



# CHCNAV AlphaAir 450

User Manual

Version 2.0



Mobile Mapping | Nov 2021

Make your work more efficient

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# 1 Reading Tips

## 1.1 Symbol Description

 Forbid

 Warning

 Important note

 Operate & Using tips

## 1.2 Recommendations

CHCNAV provides below documents for user:

- Product configuration list
- AlphaAir 450 mobile mapping system user manual

It is recommended for user to read above documents before first time using.

## 1.3 Service & Support

CHCNAV website: <http://www.chcnav.com>

Service Hotline: 400-620-6818

Wechat public:



## 1.4 Disclaimer

- The customer should use and maintain the equipment in accordance with the requirements of the manual. If the service life of equipment is affected due to improper use or maintenance, even broken, CHCNAV will not bear the relevant responsibility. All repairs and maintenance services resulting from this will be charged at standard prices.
- During the transportation, if the equipment is damaged due to improper logistics operation, CHCNAV will not bear the relevant responsibility.
- During equipment using time, if customer disassembles and assembles the equipment without CHCNAV's suggestions & permission, and resulting in damage, CHCNAV will not bear the relevant responsibility.
- Customer should use default batteries and accessories. If use non-dedicated batteries, the charger may cause unexpected situations like explosions, fires etc. The use of non-original accessories is not eligible for warranty; if occur accident, the manufacturer will not bear the corresponding responsibility.

## 2 Using Requirements

### 2.1 Using Environment

- It is not recommended to use in rainy, snowy, or foggy weather for safety. Also the point cloud data will have more noise.
- It is not recommended to frequently use in dusty environment, which will affect the service life of equipment.
- It is forbidden to expose the device and accessories under extreme temperature. The environment temperature must not be lower or higher than the specification temperature.
- When the equipment is transferred from a cold environment to a warm environment, water may condense on certain components inside the scanner. To avoid this, it is recommended to place the scanner in a sealed plastic bag before transferring. When the condensate is evaporated, then turn on the plastic bag.

### 2.2 Tips Before Using

- Check whether the laser glass is normal, if there is dust exist, please use the cleaning kit to clean it.
- Check whether the ports are clean, and whether the pins are normal.
- Check whether the connecting cables are reliable and stable, and whether the GPS cable is stable and normal.

### 2.3 Tips During Using

- When using, make sure all cables and ports are connected correctly.
- Place equipment at an open sky area with good GPS signal during powered on.
- If the buzzer sounds abnormally during the capture process, please check immediately whether the equipment status is normal.
- Before start work, check the remaining capacity of the scanner memory card. If the remaining capacity is less than 10% or does not meet the current collection capacity requirements, the laser data file need to be deleted in advance.

### 2.4 Tips After Using

- After using, unplug the cable first, then place the equipment into equipment case.
- During transportation, take care the equipment and try to avoid bump.

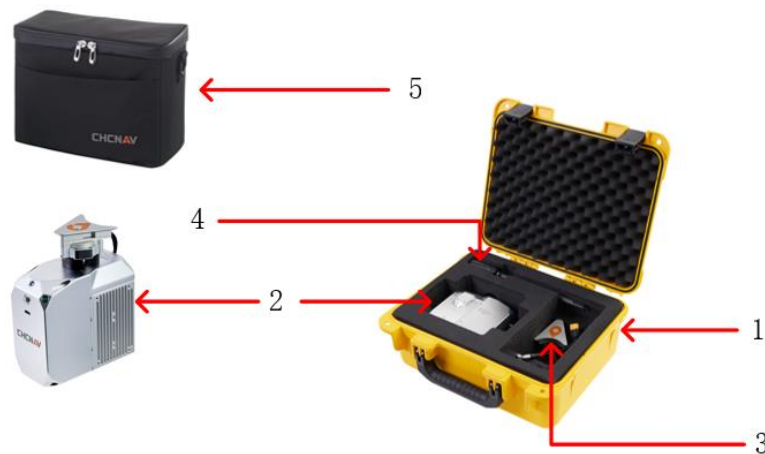
## 3 Product Description

### 3.1 Equipment List

AlphaAir 450 mobile mapping system configuration list is shown below:

Serial number	Classification	Name	Model	N
1	<b>AlphaAir 450</b>	LiDAR system	AlphaAir 450	1
2	<b>Standard Accessories</b>	Type-c to USB Data cable		1
3		8G USB flash		1
4		Clean suits		1
5		Transport container (Portable Bag)		1
6		<b>Standard Software</b>	CoCapture license	
7	CoPre license			1
8	<b>M300 Standard Accessories</b>	2.5mm cross screwdriver		1
9		M300 antenna mount		1
10		Rod antenna		1
11	<b>Other optional</b>	CHC Alphaport		1

### 3.2 Delivery of Equipment and Materials



- 1- Transport Container
- 2- AA450 Unit
- 3- CHC Alphaport adapter
- 4- Rod Antenna
- 5- Portable Bag

## 3.3 Product Introduction

AlphaAir 450 pocket lidar measurement system, the whole device is based on the lightweight and high integration design concept, carried on the BB4 or 3rd party UAV like DJI M300, can obtain longer endurance. As an emerging means of 3D data acquisition, it can quickly acquire terrain surface data, ground feature, power line information, etc., which can realize high-precision 3D terrain data and high-density 3D data acquisition of transmission lines. In addition, based on the image acquisition by the built-in camera, DOM, DSM, true color point cloud and other results can be generated, and road sections, power lines, vegetation and other results can be automatically extracted for analysis, and the inspection report can be output.

The product is shown below:

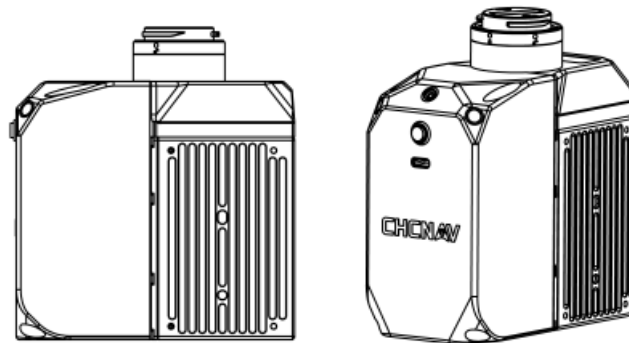


CHCNAV AA450 unit

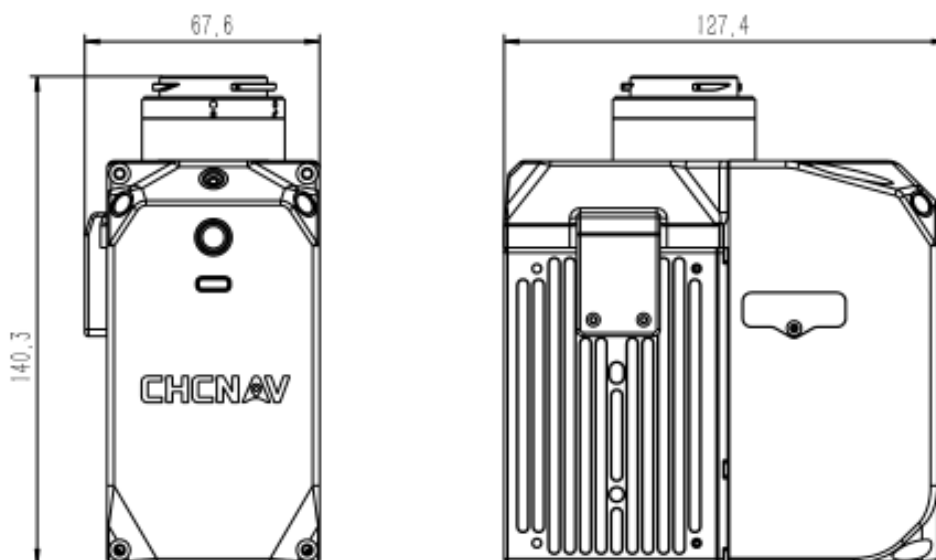


## 3.4 Equipment Size

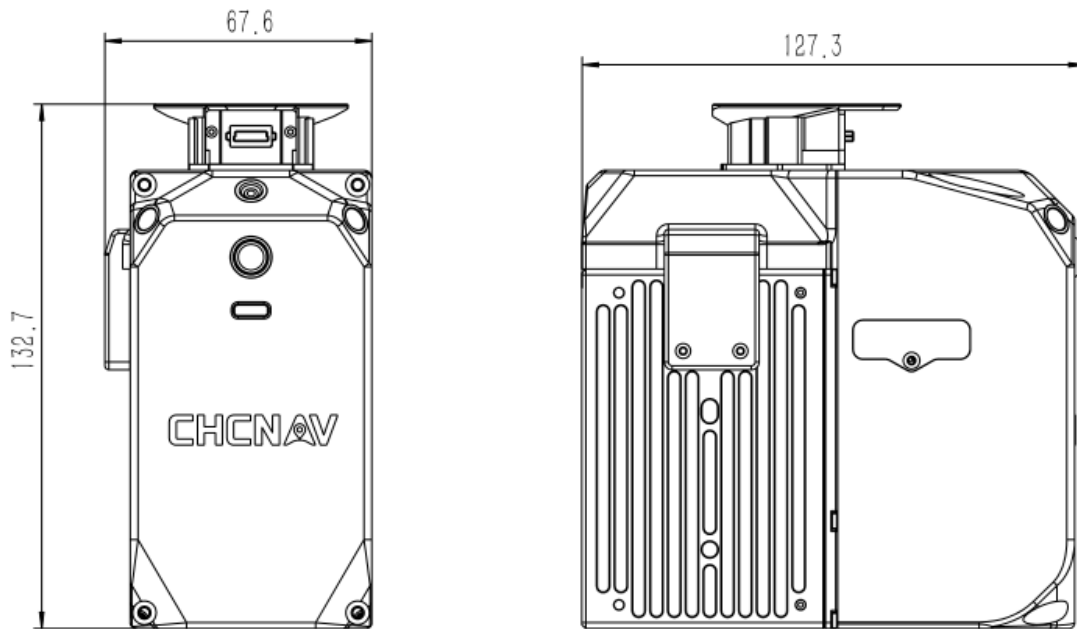
- The product diagrams are shown below:



- Weight: 950 g
- Length, width and height are shown below

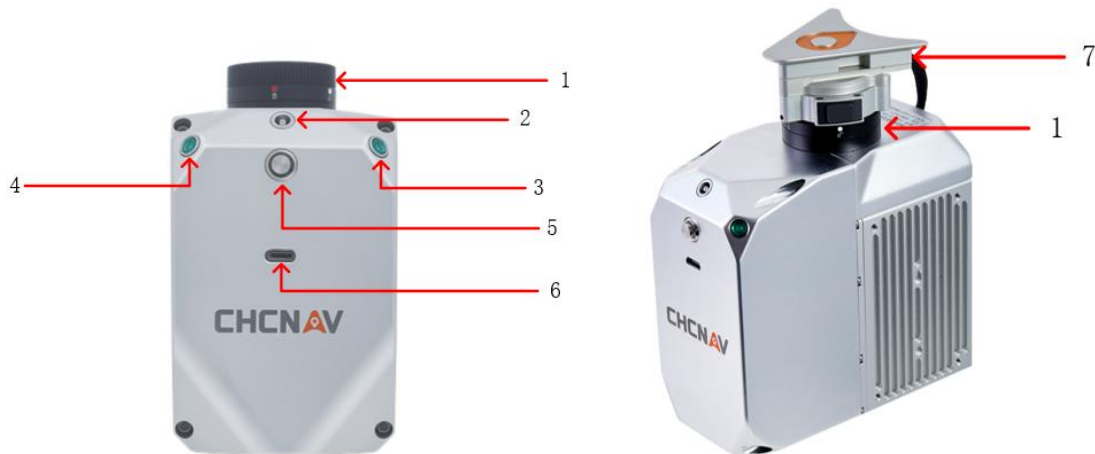


M300 interface (DJI Skyport)



BB4 interface (CHC Alphaport)

### 3.5 Device interface description



- 1- DJI Skyport Interface: Power supply and communication for M300
- 2- GNSS Antenna Interface: Receive GNSS signal for positioning and timing
- 3- LED Indicator (4-LED Indicator): Device status indicator, blinking synchronously with the ON/OFF indicator
- 4- ON/OFF Key: Turn on/off the equipment and one-button acquisition control button
- 5- TYPE-C Data Cable Interface: Connect AA450 to Computer for data coping
- 6- Alphaport Interface: Power supply and communication for BB4
- 7- Carrying handle

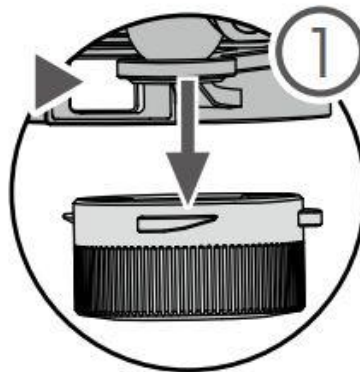
## 3.6 Electrical Characteristics

Input voltage	DC 12~24 V
Rated power	32 W
Working temperature	-20 °C to +50 °C
Storage temperature	-20 °C to +65 °C
Humidity	<80%, non-condensation

## 3.7 Airborne Platform (M300)

### 3.7.1 Airborne install steps

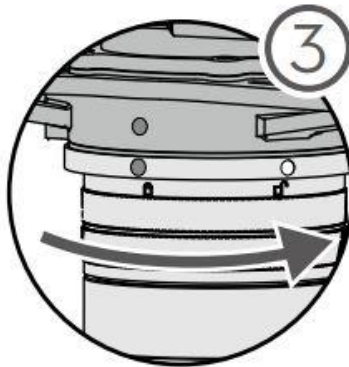
- Press the Skyport unlock button to remove the protective cover.



- Align the white dot on the AA450 Skyport interface with the red dot on the M300 interface and embed it in the installation location.



- Rotate the AA450 Skyport interface to the locked position (red dots align red dots) to be fixed.



- Insert the rod antenna into the M300 antenna mount and tighten it. Connect the other end of the GNSS feeder to the GNSS interface of the AA450.

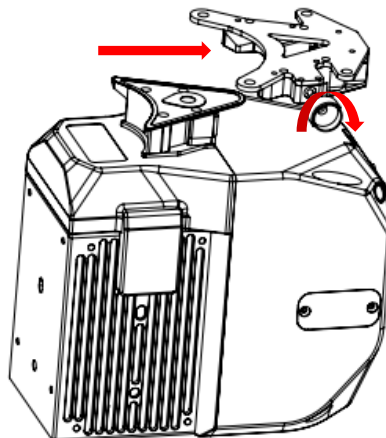
### 3.7.2 Airborne disassemble steps

- Take out the GNSS feeder from the AA450 GNSS interface, rotate the GNSS antenna counterclockwise and take it out from the antenna fixing bracket.
- Hold the bottom of the AA450 with your left hand, press the Skyport unlock button with your right hand, and remove the device by turning the quick-release connector clockwise.

## 3.8 Airborne Platform (BB4)

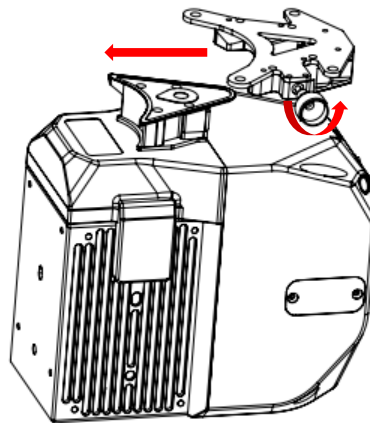
### 3.8.1 Airborne install steps

- Push the slider of scanner into the quick-release clamp which on the bottom of the airborne load plate in the direction of the arrow until hear a fix sound.
- Tighten the side screw bolts to make it stable and finally finished the installation.



## 3.8.2 Airborne disassemble steps

- Hold the bottom of scanner with left hand and turn the handle bolt on the side of the quick release fixture counterclockwise with right hand until the threaded part of the handle bolt disengages.
- Pull the handle bolt back to the maximum position with the right hand and keep it. The left hand can translate the scanner to the head direction to complete the separation of the scanner and quick-release.



## 4 Product Using

### 4.1 Advance Preparation

- Take out the equipment from the container before using. Install it on the corresponding platform and connect all cables. Meanwhile, set up the base station at an open sky area. Turn on the equipment after the base station start recording static.
- Before data collection, it is necessary to check the remaining capacity of Alpha\_LAS and Alpha\_CAM memory cards. If the remaining capacity is less than 10% or does not meet the demand of current collection capacity, the data in card should be deleted in advance.

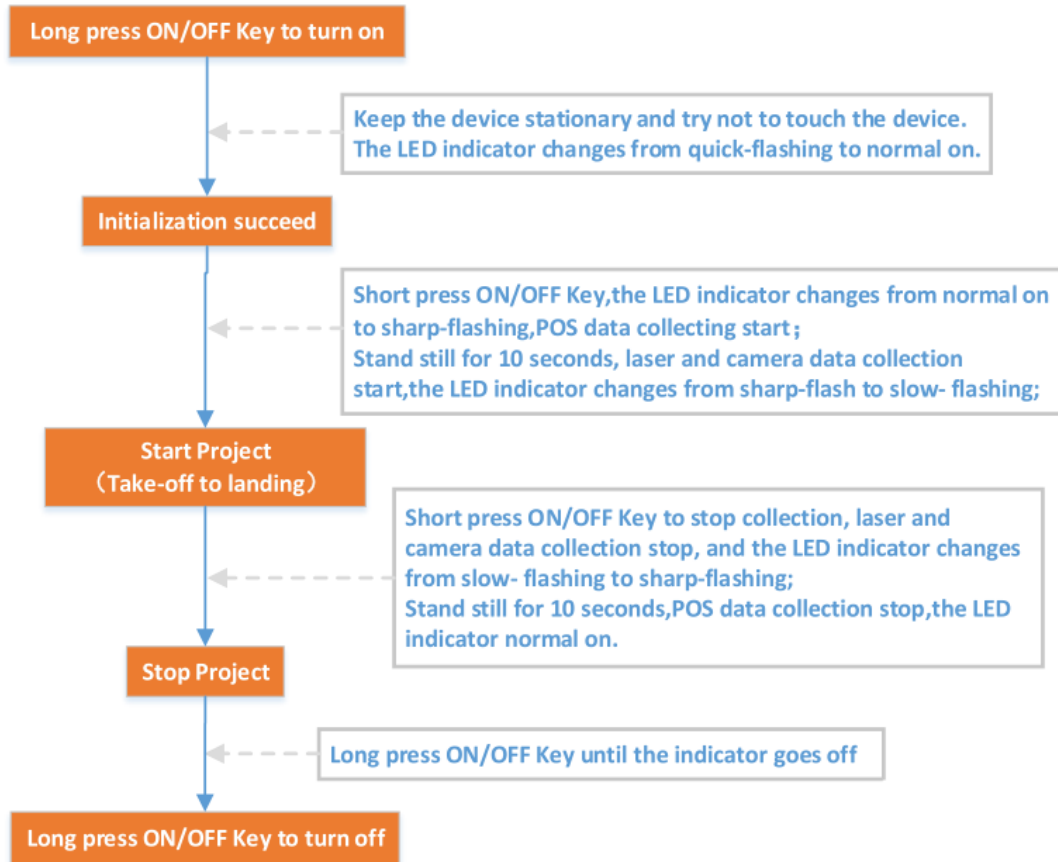
### 4.2 Equipment Installation

- First, install the equipment on the platform and lock it with screws. Remember to remove the camera protective cover.
- Connect both power supply cable and GPS feeder cable of equipment and start power on.
- Put the equipment at an open sky area and turn on LiDAR.

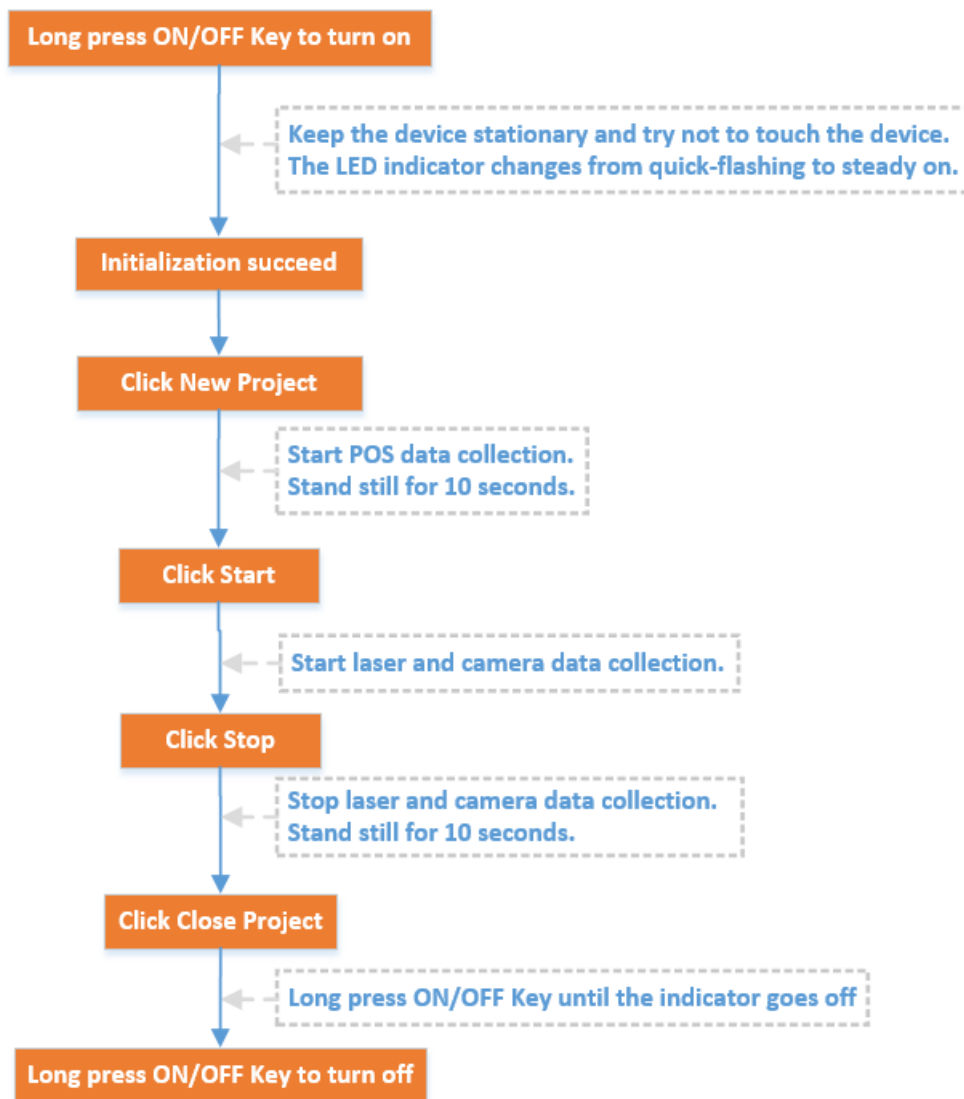
## 5 Data Acquisition

For the convenience of users, provide two methods of data collection, One-Key Control and DJI M300 Remote Control.

**\*\*\*DJI M300 Remote Control "has a higher priority than" One-Key Control \*\*\*.**



AA450 One-Key Control Flow



DJI M300 Remote Control Flow

## 5.1 One-Key Control Flow

The AA450 is embedded with one-key acquisition software, equipped with one button (including a buzzer and LED indicator) and two auxiliary LED indicators, the AA450 can be controlled by a single key to complete data collection.

- Before power on, check all cables are connect correctly and power supply is normal.
- M300 Power On: Short press the power button, then long press it within 3 seconds to power on the M300.Indicator light is always on after power on.
- LiDAR Power On: Long press the device’s “ON/OFF key”, the indicator lights up and the buzzer sounds , the indicator light flashes which means the lidar is powered on successfully. Keep the device stationary and try not to touch the device.
- Device initialization: About one minute after lidar is powered on, the indicator light is normal on which means device initialization successfully completed!

- Start project: After successfully initializing the device, short press the device's "ON/OFF key", the indicator status changed from normal on to sharp-flash, POS data collecting start. After standing still for 10 seconds, the device automatically enters the acquisition state, at this time, both the laser and the camera start to work ,the LED indicator changes from sharp-Flash to slow- flash.
- Stop project: When the collection is over, short press the device's "ON/OFF key", the laser and camera will stop working, the LED indicator changes from slow- flash to sharp-flash. Long press the "ON/OFF key" after standing still for 10 seconds, the device will stop the project, the LED indicator normal on.
- LiDAR Power Off : Long press ON/OFF Key to turn off.



### Description of LED indicator

LED quick-flash—LED on 0.1s, off 0.1s, on 0.1s, off 0.1s, on 0.1s, off 0.1s...

LED sharp-flash—LED on 0.1s, off 0.1s, on 0.1s, off 1.3s, on 0.1s, off 0.1s, on 0.1s, off 1.3s...

LED slow-flash—LED on 1s, off 1s, on 1s, off 1s, on 1s, off 1s...

Short press—More than 0.2s but less than 3s.

Long press—More than 3s (When the button is pressed, the buzzer rings. After 3s, the buzzer rings three times at a frequency of 5 HZ after that, the buzzer does not ring).

Long press—More than 10s (After 10 seconds, the buzzer rings and the green light blinks slowly).



## 5.2 DJI M300 Remote Control Flow

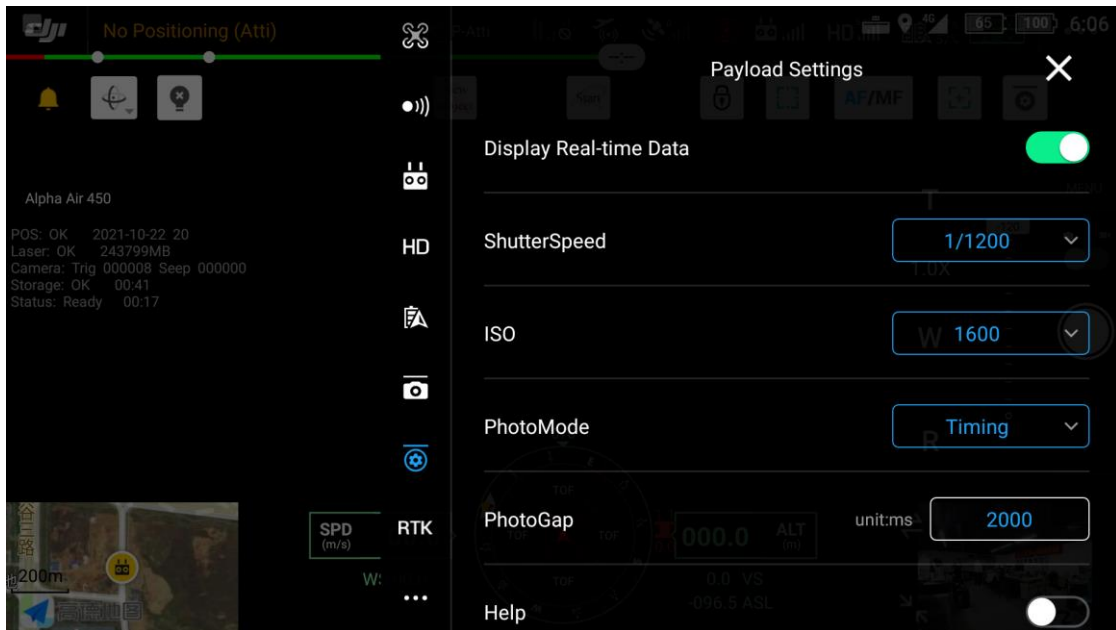
### 5.2.1 Introductions

- POS: Shows the IMU status, project date and the total number of satellites. When the POS status is unknown, it means that the device initialization unsuccessfully, and when it is OK, it means that the device initialization successfully.
- Laser: Shows the laser state and residual capacity of SD card. The memory of SD card is 256GB. Please empty it in time if the remaining capacity is insufficient.
- Camera: Shows how many photos the camera took and how many missed .
- Storage: Shows storage status and project duration.
- Status: Shows the system state and the duration of the current state.

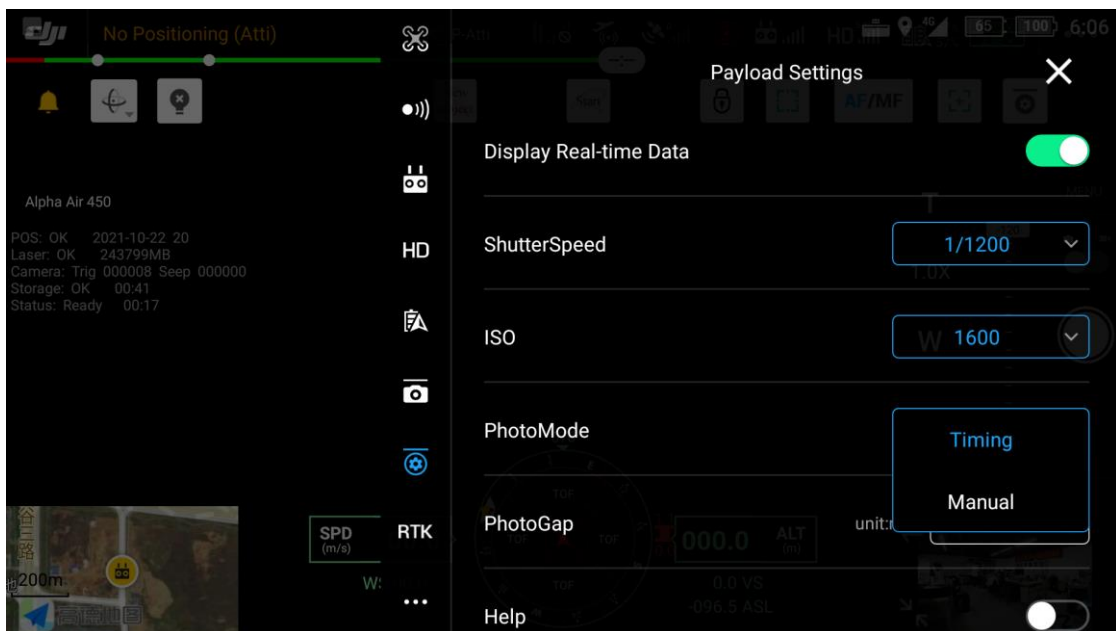


## 5.2.2 Camera Parameters Setting

- You can set the camera's ShutterSpeed, ISO, PhotoMode, PhotoGap. The default PhotoGap is 2000ms.




**Note:** PhotoMode must be set as Timing, otherwise the camera won't take pictures.



## 5.2.3 Data Acquisition

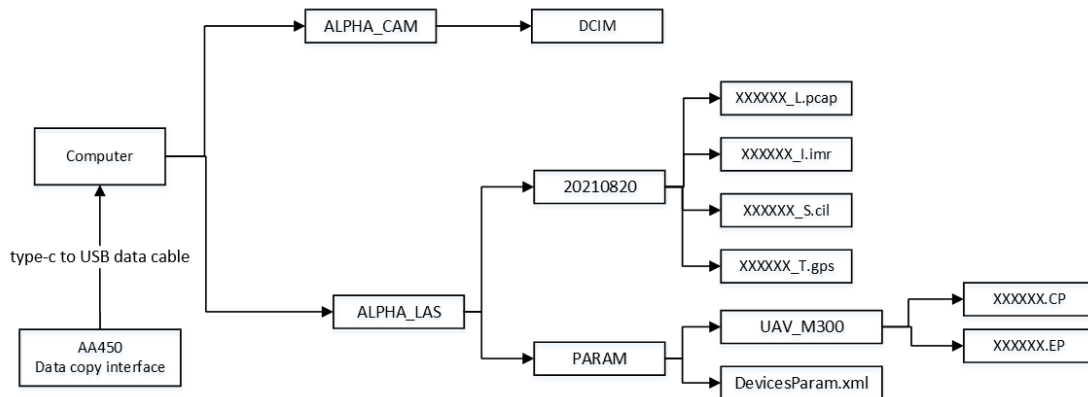
- LiDAR Power On: Long press the device's "ON/OFF key", the indicator lights up and the buzzer sounds, the indicator light flashes which means the lidar is powered on successfully. Keep the device stationary and try not to touch the device.
- Device initialization: About one minute after lidar is powered on, the indicator light is normal on which means device initialization successfully completed!
- After confirming that all device states are OK, click "New Project" to start POS data collection.
- After starting the project, the device need to be still for 10 seconds, then click "Start" to start the laser and camera data collection.
- After the project is completed, click "Stop" and the laser and camera will stop working.
- The device need to be still for 10 seconds, then click "Close project" to end the project.
- LiDAR Power Off : Long press ON/OFF Key to turn off.

 **Note:** To click "Start"/"Stop"/"Close project"/, you need to click the unlock icon on the screen and complete the operation within 3 seconds.



## 6 Data Copy

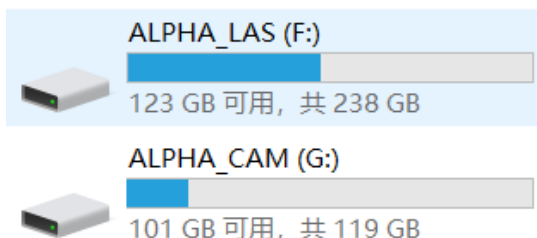
### 6.1 Introduction of the data



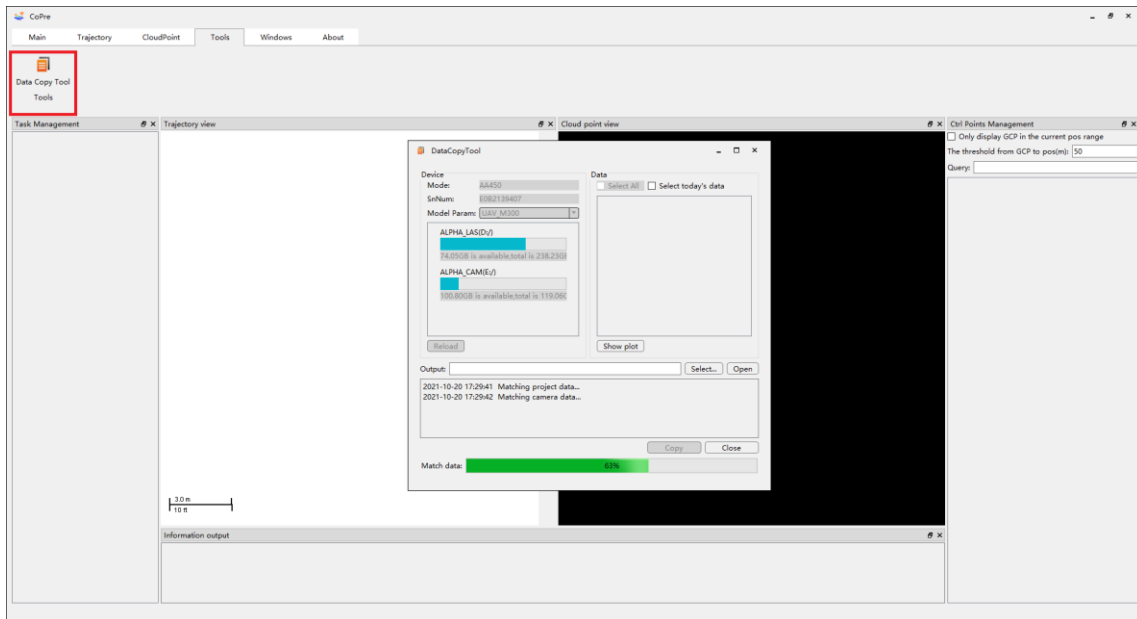
- ALPHA\_CAM: The photos are stored in the DCIM.
- ALPHA\_LAS: The data is grouped according to the collection date, For example, 20210820 indicates the data collected on August 20, 2021.
- A complete project consists of four files:
  - xxxxxx\_l.imr, IMU data.
  - xxxxxx\_s.cil, Synchronizes data.
  - xxxxxx\_t.gps,GNSS data.
  - xxxxxx\_l.pcap, Reserved data interface, for DMI data.
- xxxxxx.CP: Camera calibration file.
- xxxxxx.EP: Laser calibration file.

### 6.2 Automatically data copy

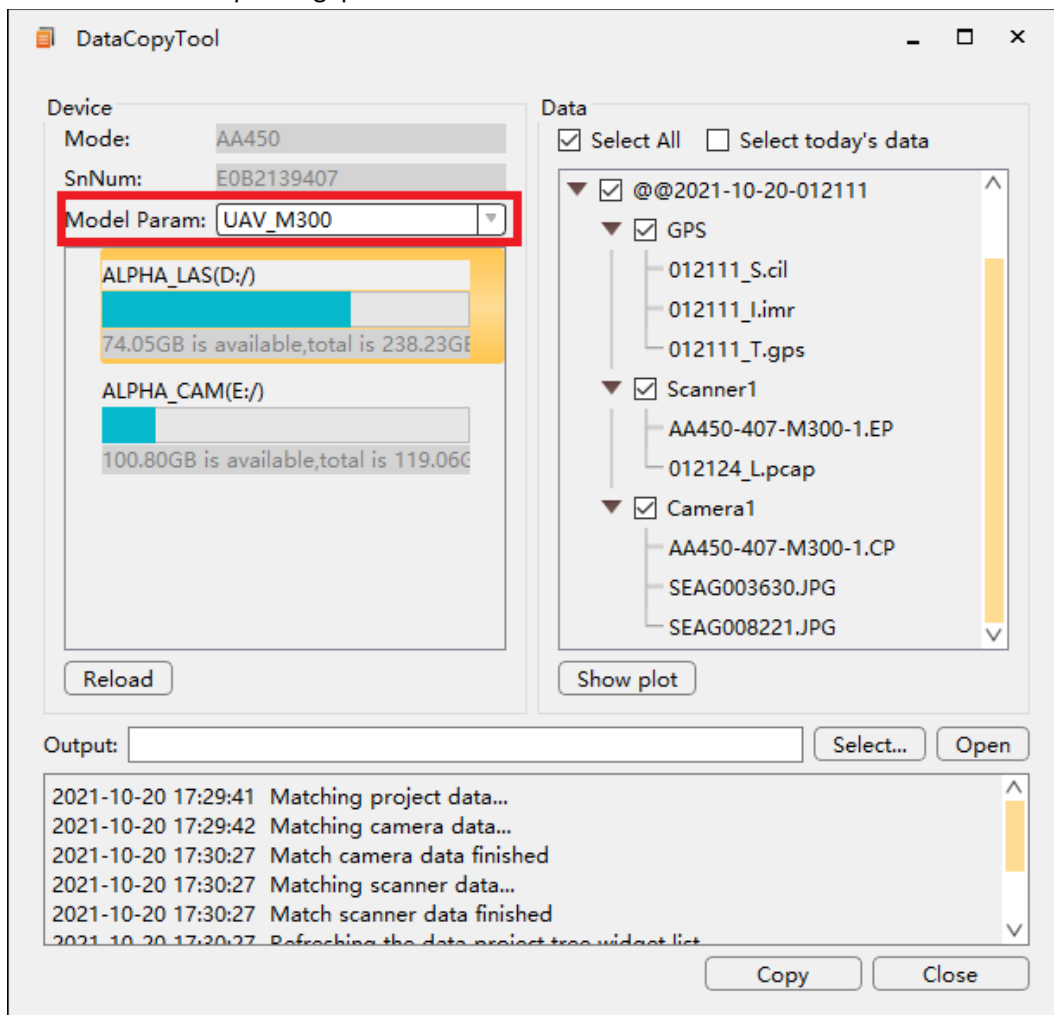
- Connect the device to the computer with type-c to USB data cable, the computer will pop up two SD cards ALPHA\_LAS and ALPHA\_CAM



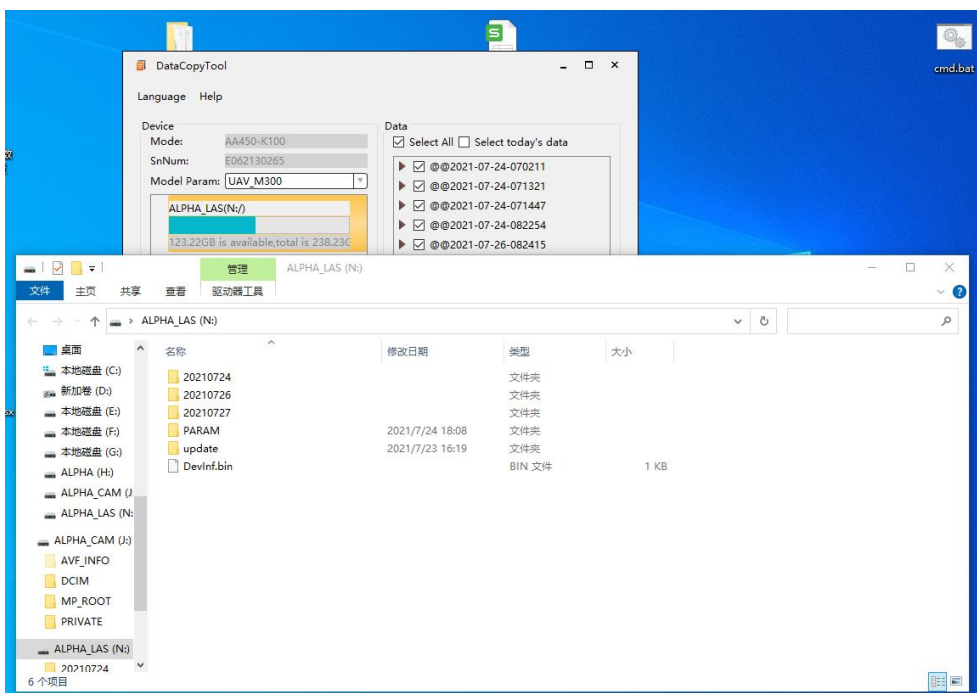
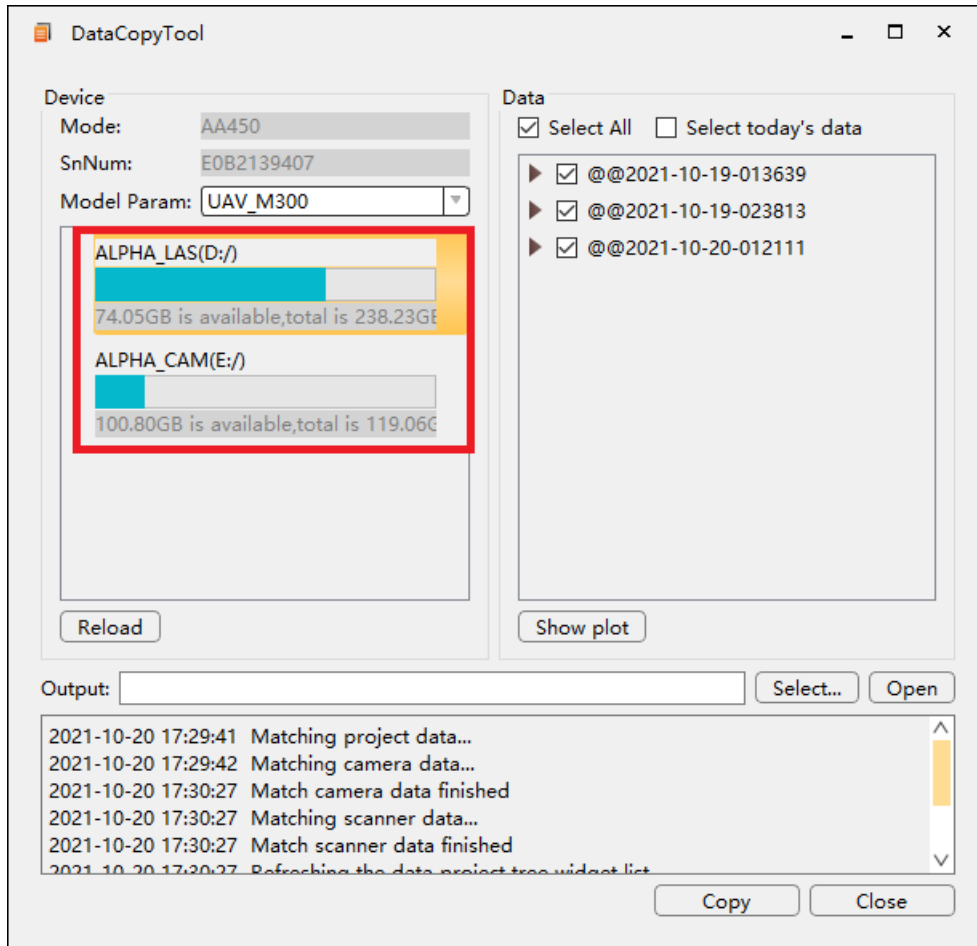
- Open Copre, Enter the following interface



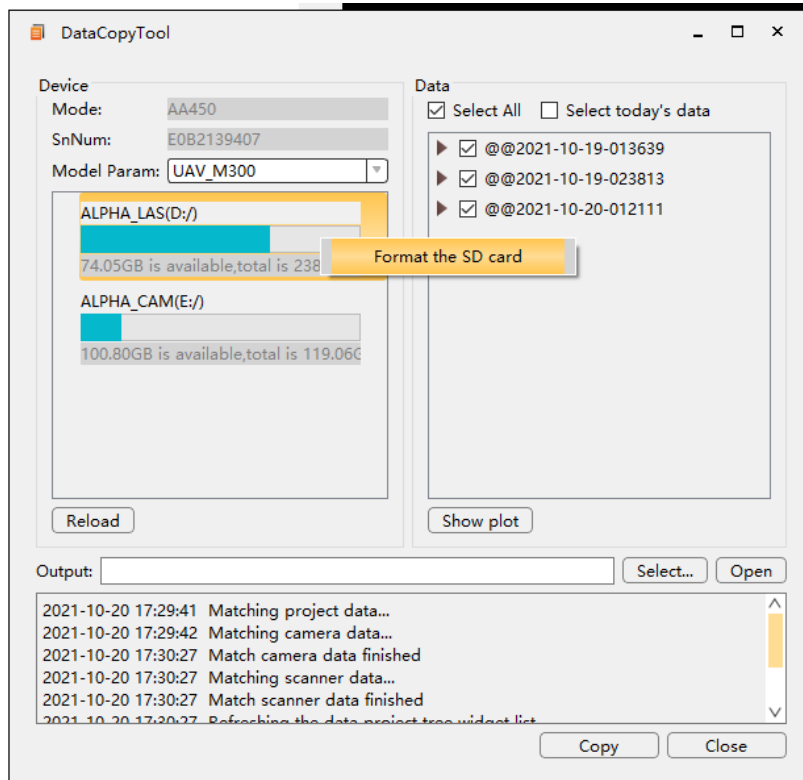
- Select the corresponding parameters



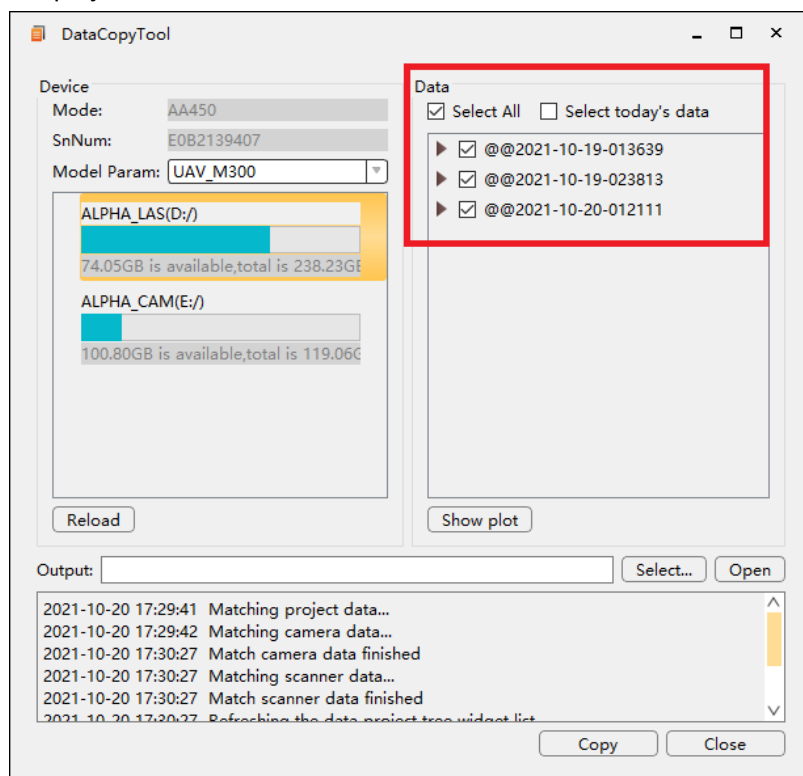
- Double-click the disk to open the corresponding folder, you can check data first



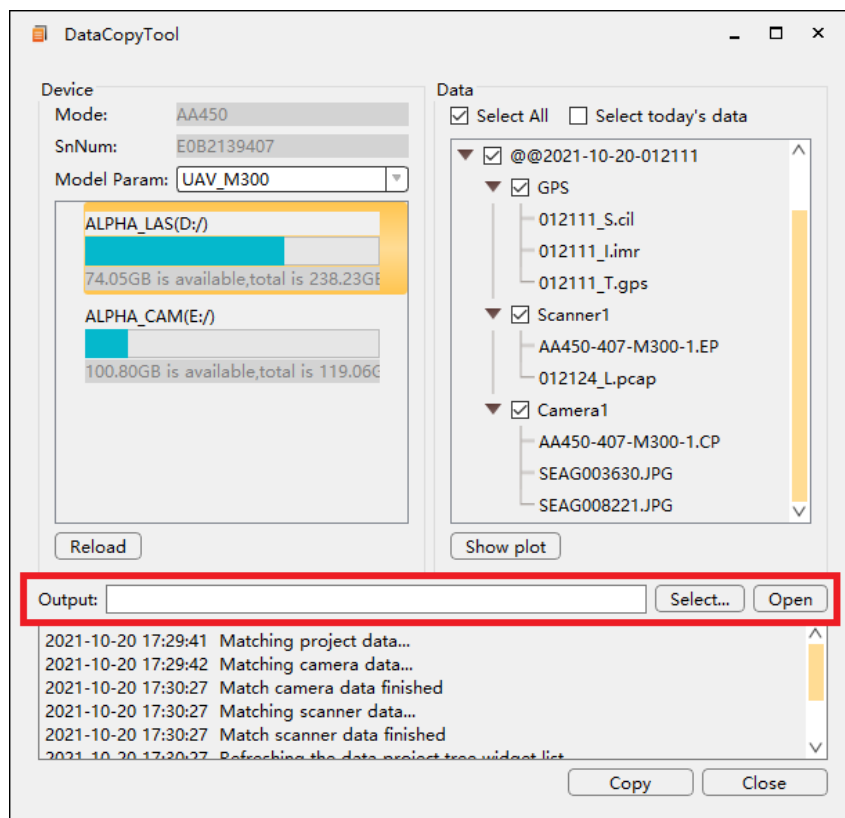
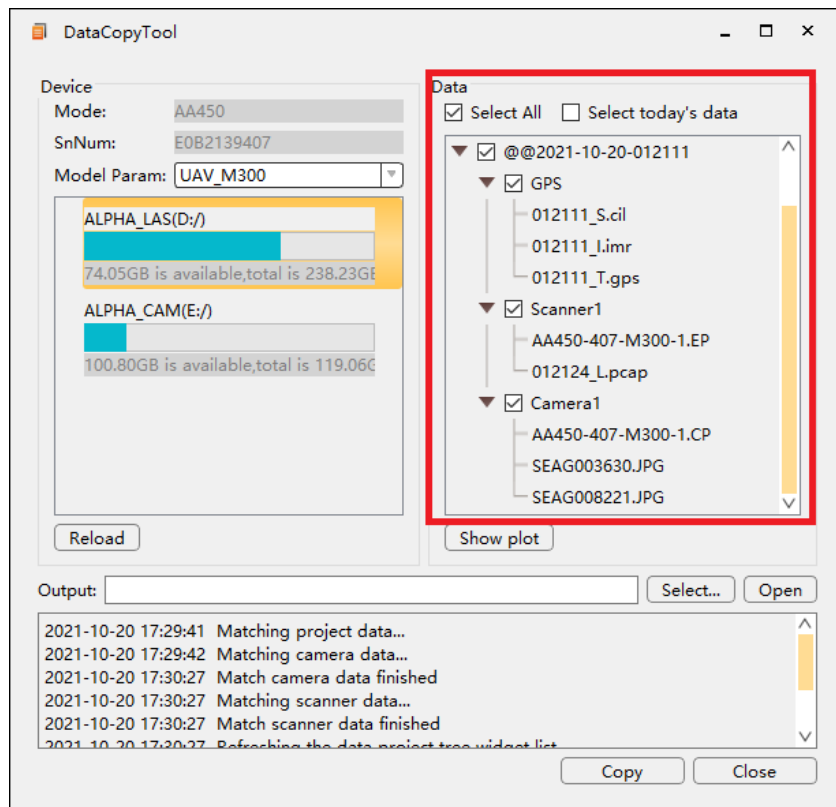
- Right-click the disk to display the format option. Format the disk when the capacity is insufficient



- List of Data projects

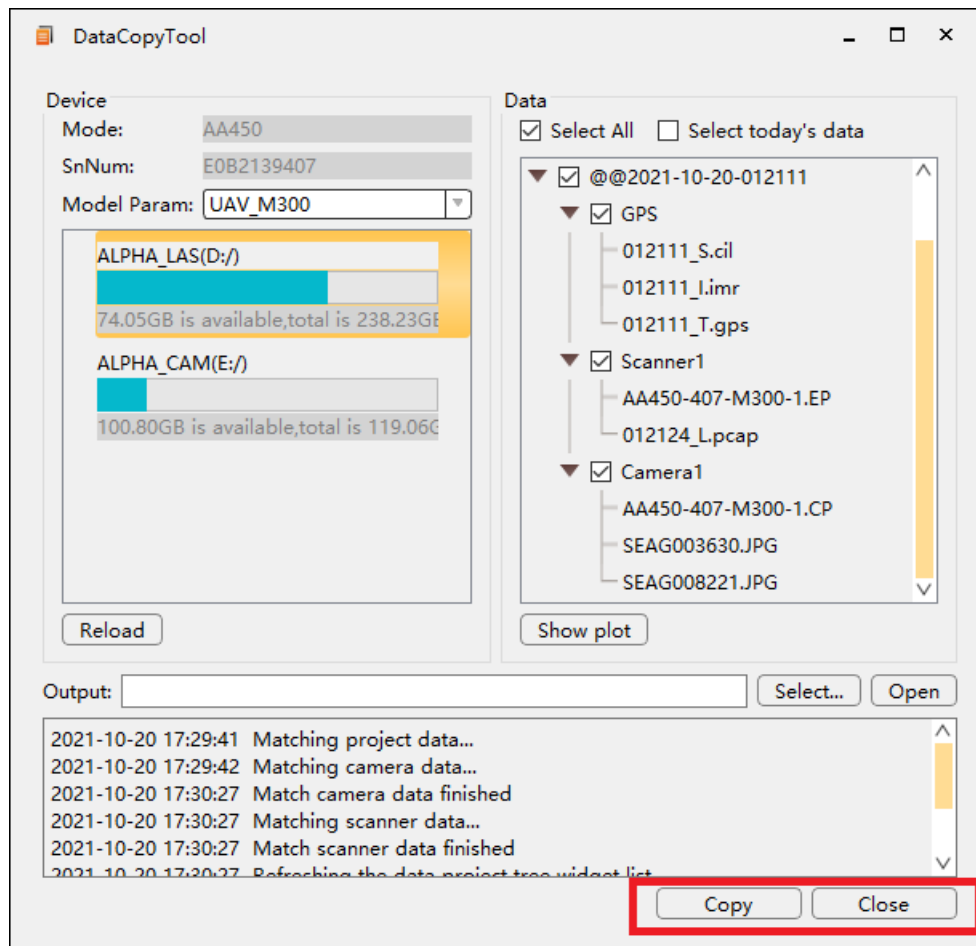


- Check the data to be copied, then create the directory and select the copy path





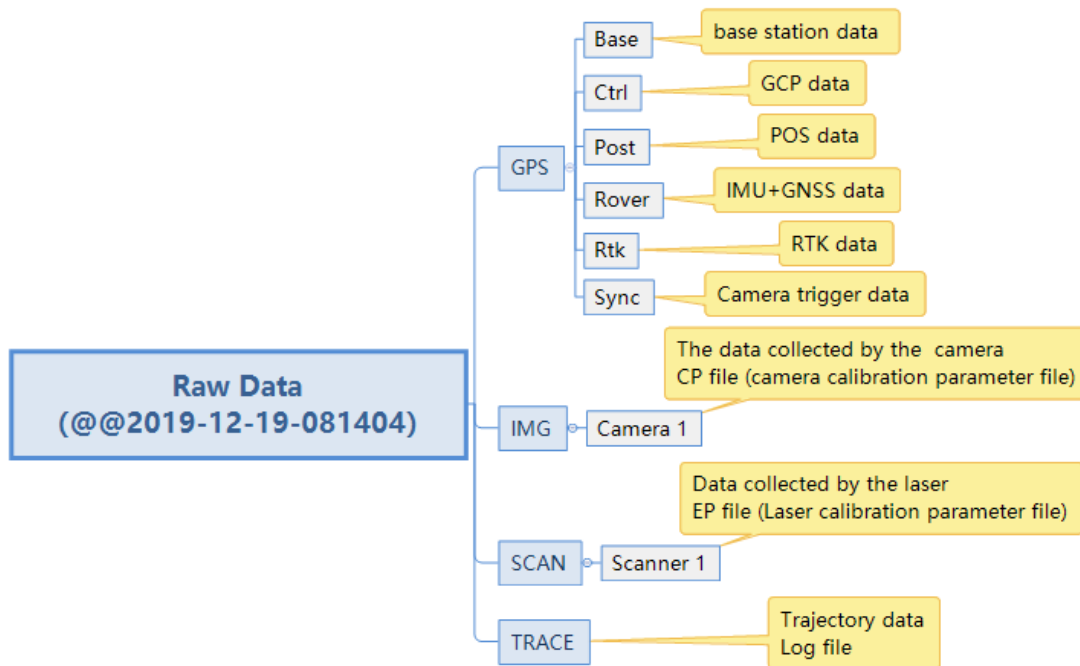
- Click the copy icon. When the data copy is complete, click close icon



## 6.3 Data structure

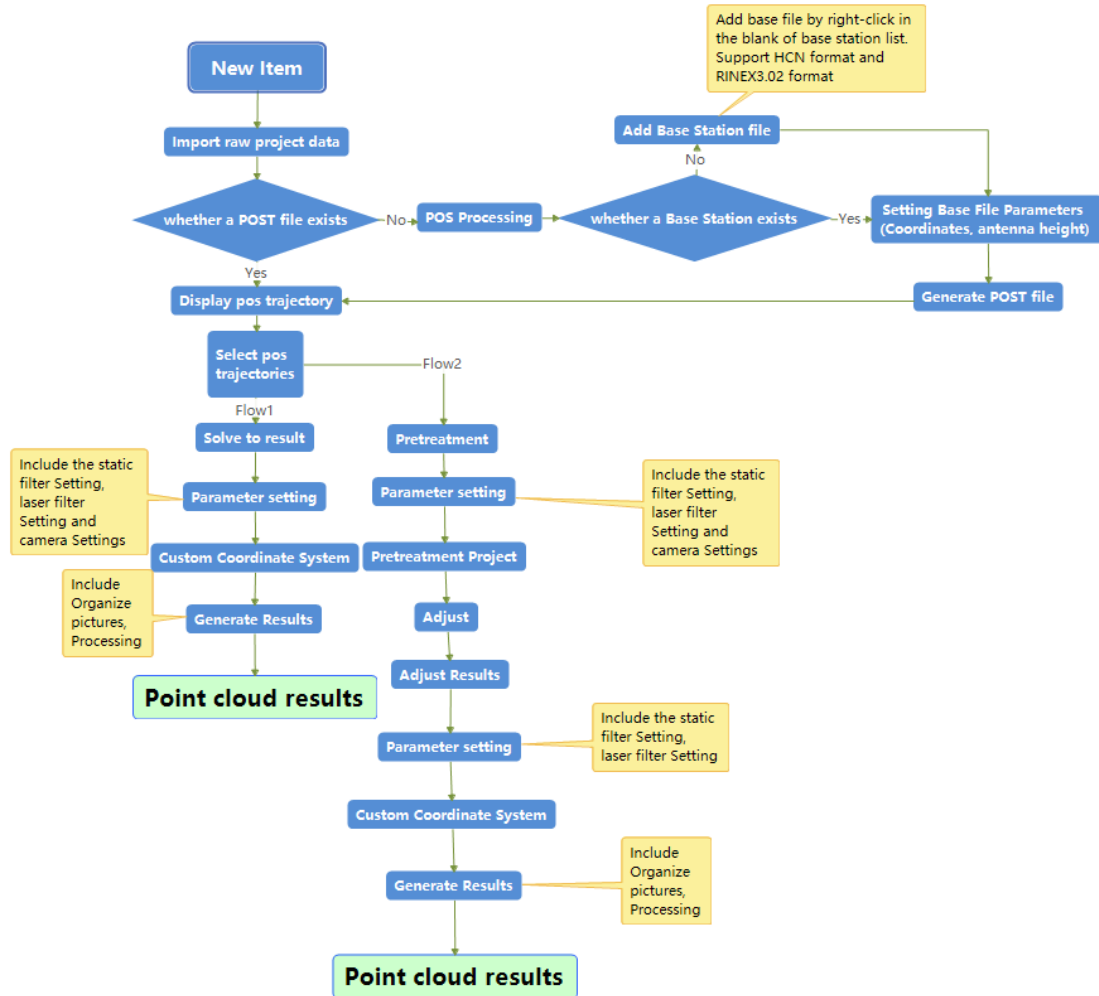
After automatically copying data, will create a folder on the data storage disk, for example, @@2021-07-30-030325. Start with "@@" and are named after the creation time. Under each folder, there are the following folders:

@@2021-07-30-030325				
名称	修改日期	类型	大小	
GPS	30/07/2021 11:34	文件夹		
IMG	30/07/2021 11:34	文件夹		
SCAN	30/07/2021 11:34	文件夹		
TRACE	30/07/2021 11:34	文件夹		



## 7 Data preprocessing in Copre

### 7.1 AA450 Data Processing Flow



## 7.2 New item

- Open the Copre software as shown in figure 1

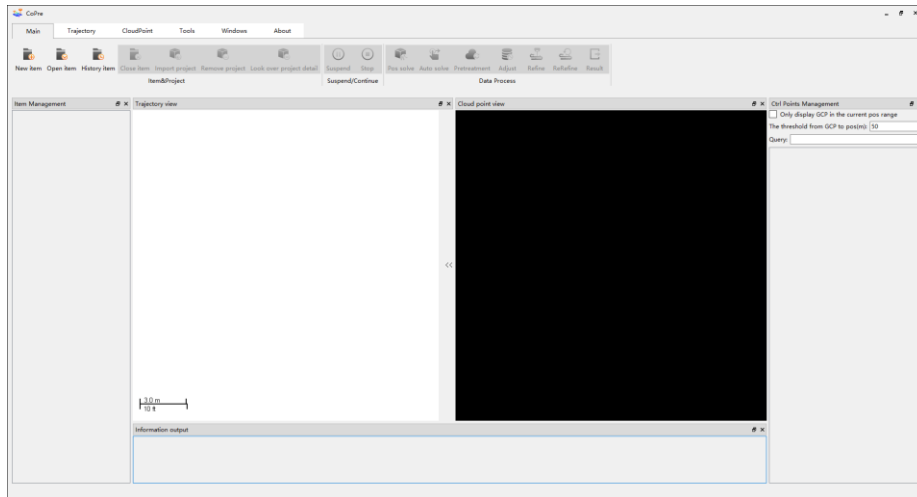


Figure 1

- Click Main - New item as shown in figure 2

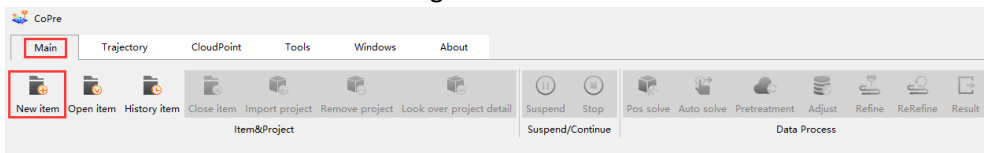


Figure 2

- The Create Item dialog box will pop up as shown in figure 3

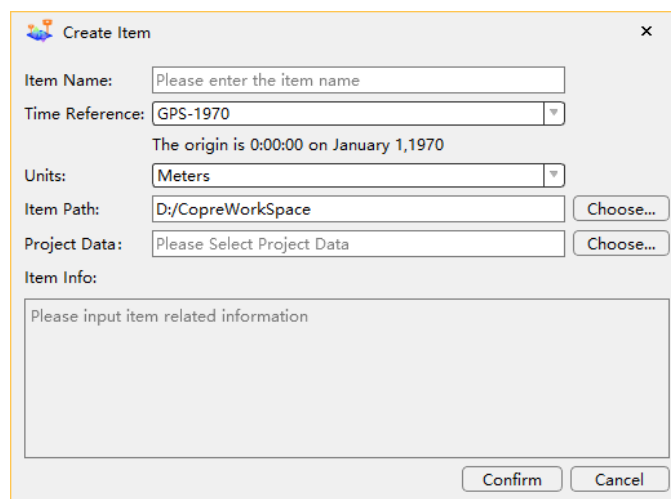


Figure 3

## 7.2.1 Item Name

- Enter the Item Name as shown in figure 4

The screenshot shows a 'Create Item' dialog box with the following fields and values:

- Item Name:** test (highlighted with a red border)
- Time Reference:** GPS-1970
- Units:** Meters
- Item Path:** D:/CopreWorkSpace (with a 'Choose...' button)
- Project Data:** Please Select Project Data (with a 'Choose...' button)

Additional text in the dialog includes: 'The origin is 0:00:00 on January 1,1970' and a large text area labeled 'Item Info' with the prompt 'Please input item related information'. 'Confirm' and 'Cancel' buttons are located at the bottom right.

Figure 4

**Note:** The Item Name must be in English and numerals only and cannot contain (/ \ \* ? : < > | ") character. Otherwise, the dialog will issue a warning, as shown in figure 5

The screenshot shows the 'Create Item' dialog box with an error state. The 'Item Name' field contains 'test.' and is highlighted with a red border. A red warning message 'Please use english' is displayed below the field. The other fields and buttons are the same as in Figure 4.

Figure 5

## 7.2.2 Select Time Reference

- Select Time Reference as shown in figure 6

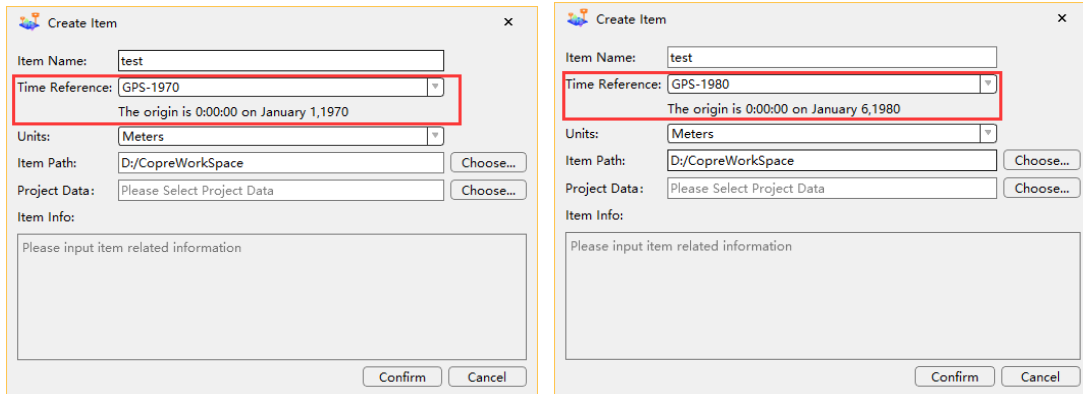


Figure 6

If the results are based on UTC, choose GPS-1970;  
 If the results are based on GPST, choose GPS-1980.

## 7.2.3 Select Units

- Select the Units of measurement required as shown in figure 7

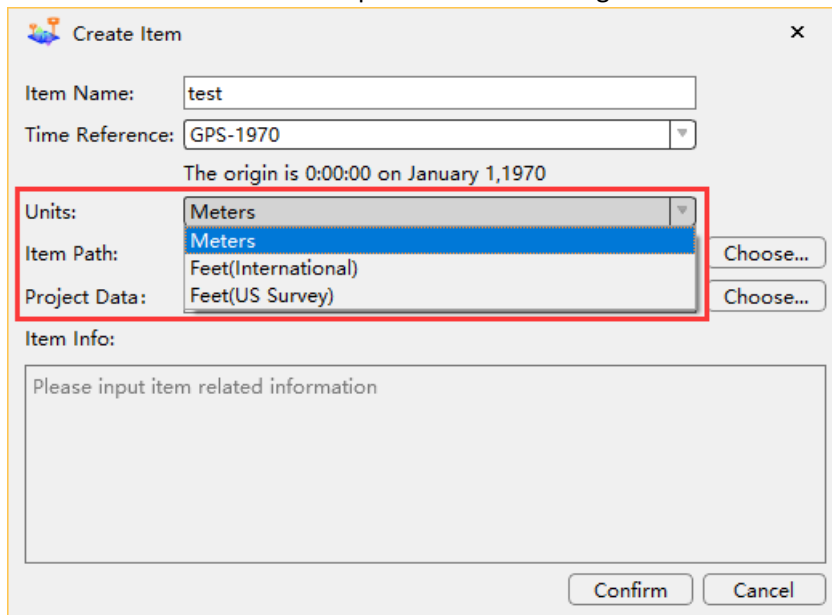


Figure 7

## 7.2.4 Select Item Path

- Click Choose, the New project file path dialog box will pop up as shown in figures 8 & 9

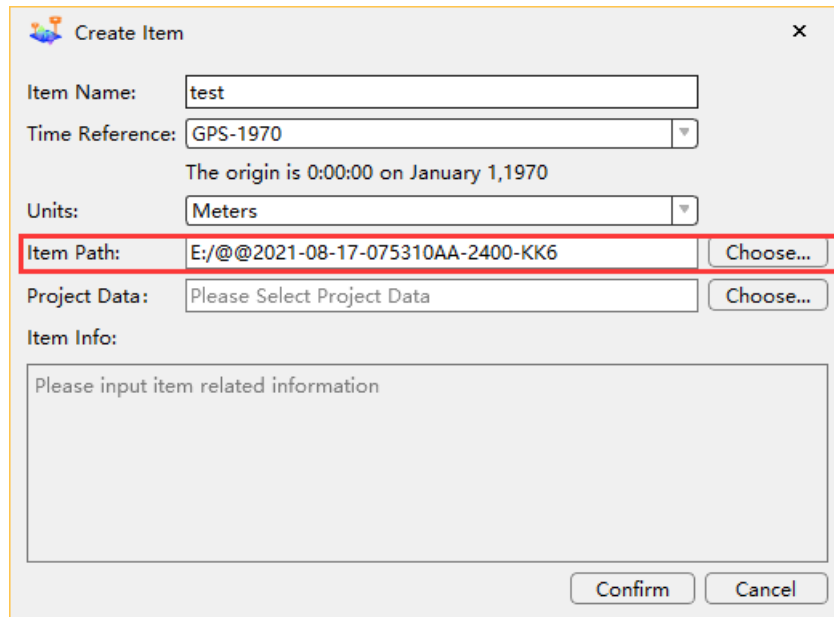


Figure 8

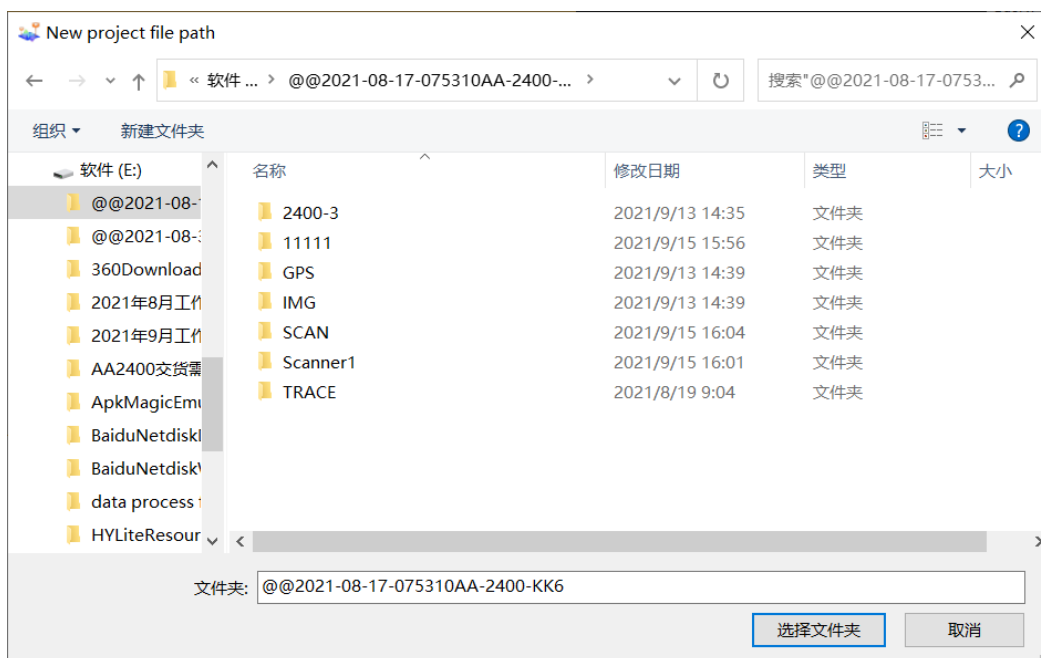


Figure 9

**Note:** The item path name cannot contain Chinese characters or Spaces.

## 7.2.5 Select Project Data

- Click Choose, Select Project Data as shown in figure 10

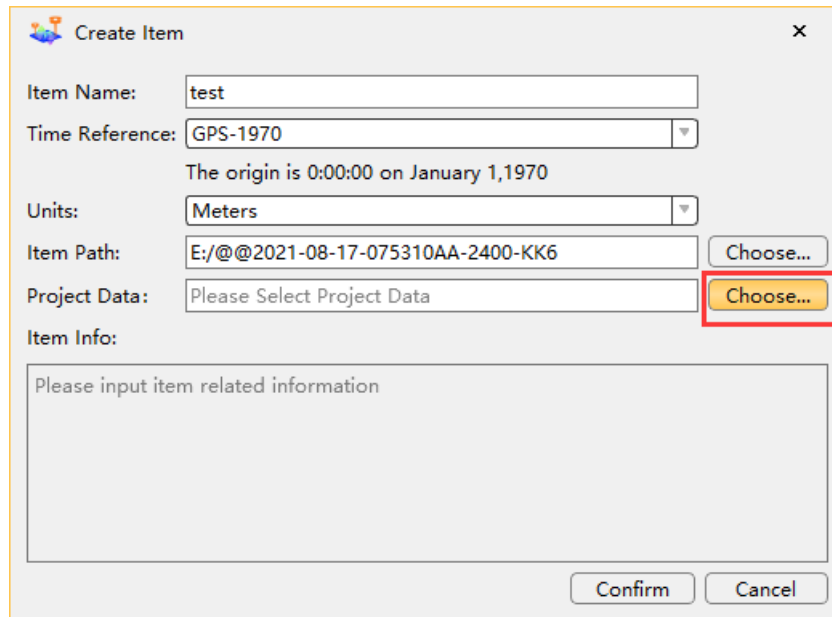


Figure 10

- The Find Directory dialog box will pop up as shown in figure 11

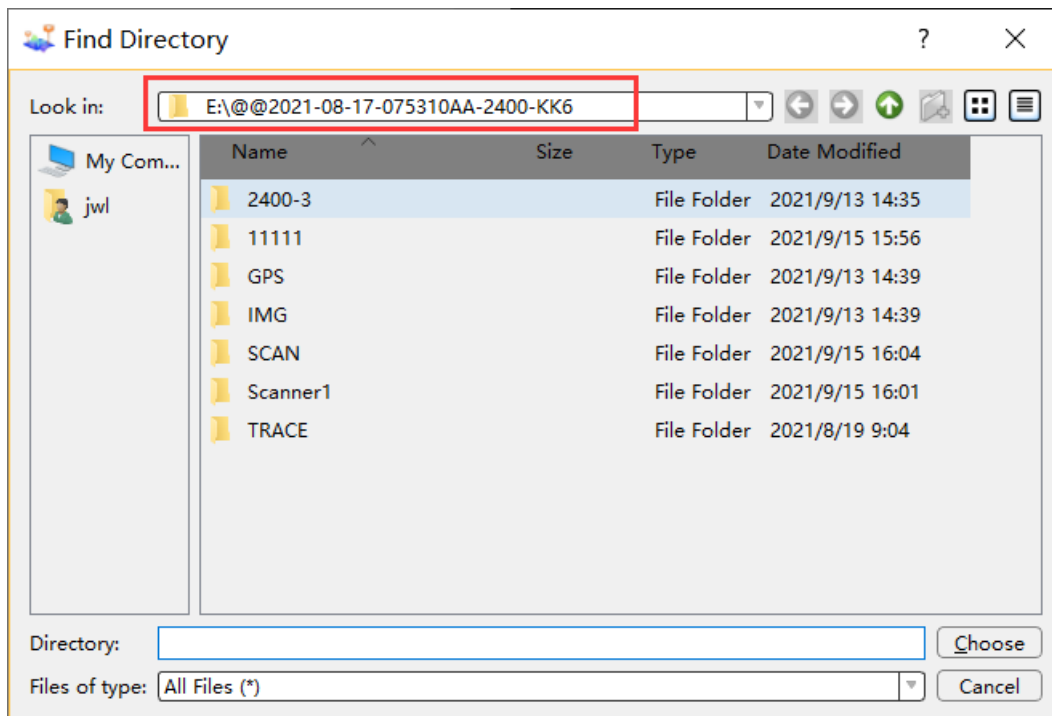


Figure 11

**Note:** The project path name cannot contain Chinese characters or Spaces. Otherwise, the Copre SW cannot identify the path and project data cannot be read.



## 7.2.6 Item Info

- You can input item related information as shown in figure 12

The 'Create Item' dialog box contains the following fields and controls:

- Item Name:** test
- Time Reference:** GPS-1970 (dropdown menu)
- Units:** Meters (dropdown menu)
- Item Path:** E:/@@2021-08-17-075310AA-2400-KK6 (text field with 'Choose...' button)
- Project Data:** E:/@@2021-08-17-075310AA-2400-KK6 (text field with 'Choose...' button)
- Item Info:** A text area containing the placeholder text 'Please input item related information', which is highlighted with a red box.
- Buttons:** Confirm and Cancel buttons at the bottom right.

Figure 12

## 7.2.7 Complete the New Item

- Click Confirm to complete the new item as shown in figure 13

This screenshot shows the same 'Create Item' dialog box as Figure 12, but with the 'Confirm' button highlighted by a red box. The 'Item Info' text area is still empty.

Figure 13

- The Item Management bar now shows the item name, as shown in figure 14

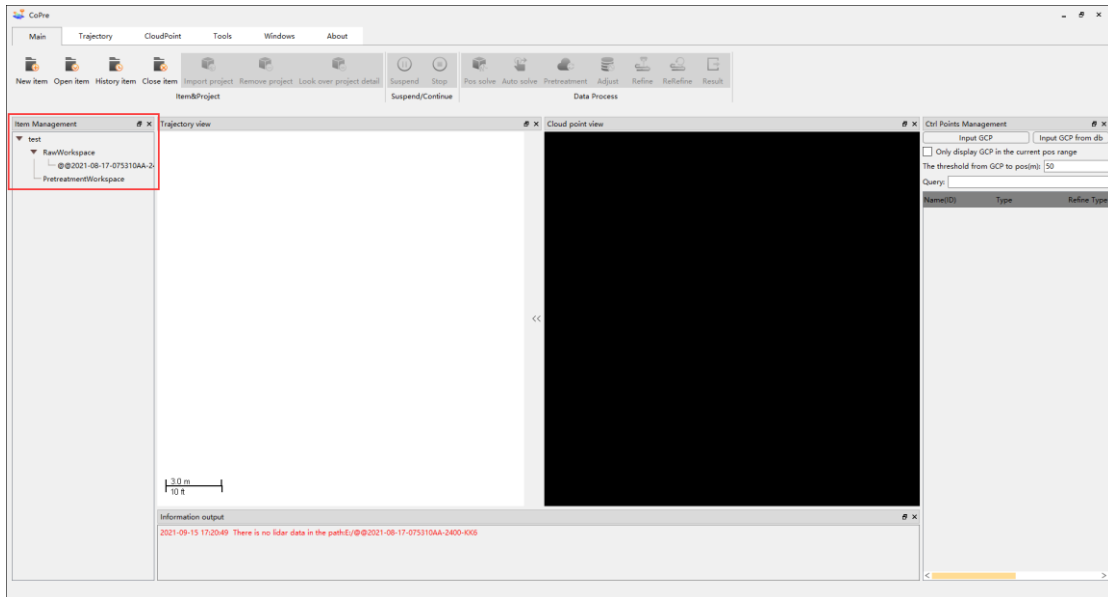


Figure 14

## 7.3 POS Processing

### 7.3.1 Place Base Station File

- Put Base Station Observation File (HCN format or RINEX format) into @@YY-MM-DD-HHMMSS /GPS/Base folder as shown in figure 15 and figure 16



Figure 15



Figure 16

## 7.3.2 POS Processing

- Right-click the project file, and the TAB appears. Then, left-click Pos solve, as shown in figures 17 and 18.
- Right-click the RawWorkspace, if there are multiple projects, multiple projects will be processed; Right-click the project name will process the current project only.

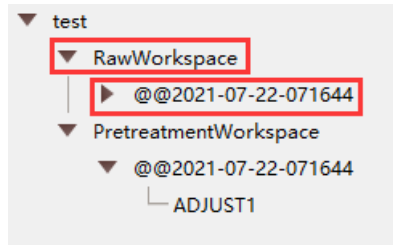


Figure 17

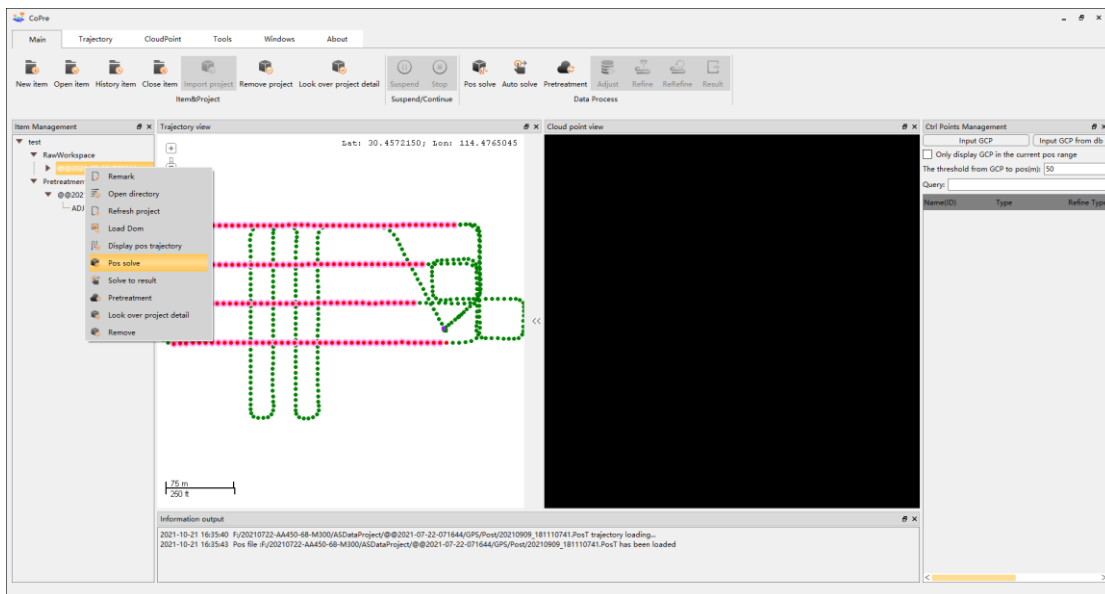


Figure 18

- Check the **Parameter settings of CoPOS**, select the appropriate satellite system according to the observation satellite quality of the base station, and input the precise coordinates of the base station (Tip: The coordinate format is dd:mm:ss.ssssss; the accuracy is better than 1 mm).Copre can automatically import Rover and IMU data, click **Pos solve**, start to process POS

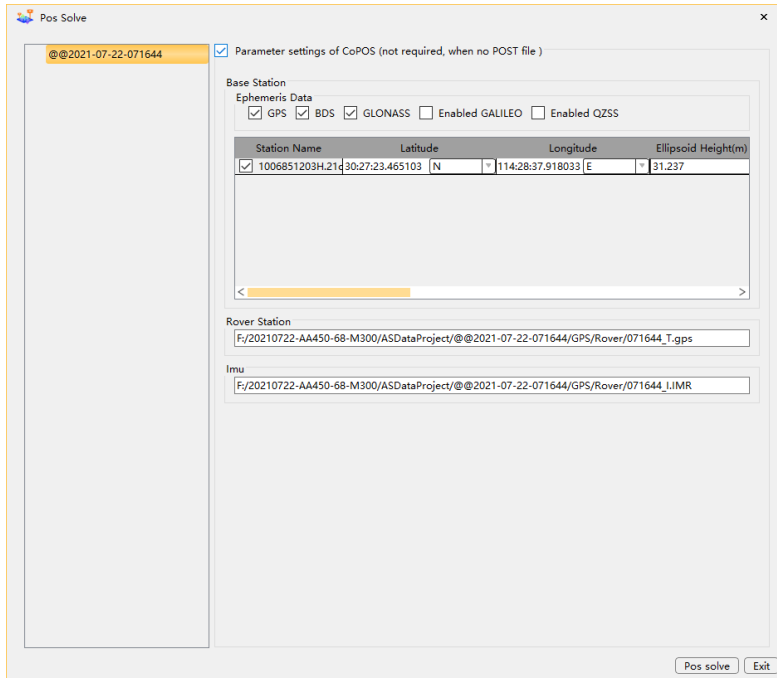


Figure 19

- After the POS is solved, the progress bar will be 100%, and relevant information will be displayed in the information output bar, as shown in figure 20

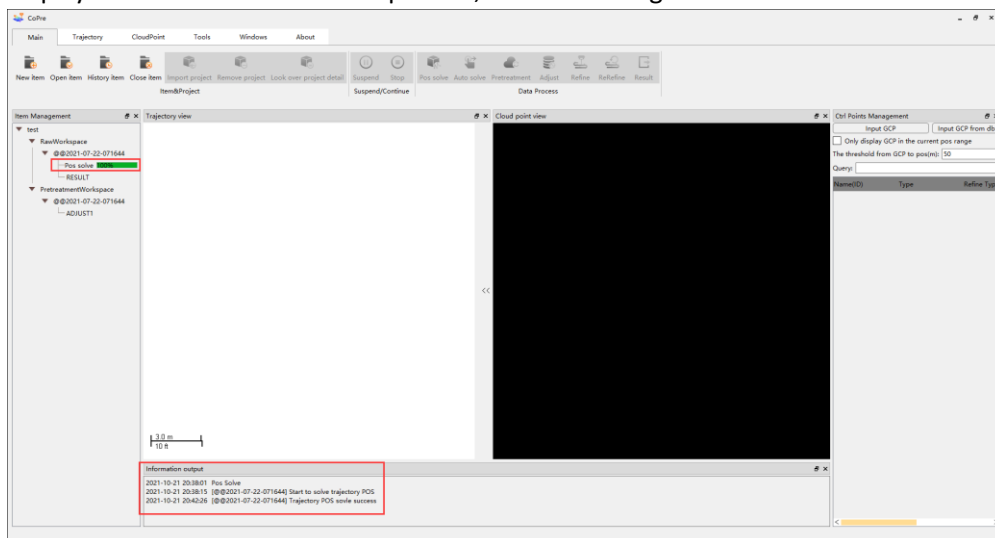


Figure 20

## 7.4 Flow1-Solve to result

### 7.4.1 Display and select pos trajectories

- Right-click the project file, and the TAB appears. Then left click Display pos trajectory (figure 21), and the POS trajectory appears in the trajectory view as shown in figure 22

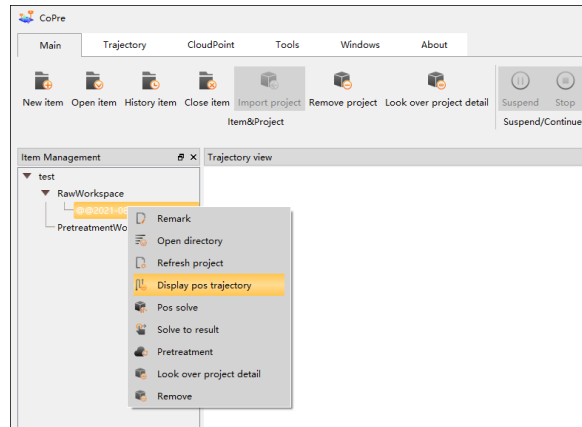


Figure 21

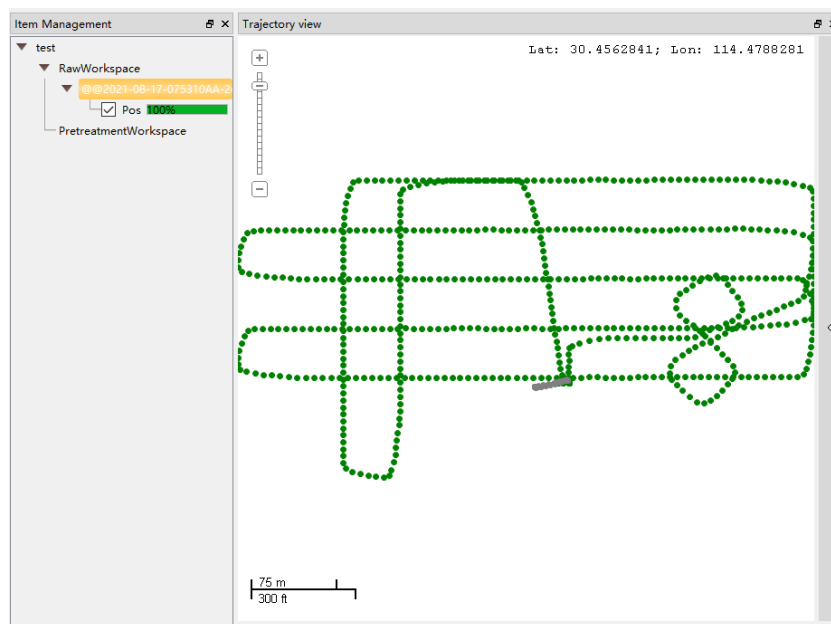


Figure 22

- Left click to select the POS trajectory to be solved, and the selected POS trajectory will turn red as shown in figure 23

**Tip:** Click the POS trajectory point with the left mouse button or long press the left mouse button to select the POS trajectory to be solved; Long press the right mouse button and move the mouse to move the POS trajectory; Short press the right mouse button to deselect the corresponding POS trajectory.

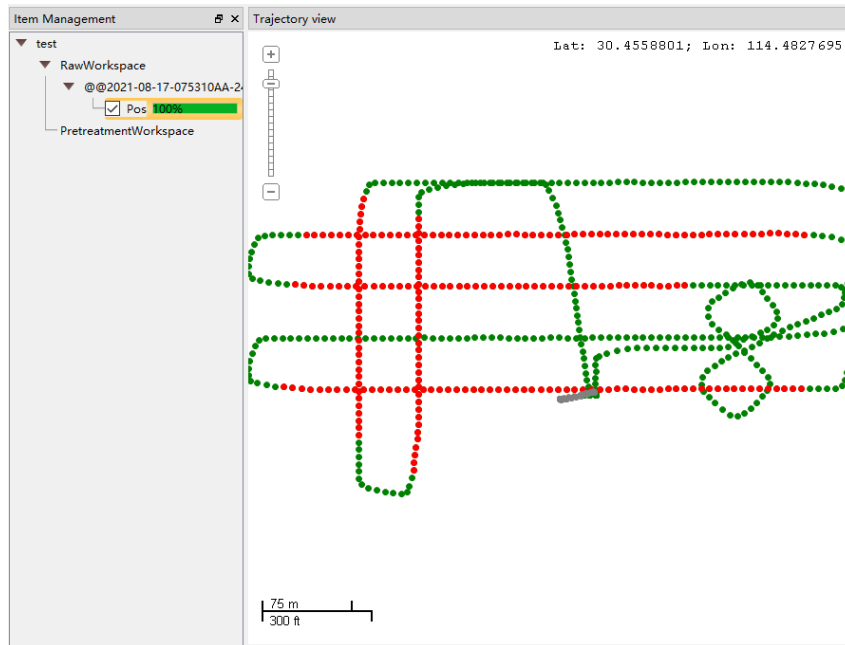


Figure 23

- Right-click the project file, and the TAB appears. Then left-click Solve to result.

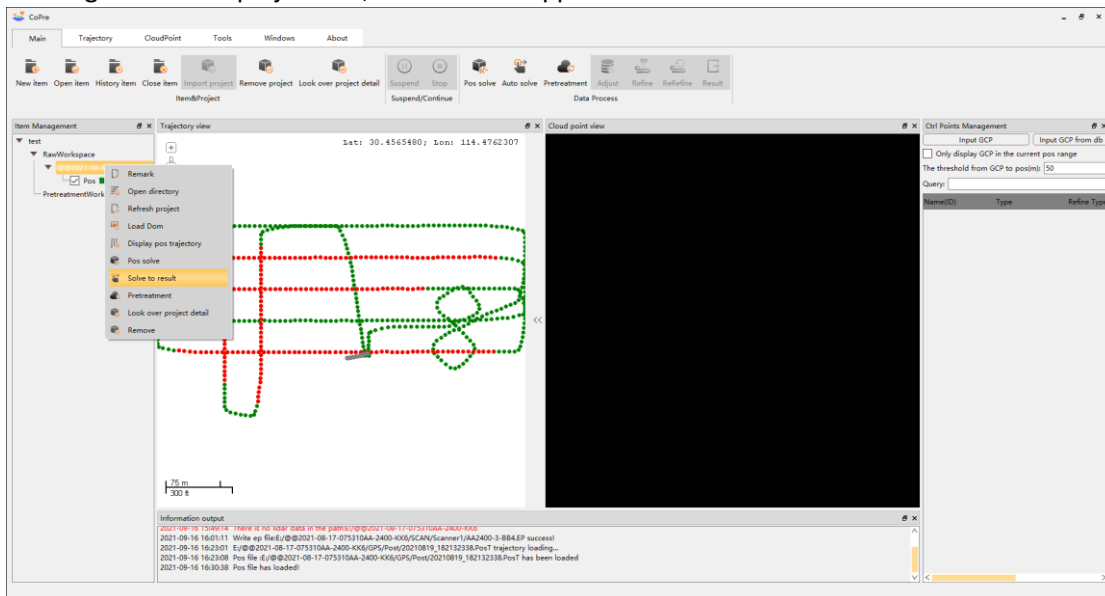


Figure 24

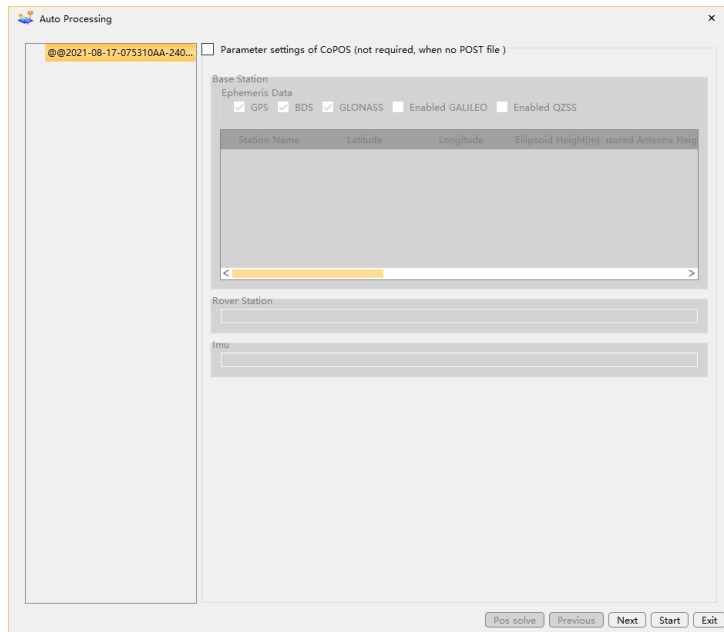


Figure 25

## 7.4.2 Parameter Setting

- Click Next to enter the static filter Setting, laser filter Setting and camera Settings. If there are multiple projects, click Batch Settings after parameter setting

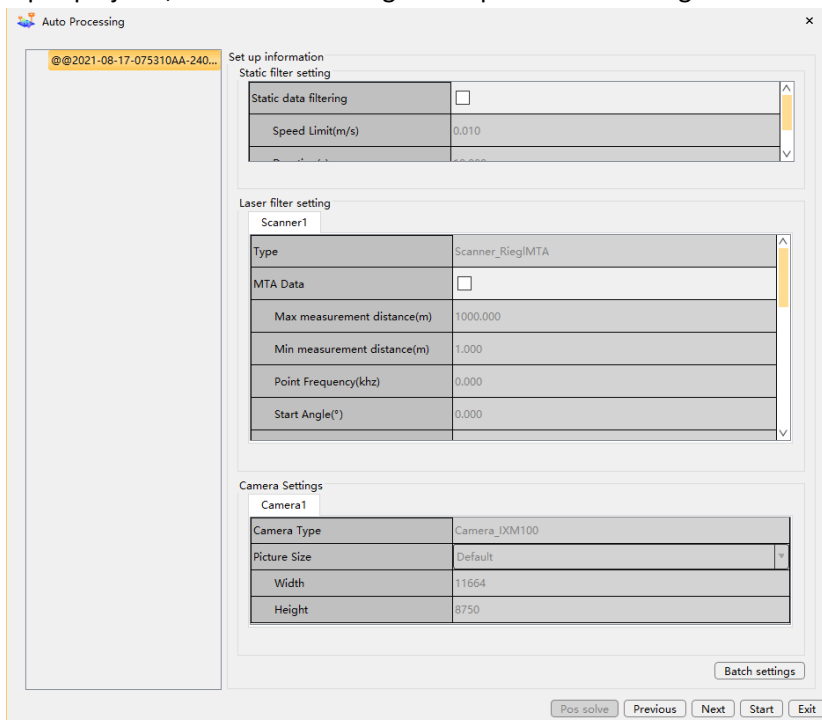


Figure 26

- Check the static data filtering, enter the appropriate speed limit threshold (m/s) and the appropriate duration threshold (s).As shown in figure 27

**Tip:** Static data filtering is not checked by default. The default speed limit threshold is 0.01m/s and the default duration threshold is 10s. The software will regard the data collected when the device works at a speed less than 0.01m/s and the duration is longer than 10s as static data and reject it.

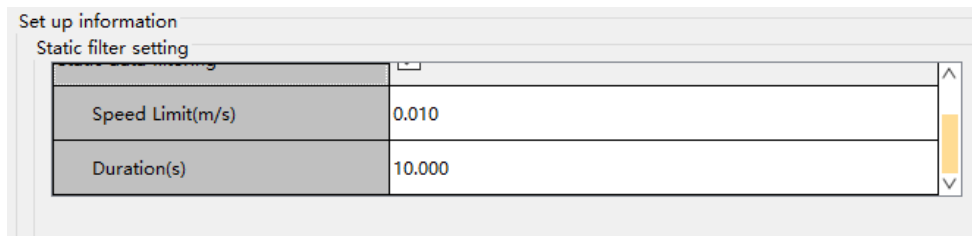


Figure 27

- You don't need to check the MTA Data, because MTA processing of Laser Data has been done in the previous step.

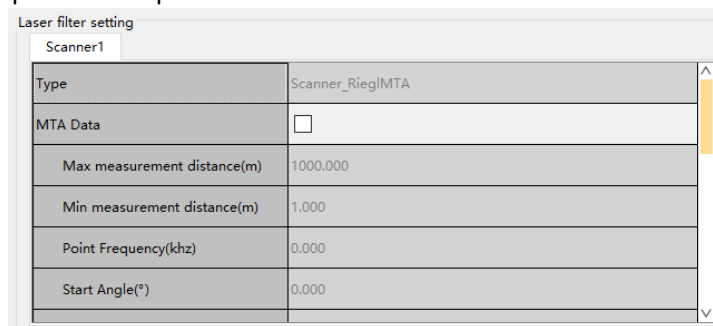


Figure 28

- Three-dimensional Distance Filtering, checked by the default, the point cloud data that is not in the range will be deleted.
- Intensity Filtering checked by the default. The point cloud data that is not in the range will be deleted.

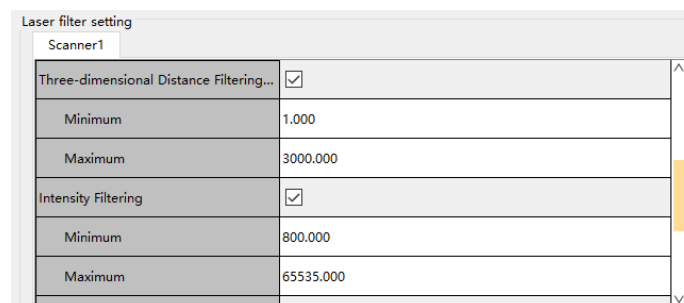


Figure 29

- Height Distance Filtering (m) not checked by the default. The point cloud data that is not in the range will be deleted. The origin of Height Distance Filtering (m) is the laser center and upward is positive.
- Noise Filtering (m), not checked by the default, the noise in the air can be filtered by setting the Noise Distance Threshold (m). For example: If you set 1.000 m, take this point as the center of the circle, a radius of one meter less than five points then that point is



considered a noise point.

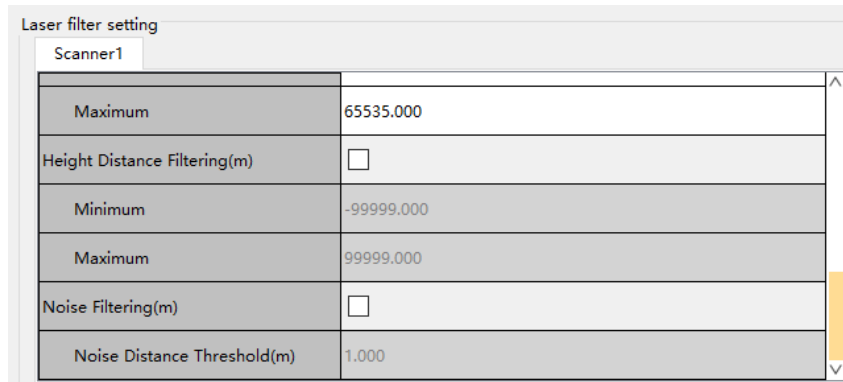


Figure 30

- Camera Settings: The software automatically identifies the camera type and size without setting it up.

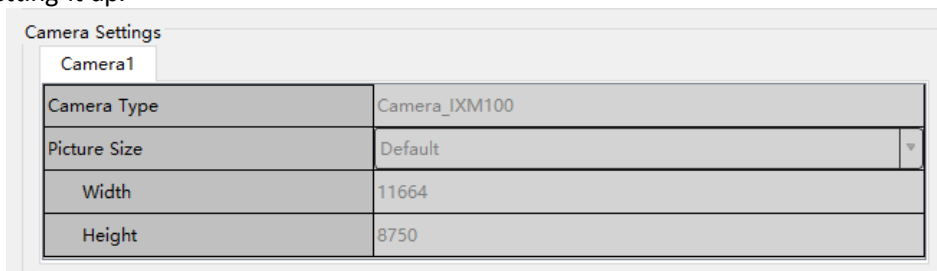


Figure 31

### 7.4.3 Custom Coordinate System

- Click Next, Pop up the Custom Coordinate System window as shown in figure 32

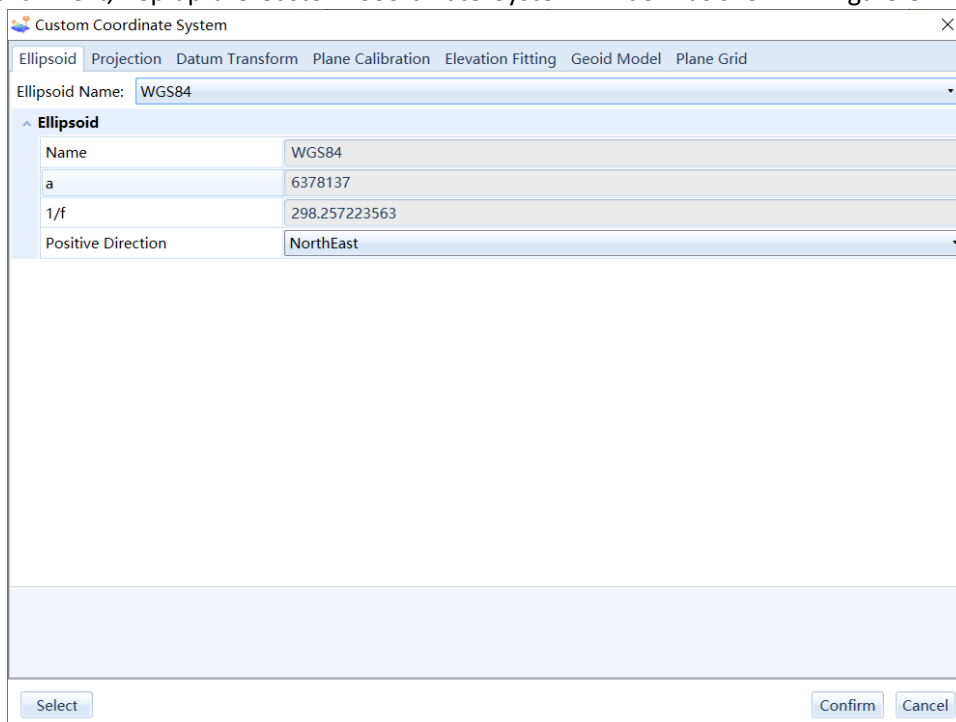


Figure 32

## 7.4.4 Point cloud coloring Settings

- Check Organize pictures, you can set the time delay (s) and whether to write EXIF information to photos.
- Check Processing, you can set the Coloring range , File Format, Remove uncolored points, Filter tower shadow.

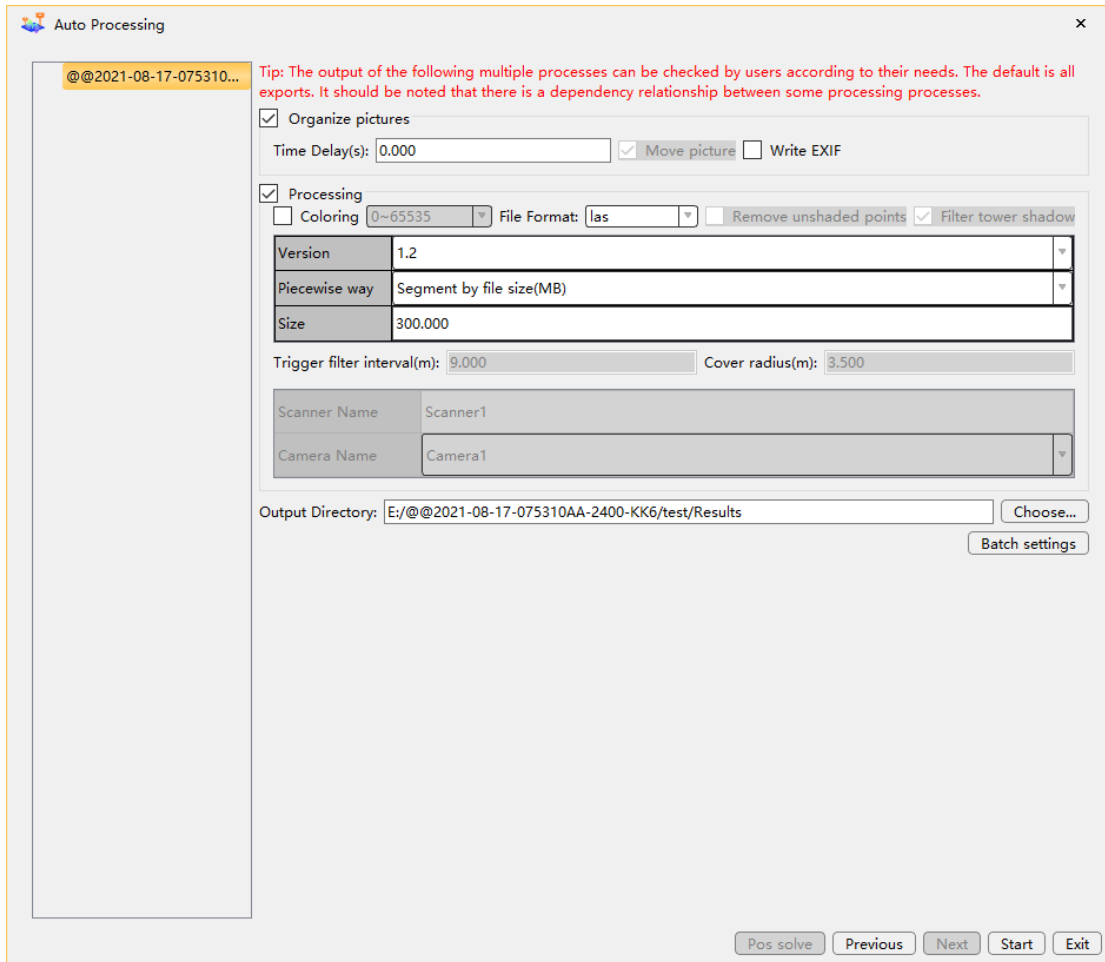



Figure 33

 **Tip:** Trigger filter interval(m) and Cover radius(m) are options for car-set, not required for AA2400.

## 7.4.5 Generate results

- Choose output directory and Click Start

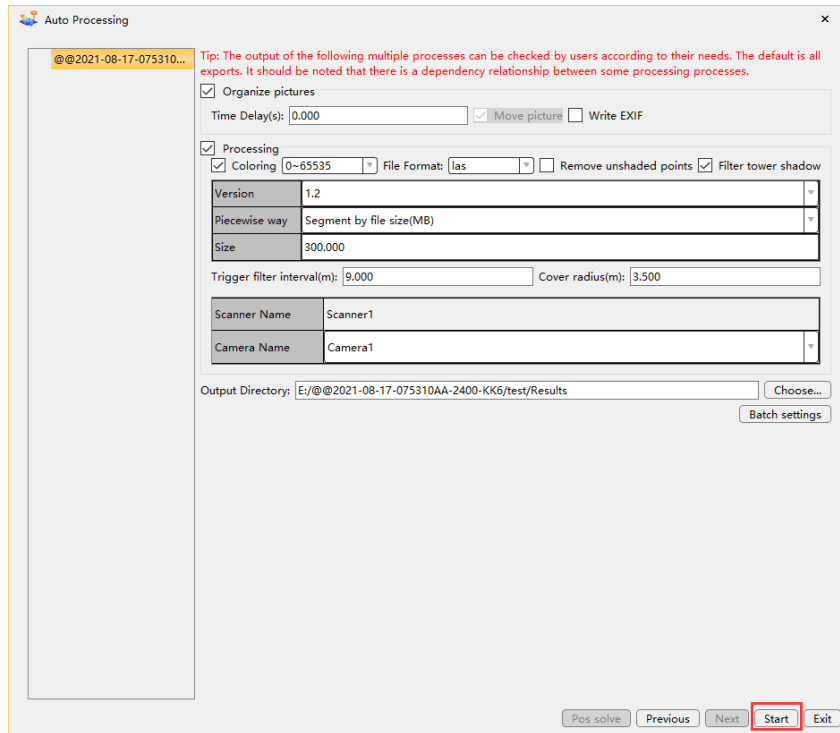


Figure 34

## 7.4.6 Point cloud results browsing

- Right-click Result, Left-click Display pos trajectory, click two points or hold down the left mouse button to select a box. The point cloud is displayed in the point cloud view

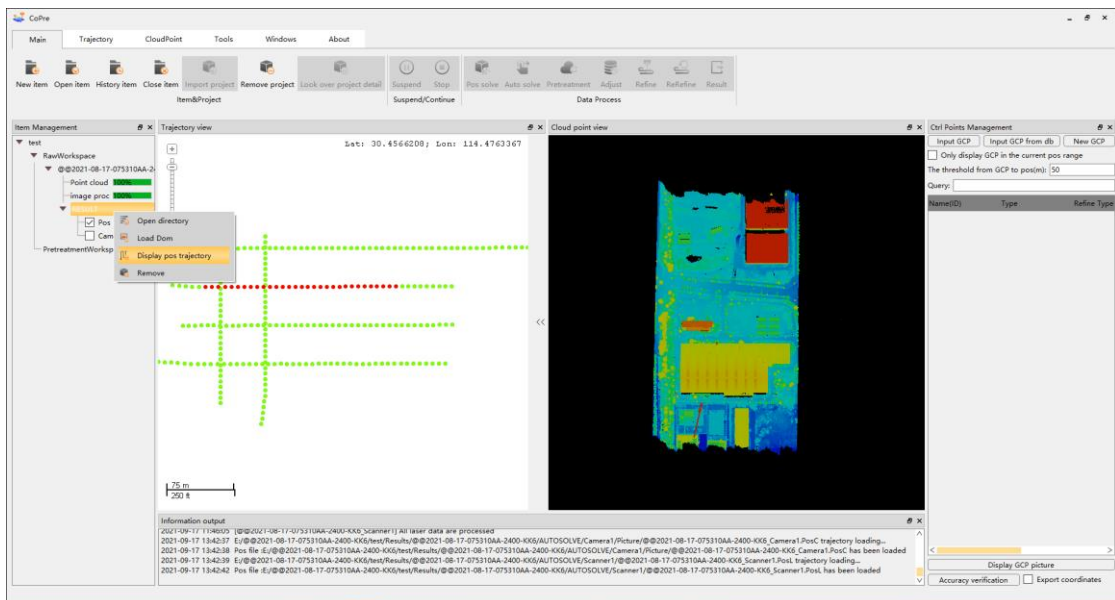


Figure 35

- In Cloud point view you can set point cloud rendering

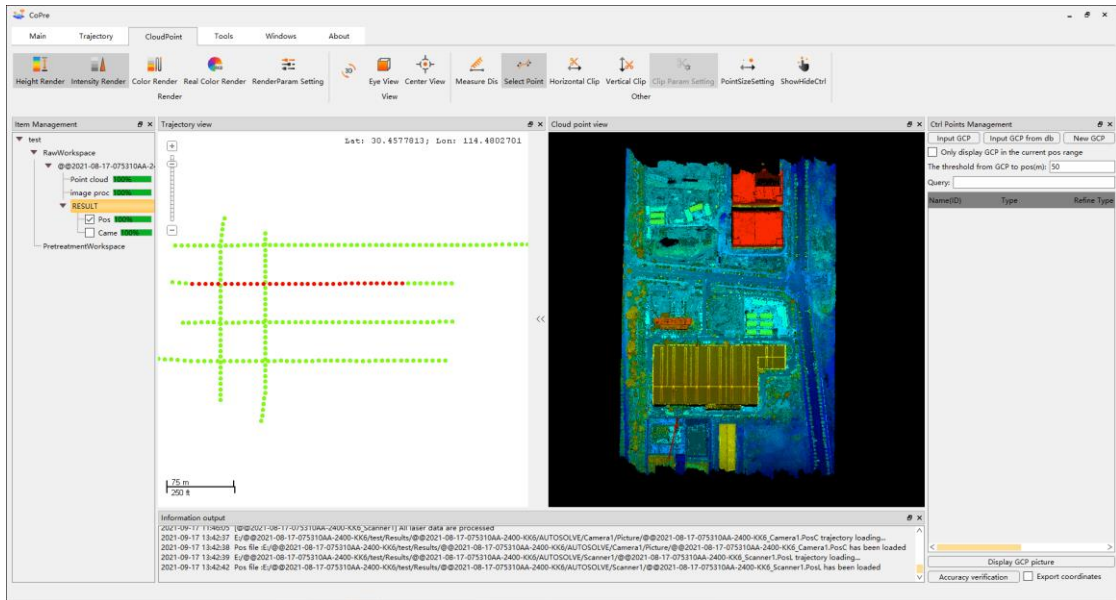


Figure 36

## 7.5 Flow2-Pretreatment

### 7.5.1 Pretreatment

- Right-click the project file, and the TAB appears. Then left-click Pretreatment
- Refer to chapter 7.4 Solve to result for parameter Settings

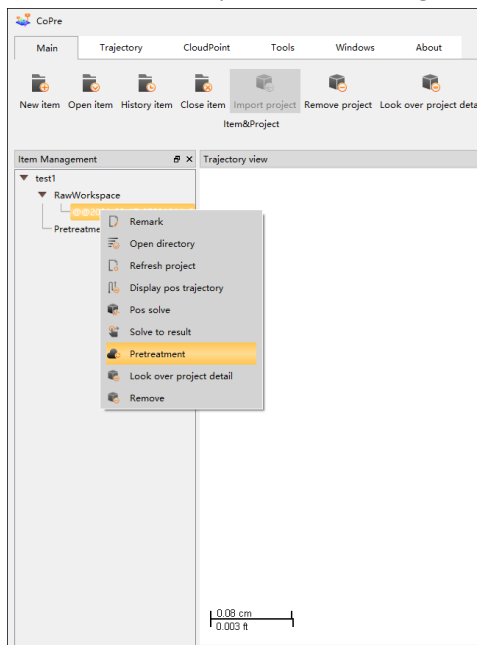


Figure 37

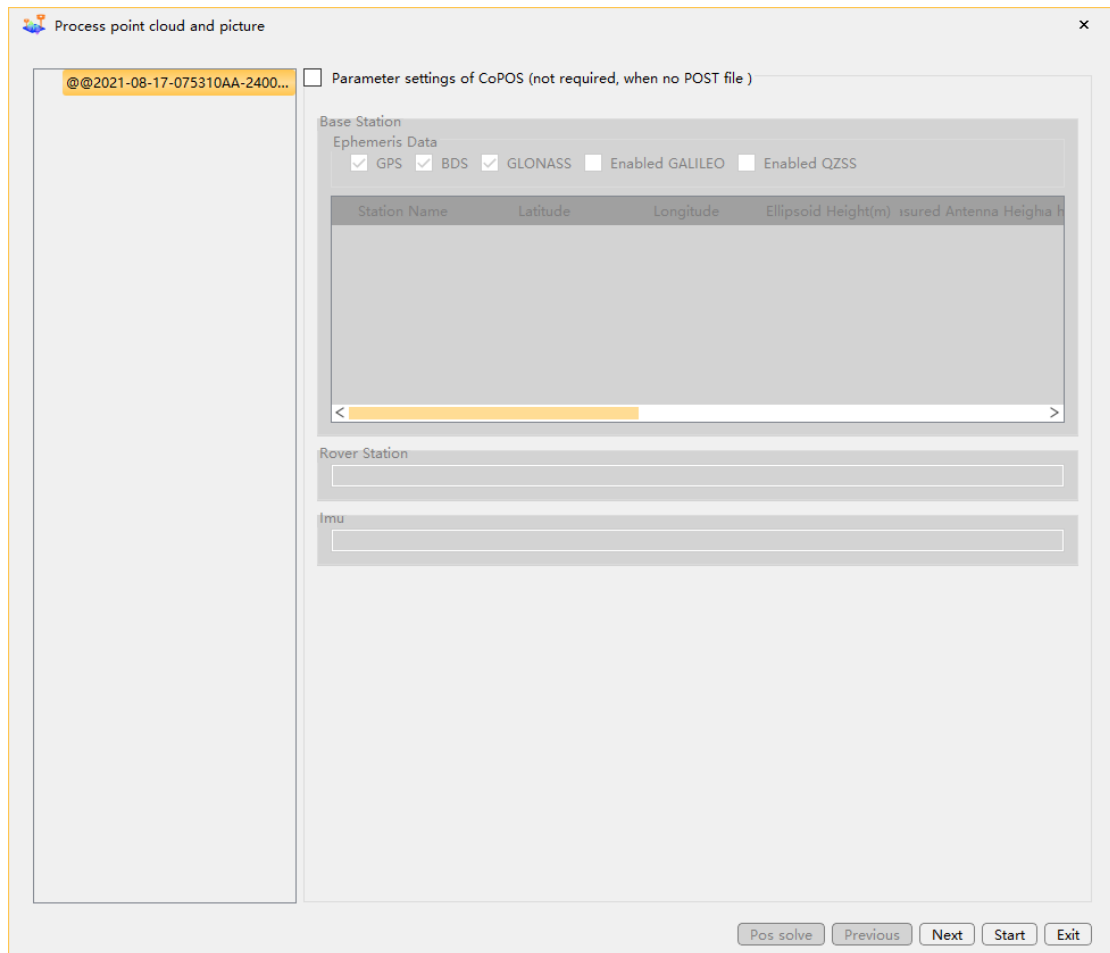


Figure 38

- After Pretreatment is complete, a preprocessing project will be generated in the Item Management column

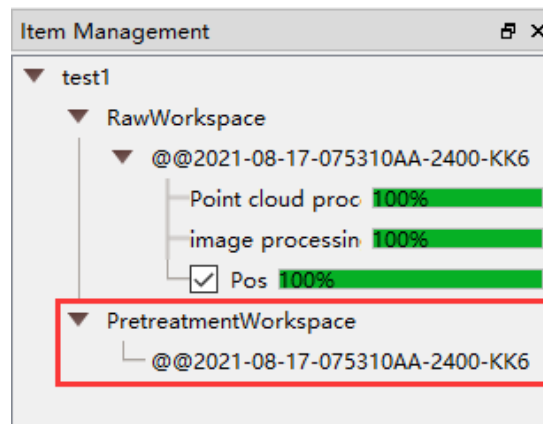


Figure 39

## 7.5.2 Adjust

- Right-click the project file. Then left click Adjust

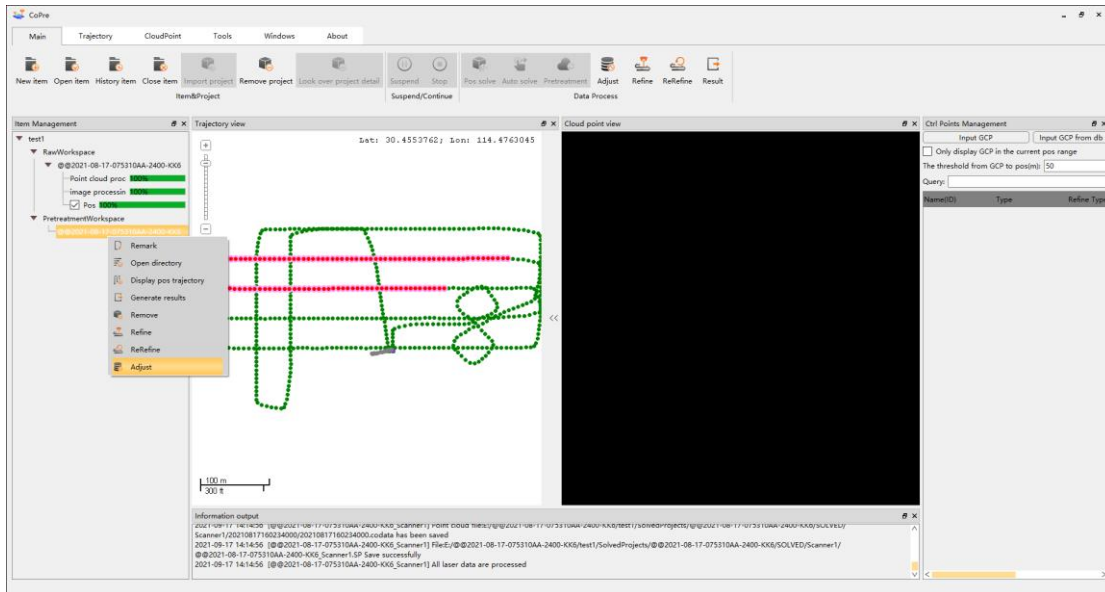


Figure 40

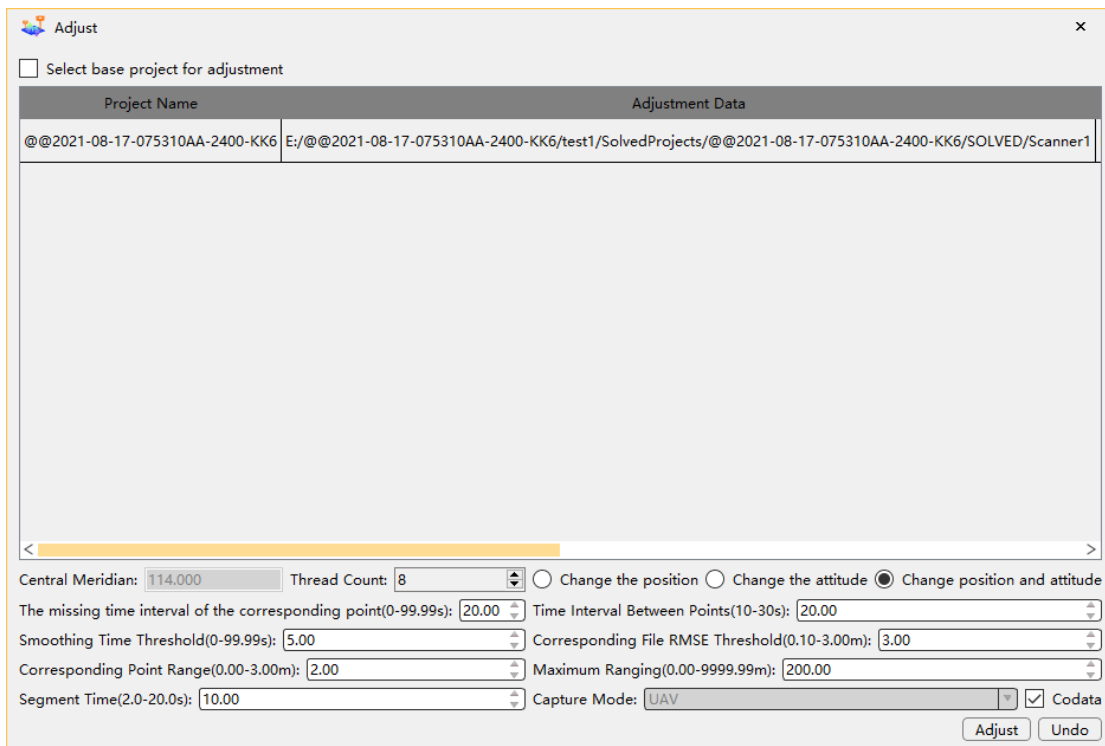


Figure 41

## Parameter description:

- Central Meridian: The software automatically identifies the Central Meridian of the point cloud.
  - Thread Count: The number of threads that participate in adjustment calculations ,according to computer configuration.
  - The missing time interval of the corresponding point (0 - 99.99 s): The time interval a homonymous point is missing between adjacent overlapping regions, it is generally equal to the time interval between trajectory points.
  - Time Interval Between Points (10 - 30 s): This parameter is generally 2-3 times of the Segment Time (10 - 30 s). The smaller its value is, the more trajectory sampling points are, and the more time and space are consumed. If the calculation time is too long, the value of this parameter can be appropriately increased.
  - Smoothing Time Threshold (0 - 99.99 s): The smooth region outside the range of the homonymous points.
  - Corresponding Point Range(0 - 3.00m): Generally, the value is 2 meters, indicates that matched point pairs within 2 meters belong to the homonymous points.
  - Corresponding File RMSE Threshold (0.10 - 3.00 m): If the RMSE of the homonymous points calculated is bigger than this parameter, it will be removed.
  - Maximum Ranging (0 - 9999.99 m): The maximum distance filter parameter set when the point cloud is solved.
  - Segment Time(2 - 20 s): According to the actual speed to set, generally according to a section of 60 meters, such as highway measurement can be set smaller (such as 2 - 6 s), city measurement can be set larger (such as 6 - 12 s).The general setting on UAV is 5 - 20 S.
- After setting parameters, click Adjust, and the software will adjust automatically

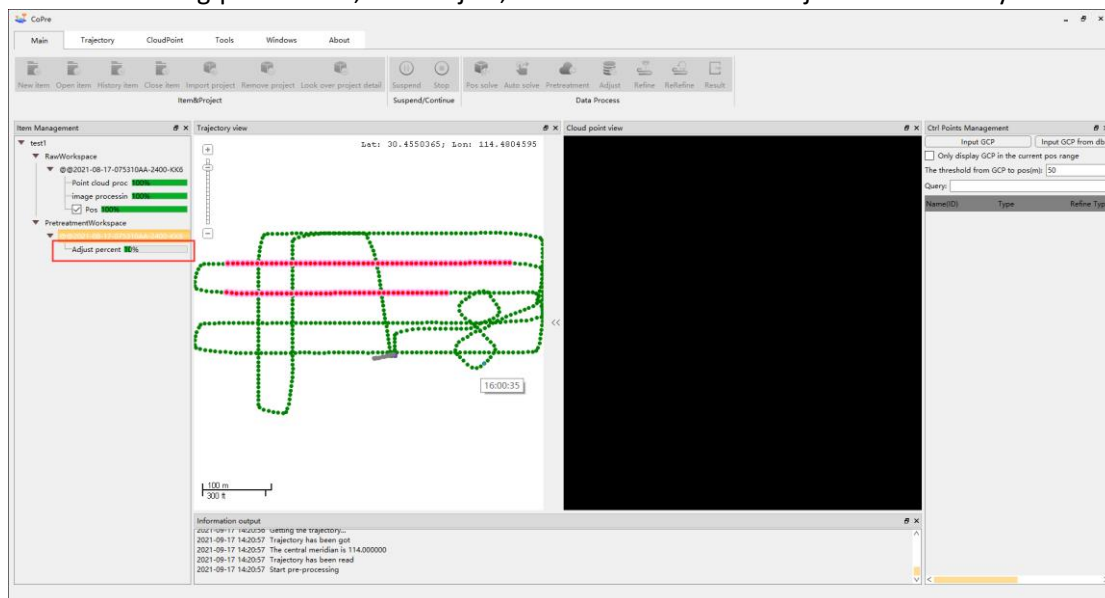


Figure 42

Adjust Report

Before Adjustment				After Adjustment			
BlockName	Delta X	Delta Y	Delta Z	BlockName	Delta X	Delta Y	Delta Z
All	0.088	0.103	0.063	All	0.047	0.048	0.046
1629187362.204648-1629187372.1256237	0.045	0.107	0.061	1629187362.204648-1629187372.1256237	0.044	0.040	0.043
1629187372.1256275-1629187381.9897728	0.046	0.135	0.058	1629187372.1256275-1629187381.9897728	0.045	0.042	0.045
1629187381.9897766-1629187391.3933372	0.055	0.135	0.068	1629187381.9897766-1629187391.3933372	0.048	0.045	0.048
1629187391.3933449-1629187398.9999962	0.049	0.139	0.074	1629187391.3933449-1629187398.9999962	0.049	0.049	0.051
1629187457.000001-1629187466.191474	0.053	0.057	0.055	1629187457.000001-1629187466.191474	0.046	0.048	0.050
1629187457.000001-1629187466.191474	0.042	0.112	0.059	1629187457.000001-1629187466.191474	0.044	0.045	0.044
1629187466.1914778-1629187475.8120813	0.074	0.065	0.049	1629187466.1914778-1629187475.8120813	0.045	0.046	0.045
1629187466.1914778-1629187475.8120813	0.070	0.096	0.057	1629187466.1914778-1629187475.8120813	0.048	0.043	0.045
1629187475.8120832-1629187485.5284414	0.061	0.049	0.045	1629187475.8120832-1629187485.5284414	0.043	0.042	0.042
1629187475.8120832-1629187485.5284414	0.060	0.088	0.049	1629187475.8120832-1629187485.5284414	0.043	0.044	0.043
1629187485.5284452-1629187489.9999971	0.049	0.080	0.047	1629187485.5284452-1629187489.9999971	0.048	0.047	0.043
1629187505.000344-1629187514.1359413	0.057	0.060	0.057	1629187505.000344-1629187514.1359413	0.042	0.042	0.043

Export To csv File...

Figure 43



## 7.5.3 Generate results

- Right-click the ADJUST project file. Then left click Generate results
- Refer to chapter 7.4 Solve to result for parameter Settings

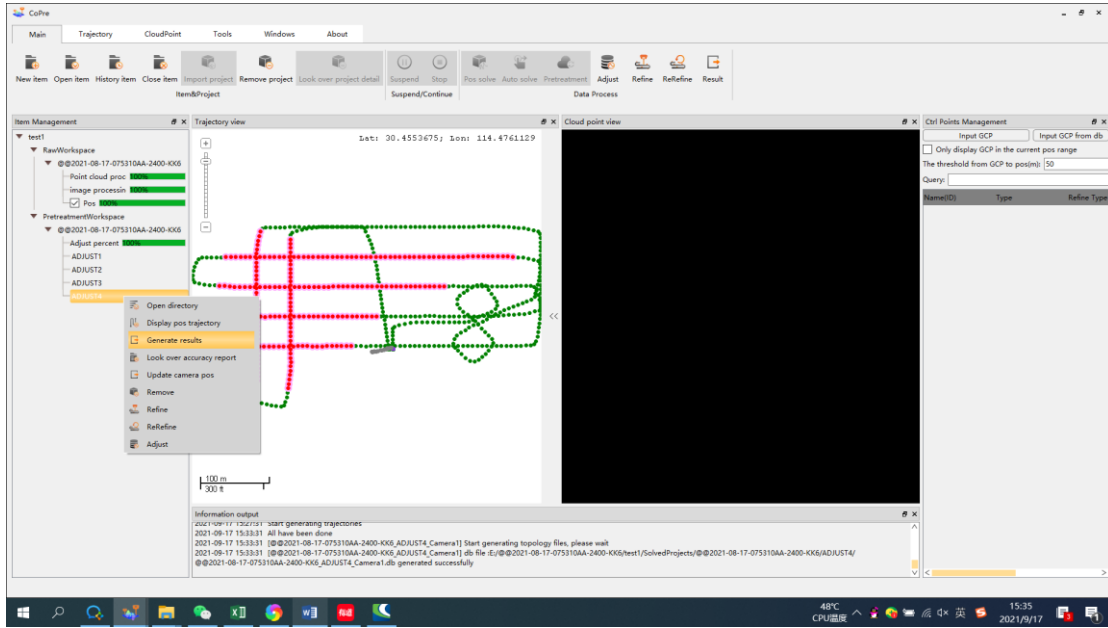


Figure 44

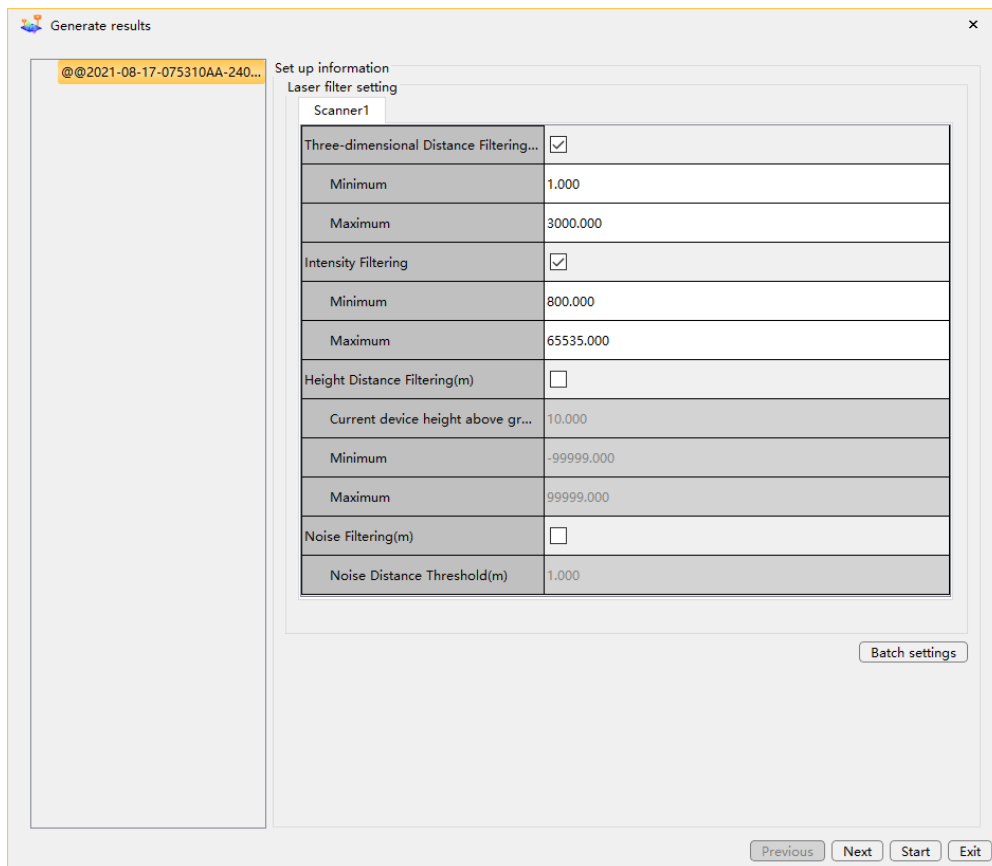


Figure 45

## 8 FAQ and Solutions

 **Tips: Common abnormalities and causes.**

**1. Initialization fails (the LED indicator keeps blinking and cannot be steady on). Possible causes include:**

- a) Abnormal timing of Lidar: improper installation of antenna feeder and rod antenna, poor quality of satellites signal, etc.
- b) Capacity of ALPHA\_LAS is insufficient: When the capacity of ALPHA\_LAS is less than 10 GB, the device cannot initialize normally.

**Solutions:**

Check whether the antenna feeder and the connection between the antenna and the device are normal; Check whether the storage is abnormal or the capacity of the ALPHA\_LAS disk is less than 10 GB. If the capacity is insufficient, use Copre to format the disk.

**2. The camera doesn't take pictures or misses a lot. Possible causes include:**

- a) The camera needs to be repaired when it encounters abnormal power outage.
- b) Capacity of ALPHA\_CAM is insufficient.
- c) PhotoMode of camera is set to Manual.

**Solutions:**

Method 1: Use the camera repair function on the DJI M300 Remote Control, wait 30 seconds, and manually shut down the device.

Method 2: After initialization, long press the power button for more than 10 seconds to shut down the device.

Method 3: Connect device to computer with type-C cable, Format the ALPHA\_CAM disk with Copre SW.

Method 4: Connect to DJI M300 Remote Control, PhotoMode of camera is set to Timing.

**3. Data cannot be copied automatically, possible causes include:**

- a) CP file and EP file are not placed in the ALPHA\_LAS disk, or the CP file and EP file are incorrect.

**Solutions:**

Check whether CP file and EP file are placed in the ALPHA\_LAS disk; Format the ALPHA\_CAM disk with Copre SW.

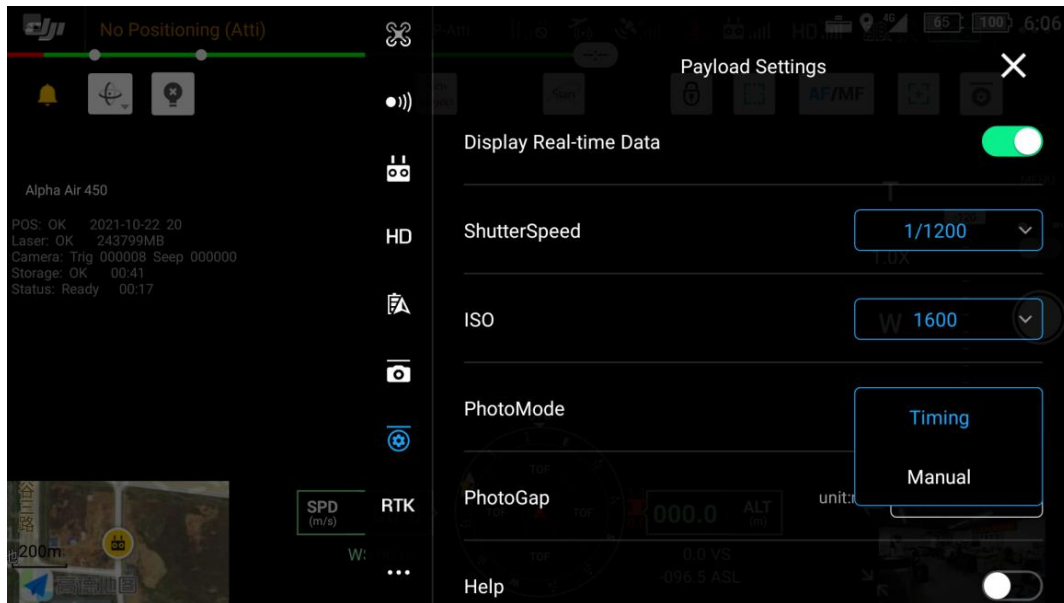
**4. Initialization is normal but cannot start project. Possible causes include:**

- a) Device authorization may expire.

**Solutions:**

Need to contact the manufacturer to request an authorization code.

**Note:** PhotoMode must be set as Timing, otherwise the camera won't take pictures.



**Note:** To click "Start"/"Stop"/"Close project"/, you need to click the unlock icon on the screen and complete the operation within 3 seconds.



## 9 Matters Need Attention

### 9.1 Important Notes

LiDAR measure system is a complex and precise survey system. In daily carrying, using and storing, please operate equipment correctly and maintenance properly. There are some important notes listed below:

- Do not disassemble equipment privately. If equipment has issue, please contact CHCNAV Support team.
- Please use the default battery and accessories. Use non-dedicated battery may cause charger exploding or burning. The use of non-original accessories is not eligible for warranty.
- When using charger for charging, please keep away from fire, flammable or explosive materials to avoid serious consequences such as fire.
- Do not dispose of waste batteries at will. Please follow local laws or standards.
- Strictly follow this manual to connect all cables. Make sure each connector plugs tightly, and the power switch should be turned on in order.
- It is forbidden to plug and unplug each connection without cutting off the power supply.
- Do not continue using any broken cables. Please purchase and replace new cables in time to avoid unnecessary damage.
- Avoid any strong impact or vibration.
- Use an umbrella or tarpaulin to prevent water inside.
- After the equipment is used, move it to the container quickly and make sure the container inside is dry.
- If need to continue using the instrument for a long period of time or under special conditions such as high humidity environment, please consult the relevant precautions of CHCNAV Support team in advance. Generally, the damaged occurred under a special environment is not covered by the product warranty.

### 9.2 Product Transportation

- CHCNAV AlphaUni product equipped special container. During transportation, make sure the container is fixed at a stable location.
- During transportation, please tell relative person that this is precise system container, and it needs to be handled gently. Also with fragile label on container.
- If the equipment is sent by express service, the container needs an outer box with foam inside also for safety.
- When transporting or moving batteries, take proper measures to prevent materials from falling or damage.

### 9.3 Using Tips

- The equipment should be handled gently during use to avoid soiling and scratching its surface, and it is strictly forbidden for surveyors or others sit on the container.
- After the external test or operation, the surface of equipment should be cleaned regularly by provided clean suits (3-5 days) and check whether the structural screws and plugs are loose, and whether the peripheral cables are loose.
- After long time storage in store, it needs to be taken out regularly (about one month) for power-on test to check whether the function is normal.
- The limitation of environment temperature is between -20 °C to +50 °C, the humidity limitation is <80 % RH and no condensation.
- If the equipment is disassembled or loosen, it should be re-calibrated.
- When it is difficult to rotate any rotating parts of the equipment, please do not forcibly rotate. After the equipment is damaged, please do not continue using, otherwise the damage of the equipment will increase. Do not disassemble equipment in field.
- If faced rain or snow in field during work, please move the equipment into the container quickly. Do not work in the cold environment with low temperature in winter, in case to prevent condensation of water vapor on the optical lens and inside the instrument.

### 9.4 Storage Tips

- The room where the equipment is stored should be clean, dry, bright and well ventilated.
- It should be placed flat or upright, and it should not be leaned casually to prevent distortion.

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