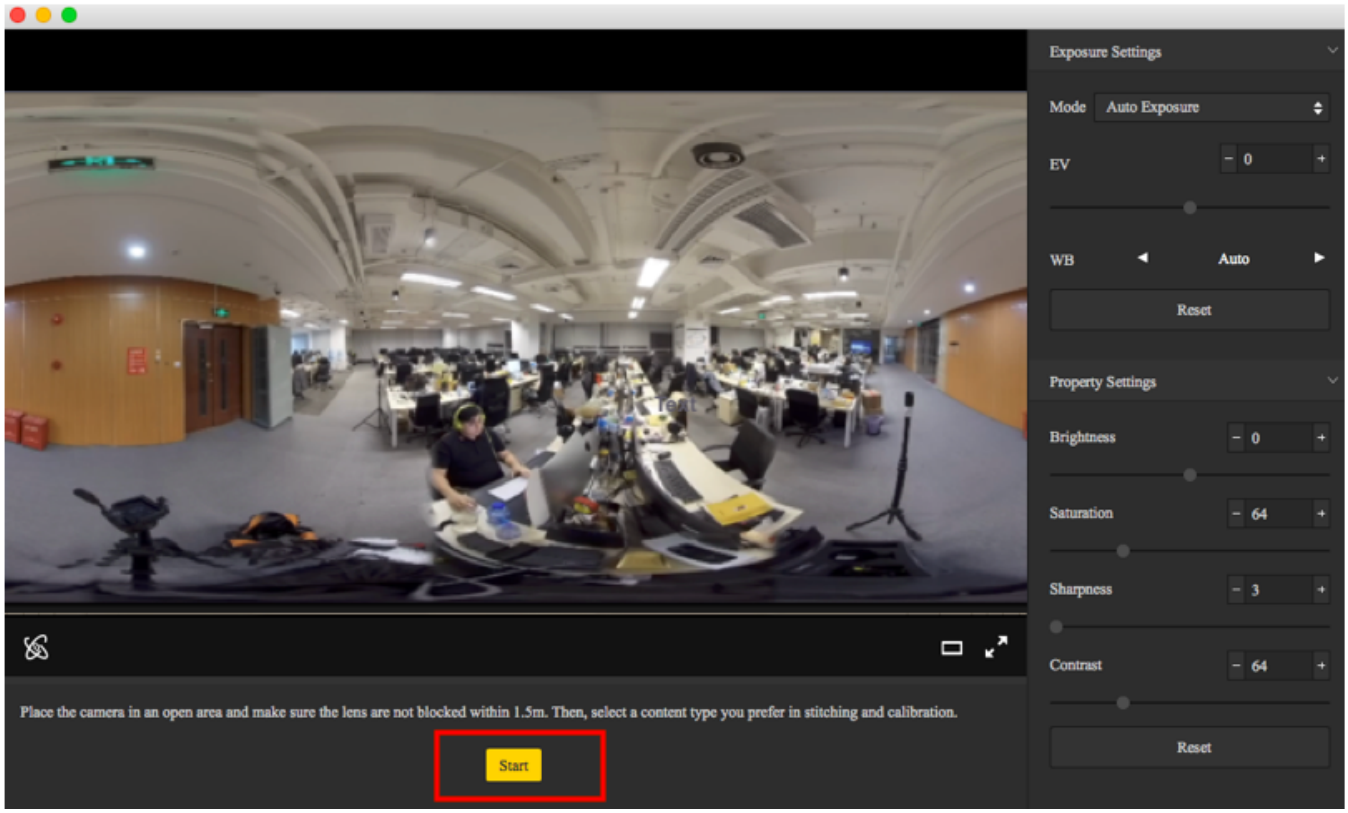


Or use "Stitching Calibration" function on computer:

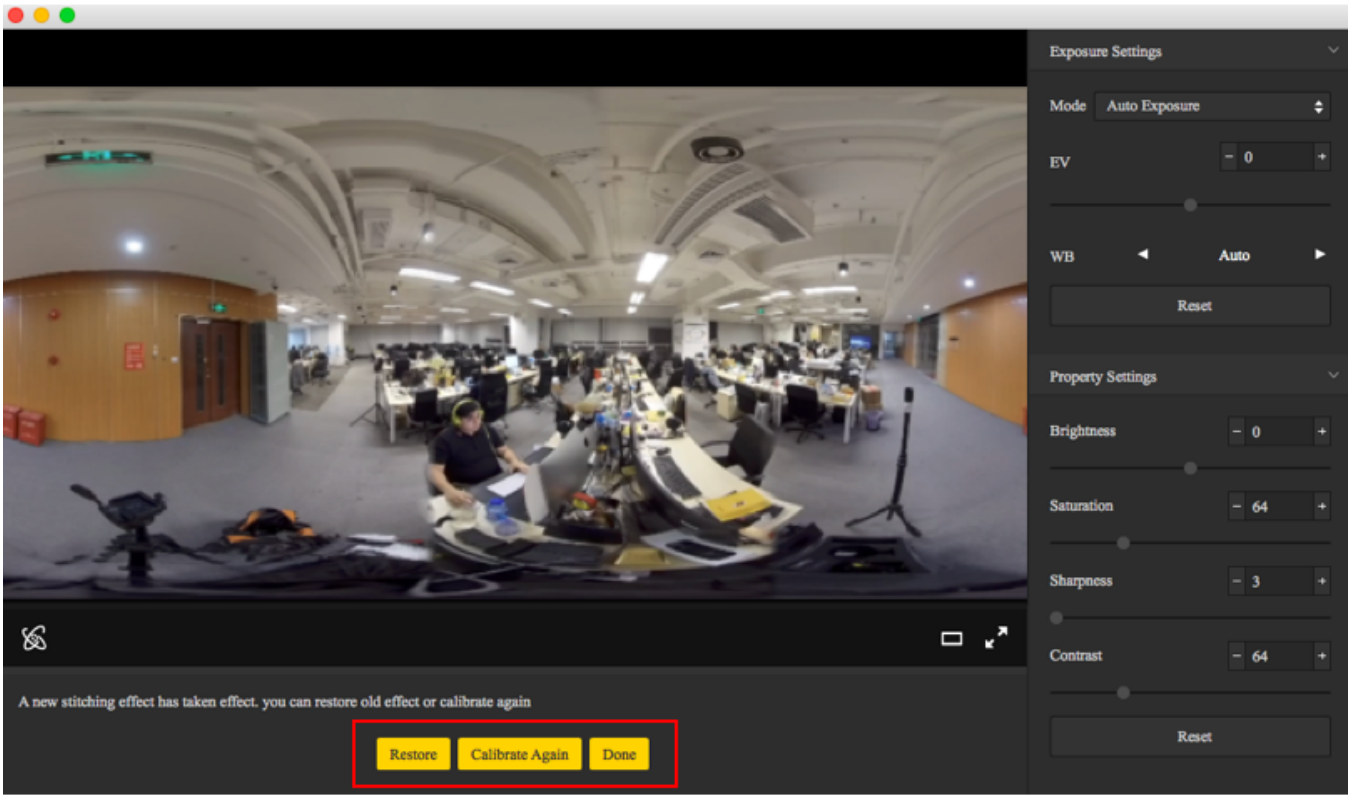
1. Click “Stitching Calibration”



2. Click “Start”

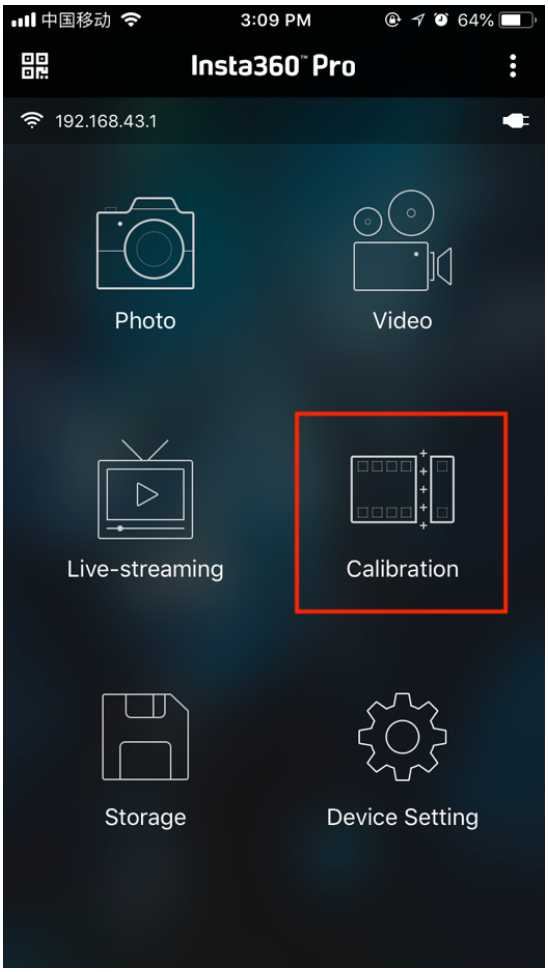


3. After stitching calibration, select the option you need. If there’s no problem, click "Done".

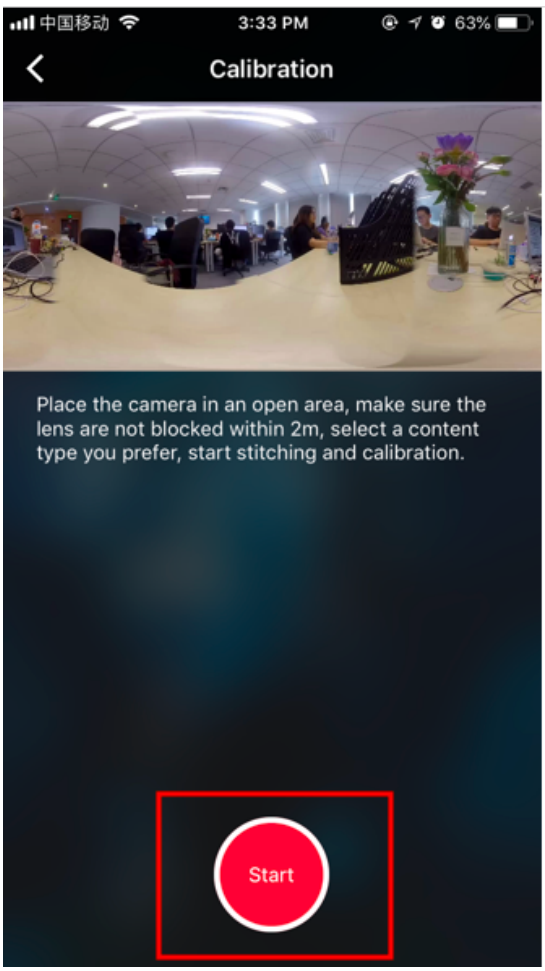


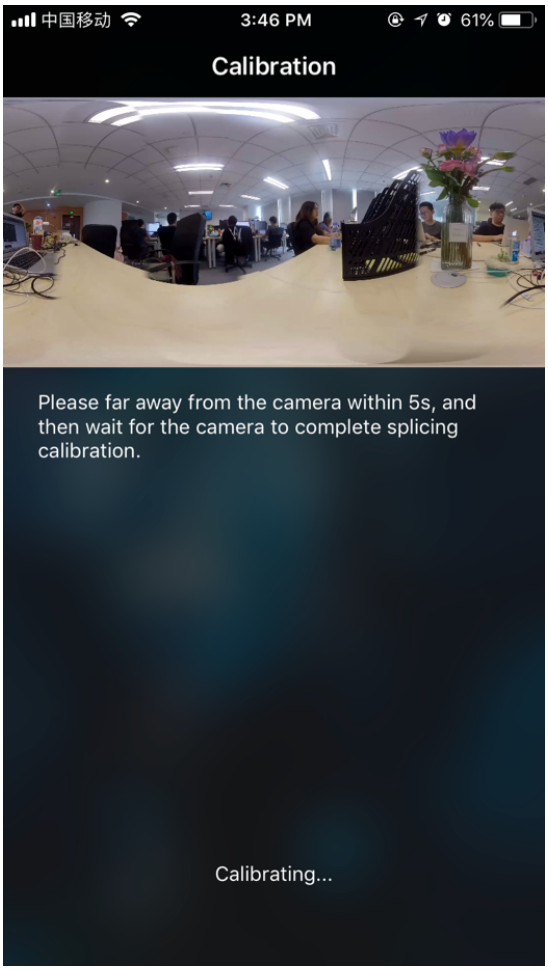
Use "Calibration" function on mobile phone:

1. Click “Calibration” after connecting Pro to the mobile phone.

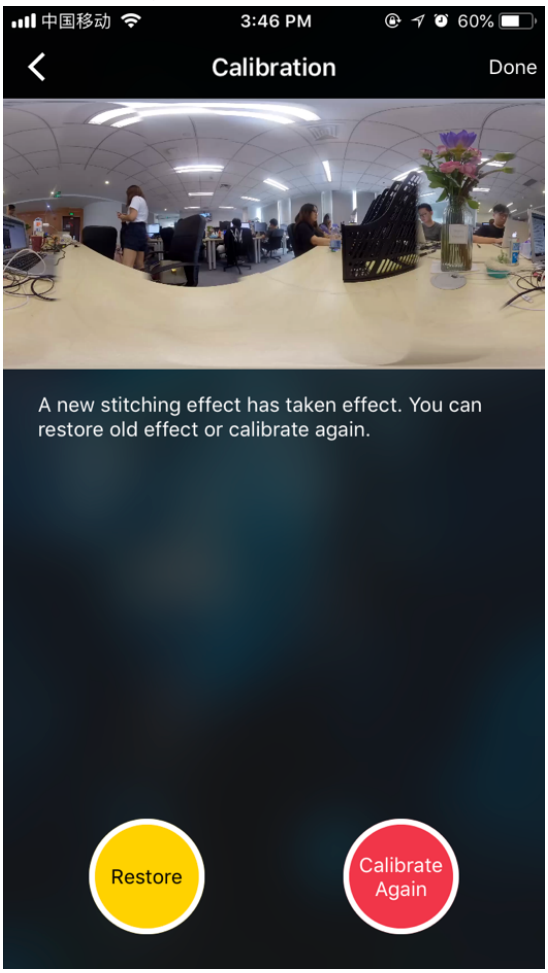


2. Click “Start”





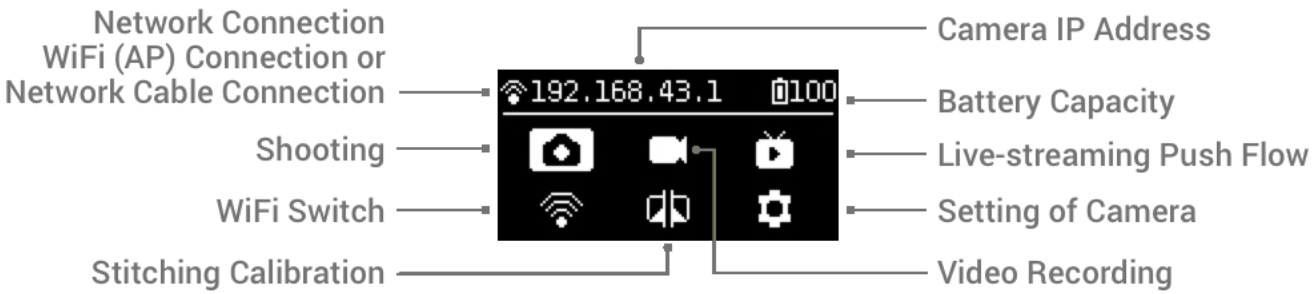
3. After stitching calibration, select the option you need. If there’s no problem, click "Done".



4.1.4 [Intermediate] Preparation of 4G network Live-streaming (Outdoor live-streaming)

1. Connect 4G wireless card via network cable to Pro.
2. If the connection succeeds, the IP address on Pro does not appear as either 192.168.43.1 or 0.0.0.0.
3. Computer or phone connect the WI-FI signal issued by 4G WI-FI network card.
4. Open app and input the IP address displayed on Pro.
5. Start **Stitching Calibration:**

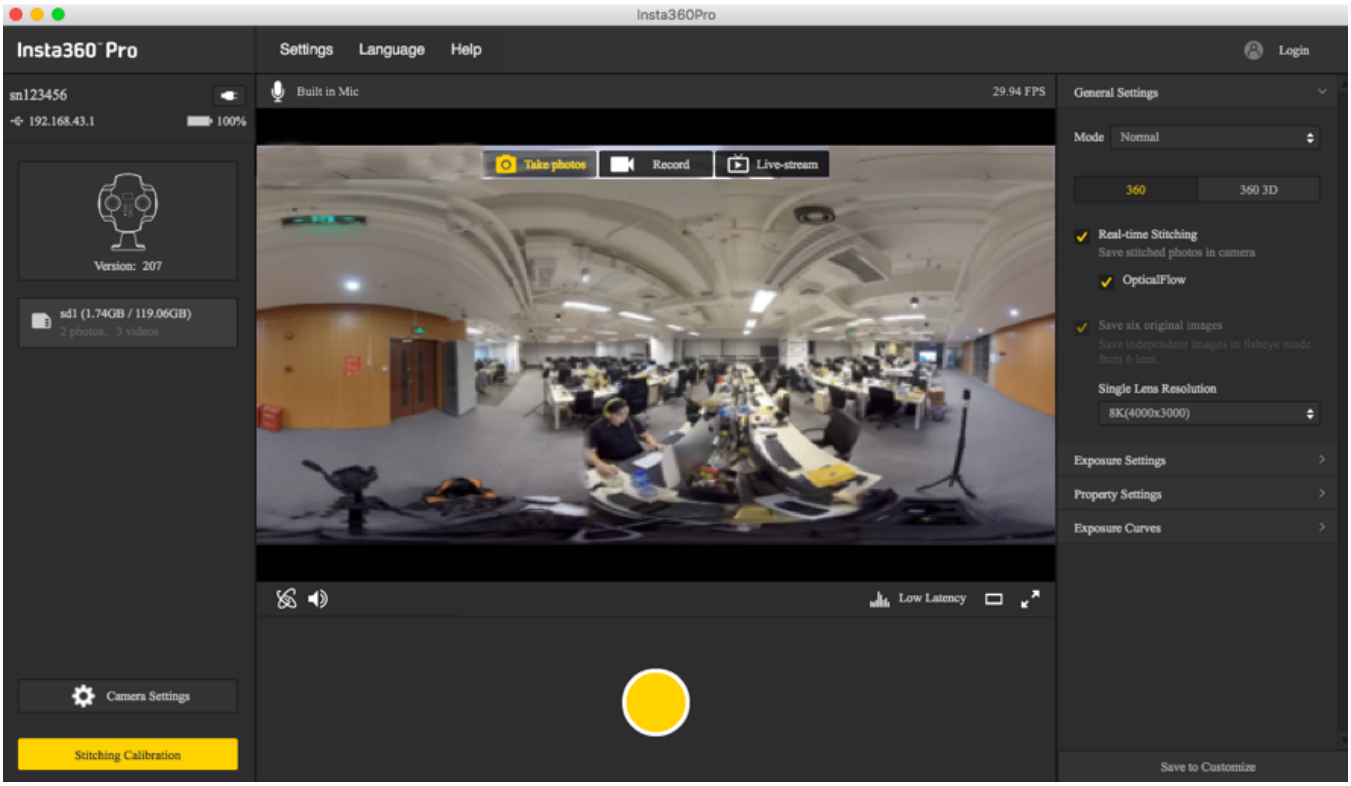
   Camera's internal stitching effect depends on specific shooting scene. For example, cameras‘ shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)



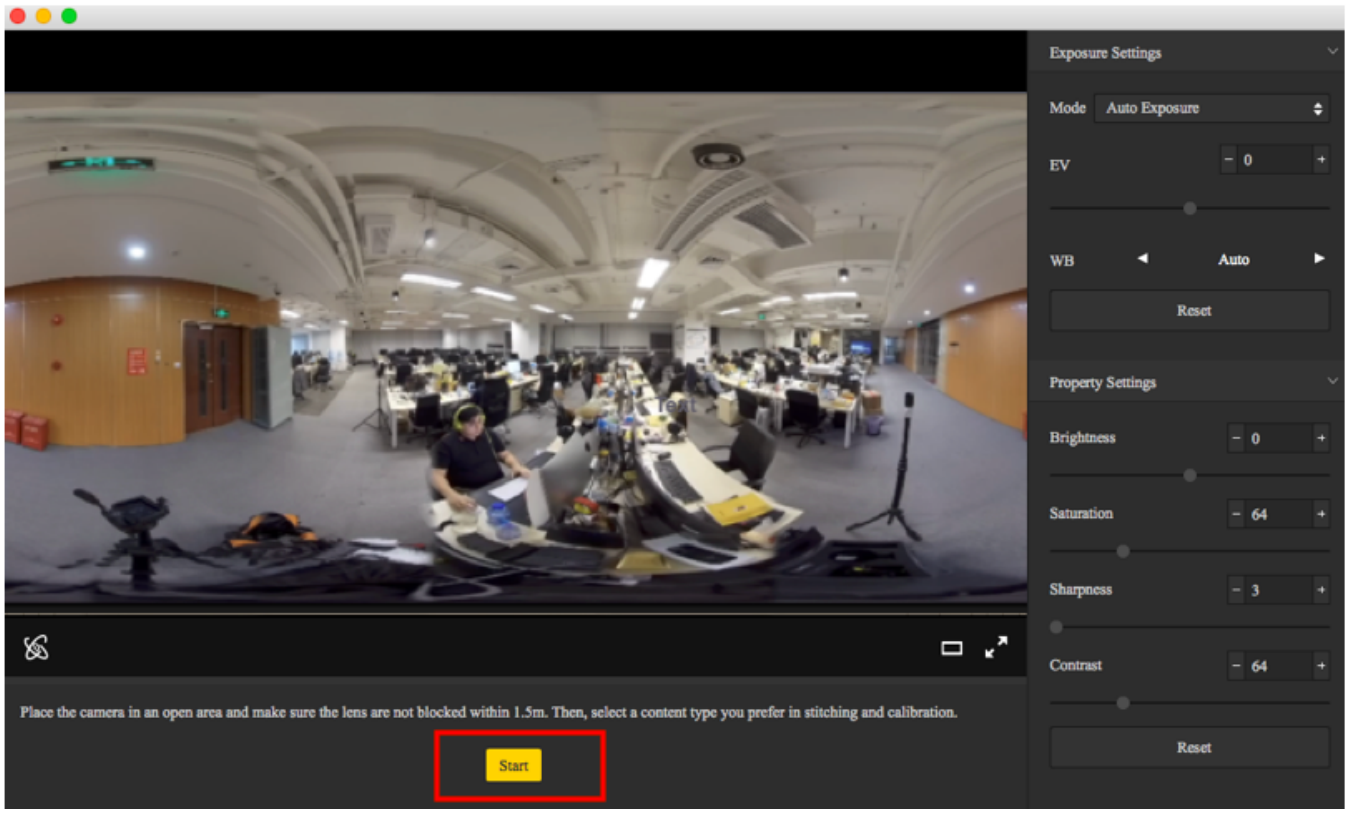
   Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

   Or use "Stitching Calibration" function on computer:

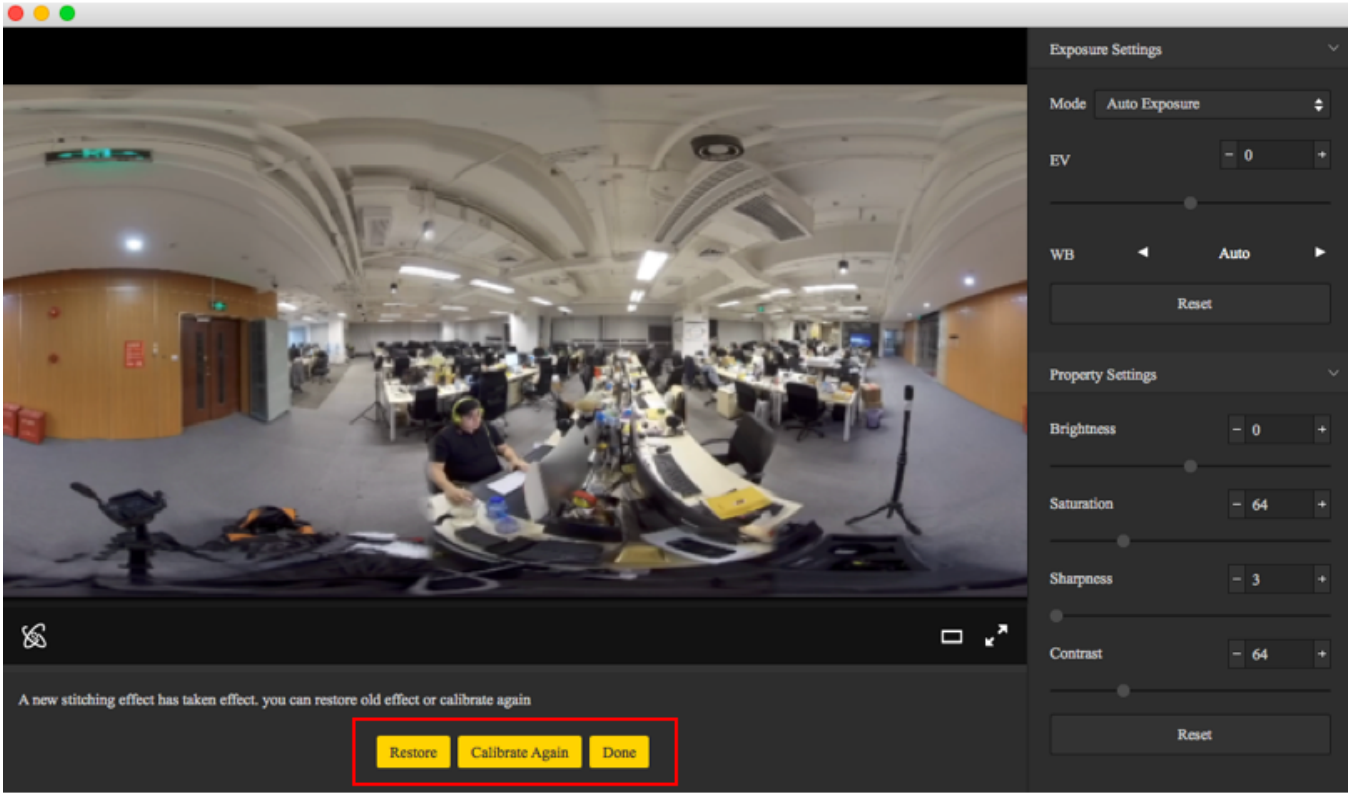
(1) Click “Stitching Calibration”



(2) Click “Start”

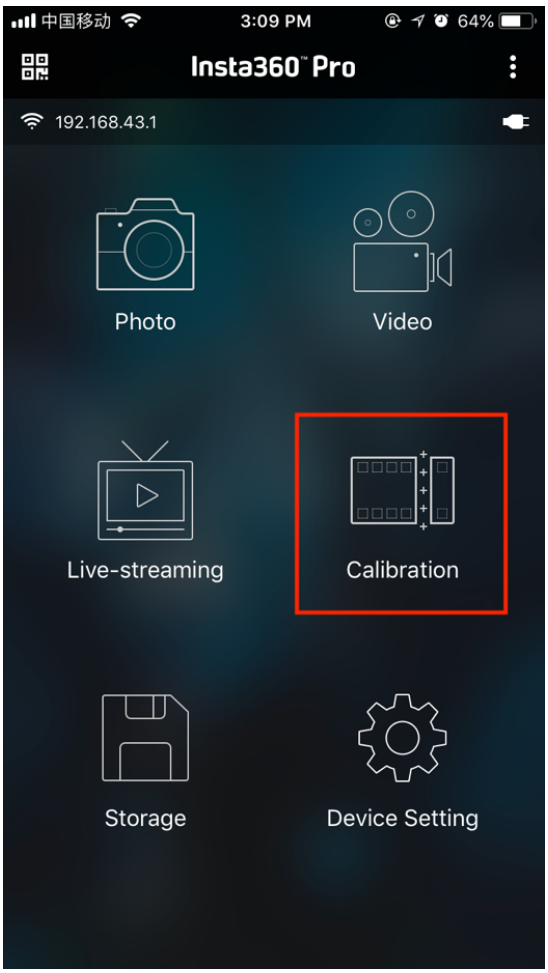


(3) After stitching calibration, select the option you need. If there's no problem, click "Done".

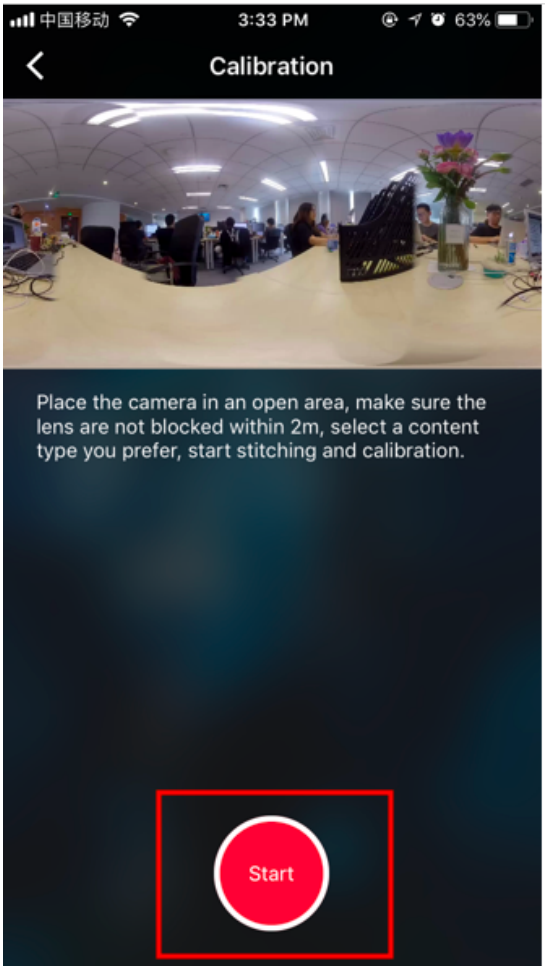


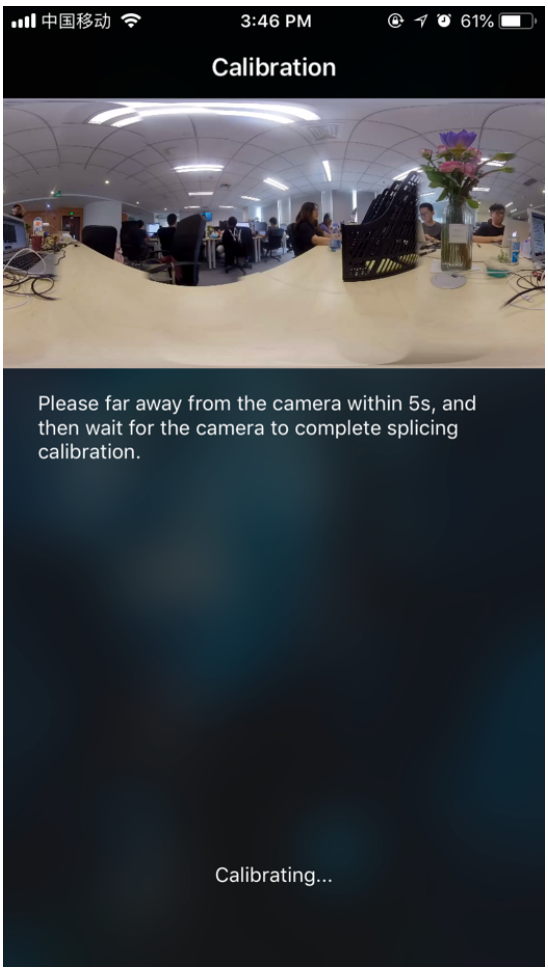
Use "Calibration" function on mobile phone:

(1) Click "Calibration" after connecting Pro to the mobile phone.

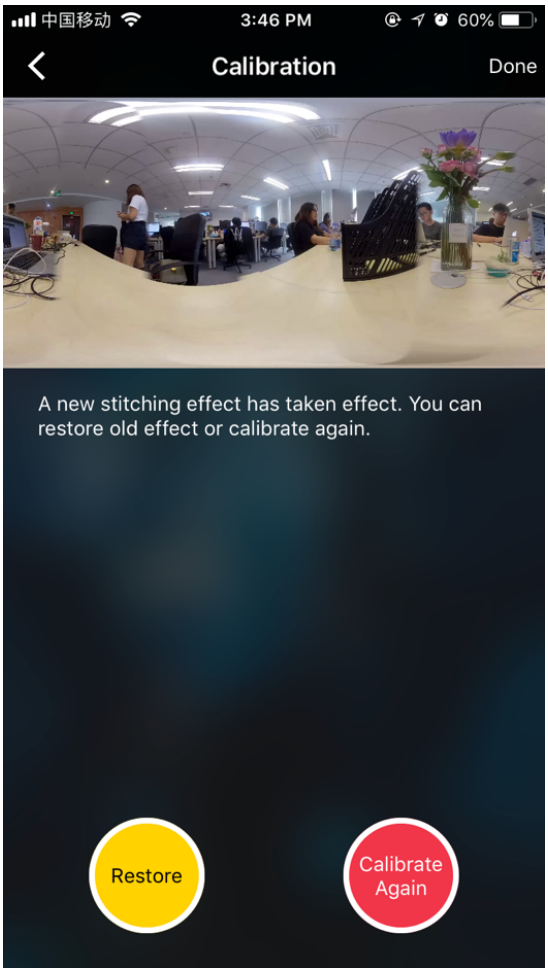


(2) Click "Start"


中国移动
3:33 PM
63%
Calibration
Place the camera in an open area, make sure the lens are not blocked within 2m, select a content type you prefer, start stitching and calibration.
Start


中国移动
3:46 PM
61%
Calibration
Please far away from the camera within 5s, and then wait for the camera to complete splicing calibration.
Calibrating...

(3) After stitching calibration, select the option you need. If there's no problem, click "Done".



6. Choose "Live-streaming" to fill out your required parameters and addresses.

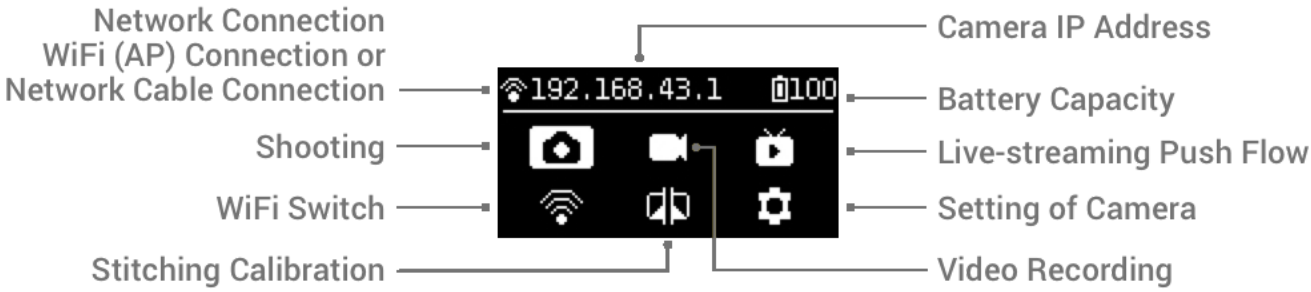
7. Click "Start" to successfully push.

4.1.5 [Intermediate] OBS Computer forwarding push for live-streaming

1. Connect Pro and router with cable to obtain IP address.

2. Start stitching calibration

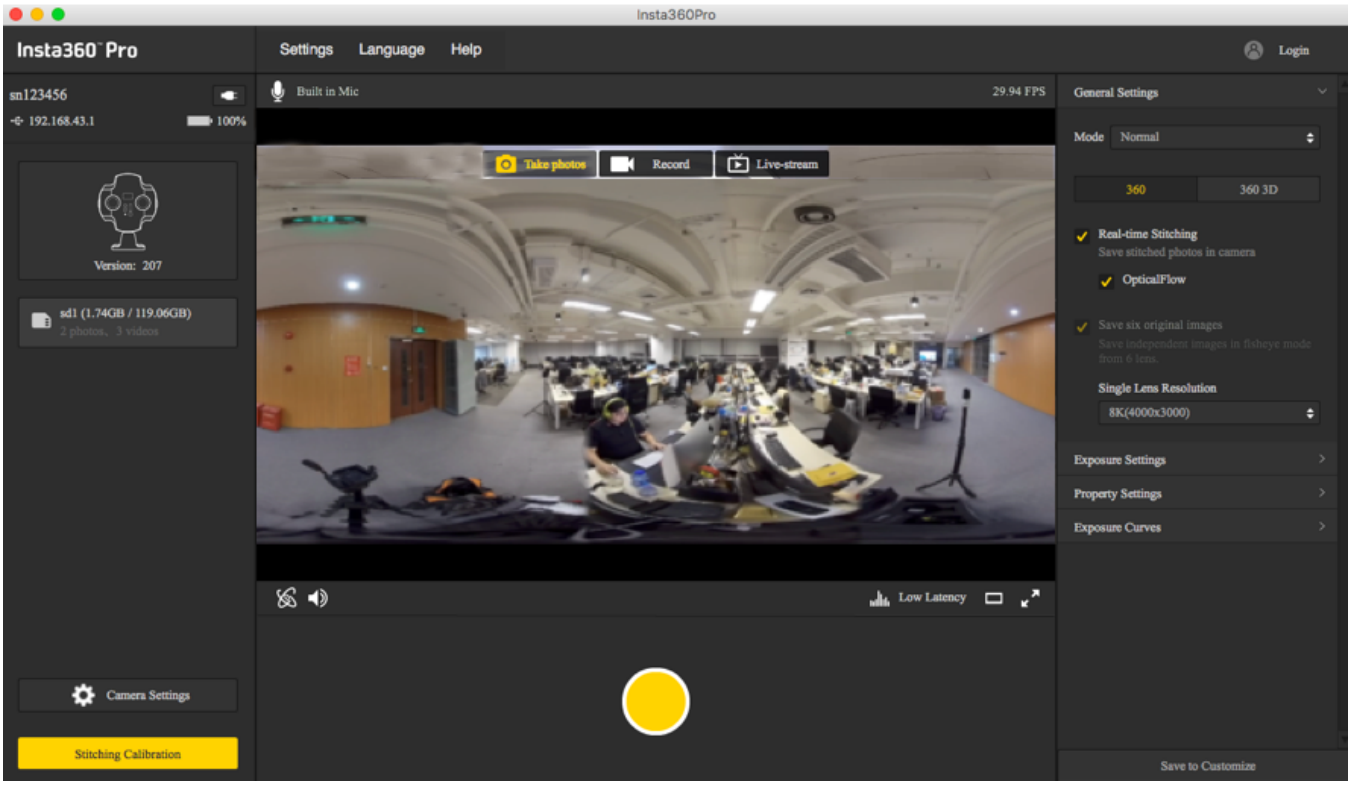
   Camera's internal stitching effect depends on specific shooting scene. For example, cameras' shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)



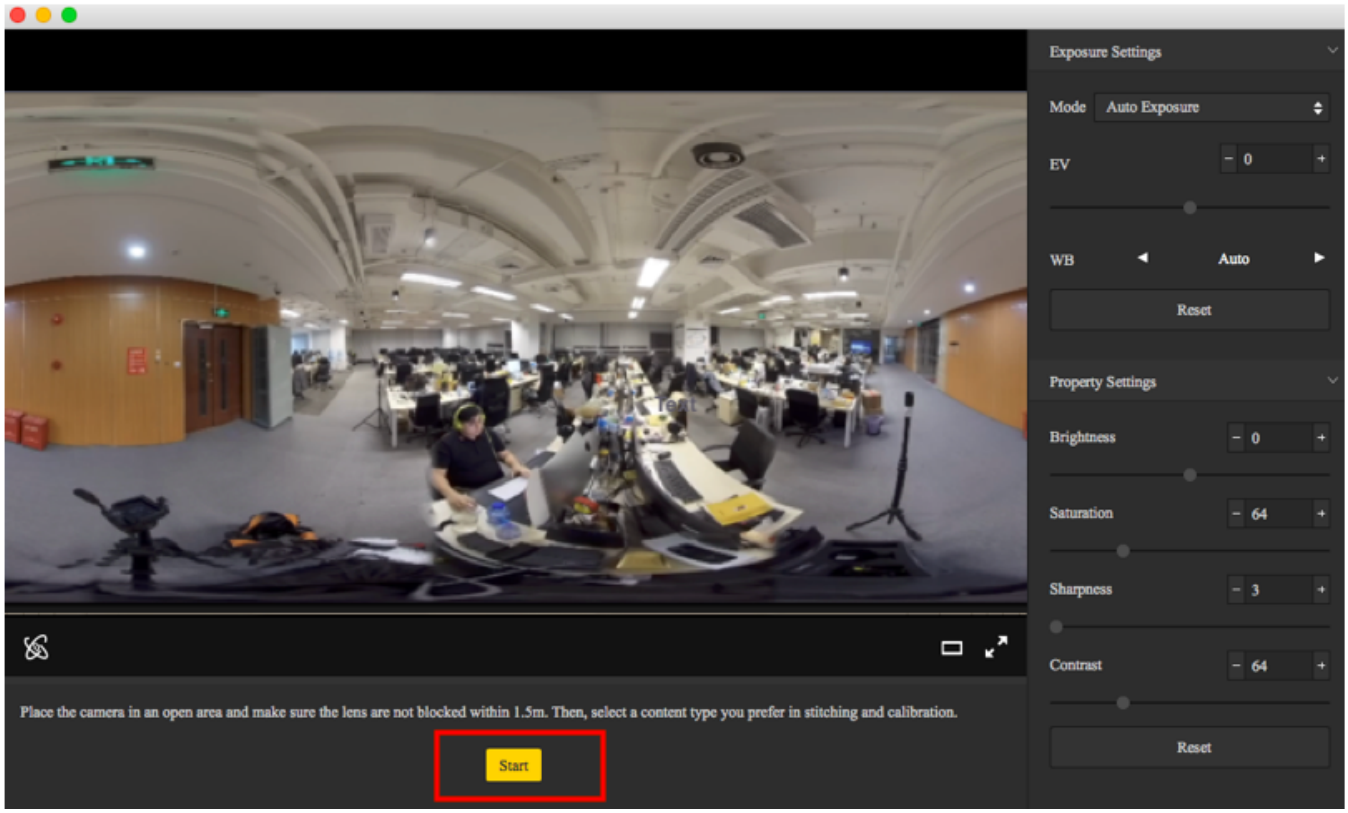
Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

Or use "Stitching Calibration" function on computer:

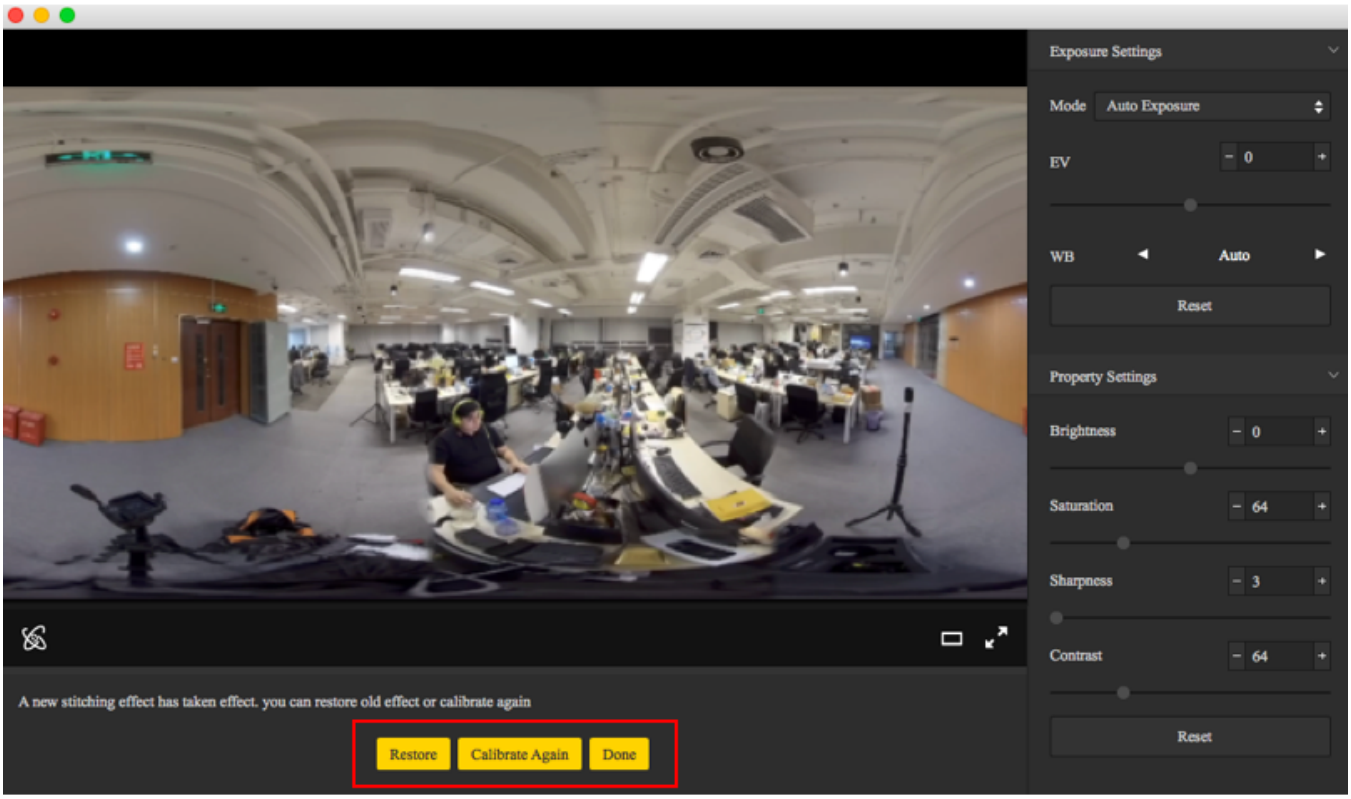
(1) Click “Stitching Calibration”



(2) Click “Start”

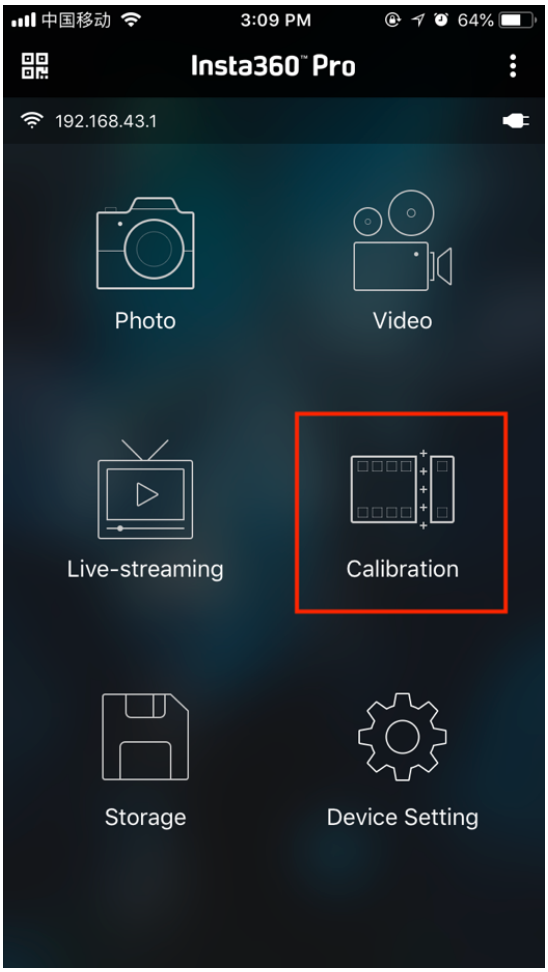


(3) After stitching calibration, select the option you need. If there’s no problem, click "Done".

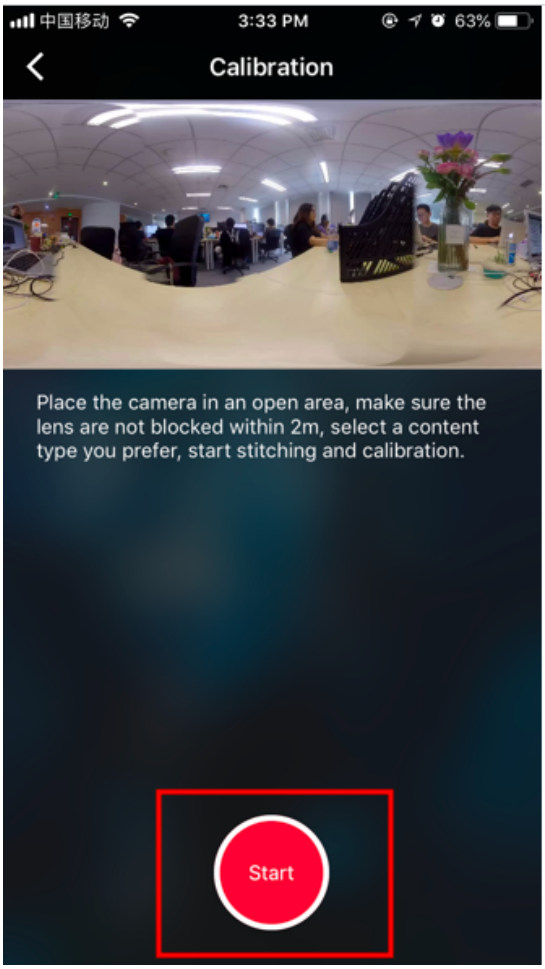


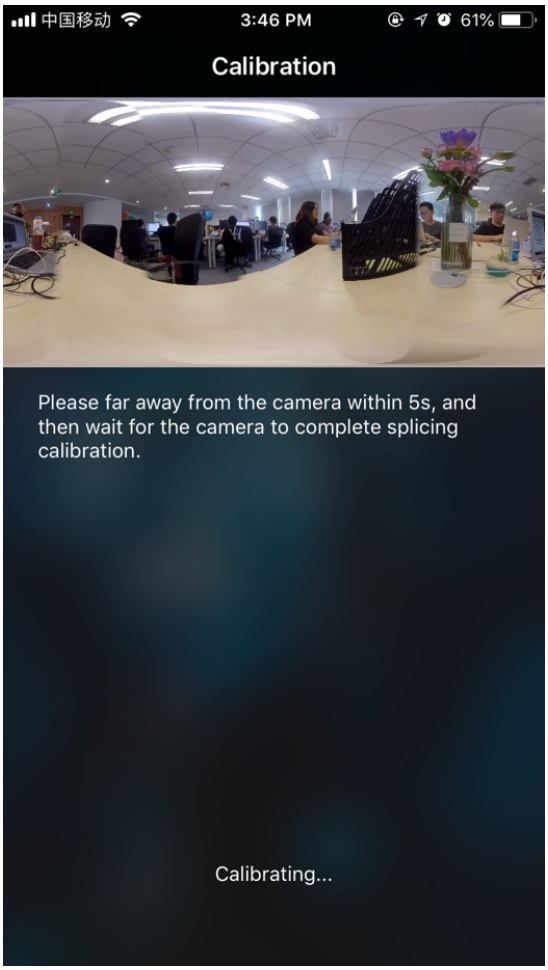
Use "Calibration" function on mobile phone:

(1) Click “Calibration” after connecting Pro to the mobile phone.

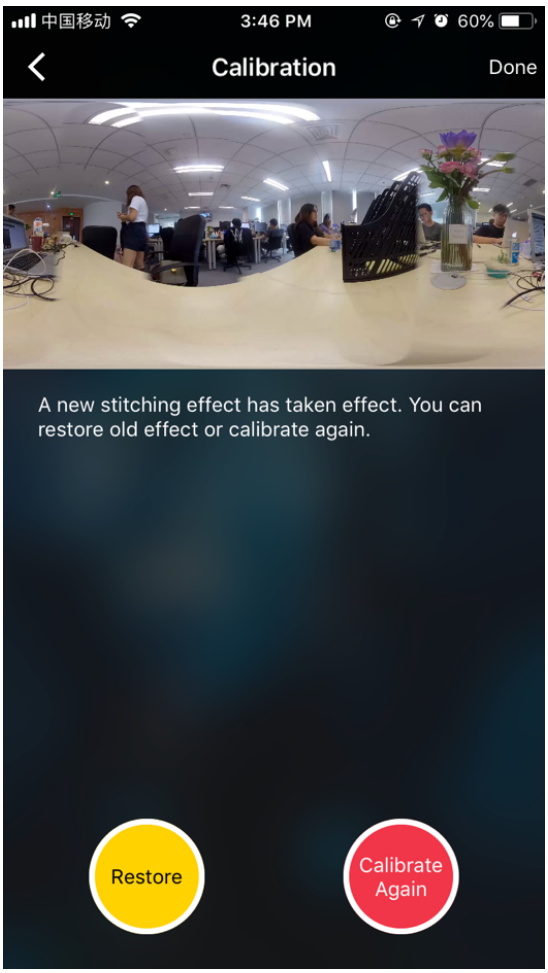


(2) Click “Start”





(3) After stitching calibration, select the option you need. If there's no problem, click "Done".

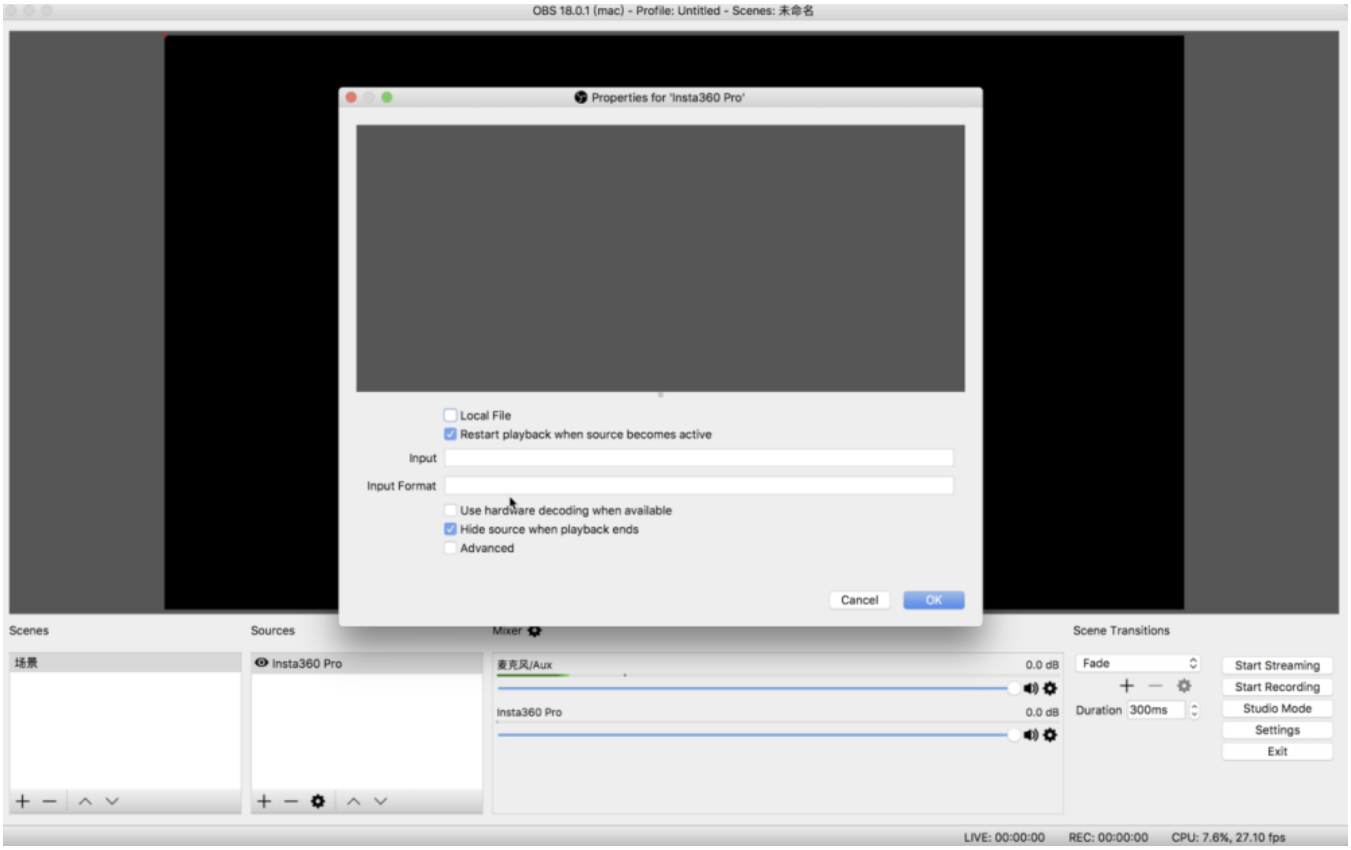


3. Before live-streaming, please adjust the resolution and bitrate of live-streaming first.

4. Select Built-in Server in the live server column.

5. Open OBS and add media sources.

6. Enter RTMP address for Pro.



7. Sets the buffer size for audio and video as 30 frames.

8. Click “Start” .

4.1.6 [Advanced] How to add or edit logo for live-streaming

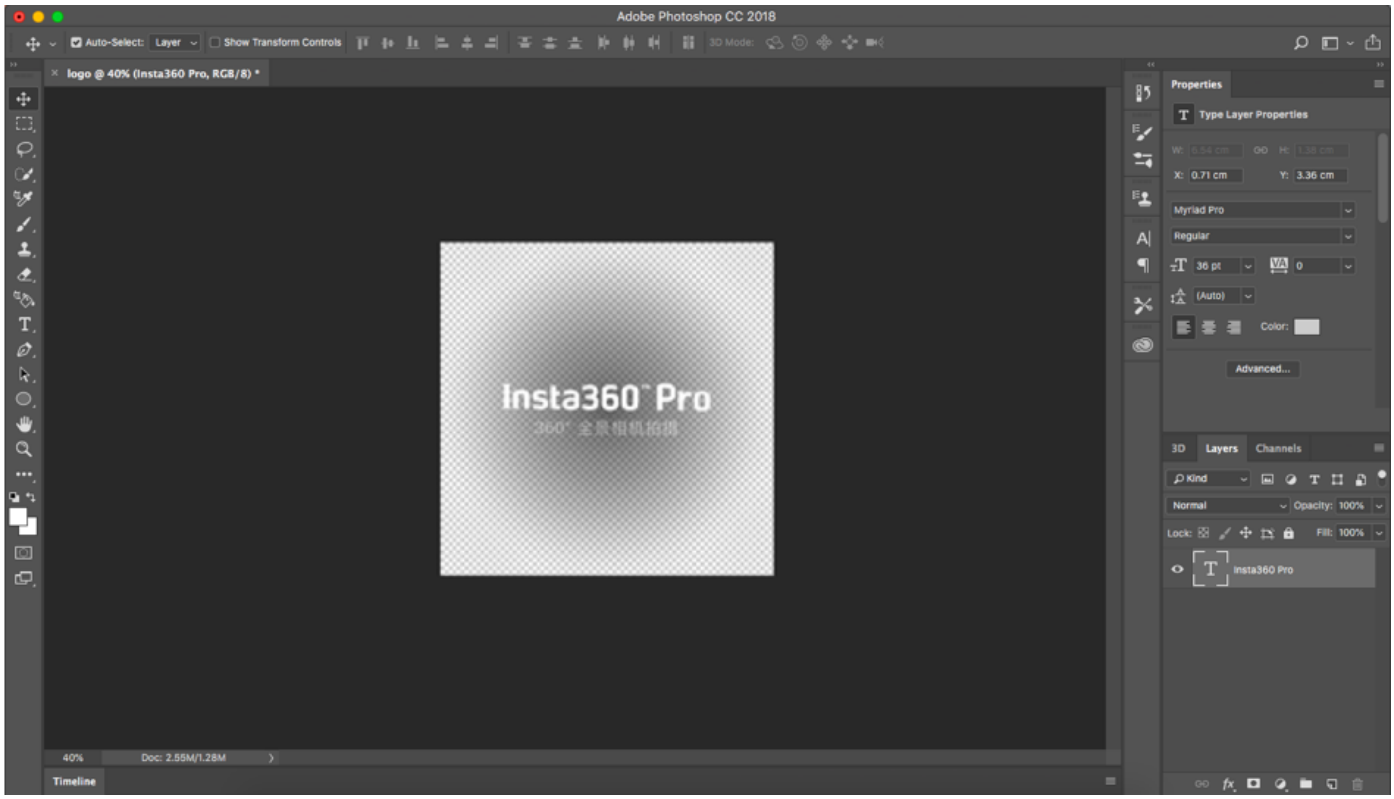
Please enable 'Bottom Logo' in camera setting.

Name the Logo as “_logo.png” and save it to current SD card or mobile hard disk.

Turn on the camera to view the preview or take a real-time stitching content, the logo you saved will automatically be cut into round shape to cover the watermark at the bottom.

The aspect ratio of “_logo.png” should be less than 50%. With the width fixed, the radius of the bottom logo will increase as you increase its height. Recommended resolution: 2000px*150px

Tutorial:



Methods for making logo:

Open Photoshop and import a transparent logo in png format.

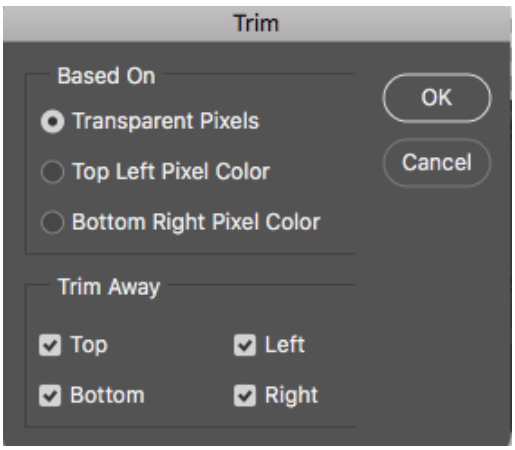
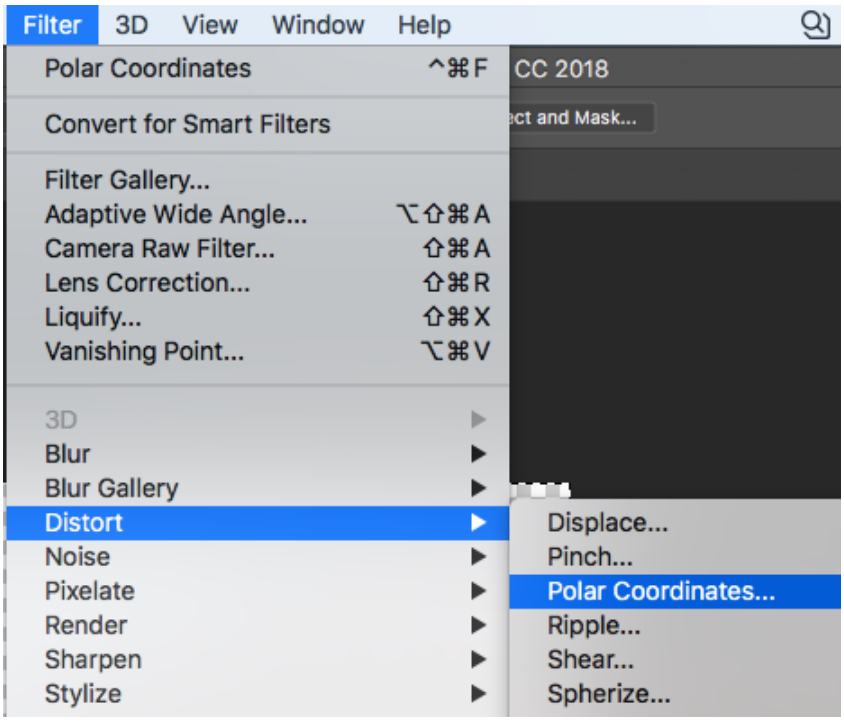


Image-Trim, select transparent pixels, cut off redundant pixels.



Distort - Polar Coordinates - Polar to Rectangular.

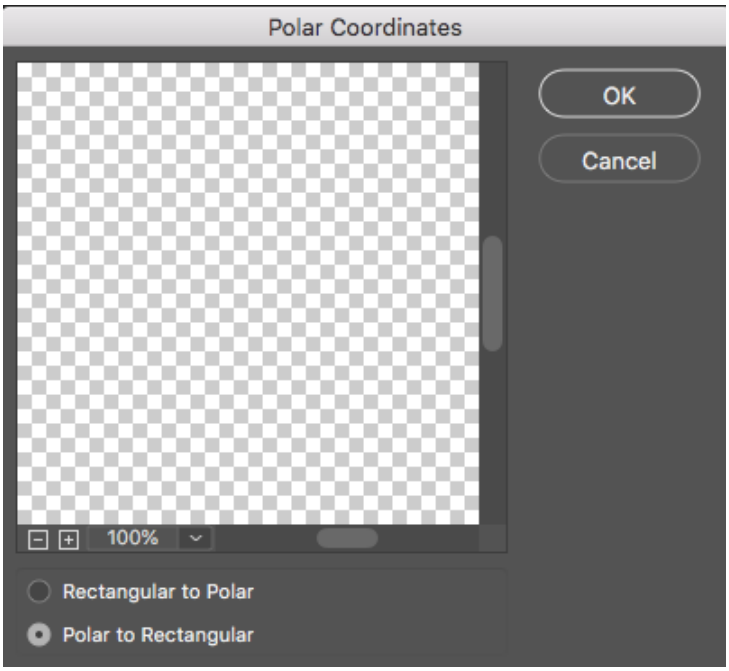


Image Rotation – 180°

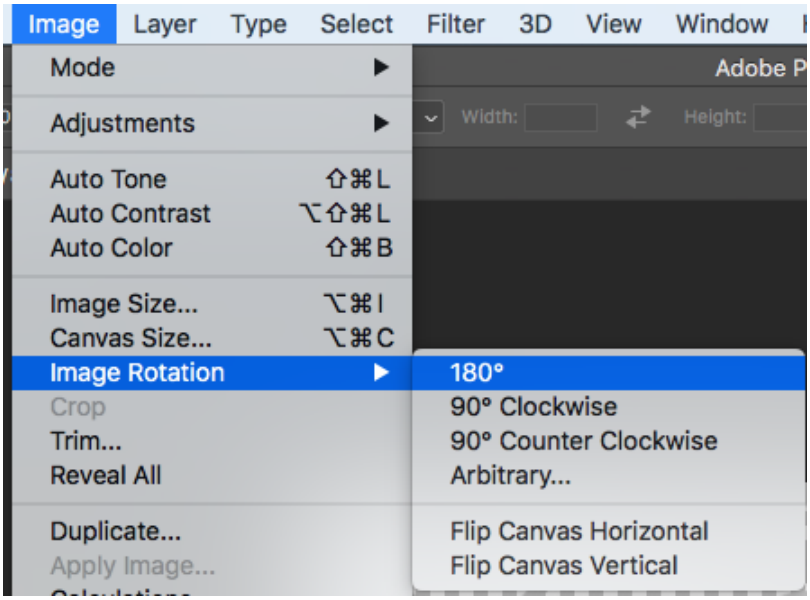
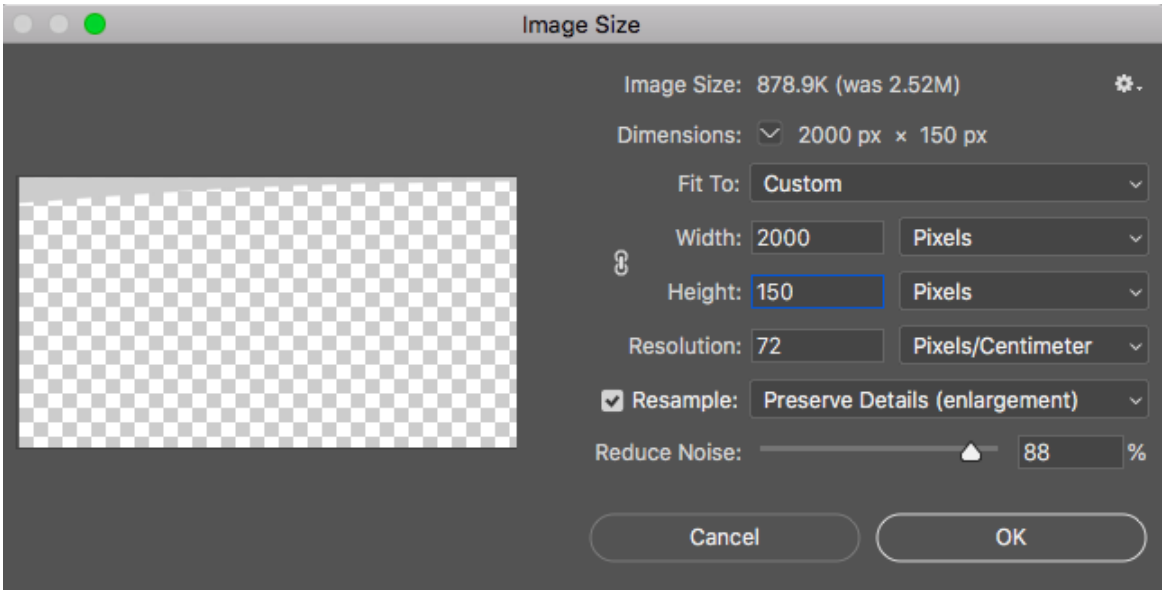


Image-Image Size, modified to 2000 * 150.



Save as _ logo.png and store it in the root directory of the SD card.

4.2.1 [Beginner] Live Interface and parameter setting

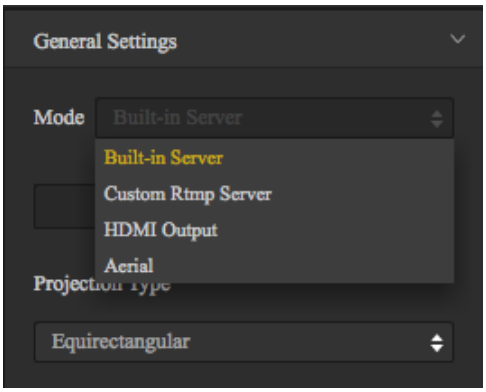
1. Mode selection:

   (1) Build-in Server: push for local player.

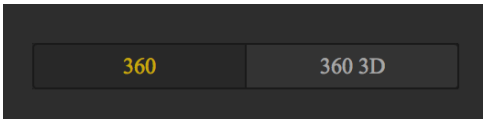
   (2) Custom Rtmp Server: fill out Rtmp server address provided by live platform.

   (3) HDMI Output: output to monitor, director station, computer etc via HDMI line.

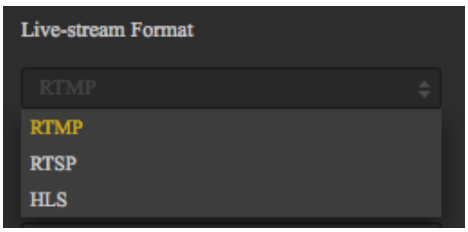
   (4) Aerial: connect aerial graph transmission settings



2. Choose panoramic (360) or 3D panoramic (360 3D) views based on requirements



3. Select Live-stream Format



(1) RTMP (Real Time Messaging Protocol)

RTMP is an open protocol developed by Adobe Systems for audio, video and data transmission between Flash players and servers.

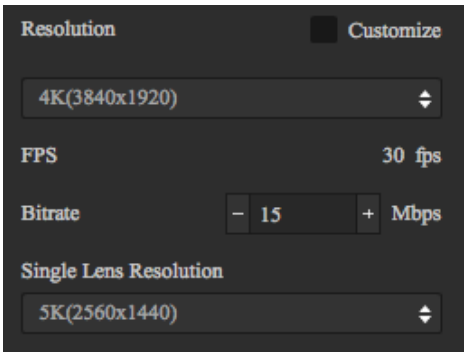
(2) RTSP (Real Time Streaming Protocol)

RTSP defines how one-to-many applications can efficiently transmit multimedia data via the IP network. RTSP provides an extensible framework that includes real-time data and existing stored data. This protocol aims at controlling multiple data transmission and connections, providing paths for selecting sending channels such as UDP, multicast UDP and TCP and selecting sending mechanisms based on RTP.

(3) HLS (Http Live Streaming)

HLS is a HTTP-based streaming media protocol proposed by Apple. HLS has a very big advantage: you can open HTML 5 to play directly. This means that you can share a live link via social media platforms like WeChat, without installing any other app as long as you have browser on your devices, so it enjoys high popularity.

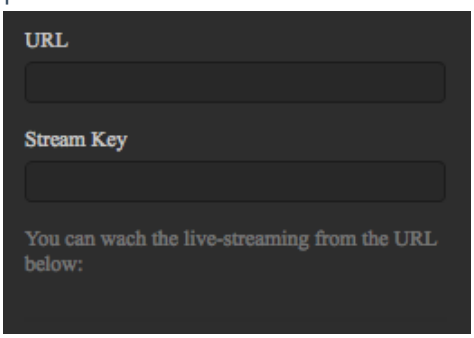
4. Resolution, frame rate, bitrate setting



Select the desired resolution based on your choice of live platform. If the settings have no desired resolution, click "Customize" to set your desired resolution (resolution cannot be greater than 3840X3840).

Note: when viewing with mobile phone, the recommended encoding rate should be 4Mbps. If there's video lag, you should first exclude whether it is caused by phone lag, if not, please select lower bitrate (in many cases the reason for video lag is because upload bandwidth isn't enough).

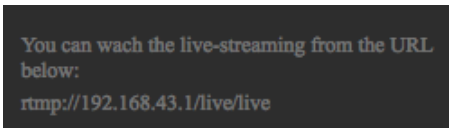
5. If you select "Custom Rtmp Server", here you can fill out the push address "URL" and "Stream Key" provided by the platform.



4.2.2 [Beginner] Push mode: internal push, server push, HDMI output

Build-in Server

It's suitable for computer local playback. Connect computer to Pro, select "Built-in Server", click "LIVE", open computer player, input the URL address displayed in Pro push settings, such as:



Custom Rtmp Server

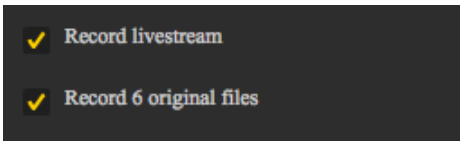
This is to push live streaming onto panoramic live platforms.

HDMI Output

Output through HDMI line to display, director station, computer etc.

4.2.3 [Beginner] Live-streaming while storing

Check according to your own needs



4.2.4 [Beginner] External audio setting

Zoom Handy Recorder H2n.

Pro firmware above 203 supports recording panoramic sound through USB external port connecting to H2N audio recording device. Please update firmware to latest version before use.

https: //www.youtube.com/watch?v=njep5CO3w3g

Recorded panoramic sound will be consistent with Pro itself according to Ambisonic standard. It can be exported via Stitcher, upload to Facebook, Youtube and other platforms supporting this standard, so as to experience panoramic sound attribute.

Method of recording panoramic sound by using H2N

1. As shown in the picture, one side of H2N input interface and one side of the Pro should be kept in the same direction, then the space direction of recorded panorama will be consistent with the direction of each space of the Pro

panorama screen.

2. Connect H2N with Pro via USB cable to set up USB panoramic sound recording mode of H2N, then operate Pro for normal video recording and broadcast live. Before you use it, please ensure that the firmware of the H2N program has been updated to the latest version. Select the 4ch mode so that tape recorders can record spatial audio.

MENU->REC->REC FORMAT->WAV48kHz/24bit;

MENU->REC->Spatial Audio->ON, to open spatial audio

4.2.5 [Intermediate] Indoor live-streaming scheme

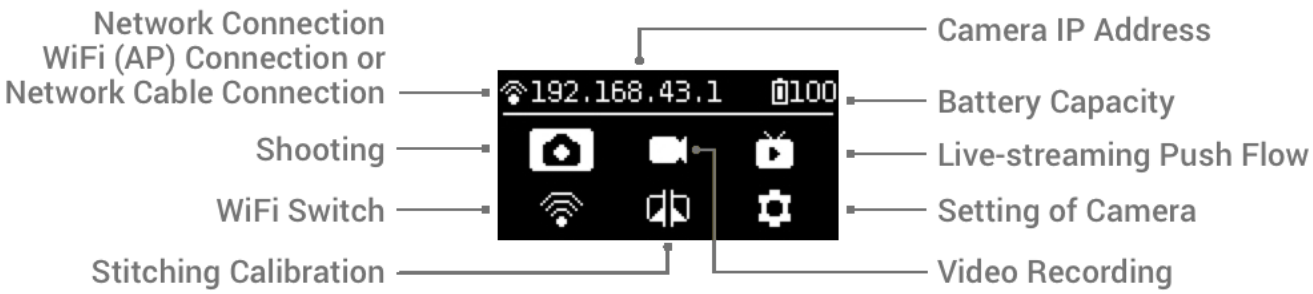
Preliminary preparations:

1. Confirm camera stand on the site (as close as possible to shooting subject).
2. Determine whether power supply and cable are connected and can be connected to fixed camera stand (network requires the upper bandwidth above 20M/S).

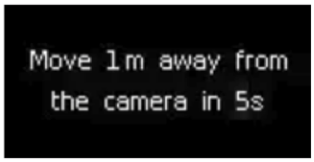
Live-streaming phase:

1. **Stitching calibration**

   Camera's internal stitching effect depends on specific shooting scene. For example, cameras‘ shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)

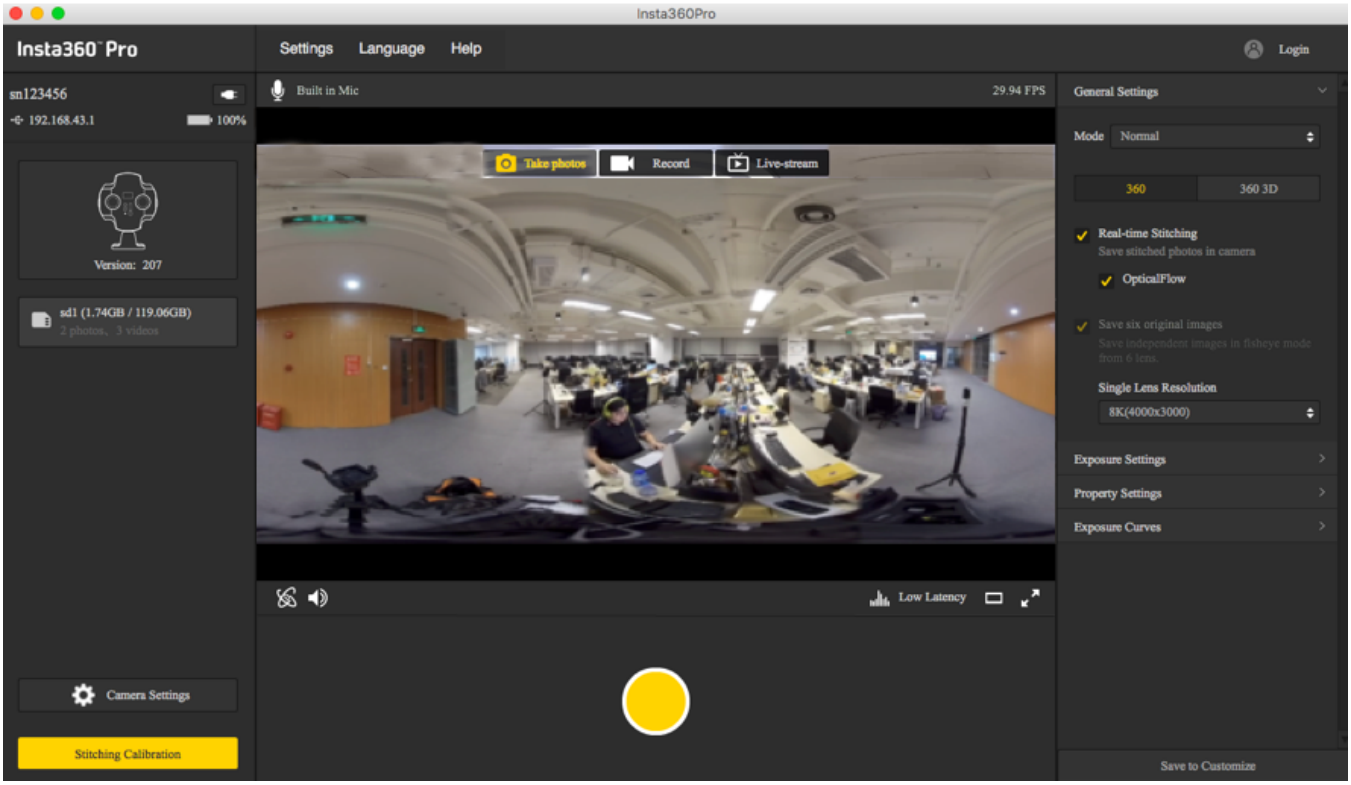


   Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

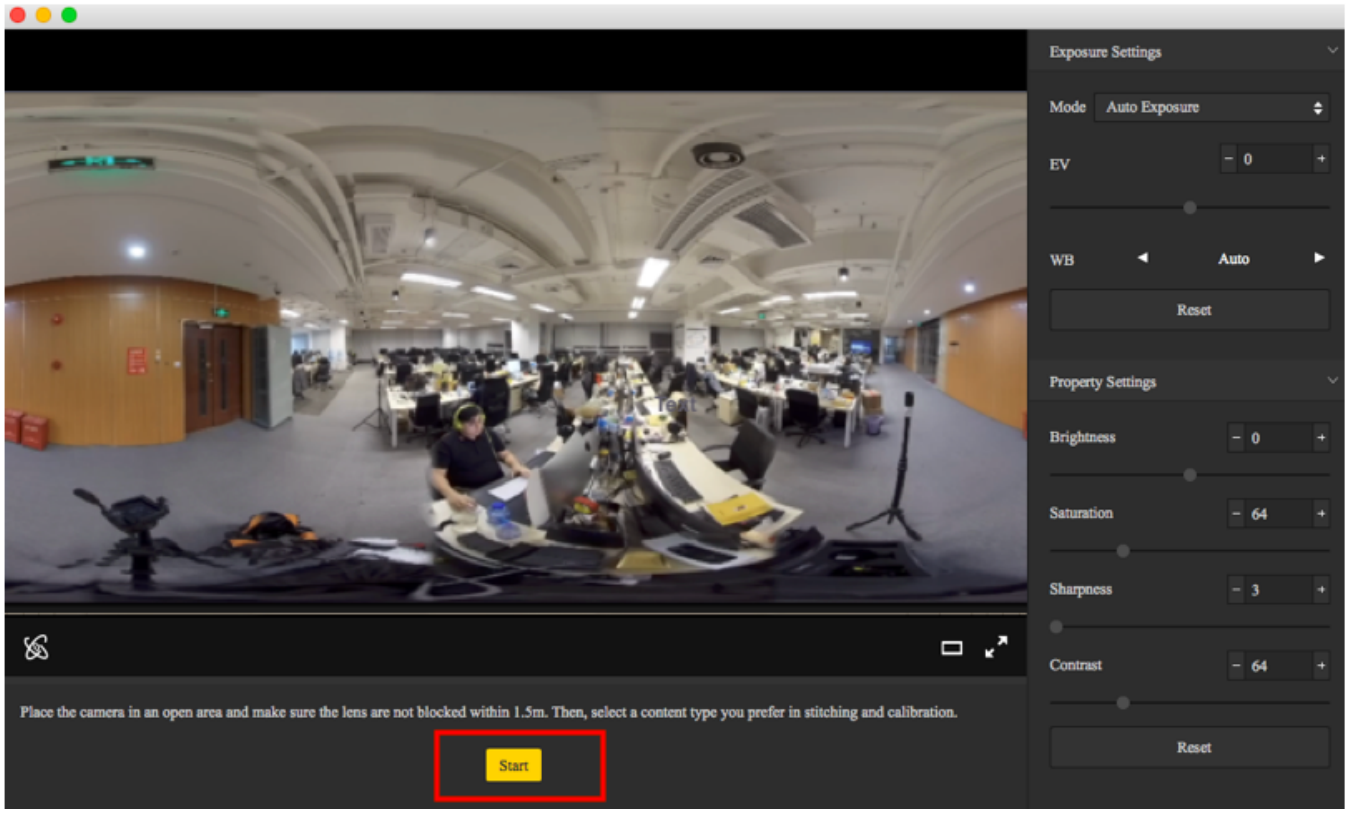


Or use "Stitching Calibration" function on computer:

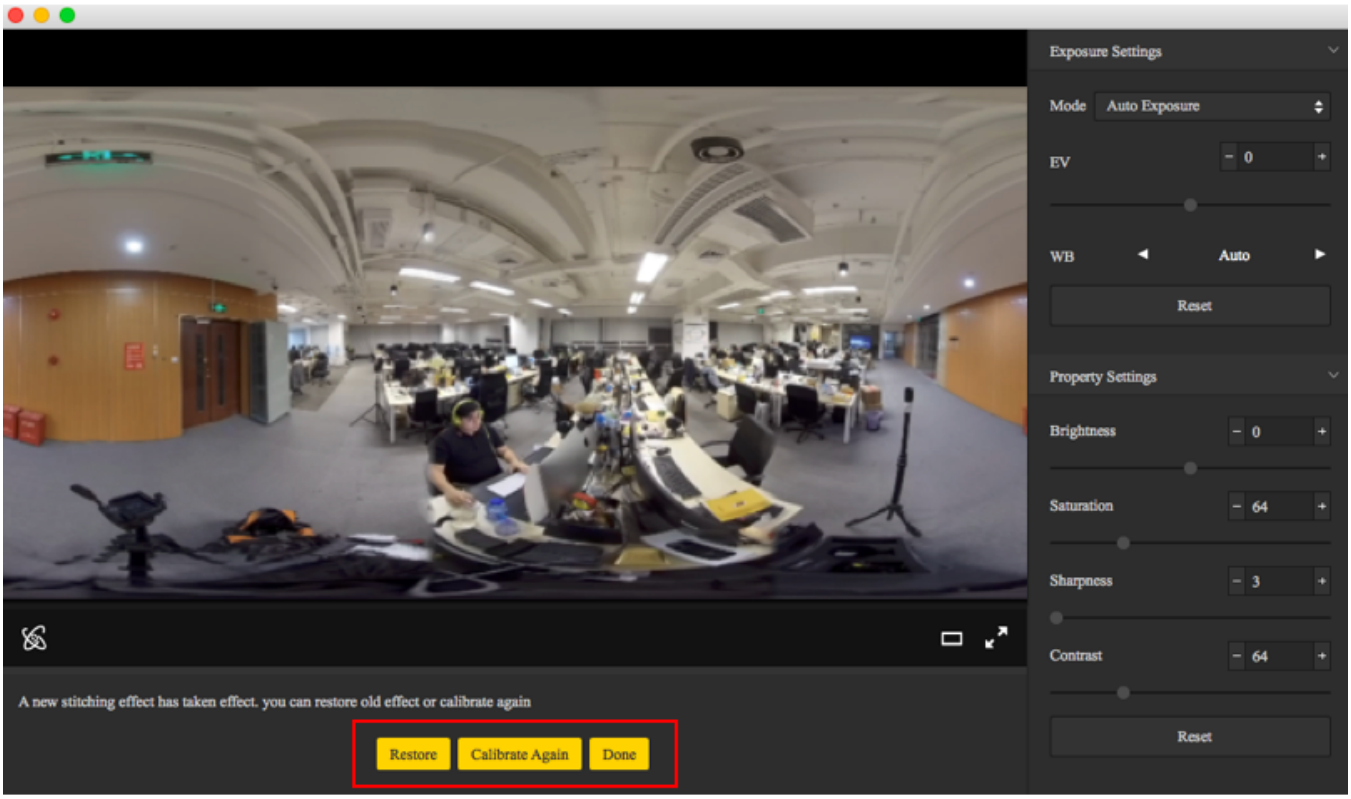
(1) Click “Stitching Calibration”



(2) Click “Start”

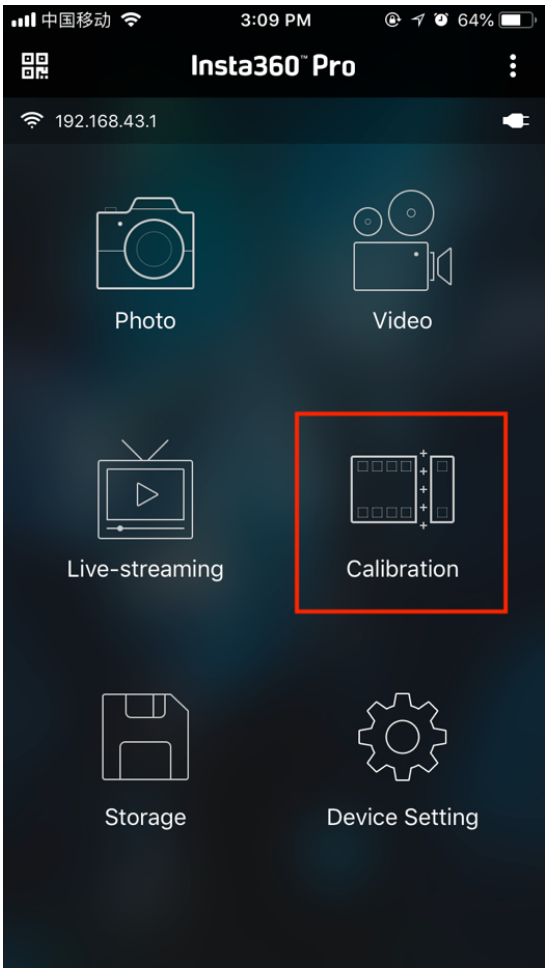


(3) After stitching calibration, select the option you need. If there’s no problem, click "Done".

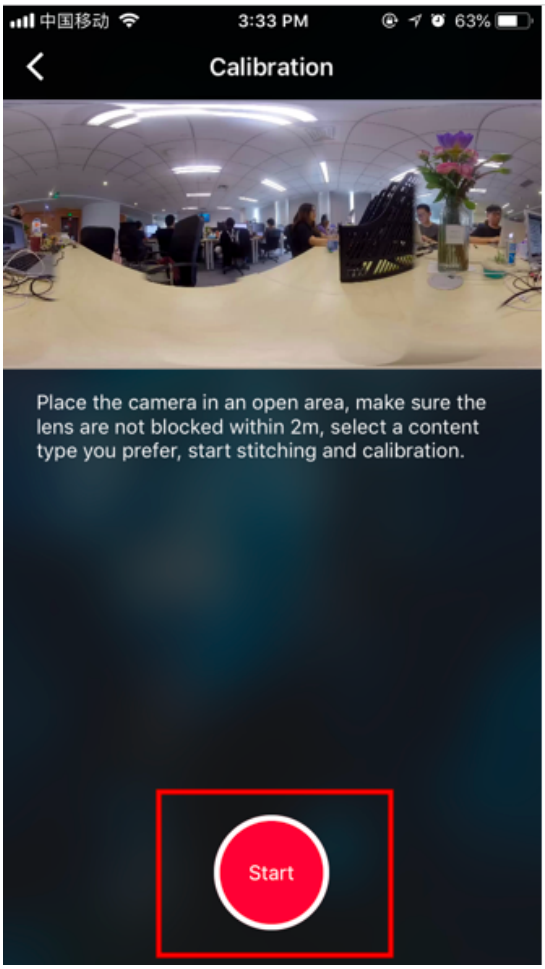


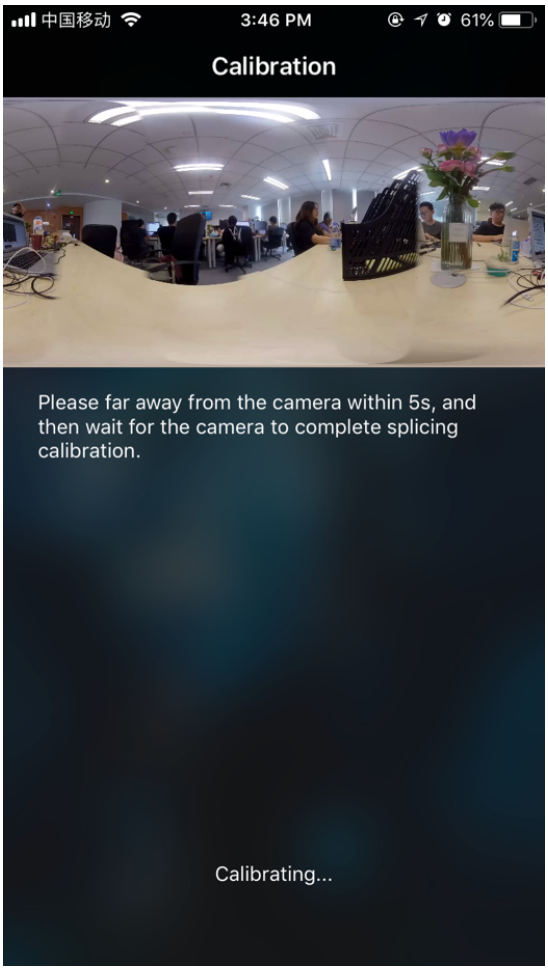
Use "Calibration" function on mobile phone:

(1) Click “Calibration” after connecting Pro to the mobile phone.

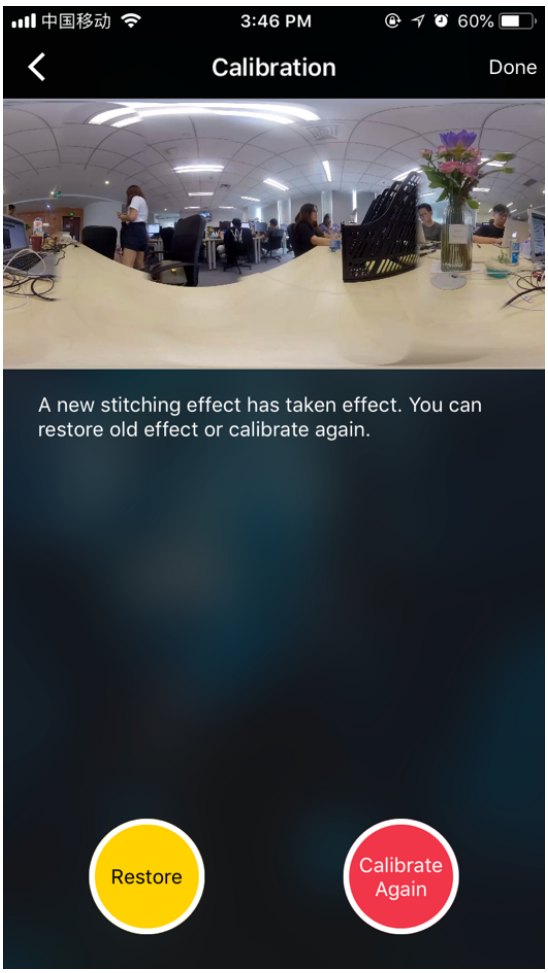


(2) Click “Start”





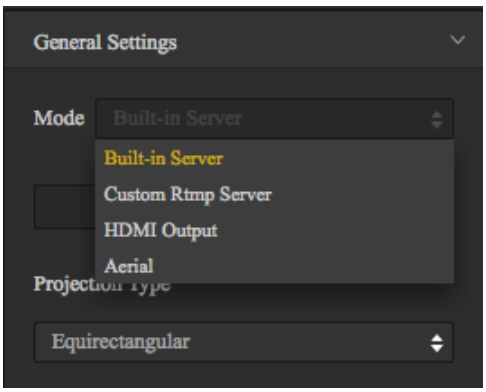
(3) After stitching calibration, select the option you need. If there's no problem, click "Done".



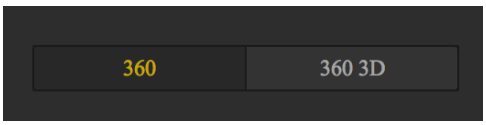
2. **Settings for live-streaming**

(1) Mode selection:

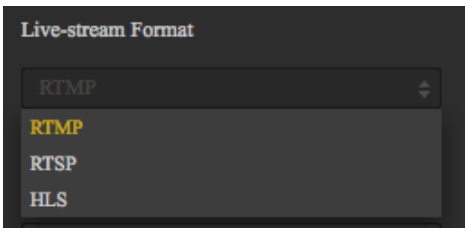
- Build-in Server: push for local player.
- Custom Rtmp Server: fill out Rtmp server addresses provided by live platform.
- HDMI Output: output from HDMI line to monitor, director station, computer etc.
- Aerial: connecting aerial graph transmission settings



(2) Choose panoramic (360) or 3D panoramic (360 3D) views based on requirements



(3) Select Live-stream Format



- RTMP (Real Time Messaging Protocol)

  RTMP is an open protocol developed by Adobe Systems for audio, video and data transmission between Flash players and servers.

- RTSP (Real Time Streaming Protocol)

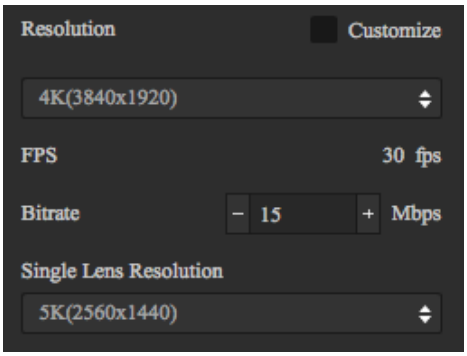
  RTSP defines how one-to-many applications can efficiently transmit multimedia data via the IP network. RTSP provides an extensible framework that includes real-time data and existing stored data. This protocol aims at controlling multiple data transmission and connections, providing paths for selecting sending channels such as UDP, multicast UDP and TCP and selecting sending mechanisms based on RTP.

- HLS (Http Live Streaming)

  It is a HTTP-based streaming media protocol proposed by Apple. HLS has a very big advantage: HTML 5 can open playback directly. This means that you can share a live link via social media platforms like WeChat, without

installing any other independent app as long as you have browser on your devices, so it enjoys high popularity.

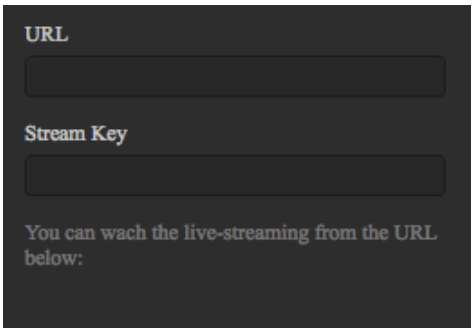
(4) Resolution, frame rate, bitrate setting



Select the desired resolution depending on your choice of live platform. If the settings have no desired resolution, click “customize” to set your desired resolution (resolution cannot be greater than 3840X3840).

Note: when viewing with mobile phone, the recommended encoding rate should be 4Mbps. If there’s video lag, you should first exclude whether it is caused by phone lag, if not, please select lower bitrate (in many cases the reason for video lag is because upload bandwidth isn't enough).

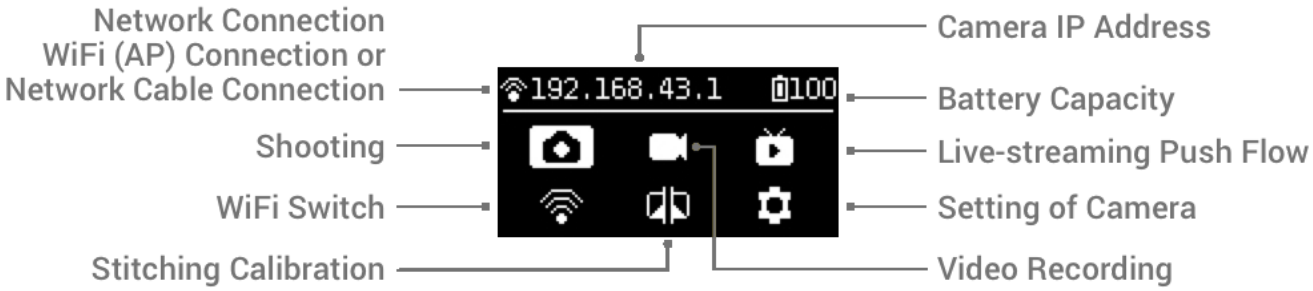
(5) If you select “Custom Rtmp Server” in the mode, here you can fill out the push address “URL” and “Stream Key” provided by the platform.



4.2.6 [Intermediate] Outdoor Live-streaming scheme

1. Prepare battery and 4G wireless card.
2. Connect 4G wireless card via network cable to Pro.
3. If the connection succeeds, the IP address on Pro does not appear as either 192.168.43.1 or 0.0.0.0.
4. Computer or phone connect the WI-FI signal issued by 4G WI-FI network card.
5. Open app and input the IP address displayed on Pro.
6. Start stitching calibration

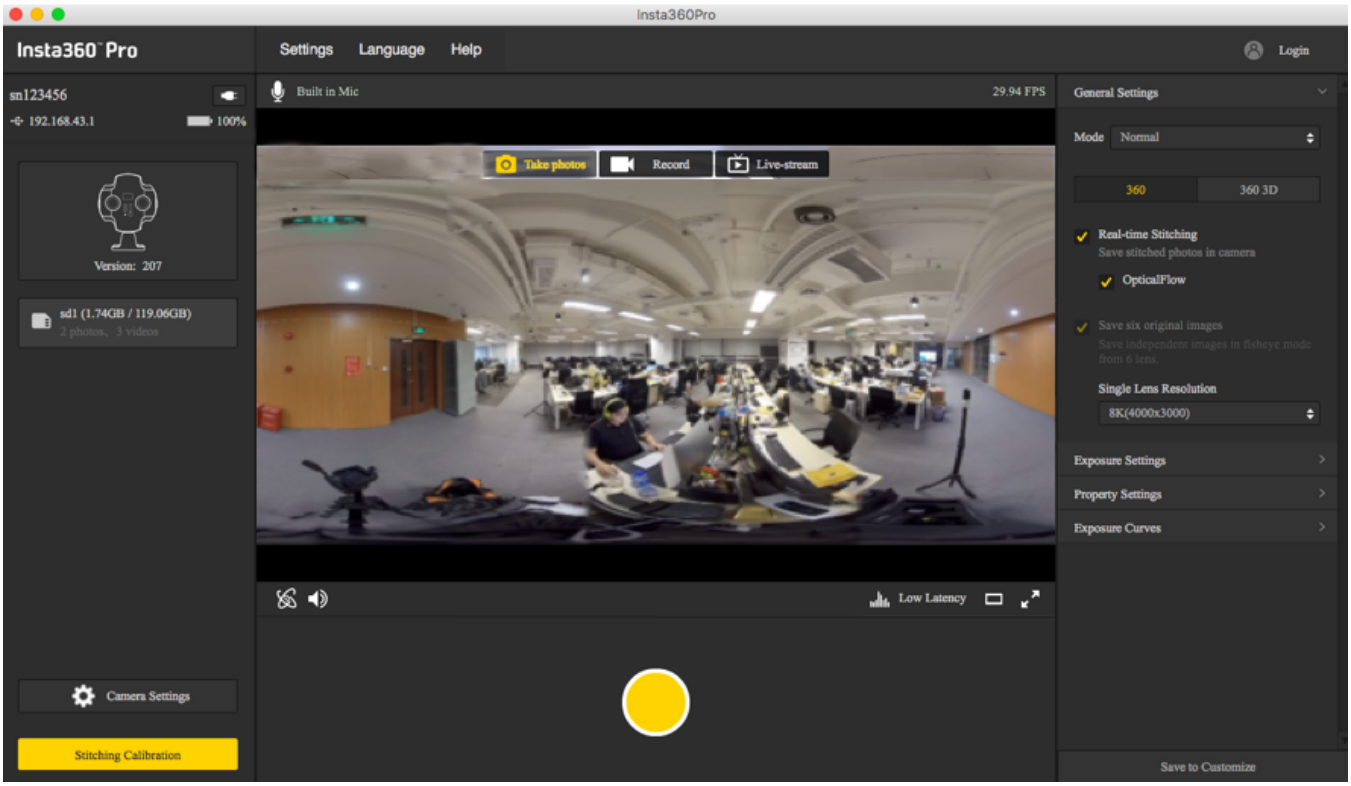
Camera's internal stitching effect depends on specific shooting scene. For example, cameras‘ shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)



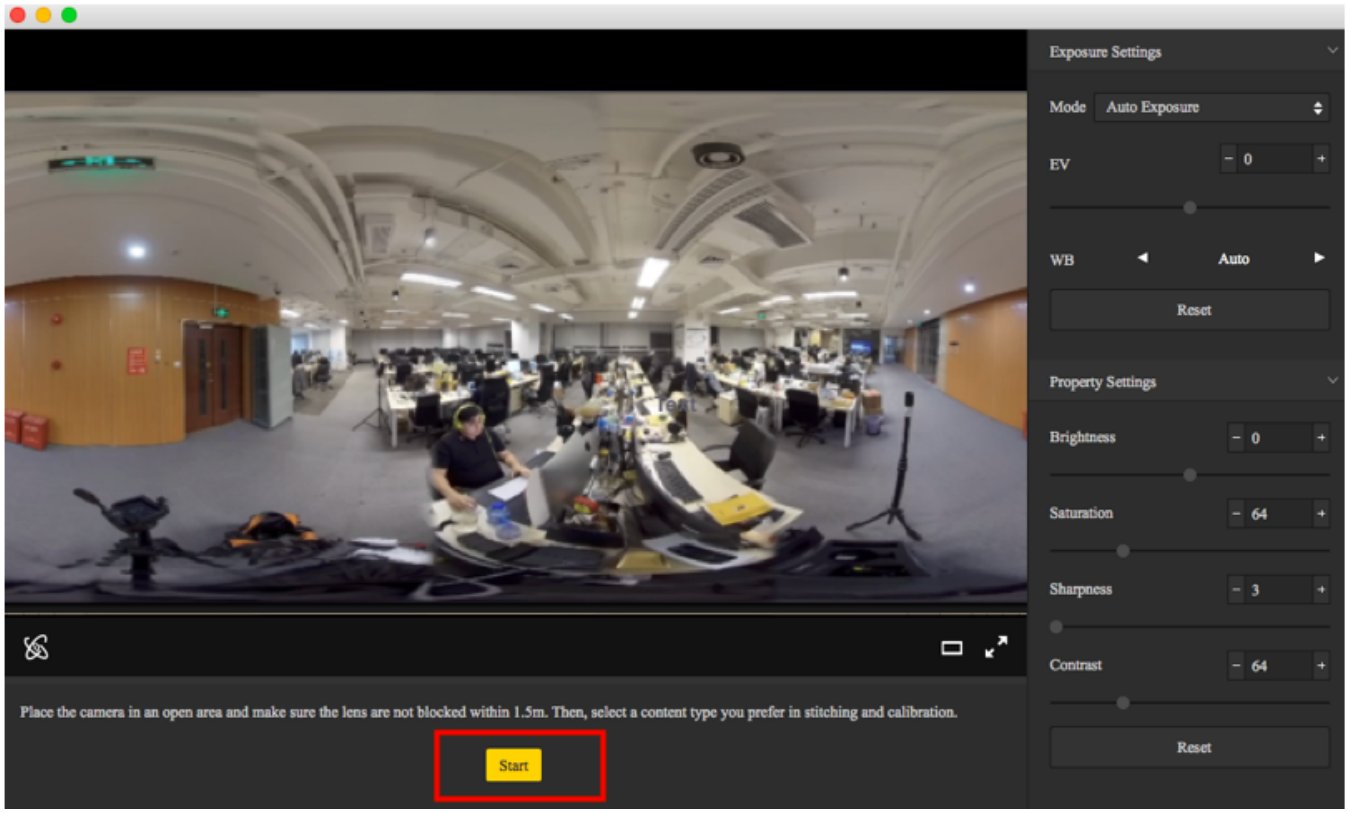
Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

Or use "Stitching Calibration" function on computer:

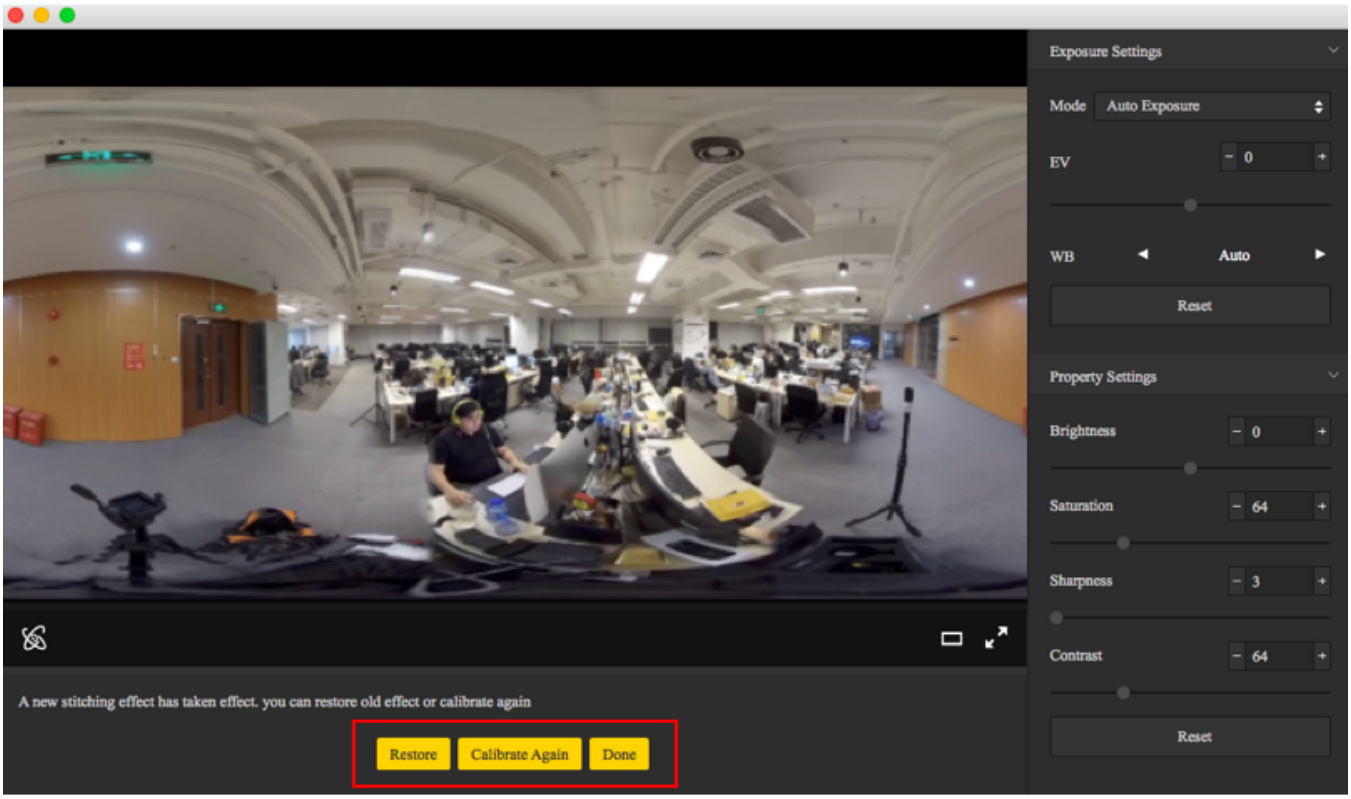
(1) Click “Stitching Calibration”



(2) Click “Start”

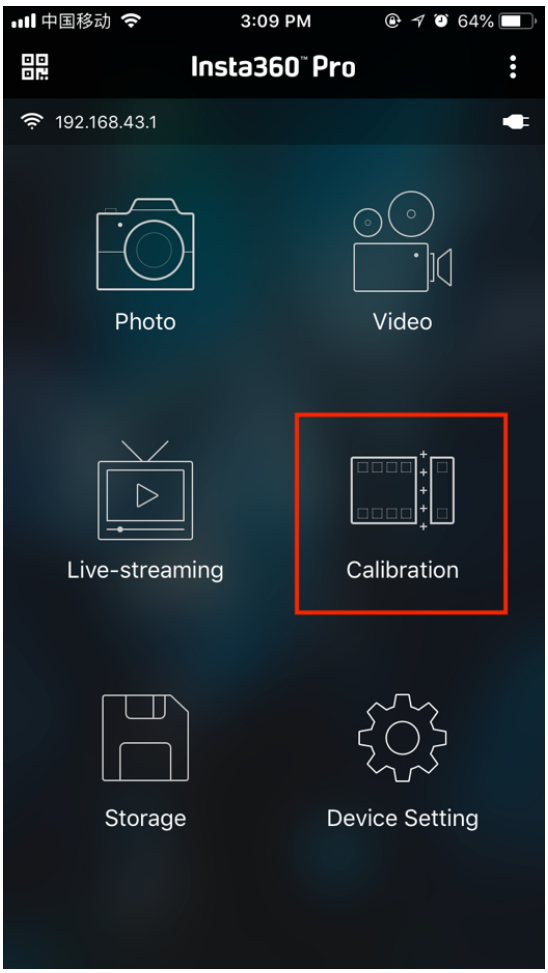


(3) After stitching calibration, select the option you need. If there's no problem, click "Done".

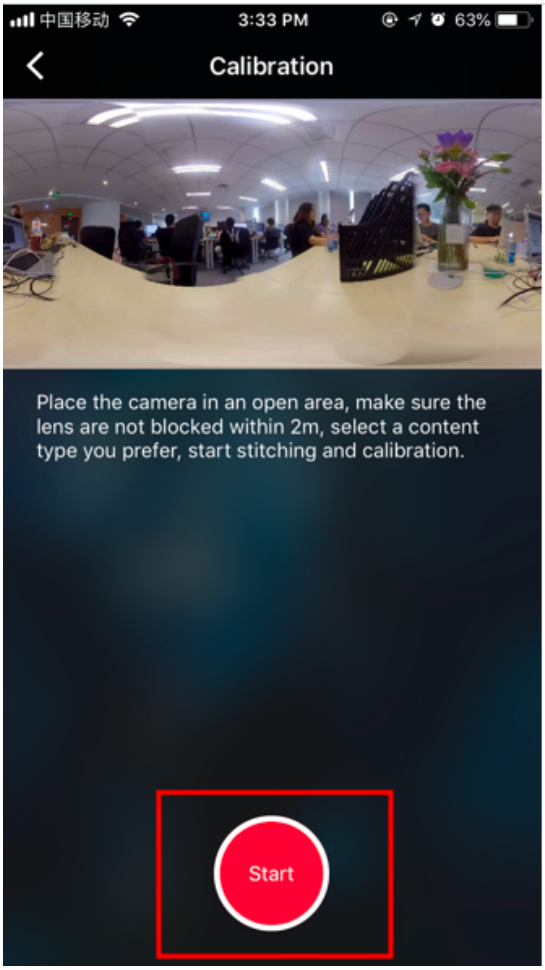


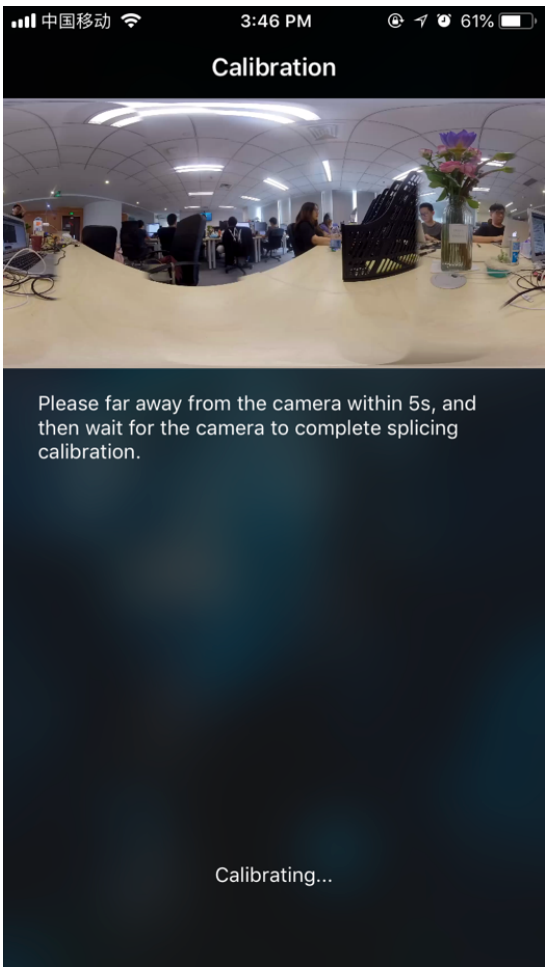
Use "Calibration" function on mobile phone:

(1) Click "Calibration" after connecting Pro to the mobile phone.

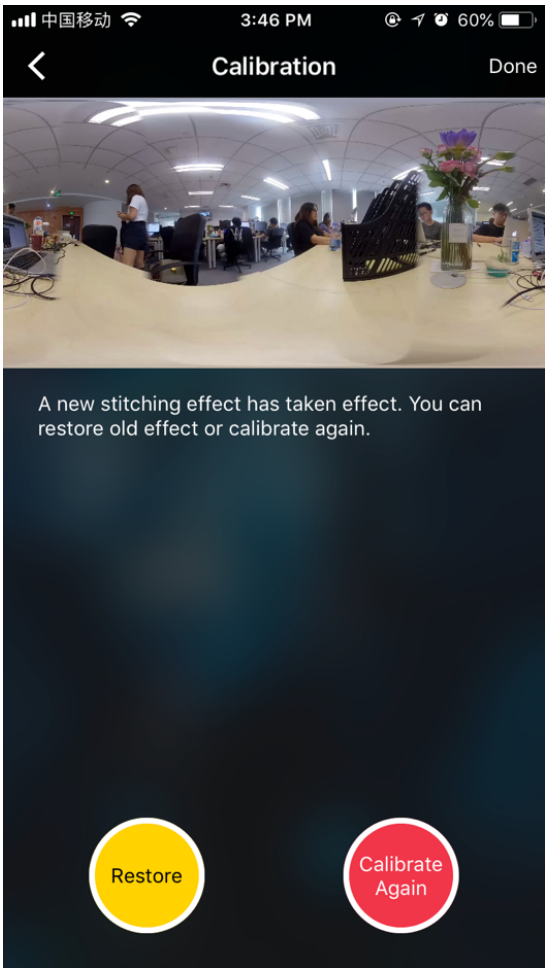


(2) Click "Start"


中国移动
3:33 PM
63%
Calibration
Place the camera in an open area, make sure the lens are not blocked within 2m, select a content type you prefer, start stitching and calibration.
Start


中国移动
3:46 PM
61%
Calibration
Please far away from the camera within 5s, and then wait for the camera to complete splicing calibration.
Calibrating...

(3) After stitching calibration, select the option you need. If there's no problem, click "Done".



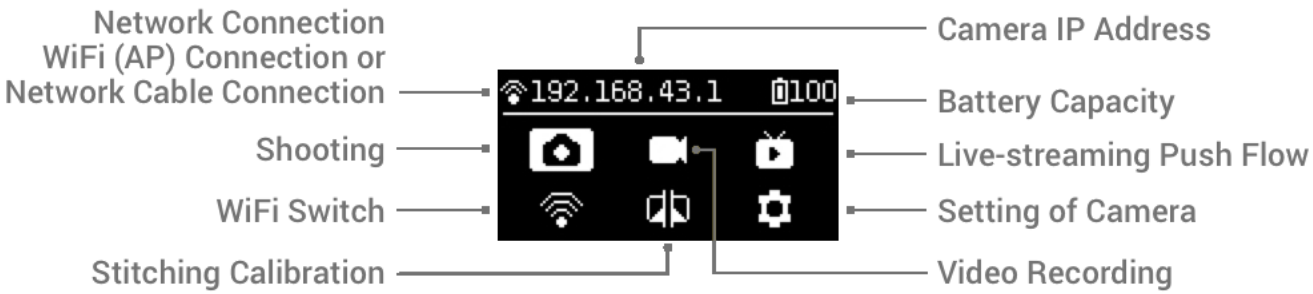
7. Choose "Live-streaming" to fill out your required parameters and addresses.

8. Click "Start" to successfully push.

4.3.1 [Beginner] YouTube live-streaming

1. Connect the camera and apply stitching calibration

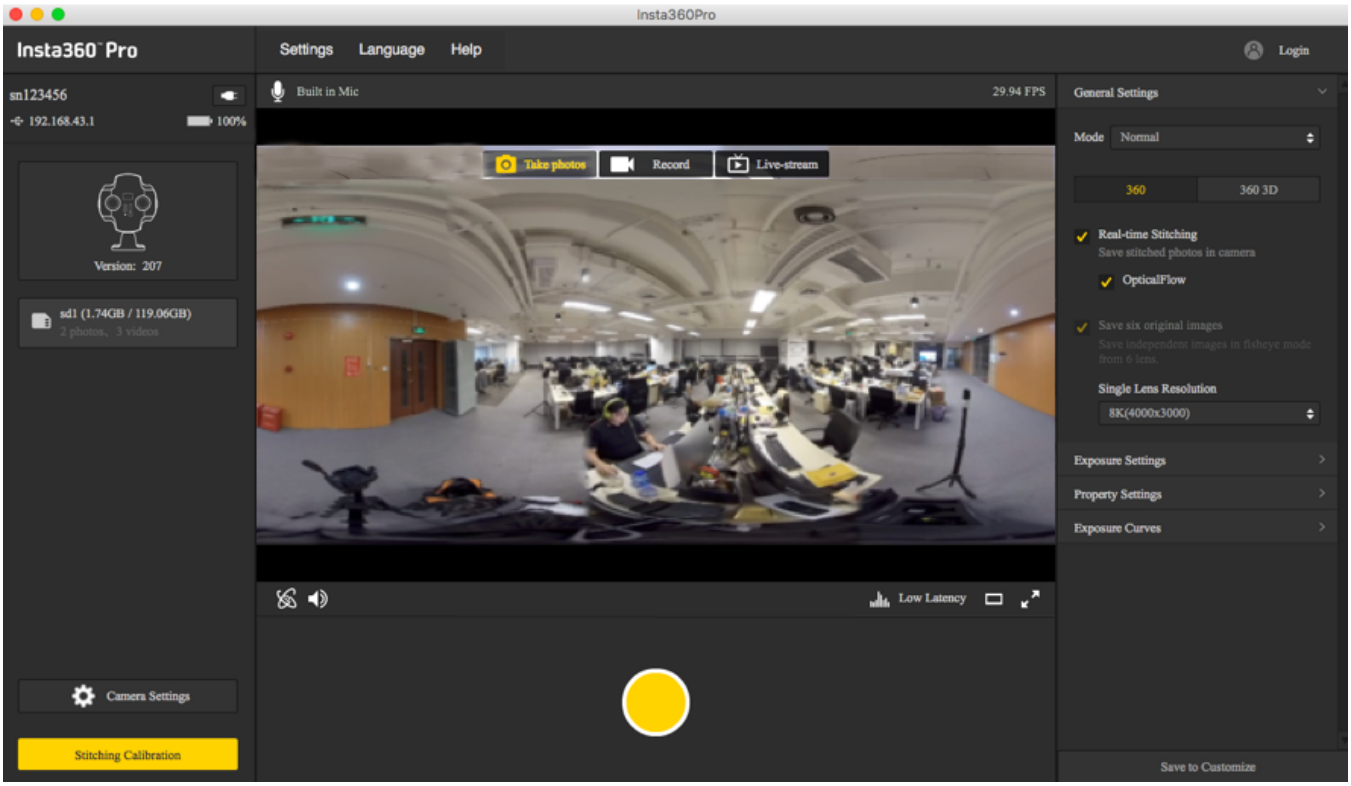
   Camera's internal stitching effect depends on specific shooting scene. For example, cameras' shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)



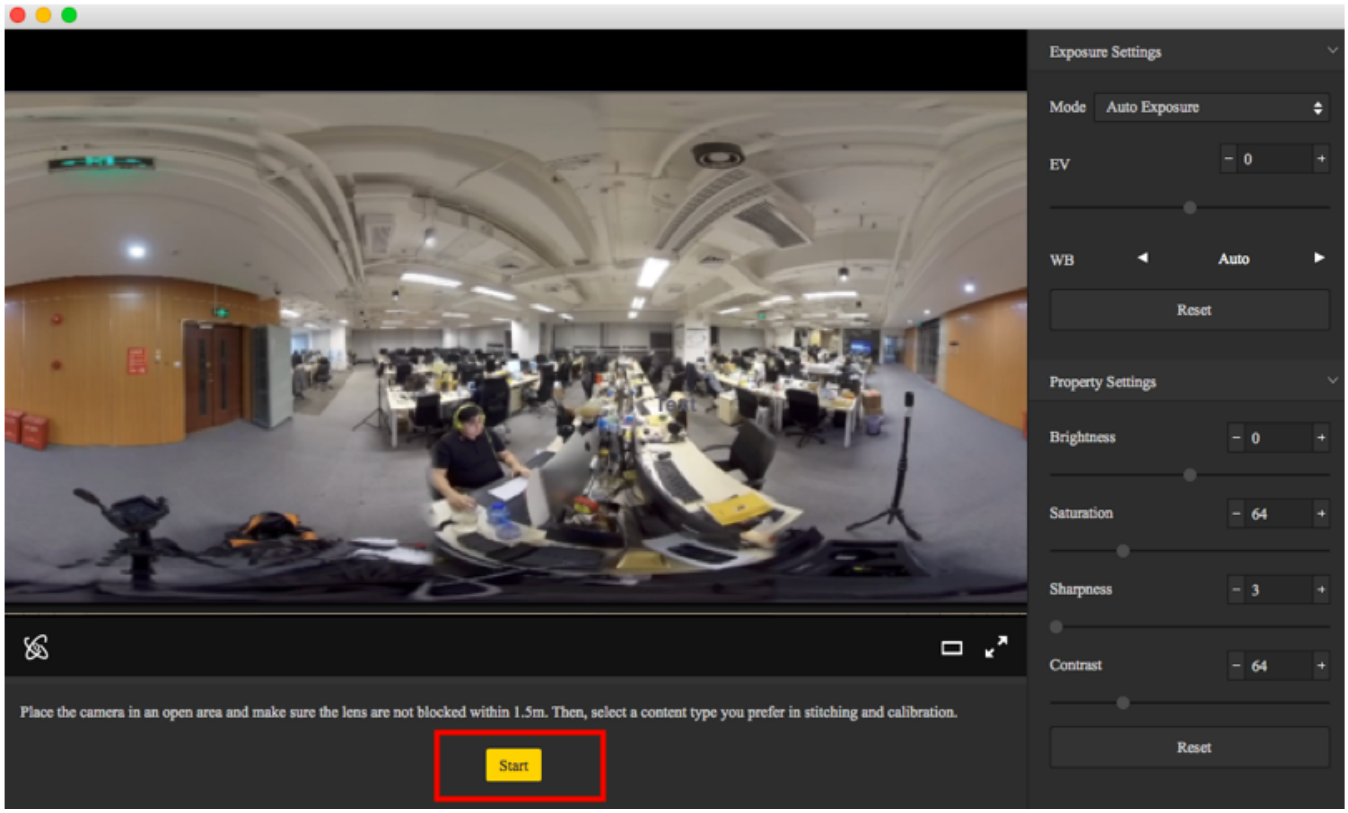
Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

Or use "Stitching Calibration" function on computer:

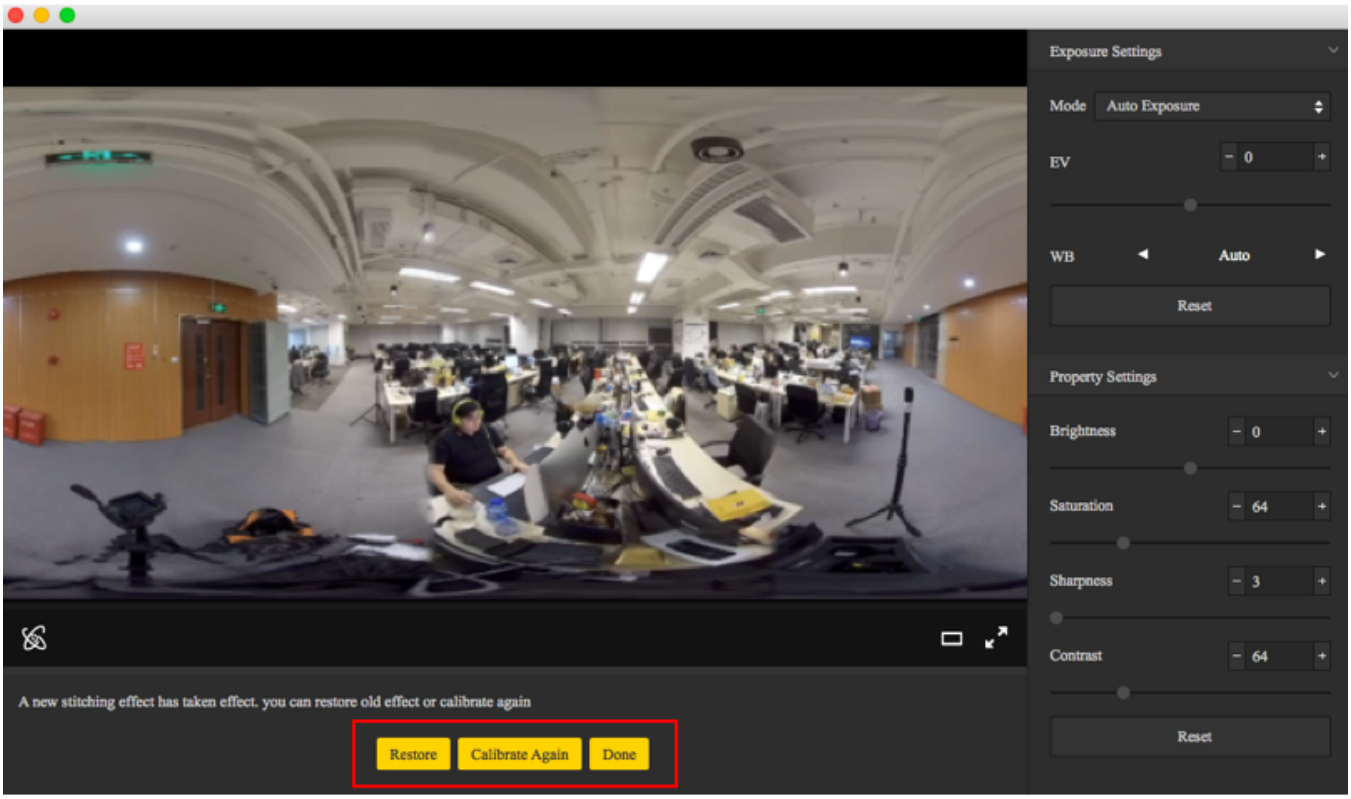
(1) Click “Stitching Calibration”



(2) Click “Start”

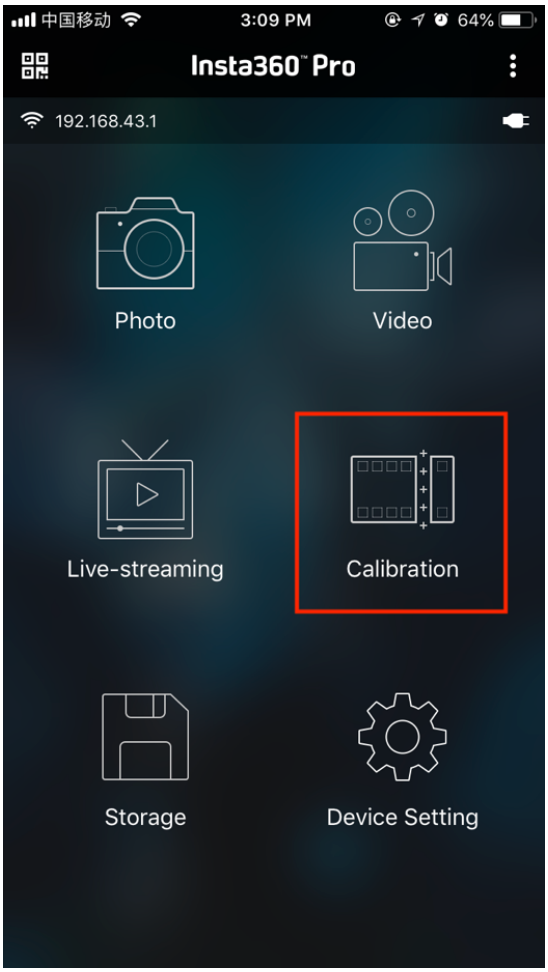


(3) After stitching calibration, select the option you need. If there’s no problem, click "Done".

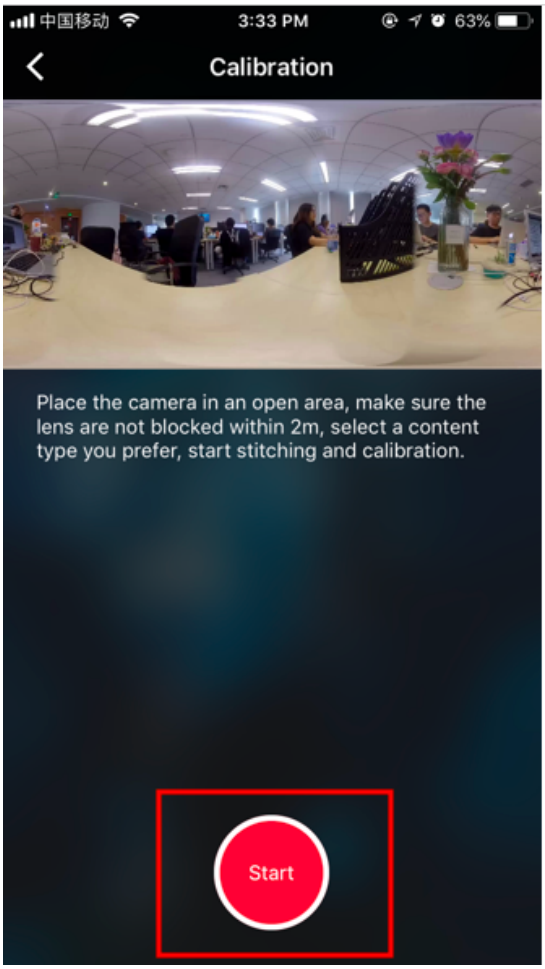


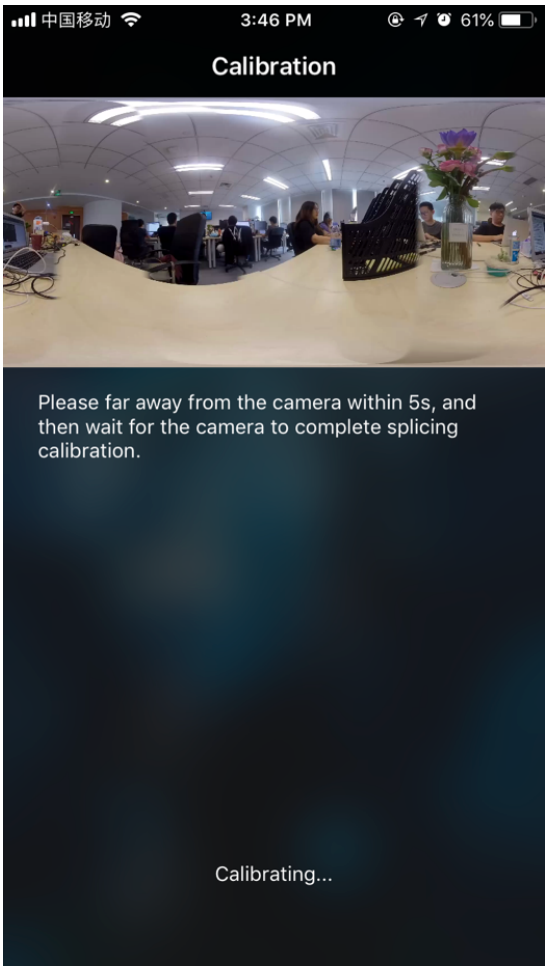
Use "Calibration" function on mobile phone:

(1) Click “Calibration” after connecting Pro to the mobile phone.

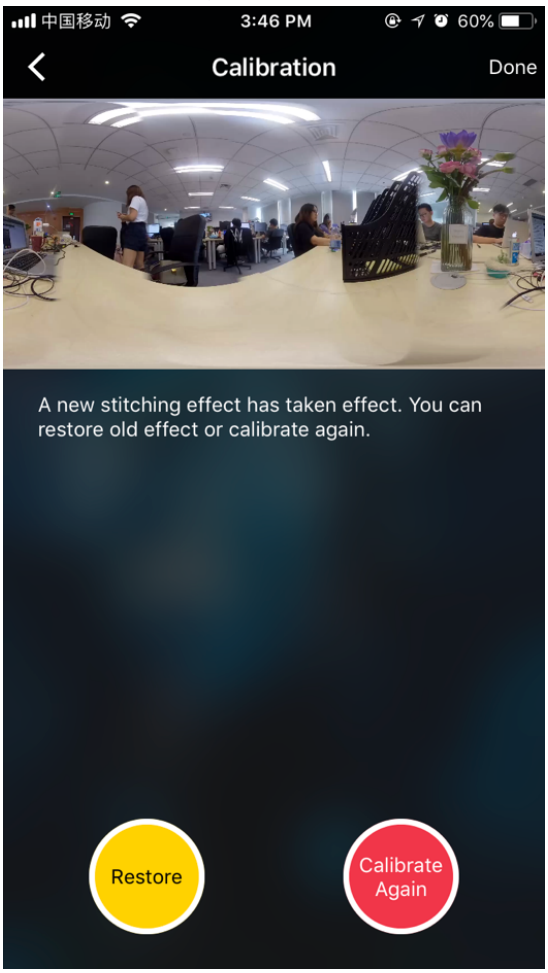


(2) Click “Start”



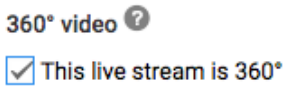


(3) After stitching calibration, select the option you need. If there's no problem, click "Done".



2. Create a live stream event on YouTube, address “https: //www.youtube.com/my_live_events “

3. In Advanced Settings, select “This live stream is 360°” option.



4. Select bitrate based on your requirements and network environment.

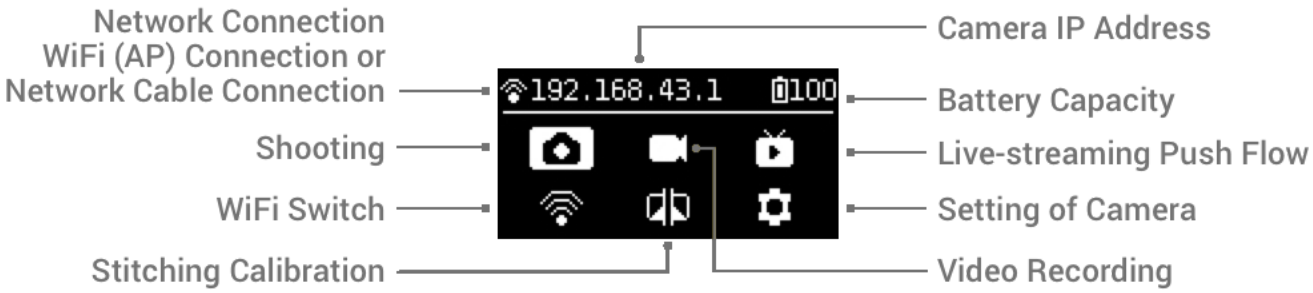
5. Select “Custom RTMP Server” and copy paste RTMP URL and stream names.

6. Click “LIVE” to start live-streaming.

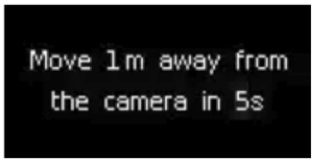
4.3.2 [Beginner] Facebook live-streaming

1. Connect the camera and apply stitching calibration

Camera's internal stitching effect depends on specific shooting scene. For example, cameras‘ shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)

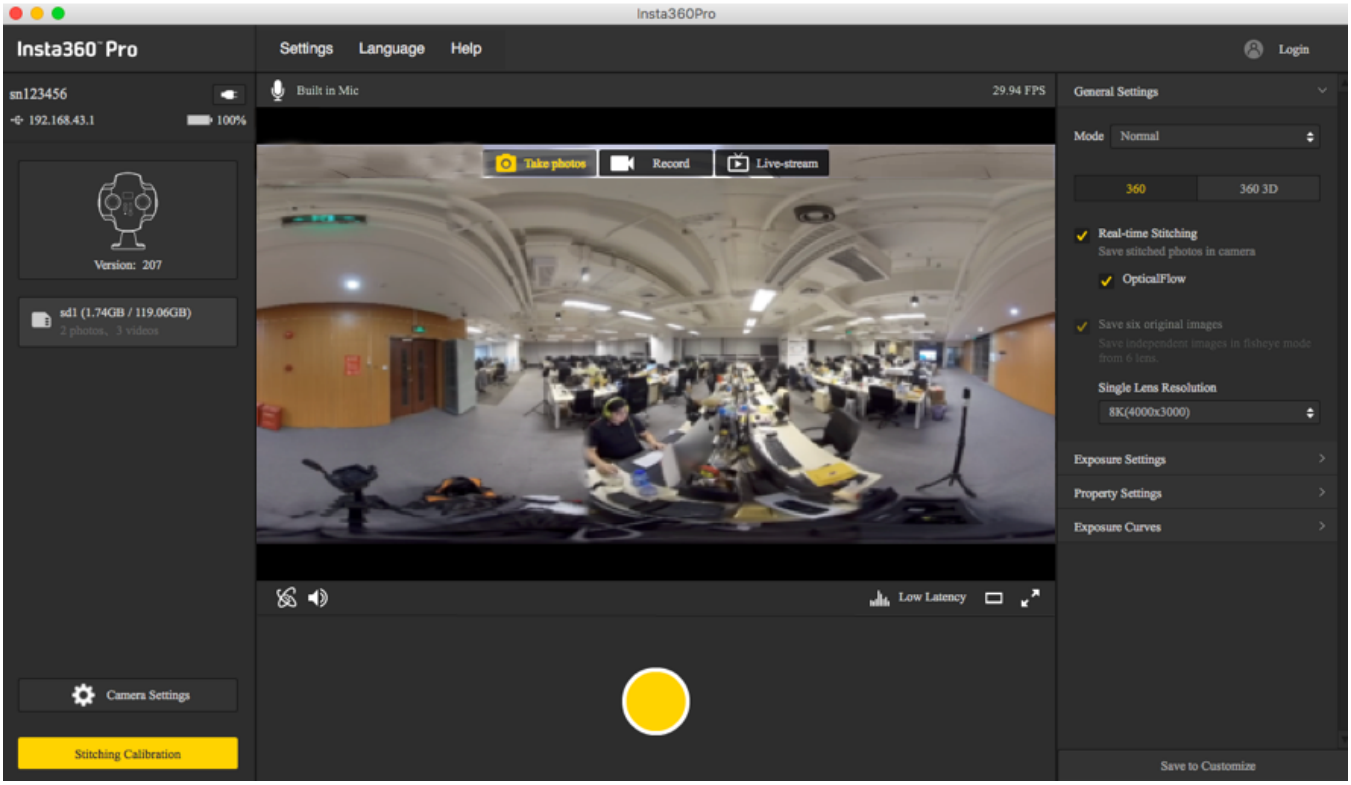


Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

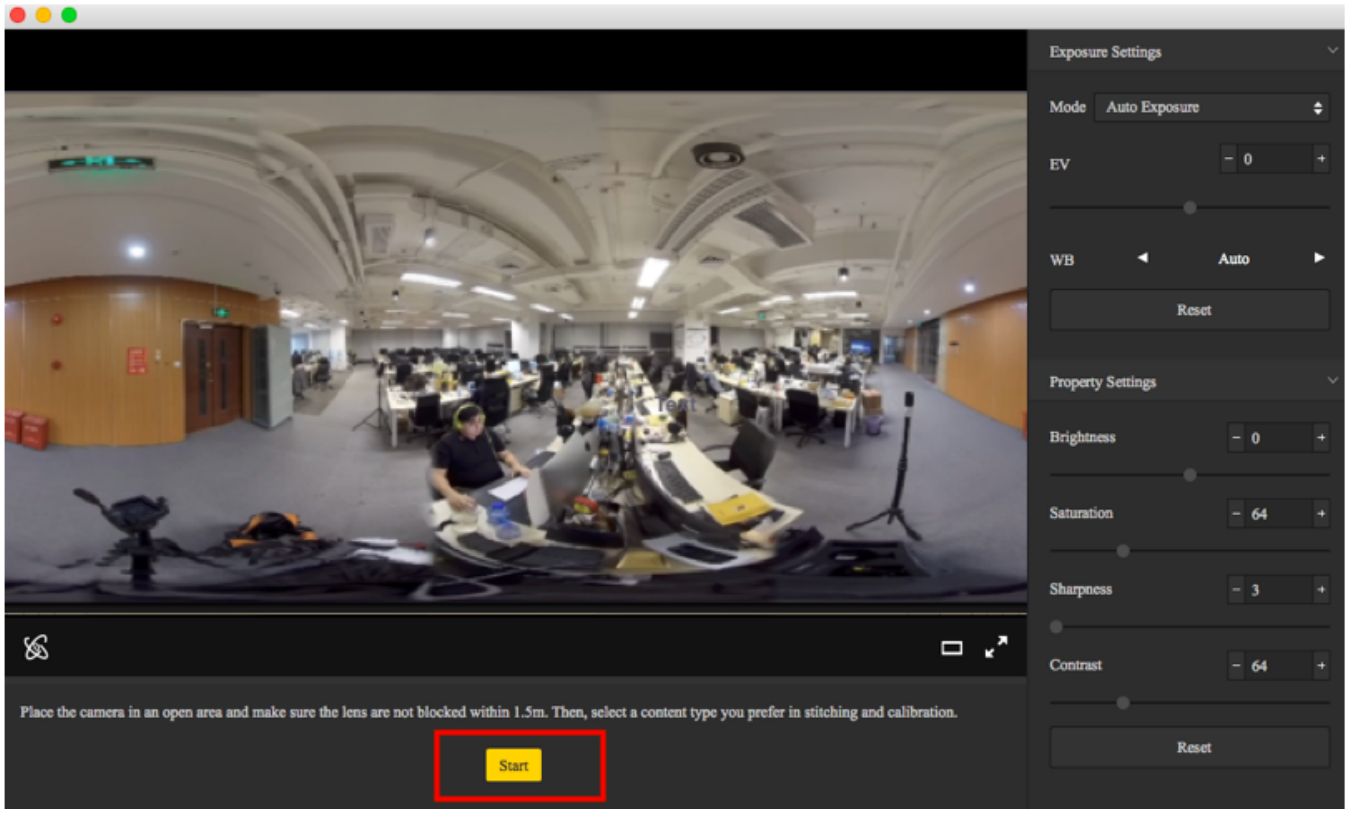


Or use "Stitching Calibration" function on computer:

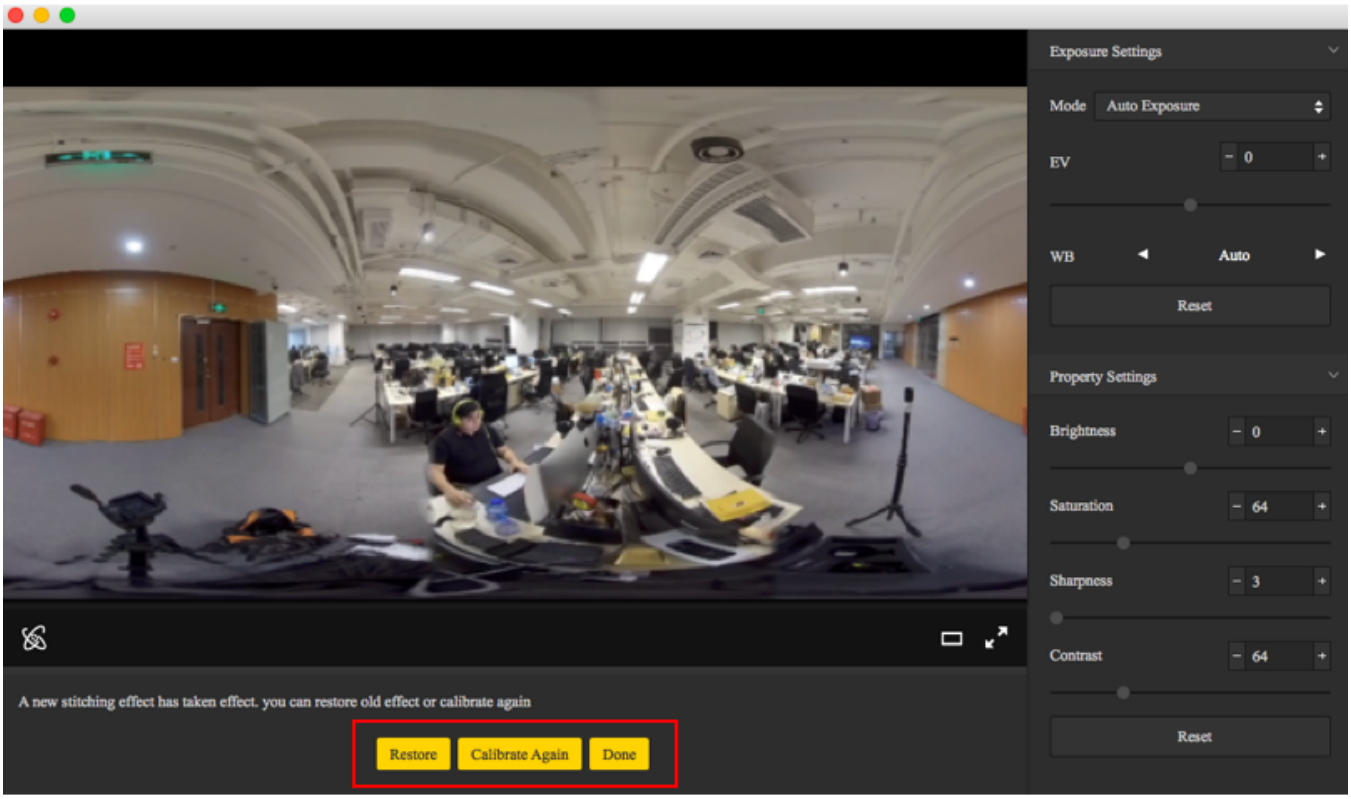
(1) Click “Stitching Calibration”



(2) Click “Start”

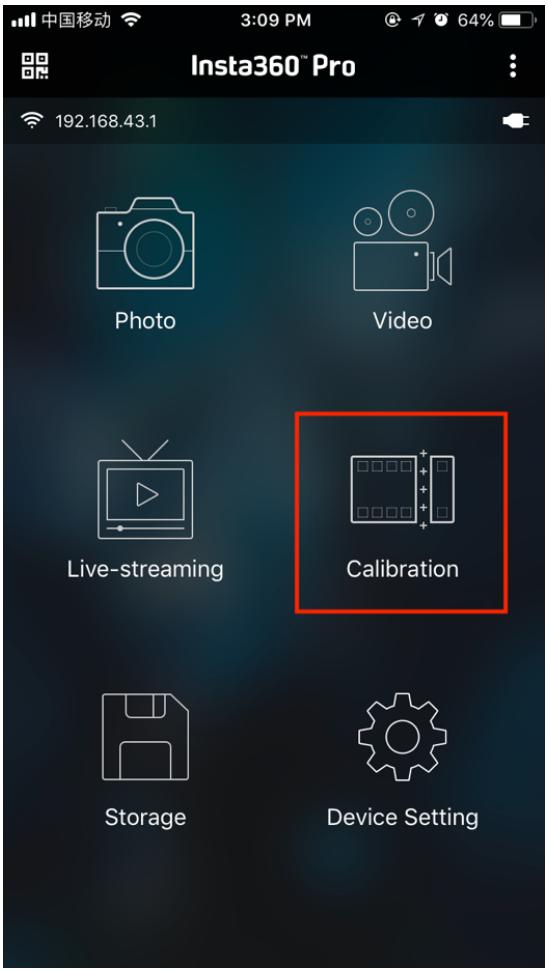


(3) After stitching calibration, select the option you need. If there’s no problem, click "Done".

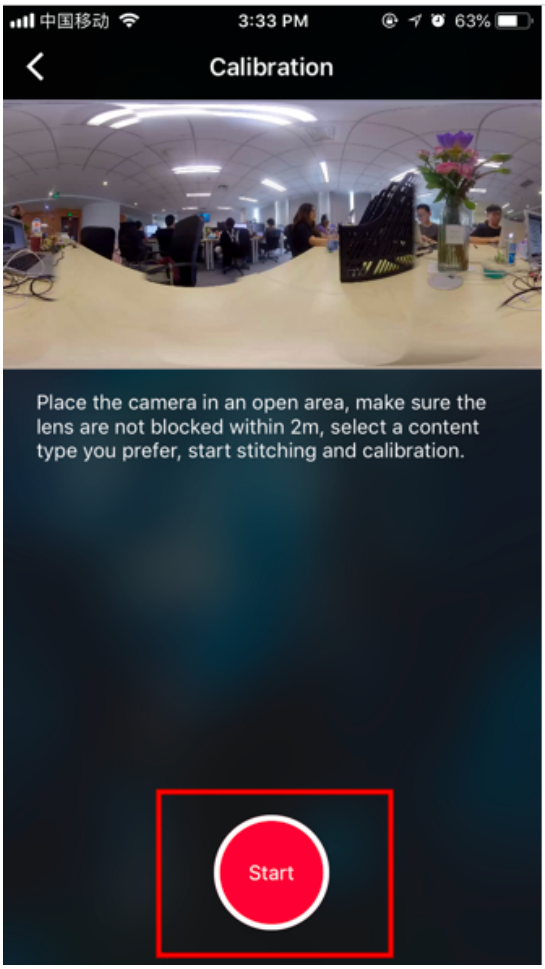


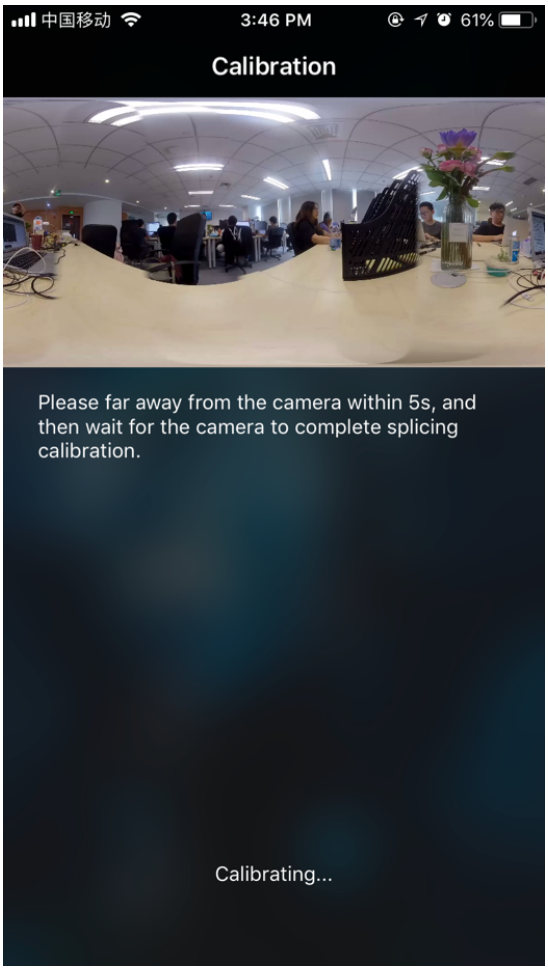
Use "Calibration" function on mobile phone:

(1) Click “Calibration” after connecting Pro to the mobile phone.

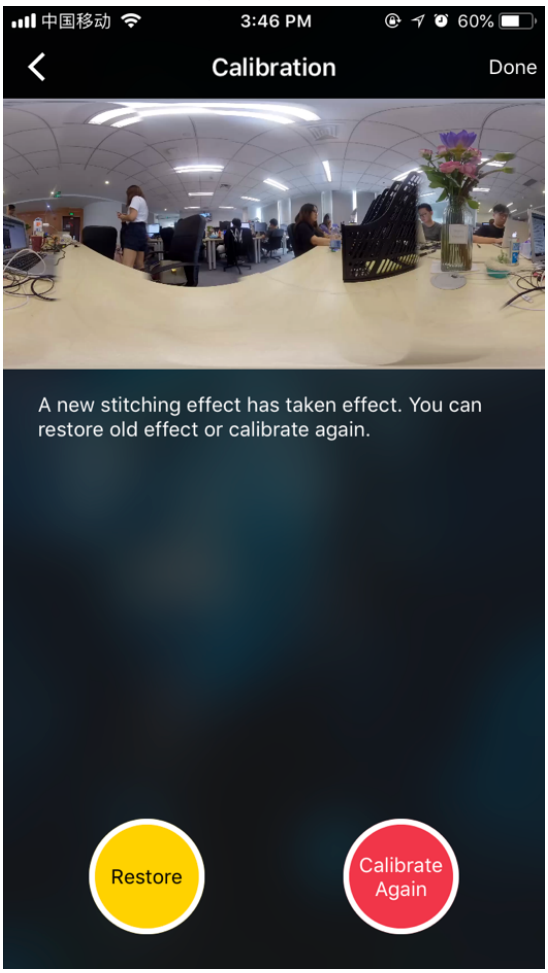


(2) Click “Start”

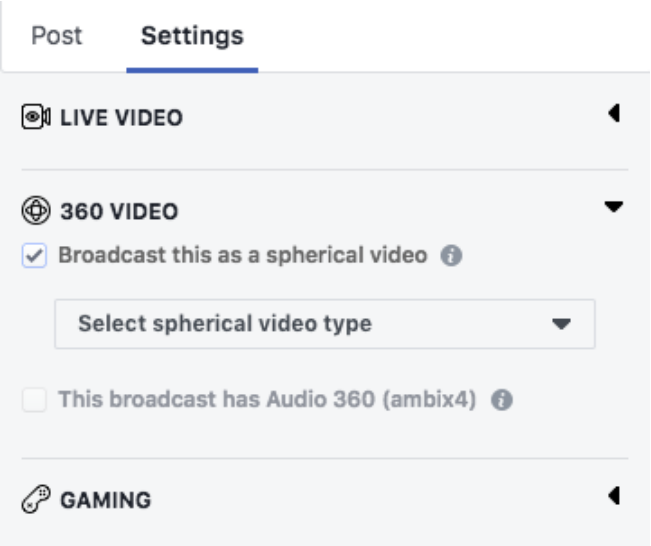




(3) After stitching calibration, select the option you need. If there's no problem, click "Done".



2. Open https: //www.facebook.com/live/create for live-streaming, and select “360 video”.



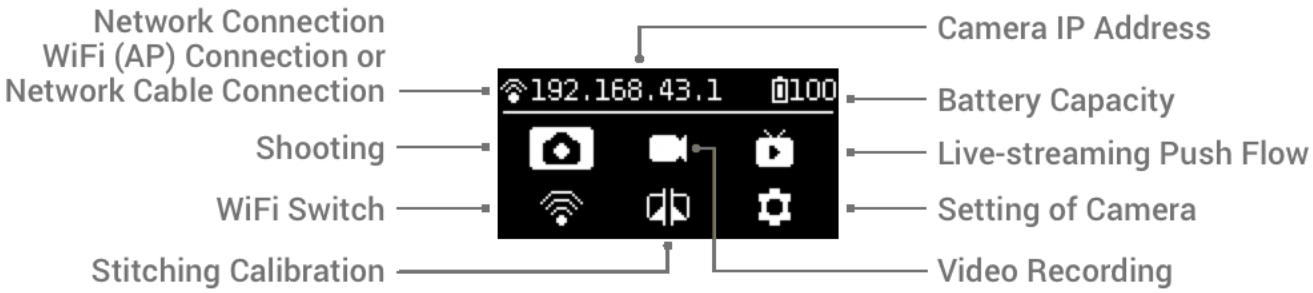
3. Select “Custom RTMP Server”, copy and paste RTMP URL and stream names.

4. Click “LIVE” for live live-streaming.

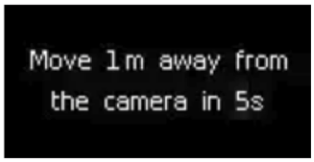
4.3.3 [Beginner] Weibo live-streaming

1. Connect the camera and apply stitching calibration

   Camera's internal stitching effect depends on specific shooting scene. For example, cameras‘ shooting quality may differ between long shots and close-ups. Therefore, if users are not satisfied with real-time stitching effect when previewing or recording (real-time stitching for live-streaming or video recording), they may use this function for calibration. (Note: do not calibrate stitching in environment without obvious feature points such as large white walls etc.)

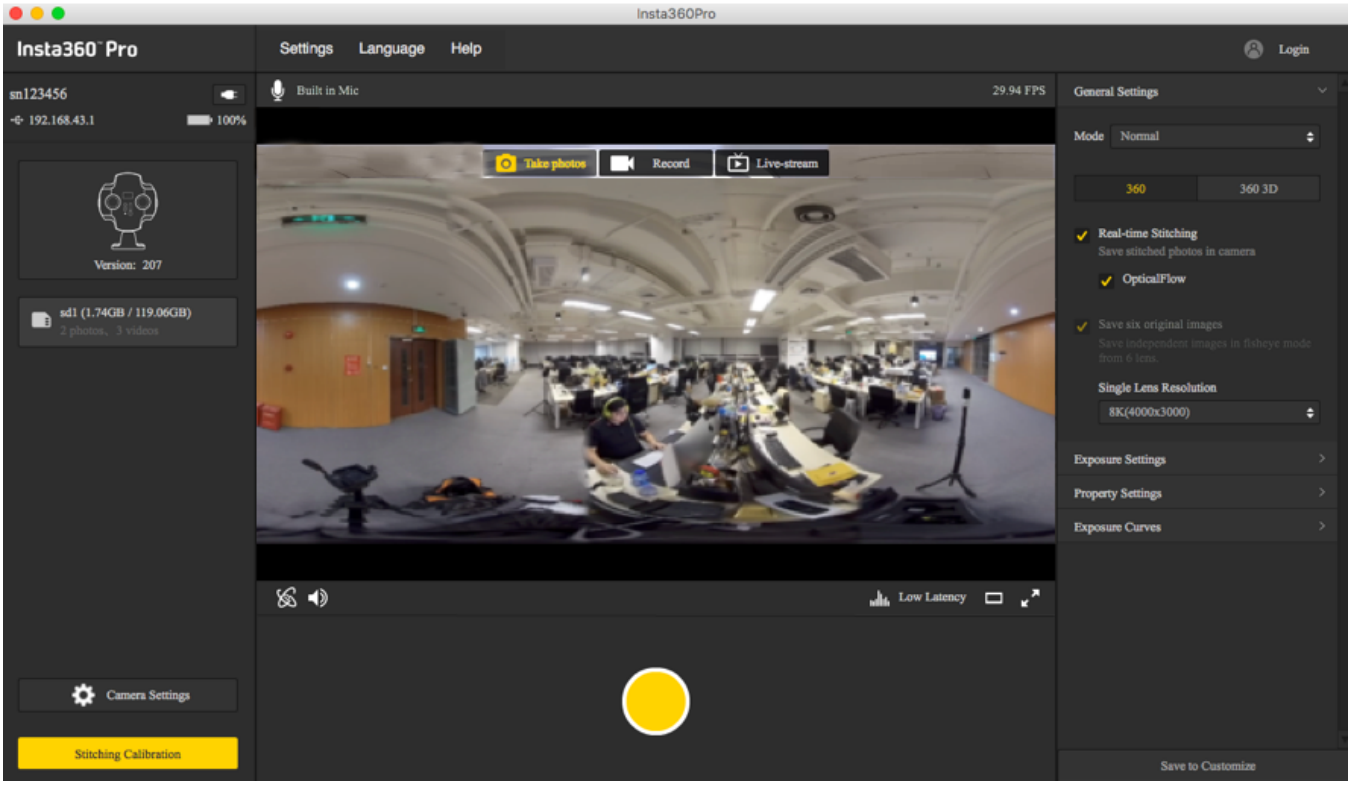


   Please be one meter away from the camera within 5 seconds after entering this function, so that stitching calibration after countdown can be achieved to the best result.

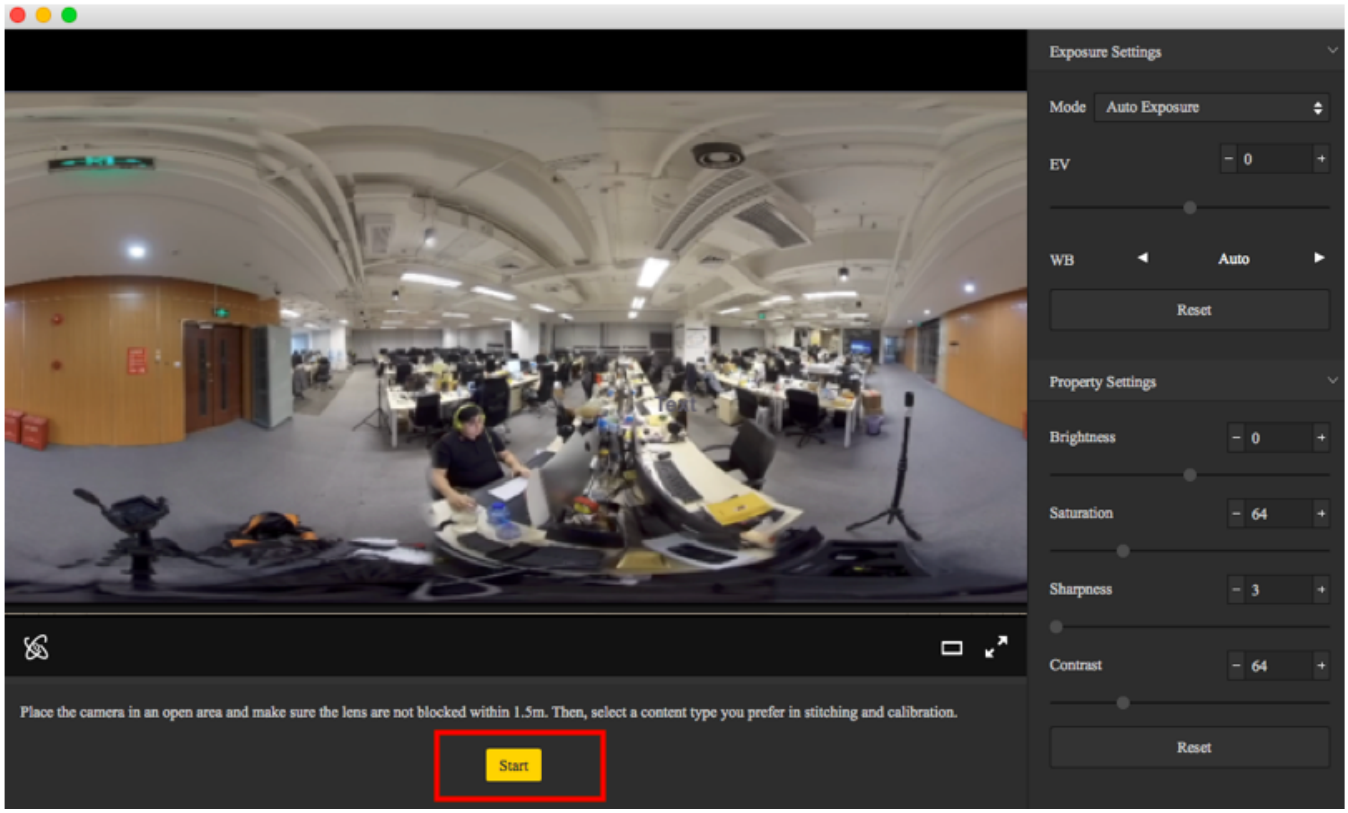


Or use "Stitching Calibration" function on computer:

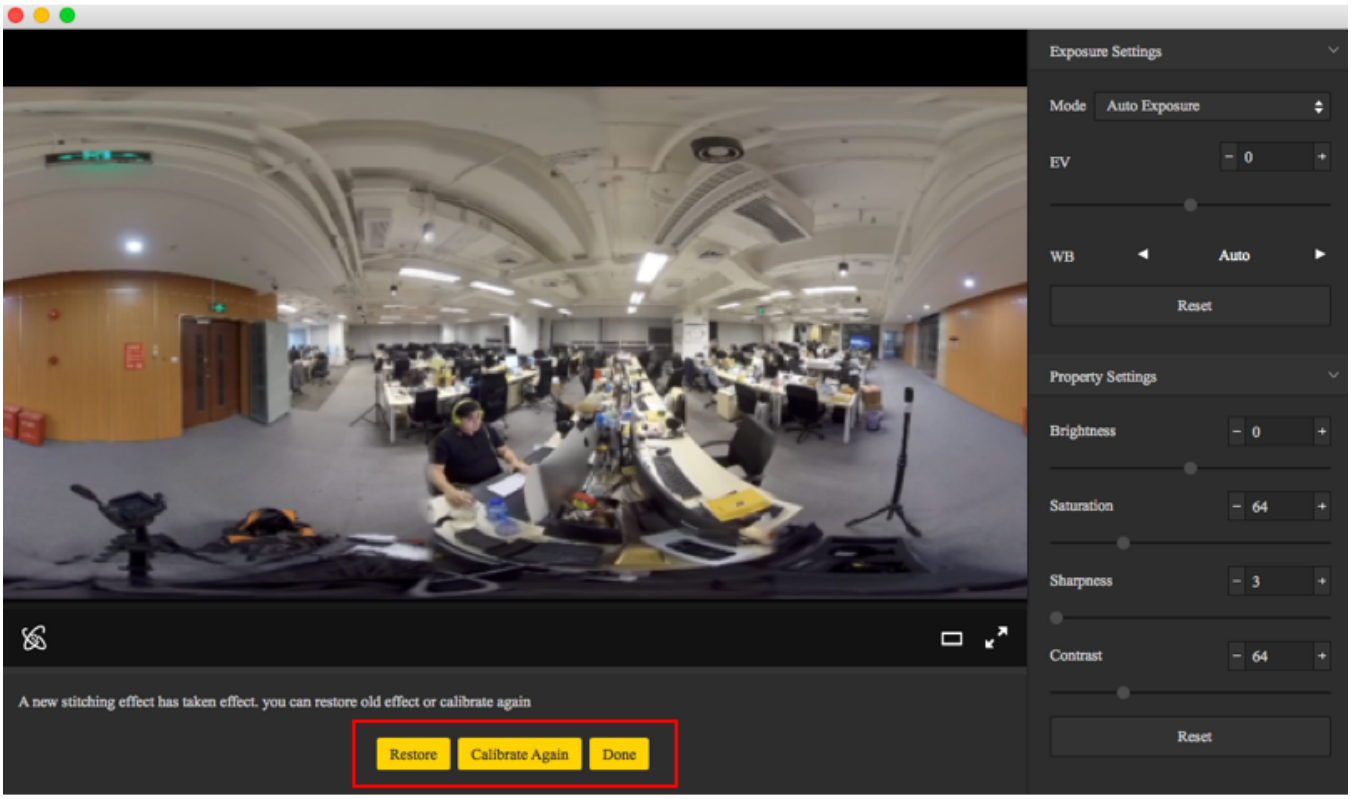
(1) Click “Stitching Calibration”



(2) Click “Start”

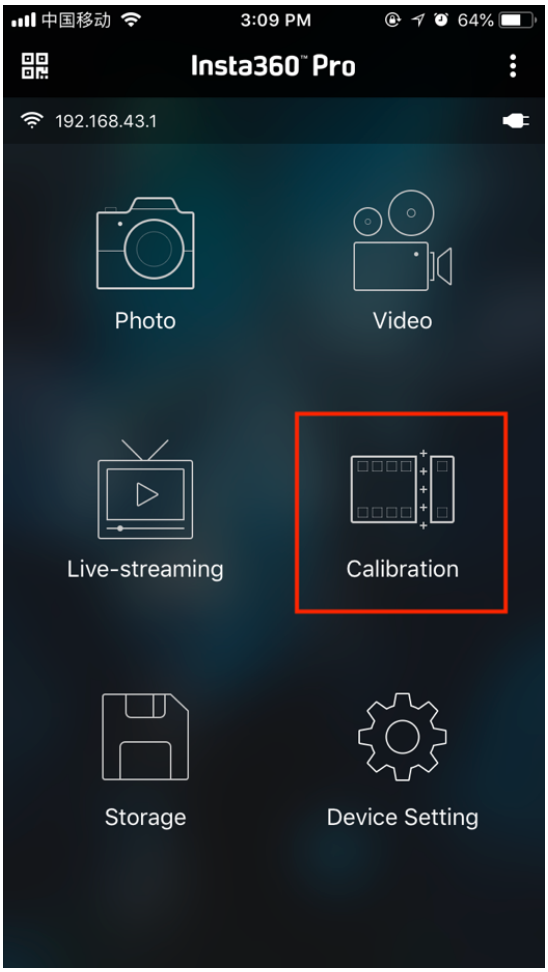


(3) After stitching calibration, select the option you need. If there’s no problem, click "Done".

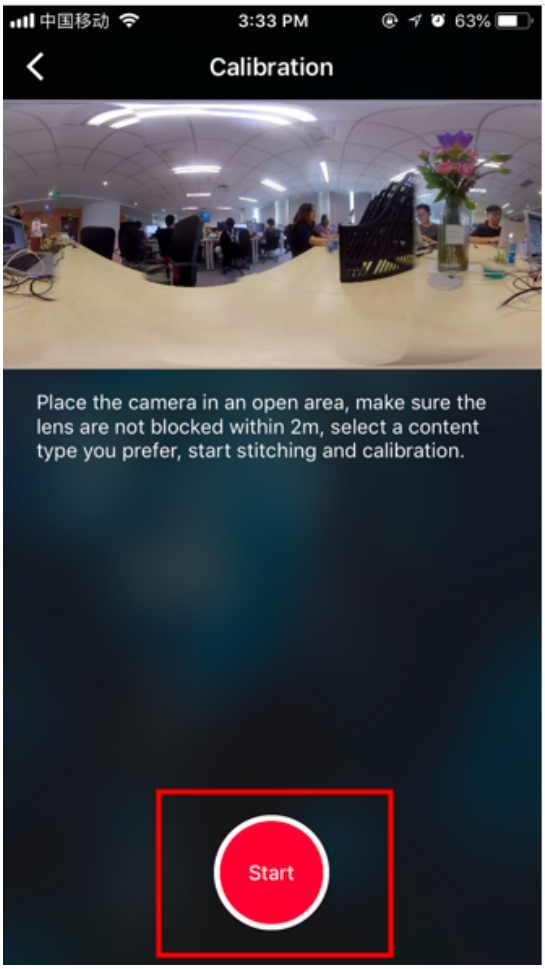


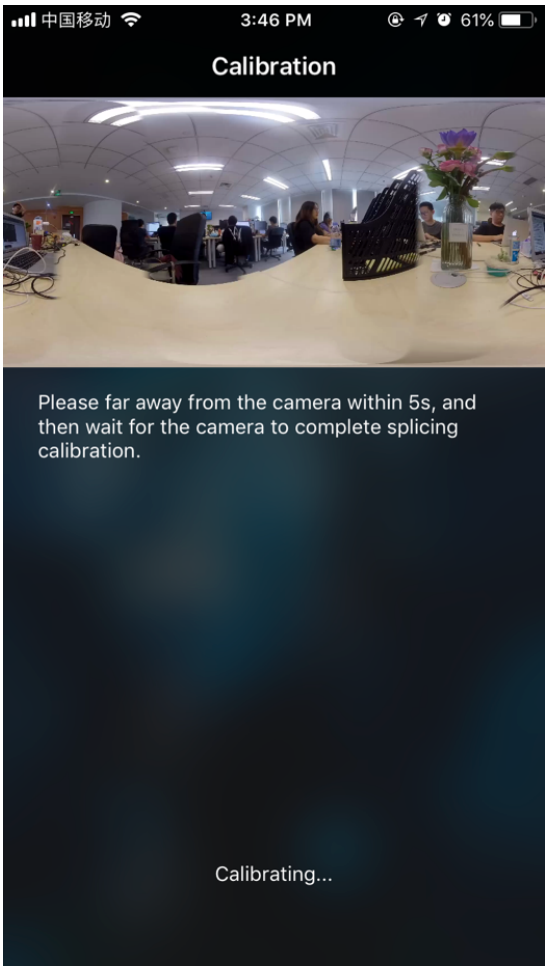
Use "Calibration" function on mobile phone:

(1) Click “Calibration” after connecting Pro to the mobile phone.

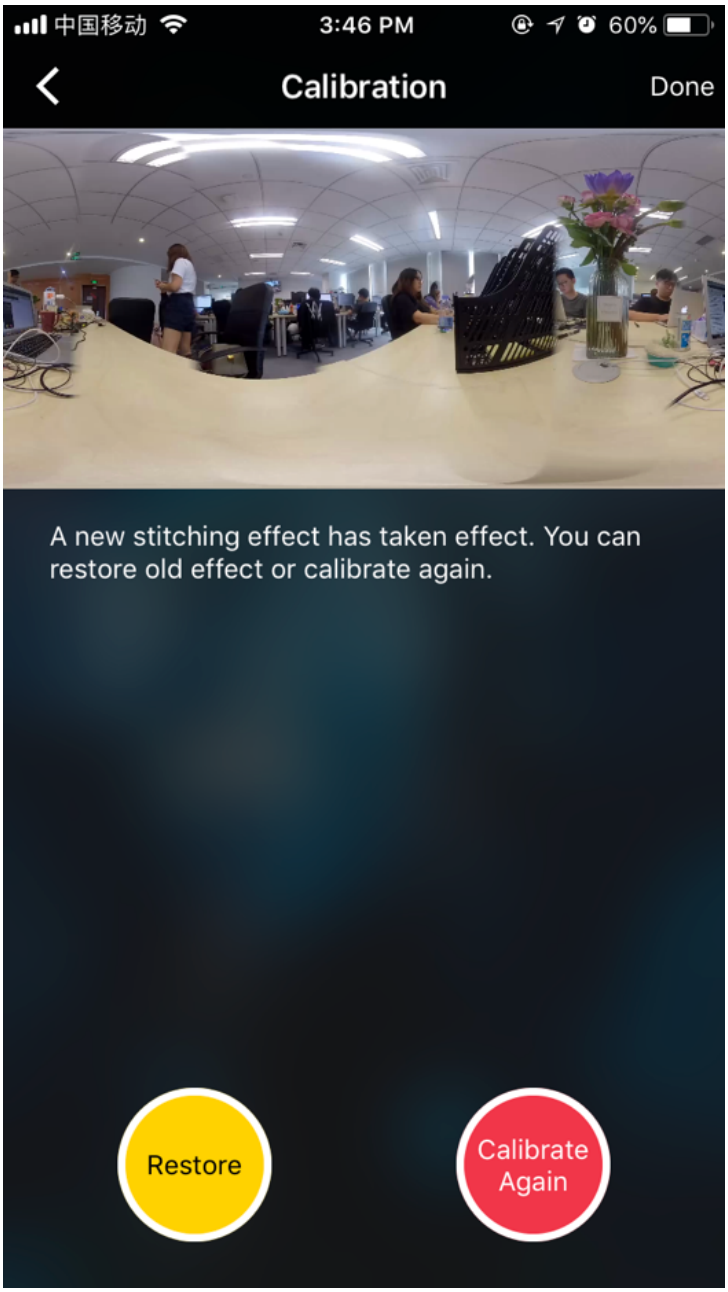


(2) Click “Start”




中国移动
3:46 PM
61%
Calibration
Please far away from the camera within 5s, and then wait for the camera to complete splicing calibration.
Calibrating...

(3) After stitching calibration, select the option you need. If there's no problem, click "Done".



2. Open "http: //tools.insta360.com/live " to begin live-streaming.
3. Binding Weibo (note: blue V users need to apply to Weibo for live-streaming)
4. Select "Custom RTMP Server" and copy paste RTMP URL and stream names.
5. Click "LIVE" for live-streaming. (Weibo live-streaming only can watch on mobile phones, and you cannot watch it on computers)

4.3.4 [Intermediate] Charging platform live-streaming, Utovr (Arcvideo, Tencent Cloud, etc.)

1. UtoVR

Before pushing, please make sure that the push device is connected to the Internet.

UtoVR users can apply for free live-streaming address via UtoVR, but there will be differences in the specification of live streaming address in different software. Here, two scenarios are illustrated as follows.

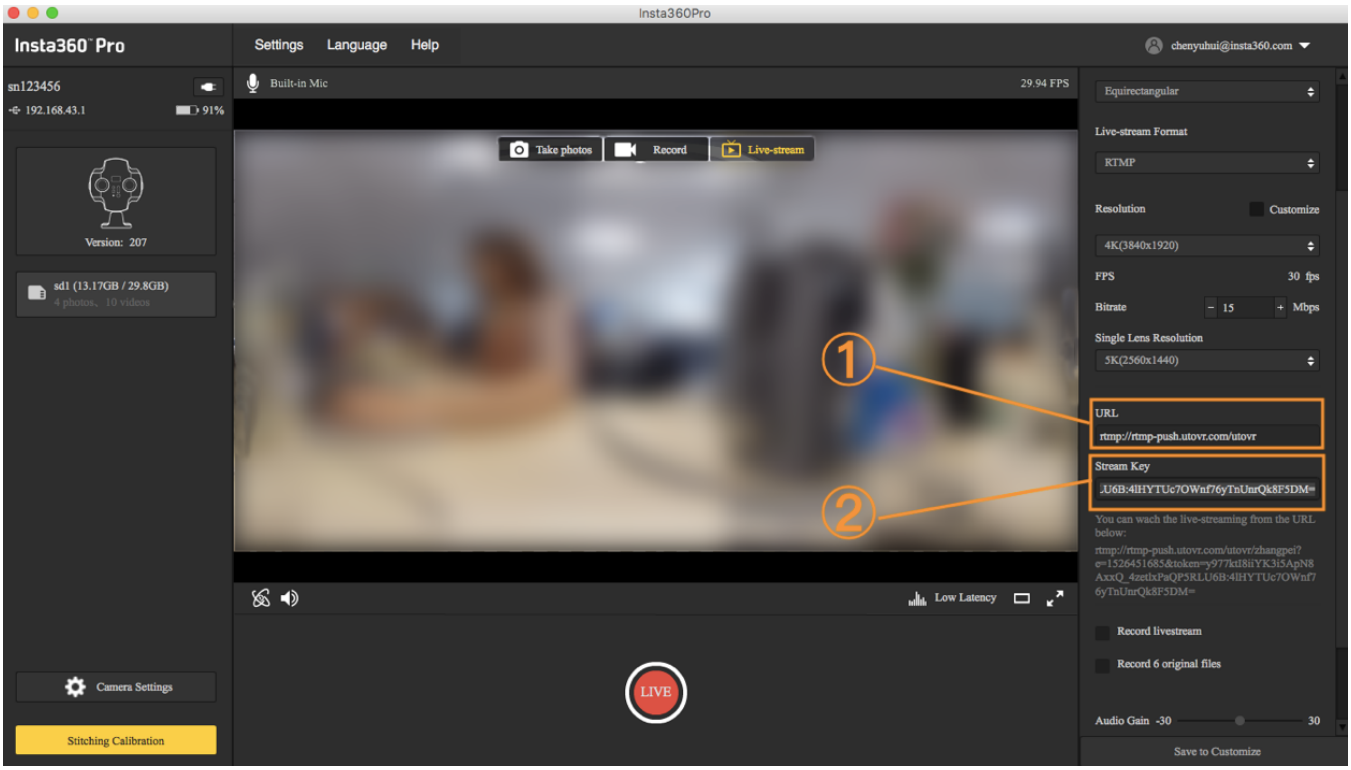
For example, the live addresses we currently receive are:
rtmp: //rtmp-push.utovr.com/utovr/zhangpei?e=1526451685&token=y977ktI8iiYK3i5ApN8AxxQ_4zetlxPaQP5RLU6B: 4lHYTUc7OWnf76yTnUnrQk8F5DM=

First thing we need to do is divide RTMP push address into two parts.

Part 1:
rtmp: //rtmp-[push.utovr.com/utovr

Part 2:
zhangpei?e=1526451685&token=y977ktI8iiYK3i5ApN8AxxQ_4zetlxPaQP5RLU6B: 4lHYTUc7OWnf76yTnUnrQk8F5DM=

with “/” behind utovr as the dividing line.

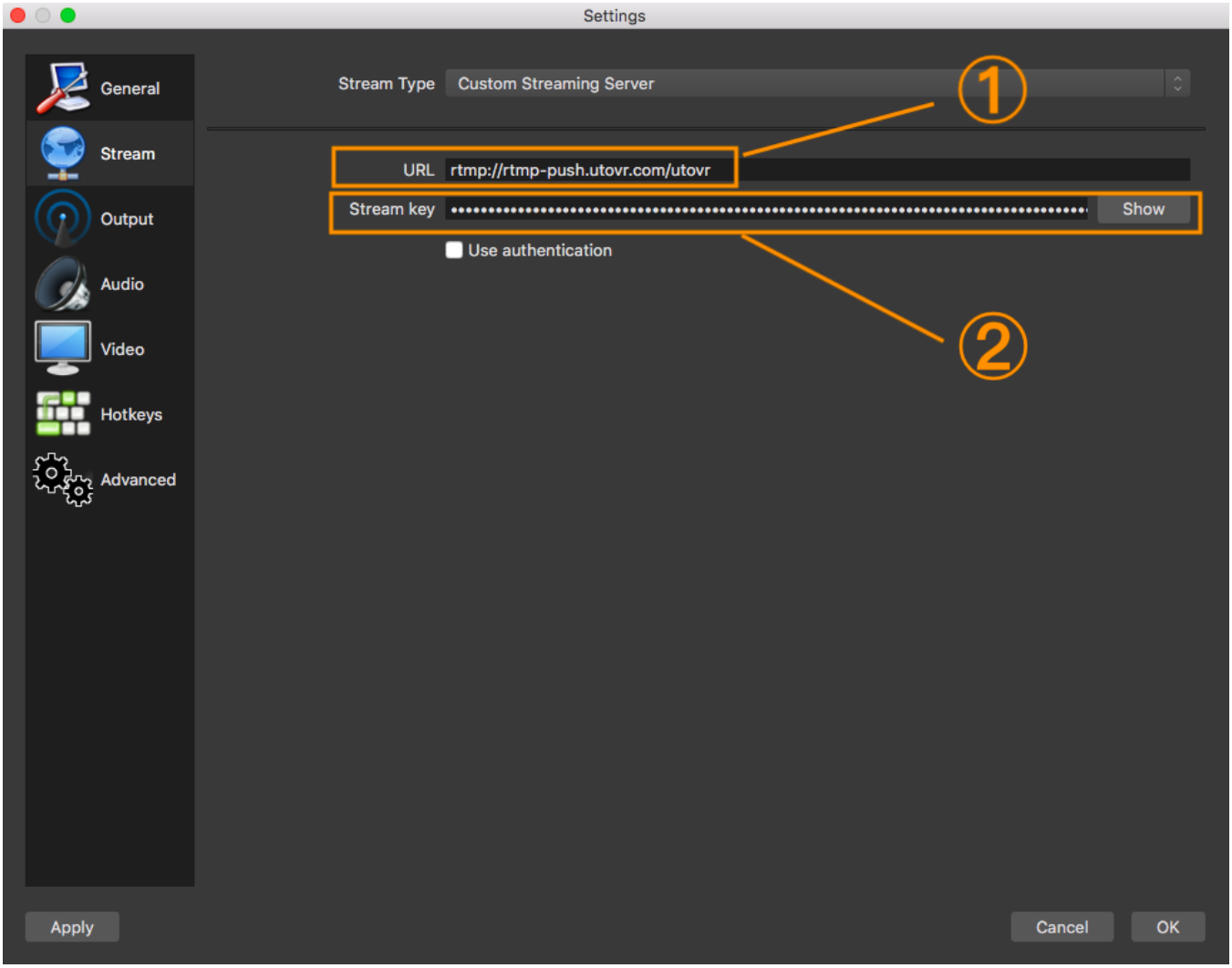


Scenario 1: fill in RTMP address in insta360 pro official control software.

Fill the first part into the column of push address in the above sequence number 1.

Fill in the stream key column in sequence number 2 with the second part.

Scenario 2: fill RTMP addresses in push software OBS



We fill the first part into the column of URL column in the above sequence number 1.

Fill in the stream name column with in the second part in the above sequence number 2.

Note: if you find a push fails, please first check whether your local network connection is normal and whether the trial time for the push address expires.

2. Arcvideo, Tencent Cloud, etc.

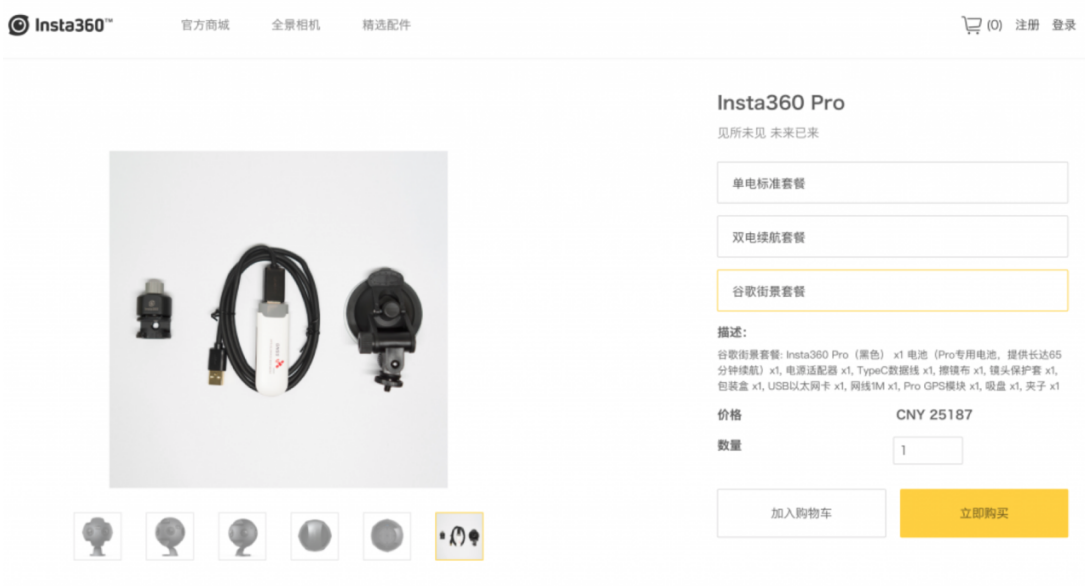
   Similarly, access your live platform, contact platform, and they will provide you with push address and push stream keys.

   Take Tencent Cloud as example, charge standard refers to: https: //buy.cloud.tencent.com/price/lvb

5.1.1 Basic preparation for Street view

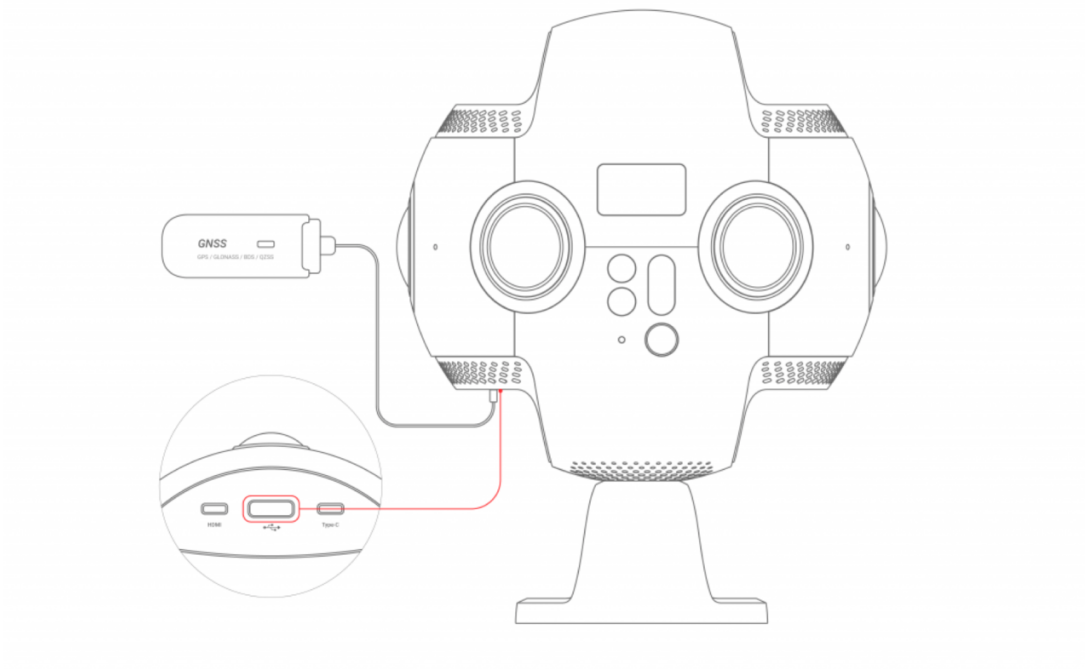
1. Please go to the official website mall (https://store.insta360.com/product/Pro_GPS). In the corresponding GPS package module of Pro product, choose to buy GPS accessories module. The accessory can be extended through the

USB port at the bottom of the Pro. Or when you buy the Pro, choose the “Google Street View package”, you will get the accessory when you pick up the product.



2. Please ensure that the camera firmware version has been updated to V157 and above. (updated to firmware 207 and above is recommended)

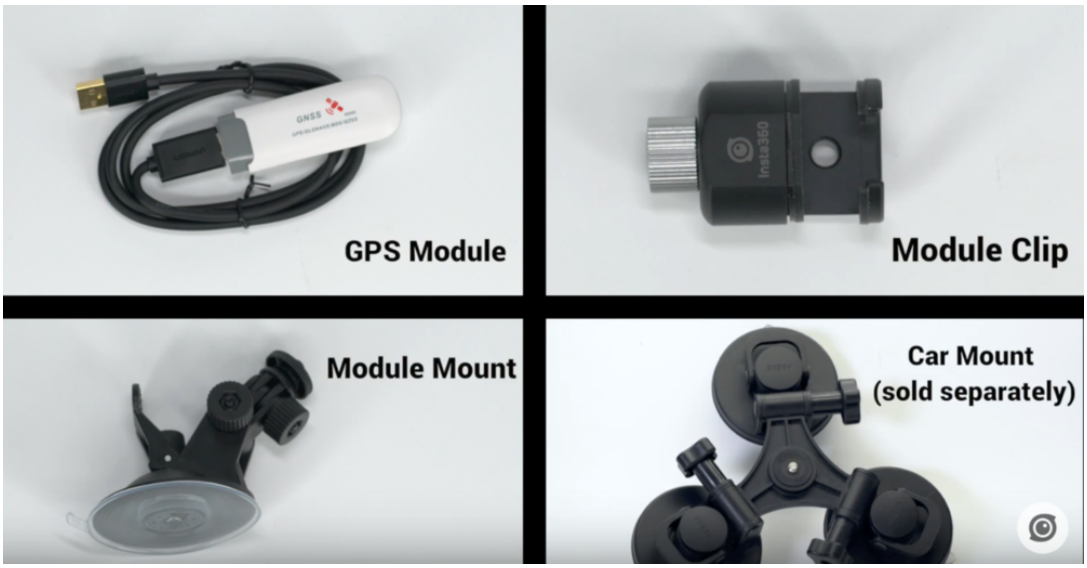
3. Please insert the GPS information module into the USB port at the bottom of the Pro. Under the normal operation of the Pro, make sure that the working light on the GPS accessory is on, and the content photographed in this state will record the GPS information.



Please note that the information recorded by the USB accessory will become inaccurate in the case of shelter. It is recommended to use the GPS extension cable (included with the package).

5.1.2 Introduction of shooting accessories for special street view

Except for the most basic GPS accessories, if there is a need to take street view on a vehicle, you need to prepare suction mount, tilt pan or small tripod to fix Pro.



As shown below, Pro equipped with GPS module is mounted on vehicle suction mount.

First, fix Pro camera on the tapped hole of triangle suction, and fix triangle suction mount safely on top of the car roof.

Then use the USB extension cable to connect the GPS accessory to the Pro camera, and hold the GPS accessory in another position on the car roof using a separate suction mount to ensure that the GPS accessory is not obscured by any other object.

The final assembly result is shown in the figure

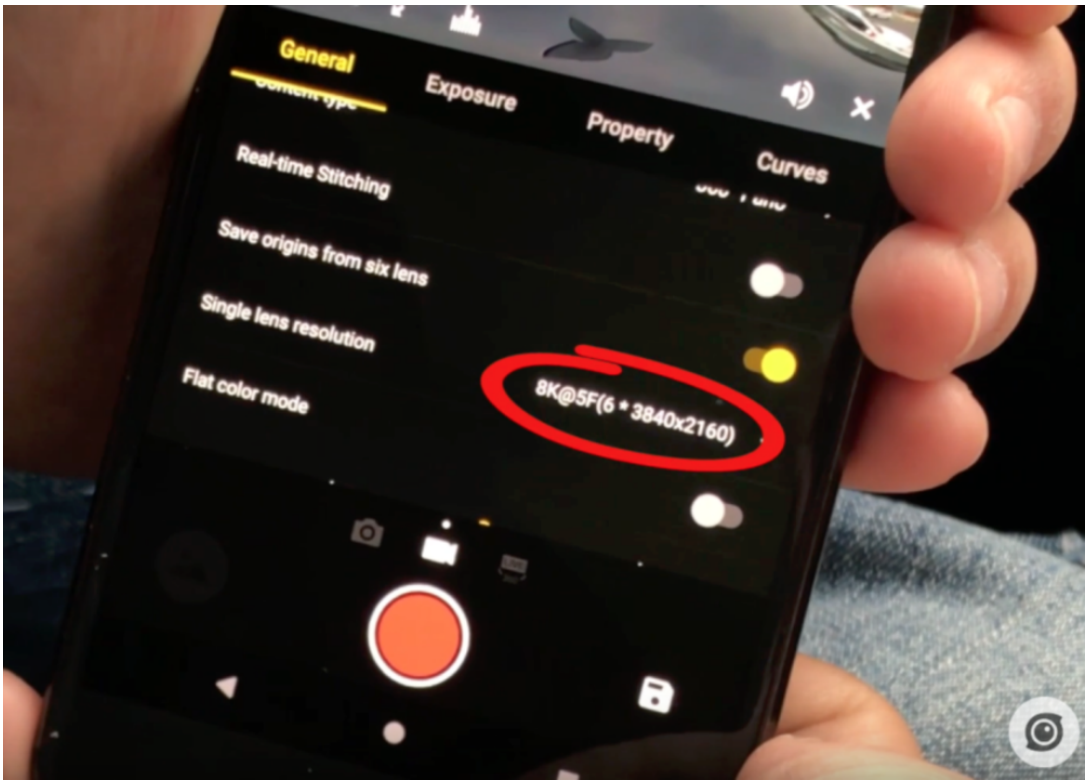
5.2.1 Parameter setting of car mounted shooting of street view

1. As shown below, ensure camera firmware updates to 157 or higher, after this version, the firmware supports Google street view photography.

   (recommend newer firmware versions 207 or above).

2. Please ensure that mobile phone app has been updated to 1.1.4 or higher versions.

   As shown below, use mobile phone app to connect to camera, enter video function interface, and set single-lens resolution to 8K@5F (6 * 3840x2160).



3. Then, press “record” , to shoot street view video that can be finally composited into 8K resolution, with 5 frames per second. In this mode, image per frame has higher quality, which can be uploaded to Google Street view as separate street view photos.

4. When shooting during driving, it is suggested that speed should not exceed 60 km/h, otherwise high speed may cause motion blur, thus making street view ineffective.

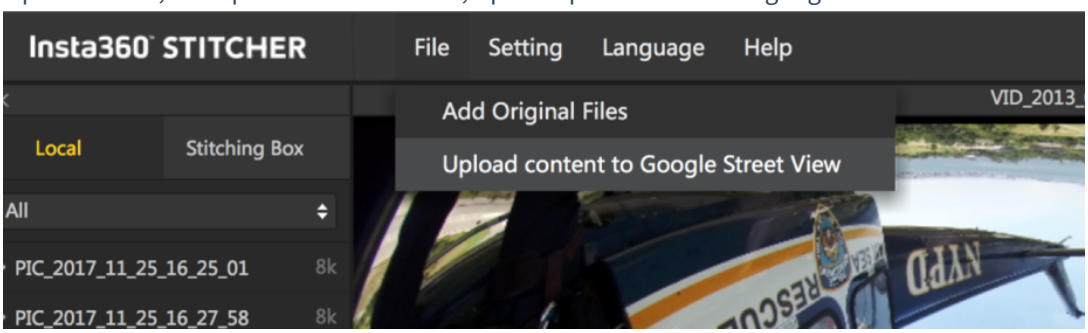
5. If long distance shoot are needed, it is recommended to use large capacity card or SSD HDD.

   Selection of storage devices refers to this post: https: //forum.insta360.com/topic/76

5.3.1 Upload street view through Stitcher

1. Ensure that Stitcher has been updated to version 1. 0 or later, with features to upload to google street view.

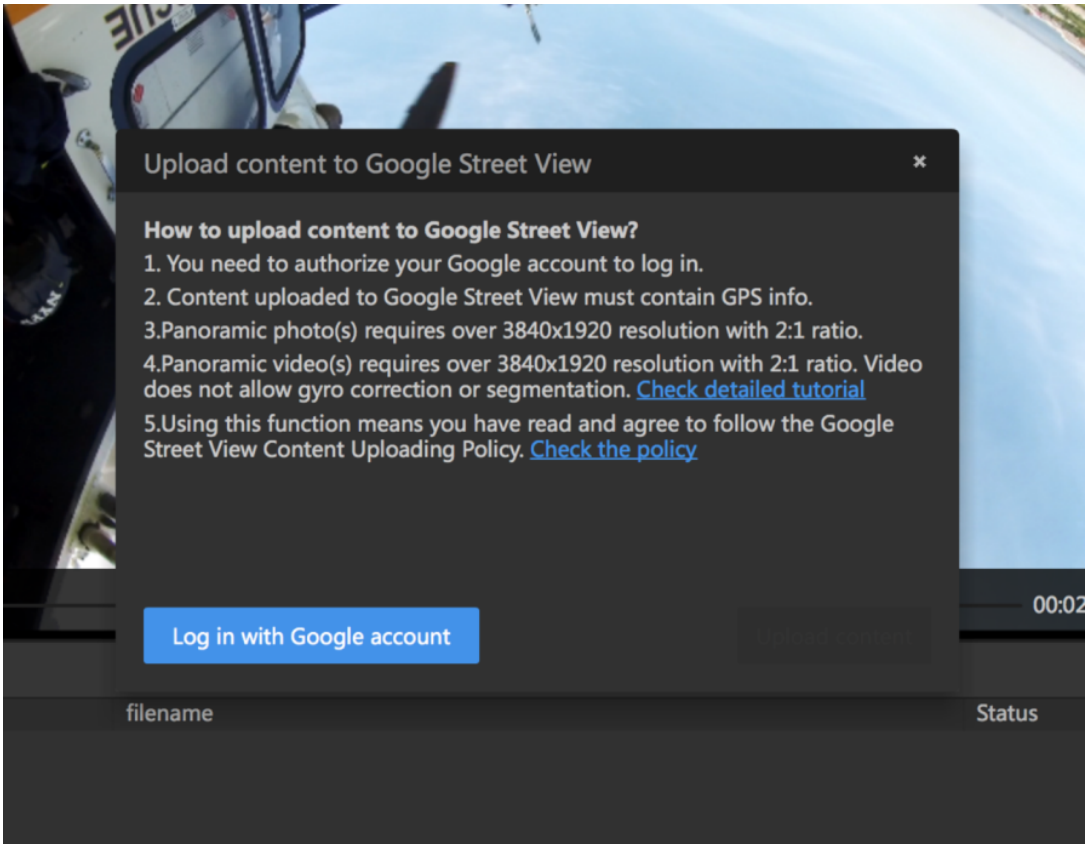
2. Open Stitcher, on top of the “File” menu, open “Upload content to google streetview” function.



3. Log into your google account in the popup menu window. As shown below, your uploaded clean content needs to meet google requirements before you pass the auditing:

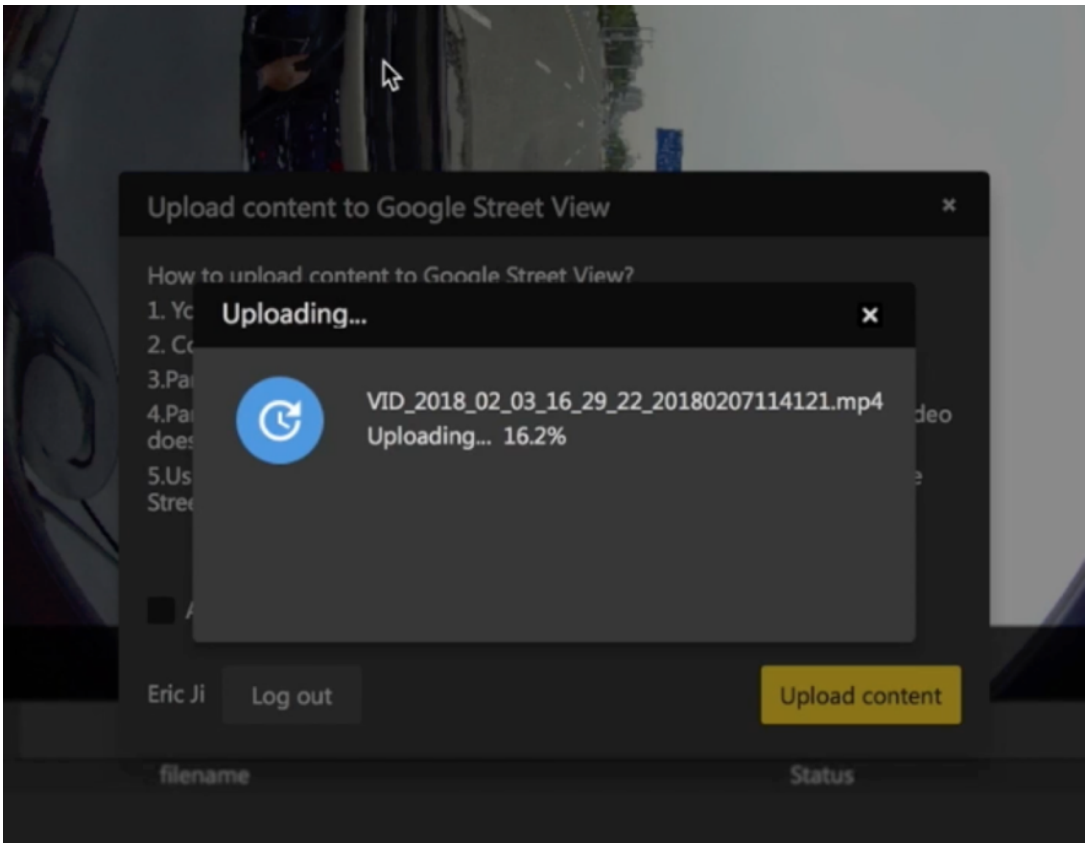
- The shooting content must contain GPS information.
- Panoramic photo specifications need to be 3840x1920 and above resolution, with screen proportion of 2: 1.
- Panoramic video specifications need to be 3840x1920 and above resolution, with screen proportion of 2: 1, and video shooting does not allow segmentation (Video Seg should be Off before shooting), and does not allow gyro correction through Stitcher.

4. It is recommended to use Pro's 8K@5fps to produce videos. After uploading , Google will make videos into street views by image sequences.



It the produced Google street view content meets above conditions, click “Upload” to submit, and wait for upload progress completed. If uploaded video is of 8K@5FPS, it will automatically be parsed into consecutive street view

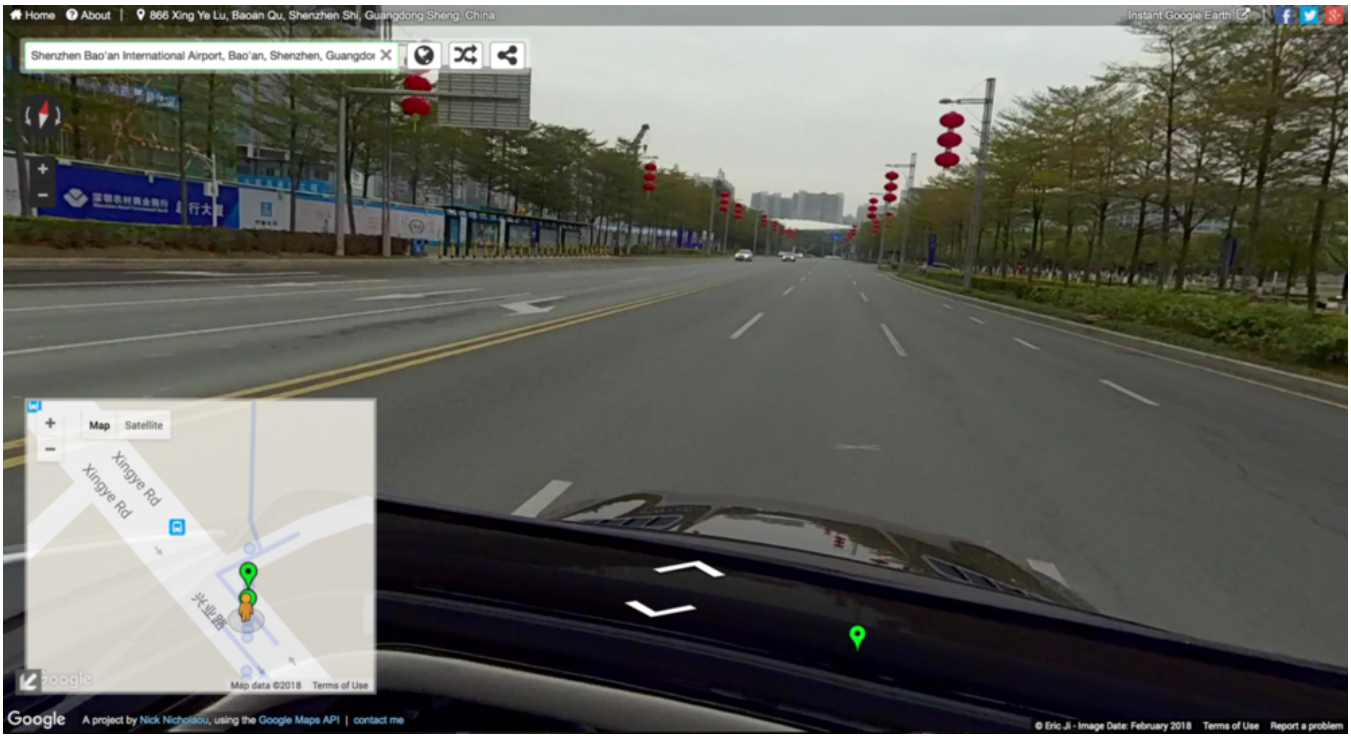
photos by Google.



5.4.1 Watch street view content via Stitcher

1. Videos successfully uploaded by Stitcher need to wait for Google server to audit before available in street view app.

2. Please note that if what you upload are photos, they are generally available in street view app and personal account of “private” within minutes. If what you upload are videos, they need several minutes to several hours of audit according to the different duration. If what you upload are 8K@5FPS videos, they will automatically be parsed into consecutive street view photos by Google.



3. If consecutive shooting lines are taken, blue lines will appear in street view maps. If they are separate locations, there will be blue dots in street view maps. If what you took were continuous shooting lines but what appear on maps were points, there may be two reasons:

   ① excessively fast speed, resulting in large GPS data displacement, which is identified by Google as independent location.

   ② GPS signals are blocked. They are identified by Google as independent locations.

   So it's important to ensure that GPS signals are stable and not to move too fast.

4. If what uploaded to Google Street view is of high quality, it will be selected by Google to join Google earth display.

6.1 [Advanced] Manual exposure and curve adjustment

Automatic exposure algorithm takes equalized exposure of overall image. It may be inaccurate to expose in certain scenarios so that manual exposure settings can be used to shoot.

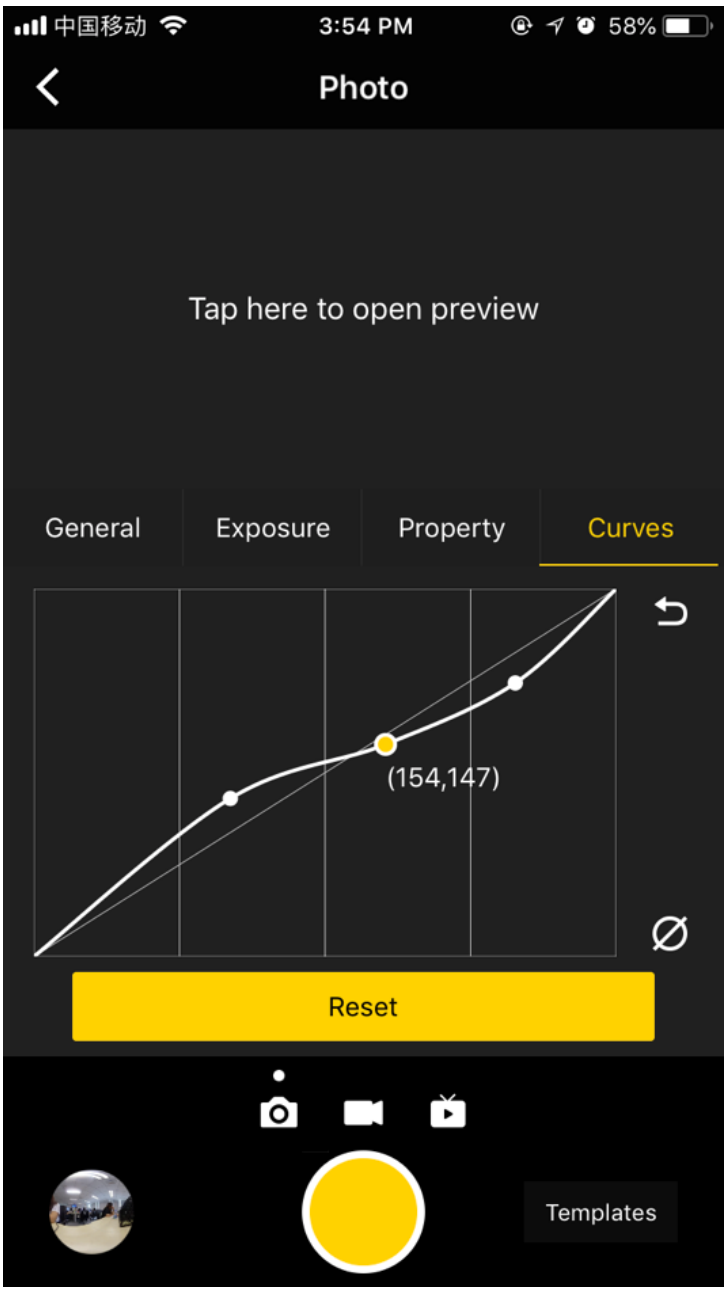
Under the mode of photographing and timelapse, there are three modes for exposure: automatic exposure, manual exposure and isolated exposure. Two exposure modes of shutter priority and ISO priority have been newly added. Shutter priority or ISO priority exposure mode cannot preview the effect in real time. When photographing in manual exposure mode, ISO (100 ~ 6400), shutter (1/30s ~ 1/8000 s) and white balance (Auto, 2700K, 3200K 4000K, 5000K, 6500K, 7500K).

When recording, you can select from three modes of automatic exposure, manual exposure and isolated exposure. ISO (100 ~ 6400), shutter (1/30s ~ 1/8000s), white balance (Auto, 2700K, 3200K 4000K, 5000K, 6500K, 7500K)can be adjusted in manual exposure mode.

When using control client terminal to connect camera to shoot, you can use curve function (similar to PS curve) to make real-time adjustment in each exposure part.

As an addition to exposure parameters, this function can adjust the intensity of brightness in different parts in detail.

Note that there is no need to use curve functions when shooting RAW photos or i-Log videos. Curve parameters can be saved to camera parameter templates for later use.

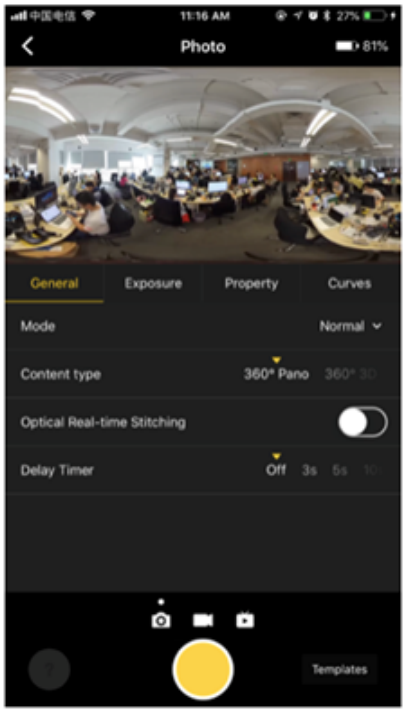


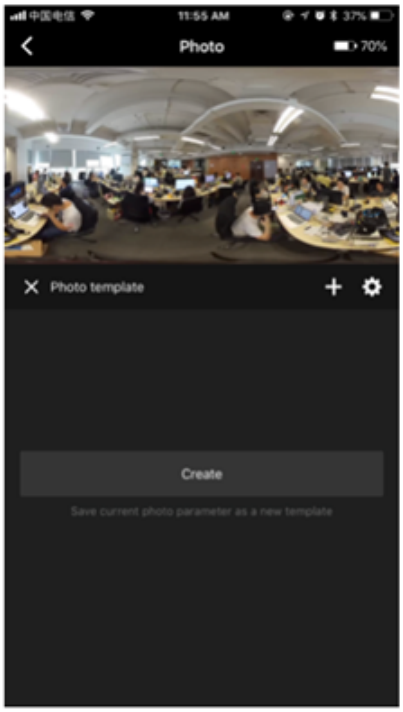
Please check the operating video: https: //v.qq.com/x/page/l0522wvhdov.html?start=29

6.2 [Advanced] Customize and template

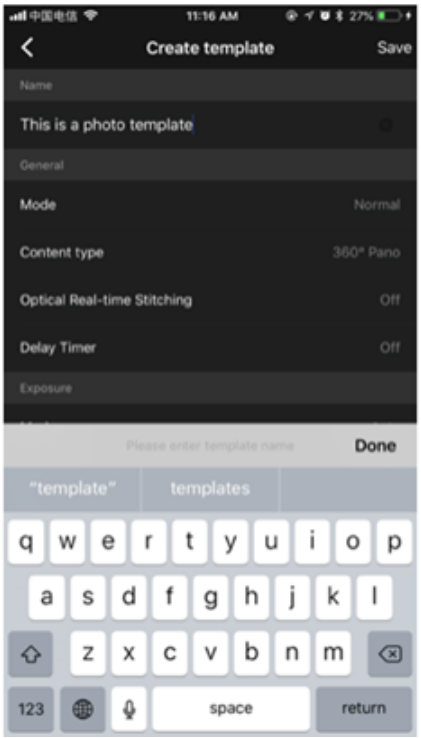
Parameter template function is newly added in the app. After connection to the camera, please go to the app's shooting interface. At the bottom right corner of the interface, there is an entry for "Templates" (parameter template), click to

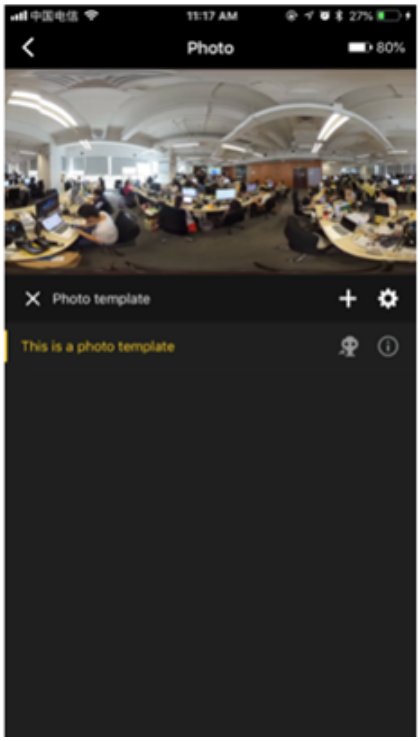
create a template that saves parameters under current shooting mode.



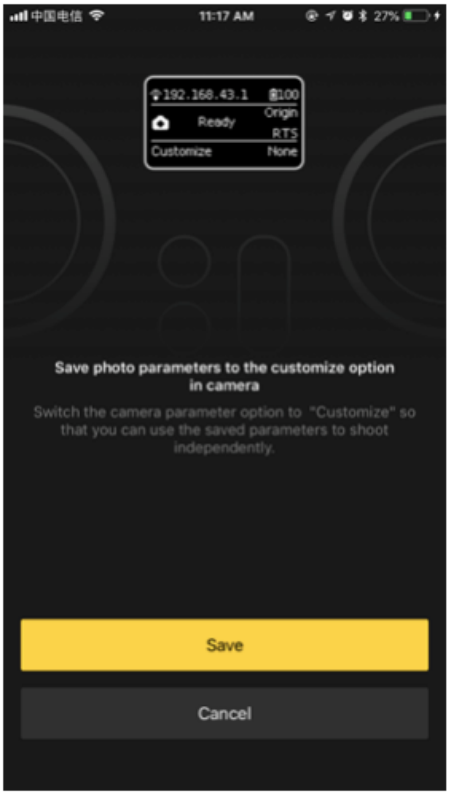


After naming and saving the current parameter template, you can select the stored parameter template to quickly set parameters in later use.

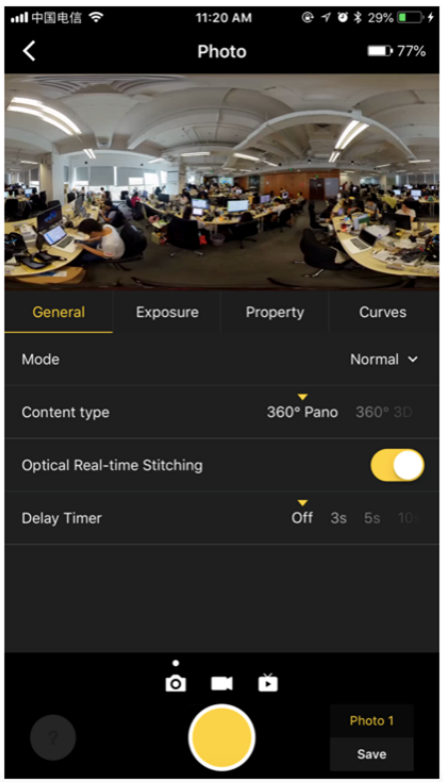




The original function to save parameters to camera custom options is adjusted to the right side of the parameter template option. Click on icon to send to camera, and a prompt will pop up to confirm whether you want to save parameters for this template to camera custom options.



If you need to modify parameters for a parameter template, please adjust the parameters you want under the state of using this template. Once you have adjusted, a “Save” button will appear below the parameter template name in use at the lower right corner. Click it to save modified parameters of parameter templates.



Note that the use of parameter templates takes effect only for the current shooting mode. This means once you switch the mode (e.g. switching from photographing to recording or live-streaming) or reenter into shooting interface after exiting camera interface, parameter template at the right corner will become an option without selection. Resetting parameter templates simply changes the status to "unselected" and does not change parameters that have been currently set.

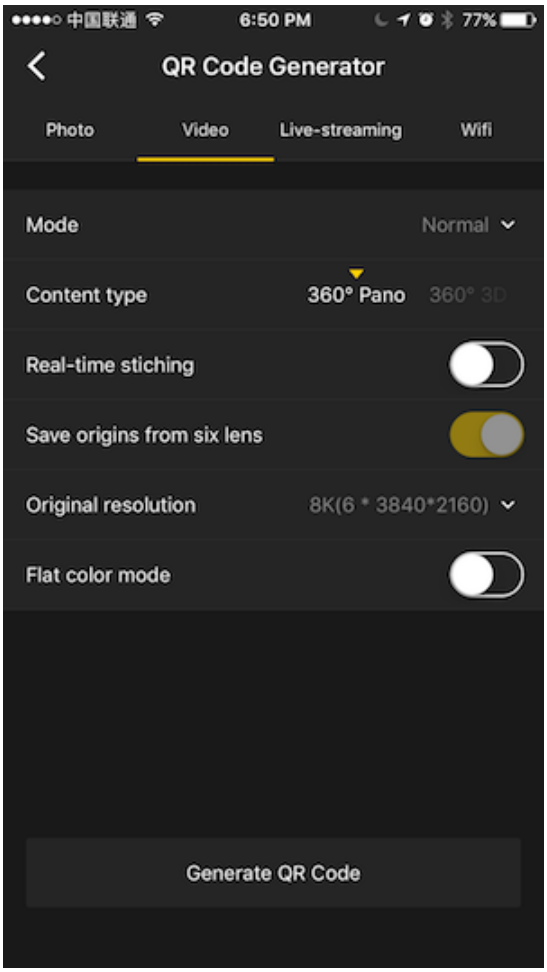
6.3 [Advanced] Generating QR codes for camera recognition

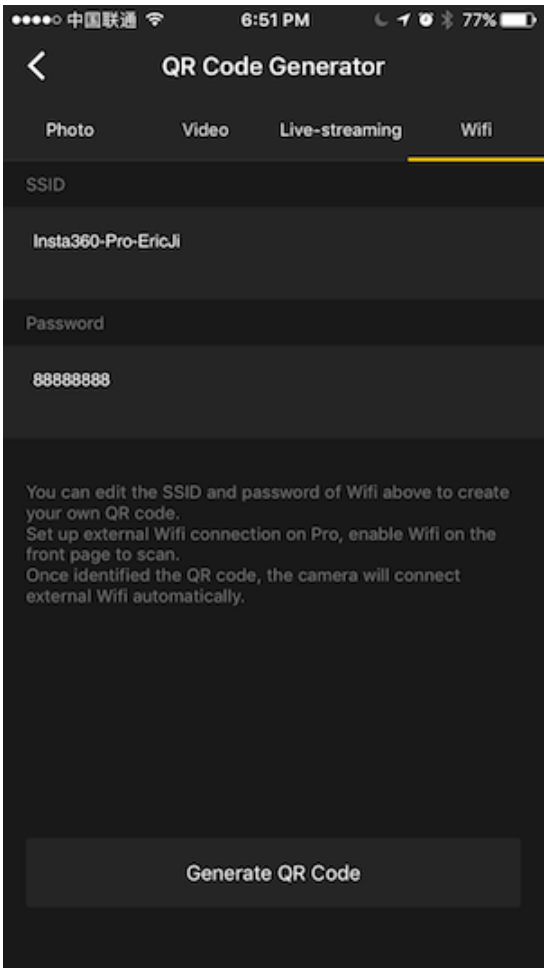
The camera can recognize the QR code generated by mobile app even without connecting it.

Activate the QR code generator in the upper left corner of the app, you can see four function modules, i.e. Photo, Video, Live-streaming and Wi-Fi.

Of which, the Photo, Video and Live-streaming support basic settings other than Exposure and Property. Align the generated QR code with one of the lens on either side of the camera screen, and wait for the camera to recognize the code. Once the camera complete the recognition successfully, a sound will be made for indication. After the recognition, the parameters may be saved into the Customize parameter gear. Thereafter, if you switch the camera to the Customize gear quickly when using the camera separately, the shooting will be performed rapidly as per the latest setting by scanning the code.

After the Wi-Fi connection information is filled in, a QR code will be generated. By scanning the QR code, the automatic connection of Wi-Fi will be achieved.





Please note that if you need to clear the scanning information (including Customize information and Wi-Fi connection information) saved by the camera, go to the setting menu of the camera body and clear it with the Reset function.

7.1 Common camera problems

7.1.1 Unable to boot

First put the battery into your camera and connect charger adapter to camera DC port, and check the adapter's indicator light and camera indicator light;

If adapter indicator light is not on, but the AC line connection is normal, the problem may be caused by the adapter. It is recommended to change the adapter to test;

If adapter indicator light is on, but camera indicator light is not, the problem may lies in camera malfunction, you can contact technical support.

7.1.2 Unable to turn off

If you cannot turn off your camera, please press reset hole to restart the camera.

7.1.3 Key failure

If a key does not work, it possibly is due to system halt or keypad failure.

It is recommended to first press power button or press reset hole to restart the camera;

If after restarting, the key is still unable to work, it may be keypad failure, and you can contact technical support.

7.1.4 OLED not bright

If the OLED screen isn't on, it is possibly caused by failed boot or system halt. Check whether LED indicator is normal or fan runs to determine successful boot or not;

If systems are stuck, it is recommended to press reset holes to restart the camera to test.

If camera operates normally, but the restart fails to solve the problem, you can contact technical support.

7.1.5 Fans do not work

If during filming, the fans do not work, please check whether the camera settings use fan shutdown mode.

If fan closed mode is not on, or fans do not rotate during non-shooting period, it is likely caused by fan fault and it is recommended to contact technical support.

7.1.6 USB 3.0 port cannot be identified

First please ensure that equipment is compatible, and then test multiple compatible devices. If all of them are not identified, it may be USB port failures, and you are recommended to contact technical support.

7.2 Common problems for Insta Pro app

7.2.1 Installation failure

For app installation failure, it can be divided into the installation failure for mobile phones and computers, which are recommended to deal with as follows:

Mobile phone app: download directly from official website to install, and ensure system compatibility;

Pro iOS app adaptation requirements: require iOS devices with processors above A7 and above, such as iPhone 6 and above, iPad Air/Mini2 and above, iPad, iPod Touch 6. iOS system version needs to 8.0 and above.

Pro Android app adaptation requirements: require Android 5.0 and above, and it is recommended to use mainstream flagship models launched after 2016. Specific compatibility lists are released later.

Computer app: download directly from official website and ensure computer system is above Win 7(64 Bit).

7.2.2 Connection Failure

Client terminal and camera must be in the same LAN, which is the basis for an app to connect to the camera. For specific methods, you can refer to 1.1.5 to ensure the connection mode is correct;

If connection mode is correct, please confirm whether the camera is connected to other client terminal. The camera can only be controlled by one client terminal during a period of time;

If only one client terminal tries to connect, please confirm or contact network management to confirm whether the LAN has special access restrictions.

7.2.3 Shooting preview image halt

Please confirm whether it is Wi-Fi connection, which is vulnerable to ambient interference.

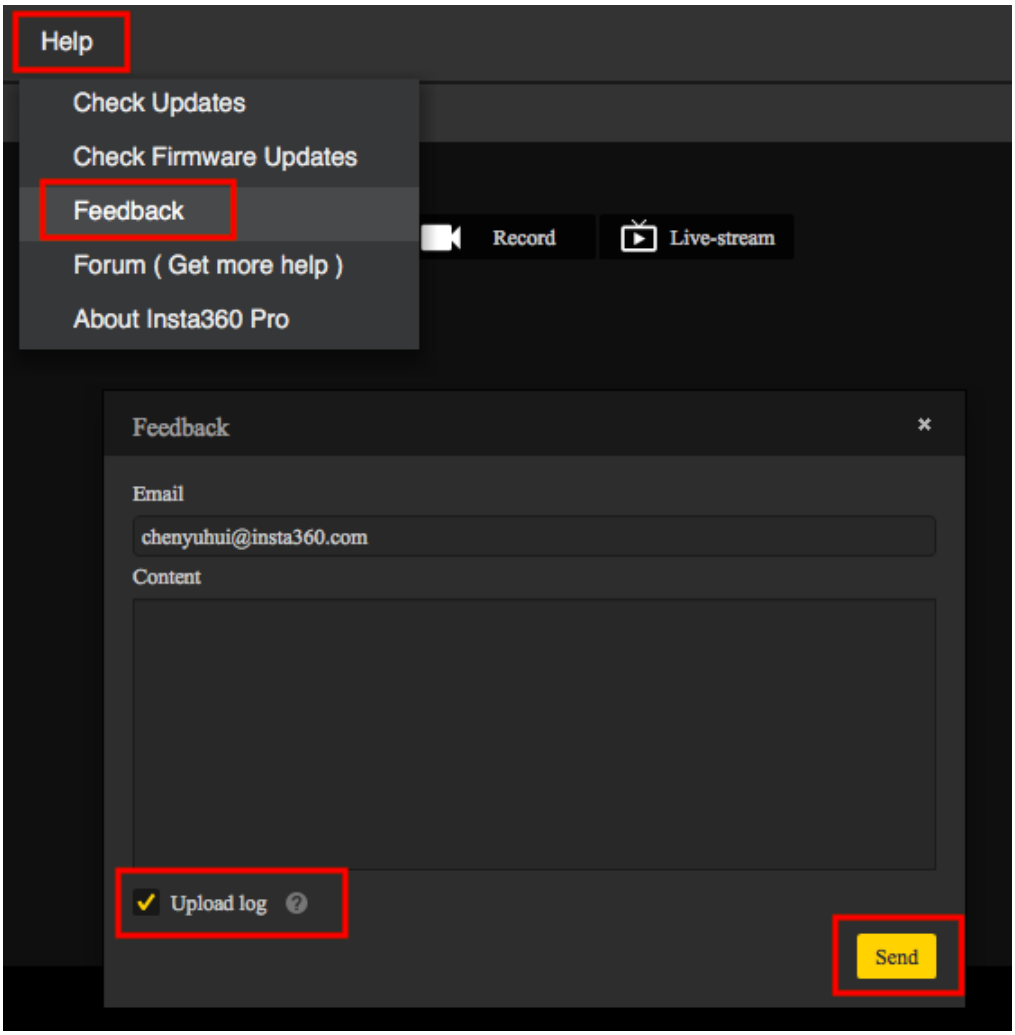
Cameras and control ends can be placed in the environment with less interference or use network cable for wired connections.

7.2.4 How to upload camera logs for question analysis

If the camera encountered problems in the process of use, you need to upload the camera logs for technical support detection. Please set the Pro connection mode to Wi-Fi:Wi-Fi or Ethernet: DHCP to ensure that the Pro can connect to the network, and connect the Pro to the Wi-Fi of the router or use the network cable to connect the router directly.

Computers also connect to the same router's Wi-Fi or Internet access, to check IP address displayed on OLED screen, open Pro app, input IP addresses to make connections, click “help” and “feedback” on top menu bar, describe problems in “content” box.

Check “upload logs” , click “send” and inform the technology support of the mailbox information of the client terminal.



7.2.5 Live-streaming abnormity

There may be following problems with Live-streaming:

No sound:

Ensure sound recording function opens;

If Pro sets panoramic sound, while live screen has no sound, please confirm that live platform can support panoramic sound;

If the live platform cannot process panoramic sounds, please adjust Pro sound recording as normal mode.

No picture:

It may be because Pro sets live resolution too high while live platform cannot support it. In this case, it is recommended to reduce the resolution for Live-streaming;

It may be because the live platform cannot handle panoramic sound, which affected the screen. It is recommended to check whether live platform supports panoramic sound, and adjust Pro sound recording mode as normal mode;

Please check whether bitrate settings are too high and network bandwidth is insufficient, please reduce bitrate and retry in this case.

It shows Reconnecting, and fails to have Live-streaming:

It may be because Pro cannot connect to the Internet, access restrictions result in inability to connect to designated live platforms or it is due to excessive bitrate and insufficient bandwidth;

Please ensure that LAN can be connected, and check whether current network accesses the specified broadcast platform; check bandwidth and reduce bitrate to retry.

HDMI output resolution cannot reach 4K:

HDMI outputs a video of 4K/60 fps. Please ensure that the collection device supports processing 4K/60 fps; if not supported, Pro will automatically reduce to other resolution specifications with frame rate of 60 fps.

7.3 Common problems for Insta360 Pro Stitcher

7.3.1 Installation failure

First, please confirm that your computer configuration specification is above 64bit win7 system;

Additionally, some antivirus software may prevent Stitcher installation, try to install it again after closing antivirus software.

7.3.2 No reaction after turning on

Generally it is due to improper installation, and it is recommended to install it again.

7.3.3 Fail to export files

Stitcher only supports exporting files captured by Pro, and the folder must contain the project file called pro.prg, and file names inside the folder should not be modified;

If folder files are not missing and internal filenames are not modified, please check whether the software is correctly installed. You can also try to solve the problem by install the Stitcher again.

7.3.4 Poor stitching, ghost image, stitching joint

As for video stitching problems: please check whether it is the problem of objects that are near the camera. If the distance is too close, it’s normal; if not, check whether objects with stitching problems are not obvious enough; if not, please select appropriate reference frames for stitching.

As for photo stitching problems: please check whether it is the problem of objects that are near the camera. If the distance is too close, like less than 1m, it’s normal; if not, check whether objects with stitching problems are not obvious enough.

7.3.5 Cannot use hardware for decoding

Check whether your computer hardware configuration meets standards or check whether graphics drives are properly installed. You may try to update graphics drivers.

7.3.6 Low optical flow stitching speed

Optical flow stitching is a frame-by-frame stitching. Its speed depends on computer performance. You are recommended to check computer configuration.

7.4 Other common problems

7.4.1 Firmware Upgrade and Rollback Tutorial

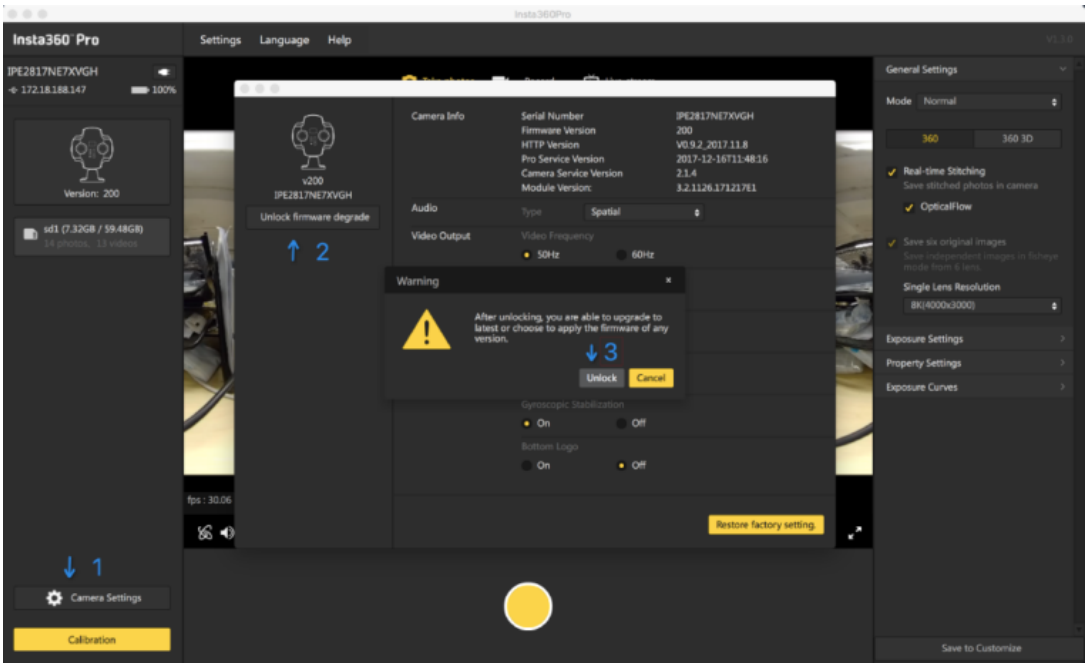
How to upgrade firmware with booting?

1. Please make sure that battery is not lower than 30% and is connected to power adapter. The camera may be booted by pressing "POWER" key under the power-off state.
2. Insert SD card that has the latest version of firmware into the camera. Notice: please make sure that you have deleted the previous firmware bin file, and keep the file name (Insta360_Pro_Update.bin) of newly downloaded firmware unchanged; otherwise the system may not be able to automatically identify the latest firmware and thus cannot upgrade regularly.
3. Restart the camera after finishing all preparations mentioned above; then the camera will enter upgrading stage to upgrade the firmware. Once the work has completed, it will restart again.
4. You can click "Info” in setting to check the version of your camera and Pro Serial Number.

How to downgrade firmware?

If you want to degrade from Beta firmware to the lower version firmware, please unlock the degrade limit of your camera's firmware first. Follow the steps as below:

1. Use the Pro PC (1.3.0 version or above) to connect to the current camera.
2. When the camera is connected, open “Camera settings” and click "Unlock firmware degrade" under the camera icon.
3. Once unlocked, the camera's firmware can be updated to any version via regular updating.



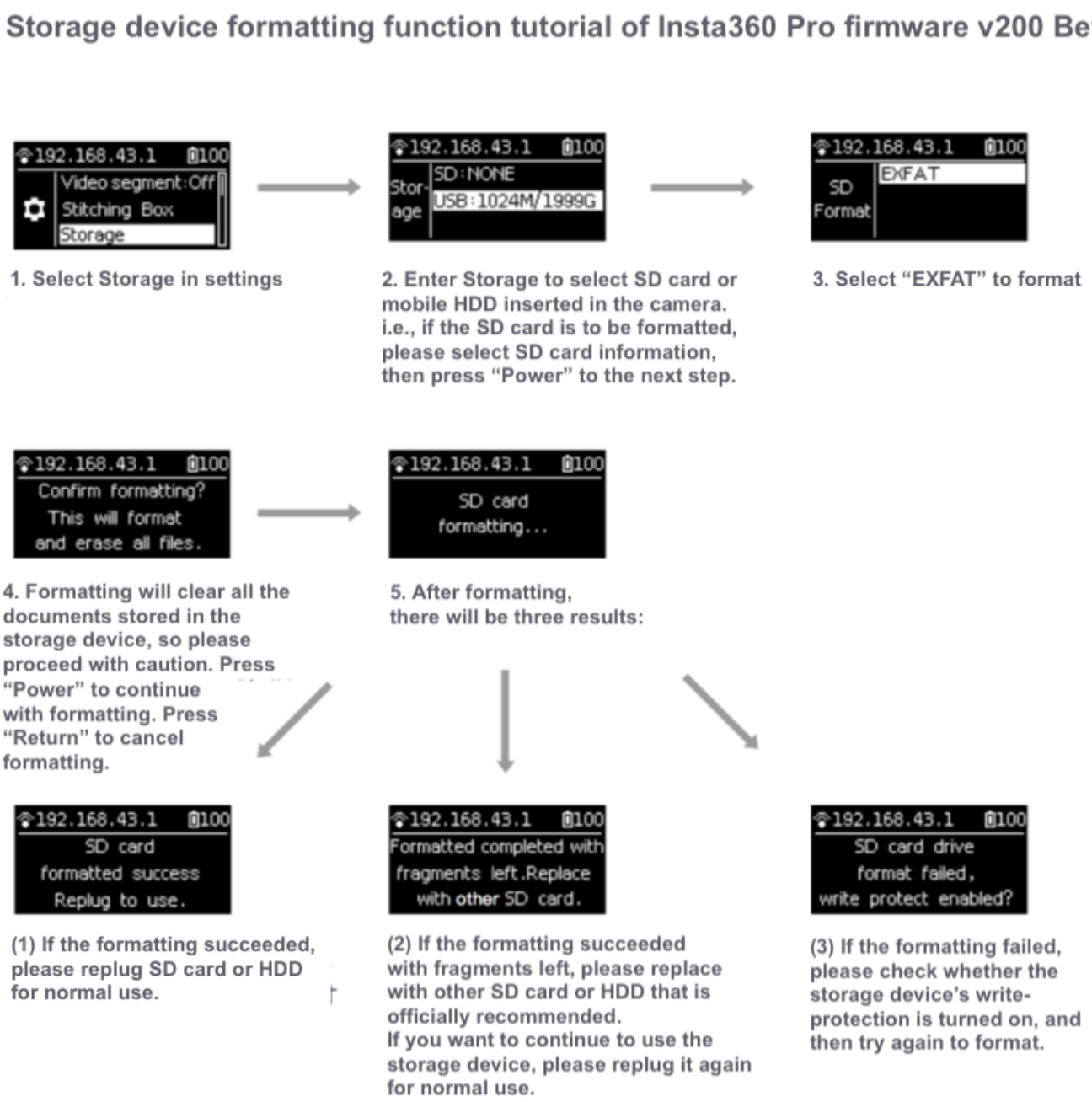
7.4.2 Working temperature and extreme environment

In order to ensure that Pro can be in optimum working condition, the recommended working environment temperature range is 0-40 °C.

Because Pro itself needs heat dissipation to maintain normal work, the camera is equipped with heat hole, so it cannot be waterproof and dustproof. Therefore, do not place Pro in excessive humidity or excessive dust environment, to avoid damage the machine and make it unavailable.

7.4.3 Insufficient card speed and overheating during filming

Pro may encounter a camera displaying “insufficient speed” during filming. Please stop filming when you encounter this situation. For firmware of V200 or above, memory card can be formatted according to instructions below or connect directly to computer for formatting operations to be exFat format:



If in the operation of Pro, the camera body is overheating, please stop shooting and place it in ventilated environment. After waiting for the camera temperature becomes normal, you can use it again, or use other equipment to cool it down.

7.4.4 Noise or no sound for external microphone

As for noise problem: please confirm whether the specification of the connected microphone is Mic-in, because currently Pro supports only Mic-in devices; moreover, if access devices are line-out, noise may occur;

As for no-sound problem: please confirm whether the connected microphone is four-part form. Currently, Pro only supports 3.5 mm two-part single channel, three-part dual track, but not support four-part form; please also confirm whether the microphone is mic-in.

7.4.5 One less channel after panoramic sound composition

Currently, Pro's four microphones have positions at the same level without vertical sound, so one less channel is normal.

7.4.6 Google Street view: GPS without positioning

First, verify that GPS module connects with camera tightly;

If it is recorded indoors, GPS signal is weak, and it is easily affected by object shelter;

Additionally, GPS modules themselves are vulnerable to electronic devices. Please maintain a certain distance from Pro or other electronic devices.

7.4.7 Jitter of images after timelapse photography composition

Timelapse photography uses gyro corrections, which will cause jitter; if gyro correction is not used, please verify whether it is due to floor jitter or tripod instability.

7.5 Error message summary

7.5.1 Common Error Codes

Error Code	Meaning	Solution
413	The operation was not allowed under this situation	Press any button to eliminate this error; if it doesn't help, please restart the camera.
414	Microphone error	If you are using external microphone, please unplug it and plug in again; then start to shoot.
415	Optical flow stitching error	Please try shooting again.
417	The temperature of camera is too high	Wait and retry.
418	Module is busy	Try again.
430	File open error	Check if the SD card was write-protected.
431	File io error	Check if the SD card was write-protected.

Error Code	Meaning	Solution
432	No enough storage space	Check the storage space of device.
433	No storage device	Connect storage device.
434	Low writing speed of storage device	Format the storage device to see whether it helps; if doesn't, please change the storage device.
435	MUX write error	Restart the camera.
436	MUX open error	Restart the camera.
437	Network reconnecting	Wait.
438	Network fails to reconnect	Check the network.
439	Network disconnected	Check the network.
450	System goes stuck	Restart the camera.
460	Failed to open lens module	1. Turn off the camera, take out the battery and leave it for about 5 mins; then restart the camera.2. If you are using H2N or other similar external audio devices, please be sure to follow the order: unplug H2N, start and set H2N; after these steps, you can connect it with Pro.
462	Lens module fails to read the command	1. Turn off the camera, take out the battery and leave it for about 5 mins, and then restart the camera. 2. If you are using H2N or other similar external audio devices, please be sure to follow the order: unplug H2N, start and set H2N; after these steps, you can connect it with Pro. 3. If the Pro was dropped before, some internal components may have been broken and caused the failure.
464	Lens module fails to read data	Unplug all USB device and SD card to see whether such error disappears. If yes, the problem may be caused by the device. If the error keeps occurring, please restart the camera.
466	Lens module falls offline	Turn off the camera, take out the battery and leave it for about 5 mins, and then restart the camera.
701/703	SD card is locked	Check if the SD card is write-protected.
1001	Program start-up error	Reset or restart.

7.5.2 Indicator status summary

Power adapter: the camera adopts12V 5A power adapter with DC interface.

Battery type and duration: the camera uses 5100 mAh replaceable battery. Without Wi-Fi, the battery life is about 50 min. To fully charge a battery takes about 2.5 hours.

Charging with power off

When the camera is not fully charged, the red power indicating lamp will go on;

When the camera is fully charged, the green power indicating lamp will go on.

Charging with power on

When the electricity quantity of the camera is below 10%, the red power indicating lamp will go on until the low-point protection is enabled or the camera is shut down upon exhaust of electricity;

When the electricity quantity of the camera is between 11% and 20%, the yellow power indicating lamp will go on;

When the electricity quantity of the camera is between 21% and 100%, the white power indicating lamp will go on;

When the camera operates, the work indicating lamp will be in the same color as the power indicating lamp.

7.6 Official technical support and Forum

If none of these instructions solve any problems encountered, visit website forums to obtain more technical guidance or contact official technical support to solve problems:

Insta360

Shenzhen Arashi Vision Company Limited

TEL (+86) 400-833-4360

EMAIL service@insta360.com

WEB www.insta360.com

ADD 6/F, Building A, Logan Century Center, 23 Haixiu Road,
Bao'an District, Shenzhen, China