



GNSS RTK Hybrid Supreme ME Surveying System User Manual



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Chapter 1 Overview

1.1 Introduction

This manual takes ME surveying system as an example and provides explanations on how to install, set up, use accessories, and operate the ME surveying system. It is recommended that you read this manual carefully before using the instrument.

Chapter 2 ME system introduction

2.1 Product introduction

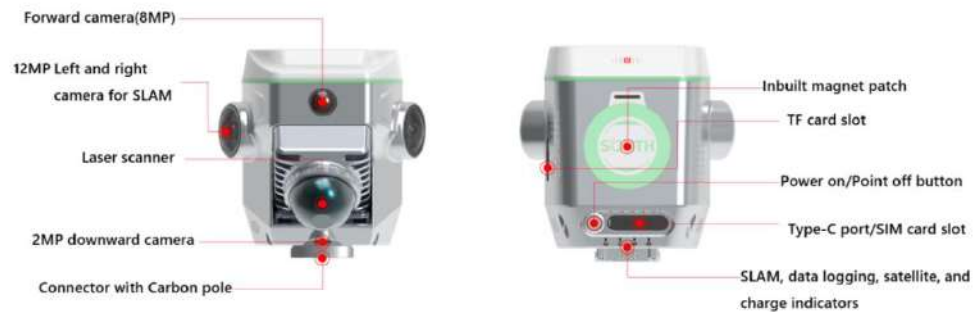
As a portable measurement device, ME system integrates handheld SLAM LiDAR and RTK technology, utilizes multi-source fusion algorithms to achieve deep integration of SLAM and RTK. The deep integration algorithm combines RTK high-precision positioning (centimeter level) with SLAM technology to address the limitations of a single technology in complex environments (such as urban canyons and indoor-outdoor transition areas), achieving stable output of centimeter-level accuracy across all areas.

2.2 Overall introduction

The ME measurement system mainly consists of four main parts: the main unit, the data controller, the handgrip battery, and the battery accessories, as shown in the figure:



2.3 ME system appearance introduction

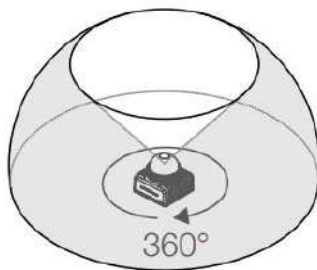


2.4 Device interface and indicator lights

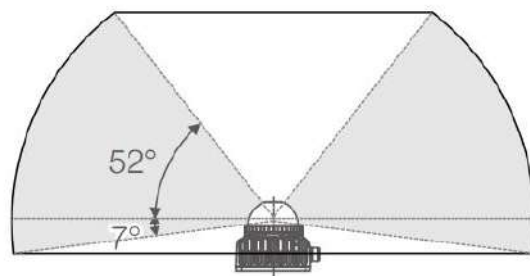
No.	interface and structure	descriptions
1	laser scanner	SLAM + mixed solutions
2	forward camera(8MP*1)	Air measurement
3	downward camera(2MP*1)	AR Stakeout
4	Left and right camera(12MP*2)	SLAM-point cloud colorized
5	Connector with carbon pole	to connect ME with carbon pole
6	Type-C port	Charge the inbuilt battery of ME main unit
7	SIM card slot	Access to CORS
8	TF card slot	SLAM data storage
9	Power indicator light	when the system is powered on, the red light stays on, and it goes out after shutting down.
10	SLAM indicator light	Red means starting, green means started successfully, and blue means scanning.
11	data indicator light	not Fixed: Red light flashes; Fixed solution: Green light flashes
12	satellite indicator light	when receiving the satellite, the green light flashes.
13	charging indicator light	the red light stays on when the battery is not fully charged, and turns off after it is fully charged.

14	inbuilt magnet patch	supports magnetic attachment for mobile phones
15	power button	can be pressed normally, can power on and off (long press for 3 seconds), supports self-test, setting working modes, restoring factory settings, and forced reboot.

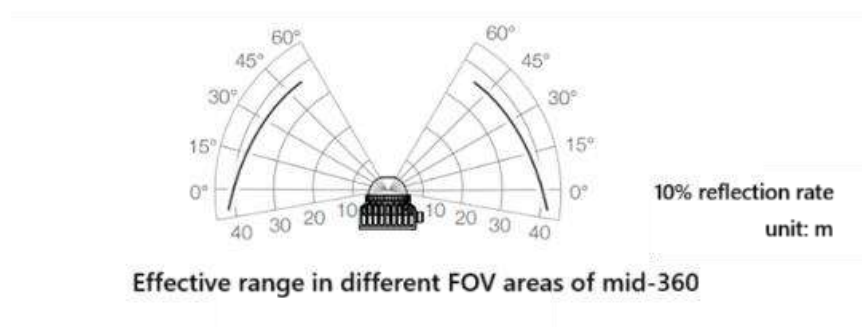
2.5 Introduction to the Laser scanner



Horizontal



Vertical



As shown in the figure above, when the reflectivity of the target object is 10%, the farthest detection distance at the bottom of the vertical FOV range is about 40 m; the farther up you go, the farthest detection distance will correspondingly shorten, so please pay attention when using it.

40m at 10% reflectance (reflected amount/incident amount), 70m at 80% reflectance; white wall reflectance 60%-80%, plants reflectance in visible light 10%-20%, ground reflectance 10%-35%, water surface reflectance 7%-10%.

2.6 Standard Configuration list(ME as an example)

No.	Item	Description	Quantity	Remarks
1	Main Unit	Model: ME	1	Rx radio module built in
2	Laser Scanner Protective Cover		1	removed only when SLAM is enabled
3	Camera Lens Protective Cover		1	removed only when SLAM is enabled
4	Handgrip Battery Unit	Model: iGrip 49W, 3400mAh	1	suggested to buy extra for additional and flexible use
5	Base Stand		1	installed only when SLAM handheld is in use
6	Charger Adapter		1	
7	Charging Cable		1	
8	Data Transfer Cable		1	1 m
9	TF Card		1	256 GB
10	TF Card Reader		1	
11	Cleaning Cloth		1	
12	Magnet Ring		1	installed only when SLAM handheld is in use
13	Fieldwork Software License	Software SurvStar	1	code registration, perpetual
14	SLAM process Software License	Software AcuteLas Studio	1	code registration, perpetual

Notes: ME Plus will include a RX radio Antenna, because there is an built-in radio module in ME Plus.

2.7 Introduction to Main unit accessories



Note: The model and type of the instrument accessories may change with instrument upgrades, and the specific configuration is subject to the configuration list sent with the goods.

Chapter 3 Operations

3.1 Preparations

3.1.1 Charging and field work

Connect the device to the power supply using a data cable for charging; it takes about 2 to 2.5 hours to charge the main unit and controller batteries from 0% to 100% (ensure there is enough power for data collection).



3.1.2 Scanning route plan

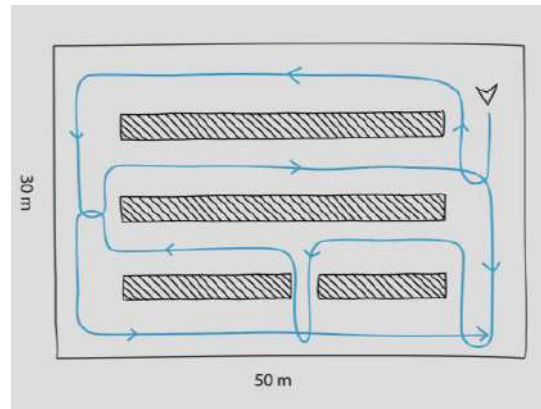
Plan the route in advance, and determine the scanning area route and record the starting position.

3.1.3 Loop closure

Data collection in an environment without GNSS signals requires loop operations. Looping is an important means to improve data accuracy; the collection route should ideally form a loop. It is recommended to perform a loop whenever the collection mileage exceeds 350 meters.

3.1.4 Data collection walking speed

The scanning speed is at a normal walking pace, and the equipment should not shake violently during the process. When turning, please turn slowly.



Outdoor loop example

3.2 Scanning skills

3.2.1 Indoor

When working in complex indoor scenes, it is important to pay attention to some collection techniques and methods. If the indoor space is a large room, you can make appropriate loops or walk straight into the room, then slowly turn around to come out. If it is a small room, it is possible to operate without entering the room. Instead, extend the device into the doorway to measure, pausing briefly at the entrance. For instance, this method will be applied when there are multiple rooms to be scanned indoors. When scanning narrow passages or at corners, please turn slowly. For example, when turning in a narrow corridor or going up and down stairs, try to face the open area. If get close to the wall, please first turn hand to the direction they intend to turn, to avoid the device getting too close to the wall. Also, hand movements should not be too large; turn slowly to increase the success rate of matching features with fewer points.

3.2.2 Block-wise Scanning for Large Outdoor Scenes

For large-area scene scanning, the initial scanning position should be identified by locating distinctive objects with recognizable features, and the travel path for each sub-region must be planned in advance.

During scanning, if Real-Time Kinematic (RTK) positioning is unavailable, loop closures should be pursued. For smaller scanning areas, a large loop can be formed by having the trajectory circle from the start to the end point. For larger areas, in addition to the large loop, it is advisable to incorporate

small loops at appropriate locations depending on the scenario. Proper loop closures help improve the accuracy of subsequent data processing.

If RTK is available during scanning, loop closures may be omitted. For example, when collecting data along a road, a fixed RTK solution should be acquired at the starting point, followed by a one-minute wait before beginning data collection. Data acquisition may conclude once a fixed RTK solution is obtained at the endpoint.

Each sub-region must undergo a closed-loop scan, ensuring that adjacent regions share a certain overlapping area to facilitate registration.



Schematic Diagram of Block-Wise Scanning for Large Outdoor Scenes

3.3 Main unit installation

3.3.1 Preparation

Main unit(a), Handgrip battery(b), Base stand(c), TF(internal memory)(d)



3.3.2 Equipment installation

Battery installation

Fix the base stand to the battery according to the screw on the base stand.



Base stand installation

Note: Please make sure the orientation of the battery and the base stand is correct, otherwise the screws may not fit in.

Main unit installation



After connect the battery with base stand, connect ME receiver as the above picture shows, one hand holds the receiver, the other hand holds the battery and then try connect them, please make sure to hear a click sound of lock tightening.

Notes:

- 1) When installing the handle battery on the main unit, please hold the main unit with one hand and hold the handle battery with the other hand;
- 2) Ensure that the handle battery is securely fixed to the main unit by pushing and pulling the handle battery back and forth;
- 3) Please make sure to place the assembled device on a stable and level surface;

- 4) When installing the handle battery with the main unit, make sure that the handgrip battery is in the power-off status.

TF card installation



Insert the TF card with the chip side facing the laser scanner .

Note: Before starting ME system each time , please ensure that the TF card is inserted in the appropriate card slot. Otherwise, the subsequent SLAM-related functions cannot be used.

Handheld battery Power on/Power off

Power on:

Because ME system has an built-in battery as well as a handgrip external battery, so there are two steps necessary to power on ME system:

1st, short press the battery button once, and then long press the button for 2seconds to power on the handheld battery;



2nd, press the power on button on ME receiver to activate the internal battery as picture below shows:



Power off: press the button once briefly, then press and hold the button for two seconds. When holding, the battery indicator light will be fully on and then extinguish one by one. The second step is to power on the main unit.

Notes:

- 1) Press briefly to display the battery level, the number of lights that light up represents the remaining percentage of battery, for example, two lights indicate 50% battery; if there is no response when pressed long, please repeat the steps once.
- 2) When turning on the device, it is recommended to first turn on the handheld battery and then turn on ME main unit;
- 3) when not in use for a long time, always cover the laser protection cover to prevent collisions.



4) For long time working, please ensure to power on the handheld grip battery, the main unit internal battery working time is about 30~40 minutes only.

3.3.3 Install ME with a handheld battery directly or on the Carbon fiber pole



On the handheld battery



on a carbon pole without handheld battery(only for short time working)



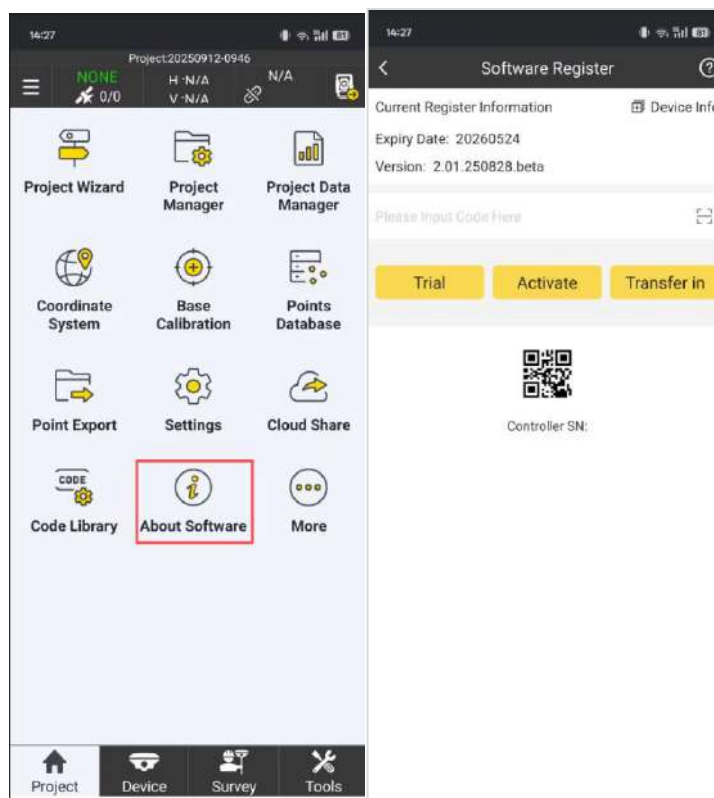
On a carbon pole with handheld battery(for long time working)

3.4 Operations in Survstar

SurvStar software includes all operations of ME surveying system, include all RTK functions, point survey, point stakeout, line survey, line stake out, AR-stakeout, photogrammetry survey and so on; Also, SLAM-related functions are conducted with Survstar, for example, Magic calculation, Air measurement, AR stakeout, and so on.

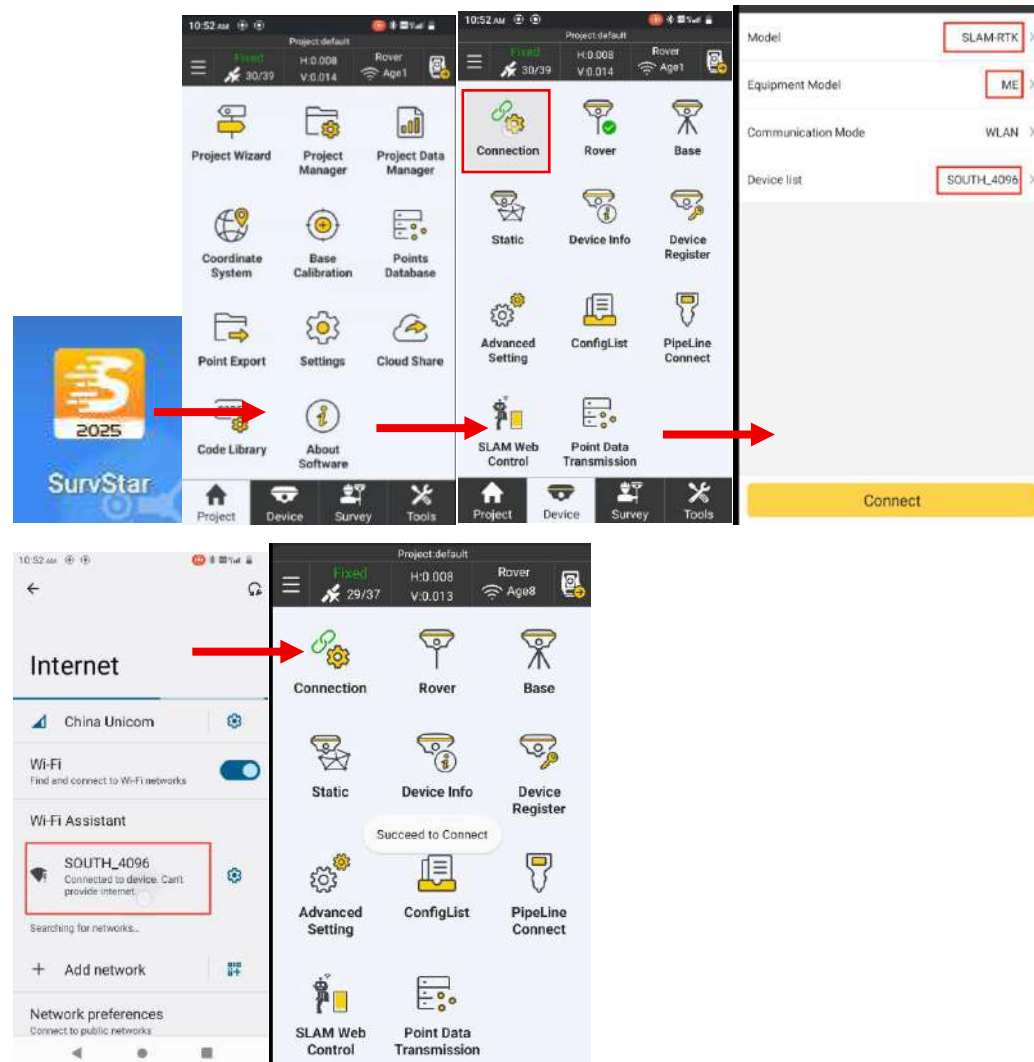
3.4.1 SurvStar registration

Fieldwork software is SurvStar, most of RTK models from SOUTH used this software. it can work on Data controller,tablet or mobile phone with Android system.The factory will provide a permanent license for SurvStar software after received the payment. Before that, temporary license is available, please contact the technical support.



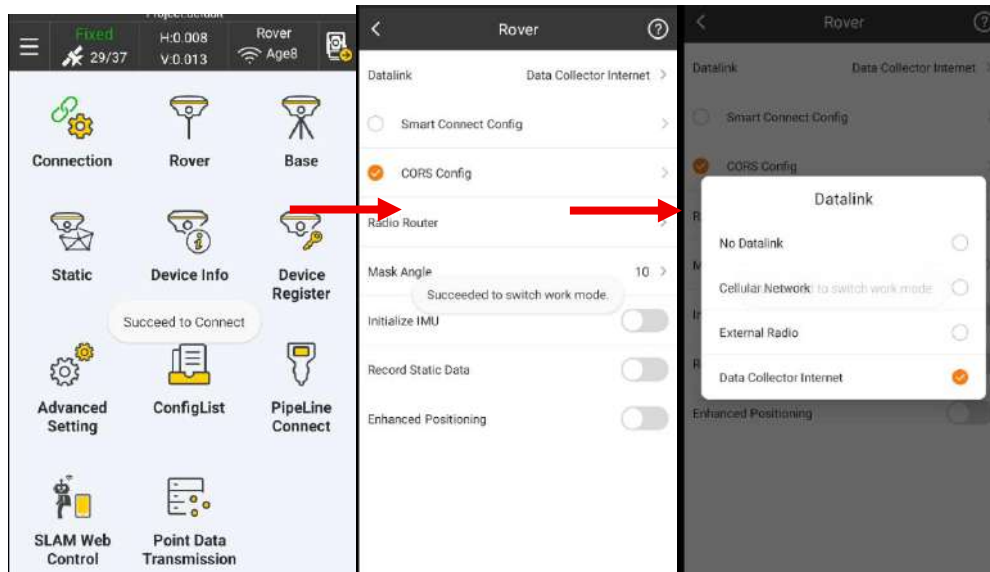
3.4.2 Device connection

Go to Device->Connection, set model to "SLAM-RTK", Equipment Mode to "ME", from the Communication Mode select "WLAN", and then from Device list find the ME serial number and connect it.

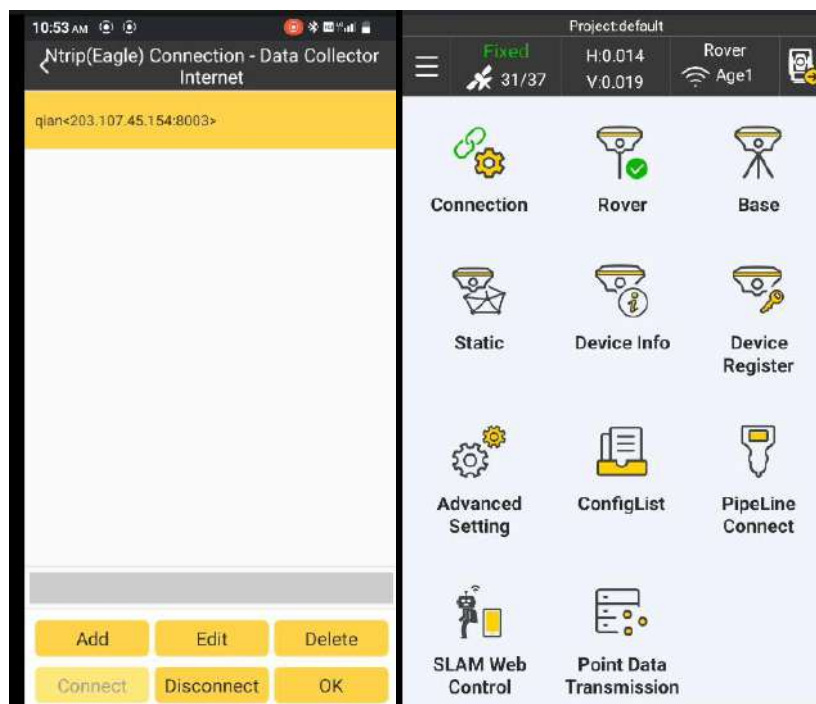


3.4.3 Set CORS information in Rover

Data link has four options, if insert a SIM card in ME system, please set Cellular network; If insert a SIM card in the data controller, H9 for example, please set Data controller internet;



Then enter CORS config, Add or Edit a existing CORS account; after that, click connect; when CORS access is ready, ME system will get Fixed solution automatically in outdoor scenery.



3.4.4 Antenna height value input

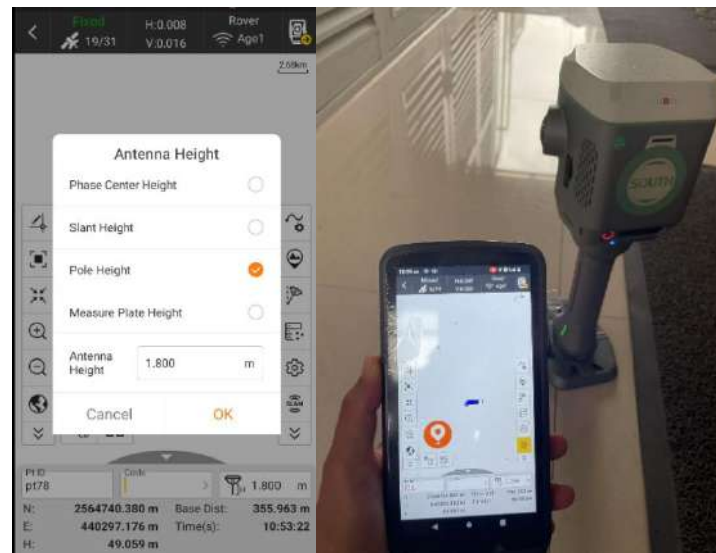
Please input the antenna height value first, the handheld battery height is 0.2m,



if only use the handheld battery, please input antenna height to 0.2m,



if work like this, please input the pole height plus the value of the battery 0.2m, for example, if the pole height is 1.4m, antenna height value, please input 1.6m.



At this sample, I only use the handheld battery, so I input the antenna height value to 0.2m.

3.4.5 Magic Calculation(Mixed solution)

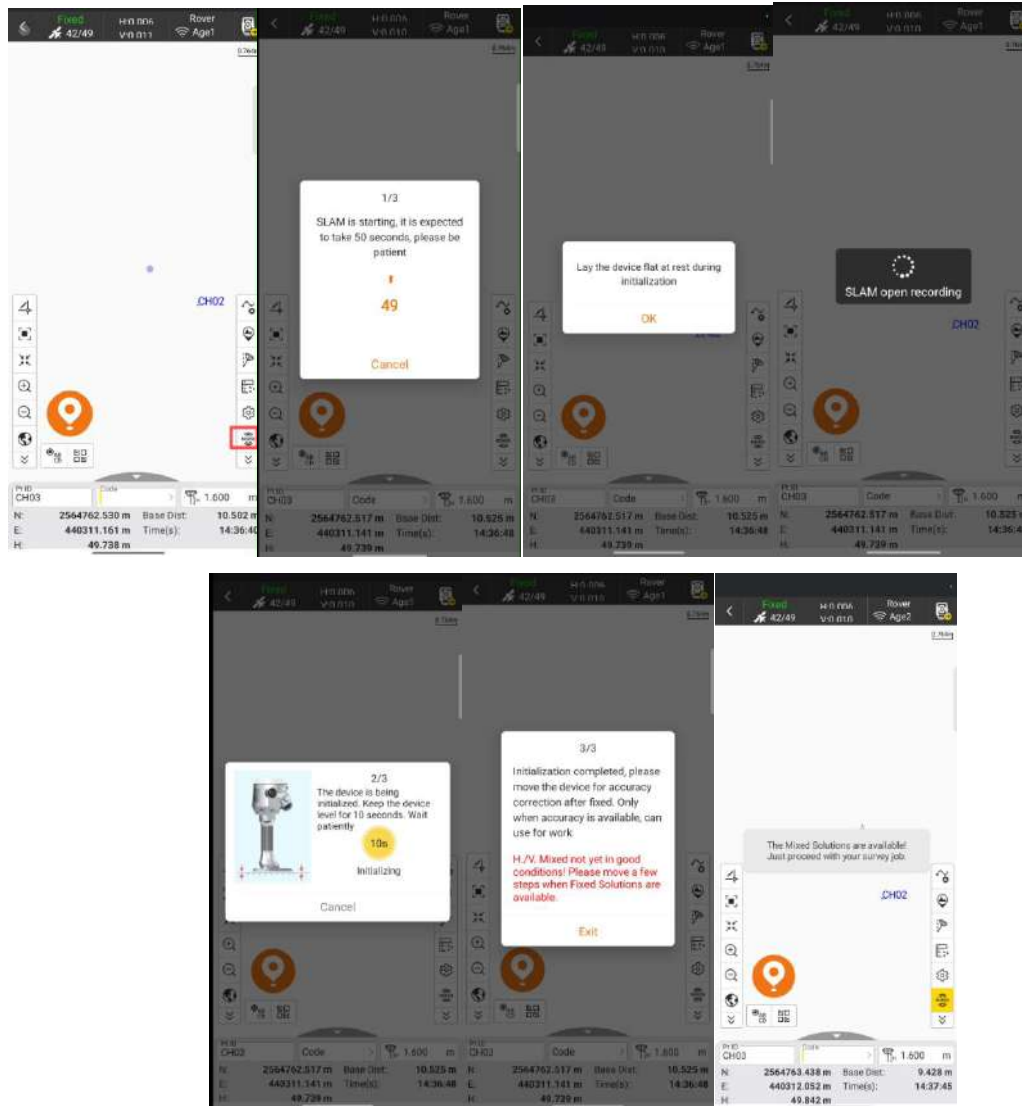
The **Mixed solution** is the greatest innovation of the ME system, which enables the ME system to achieve a Mixed solution after fixed solution outdoors. This allows precise positioning results to be obtained in places indoors where there is no GNSS signal or satellite signal is very weak, under the correction of the SLAM trajectory, The specific steps of operation in Survstar are as follows:



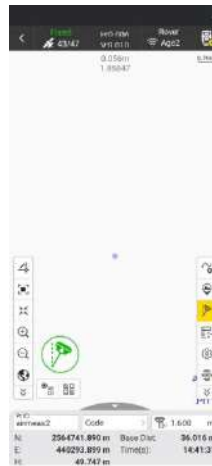
Magic calculation working in indoors area

There is a **"Mixed"** icon on the right column, click it to activate the function for Magic calculation, the system will enter a 50s initialization and a 10s initialization, when popup a red message *"H./V. Mixed not yes in good conditions, please move a few steps when Fixed solutions are available."* please walk several steps(5-7 meters is better in open area

with more than 20 satellites, and Fixed solutions, with Rover Age value within 5.) When the message "The Mixed Solutions are available! Please proceed with the survey job" popup, it is possible to measure or stake out points in places without satellites signals or weak signals.

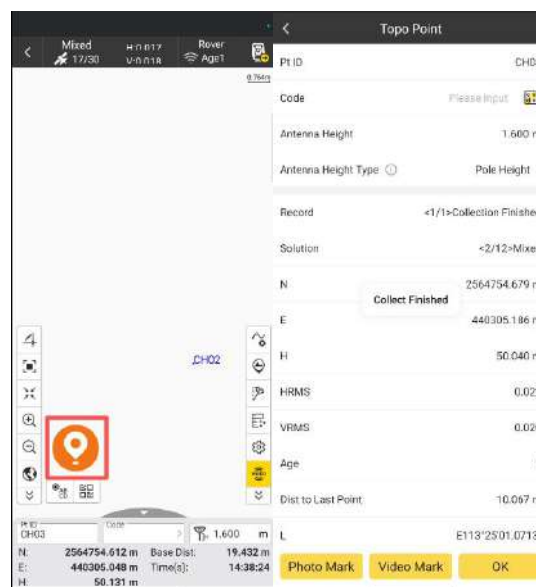


If the user want to use tilt survey function when measure points, please activate tilt survey before enter Mixed solution.



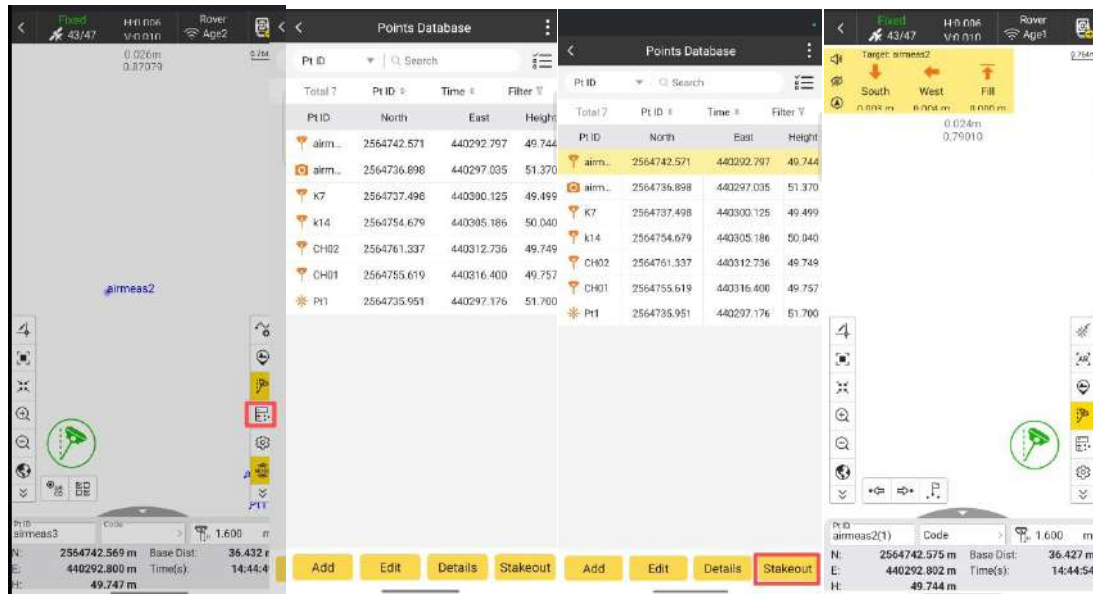
3.4.6 Mixed solution-Point survey

After Mixed solution is ready, click the measure icon below to save point, before save, please ensure that the pole height is correct, and then click OK to save point.



3.4.7 Mixed solution-Point stakeout

Select a point from the point database

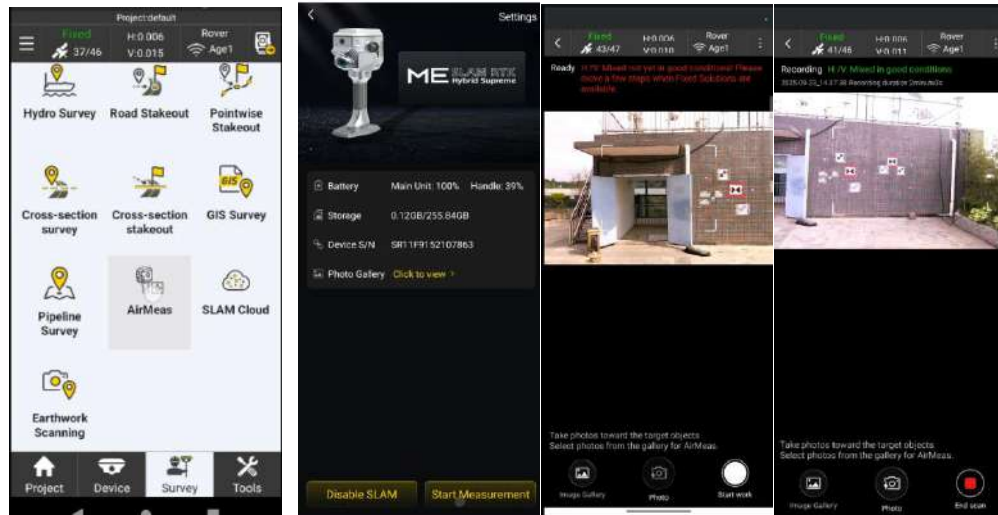


3.4.8 Air Measurement

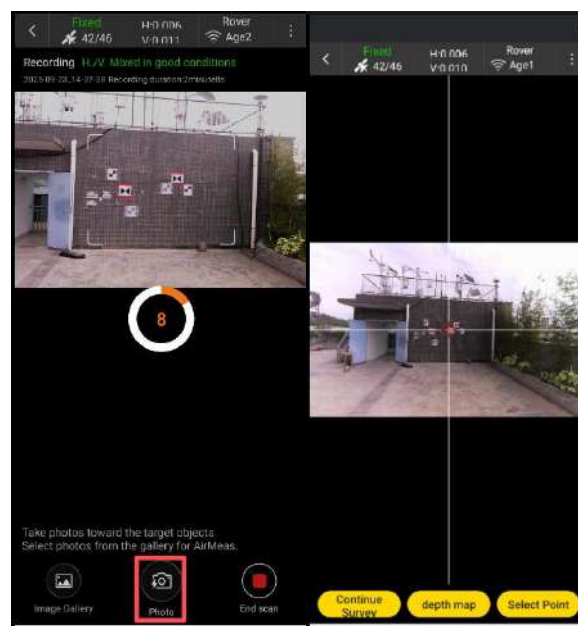
Air Measurement is one of the method of contact-less measurement, the steps for Air Measurement is as follows:

Step1: click “AirMeas” to enter Air Measurement interface, and then click “Enable SLAM”, wait the initialization for 50s, after that wait one more 10s for laser scanner initializing,

Step2: click “Start Measurement” to enter the Measurement interface, first there will be a red message “H/V Mixed is not available”, please walk a small circle or walk a few steps(5-7meters in open area) until see a green message “H/V Mixed in good conditions”, it is ready to measure.



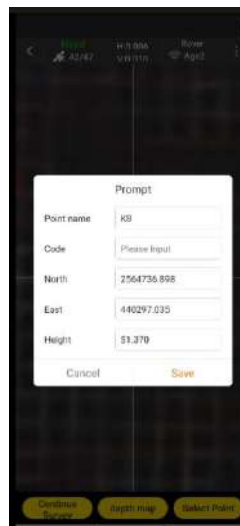
Try to position the point to be measured at the center of the screen, then click the **“Photo”** button. After click **“Photo”**, the following screen will show as below:



Zoom in the image to precisely locate the point to measure,



And then click “Select Point” to save the coordinate of the current point.

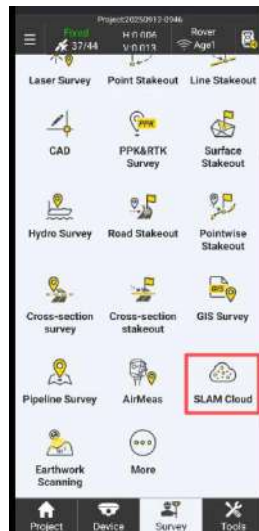


Notes:

1. During the air measurement procedure, keep ME system stable; otherwise, there will be distortion between the image and the depth map.
2. Initialization should be conducted in a open environment with a good fixed solution;
3. When collecting data using the handgrip battery, the height of the handheld battery is 20 cm(that 0.2 m), which needs to be added to the pole height.
4. During initialization, ensure that the device is stable, and there should not be any moving objects around device.
5. Precisely Calibration: when Mixed solutions is available, it is still necessary to do calibrate by moving over 5-7 meters to complete a circle in order to provide higher accuracy.

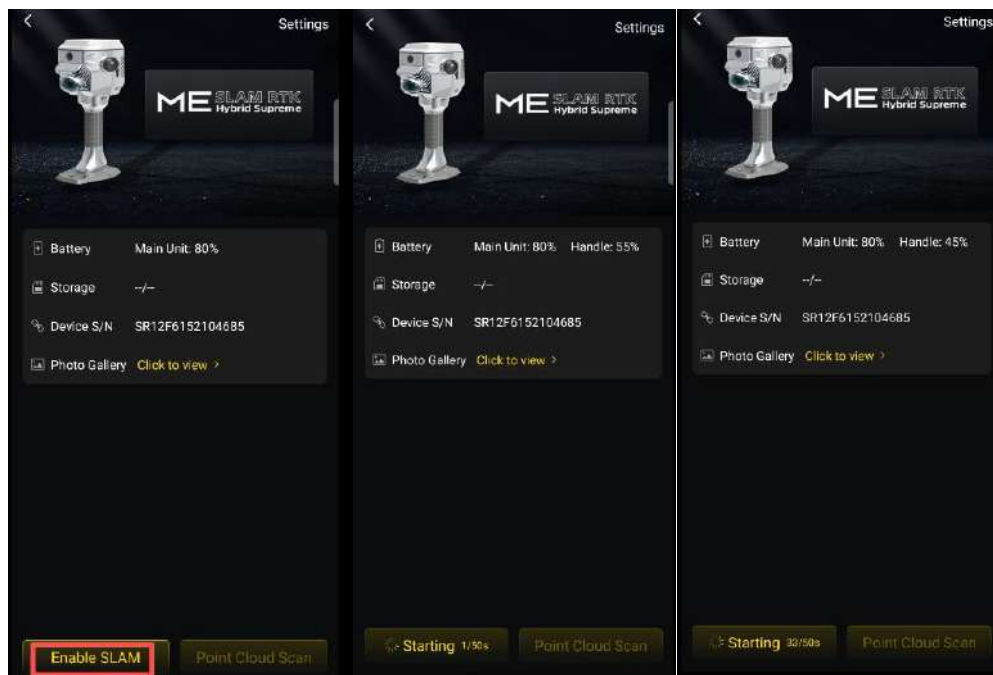
3.4.9 Point cloud scanning (SLAM Cloud)

Click “SLAM Cloud” to activate the function of point cloud scanning,

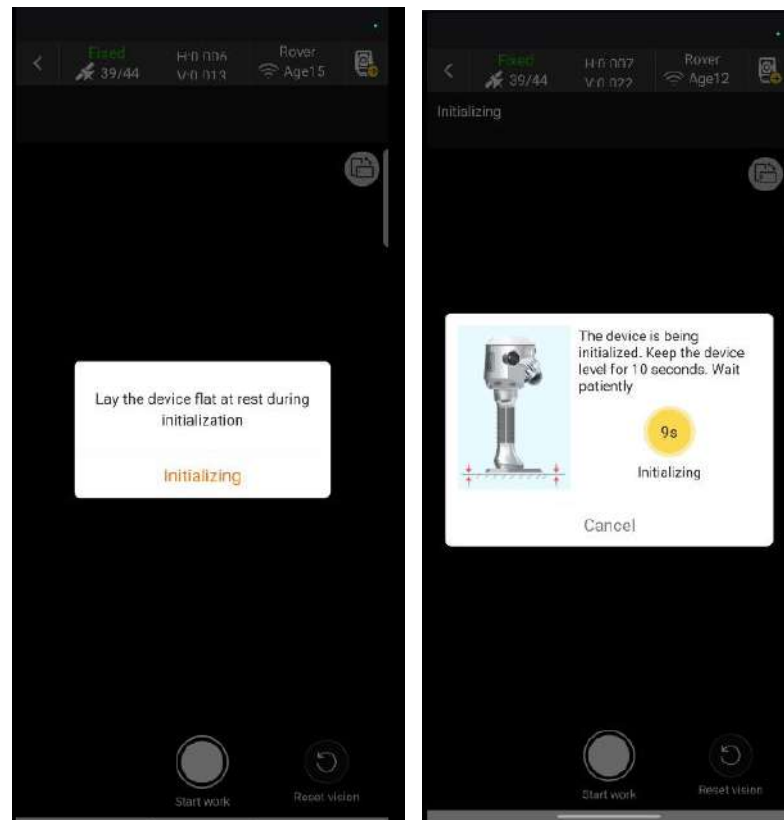


1. Enable SLAM

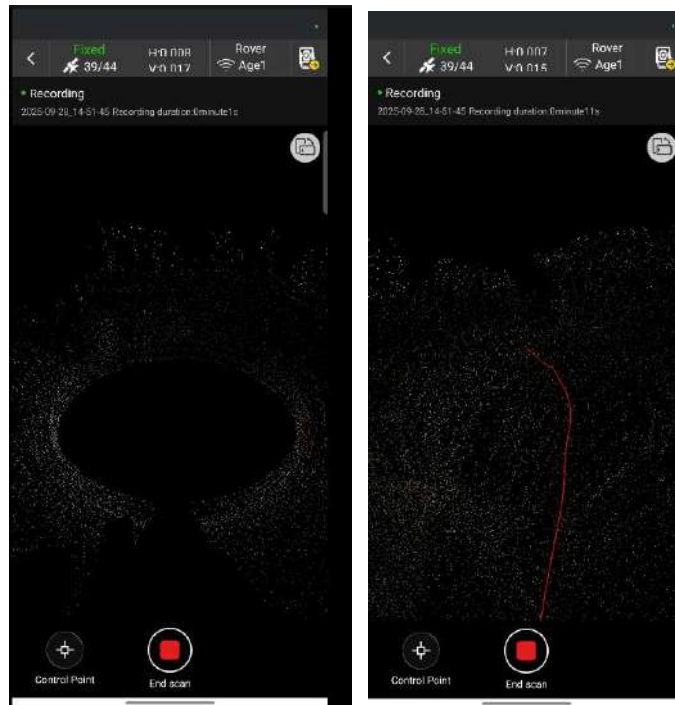
After click “Enable SLAM”, please wait **50s** for laser scanner initialization;



After 50s initialization finish, there will popup a 10s initializing message as follows,
click Initializing to enter the following interface:



When finish the 10s initializing, ME system will start scanning automatically, when finish scanning, click “ End scan”.



Notes:

1. **Device Initialization:** The LiDAR can be powered on 2 minutes in advance for preheating. During initialization, ensure the device is stationary and there are no moving objects nearby(especially in front of the device when initializing);
2. **Device Handling Posture:** Since Me uses a fixed LiDAR with a scanning angle of $59^{\circ} \times 360^{\circ}$, if the scanned object is oriented toward the ground, tilt the device forward about 15° .



If the scanned object is oriented toward a vertical surface(such as building facade survey), tilt the device backward about 15° . Ensure there are no moving objects

following around the device. Additionally, mobile phones and notebooks should be placed directly behind the device without blocking the fish-eye camera or LiDAR;



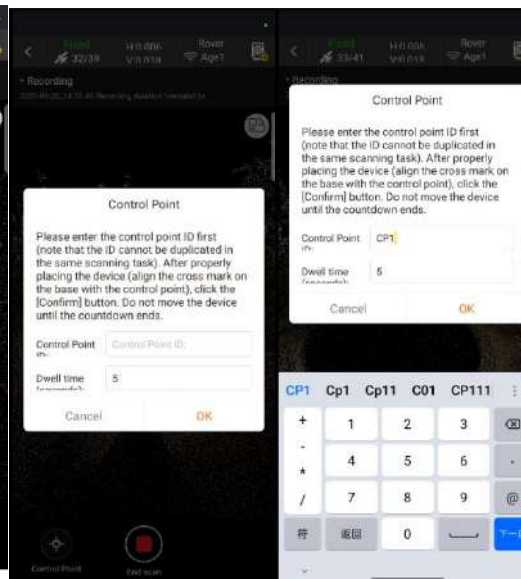
3. **Walking Speed:** Maintain a normal walking pace, not too slow. In areas requiring finer detail display, the pace can be slightly slower;
4. **Walking Route:** Use a figure-eight or circular (closed-loop) path, with approximately 5 meters between parallel lines;
5. **Data Collection Time:** Limit collection to within 20 minutes. Longer collection times will result in longer calculation times and relatively larger cumulative errors;
6. **Shutting Down and Disassembling the Main Unit:** When turning off the device, first switch off the main unit, then the handgrip battery. When disassembling the device, first remove the handgrip battery and main unit, then remove the base stand and handgrip battery.

3.4.10 Control point collection

During the scanning, if there are some GCPs available, the user can mark the GCPs, enter the GCPs point name and then wait 5 second countdown to save the GCPs, after that, keep on the scanning.

(Note: If use GCPs to convert coordinates, please remember to make more than 3 GCPs.

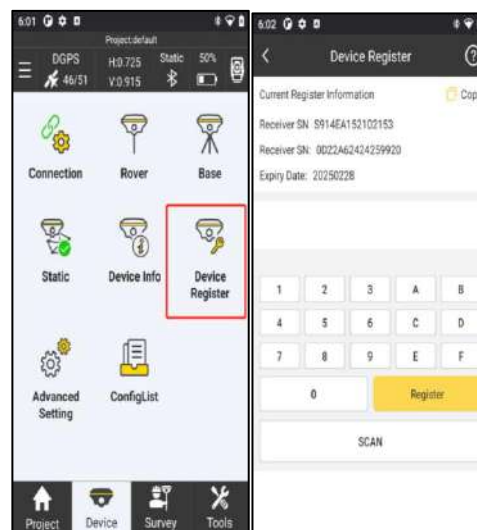
Precisely put the cross center on the base stand at the GCPs point



Notes: All other basic functions of GNSS RTK receiver, point survey, point stakeout, line survey, line stake out, and so on, please refer to the GNSS related manual, for example, Survstar Manual.

3.4.11 Device registration

In this page, we can check the device registration information and register device. Click Copy will copy the receiver SN. Input the registration code in the bar, and click Register, then the device will be registered. We can also click SCAN to scan the QR code to register.

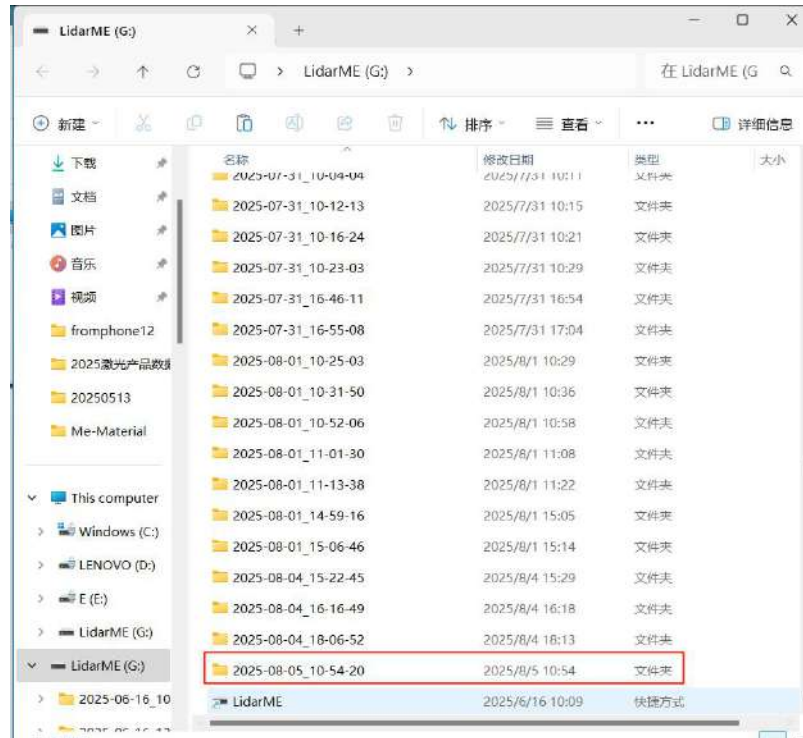


Chapter 4 Data download and processing

4.1 SLAM data download

Plug out the TF card from ME system, and then insert it to the TF card reader, after that Plug the reader to laptop, and find the project folder according to data collection time.

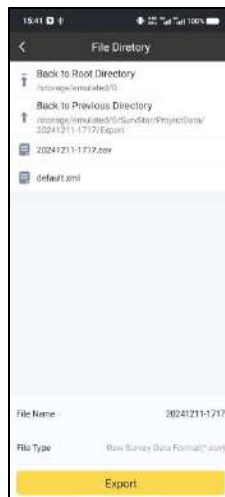
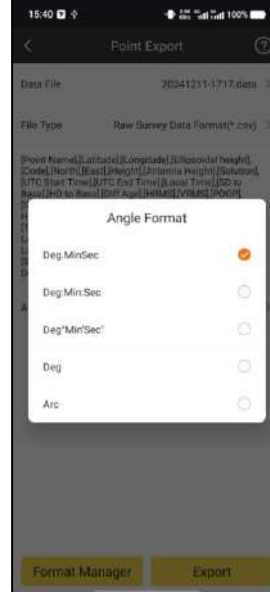
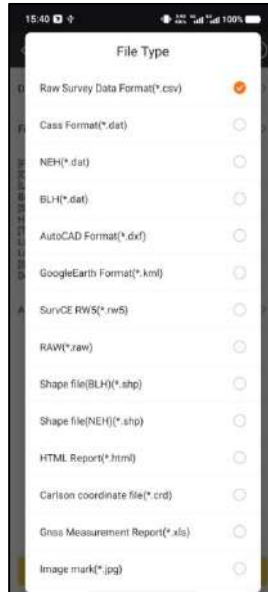




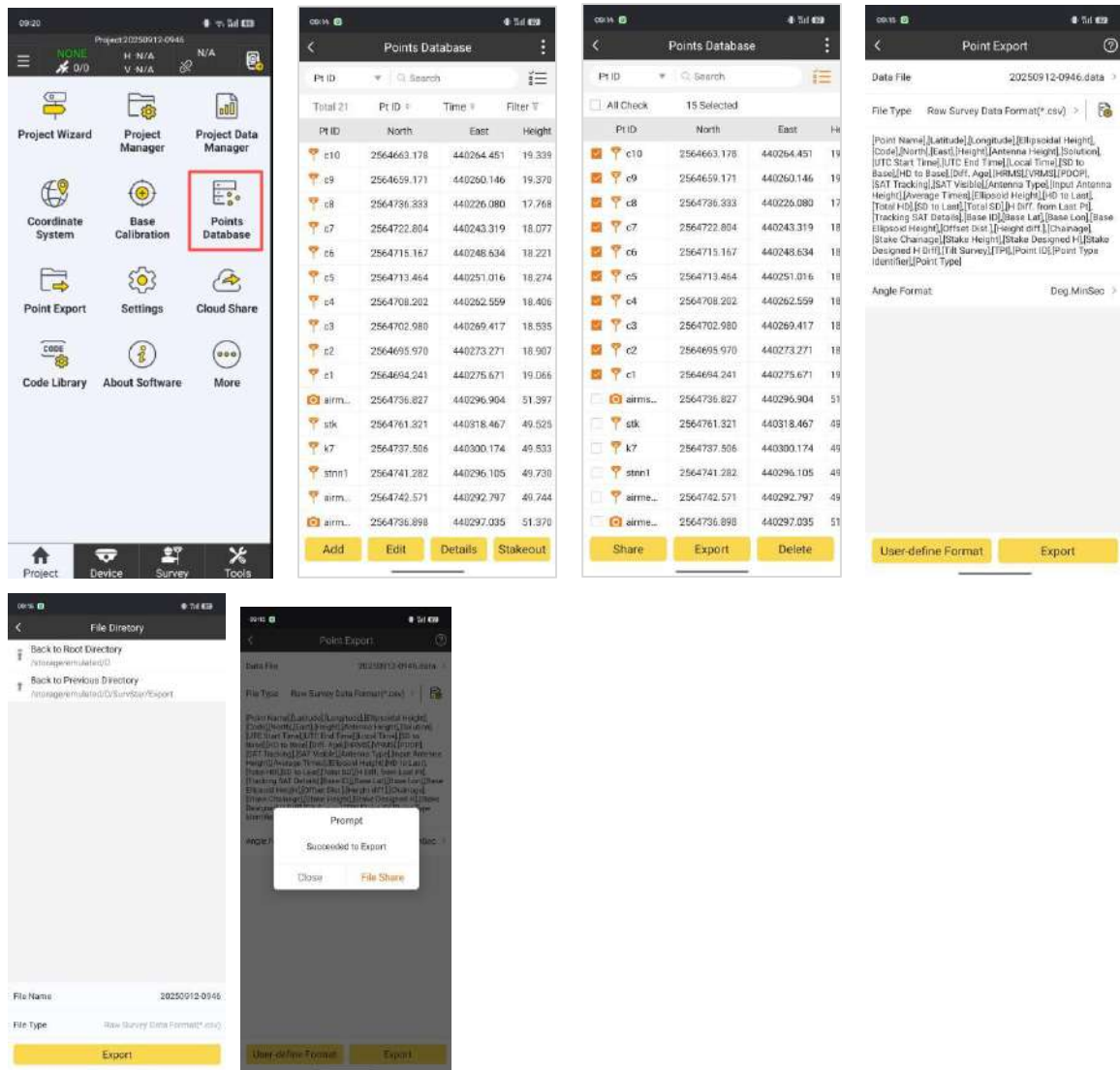
4.2 RTK Point measurements Export

4.2.1 RTK points export from from Menu Point Export

Click **“Project/Point Export”**, set the data format and then export it to a location, after that, find the location when connect the data controller or mobile phone with computer.



4.2.3 Export RTK points from Menu Point Database



4.3 SLAM data processing

AcuteLas Studio software include the function to process ME/ME Plus SLAM data,



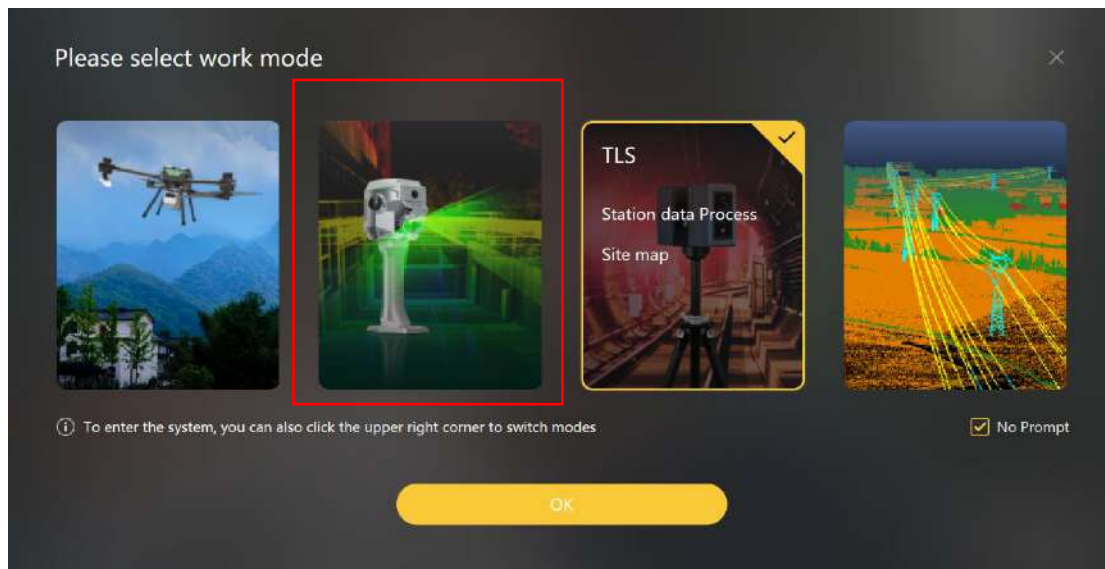
The software name is as following:



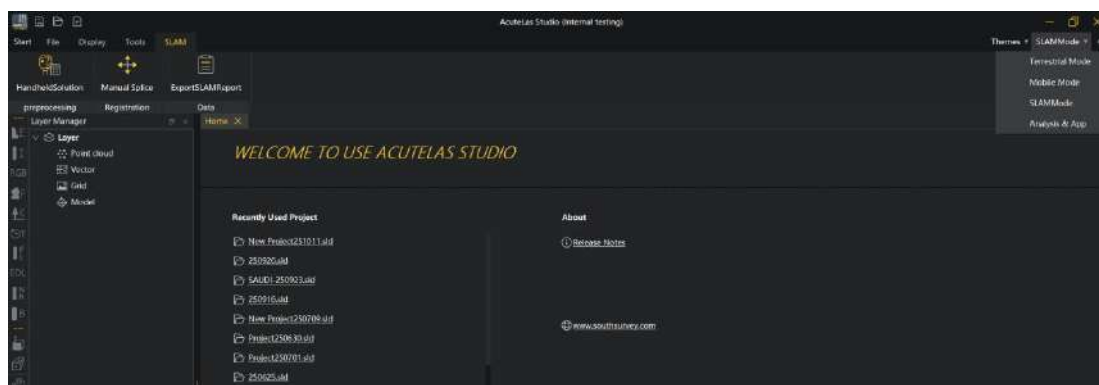
After Install, there will be a icon AcuteLas Studio generated on the desktop,



For the first time run the software, there will be four modes to choose from, for SLAM data processing, please select the second one with a picture of ME surveying system.



If not the first time to open the software, please find the mode switch on the right corner to set SLAM Mode, after set the main interface is as below shows:



AcuteLas Studio-SLAM mode is used to process ME/ME Plus SLAM data to receive point

cloud data. SLAM Mode totally has four functions:

1. Directly Process SLAM data (to receive colorized point cloud with only relative coordinates)
2. Process SLAM data with Ground Control Points(mark at least 3 GCPs during the scanning)
3. Process SLAM data with PPK
4. Process SLAM data with RTK(RTK fixed is available during the scanning)

Next, the specific processing steps of the four functions above will be introduced in detail.

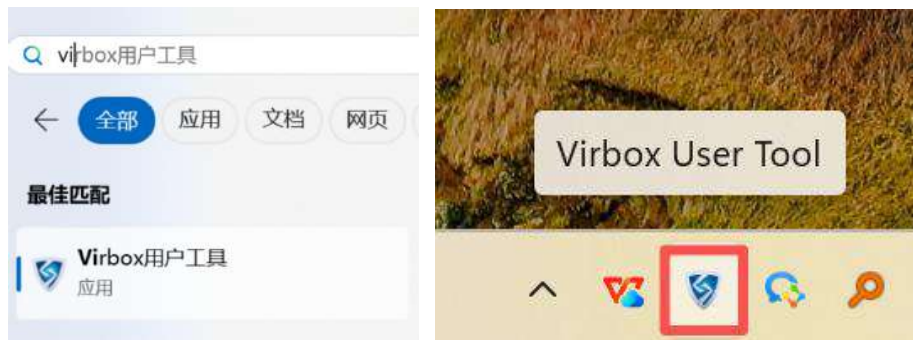
4.3.1 AcuteLas Studio software license application

When finish installation AcuteLas Studio software,

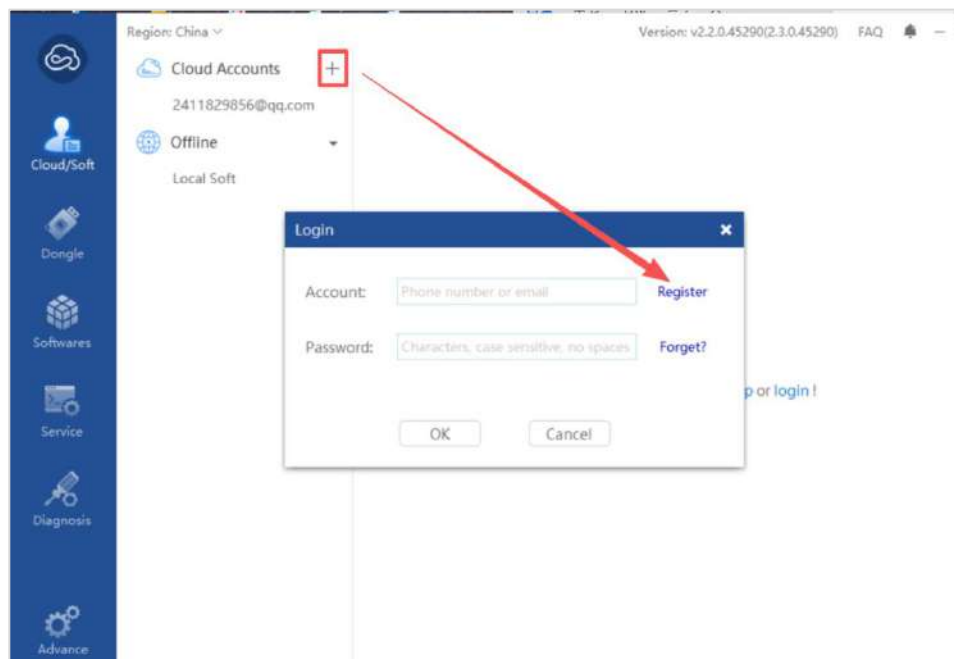


a shortcut to the software will be automatically created on the desktop. If for the first time installation of AcuteLas studio software, **Runtime environment** and **SoftDog Drive** can be ticked to install after click"Finish". if not the first time installation, click the "Finish" button to close the installation wizard window.

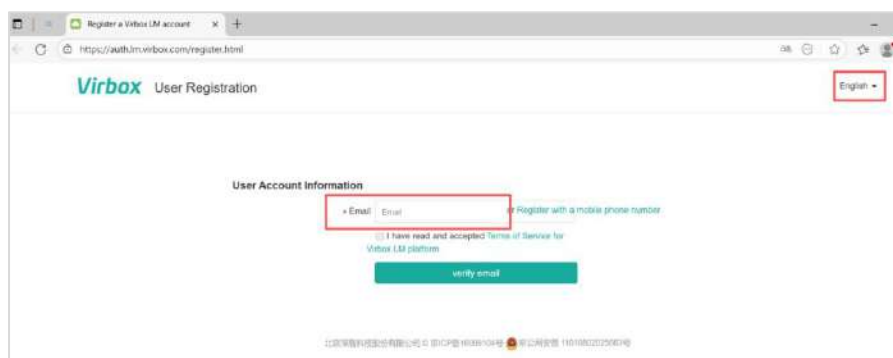
After the Software dongle driver is installed, there will be a Virbox User Tool installed on the computer,



Run it and register an account, normally,



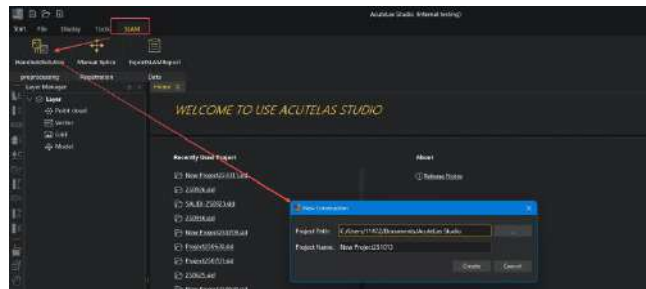
it is recommended to register with frequently used email,



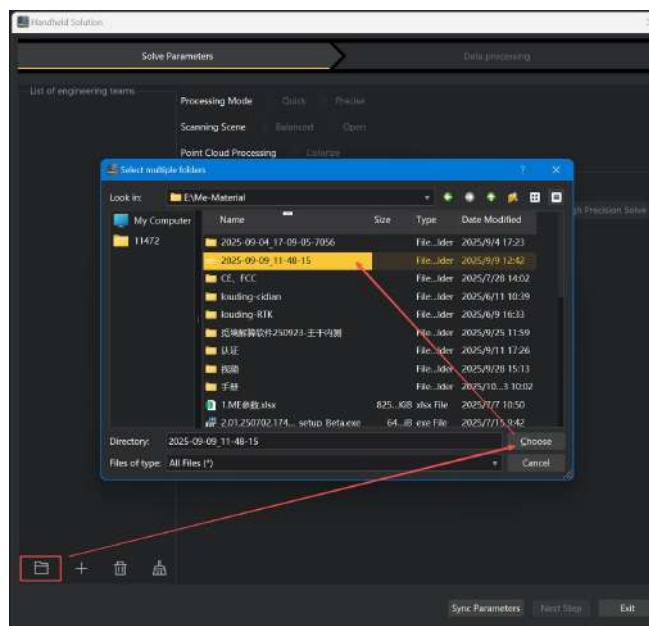
When finish the account register, send us your email address to apply an authorization to use the software.

4.3.2 Direct Processing(Pure SLAM Solve)

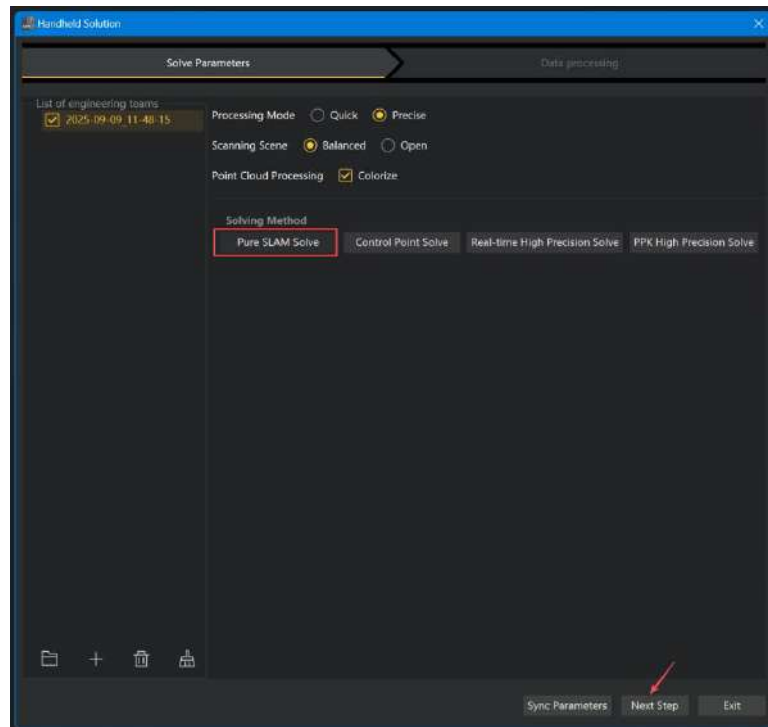
1. Open the Handheld Solution module, set the **Project save path**(it is better not to save the project in the system Disk C, and confirm that the disk has enough space for processing), input **Project name**, and then click **Create** to create a new project,



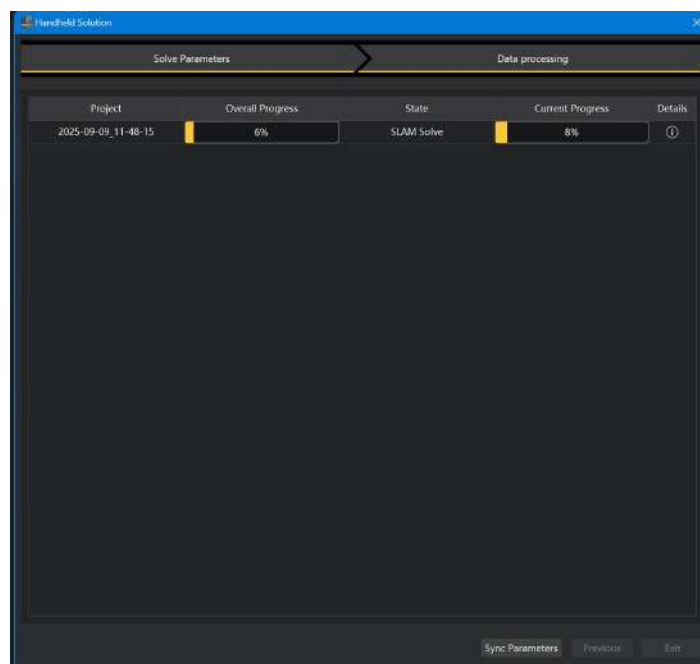
2. Click the bottom **FOLDER** icon to **Import the Project folder**(which copy out from the TF card of ME surveying system).



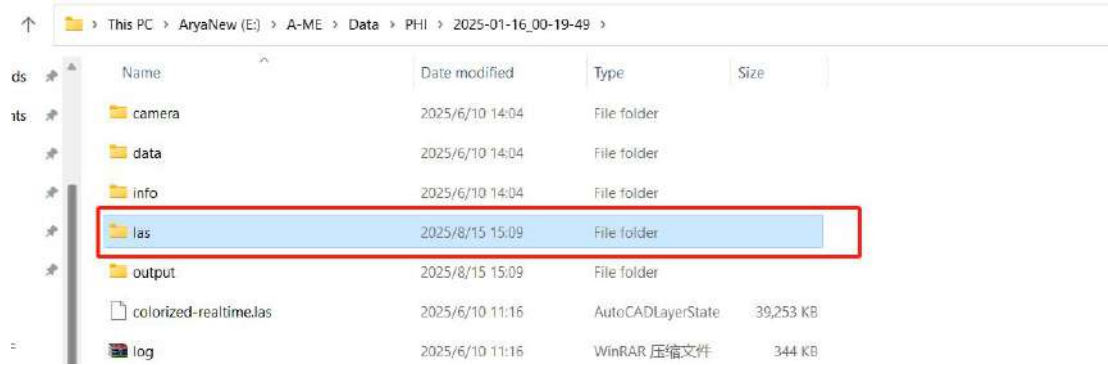
3. click **Pure SLAM Solve**, and then click **Next Step** to start the processing,



And it will popup the following window for processing, and it will show the processing progress bar.

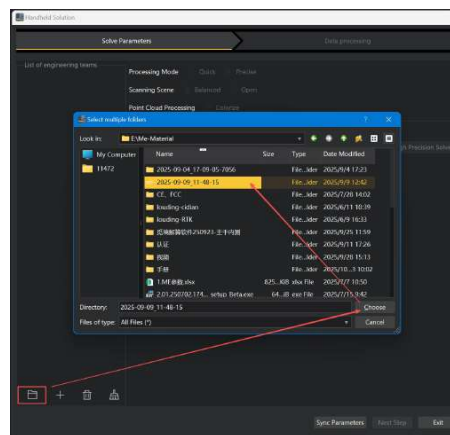


4.After processing, find the .las file in the las folder under the data directory.

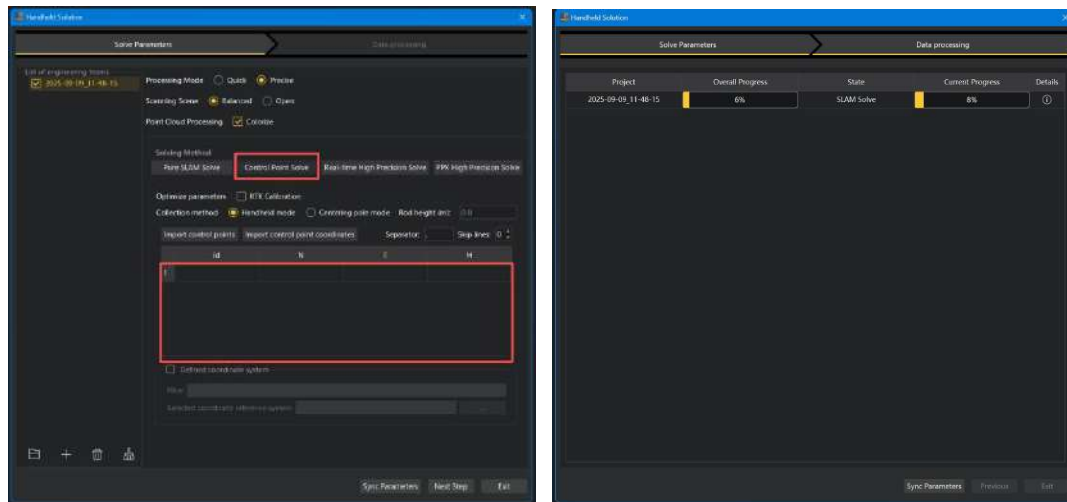


4.3.3 Control Point Solve(Mark more than 3 GCPs during scanning)

1. Open the Handheld Solution module. Click Import Project Group.



2. If during the scanning, already marked more than 3 GCPs(≥ 3), the solving method here can be set to Control Point Solve, input the GCPs coordinates one by one in the big red rectangle area below, and please note that the coordinate sequence should be point name, Northing, Easting, and Height value(elevation value).and then click"Next step" to start the processing. And then just wait the processing finish.



4.3.4 Real-time High Precision Solve(RTK fixed is available during scanning)

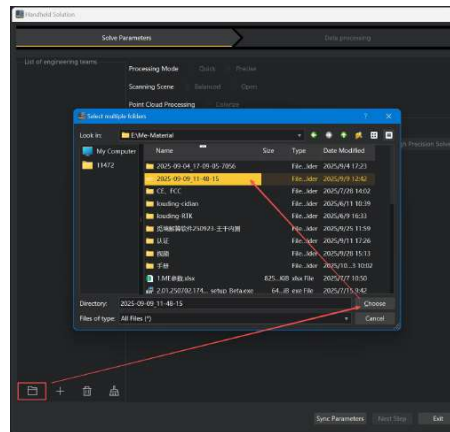
To use this method, please confirm the following two points during the scanning and after the scanning:

- 1) Please make sure to start scanning under **RTK fixed** solution. The software will automatically record an RtkPoint.txt file.
- 2) Connect the data controller or mobile Phone to the computer and copy the RtkPoint.txt file.

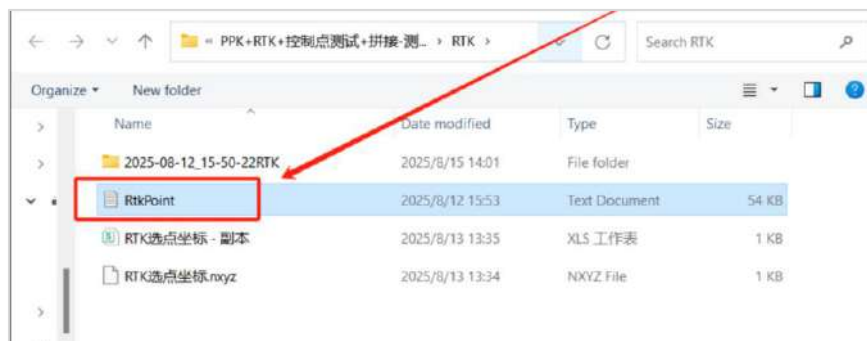
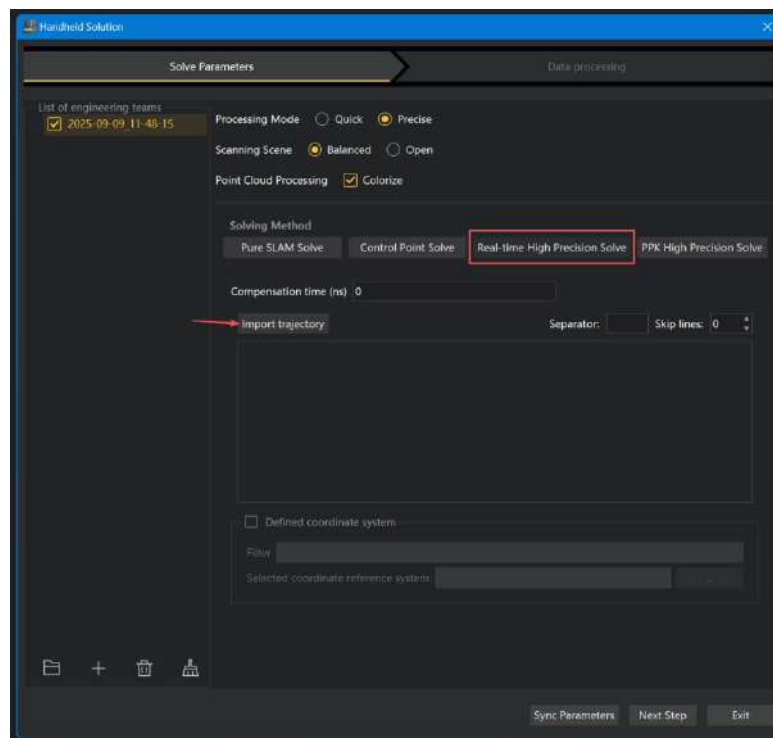
Location:\H9\Internal shared storage\SurvStar\ProjectData\default\Slam\Cloud***** (Date)**-**-**_**-**-** (file name)

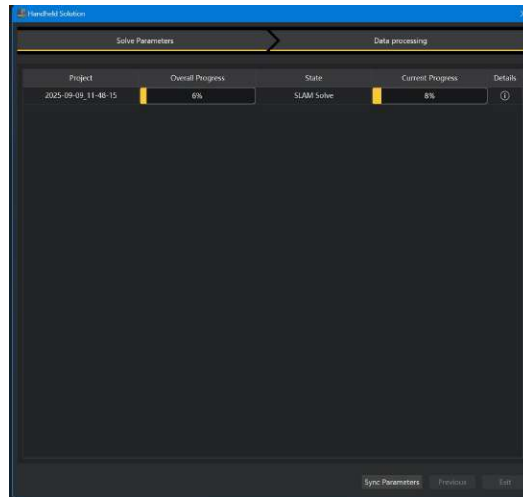


1. Open the Handheld Solution module. Click Import Project Group.



2. Select the method “Real-time High Precision Solve”, click Import trajectory to load the RTKpoint file(*.txt format), and then click”Next Step” to start the processing.





4.3.5 PPK High Precision Solve

4.3.5.1 ME surveying system-PPK fieldwork flow:

Base operation steps: Start static collection on the base station (1s interval), wait **10 minutes** at least.

ME operation steps: Start ME's static collection and then begin scanning. After the scan, wait a bit before stopping static collection and **note the end time**.

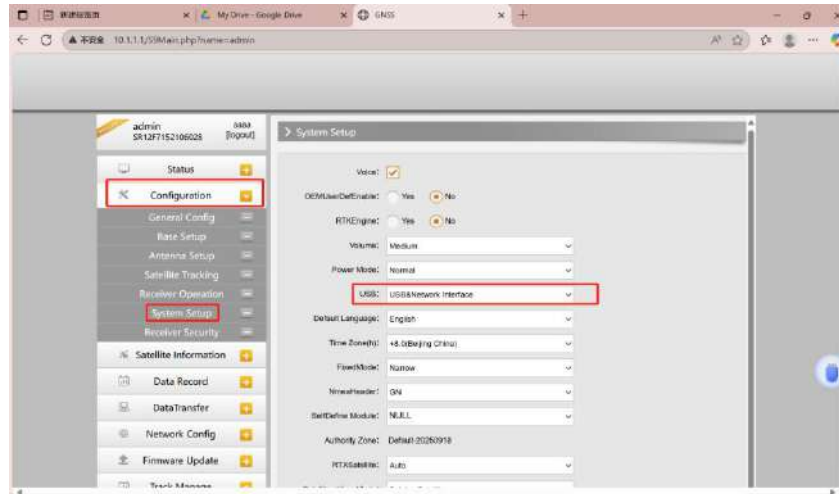
4.3.5.2 Data preparation before processing

Copy *.sth data from **base receiver or base station** and **ME**:

Base: Please refer to the operation manual for the specific model.

ME:

After connecting to the device's Wi-Fi, open a browser and visit 10.1.1.1. Follow the diagram below to change the USB transfer mode.



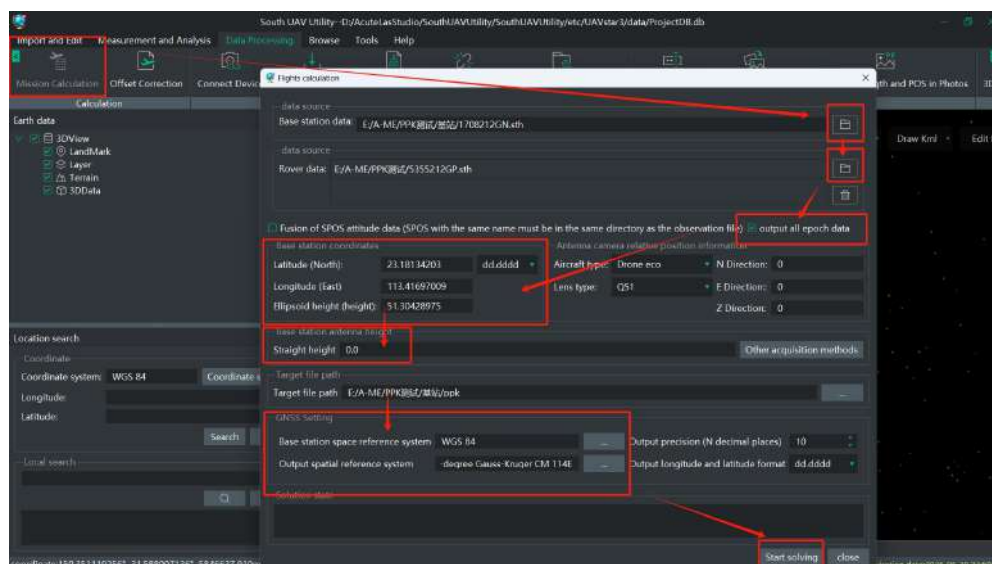
Then, connect the device to your computer via Type-C to access internal storage. Select the correct corresponding item based on the end time.

Finally, need to obtain one set of static data from the base receiver and another from ME.

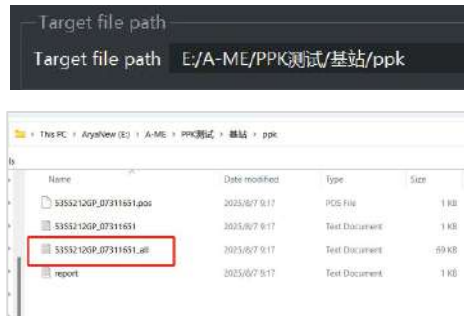
4.3.5.3 Press PPK trajectory data with software SOUTH UAV Utility

Press **Base Station data** and Sth static from ME/ME Plus in software SOUTH UAV Utility,

- Only set base station coordinates and antenna height.
- Only single-base station is supported.

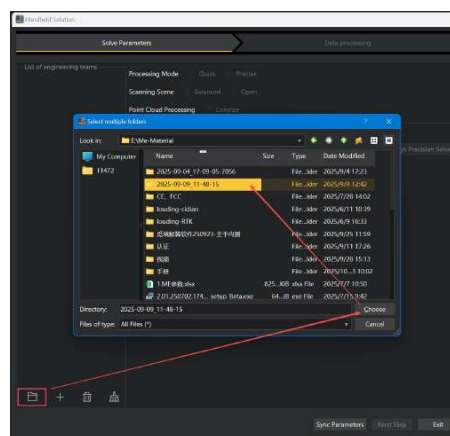


After process, find the result file location in _all.txt.

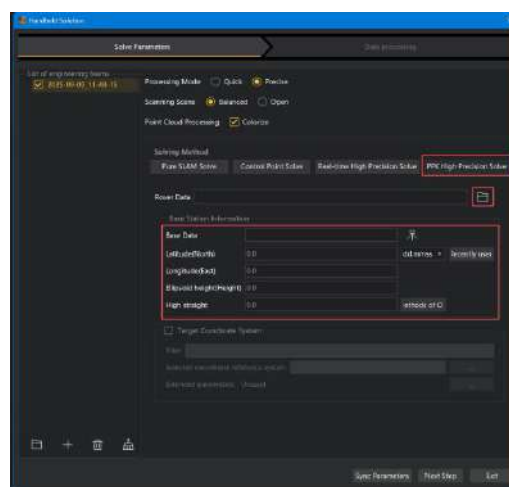


4.3.5.4 Press SLAM data with PPK trajectory

1. Open Handheld Solution. Click Import Project .

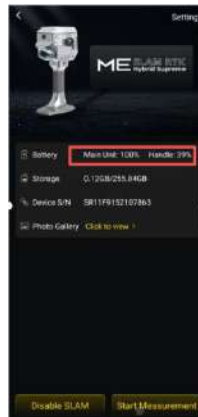


2. Click "PPK High Precision Solve", then select the **PPK result file**(from processing in SOUTH UAV utility) , and then input the Base Station Coordinates, and then click "Next Step" to start the processing, after that wait until the processing finish and find the Las files.



Chapter 5 Battery Charge

Before charge, please check the battery capacity status from below



5.1 Handheld battery charge



5.2 built-in battery charge



Chapter 6 Daily maintenance

6.1 Daily cleaning

1.Regularly (for example, once a week) wipe the exterior of the main unit with a clean, soft damp cloth to remove dust and stains. Especially for the antenna, pay special attention to keeping its surface clean, because dust, oil, and other contaminants may affect satellite signal reception. If the antenna surface is dirty, gently clean it with a small amount of neutral detergent and a soft brush, then rinse with clean water and let it dry before use. Please clean the laser scanner head with the standard configured cleaning cloth.

2. Maintenance and upkeep during operation(Temperature)

Monitoring the device's temperature status in real-time (via display screen or companion app) continuously. If it exceeds 60°C, the machine will stop immediately.

6.2 Working environment

1) Temperature

The recommended operating temperature range for the GNSS receiver is -10°C to +40°C. Avoid using or storing the main unit in extreme temperature environments. In high-temperature environments, ensure proper ventilation and heat dissipation; in low-temperature environments, take appropriate measures to keep it warm, such as using an insulated box. When the receiver moves from a cold environment to a warm one, prevent condensation, as moisture may damage the internal circuitry.

2) Humidity environment

The main unit should be kept in a relatively dry environment as much as possible, with an ideal relative humidity of 20% to 80%. If used in a high-humidity environment (such as during the rainy season or in humid coastal areas),please place the main unit in a dry, ventilated area or in a sealed container with desiccant after use to absorb any moisture that may have entered the device.

3) Dust and Sand Protection:

In environments with a lot of dust and sand, such as deserts or construction sites, please protect the main unit as much as possible (standard configured in the transportation box). Fine sand particles entering the equipment can affect the functionality of buttons and interfaces, and may even interfere

with the normal operation of internal circuits.

6.3 Battery management (both built-in and the handgrip)

- 1) Avoid using the device while charging to prevent the battery from overheating.
- 2) Use the standard configured power adapter, and avoid using power sources that do not meet specifications. When the main unit is not used for a long time, charge the battery to an appropriate level (generally around 50%) and then remove it for separate storage. It is recommended to perform a charge-discharge cycle every three months to prevent battery aging.

6.4 Physical protection

- 1) **Shock Prevention:** during transportation and use, please protect the main unit from severe vibrations. And make sure place it in a packaging box with cushioning materials (such as sponge or foam). For example, during vehicle-mounted mobile measurements, please keep it be securely fastened to prevent damage from collisions caused by vehicle bumps.
- 2) **Drop Protection:** because the receiver contains many delicate electronic components and connection circuits, as well as fragile parts such as cameras and laser heads, dropping it may cause components to become loose, break, or circuits to disconnect.

6.5 Interface and antenna maintenance

- 1) **Interface Protection:** The receiver's interfaces (such as USB ports, power ports, etc.) should be kept clean and dry. When plugging or unplugging cables, do it gently to avoid damaging the interfaces. If there is dirt on the interfaces, you can gently brush it off with a clean soft brush or wipe it with anhydrous ethanol.
- 2) **Maintenance:** Keep the antenna surface clean to prevent it from being covered by oil, dust, or other substances, as this may affect the reception of satellite signals. If the antenna is detachable, it can be removed and please store it separately when not in use to prevent damage.

6.6 Storage conditions and precautions

Item	requirements
Storage temperature	-30℃ ~ +60℃ (recommended -10℃ ~ +40℃)

Item	requirements
Storage condensing	≤80% RH (non-condensing)
Forbidden environment	Near strong magnetic fields, corrosive gases, and vibration sources

6.7 Other precautions

1. It is strictly forbidden to disassemble any components of the system equipment. In case of a malfunction, please carefully record the relevant information and contact our technical support promptly;
2. Pay attention to the operating voltage of the system equipment. Please use the power adapter and data cable provided as standard by our company to avoid damaging the equipment;
3. Please connect the equipment strictly according to the installation and wiring methods in the user manual, and ensure all connectors are firmly connected;
4. Do not continue to use any damaged cables or other accessories; please replace them with new cables or accessories promptly to avoid unnecessary harm;
5. When the equipment is used in environments with strong static electricity such as offshore or in ship cabins, it is recommended to install surge protectors at the GNSS1 and GNSS2 satellite antenna ports of the receiver. For details, please contact technical personnel;
6. Laser safety instructions: Never point the laser at people, animals, or reflective objects (such as glass or mirrors). If accidentally exposed to the eyes, close your eyes immediately and move away from the beam area;
7. Avoid strong vibrations. Severe vibrations may cause internal antennas or circuit boards to shift, affecting positioning accuracy;
8. Firmware and software: Always back up device data before upgrading the firmware and ensure sufficient battery charge. It is prohibited to disassemble the device or modify hardware parameters without authorization, as this may void the warranty.

6.8 FAQs

1.Fail to power on the device

- 1) check the built-in battery power status, as well as the handgrip battery power status;

2) Use a multi-meter to measure the connector voltage and check whether the connecting cables are intact. If there is a problem with the cables, please replace them;

3) If the device overheats, suspend use and place it in a cool place to allow it to cool down;

2. Positioning error

1) **if use CORS**, please make sure that the data controller/Mobile phone(Android system) is properly inserted with a SIM card or not,

2) **if use CORS**, please ensure to set the correct Port,Access point, account and password;

3) **if use internal UHF radio**, please check the channel setting in Rover setting is the same with the Base station; Confirm whether the base station coordinates deviate significantly from the actual coordinates;

3. Colorized point cloud failure

1) please check the camera status first, not broken or covered by something;check the protection cover for the camera is removed before the scanning;

2) Please check the image folder, there is images captured during the scanning or not;

Special Reminder

If the problem cannot be resolved, do not attempt to disassemble the device yourself. Please contact the technical support promptly.