SOUTH

GNSS RTK Hybrid Supreme ME Surveying System User Manual

2025.10 Version.

Content

SOUTH

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.

1.2 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.

1.3 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:

1.4 ME system appearance introduction
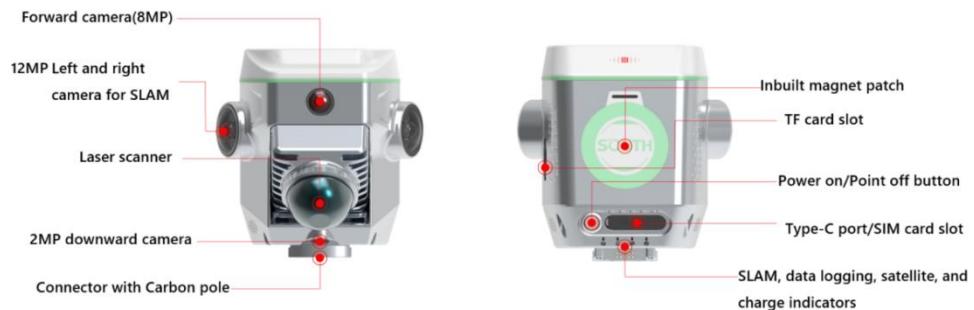
1.5 Device interface and indicator lights

| 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.

1.6 Introduction to the Laser scanner
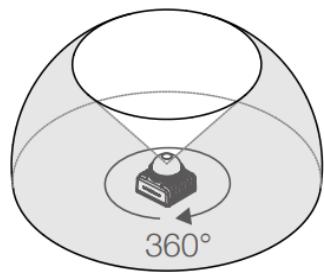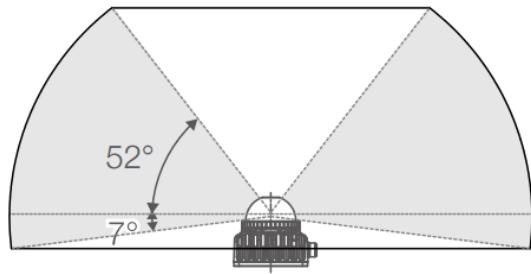
Horizontal   Vertical
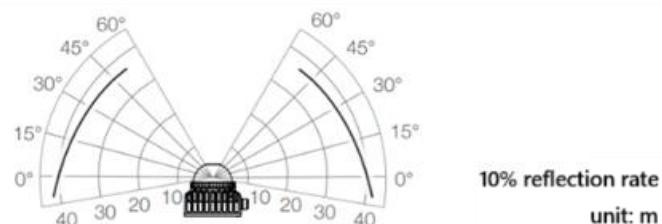
Effective range in different FOV areas of mid-360

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%.

1.7 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
15	Antenna		1	UHF antenna

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

1.8 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 2 Operations

2.1 Preparations

2.1.1 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).


2.1.2 Scanning route plan

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

2.1.3 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.

2.1.4 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.
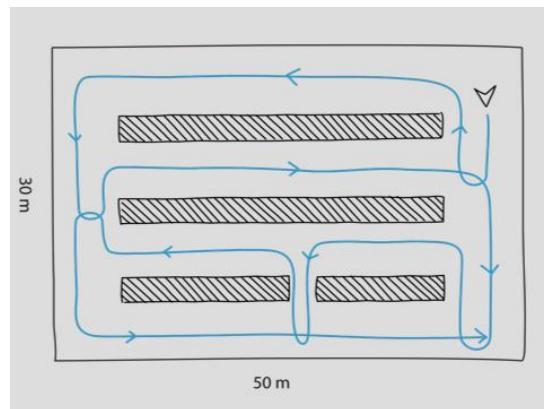
Outdoor loop example

2.2 Main unit installation

2.2.1 Preparation

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

2.2.2 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.

SIM card installation

According to the sign insert the SIM card.

You can use cellular network mode after insert SIM card.

Note: before insert SIM card, please ensure that the SIM card have Internet.

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.

Laser scanner protection cover

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.

2.2.3 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)

2.3 Scanning skills

2.3.1 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.

2.3.2 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

2.4 Web UI Management

2.4.1 Overview

Because of using the smart embedded Linux operating system and SOUTH intelligent cloud technology, the web UI allows users to configure and monitor the status of ME receiver in real-time. The access method can not only be achieved through WiFi connection, but also through USB mode connection.

2.4.2 Access by WiFi

The WIFI hotspot is default broadcasted by ME receiver, search the WIFI hotspot which named with SOUTH_xxxx using smartphone, tablet PC or laptop, then establish the WIFI connection, input the default IP (10.1.1.1) into browser, on the login interface, apply "admin" for the username and password. For example, search the WIFI hotspot broadcasted by a ME receiver using a laptop PC, choose the WIFI hotspot of ME receiver to establish the connection without password.

Run IE browser on laptop PC and input the default IP (10.1.1.1) into address bar, after clicking Enter key, it will access login interface, then apply "admin" for username and password to login.
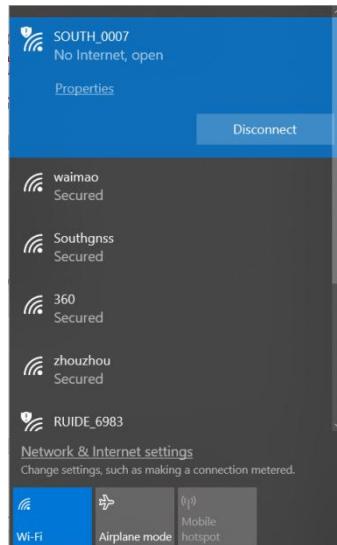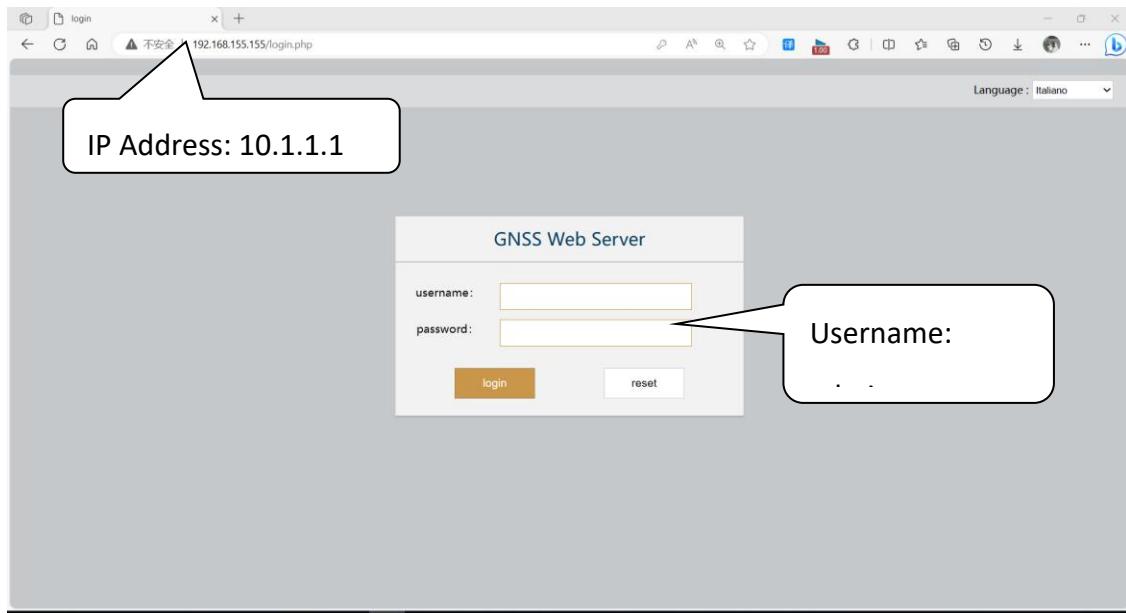
2.4.3 Access by USB

On this mode, the Type-C USB port of ME Receiver must work as an Ethernet port, then internal web UI shall be accessed via USB cable connection with computer.

First of all, a corresponding driver is required to install to the computer, then this function could be activated.

Due to different operating system is installed on computer, the drivers should be applied to a suitable one. The file bugvista64.inf is applied to 64bit operating system, and linux.inf is for 32bit operating system.
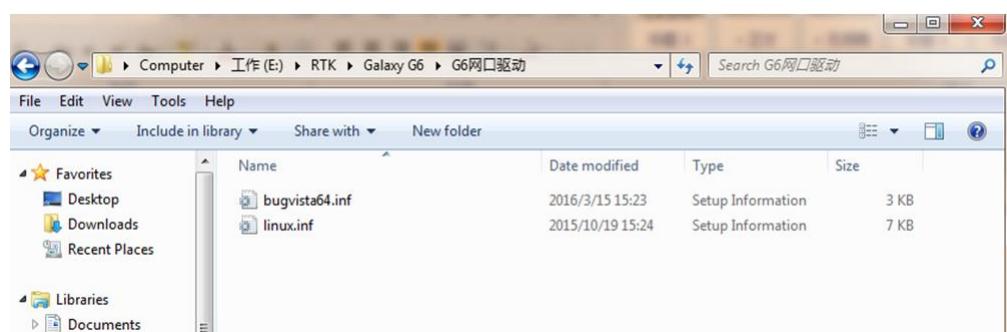
Choose the folder which contains the drivers
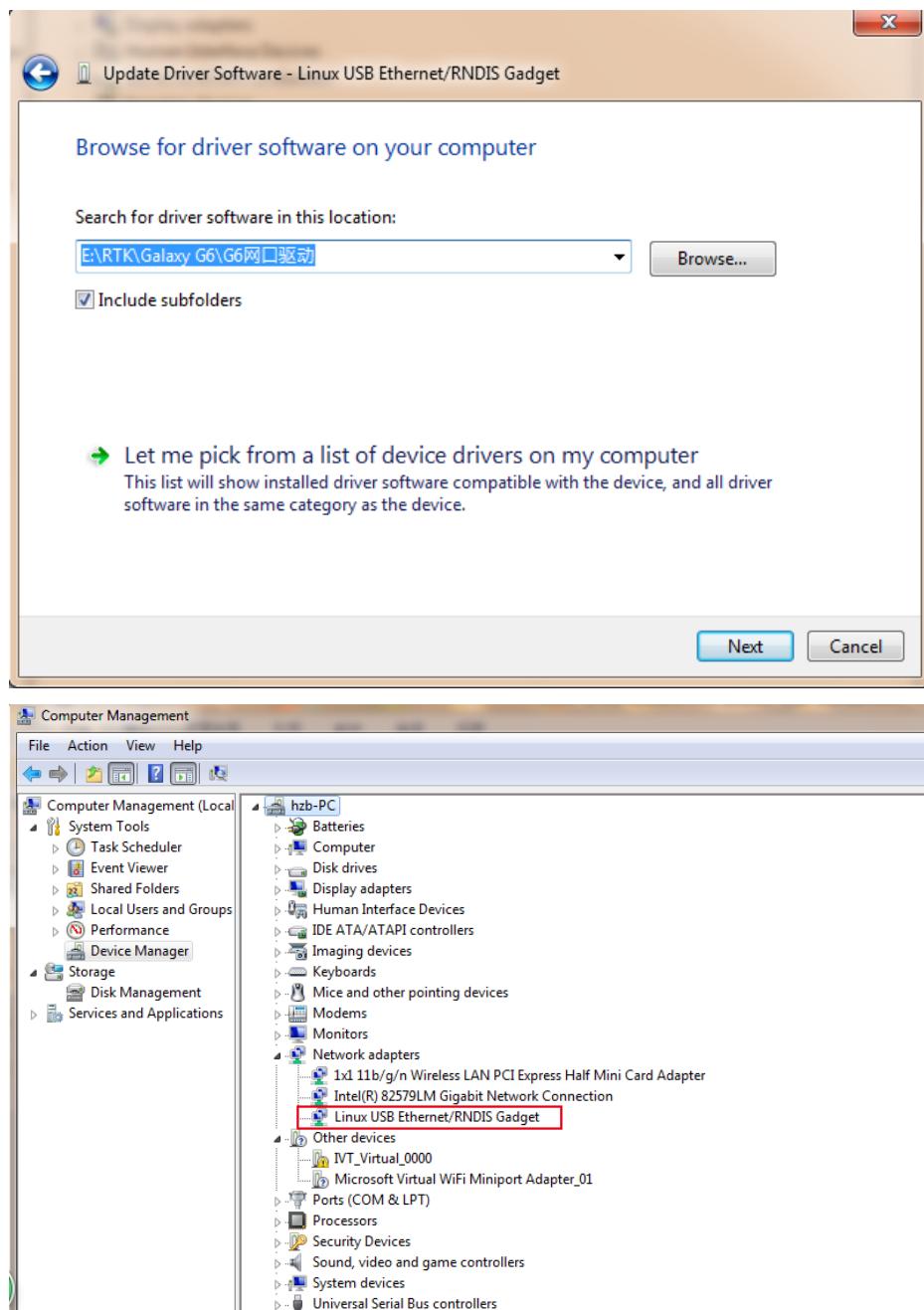
NOTE: The driver can be downloaded from official website automatically or please contact with us for more supports.

If the driver has been successfully installed, the USB port of ME receiver will be recognized as **Linux USB Ethernet/RNDIS Gadget**, and a local area connection will generate in **Network Connections** on the computer. For example, Local Area Connection 138 generates after connectingME receiver to computer via USB network interface.
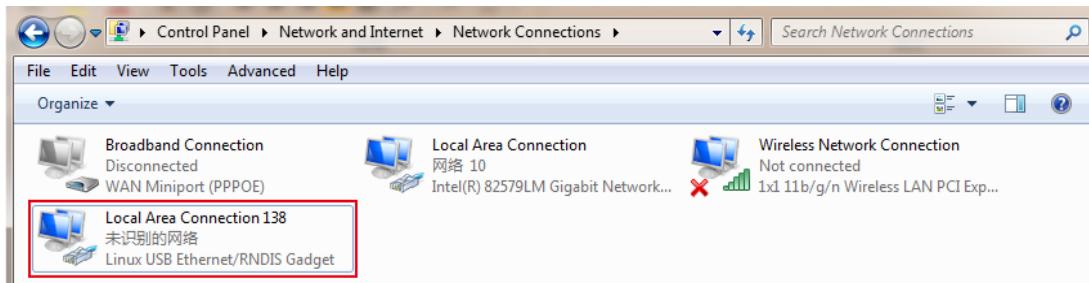
However, sometimes the computer cannot detect the receiver by USB network interface because there is something wrong with acquiring IP automatically, therefore, we need to do something to avoid such problem, that is to set a fixed LAN IP for the connection:

Right click on the local area connection which newly generates, choose properties to call out the local area connection properties window.
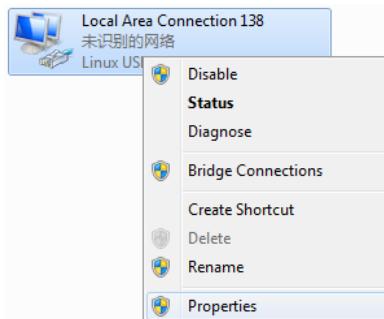
Then double click on Internet Protocol Version 4 (TCP/IPv4) option or click on properties button to call out Internet Protocol Version 4 (TCP/IPv4) properties window, set the fixed LAN IP address as shown in following, then click OK button and confirm the settings, return to the IE browser and use the IP address 192.168.155.155 to access the internal web UI.
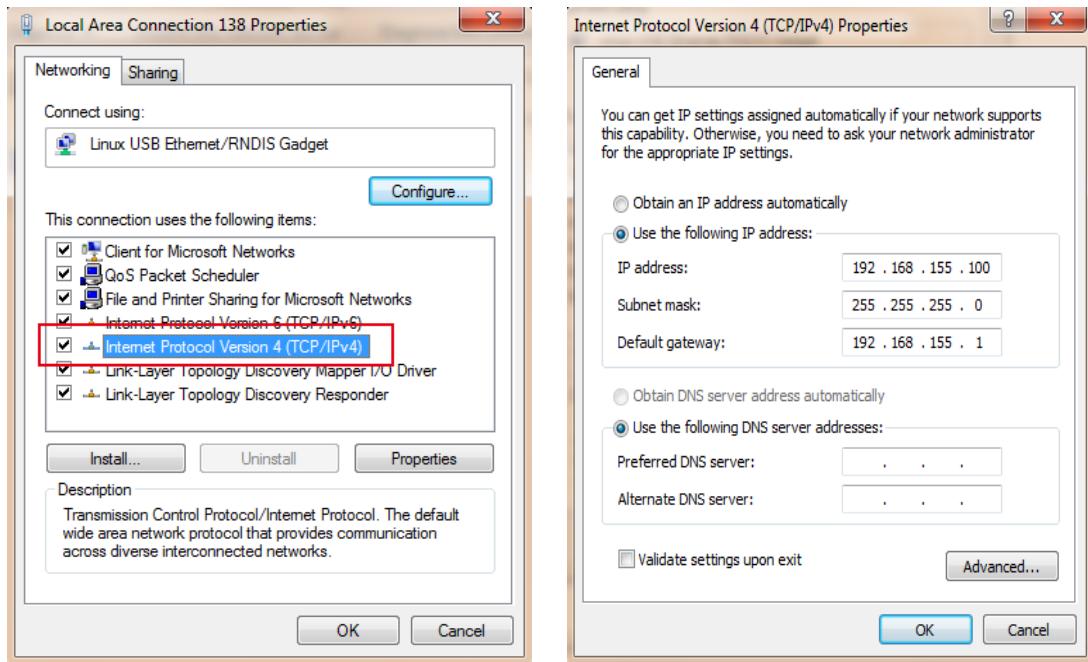
Run IE broswer on computer and input the default IP (192.168.155.155) into address bar, after a while, the system login interface is refreshed, then apply "admin" for username and password to login
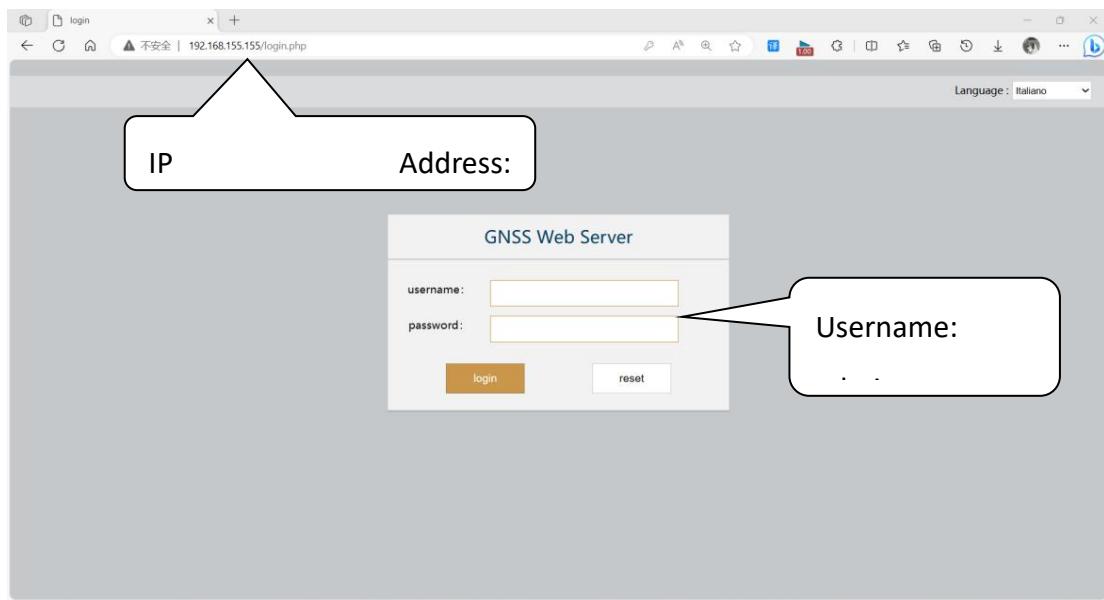
2.4.4 Web UI main interface

After login the Web UI management of ME by WIFI or USB connection, the main interface appears with displaying configuration items and positioning. As shown at following figures.

In the Web UI home page, the configuration items are listed at left side. And the positioning information including coordinates information and satellites are displayed at right side

Ref	Component	Description
🖥	**Status**	Positioning information, satellite tracking and the others will be displayed in this page
✖	**Configuration**	It contains registration for receiver, base configuration, antenna configuration, satellite configuration, receiver configuration and system configuration.
💥	**Satellite Information**	Display and control the satellites are used or not
📊	**Data Record**	Configure the parameters for static mode and raw data download
🖥	**Data Transfer**	Contains NTRIP configuration, TCP/IP configuration and data transferring with PC
🌐	**Network Config**	Contains network parameters configuration, WIFI configuration and the other functions
📡	**Radio Config**	Configure the parameters and frequency for radio modem

	Firmware Update	It is used to upgrade the firmware for receiver and each modem
	Track Manage	Record track file while doing measurement
	Coordinate System	Setup a local coordinate system for ME
	Online Service	Upload data onto a server in real-time
	User Management	Add and manage the Web UI users
	System Log	System and data log

2.4.4.1 Status

System Information, Work Status and Position Information are listed under Status menu.

System Information

In this page, all the information of ME receiver is displayed such as serial number, hardware ID, MAC address, firmware version and so on.

Work Status

The physical state of ME receiver such as working mode, datalink, host temperature, remaining power

and the free memory is obtained from this page
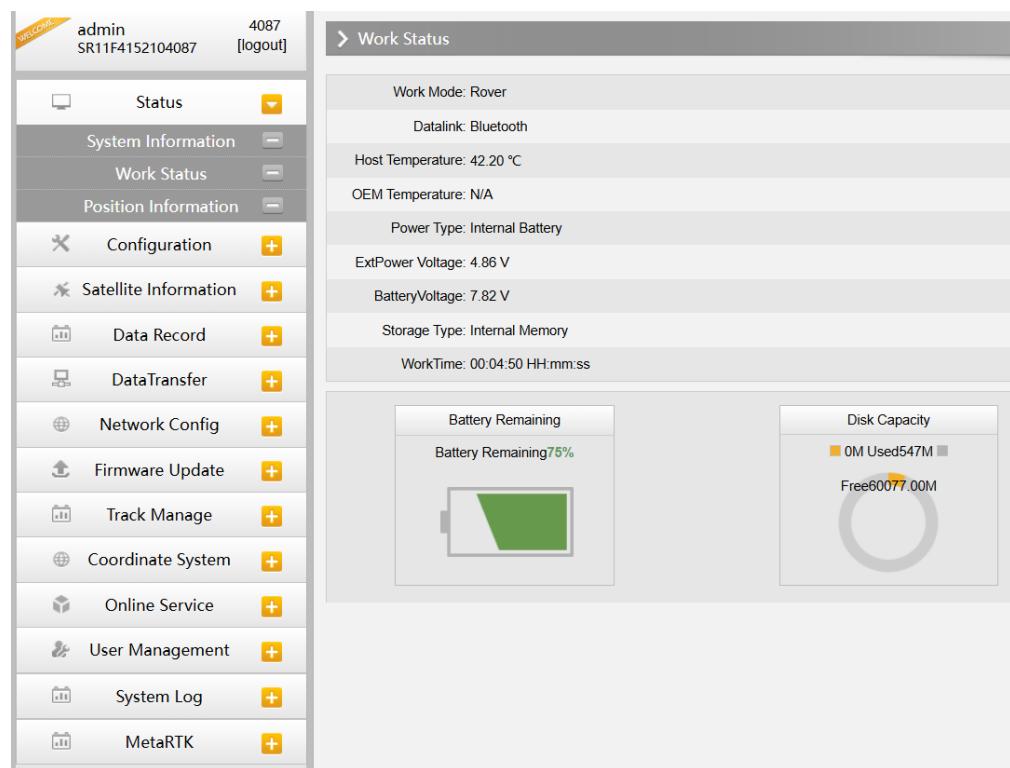
Position Information

In this page, users can be clear at a glance on current position information and satellite information

2.4.4.2 Configuration

General Config, Base Setup, Antenna Setup, Satellite Tracking, Receiver Operate and Default Language are contained under Configuration menu. Users are able to configure all kinds of parameters for ME receiver under Configuration menu, and all the settings are immediate effect after saving.

General Config

The registration for receiver working mode setting can be completed in this general configuration page.
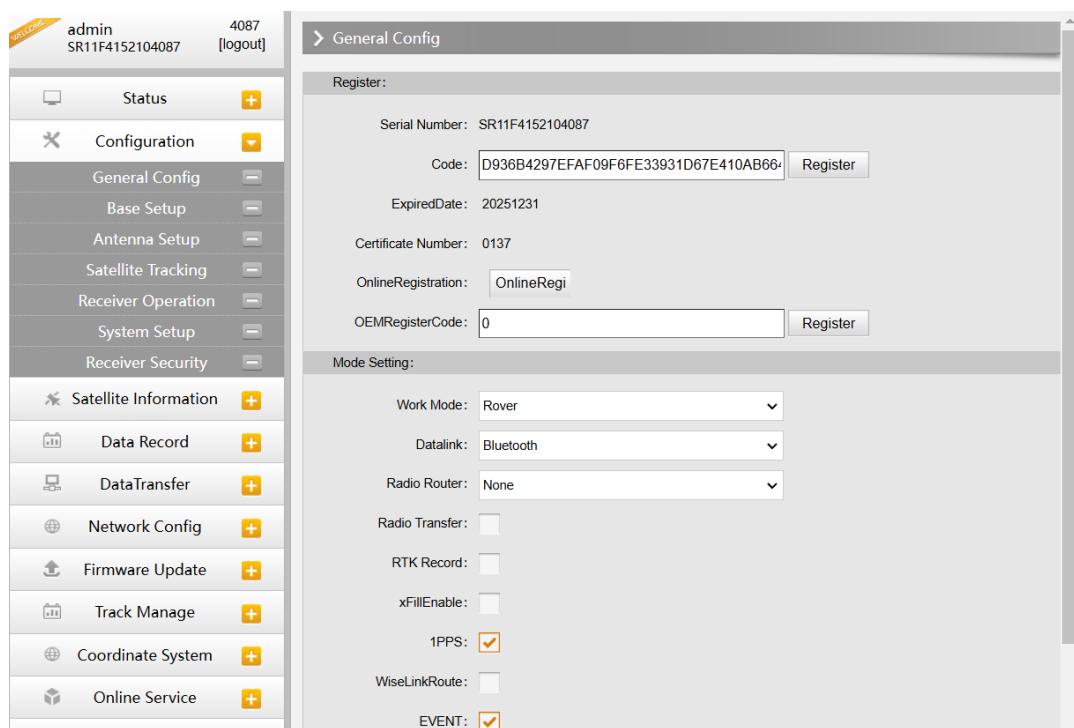
If the code of ME receiver has expired or is going to be run out, please provide the serial number of your ME receiver for us to apply for another available code, then input the code into the blank or register the receiver online.
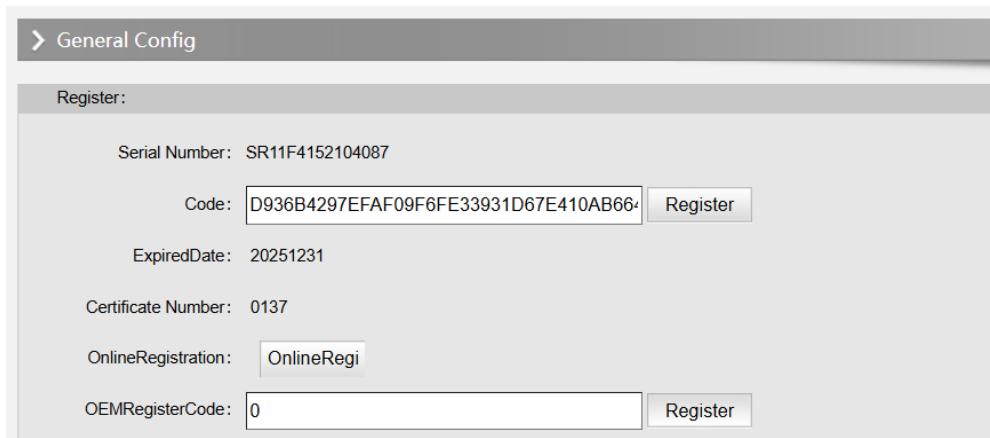
ME receiver allows users to setup the working mode and datalink from this Web UI that only need the mobile phone or tablet PC is able to connect the WiFi hot spot of ME receiver.
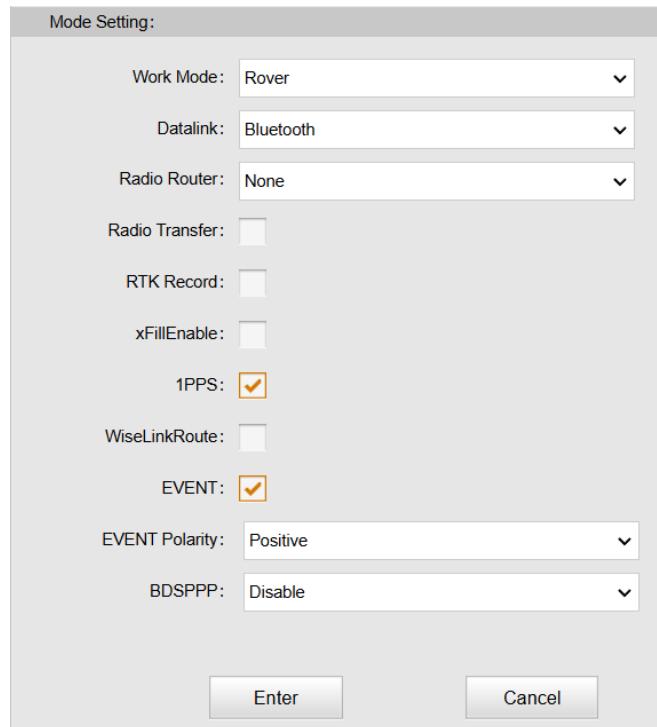
Work Mode: There are **Rover**, Base and Static contained in this dropdown list

(Note：Me receiver cannot be set Base work mode, it can work as static mode when using PPK work mode.)

Datalink: Pull down the list, there will be all kinds of options for datalink, such as radio, Network, External, Bluetooth, WIFI. Whether *(Note: Whether the current receiver comes with a built-in radio station, please check the specific model and configuration before deciding whether to use it*)
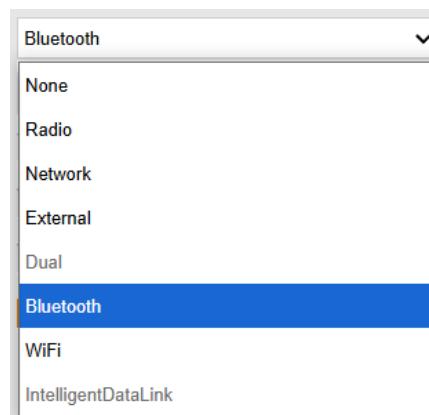
Radio Transfer: This is the function that ME receiver is able to transfer the correction from Base station to the other rovers with the internal UHF, definitely, ME receiver can work as a radio transfer (radio repeater).
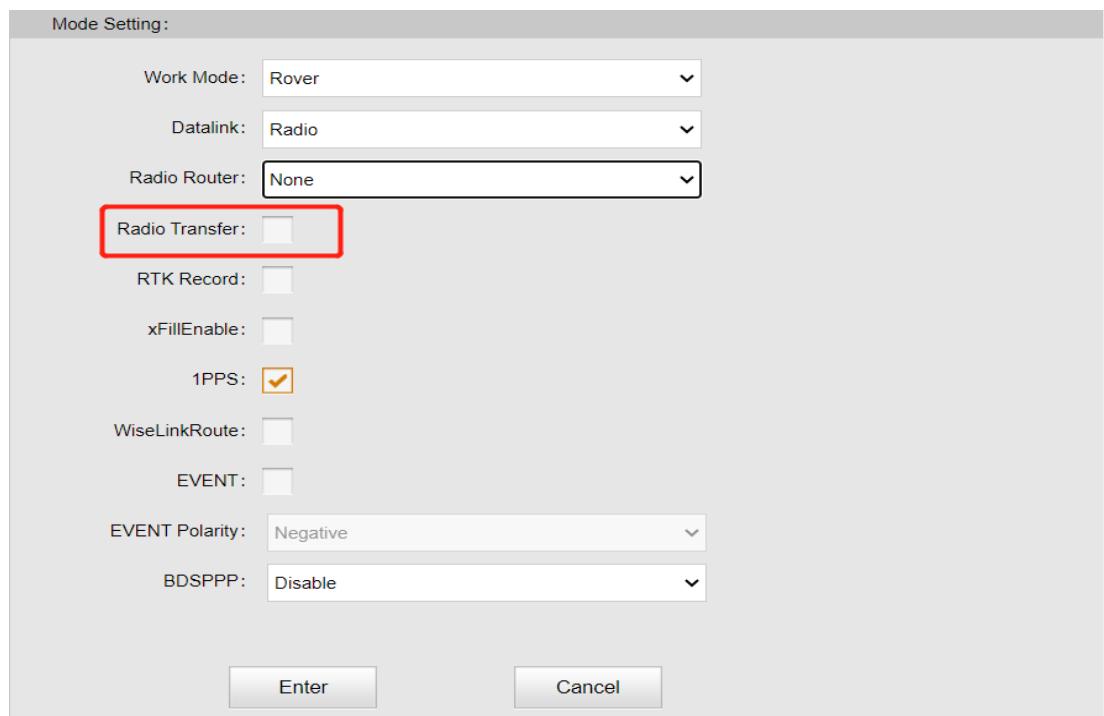
Operation:

1, check the box of "RadioTransfer" on "General Config" dialog for Base station.
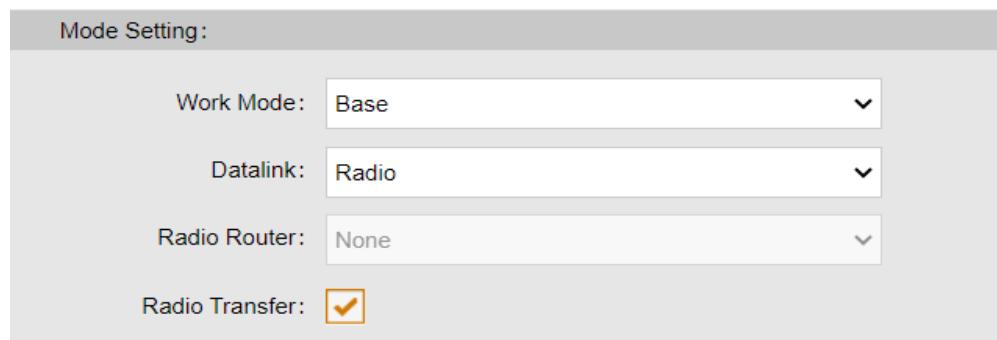
2, open the same function for Rover in critical status (when the Rover is close to working distance of Base internal UHF).
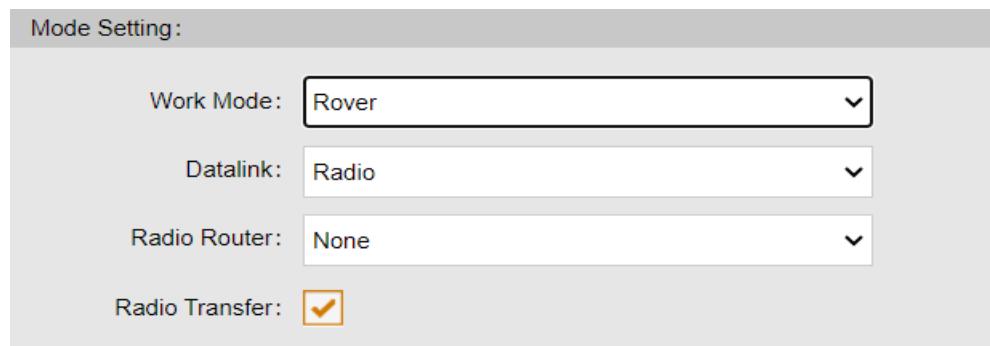
3, configure the datalink of the other rovers into internal UHF mode, then make sure the channel, protocol and frequency point are same as "Repeater" rover.

Note: please take in mind that the "Repeater" rover should keep away from Base station to avoid signal interference.

RTK Record: This is used to enable raw data recording in base mode or rover mode for post-processing

xFillEnable: the "Fixed-keep" function, to allow ME receiver keep the centimiter-level accuracy when the correction is missing

1 PPS: This option is for the 1 pulse per second output

WiseLinkRoute: receivers first priority to use internet transmit and receive corrections (a internet server is needed), if lost the internet signals, then receivers will use radio transmit and receive corrections

EVENT: This option is for the EVENT marker input

EVENT Polarity: EVENT input method.

BDSPPP: Disable BDSPPP function, Dynamic PPP(rover) and Static PPP(static).
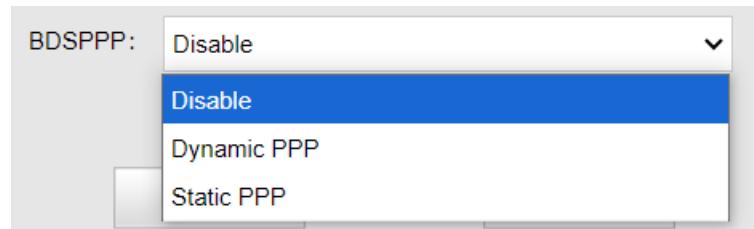
Base Setup *(Note：**Me receiver** can not be set Base)*

When ME receiver works as a base, the basic configuration for base can be setup in this page. Users can input the correct coordinates or capture a current position for the base. Also users can define what kind of correction format is transmitted.

CMR ID/RTCM2.X ID/RTCM3.X ID: Users can specify the ID for transmitting correction.

Position: Click this button to capture the coordinates for current position

Spare: This is used to the repeat station

Base Start Mode: Here contains 3 methods to start the Base, manually start base, automatically start base by fixed point, automatically start base by current point.

SLink Base Accuracy: Here contains 3 methods to make sure the Base accuracy, L, M, H. Choose different methods according to different needs.

Correction: Here contains the global general used correction formats including RTD,RTCM23, RTCM30, RTCM32, CMR and SCMRx

DifferInterval: Base differential transmit interval (seconds/once)

PDOP Value: This value is setup for the PDOP limitation.

**Status:** Here will display the status for base in real-time.

Antenna Setup

The antenna parameters are configured in this page including the antenna height, measuring method.

Antenna Height: This is the value for height of antenna while surveying.

Measuring Method: Here provides several methods for measuring the antenna height such as carrier phase center, slant height, antenna edge, height plate and to the bottom.


Satellite Tracking

In this page, users can define the mask angle for satellite tracking, and check on the box of corresponding band from the constellation that to use this band or not

Receiver Operation

The page provides all kinds of operations to control the receiver such as self-check operation, clean epochs, factory reset, reboot and power off.

Self-check: Users can also do the self-check from this configuration page, click on the Check all button

to check all the modems or click on the check button corresponding to the modem to check one by one.

Clean EPH: Click this button to clear the remaining epochs to let recever track the satellites better.

Factory Default: Click this button to bring the receiver back to factory default setting.

Reboot: Click this button to restart the receiver.

Power Off: Click this button to power off the receiver.

Reset OEM(cold): to reset OEM, and receiver will restart.

Reset OEM(hot): to reset OEM, receiver will not need to restart.

System Setup

This page is used to control Voice prompt, volume of voice, power saving, USB mode and the default

language for receiver.
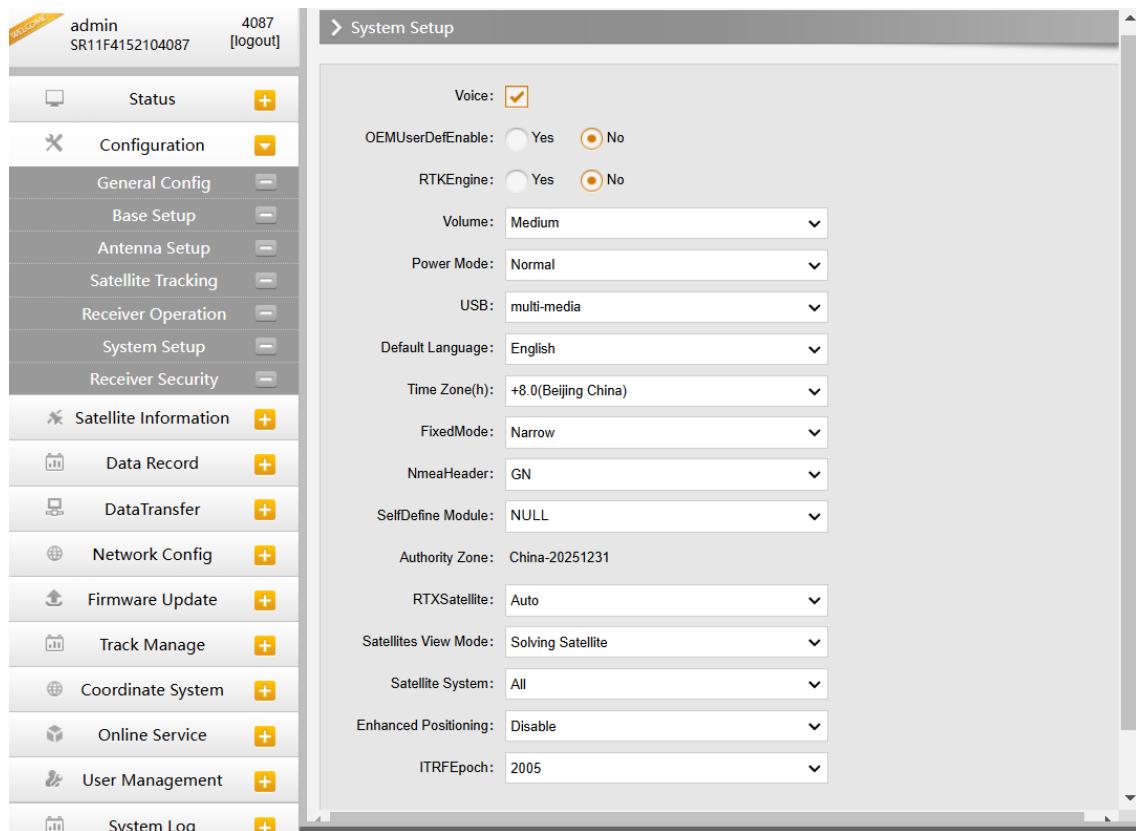
Voice: Check on this box to turn on the voice guide for ME receiver, uncheck it to turn off the voice guide.

OEMuserdefEnable: check "No" for ME receiver.

RTKEngine: check "No" for ME receiver.

Voice Volume: Define the voice volume for ME receiver's speaker.

Power Mode: Configure the receiver to use the power saving mode or not.

USB: Now ME receiver supports the USB mode and Network interface at the same time through the usb type-c cable.

Default Language: Configure the default language for ME receiver which associates with voice guide.

TimeZone(h): Use this to setup the corresponding time zone for your country or area.

FixedMode: Some receiver has the option for fixed mode narrow or wide, but this option is not working on ME receiver.

NMEAheader: Choose the output data header in GN, GP or HE format.

Self-defense module: To set a user-defined work mode and output mode for receiver. Usually please choose NULL.

Authority zone: Default means the default area. Global-20991215 means it can work in all around the world.


Satellites View Mode: There are two methods, Solving Satellite and Common Visible Satellite.

Satellites System: You can choose the different satellite systems in here.

Enhanced Positioning: It has a big influence for RTK when the ionosphere is active, so you can try turn on this feature.

ITRFEpoch: epoch selection, select an epoch at a different time based on the update time.

Receiver security: to backup the receiver system, so that we can use the backup system if the receiver has any problem.
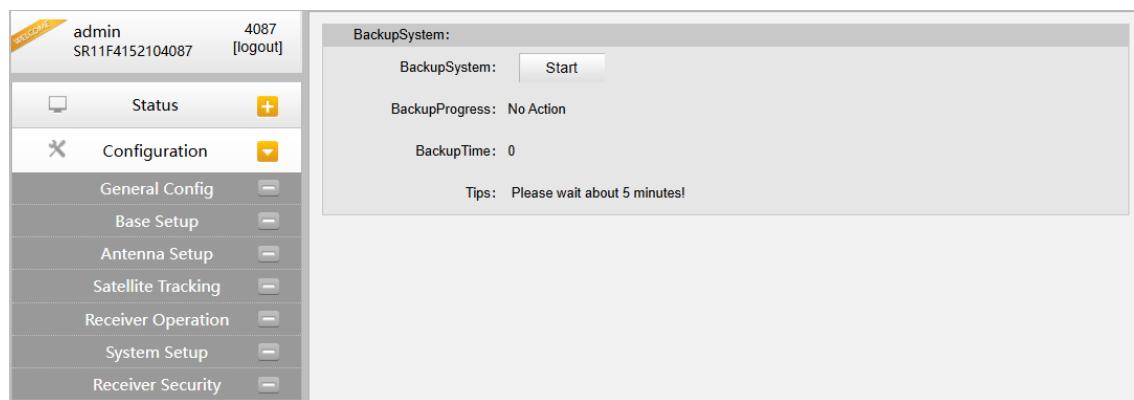
2.4.4.3 Satellite Information

The "Satellite Information" provides all kinds of tables, graph and the skyplot to view the information of tracking satellites. And it is allowed to configure to use which satellite in constellation on/off page by checking on the corresponding box.

Tacking Table

Here is the table to list all current used satellites and the other information for these satellites.

Skyplot

In this page, all the tracking satellires are shown on the skypolt, this let users intuitively view and know where the current position of satellite is.
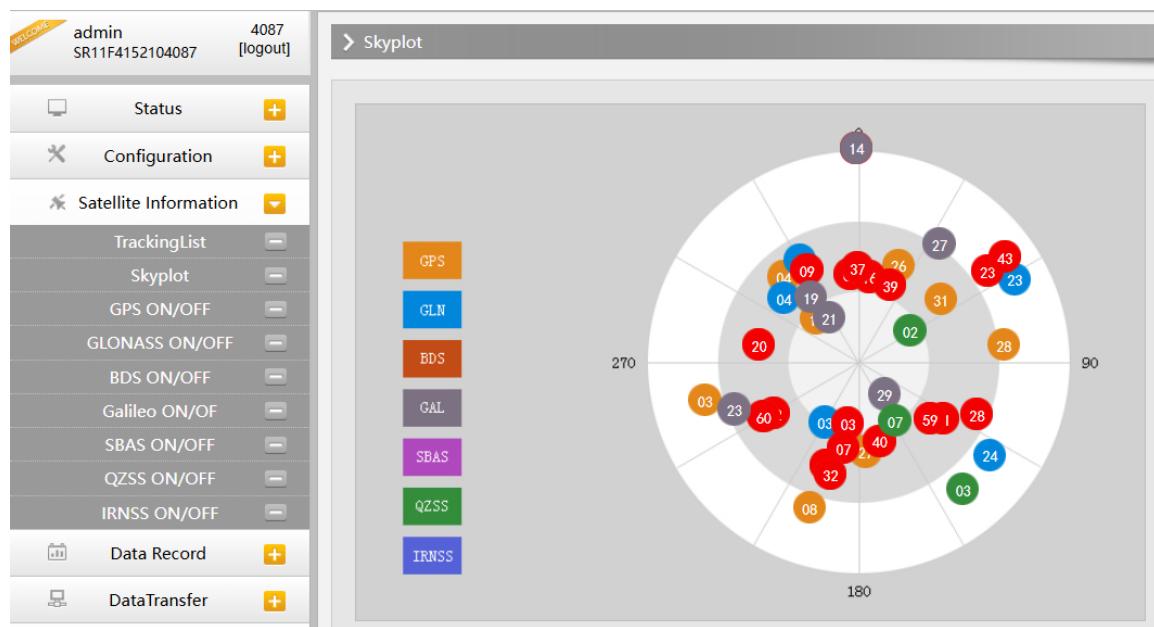
GPS on/off

For all the running GNSS constellations or the augmentation system,ME receiver allows to configure to use which satellite or not.

In gnss on/off page, all the running satellites are listed, and unselect the box corresponding to the satellite to not use it.
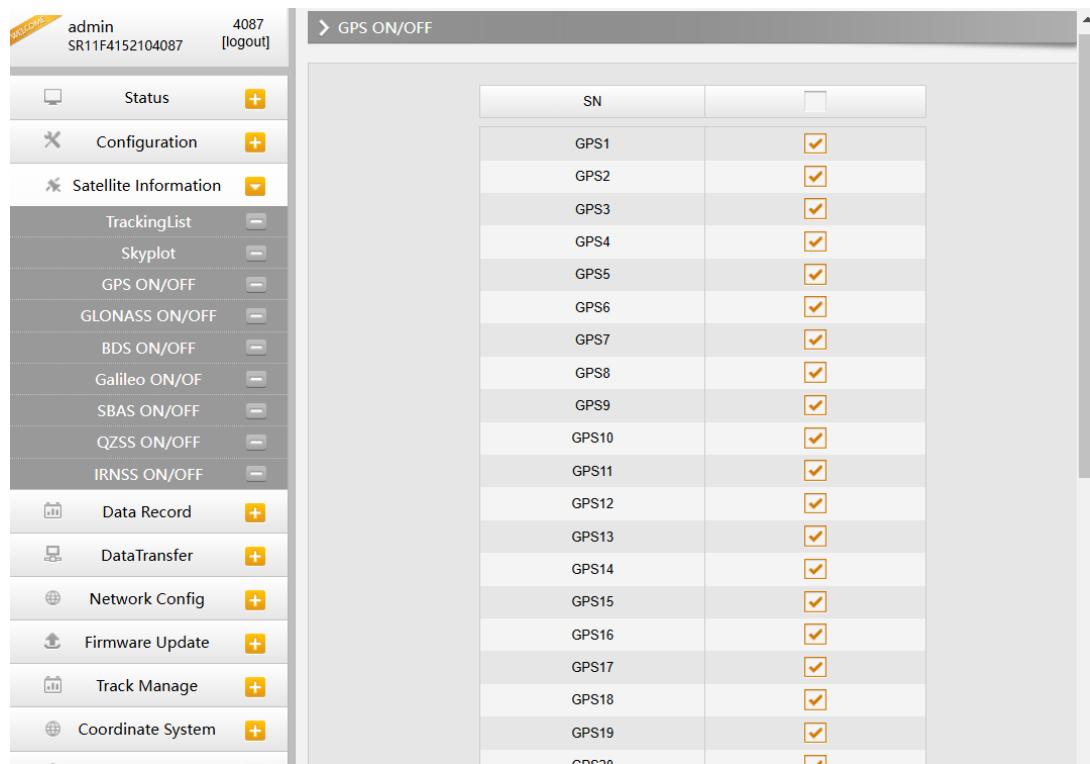
GLONASS on/off: to check and uncheck the satellites for tracking

BDS on/off: to check and uncheck the satellites for tracking

GALILEO on/off: to check and uncheck the satellites for tracking

SBAS on/off: to check and uncheck the satellites for tracking

QZSS on/off: to check and uncheck the satellites for tracking

IRNSS on/off: to check and uncheck the satellites for tracking

2.4.4.4 Data Record (*Note**：Me receiver **cannot** be set **Base transmitting mode**, it can work as static mode)*

The "Data Record" performance is mainly used to configure all the parameters for receiver in static mode. Much more operations can be done on ME receiver such as storage path, interval, data format and data files download.

For ME static mode setting, the user can set it in WebUI as follows, or in Survstar(refer to PPK work mode setting in **Chapter3.3.5** ME surveying system - PPK fieldwork flow).

Recording Config

The page provides more practical operations for raw data storage.

Storage Option: Here are the options to be selected for where the raw data will be stored, internal memory or external memory.

Interval: This is the sampling interval for data storage, 50Hz (0.02s) sampling interval now is available for ME receiver.

File Interval: This is used to defined the data storage time for the static file.

Data Format: Here are 3 options to selected for ME receiver to store what kind of format data, STH, Rinex2.0 and Rinex3.0.

Point Name: A point name is required, the last 4 digits of SN is default setting for the point name.

Auto Delete: This is used to configured ME receiver to delete the previous data files automatically if the memory is full.

Format: Click this button to format the internal memory for ME receiver.

Recording Mode: Here are 2 options to configure ME receiver to record raw data automatically or not if it achieves the sampling conditions.

Once Record Enable: to set a Timer for static recording, for example if set 5 minutes, then the receiver will only record 5 minutes, after that receiver will stop record static data.

Recording Status: Here shows the status(time) of static data storage.

Data Download

This page provides the data files to download.

Choose the storage where the static data recorded, and file type, then click on the blank of "Select Date" to choose what date the data was recorded and click "Get Data" button, all the files recorded in the date you choose will show in the table, tap download button to download the data files.

FTP Transmission

FTP is a file transfer protocol.

ME receiver via FTP protocol, as ftp client mode to automatically send static and dynamic files on receiver disks to the ftp server.

Multi Record

It can record the static data on different channels in the same period

2.4.4.5 Data Transfer

This performance contains General, Serial Port Config, TCP/IP Config, NTRIP Config and Data Flow Config. The "Data Transfer" allows to configure the output mode for raw observation data and differential data, as well as to the NTRIP performance configuration.

General

This page shows the service condition and the output contents of the ports, if the port item display in green, that means the port is being used, and the port is not used while the item display in red.
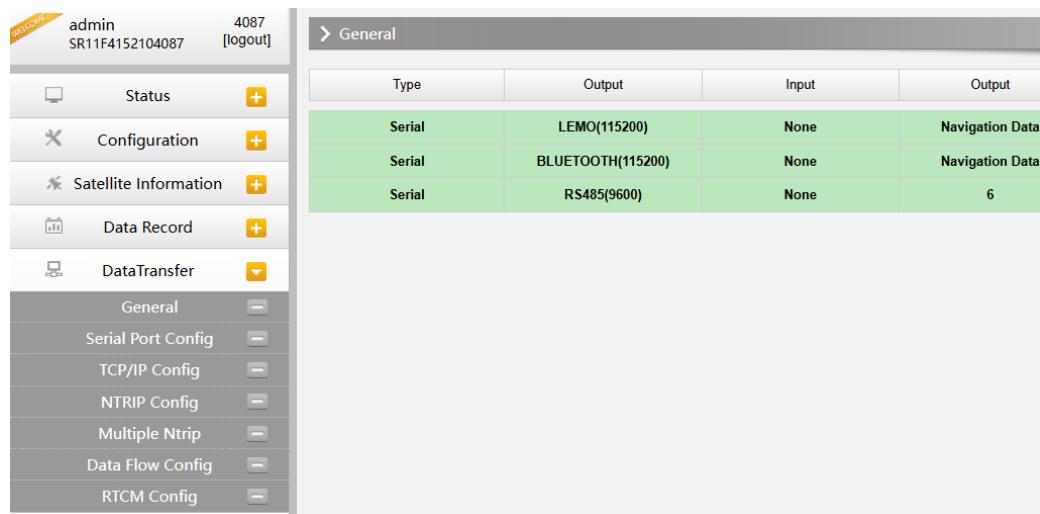
Serial port Config

This page is allowed to configure the baud rate, odd-even check and the data flow for serial port (5-pin port) and Bluetooth.
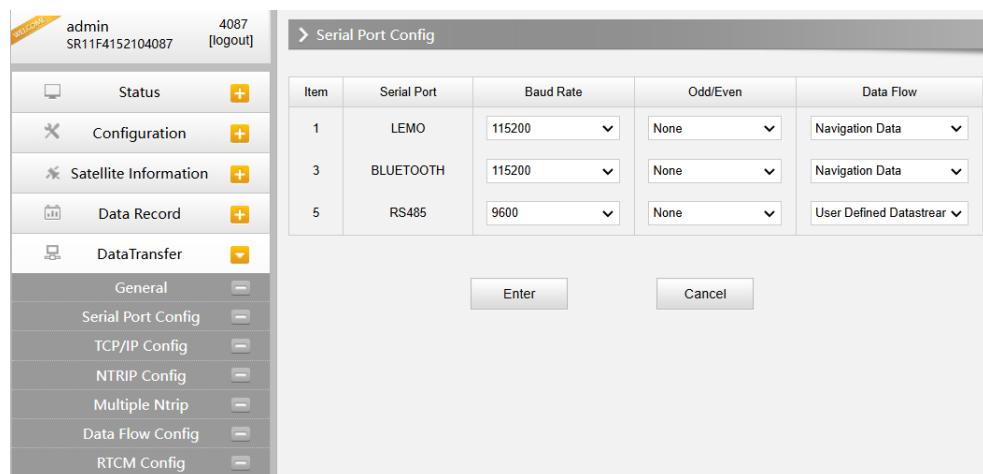
⚠️ *CAUTION: do not change the default value in this page for each item, if you want to change the settings, please contact with SOUTH technician for further support.*

In the dropdown list of data flow, there shows 4 items for selection.

Raw observation data: This is the raw observation data straight from OEM board.

Correction Data: This is the correction data straight from OEM board.

Navigation Data: This is the navigation data output from receiver such as NMEA-0183, GSV, AVR, RMC and so on. It is configured in Data Flow Config page.

SIC Observation Data: This is the user-defined format observation data from SOUTH.

OpenSIC Observation Data: This is the open version of SOUTH user-defined format observation data for secondary development.

External Sensor Input: The Data that input via an external sensor.

User Defined Datastream: You can choose this option when you want to defined datastream.

UAVGCS: UAV data format.
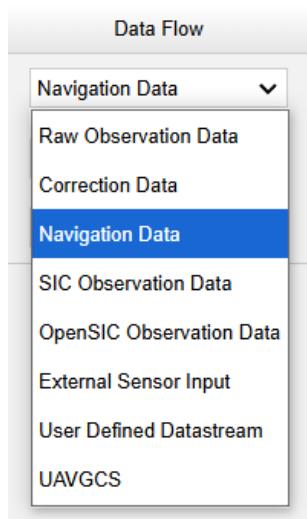
TCP/IP Config

This is used to configured the raw data or navigation data to be uploaded or transferred to a server. And there are Caster and Server working mode for this performance.

Caster: If this working mode is selected, ME receiver will be a client to upload the data to a specify server if it connects to the internet by WIFI. Input the specified IP and port for server, and the data format what is uploaded. Then users are able to see the uploaded data on server.

Server: ME receiver will upload the data onto internet by the static WIFI if server is selected, then users are able to obtain its dynamic data by accessing to ME receiver through the IP from receiver.

NTRIP Config

This is used to configure the NTRIP performance while receiver is going to connect to internet. ME receiver supports complete NTRIP performance including NTRIP Client, NTRIP Server and NTRIP Caster.

Multiple Ntrip

To transmit corrections to different server at the same time through Ntrip protocol

Data Flow Config

In this page, users can optionally to configure the content and the update rate of data flow that to output

or not to output what kind of data format.

Click on the dropdown list for each data format to define the update rate
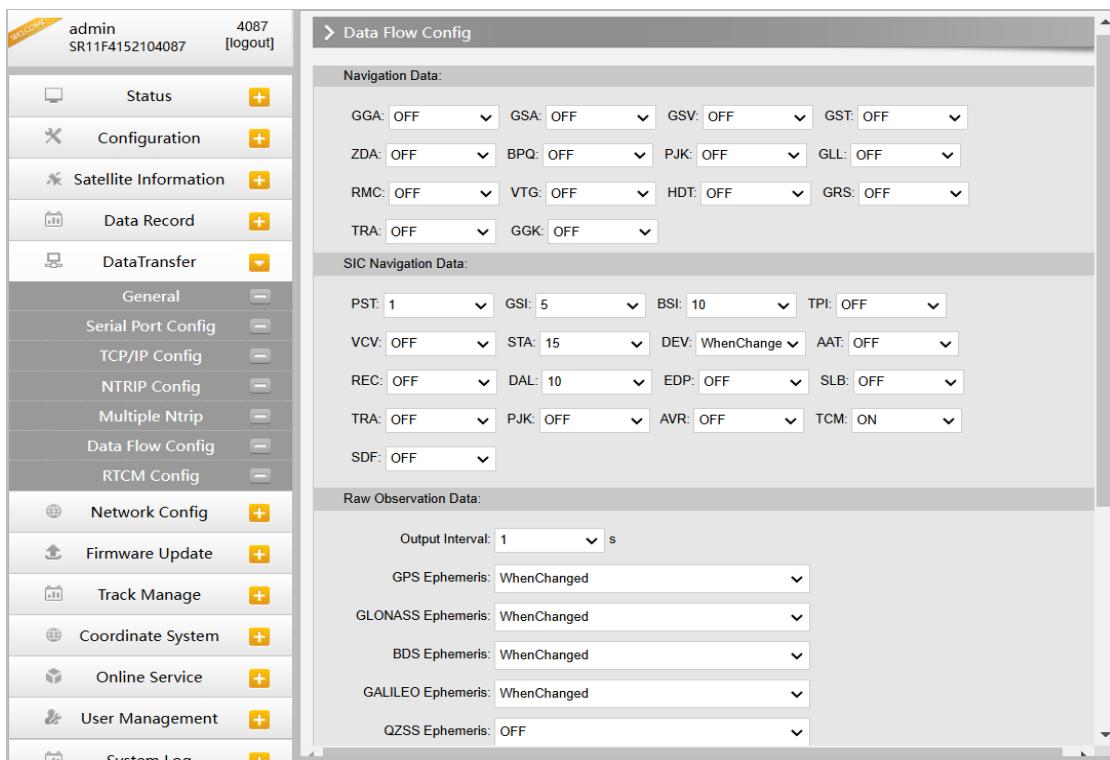
RTCM Config

In this page, users can set different differential signal formats.
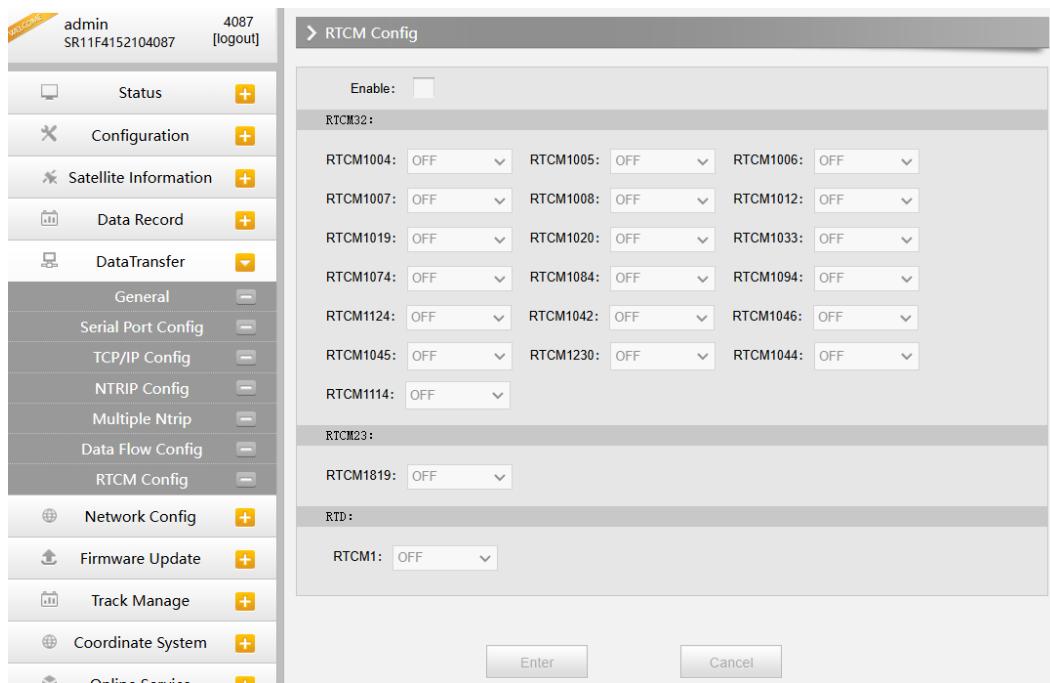
2.4.4.5 Network Config

The "Network Config" is able to configure the ways and the contents for internet access of New

ME plus. GSM/GPRS Config, CSD Config, WIFI Config, Bluetooth Config, Port Forwarding,

Router and Network Testing are under the list of Network Config

GSM/GPRS Config

In this page, all the information of receiver under GPRS mode will be displayed including the

hardware information and dialing status.

Status: The dialing status and hardware information are displayed in this field that users can

intuitively to view the signal of network, module model and the IMEI number of the module.

Parameter Config: The parameters of SIM card are input in this field including APN, assigned

username and password, dial mode.

WIFI Config

This is mainly used on the WIFI configuration for ME, there are AP mode and Client mode for optional.

AP: This is used to enable the WIFI hotspot for ME to broadcast for mobile terminals such as

smartphone or tablet to connect and access the Web UI.

Check the box of AP in Work Mode to enable the WIFI hotspot for ME, and define the SSID,   password,

encryption method and broadcasting channel for WIFI connection.

DHCP IP Range: This is allowed to user-defined the IP for Web UI login.
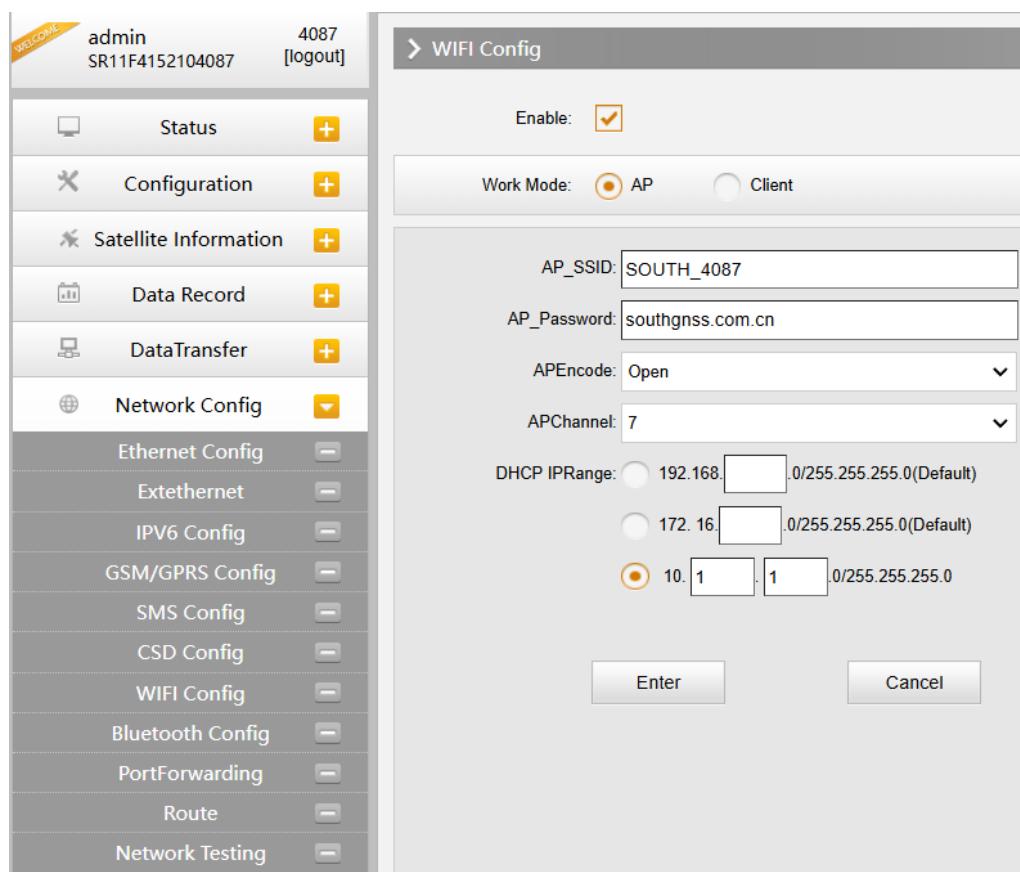
Client: This option enables ME to search and connect the other WIFI hotspot which connects to the internet, the receiver is able to download and use the mountpoint from reference station.

Client_SSID: This is the WIFI hotspot which ME is going to connect

Scan: Click this button to search the surrounding available WIFI hotspot.

Password: This is the password which the WIFI hotspot requires.

IP fields: If ME successfully connects to the WIFI, there will be an LAN IP address generated by ME.

ClearSSID: Click this button to clear the SSID list.

Bluetooth Config

In this page, users can view the information and connection status of Bluetooth, such the MAC of Bluetooth, discoverable or not, the PIN code, and the connection devices in following table.

The advanced Settings module enables Bluetooth search.

Port Forwarding

This page is mainly used to view and configure the internet transmission port for ME, customize and debug receiver.
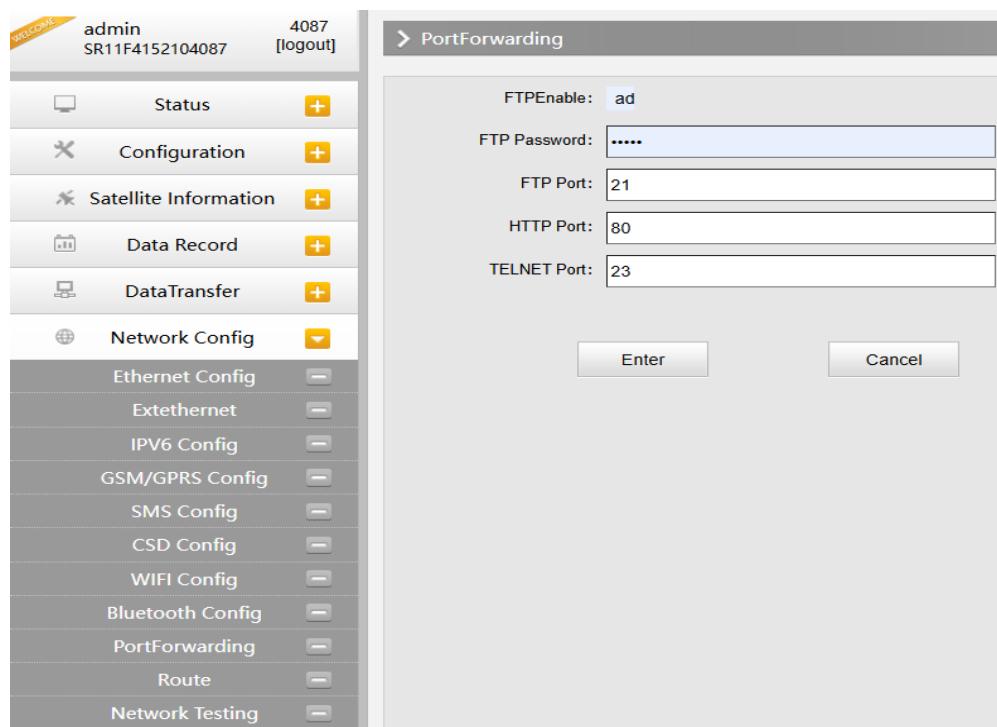
NOTE: *Usually, we will keep the default setting in this page, if you would like to modify it, please contact with SOUTH technician for more supports.*

Route

This is mainly used to view and configure the parameters for router, only under the condition of customize and debug receiver.
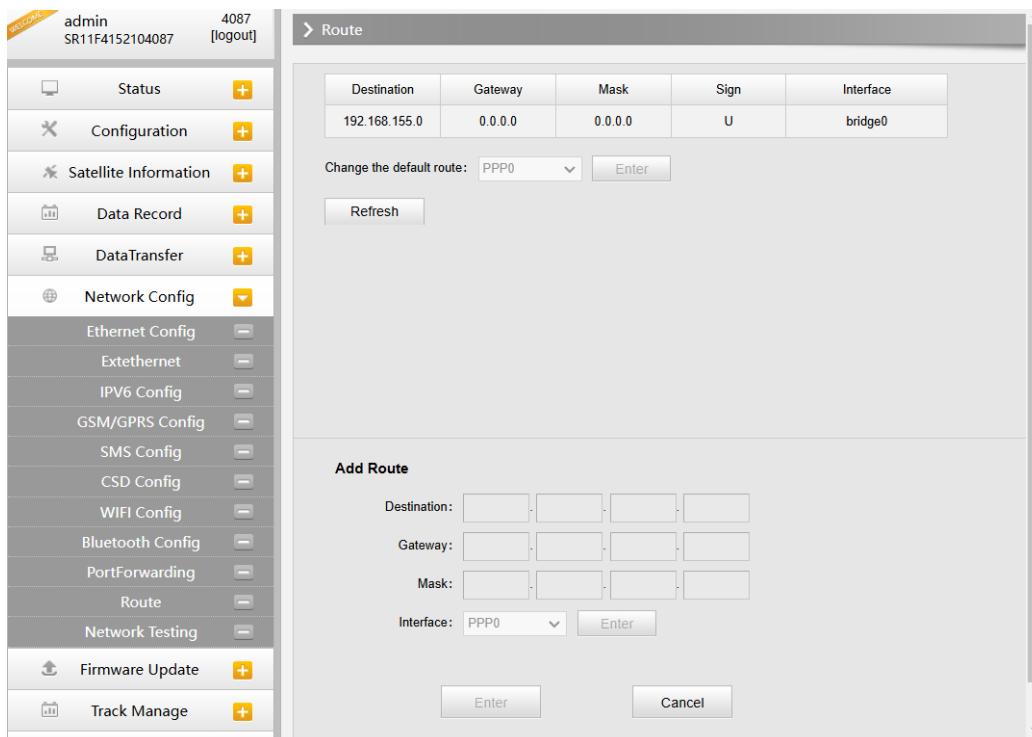
NOTE: Usually, we will keep the default setting in this page, if you would like to modify it, please contact with SOUTH technician for more supports.

Network testing

In this page , after entering the IP address, the user can query the network status.

2.4.4.6 Radio Config

As the name implies, the parameters of radio can be done in "Radio Config", it is divided into Radio

Parameter and Radio Frequency.

Radio Parameter

This page is mainly used to configure the parameters for internal radio module of ME receiver.

High performance mode: To increase the radio performance in the forest and harsh environment, both Base and Rover should be enable this function at the same time, and the protocol should be Farlink. If Rover doesn't support Farlink protocol, then the Base should disable this function, otherwise Rover cannot get fixed solution. Usually we suggest clients disable this function.

Air Baud Rate: This represents the data transmission rate in the air of internal radio, the higher value, the bigger of data size transmitted per second, usually keep the default setting with 9600.

Data Baud Rate: This represents the rate of data transmission port of internal radio. The rate should be the same in both Base and Rover. In general, the data baud rate of SOUTH radio module has been unified to be 19200, keep it as default.

Channel: This is the communication channels for internal UHF, the value of the channel must be the same both in Base and Rover.

Power: This appears only in Base mode, the radio transmitting power is allowed to define in High, Middle or Low power.

Protocol: This is radio communication protocol for data transmission, SOUTH (SOUTH) ，Farlink and TRIMTALK are optional in this page and SOUTH is the default setting, if it is changed, Base and Rover must use the same protocol for communication.

LockBase: If users choose FarLink protocol, the signal sent when the base station connects to the mobile station will be locked and will not be interfered by other base stations.

BaseNetID: If enable the LockBase, then you can input the ID of the Base you will receive.

BaseAlarm: If Base receiver moves(by some unexpected reasons), rover will receive a notification about the base movement.

Factory Default: Click this button to restore the factory default for internal UHF module.

Radio Frequency

For ME receiver, the powerful internal radio module supports much more radio channels apply to the legal frequency in different countries or areas.

There are 16 radio channels listed in this page after clicking on radio frequency. Users are able to change the frequency freely in the channel spacing, click Restore button to bring the frequency of each channel back to default setting.

2.4.4.7 RTK Firmware Update and SLAM firmware Update

To Update ME's firmware, we need to update both RTK and SLAM firmware.

Update the latest firmware for receiver or for corresponding modems can be done in "Firmware Update".

RTK Firmware Update

This page displays all the information of the firmware which current installed on ME receiver, and allows to update the latest version firmware for receiver. To get latest version firmware please contact with SOUTH technician.
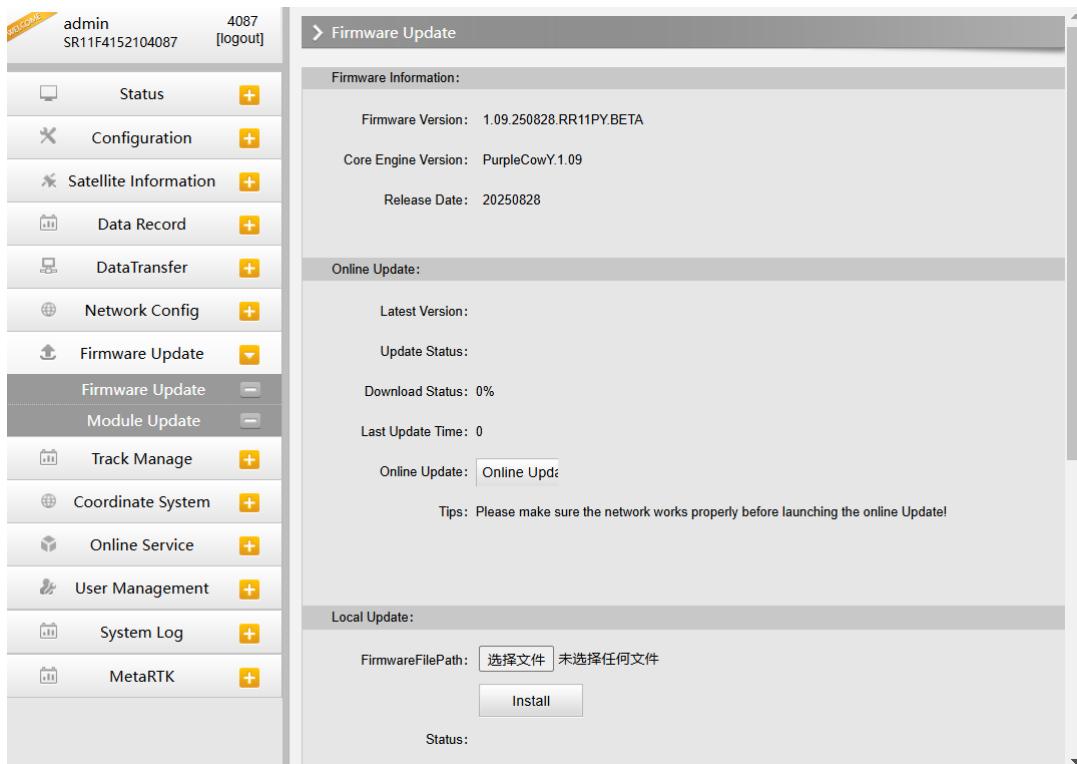
Local Update: Update the latest firmware by using a firmware file.

How to upgrade the firmware with Local Update

a) Click on "Browse" button to load firmware file (Please take in mind that the firmware is ended with .img as the extension name).
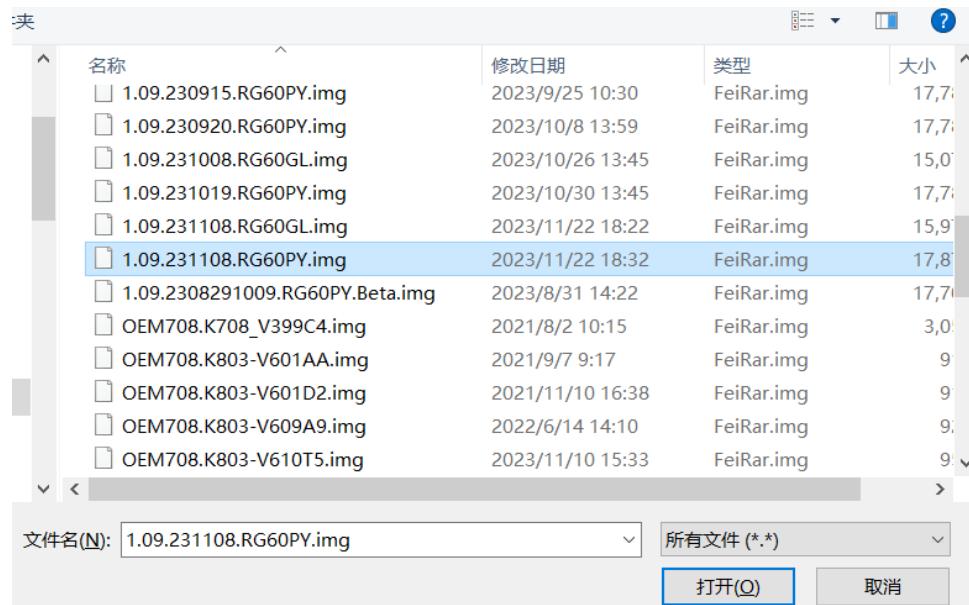
b) And then click "Installation" button to start upgrading.
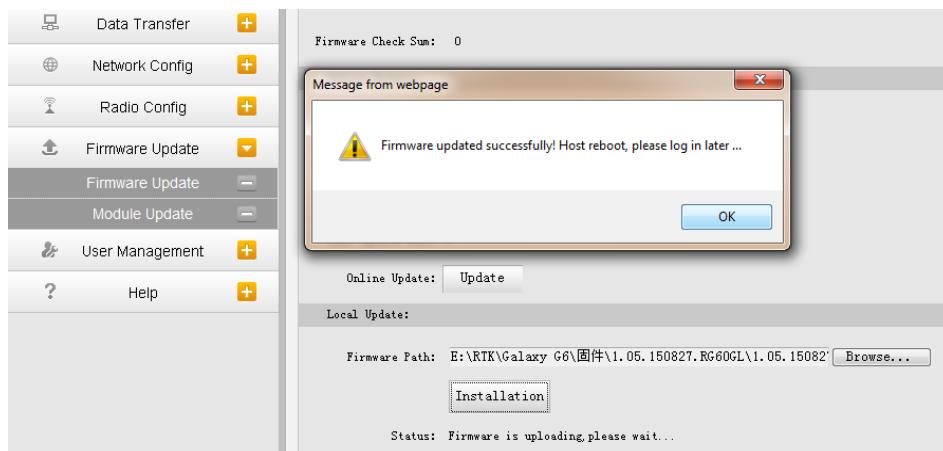
c) After the firmware is completed upgrading, a dialog will appear saying "Firmware updated successfully! Host reboot, please log in later…", then the receiver will restart automatically.
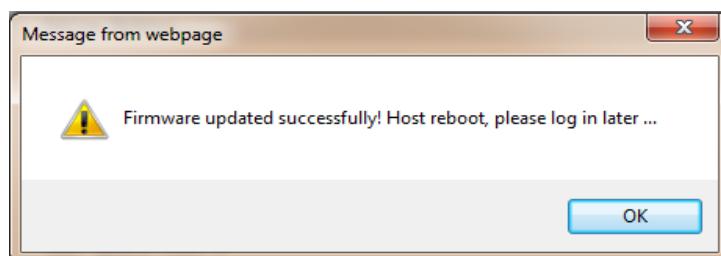
SPECIAL REMIND:ME receiver doesn't support to update the firmware with the help of INstar program any more, in the future, update the firmware for ME receiver shall be done through the Web UI.

SLAM Module Update

1- Go to ME's WEB UI-MetaRTK-LidarME-Enable work status into startup to start the
    SLAM Sensor;

2-Go to ME's WEB UI-Firmware Update-Module Update-MetaRTK Update, select the
right update files and click Install to update SLAM Module
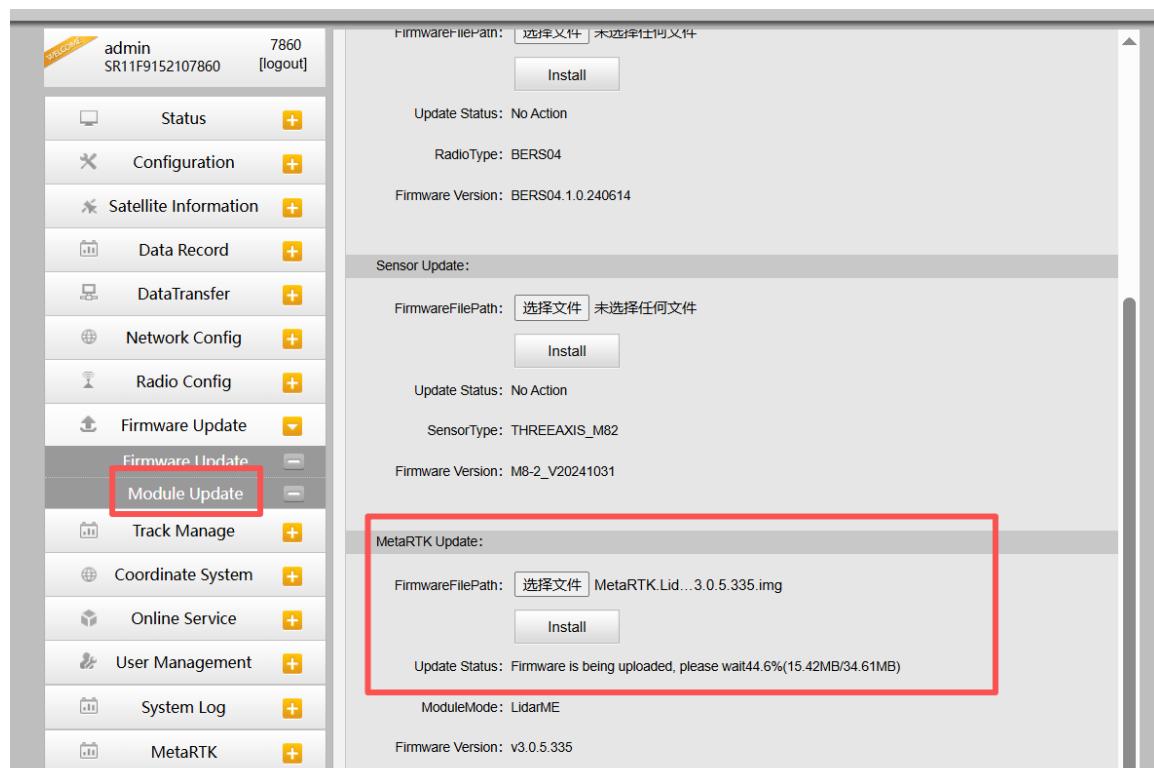
After updating, click Close to disable the SLAM module
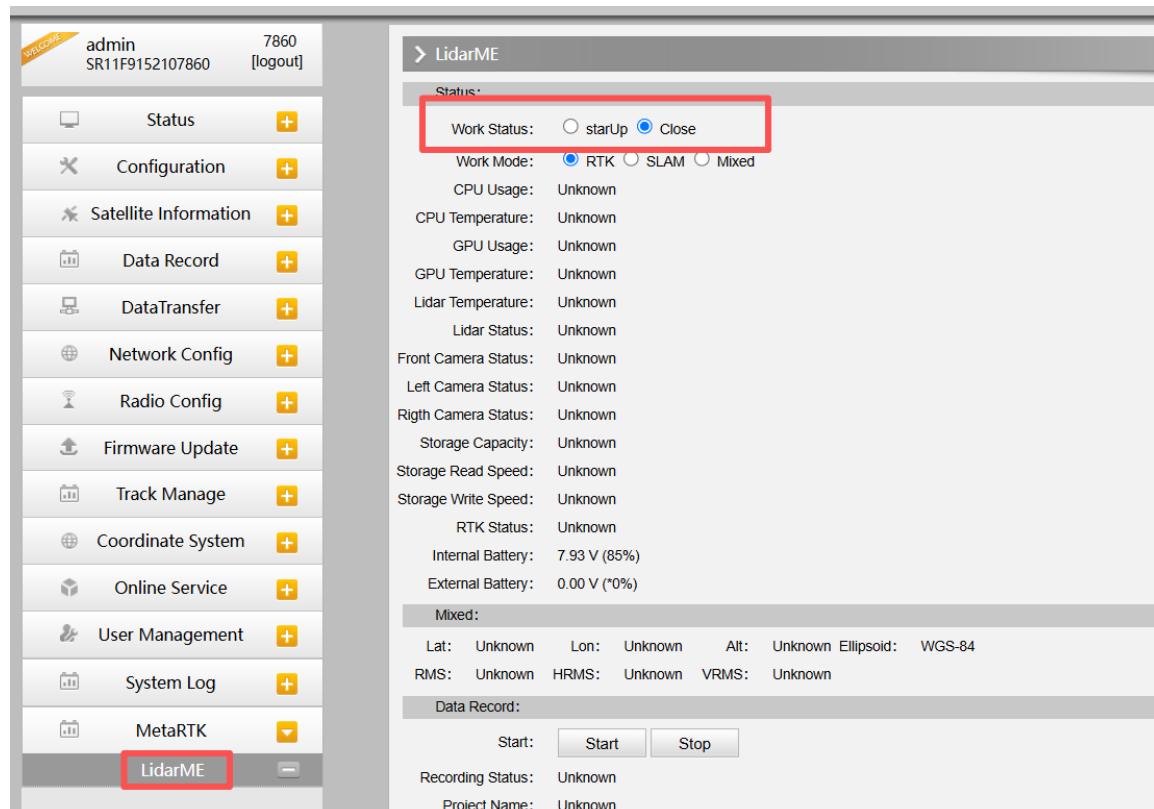
Module Update

This page is used to update the firmware for corresponding modem such as OEM board, radio module

and sensor.
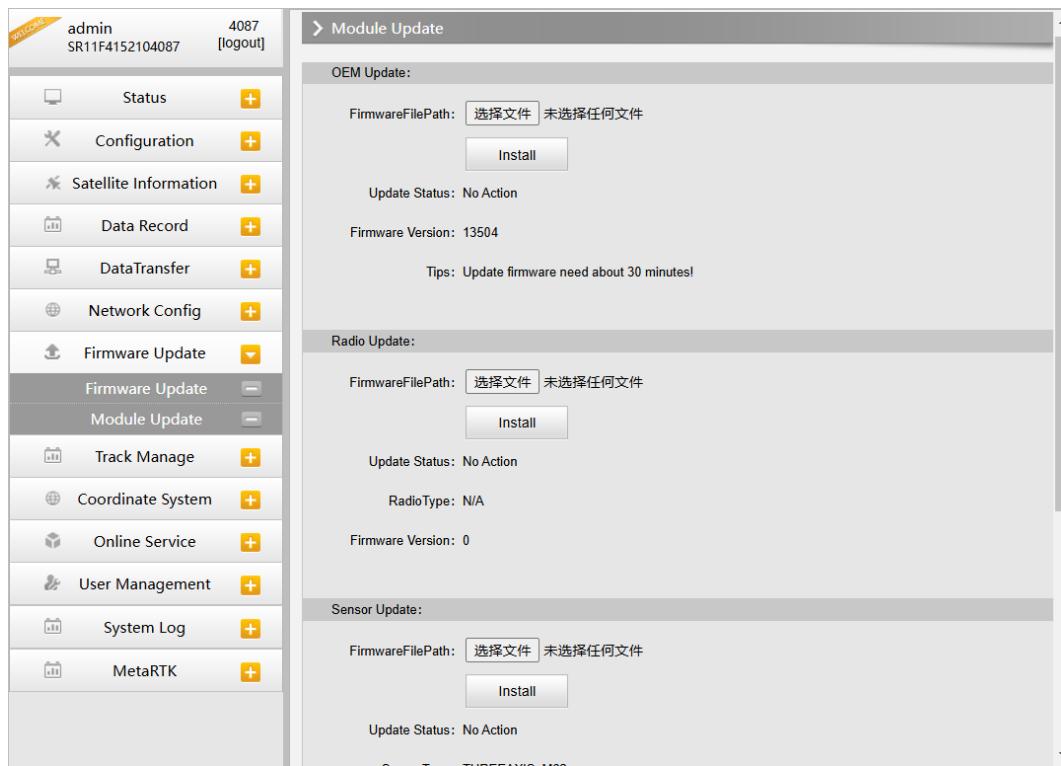
2.4.4.8 Track Manage

ME receiver now supports to record the track while doing measurement, and upload the data onto the server.

Parameter Setting
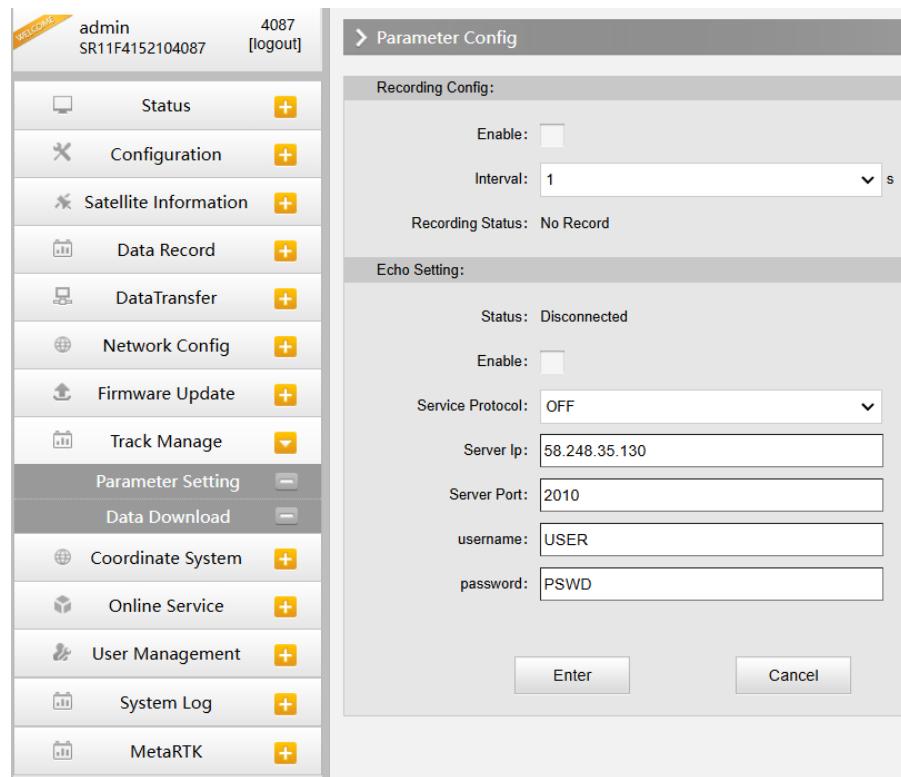
Record Setting

Check on the box of "Record Enable" to activate track recording function, and choose a proper recording interval in dropdown list of "Record Interval".

EchoEnable Setting

This configuration dialog is used to upload the recording data to a server in real-time.

Data Download

On this page, users can download the track data file from receiver. Choose the recording date and click "Get Data" to load all the data files recorded at that day, then choose the files and click download button.

2.4.4.9 Coordinate System(reserve)

ME receiver allows users to setup the local coordinate system on internal web UI management. The instrument would output the local coordinates according to this coordinate system.

2.4.4.10 Online Service(reserve)

This function is to upload the data onto a server real-time, including Navigation data, raw observation data, correction data, SIC observation data and open SIC observation data, basic information data.
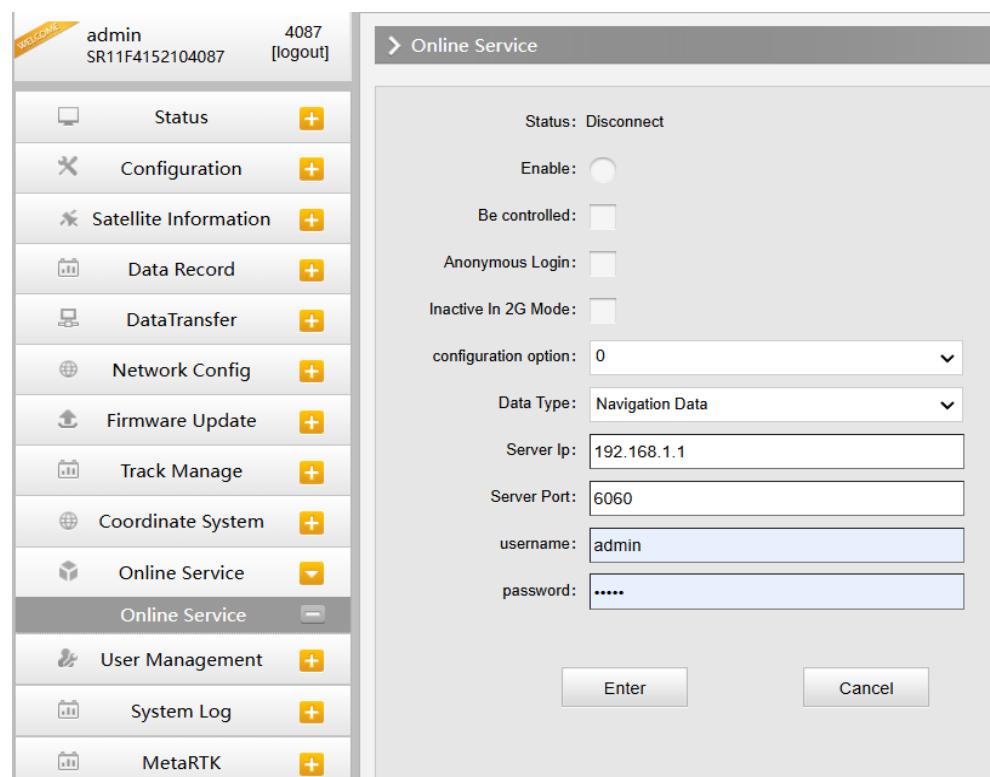
2.4.4.11 User Management

This page is used to manage the authority of login Web UI for users, including the username, password and add users.
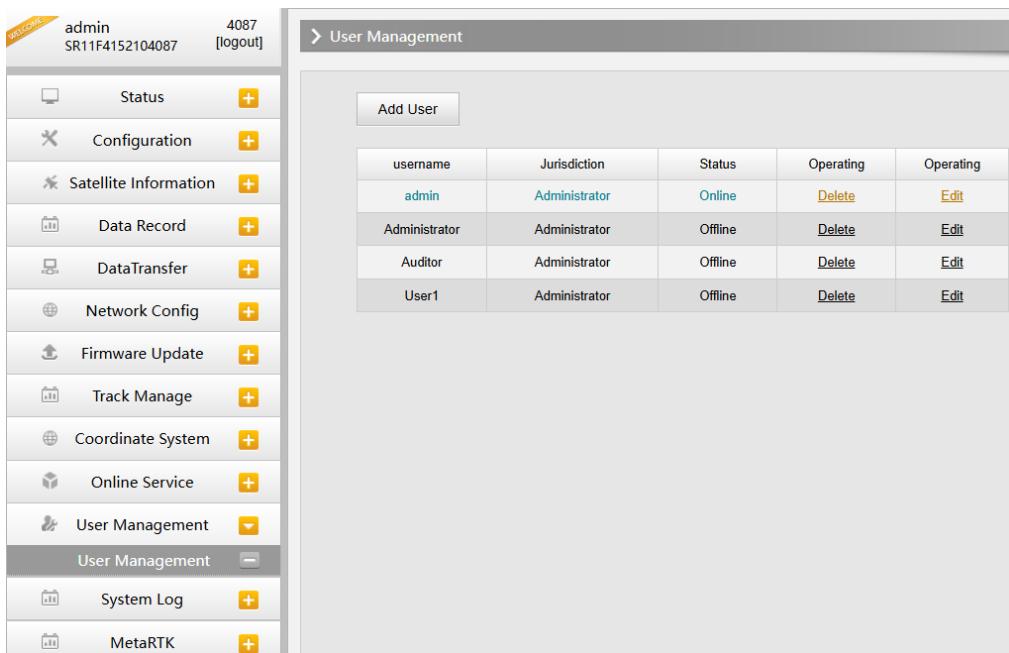
2.4.4.12 System log

System log

In this page, users can download the system log book of receiver (the log book can help to backtrack the working status of receiver).

NOTE: Only the administrator can modify any parameters for receiver and manage users, and the ordinary users only have the right to view the relative parameters.
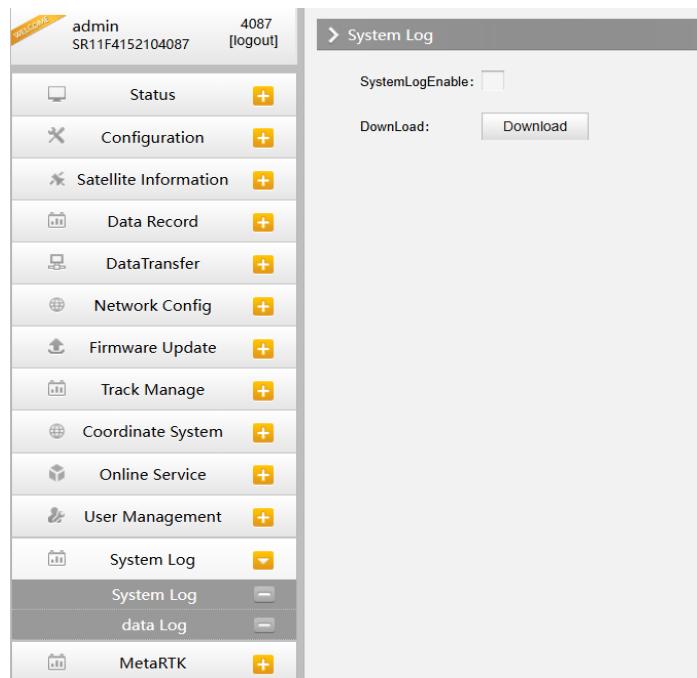
Data log

In this page, users can record data and choose duration.
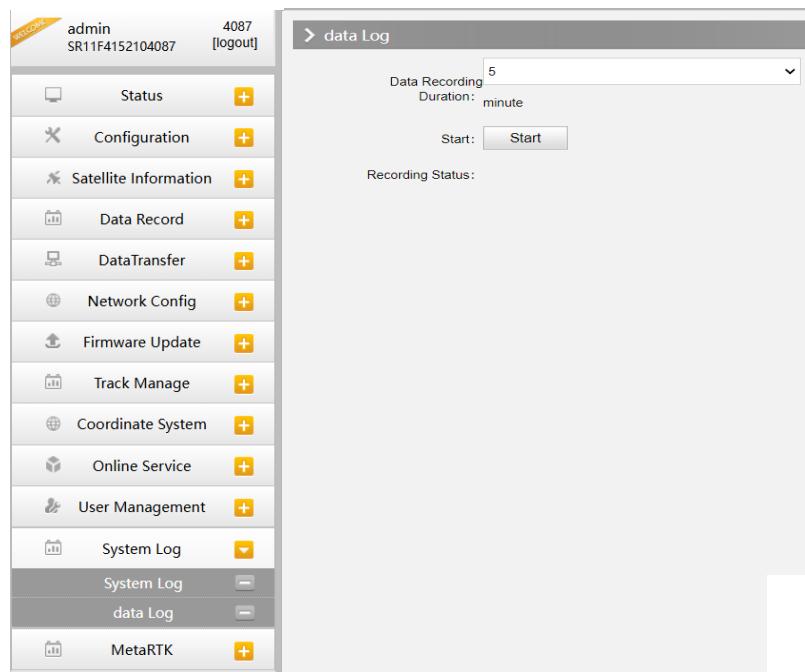
2.5 Operations in SurvStar

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.

2.5.1 RTK function of ME receiver

2.5.1.1 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.
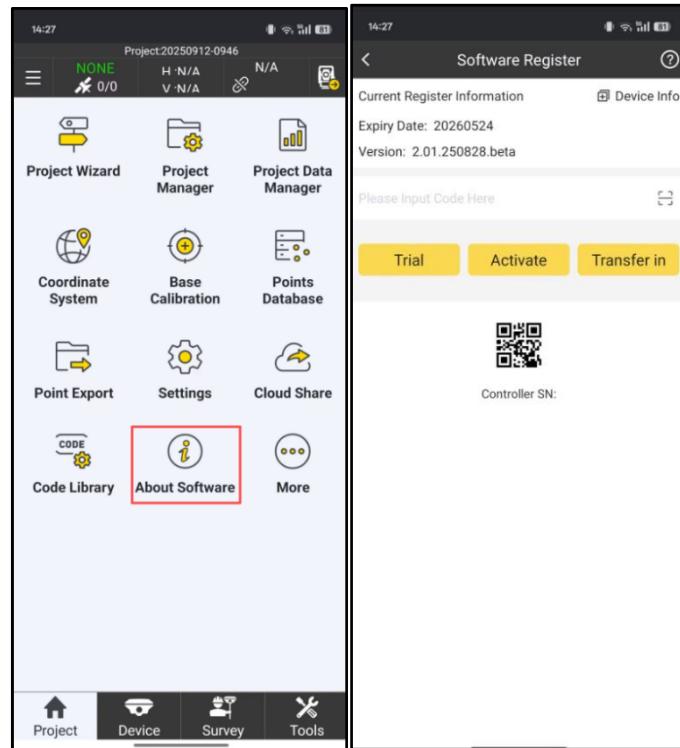
2.5.1.2 Device connection

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.
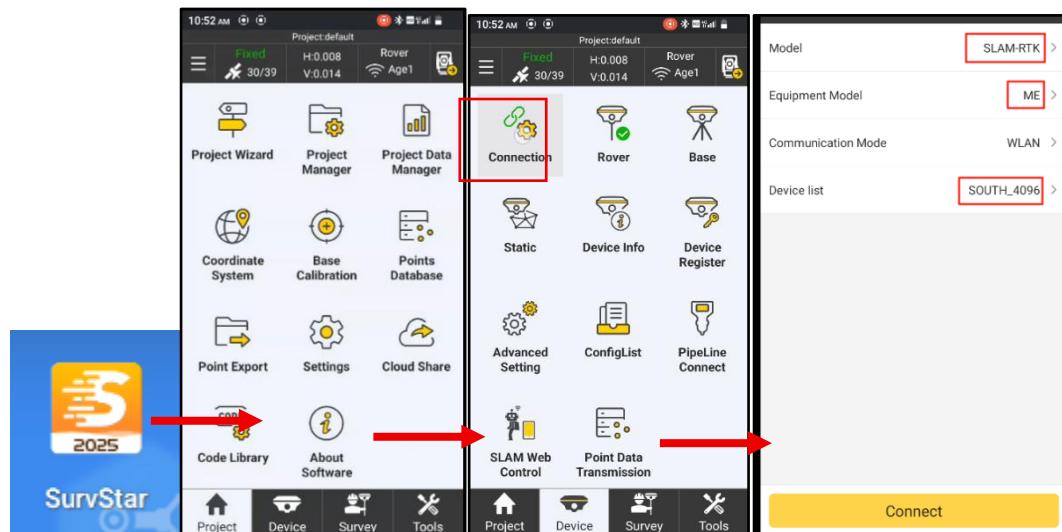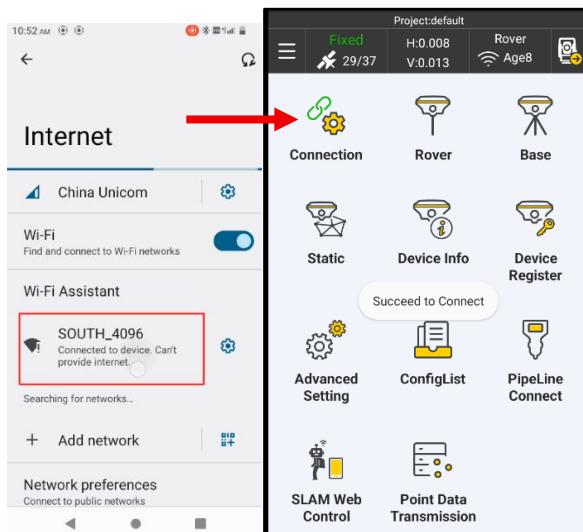
2.5.1.3 Device registration

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.
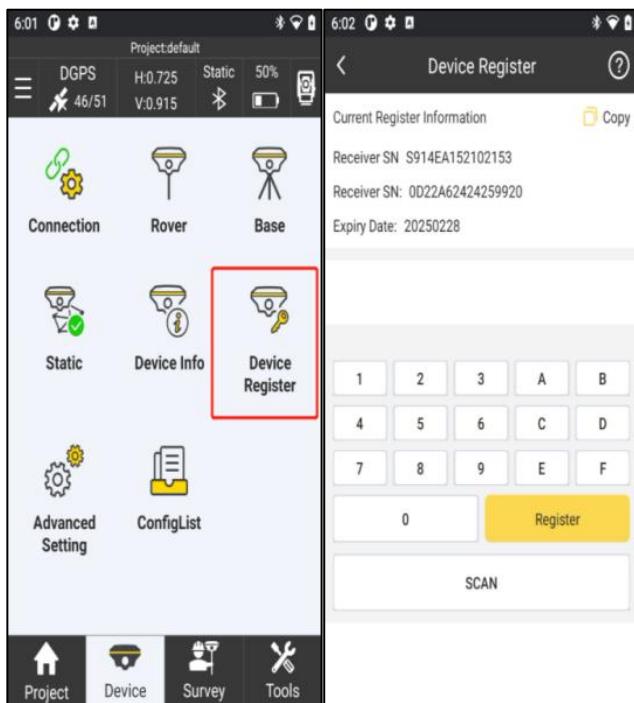
2.5.1.4 Set CORS information in Rover

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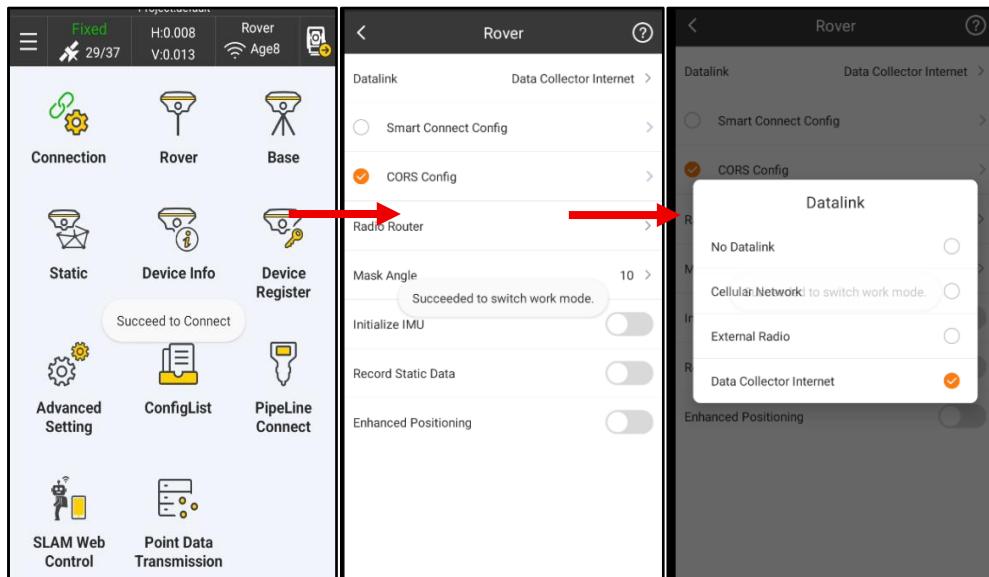
Then enter CORS config, Add or Edit a existing CORS account; after that, click connect; when CORS access is ready, ME system will get Fixed solution automatically in outdoor scenery.
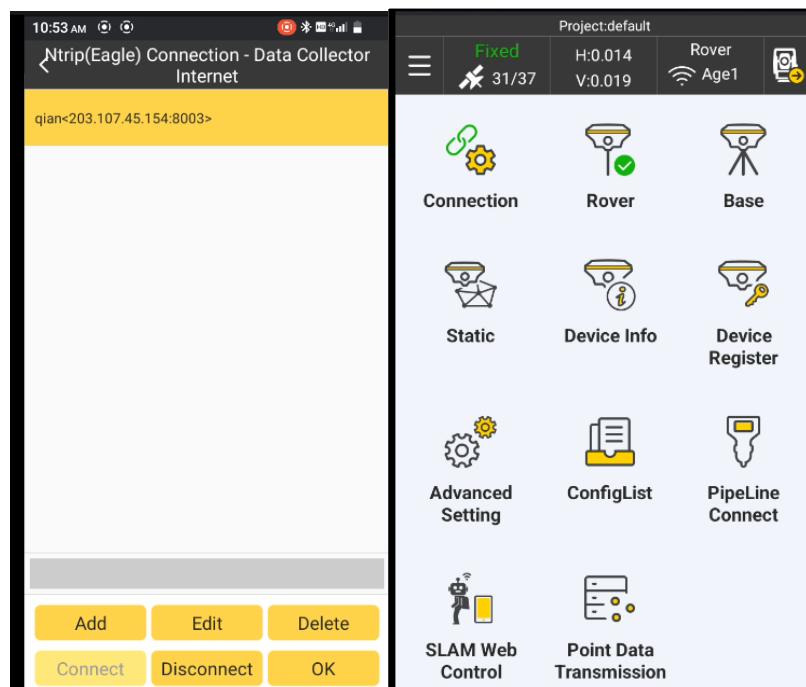
2.5.1.5 Set Datalink internal UHF

The ME receiver work as a Rover still, Take another receiver to work as a Base station, the

datalink of them can be set UHF. The detailed operations are as follows.

Rover UHF

Set the ME receiver work as a Rover work mode at this moment. Set datalink UHF.
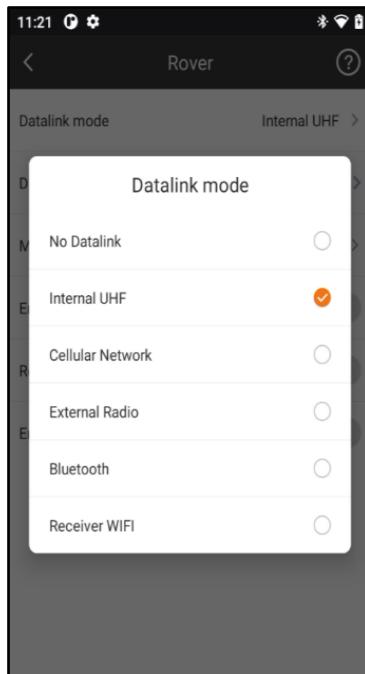
In UHF datalink, we need to set parameters which are the same as it in the base.

For example, 1.Protocol SOUTH; 2.Channel 5; 3.baud rate 9600;
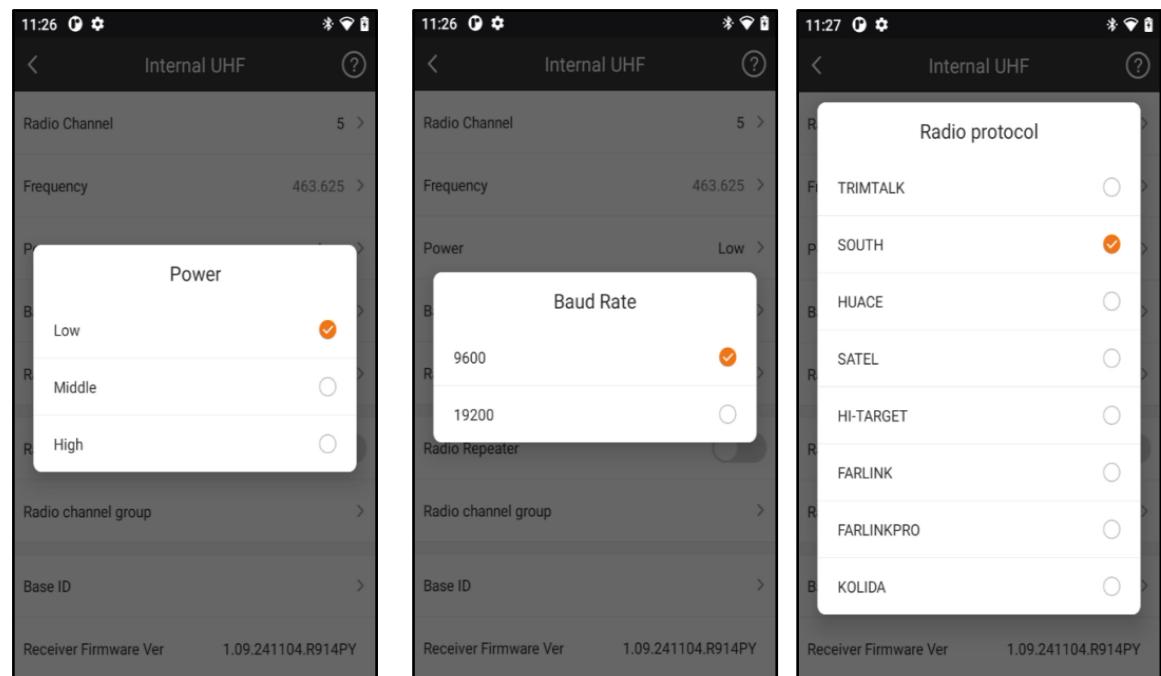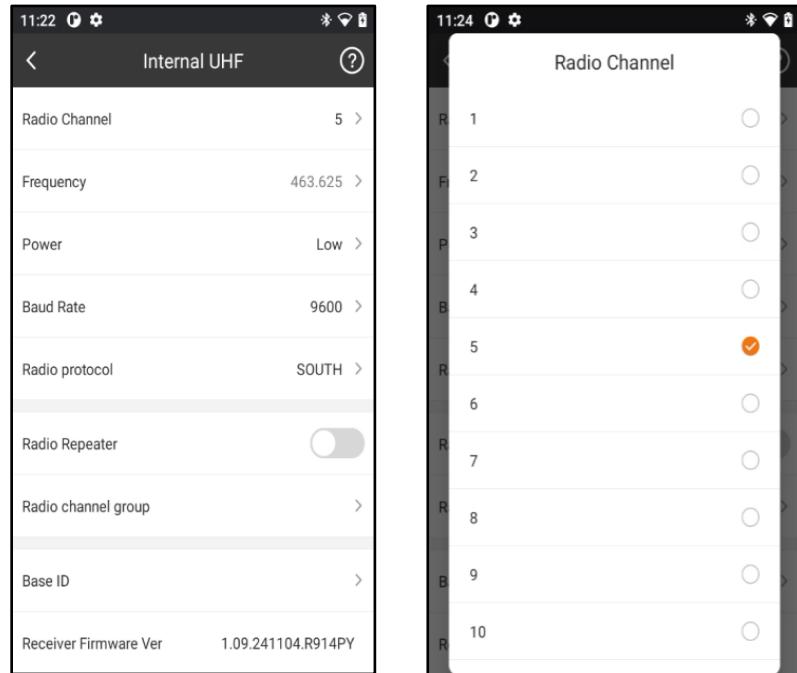
After those parameters above are set the same as base, rover (the ME receiver) can receive corrections from base and get base information.
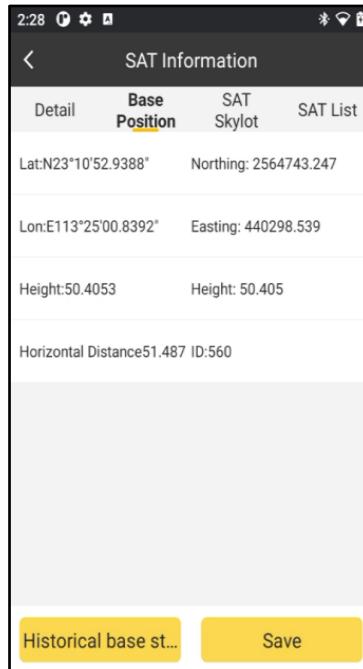
2.5.1.6 Antenna height value input

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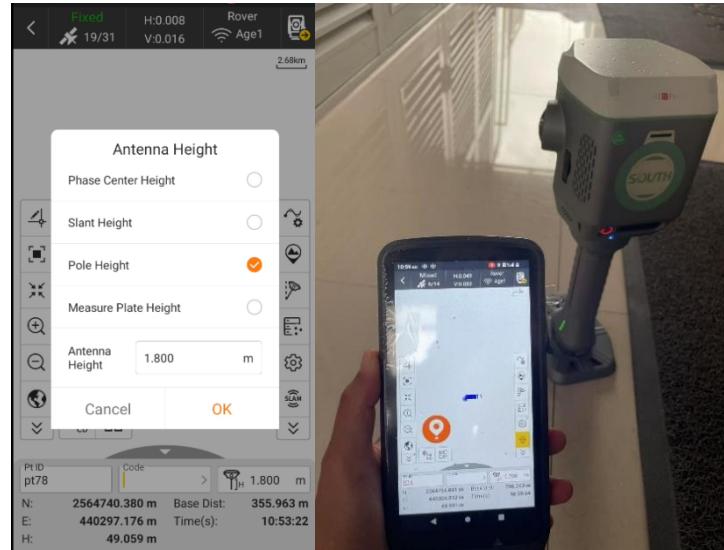
At this sample, I only use the handheld battery, so I input the antenna height value to 0.2m.

2.5.2 The SLAM function of ME receiver

2.5.2.1 Point cloud scanning（SLAM Cloud）

Click "**SLAM Cloud**" to activate the function of point cloud scanning,
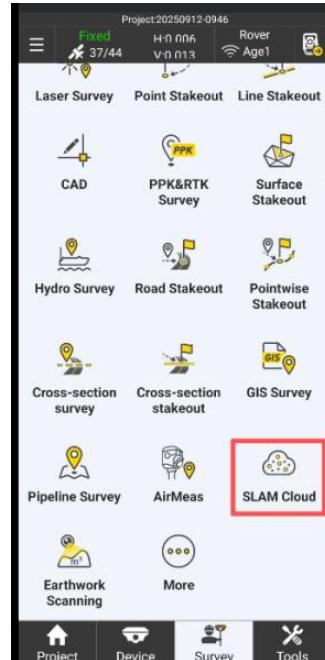
1. **Enable SLAM**

After click "**Enable SLAM**", please wait **50s** for laser scanner initialization;
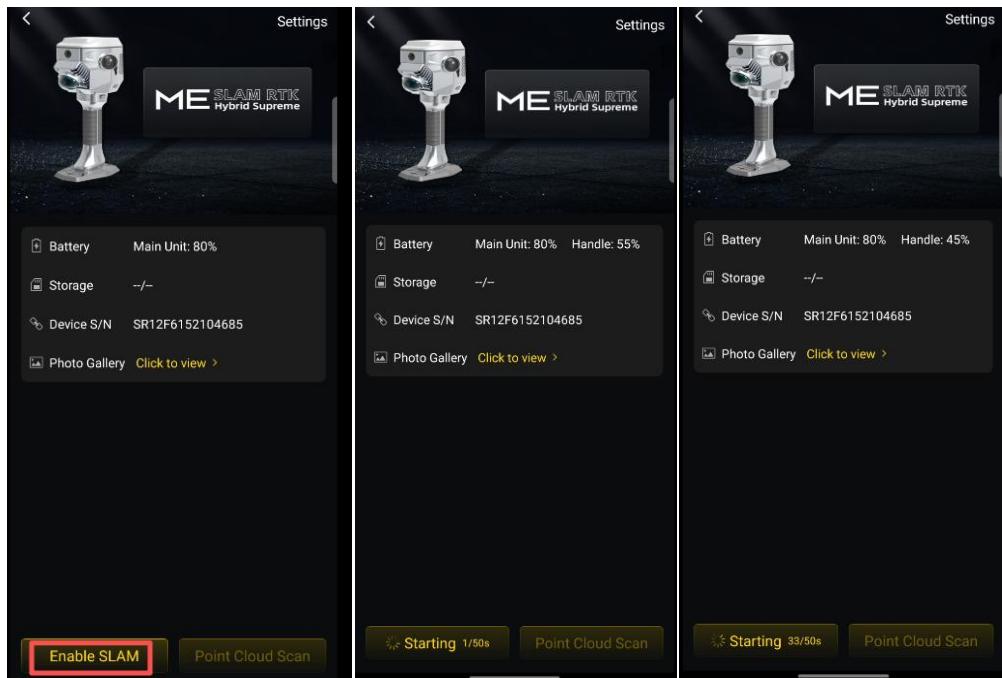
After 50s initialization finish, there will popup a 10s initializing message as follows, click
Initializing to enter the following interface:
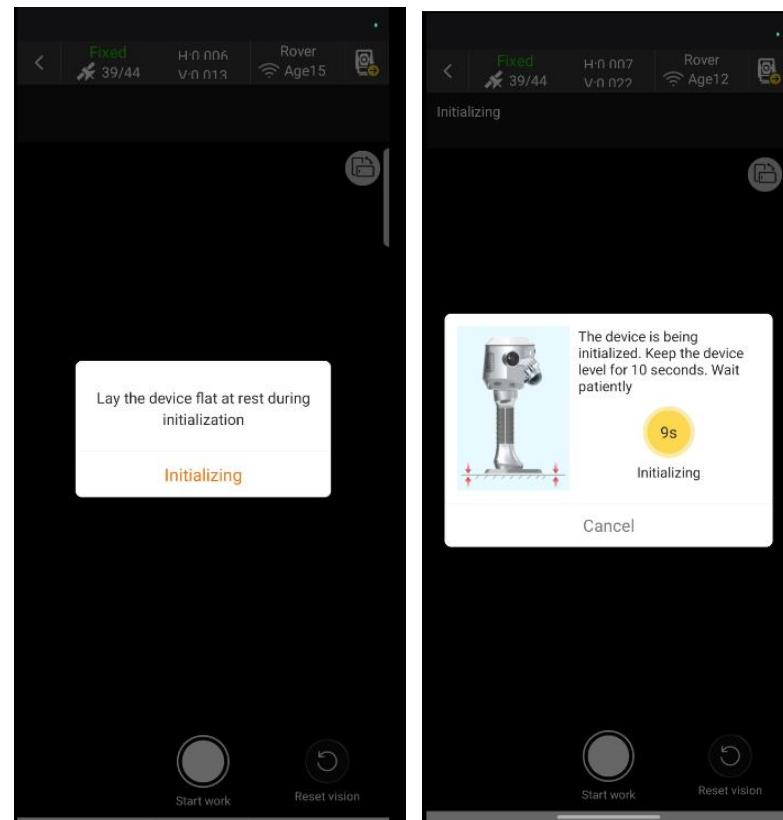
When finish the 10s initializing, ME system will start scanning automatically, when finish scanning, click " End scan".
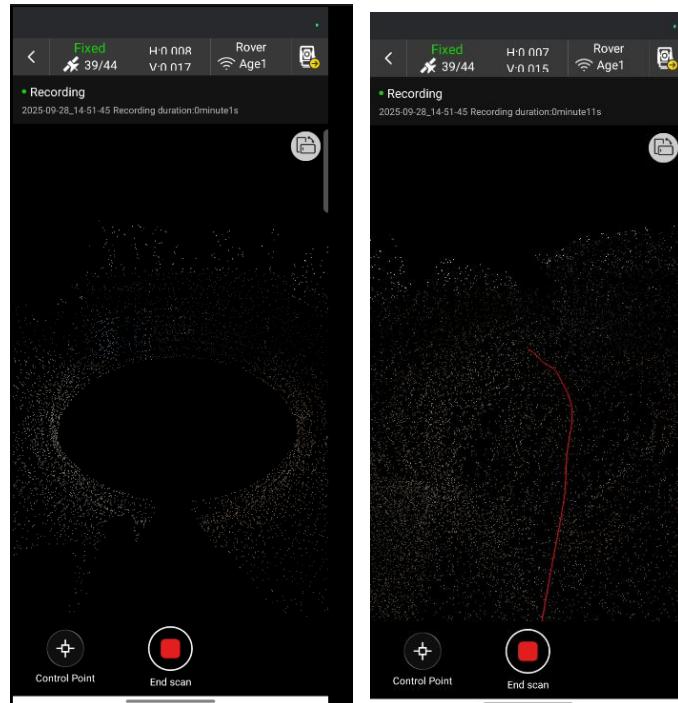
Notes:

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°*360°, if the scanned object is oriented toward the ground, tilt the device forward about 15°.
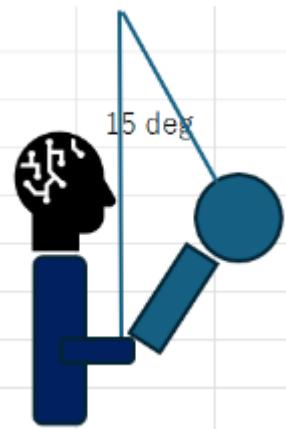
If the scanned object is oriented toward a vertical surface(such as building facade survey), tilt the device backward about 15°.   Ensure there are no moving objects following around the device. Additionally, mobile phones and notebooks should be placed directly behind the device without blocking the 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.

2.5.3 The Mixed Solution of ME receiver

2.5.3.1 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.
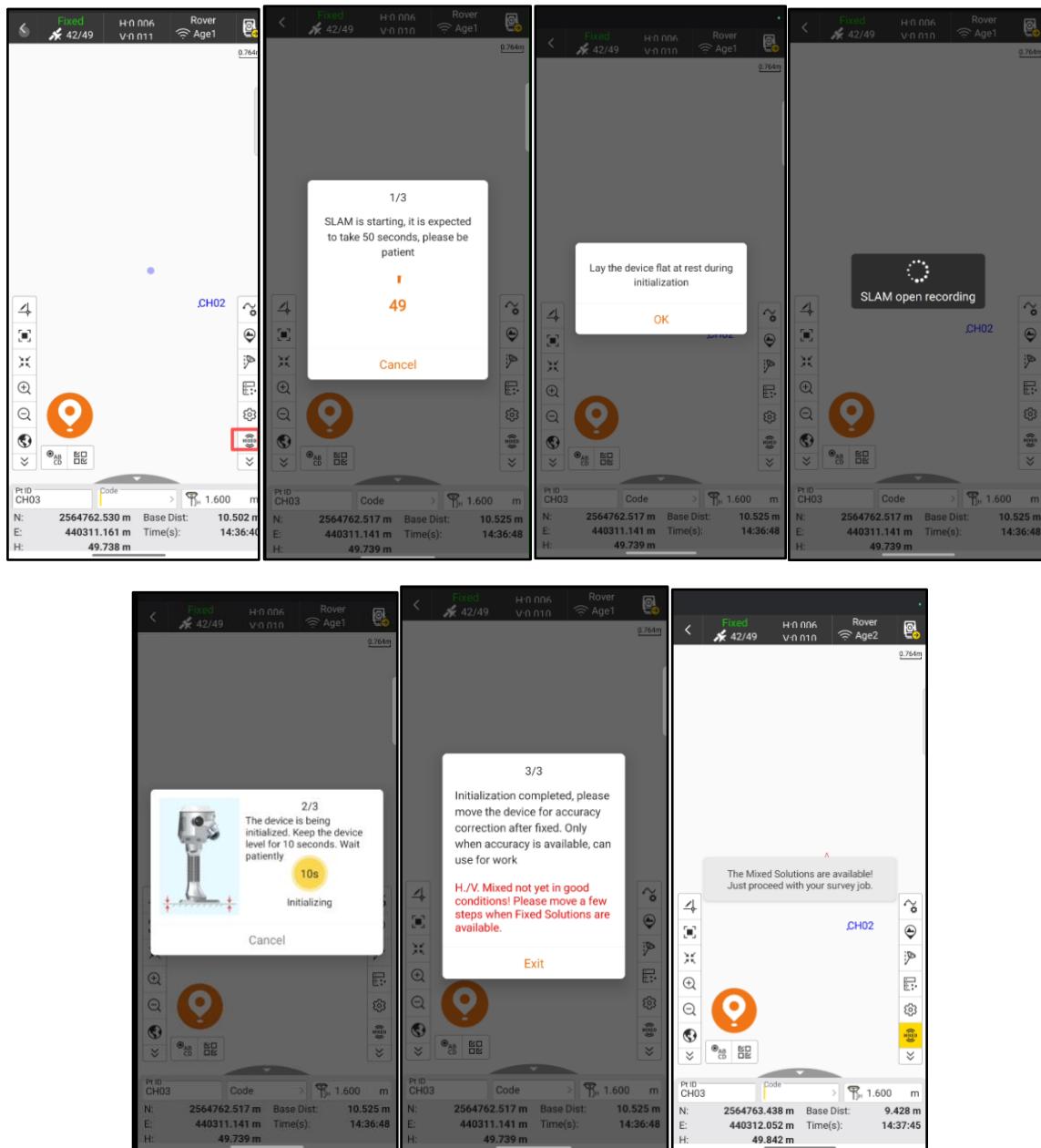
If the user want to use tilt survey function when measure points, please activate tilt survey before enter

Mixed solution.
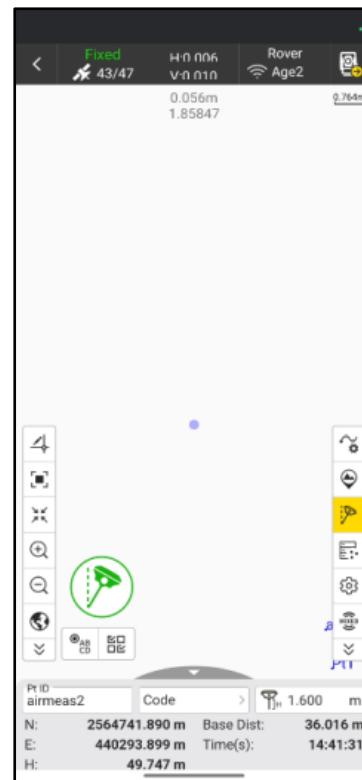
2.5.3.2 Mixed solution-Point survey

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.
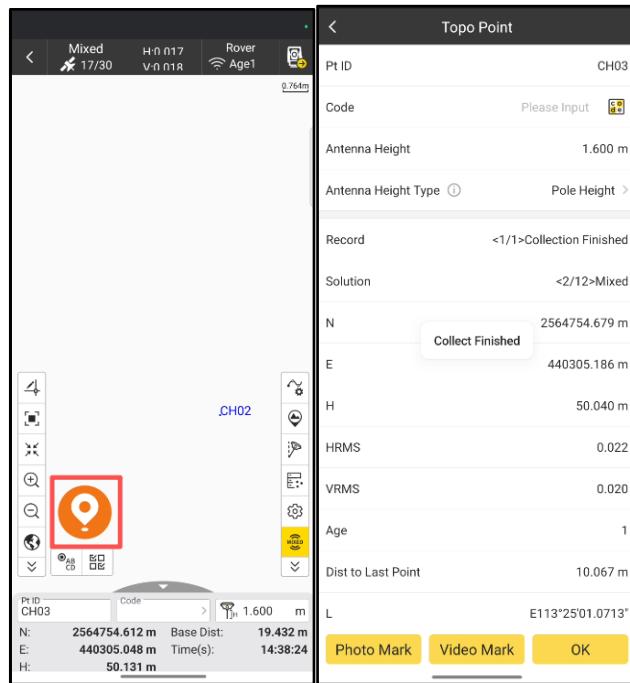
2.5.3.3 Mixed solution-Point stakeout

Select a point from the point database
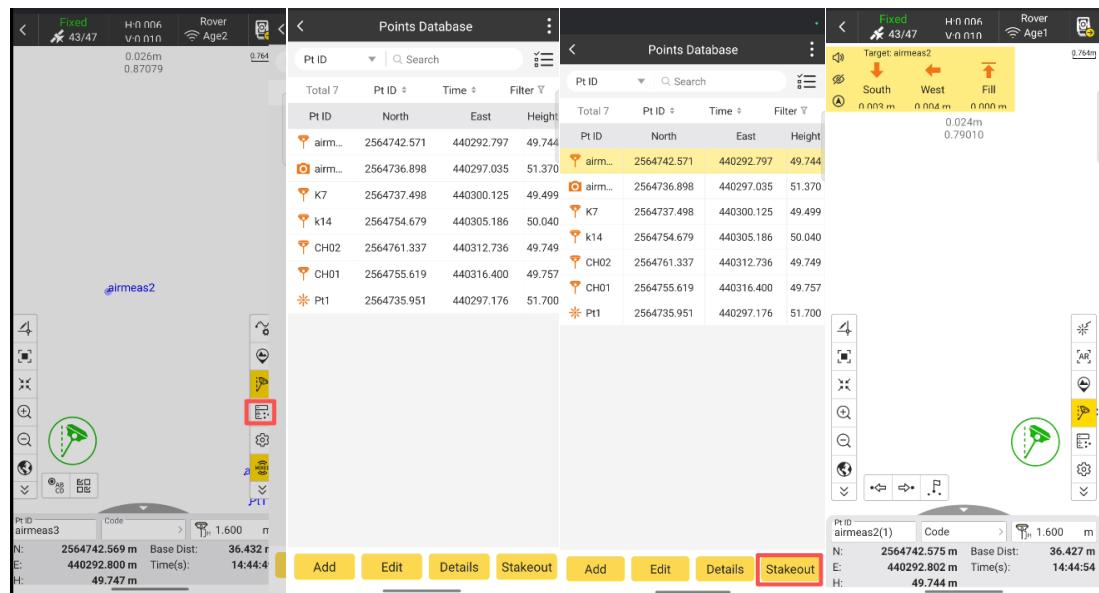
2.5.4 Air Measurement

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.
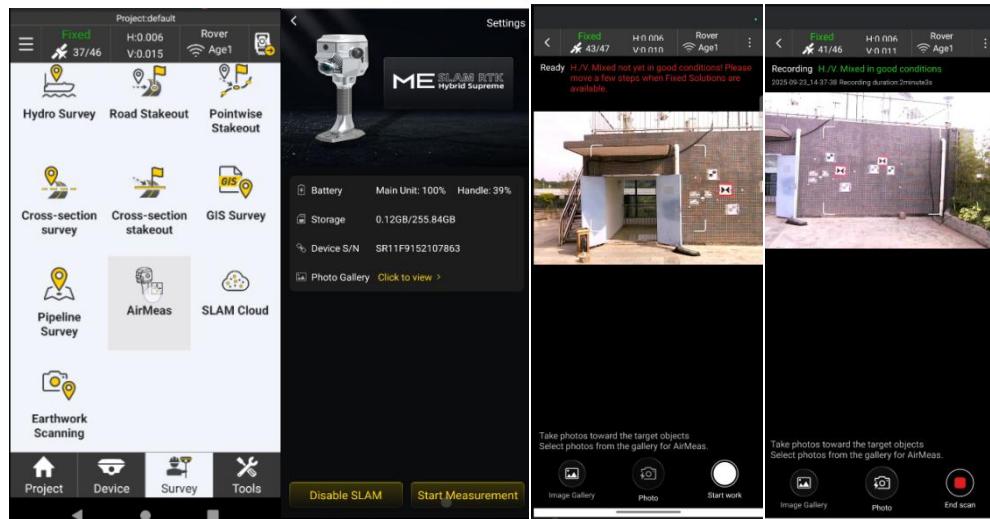
Try to position the point to be measured at the center of the screen, then click the "**Photo"** button.After click "**Photo**", the following screen will show as below:
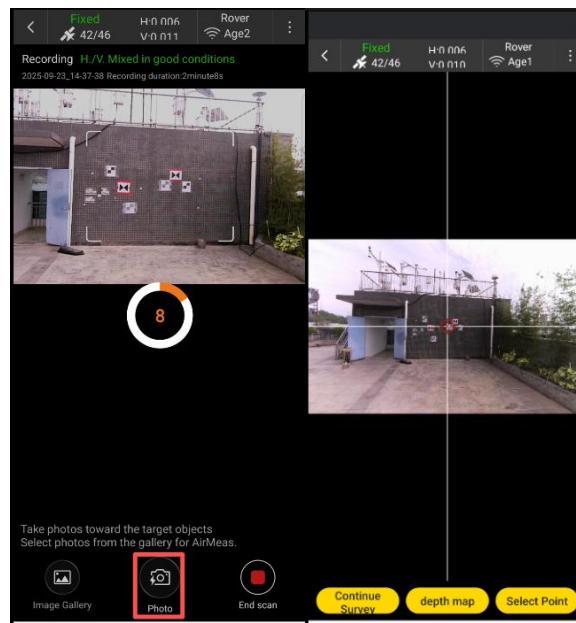
Zoom in the image to precisely locates the point to measure,
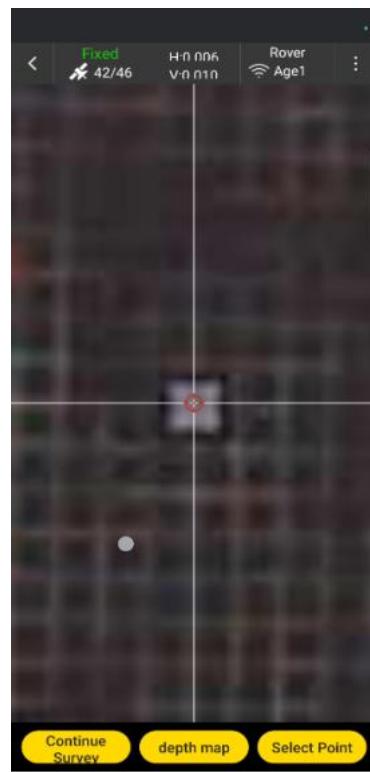
And then click "Select Point" to save the coordinate of the current point.
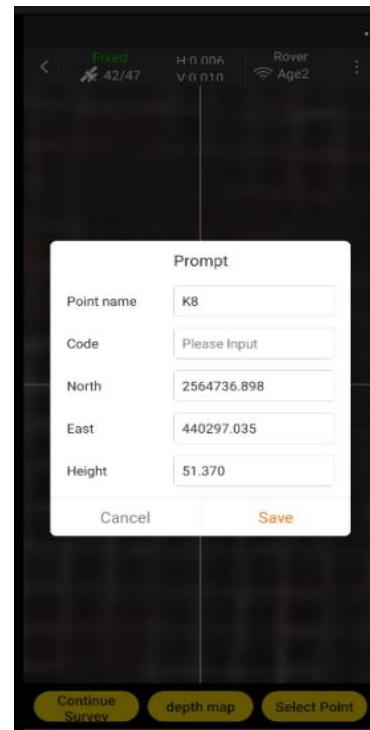
Notes:

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.

2.5.5 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
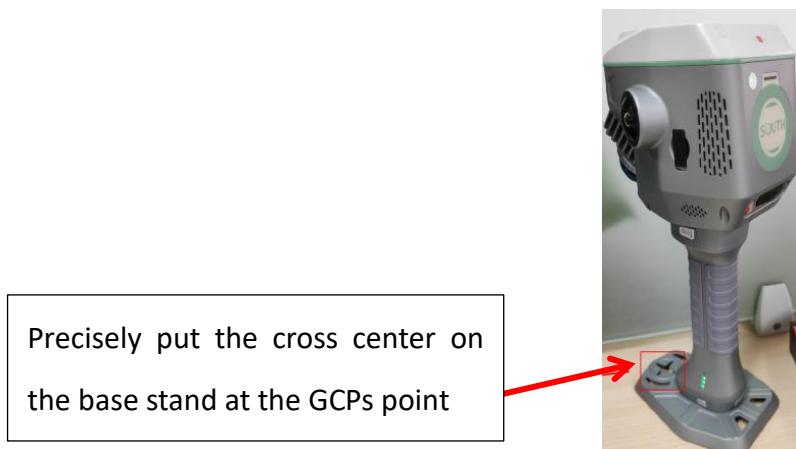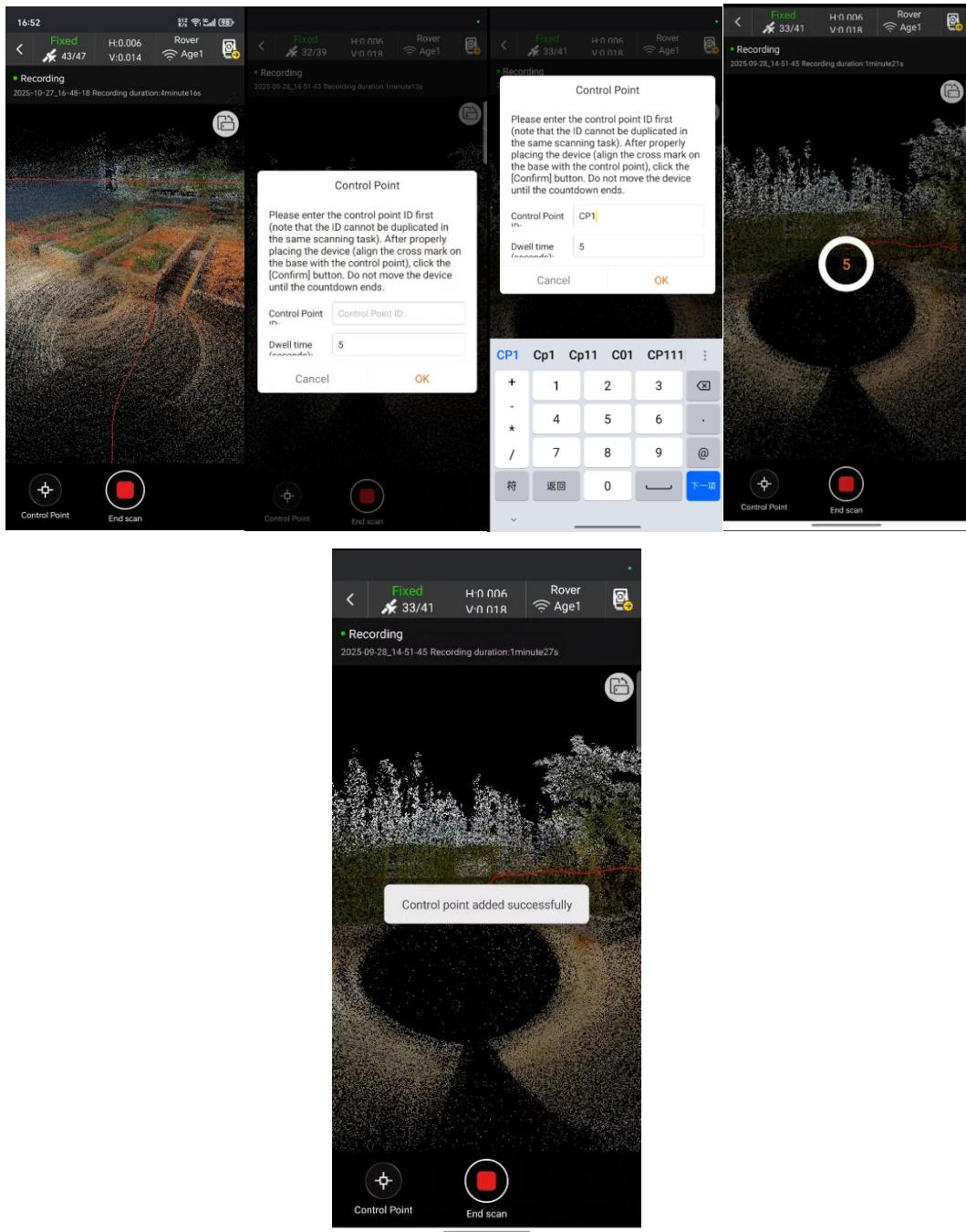
Notes: *All other basic functions of GNSS RTK receiver, point survey, point stakeout, line survey, line stake out, and so on, please refer to the GNSS related manual, for example, SurvStar Manual.*

2.5.6 The Earthwork scanning

2.5.6.1 Initializing

Click the function "Earthwork scanning", Enter the "Earthwork scanning" interface.
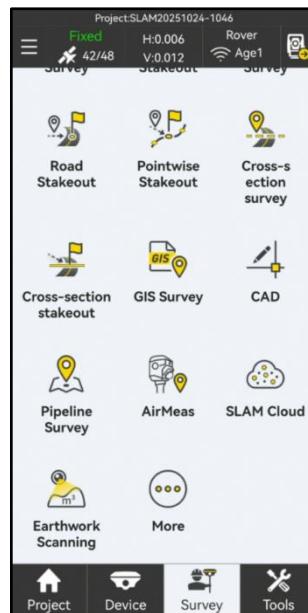
Click the "Earthwork Scan"
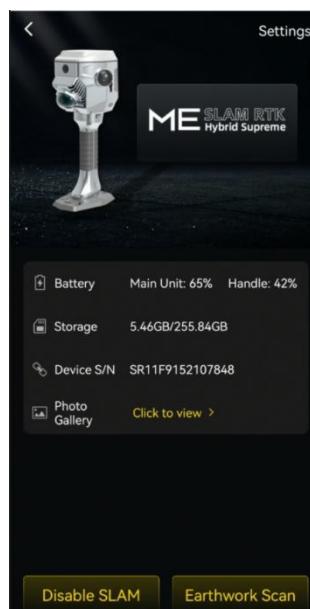
At this time, it popups a window, please put the ME receiver on a flat ground and keep it in stationary status.
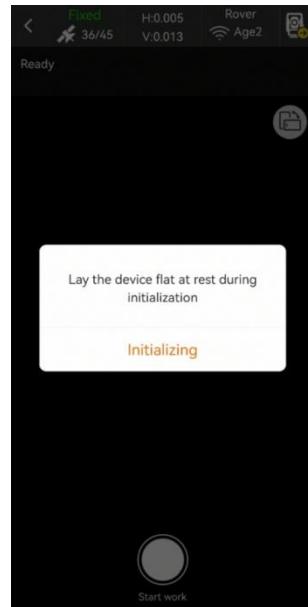
Click "Initializing" it popups another window, and start to initialize in 10 seconds till this window disappear. Then we catch the ME receiver to scan point cloud.
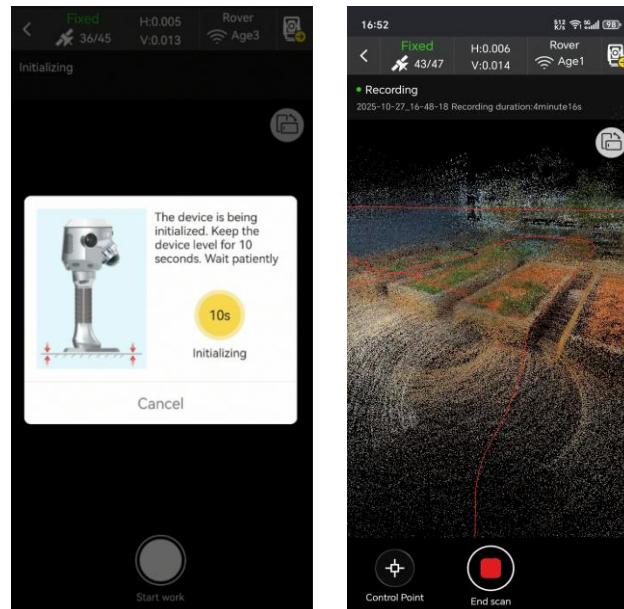
2.5.6.2 Scanning

The scanning trajectory forms a closed loop, and there is a certain overlap distance between the starting position and the ending position.
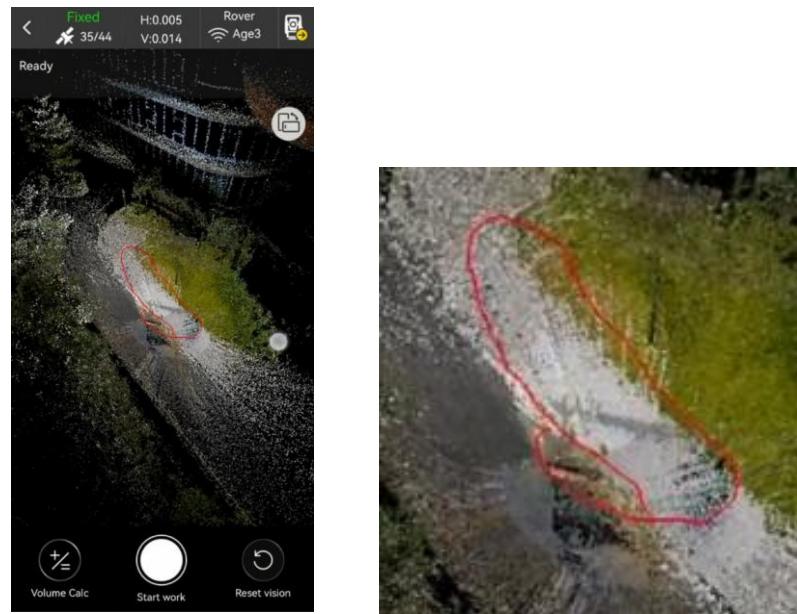
2.5.6.3 Draw boundary for calculating

After the scanning, click "Volume Calc", move the cursor to draw a closed boundary for calculating, and then click "Calculate" The result shows on the bottom of this interface
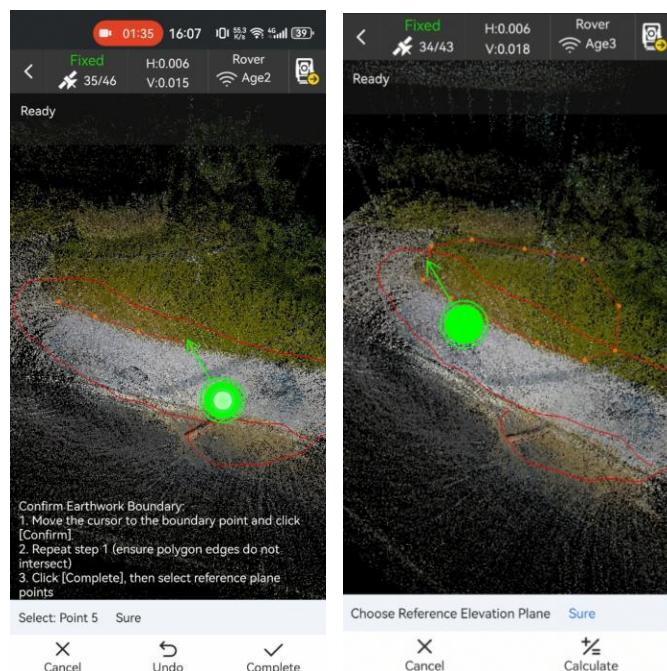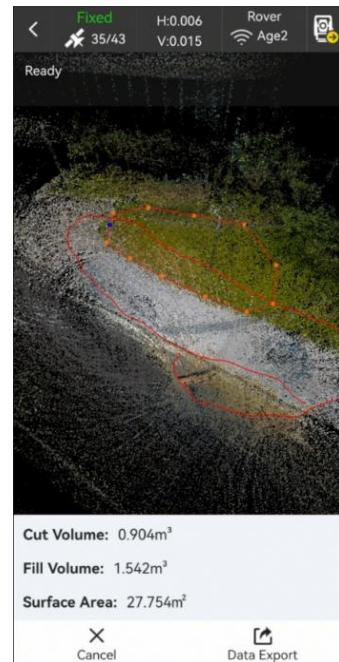
Chapter 3 Data download and processing

3.1 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.
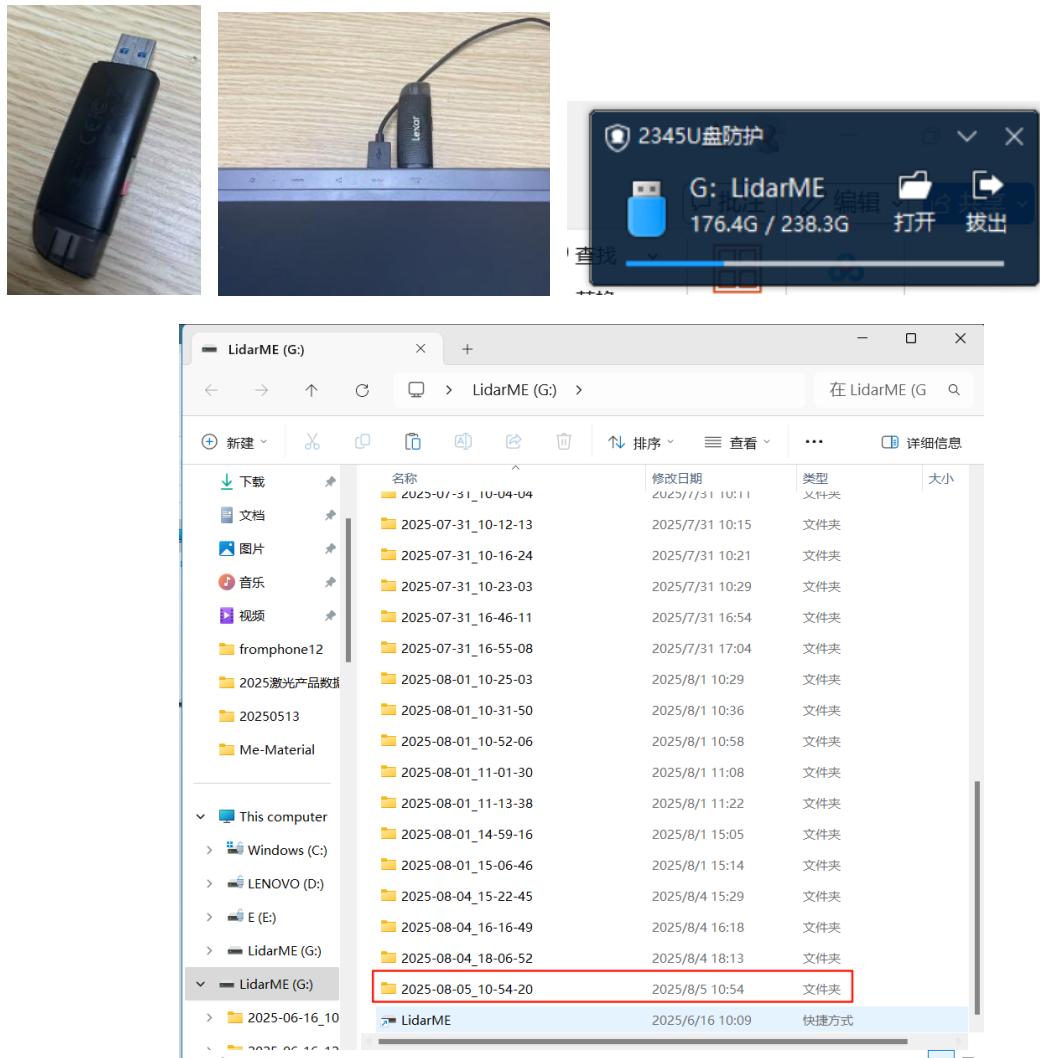
3.2 RTK Point measurements Export

3.2.1 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.

Screen 1 (Project menu):

15:38

Project:20241211-1717

Fixed H:0.000 Rover 100%
32/40 V:0.000

Project Wizard | Project Manager | Project Data Manager
Coordinate System | Base Calibration | Points Database
Point Export | App Settings | About Software
Cloud Share | Code Library

Project | Device | Survey | Tools

Screen 2 (File Type):

15:40

File Type

Raw Survey Data Format(*.csv) ✓
Cass Format(*.dat)
NEH(*.dat)
BLH(*.dat)
AutoCAD Format(*.dxf)
GoogleEarth Format(*.kml)
SurvCE RW5(*.rw5)
RAW(*.raw)
Shape file(BLH)(*.shp)
Shape file(NEH)(*.shp)
HTML Report(*.html)
Carlson coordinate file(*.crd)
Gnss Measurement Report(*.xls)
Image mark(*.jpg)

Screen 3 (Point Export - Angle Format):

15:40

Point Export

Data File 20241211-1717.data
File Type Raw Survey Data Format(*.csv)

[Point Name],[Latitude],[Longitude],[Ellipsoidal height],
[Code],[North],[East],[Height],[Antenna Height],[Solution],
[UTC Start Time],[UTC End Time],[Local Time],[SD to
Base],[HD to Base],[Diff Age],[HRMS],[VRMS],[PDOP],

Angle Format

Deg.MinSec ✓
Deg:Min:Sec
Deg°Min'Sec"
Deg
Arc

Format Manager | Export

Screen 4 (Point Export):

15:41

Point Export

Data File 20241211-1717.data
File Type Raw Survey Data Format(*.csv)

[Point Name],[Latitude],[Longitude],[Ellipsoidal height],
[Code],[North],[East],[Height],[Antenna Height],[Solution],
[UTC Start Time],[UTC End Time],[Local Time],[SD to
Base],[HD to Base],[Diff Age],[HRMS],[VRMS],[PDOP],
[SAT Locked],[SAT Visible],[Antenna Type],[Input Antenna
Height],[Average Times],[Ellipsoid Height],[HD to Last],
[Total HD],[SD to Last],[Total SD],[Height Difference from
Last Point],[Locked SAT Detail],[Base ID],[Base Lat],[Base
Lon],[Base Ellipsoid Height],[Offset Dist],[Chainage],
[Stake Chainage],[Stake Height],[Stake Designed H],[Stake
Designed H Diff],[Tilt Survey],[TPI],[Point ID],[Point Type]

Angle Format Deg.MinSec

Format Manager | Export

Screen 5 (File Directory):

15:41

File Diretory

Back to Root Directory
/storage/emulated/0

Back to Previous Directory
/storage/emulated/0/SurvStar/ProjectData/
20241211-1717/Export

20241211-1717.csv

default.xml

File Name 20241211-1717

File Type Raw Survey Data Format(*.csv)

Export

3.2.2 Export RTK points from Menu Point Database

3.3 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,
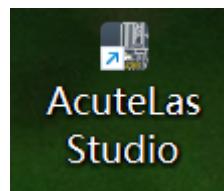
For the first time run the software, there will be four modes to choose from, for SLAM data

processing, please select the second one with a picture of ME surveying system.
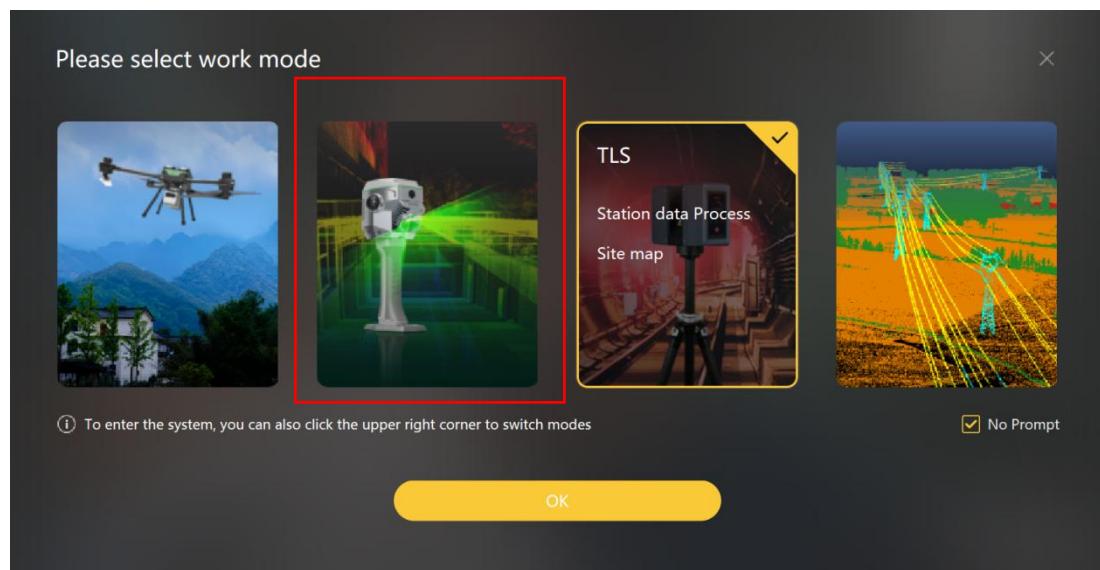
If not the first time to open the software, please find the mode switch on the right corner to set SLAM

Mode,after set the main interface is as below shows:
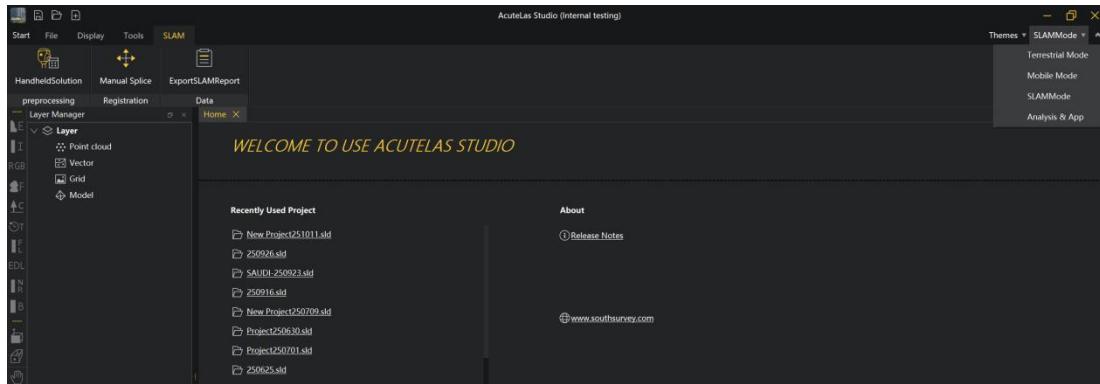
AcuteLas Studio-SLAM mode is used to process ME/ME Plus SLAM data to receive point cloud data.

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.

3.3.1 AcuteLas Studio software license application

When finish installation AcuteLas Studio software,
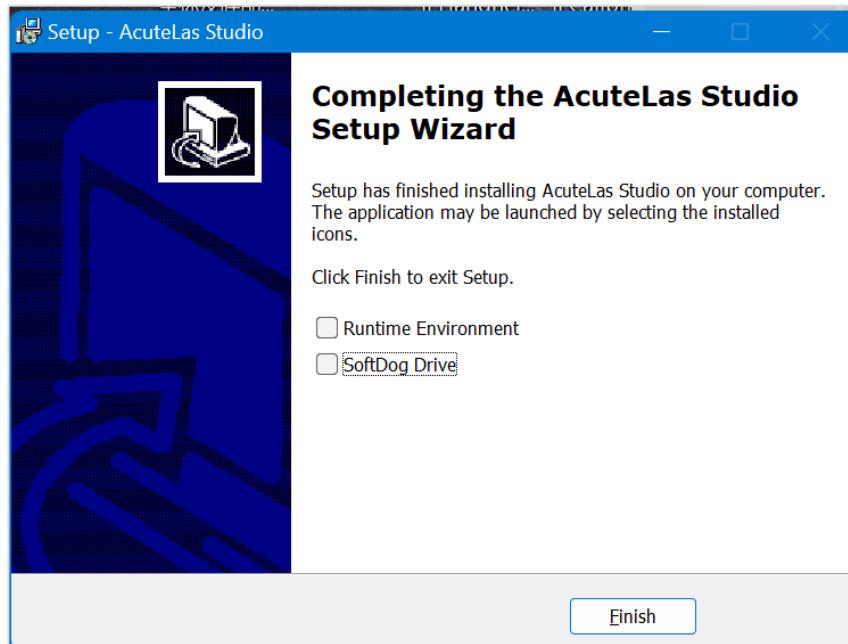
a shortcut to the software will be automatically created on the desktop. If for the first time installation

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,
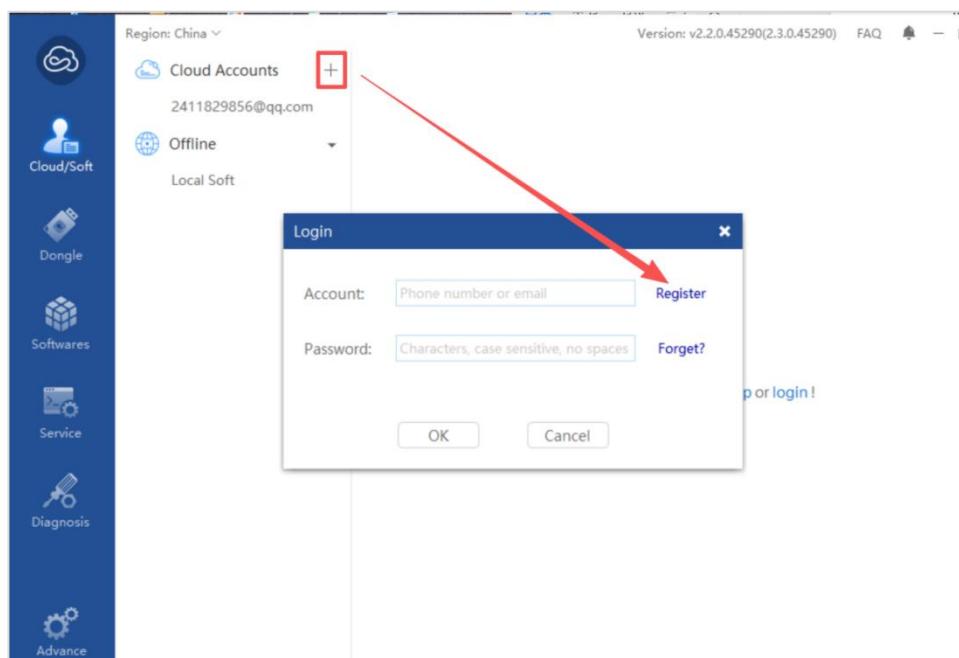
it is recommended to register with frequently used email,
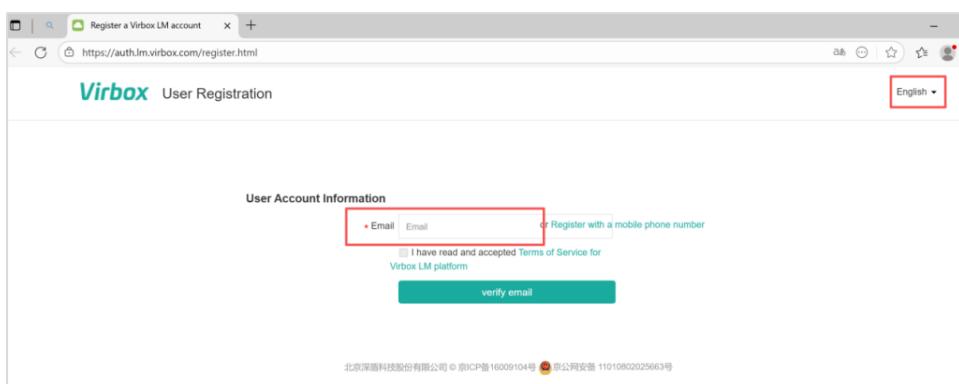
When finish the account register, send us your email address to apply an authorization to use the

software.

3.3.2 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** "create a new project,
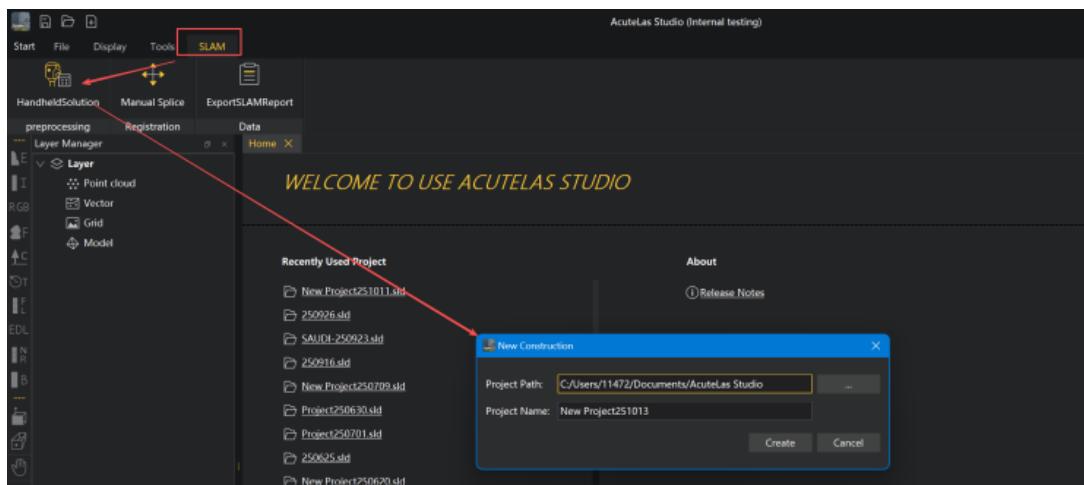
2.Click the bottom **FOLDER** icon to **Import the Project folder**(which copy out from the TF card of ME surveying system**).**
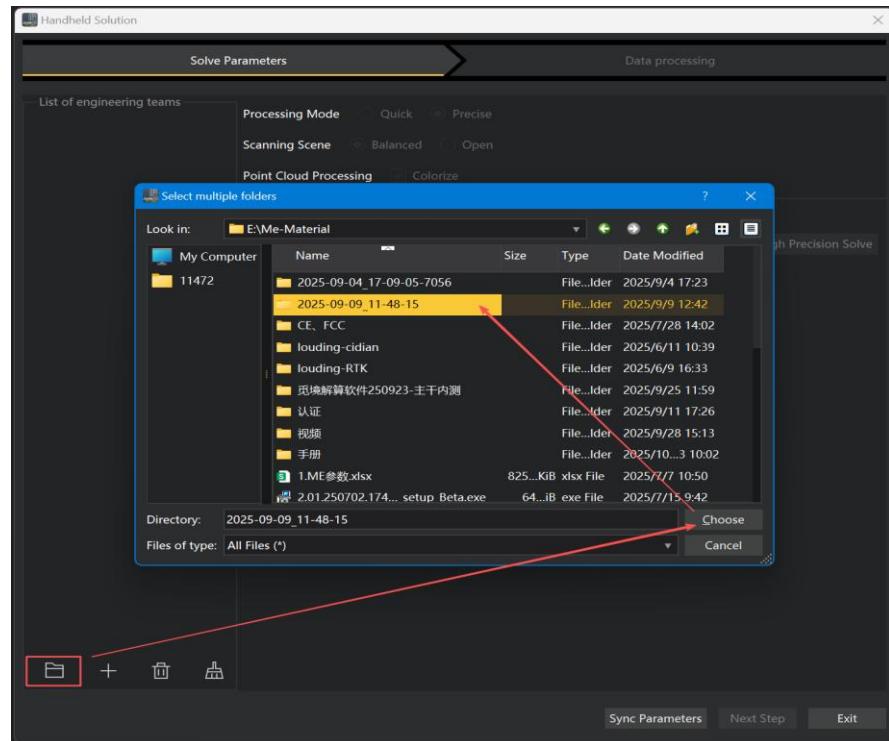
3. click "**Pure SLAM Solve**", and then click "**Next Step**" to start the processing,
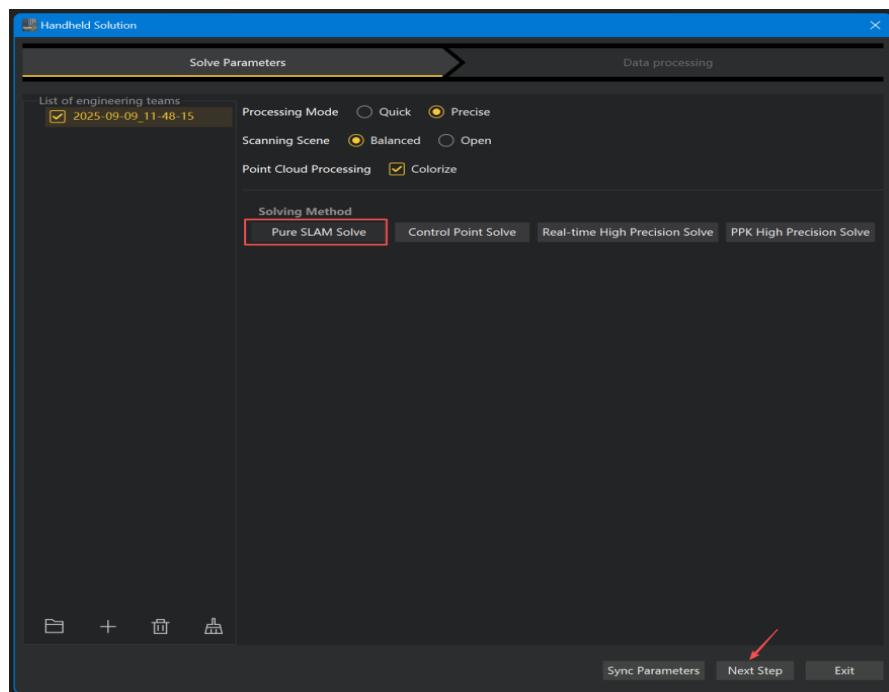
And it will popup the following window for processing, and it will show the processing progress bar.
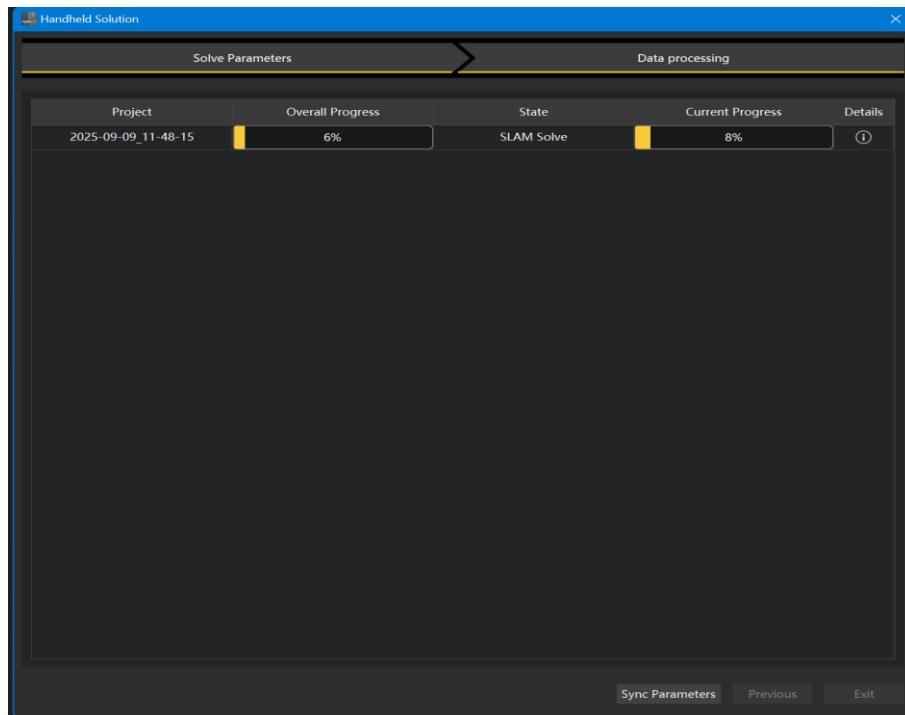
4.After processing, find the .las file in the las folder under the data directory.
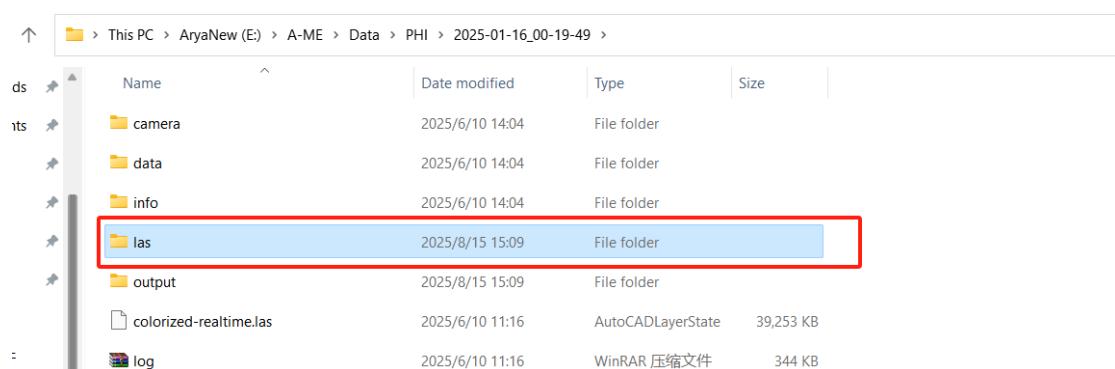
3.3.3 Control Point Solve(Mark more than 3 GCPs during scanning)

1. Open the Handheld Solution module. Click Import Project Group.
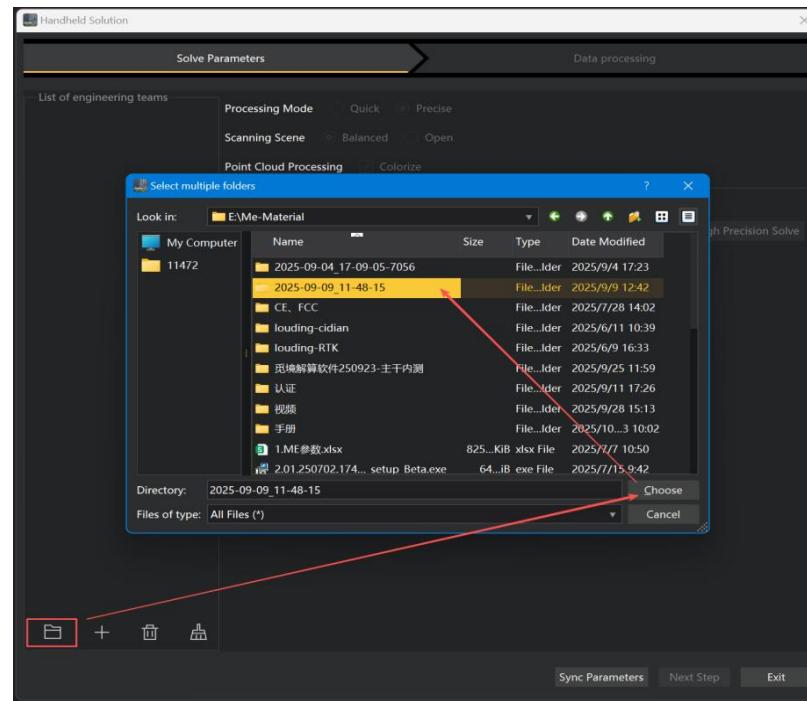
2. If during the scanning, already marked more than 3 GCPs(≥3), the solving method here can be set to Control Point Solve, input the GCPs coordinates one by one in the big red rectangle area below, and please note that the coordinate sequence should be point name, Northing, Easting, and Height value(elevation value).and then click"Next step" to start the processing. And then just wait the processing finish.
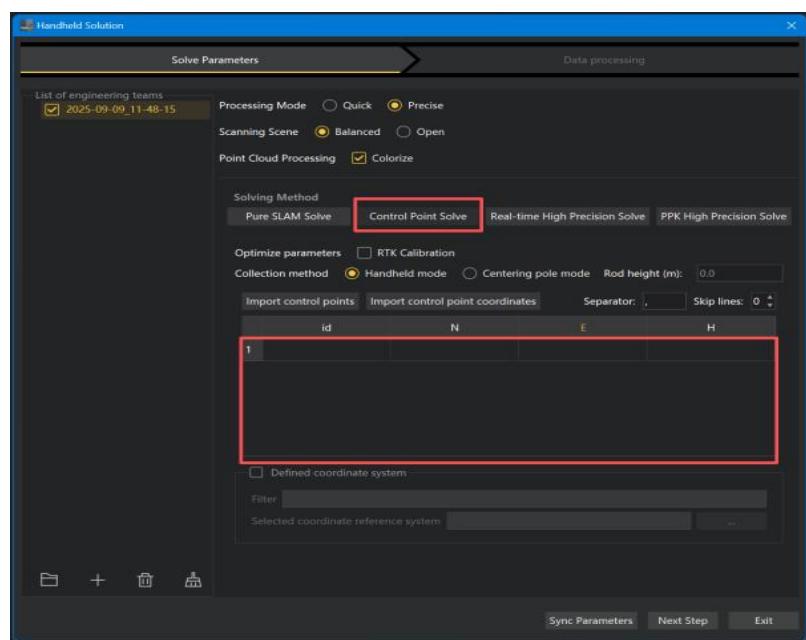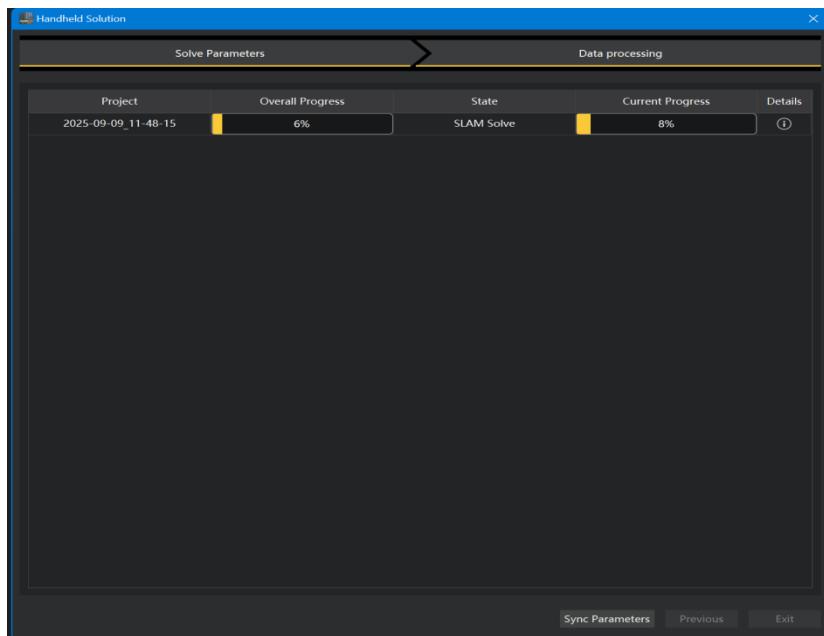
3.3.4 Real-time High Precision Solve(RTK fixed is available during scanning)

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) Previously we need connect data controller or mobile phone and copy the RTKPoint.txt file. Now after we finish scanning, RTKPoint.txt file will be saved automatically in the SLAM Project inside ME.

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

2. Select the method "Use RTK", load the whole SLAM project and then click"Next Step" to start the processing.
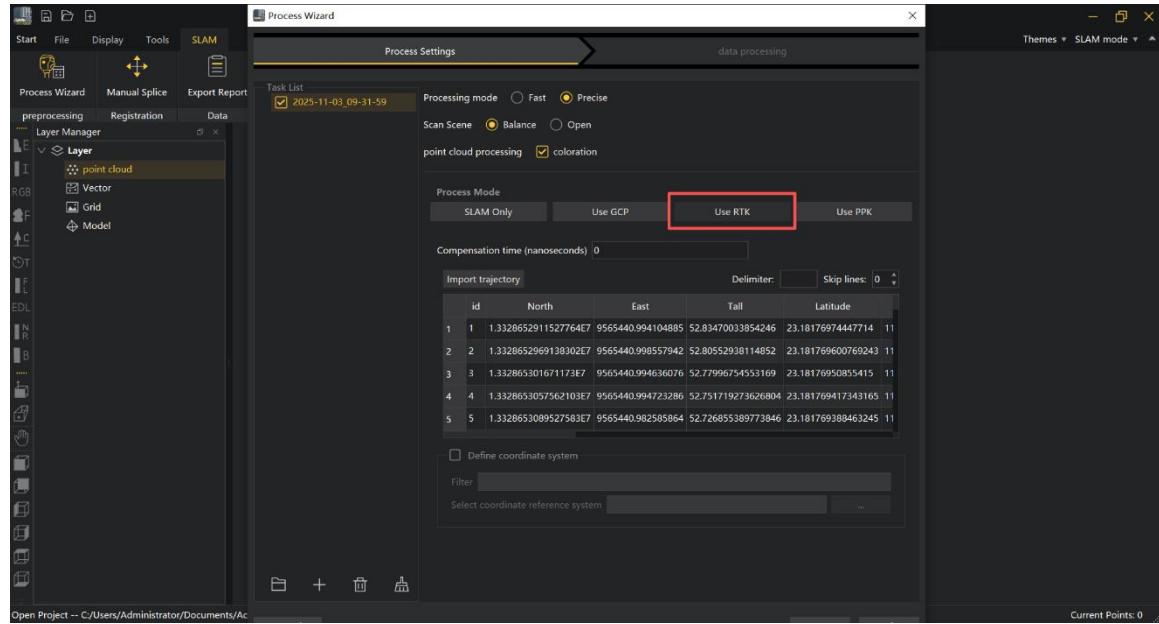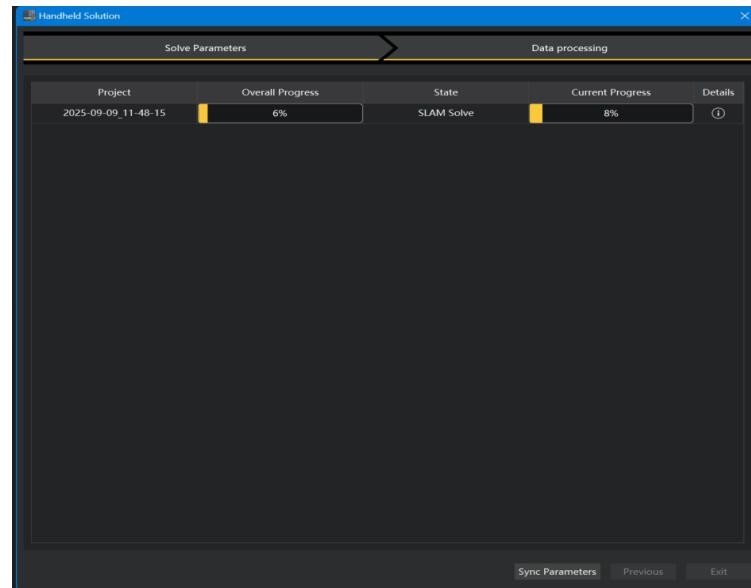
3.3.5 PPK High Precision Solve

3.3.5.1 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**.
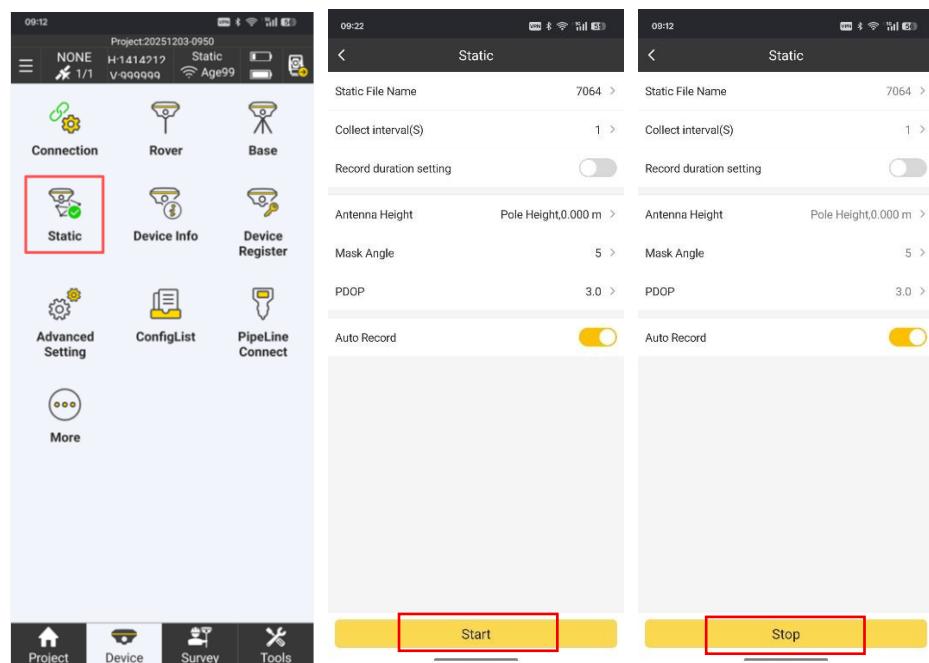
3.3.5.2 Data preparation before processing

Copy *.sth data from **base receiver (base receiver data can be *.sth format or Rinex format) or base station(if use CORS station)** and **ME**:

Base data copy method:

Please refer to the operation manual for the specific model. If the base receiver is from SOUTH brand, download the data with Type-C cable or from WebUI interface.

ME static data copy method:

After connecting to the device's Wi-Fi, open the browser and visit 10.1.1.1. Follow the diagram below to change the USB transfer mode.
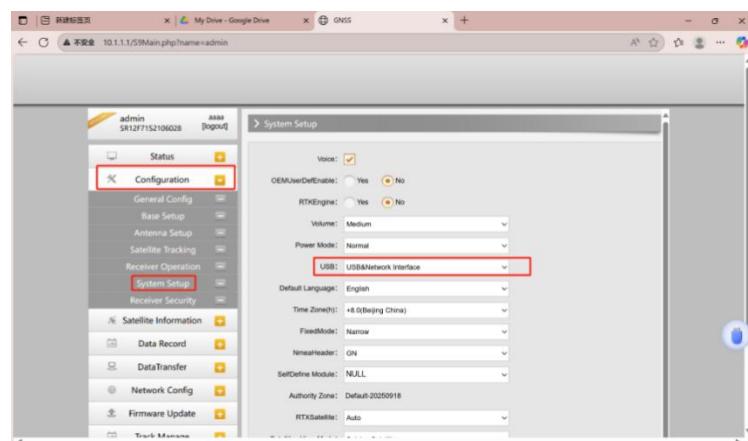
Then, connect the ME receiver to the computer via Type-C cable to access internal storage. Select the correct corresponding item based on the end time.

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

3.3.5.3 Press SLAM data with PPK trajectory

1. Open Handheld Solution. Click Import Project .
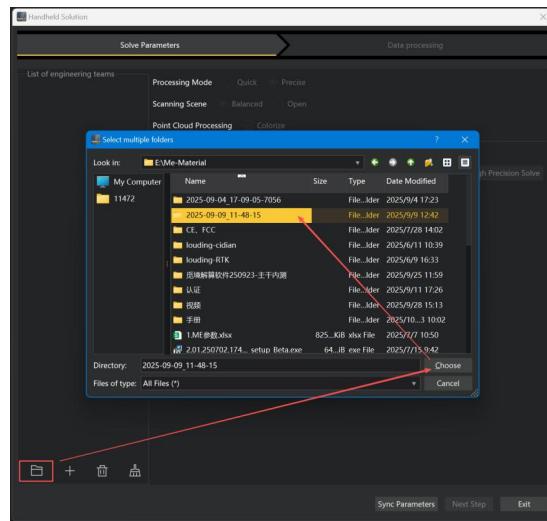
2. Click "**PPK High Precision Solve**",

load *.sth format data from ME receiver for **Mobile station data**, and then load the **base station data**(*.sth format or Rinex format)，input the Base Station Coordinates information, set the straight height value of the base station will be recognized automatically after import the base station data, and then click "**Next Step**"to start the processing, after that wait until the processing finish and find the Las files.
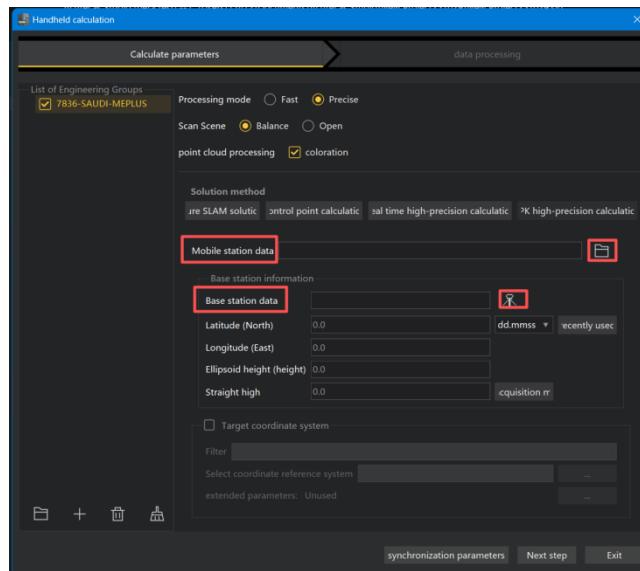
Chapter 4 Battery Charge

Before charge, please check the battery capacity status from below
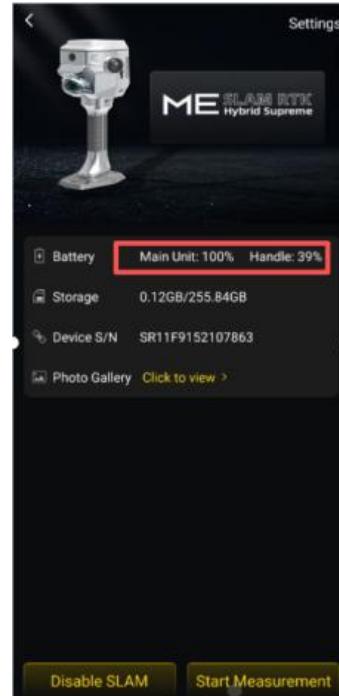
4.1 Handheld battery charge

4.2 built-in battery charge

Chapter 5 Daily maintenance

5.1 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.

5.2 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.

5.3 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.

5.4 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.

5.5 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.

5.6 Storage conditions and precautions

Item	requirements
Storage temperature	-30℃ ~ +60℃（recommended-10℃~+40℃）
Storage condensing	≤80% RH（non-condensing）
Forbidden environment	Near strong magnetic fields, corrosive gases, and vibration sources

5.7 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.

5.8 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(Adroid 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.

Chapter 6 Specifications

SPECIFICATION

MODEL		ME	ME Plus
PHYSICAL ------			
Dimension		13 x 147 x 138 mm	
Net Weight		1.38 kg	
Camera (for SLAM)		12MP x2 left and right, 8MP x1 forward	
Camera (for GNSS)		2MP x1 downward	
Laser Scanner		Livox Mid-360	
Temperature Sensor		built in, intelligent variable frequency control	
IMU Module		built in for GNSS, and supports tilt survey option	
Wi-Fi Module		built in and serves as a hotspot source	
Network Telecom		SIM card slot built in, Nano SIM	
Radio Wireless		N/A	available
ELECTRICAL ------			
Power Supply		inbuilt battery + handgrip battery	
Endurance		inbuilt battery ≥0.5h; handgrip battery ≥2h	
Power Consumption		26 W	
Charging		1-2 h	
Input Voltage		14.4 V	
Power Output		30 W	
TECHNICAL ------			
GNSS Features	full constellation tracking and smart dynamic sensitivity positioning technology		
GNSS Performance	Signal Tracking	1,698 channels	
	Multi-constellation	GPS/Glonass/BDS/Galileo/QZSS/NavIC/IRNSS/SBAS	
	Positioning Output Frequency	1-10 Hz	
	Initialization Time	< 10 sec	
	Cold Restart	< 12 sec	
	Initialization Reliability	> 99.9%	
	IMU Refresh Rate	200 Hz	
GNSS Accuracy	Single Point Positioning	H. 1.5m RMS; V. 2.5m RMS	
	DGPS	H. 0.4m RMS; V. 0.8m RMS	
	Real Time Kinematic (RTK)	H. 8mm+1ppm RMS; V. 15mm+1ppm RMS	
	Post Processed Kinematic (PPK)	H. 3mm+1ppm RMS; V. 5mm+1ppm RMS	
	Precise Point Positioning (PPP)	supports PPP-B2b, H. 10 cm; V. 20 cm	
	High-precision Static	H. 2.5mm+0.1ppm RMS; V. 3.5mm+0.4ppm RMS	
	Static and Rapid Static	H. 2.5mm+0.5ppm RMS; V. 5mm+0.5ppm RMS	
	Code Differential	H. 0.4m RMS; V. 0.8m RMS	
	Positioning Refresh Rate	1Hz/5Hz/10Hz	
	Time for First Fixed Solution	cold start 45sec; hot start 10sec; single repeat 1sec	
SLAM Performance	Scanning Range	0.1-70m (70m/40m @ 80%/10% reflectivity)	
	Measurement Rate	200,000 pts/sec	
	Field Of View (FOV)	360° x 59°	
	Laser Wavelength	905 nm	
	Laser Safety Class	Class 1 (IEC 60825-1:2014), eye-safe	
	Loop Closure Free	available when RTK is enabled outdoors	
	PPK Mode	available	
SLAM Accuracy	Realtime Assessment	available	
	Relative Accuracy	≤10 mm	
	Range Noise	approx. 5-20 mm (optimized)	
	Absolute Accuracy (RTK)	best up to 3-5 cm (powered by onboard RTK)	
	Absolute Accuracy (PPK)	best up to 2-4 cm (post processed)	
Merged Applications	Positioning Accuracy while Satellites Unlocked (known as Magicalc)	best up to 2-3 cm, typical 5-10 cm	
	Contactless Measurement Accuracy	≤5 cm (@15 m)	
AR Stake-out Performance	Super Stake-out Accuracy	optimal H. 8mm+1ppm RMS; V. 15mm+1ppm RMS typical H. 10mm+1ppm RMS; V. 20mm+1ppm RMS	
	Visual Stake-out Accuracy	optimal H. 8mm+1ppm RMS; V. 15mm+1ppm RMS typical H. 10mm+1ppm RMS; V. 20mm+1ppm RMS	
COMMUNICATION ------			
Radio Datalink		N/A	Rx module built in
Voice Language		CHN/ENG/KOR/RUS/PRT/ESP/TUR as default	
Audio Messaging iVoice		smart audio for status broadcasting and instructions	
Bluetooth		BT4.2 (BR/EDR+BLE) standard	
NFC Wireless		auto pairing between device and controller by touch	
WLAN		802.11b/g/n standard	
ENVIRONMENTAL ------			
Working Temperature		-20℃ ~ +55℃	
Storage Temperature		-40℃ ~ +80℃	
Operating Humidity		80% non-condensing	
DATA MANAGEMENT ------			
Data Format	Static: South STH, Rinex2/3.02, etc.; Differential: RTCM3.0/3.2; GPS output: NMEA0183, PJK plane coordinate, binary code; Network Mode: VRS/FKP/MAC/N-trip		