

RobotSLAM User Manual



Contents

1. Getting to know RobotSLAM	3
1.1 Unboxing	3
1.2 Technical Specifications	4
2. Device details	6
2.1 device connection	8
2.2 Data capture	10
3. Data download and RTK function settings	12
3.1 Data download	12
3.2 RTK settings	14
3.3 Control the RobotSLAM via Palm software	16
3.4 Activate the device	16
4. Data processing	18
4.1 Computer configuration	18
4.2 RobotSLAM Engine software installation	18
4.3 Apply a software license	19
4.4 Data processing in RobotSLAM Engine	20
4.5 Export colorized point cloud	25
4.6 Export Absolute Coordinates	25
5. Battery	27
6. Usage Guidelines	29
6.1 Walking Speed	29
6.2 Loop closure	30
6.3 indoor scanning	30

1.Getting to know RobotSLAM

1.1 Unboxing



ID	Part Name	Quantity
A	Handheld （include handheld grip and target base）	1
B	GNSS antenna&cable （for built in GNSS module）	1
C	Smartphone Holder	1
D	Shoulder strap	1
E	Main cable	1
F	Battery compartment	1
G	Rechargeable battery	2
H	Battery charger&cable	1
I	Ethernet cable	1
J	USB flash drive	1

K	External TF card	1
L	SD card reader	1
M	Cleaning cloth	1
N	Hand-carry case	1
O	Panorama camera (optional)	1
P	Fill-in light	1

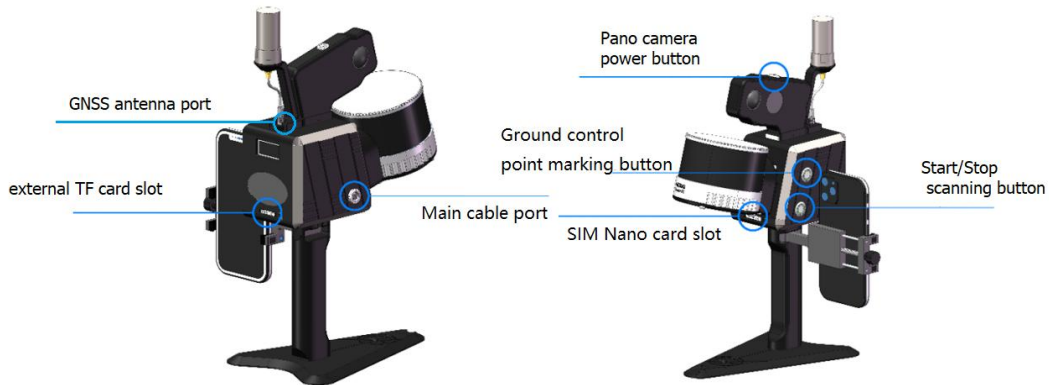
1.2 Technical Specifications

Specification	Parameter	
Principle	mechanical rotation	
Models	RobotSLAM	RobotSLAM Plus
Laser sensor	16-line	32-line
System accuracy	1cm (highest)	
Laser safety class	CLASS 1	
Measuring range	0.05 ~ 120 m	
FOV(horizontal)	360°x285°	
Angle resolution(H.)	0.18° (10 Hz)	
Angle resolution(V.)	2°	1°
Scanning frequency	5Hz/10 Hz	
Scan Rate	320,000points/sec	640,000point/sec
Storage	Built in storage: 512G SSD	
	Camera built in storage: 128G TF	
	External TF card: standard 128G (support extend to 512G)	
Weight(only handheld)	1.92 kg	

Induration time	Single battery $\geq$ 2h, two batteries $\geq$ 4h
Environment	-20℃ $\sim$ 65℃（working） / -40℃ $\sim$ 85℃（storage）
Data acquisition time to data processing	1:2

2. Device details

Device interface display

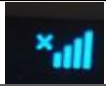


ID	Port Name	Functions	descriptions
1	Start/Stop scanning button	Start/Stop scanning	the button is to control the device to start scanning or stop scanning; if RTK function works, the button color is blue, if not, the button color is purple;
2	Ground control point marking button	press once to record the current ground control point location	place the device on the ground control point marks, and press the button shortly one time to record the GCP location
3	Main cable point	DC 12V ~ 16.8 V	please use the standard battery
4	GNSS antenna port	OOS signal	please use the standard GNSS antenna
5	Nano SIM card slot	SIM card	Able to access CORS via N
6	External TF card slot	TF card	insert the external TF card

LED screen display



ID	Item	Content	Description
1	GNSS solution status	N1/N2	number of locked satellites/numbers of searched satellites
2	Data recording status	Storing	Recording...
		Unstore	Stop recording
		Cam data download	Camera data is downloading, please wait...
3	RTK Positioning status	No gnss	No GNSS signal
		Single	there is GNSS signal, but don't reach differential solution; Solution: please check the RTK account settings, if RTK settings is correct, the satellite signal is weak;
		Float	Not fix, the accuracy is between meter and centimeter
		Fixed	1~3cm positioning accuracy
4	Collection tie	h: m: s	Collected time

5	Network access		SIM card loaded
			No SIM card
6	External storage		Not detected TF card
			TF card detected
		If there is O on the left of the TF card sign	External storage works

2.1 device connection



↓ **Internet cable connection**



Main cable connection

Power button

Internet cable connection—it is used to download the data, one end connect to the device, the other end connect to the computer;

Power button-it is designed to power on the lidar system;

1. insert one or two batteries to the **battery compartment**;
2. connect one end of the **main cable** to the laser scanner, the other

end to the battery compartment;

Install the GNSS antenna

Push the GNSS antenna base plate to the slot, and insert the antenna cable to the port;



Notes: It is better to remove the GNSS antenna carefully, not to rotate the antenna cable;

Install the panorama camera (it is an optional part)



Press the lock button with left hand, and push the camera to the camera slot with right hand; the same method to uninstall the camera.

Notes: Please remove the panorama camera carefully, not to hurt the laser scanner in front.

2.2 Data capture

1. Connect the battery and the main cable with the battery compartment;



2. Press the power button and LED light is on;



Press power button



LED light ON

3. Long Press the camera power button, and the camera is on;



long press the camera power button



Camera ON

4. Go to the start point, put the instrument on the ground(flat ground);



Press the start recording
button, the scanner
starts scanning



The camera will start recording too at the
same time or after a few seconds

5. After starting the scan, please keep the instrument in one place without moving for 1 minute or so, and then get up and start scanning;



Initialization time(1minute)

Scanning

Finalization time(1minute)

6. when finishing the scan, keep the instrument in the same place without moving for 1 minute too, and then press the start recording button again to stop the scan.

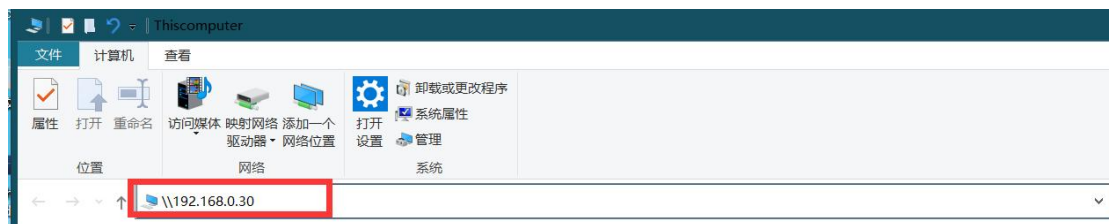


- Notes:** 1. When initializing, don't move the instrument;
2. Keep the instrument in front of the operator in scanning process.

3.Data download and RTK function settings

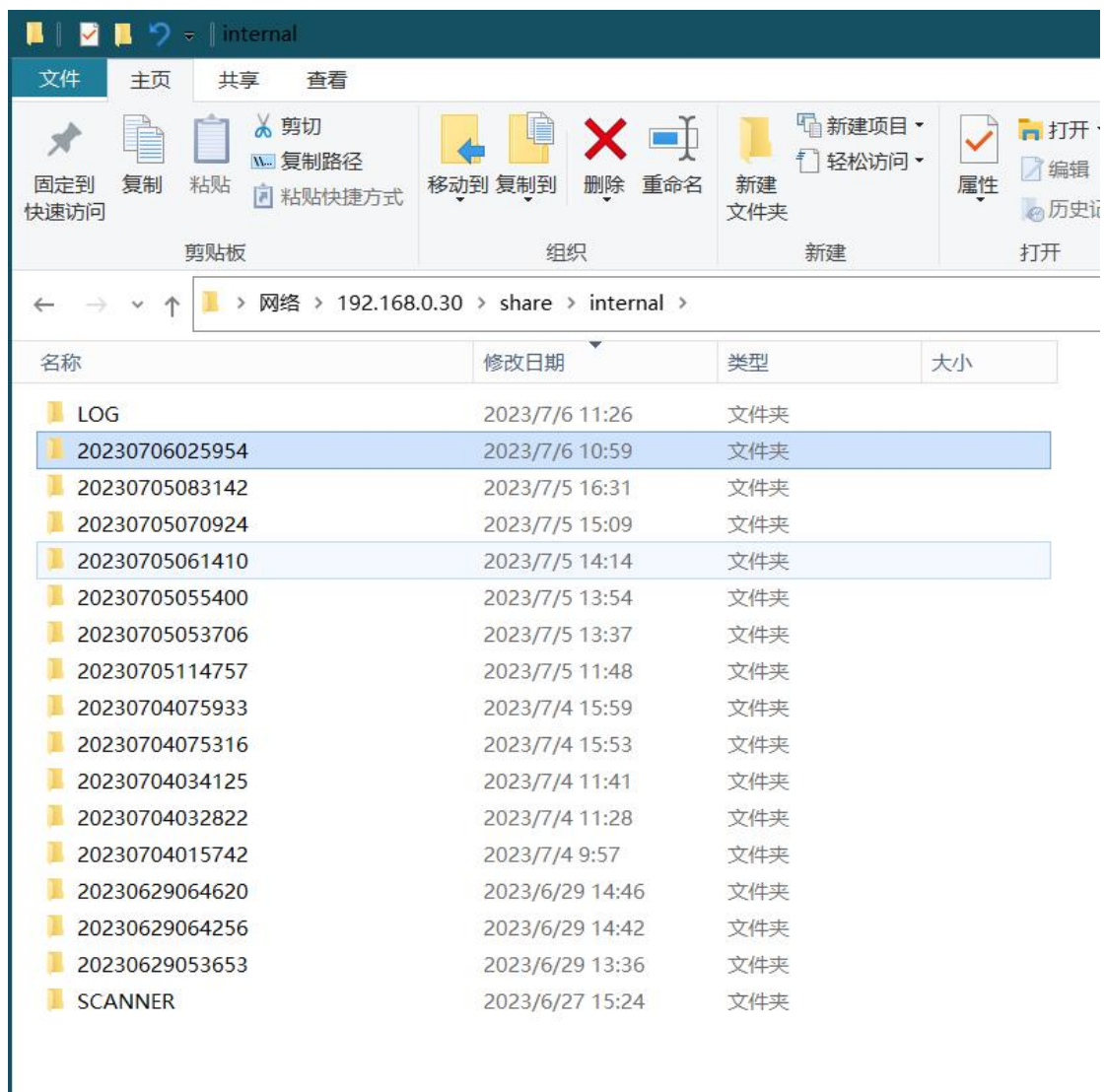
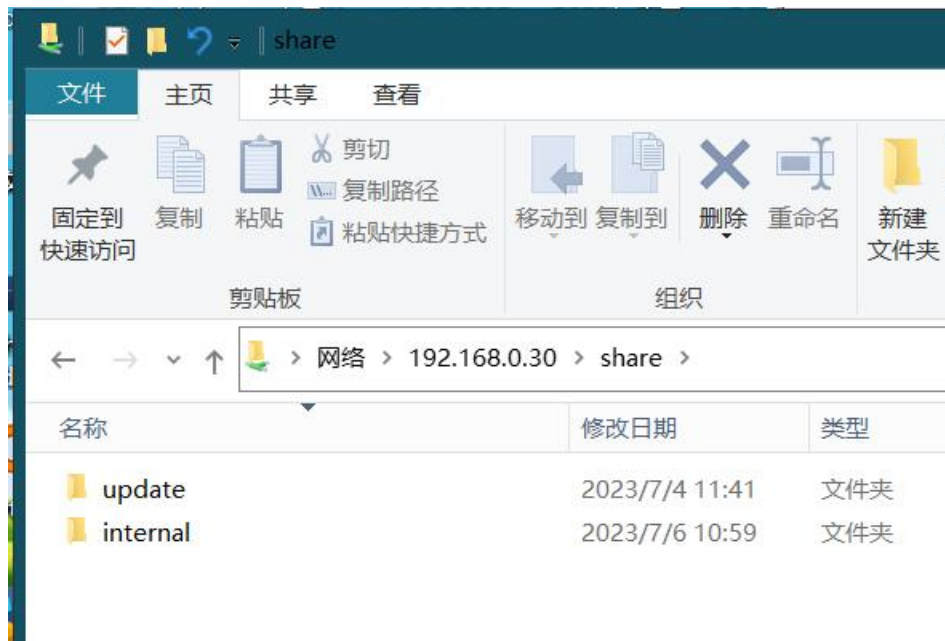
3.1 Data download

Connect the LiDAR system with the computer via a network cable:



Input [\\192.168.0.30](#) in your computer





Copy out the data folder, all the information is in the same folder.

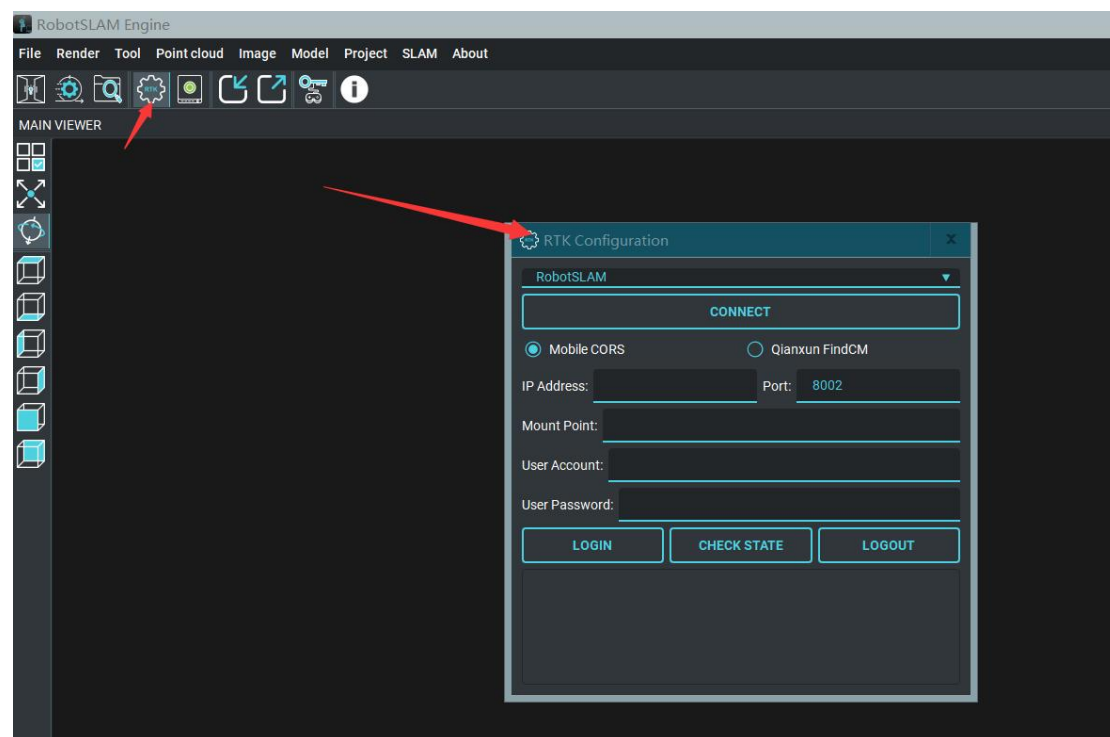
3.2 RTK settings

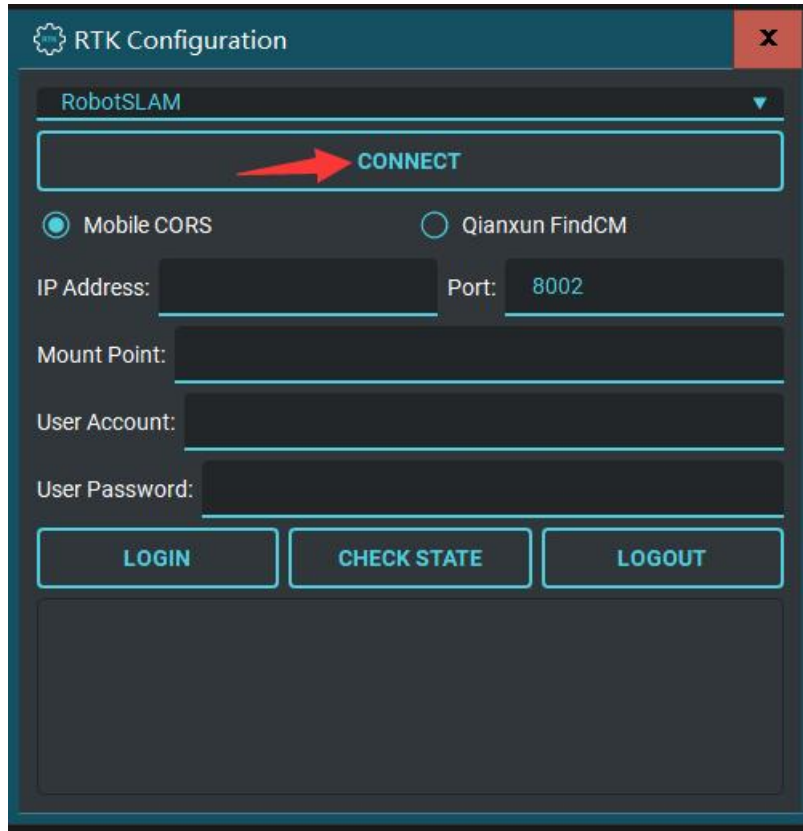
Before using RTK function, please insert a SIM card first,



SIM card slot

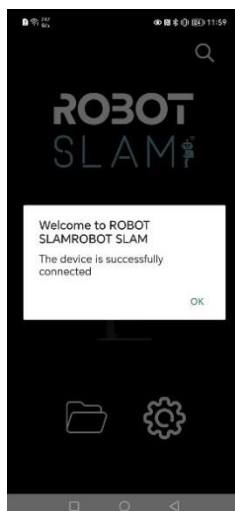
Method 1- Set RTK with the RobotSLAM engine software-in the computer



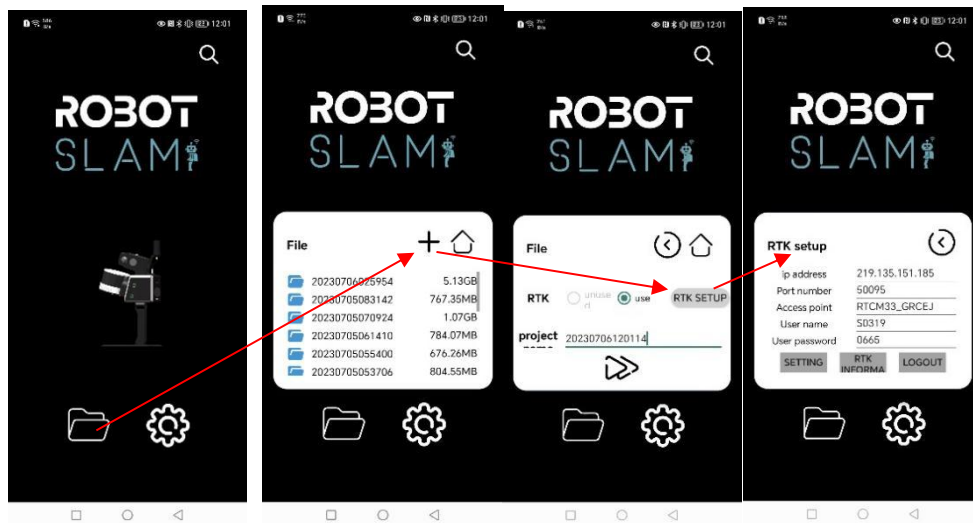


Method 2-using the mobile phone APP-RobotSLAM Palm

1. Connect the device wifi to the android system mobile phone; the password is 12345678;
2. Run software RobotSLAM Palm and make sure connect the device already;

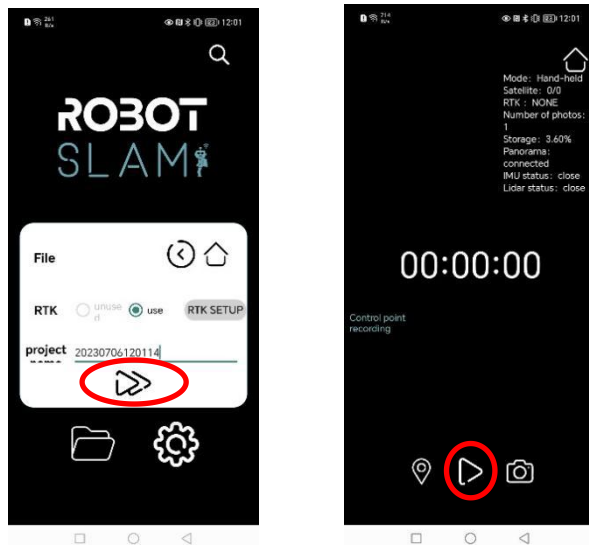


3. Set the RTK information, and if next time, you want login a new RTK information, please log out the old one, and then input the new information.



3.3 Control the RobotSLAM via Palm software

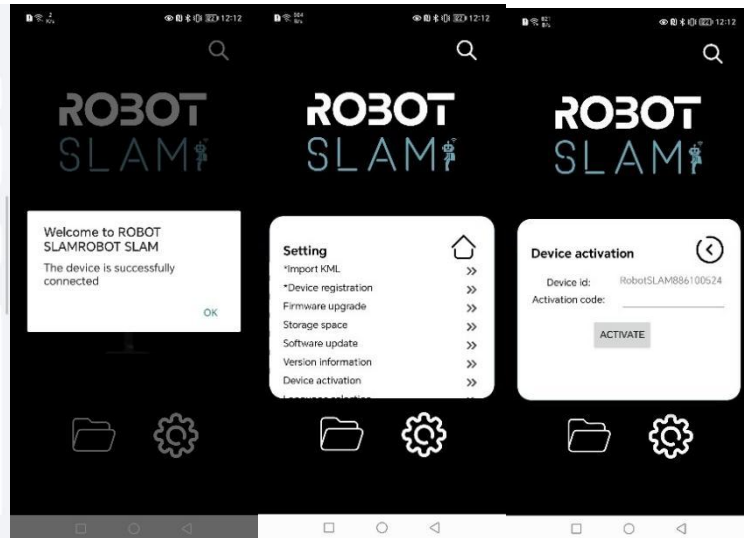
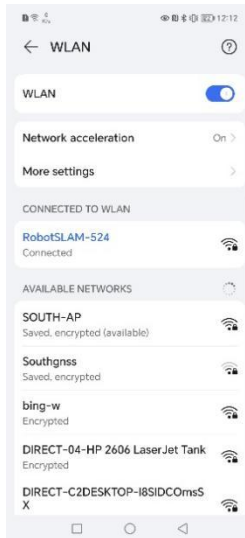
Click the arrow button to enter the interface to control the device,



Click to start/stop the scan

3.4 Activate the device

Please get the activation code from the factory, and connect the mobile phone WIFI, and then input the code to activate it;



4.Data processing

4.1 Computer configuration

Computer	Minimum	Recommended
Operating system	Windows10/Windows11 64-bit	
Graphics card	GTX-3060/RX6600M or above (NVIDIA series recommended)	
CPU	Intel i7-11800H/AMD R7-5800H or above	Intel i7-12700H/AMD R7-6800H or above
Internal Memory	16GB or above	32GB or above
SSD	1TB or above	2T or above

4.2 RobotSLAM Engine software installation



The postprocessing software is **RobotSLAM Engine**,

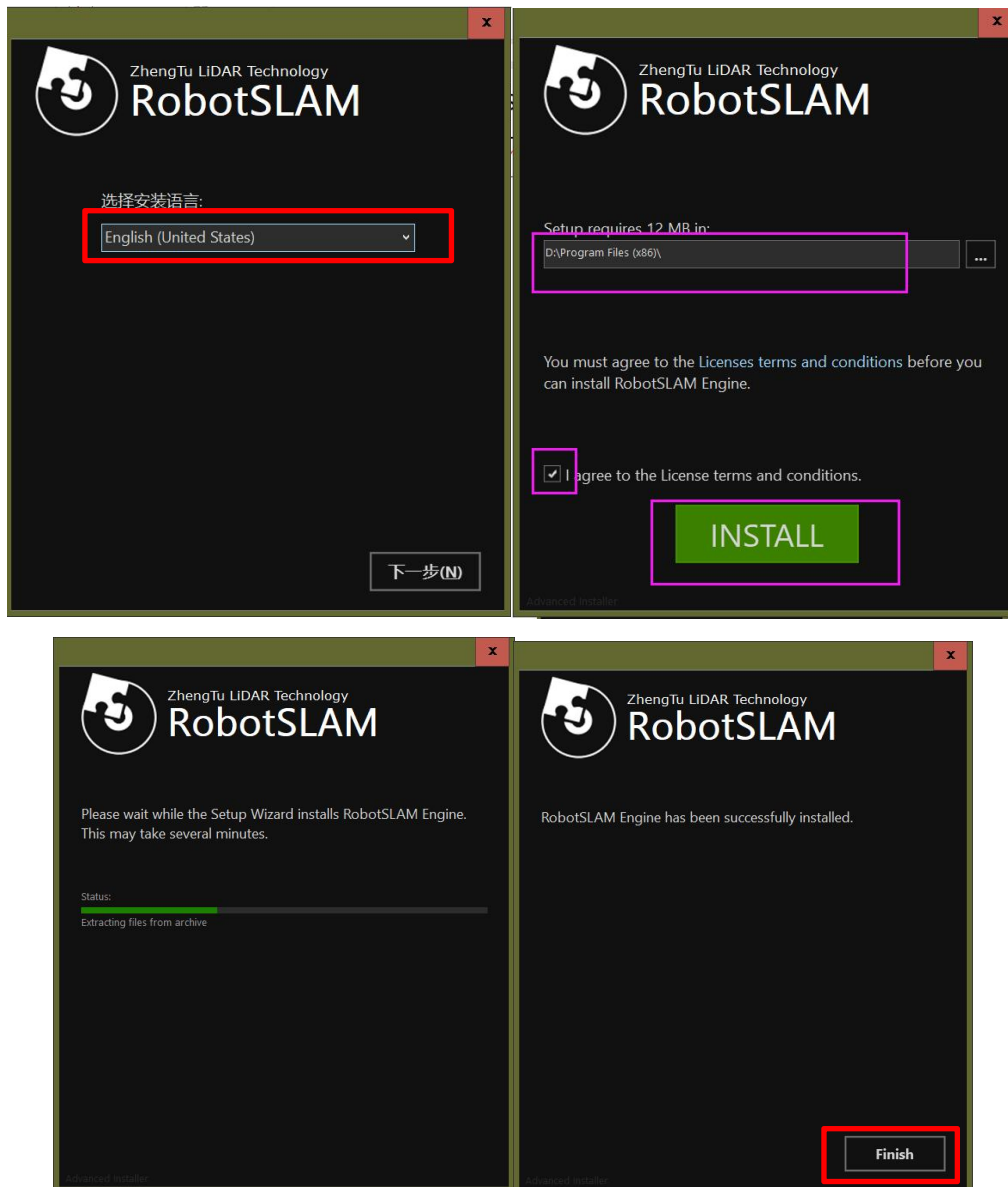
Before start processing, there are two software to install,

RobotSLAM Engine_V1.1.5-Update-EN.exe	2023/6/7 11:23	应用程序	968,447 KB
RobotSLAM_Server_V1.0.0-Setup-x64-EN.exe	2023/6/16 11:28	应用程序	197,996 KB

1st, double click" RobotSLAM_Server_V1.0.0-Setup-x64.exe" to install it;

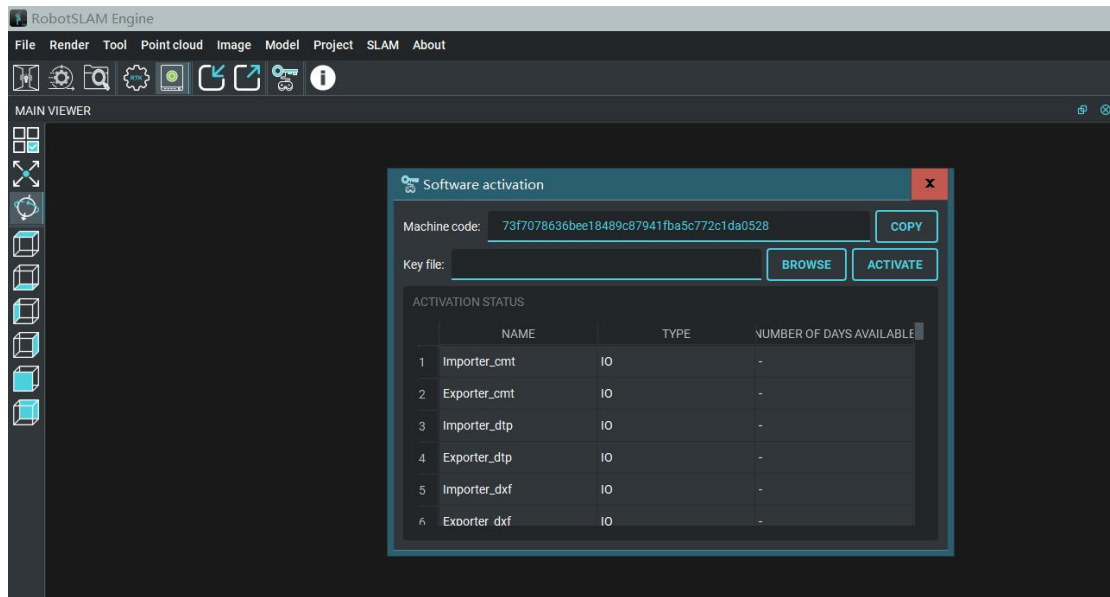
2nd, double click" RobotSLAM Engine_V1.1.5-Update-EN.exe" to install it, select

"**English(US)** or **English(UK)**"; click "下一步(NEXT)"; set the installation path,



4.3 Apply a software license

1. send the factory your machine code to apply a license file:

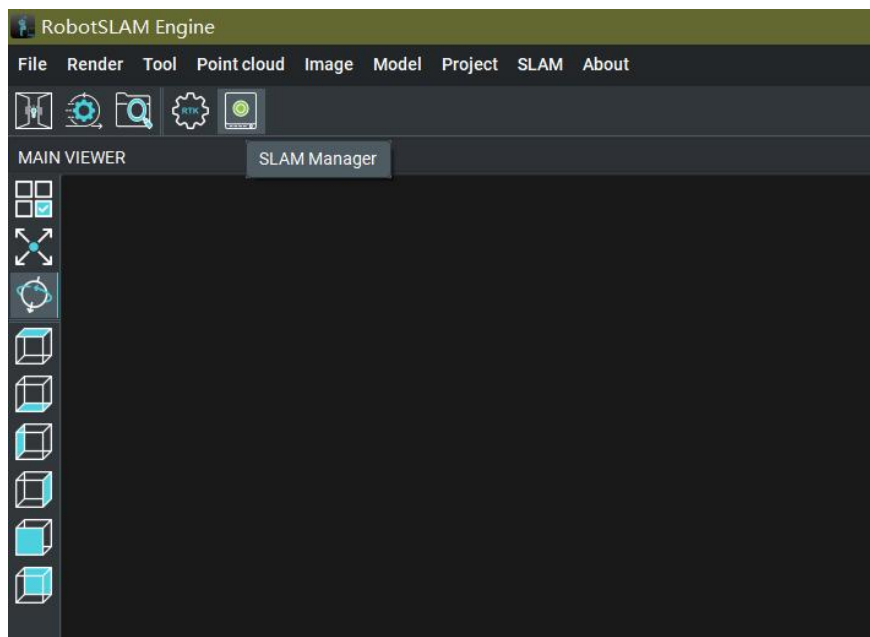


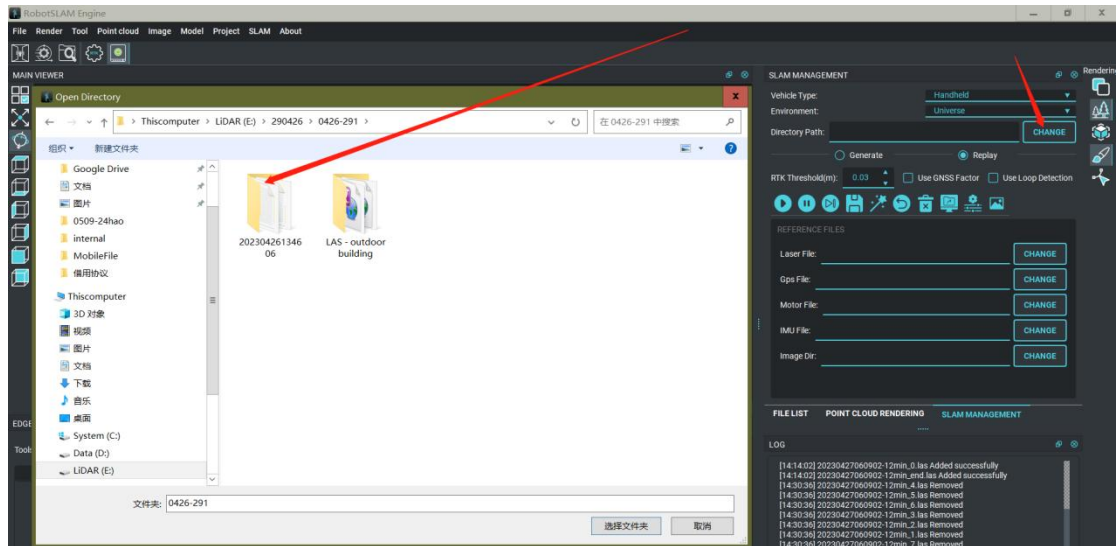
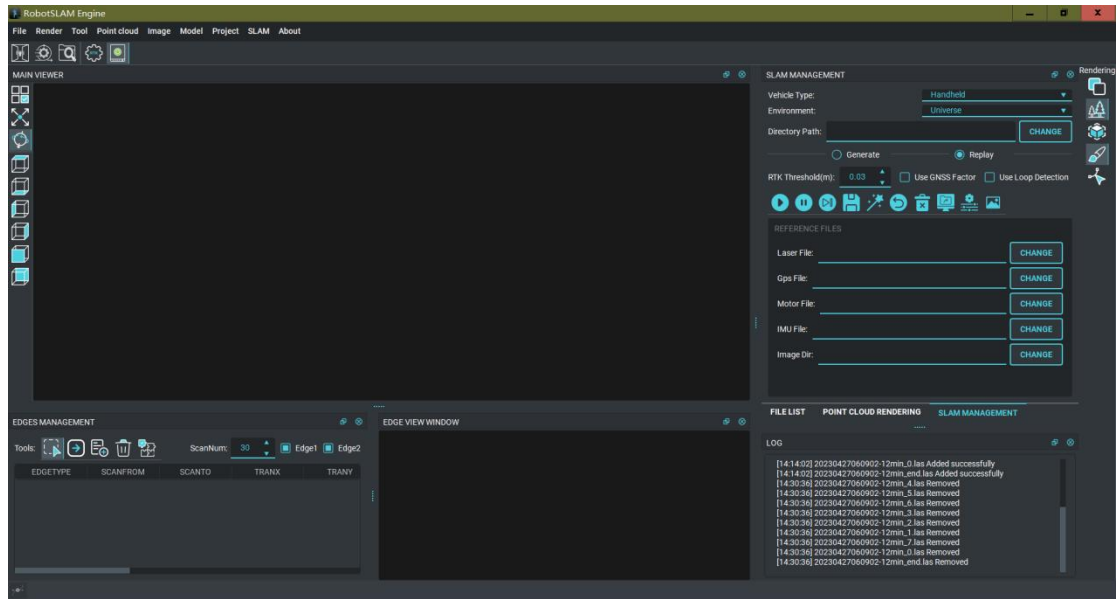
2.click "BROWSE" to import the license file and click ACTIVATE;

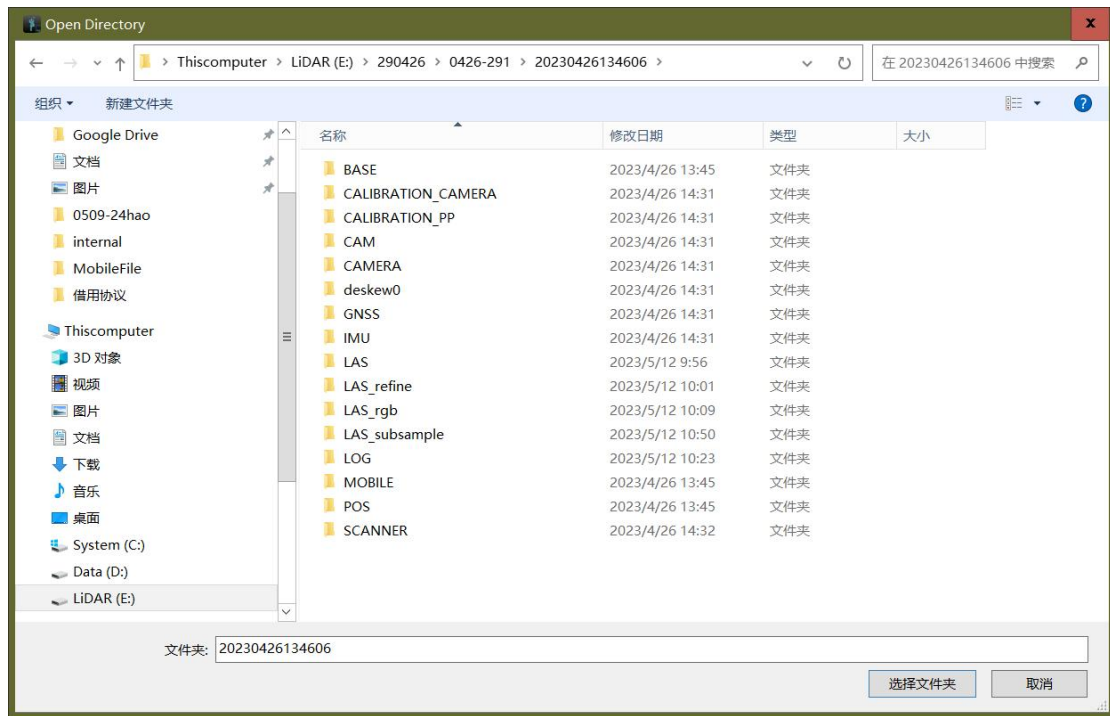
4.4 Data processing in RobotSLAM Engine

1st , Double click to run RobotSLAM Engine software

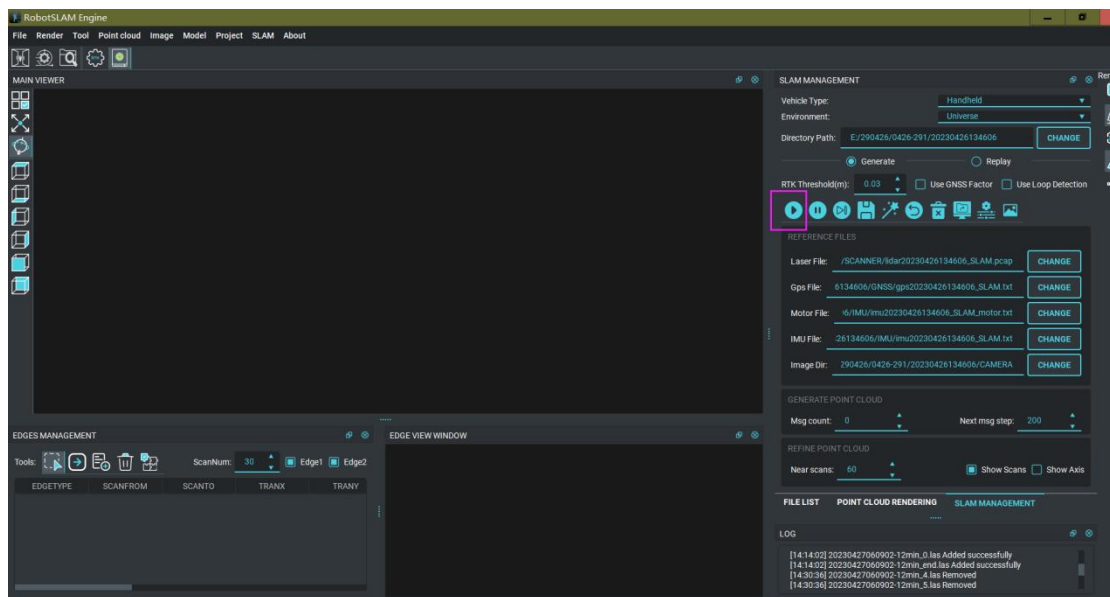
2nd , Open SLAM Manager, click" CHANGE" to load the project folder;

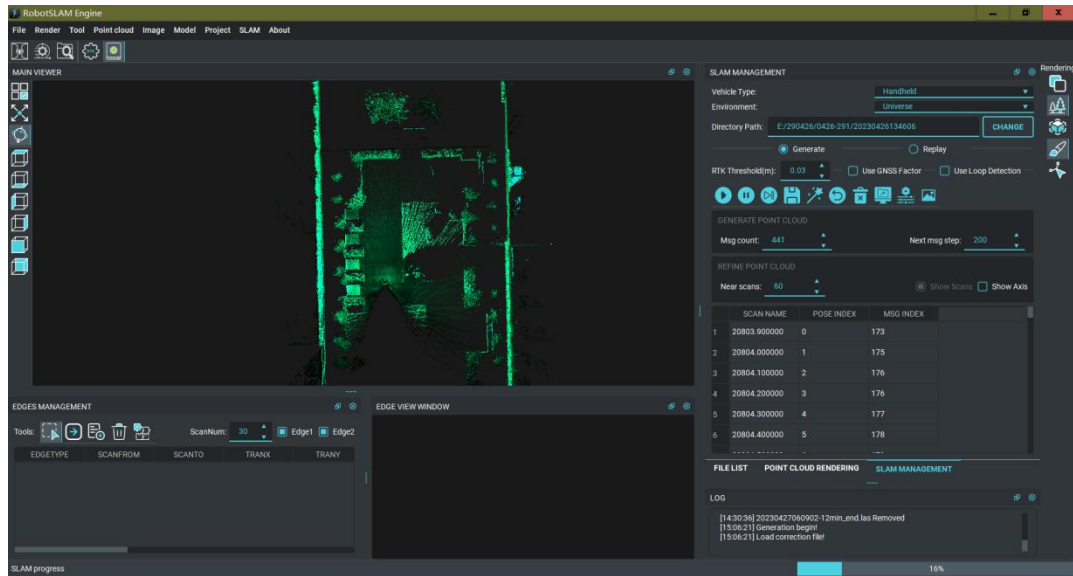




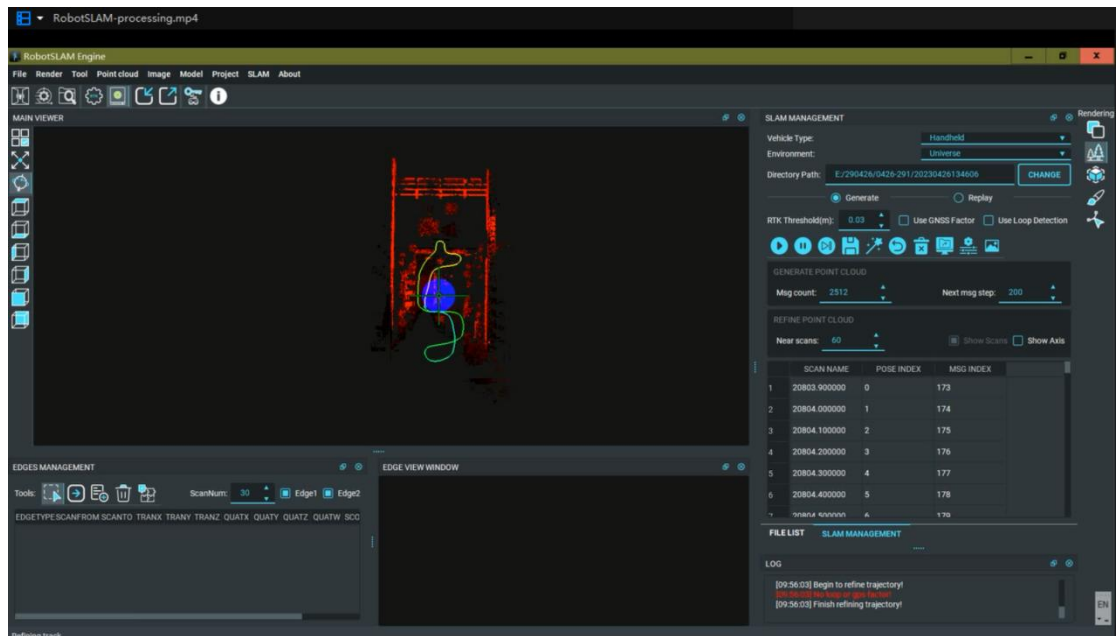


3rd , if the scanning time is less than 20 minutes, directly click “Run Bag file”

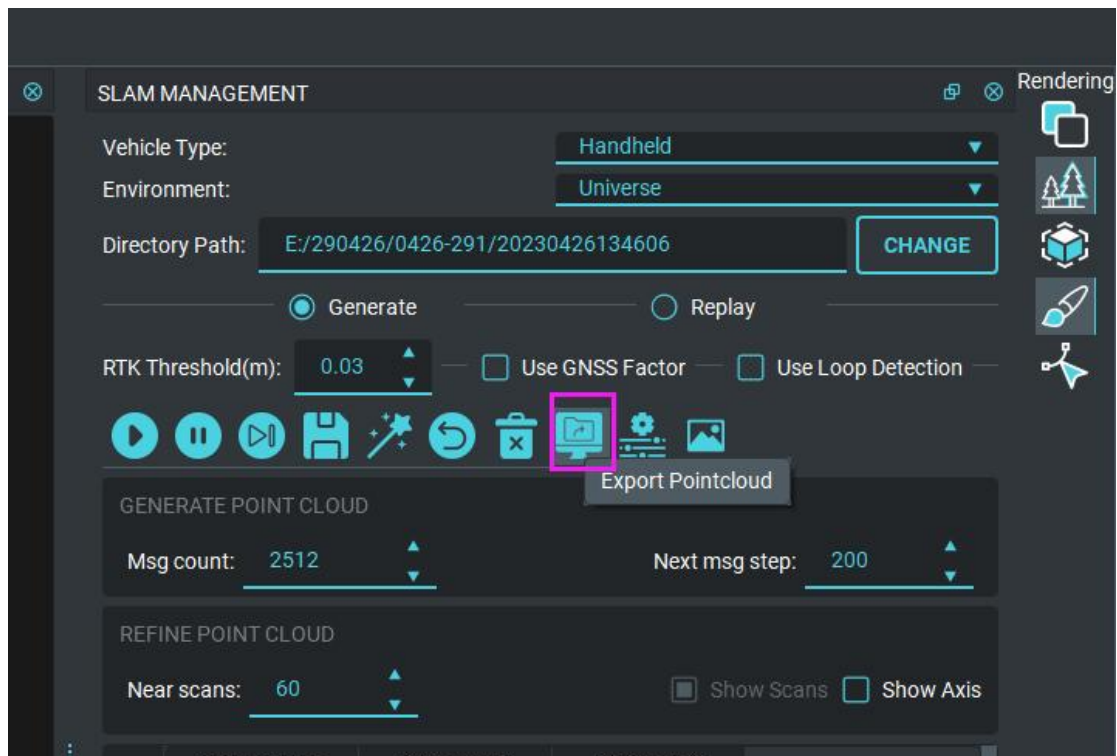




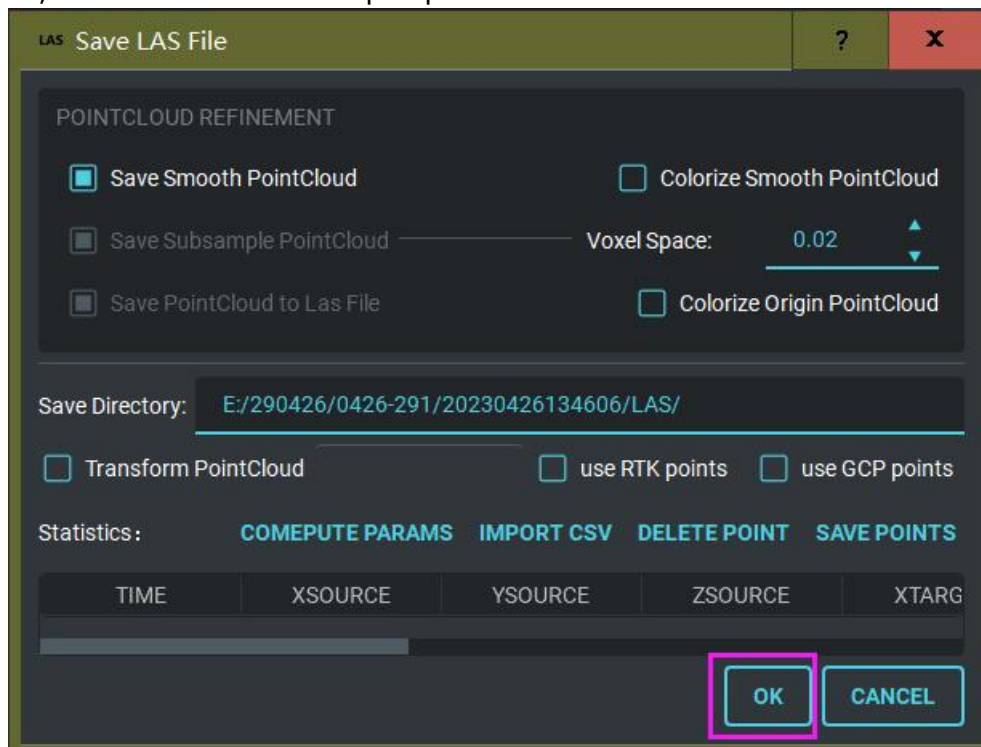
4th , wait for the processing, when the processing bar reach 100%, and show “Finish refining trajectory”, the processing finish.



5th, **Export point cloud** by clicking the following icon:

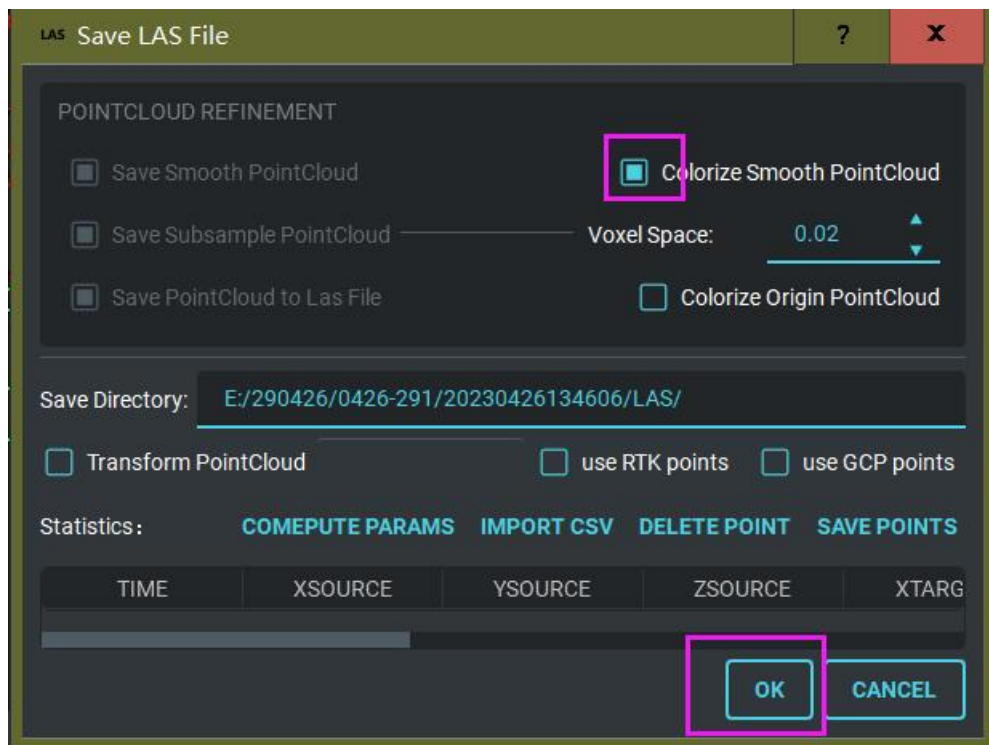


6th, and then click "OK" to export point cloud.



4.5 Export colored point cloud

If the data also collect video with the panorama camera, check "Colorize Smooth Pointcloud" or "Colorize Origin Pointcloud" to export the point cloud, and then click OK.



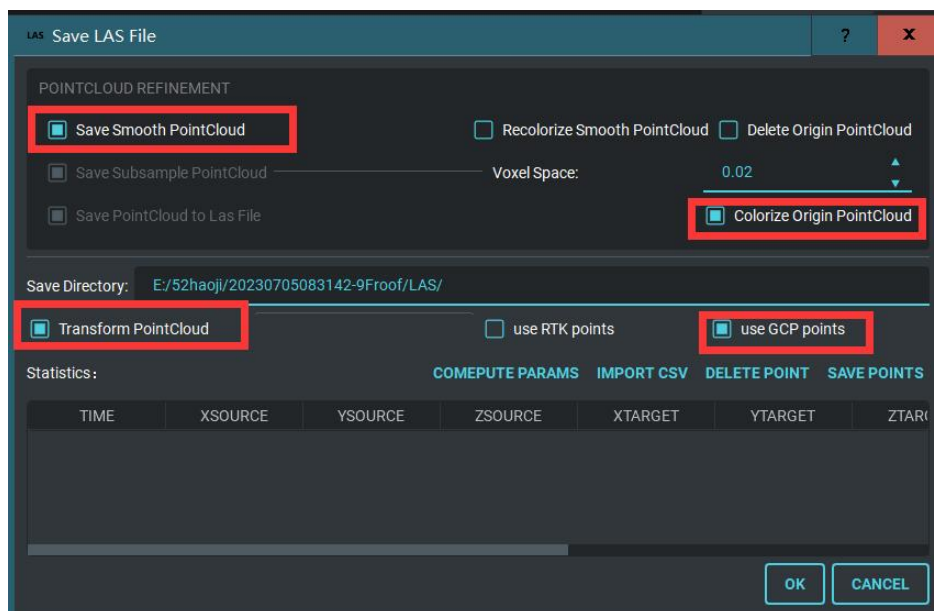
4.6 Export Absolute Coordinates

1. If marks GCPs in the scanning process



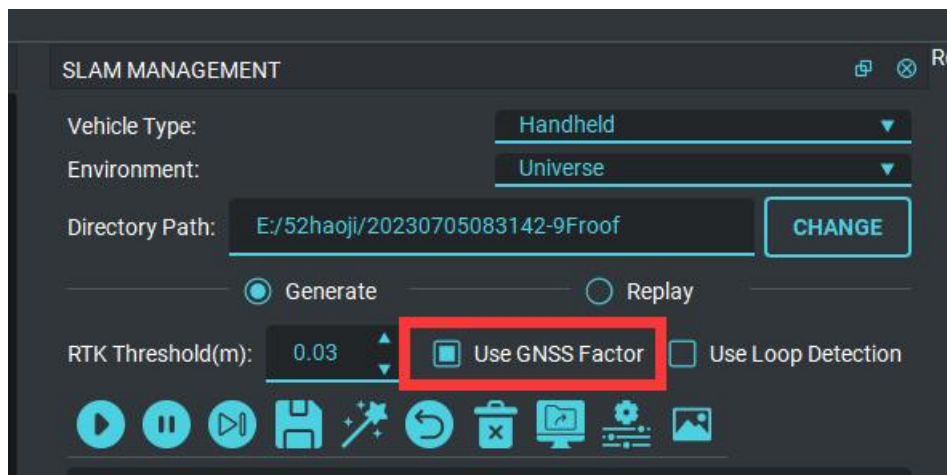
Marking GCPs on the ground

If some Ground Control Points are marked and get the coordinates file for the GCPs, please check "Transform Point Cloud" and "Use GCP points" to receive absolute coordinates;

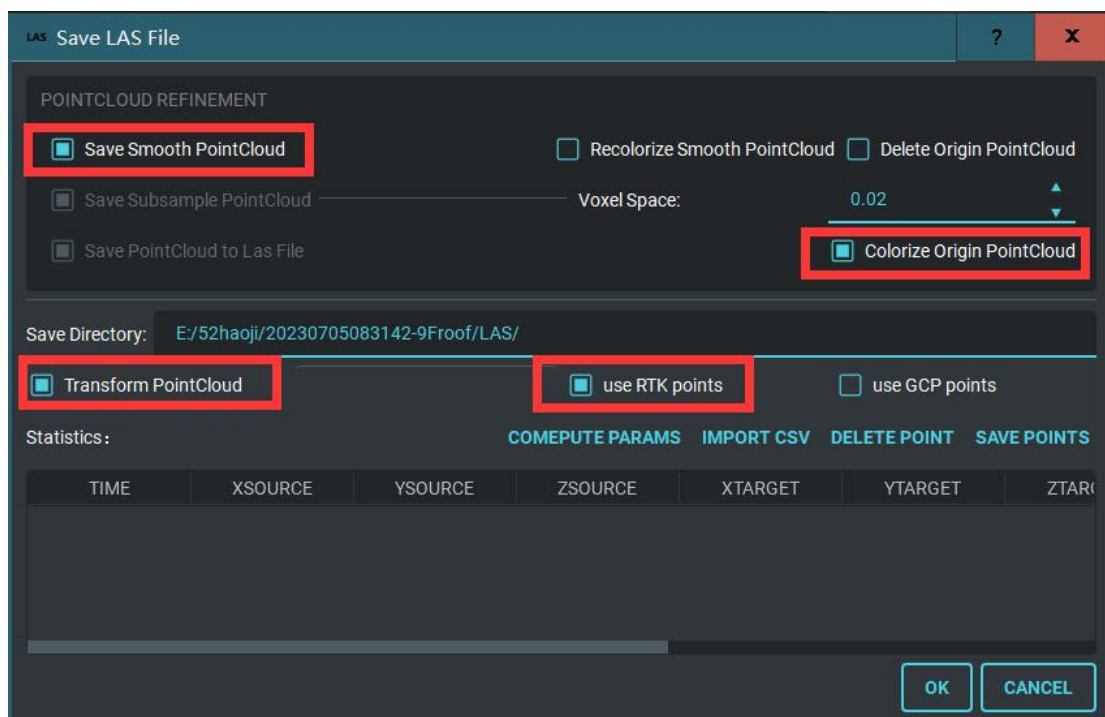


2.If RTK access to CORS network during scanning process

If RTK function works and the GNSS solution is Fixed most of the time, before process, please check "Use GNSS Factor",

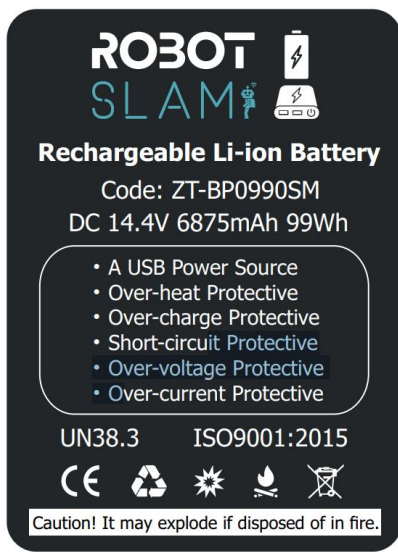


And when export point cloud, please check the followings:



5.Battery

RobotSLAM includes two batteries, one battery can work 2hours, two batteries totally can work about 4hours.



Battery charging

Battery LDE display (remaining power display)



6.Usage Guidelines

This chapter will talk about guidelines for how to use RobotSLAM to receive desirable surveying results.

As we know, SLAM can work both indoors and outdoors, and don't rely on the satellite signals to do the scanning and get 3D point cloud. But it doesn't mean we can scan randomly to get the results. And there are some rules need to take care.

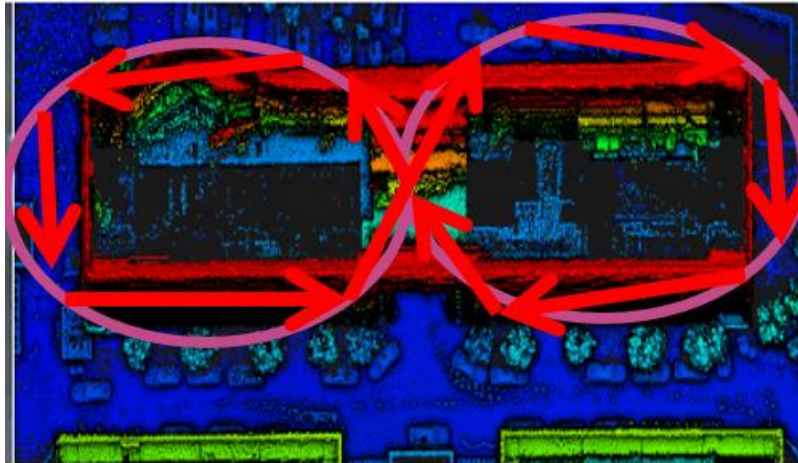
6.1 Walking Speed

1. The scanning speed is normally walking speed;
2. Don't shake the device violently during the process. When turning, turn around slowly, especially for indoor environment or stairs scanning.



6.2 Loop closure

It is necessary that the operator should start scanning and end scanning in the same position to close the loop. Because there are cumulative errors in the SLAM scanning, and the loop works well to eliminate the error.



Outdoor small scene route planning



Outdoor large scene route planning

6.3 indoor scanning

1. For indoor environment scanning, please open all doors in advance;
2. Plan walking route in advance;
3. Avoid walking people as much as possible;



Open the door before start scanning



FCC Caution:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

Specific Absorption Rate (SAR) information:

This device meets the government's requirements for exposure to radio waves. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. FCC RF Exposure Information and Statement the SAR limit of USA (FCC) is 1.6 W/kg averaged over one gram of tissue. Device types: This device has also been tested against this SAR limit.

This device was tested for typical body-worn operations with the back of the This device kept 0mm from the body. To maintain compliance with FCC RF exposure requirements, use accessories that maintain an 0mm separation distance between the user's body and the back of This device. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided.