

Survstar User Manual

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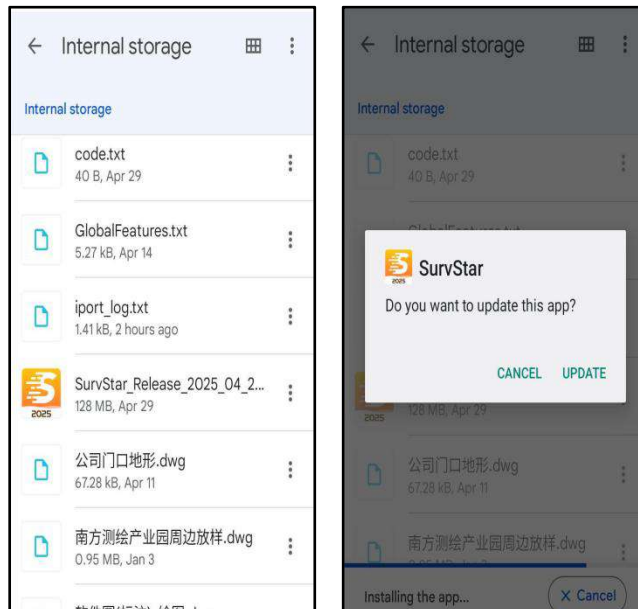
Chapter 1 Installation & Uninstall

1-1 Installation

1. Copy the APK file to android device storage.



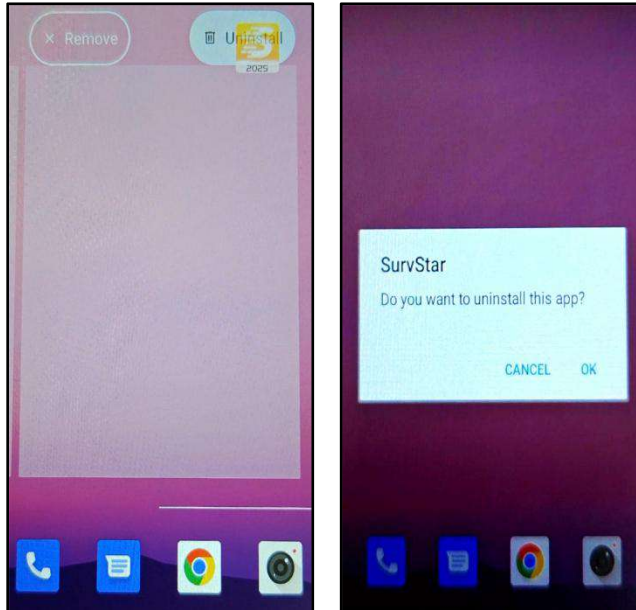
2. Find the APK file in android device and click it to install Survstar.





1-2 Uninstall

Find the Survstar icon in android device, and long press it then drag and drop it to Uninstall.

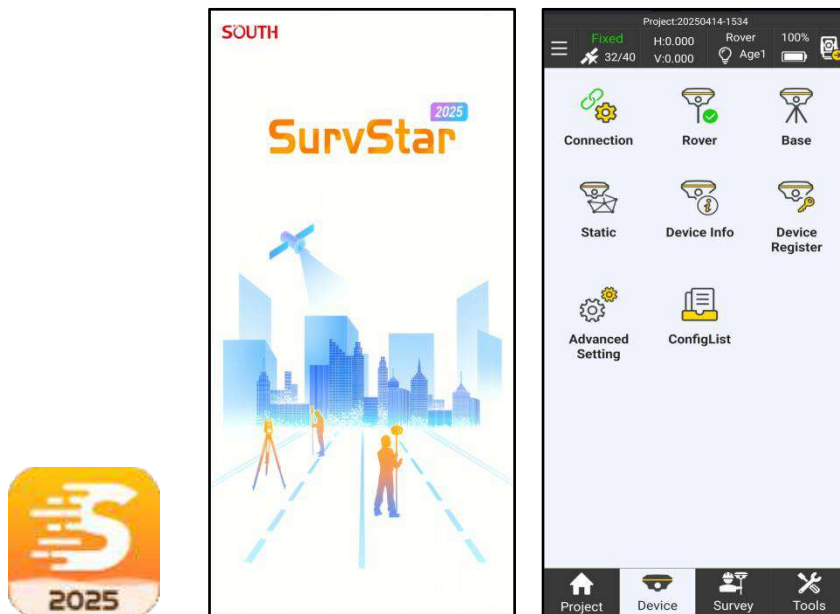




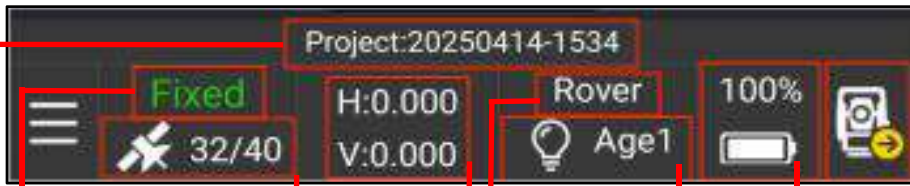
Chapter 2 Main Interface

2-1 Introduction

Open Survstar, on the top it is General Information section (including the current project name, gnss quality status, satellite number, HRMS and VRMS, work mode and datalink, device battery percentage, device connection), on the bottom it is the Function section (including four main functions: Project, Device, Survey and Tools)



2-2 General Information section



current project name.

gnss status: Single, DGPS, Float or Fixed.

satellite number: Used/Tracked satellites.

H and V: HRMS and VRMS, displayed in meters.


work mode: Base, Rover or Static.

datalink: UHF, internet, external or Bluetooth (by collector internet).

device battery percentage.

device connection: check the device connection quickly.



Click  27/37, we will enter to SAT Information page. In that page, we can check the position information, accuracy, base position, SAT skylot, SNR and SAT list.



SAT Information

Details Base Position SAT Skylot SAT List

Position Information

Solution: Fixed Age: 1

Lat: N22°59'59.9994" N: 2544887.176

Lon: E113°00'00.0014" E: 397473.864

Height: 42.9000 Z: 42.900

Direction: 38°11'50.4721" Speed: 0.263

Time(s): 2025-04-22 11:08:05

Accuracy

PDOP: 1.030 HRMS: 0.000

VDOP: 0.890 VRMS: 0.000

HDOP: 0.520

SAT Information

Details Base Position SAT Skylot SAT List

Lat: N22°59'58.2000" N: 2544832.166

Lon: E112°59'58.2000" E: 397422.179

Height: 30.5000 Z: 30.500

Horizontal Distance: 75.318 ID: 1

Historical base st... Save

SAT Information

Details Base Position SAT Skylot SAT List

Fixed (32/40)

GPS: 7

BD: 21

QZSS: 0

GLONASS: 0

GALILEO: 4

Satellite cutoff an... Satellites Control

SAT Information

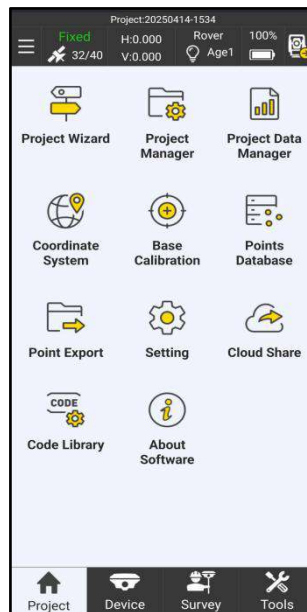
SAT No.	SNR	Elevation Angle	Azimuth	Status
G02	41.0/29.0/0.0	59.0	58.0	Tracking
G05	37.0/0.0/0.0	53.0	360.0	Visible
G06	33.0/0.0/0.0	21.0	102.0	Tracking
G12	37.0/33.0/0.0	14.0	226.0	Tracking
G13	46.0/34.0/0.0	64.0	160.0	Tracking
G15	46.0/45.0/0.0	38.0	210.0	Tracking
G25	38.0/40.0/43.0	10.0	260.0	Tracking
G29	0.0/0.0/0.0	0.0	0.0	Visible
G30	34.0/0.0/0.0	10.0	84.0	Tracking
R05	0.0/0.0/0.0	0.0	0.0	Visible
R06	0.0/0.0/0.0	0.0	0.0	Visible
R07	0.0/0.0/0.0	0.0	0.0	Visible
R20	0.0/0.0/0.0	0.0	0.0	Visible
R21	0.0/0.0/0.0	0.0	0.0	Visible
C01	42.0/0.0/38.0	45.0	124.0	Tracking
C02	44.0/41.0/45.0	48.0	236.0	Tracking

2-3 Function section

There are four main section on the bottom: Project (*Chapter 3*), Device (*Chapter 4*), Survey (*Chapter 5*), Tools (*Chapter 6*)

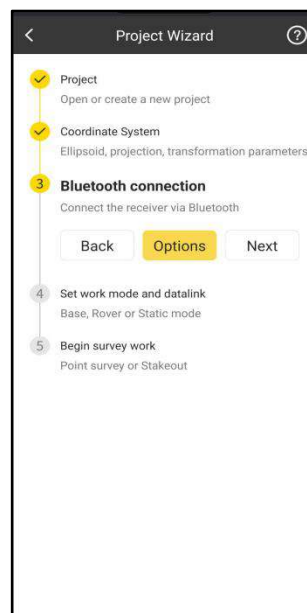
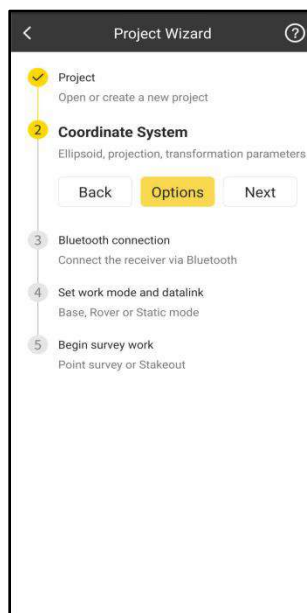
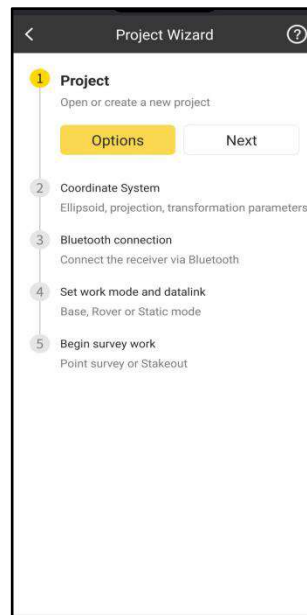
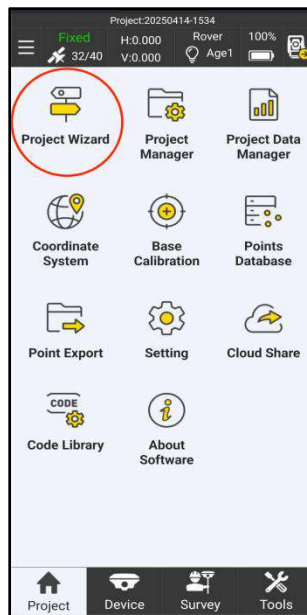


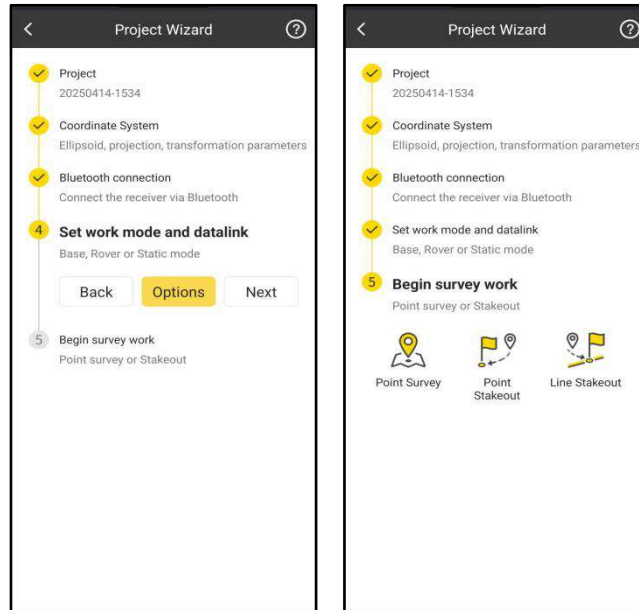
Chapter 3 Project



3-1 Project Wizard

Project wizard is a quick workflow to start working by Survstar, it contains the Project (Project Manager, Coordinate System), Device (Connection, Rover/Base/Static mode and datalink), Survey(Point Survey, Point Stakeout, Line Stakeout) configuration, Click the “Options” to change the configurations.





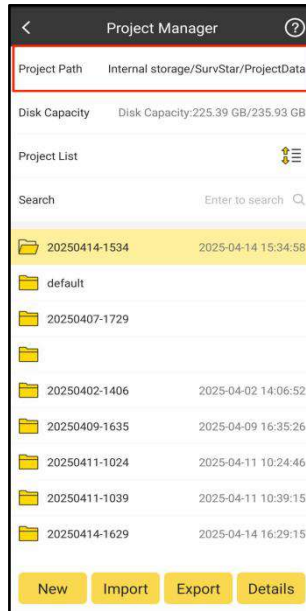
3-2 Project Manager

Project Manager defines the title of a project, and where the project folder store. You can choose and check the data on the previous project, or create a new project file.



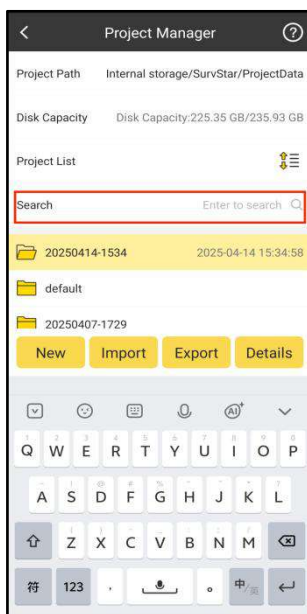


Projects we created are saved in the default directory of controller: Internal storage/Survstar/ProjectData.



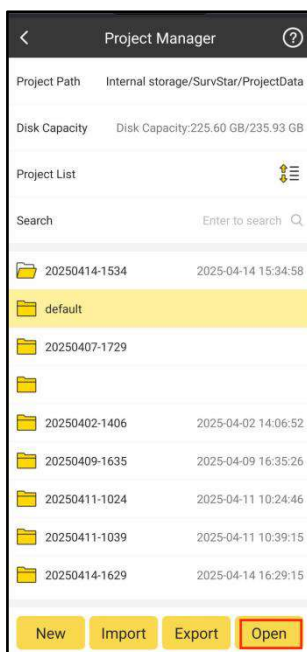
3-2-1 Search Project

In Project Manager-Project List, we can search projects.



3-2-2 Open Project

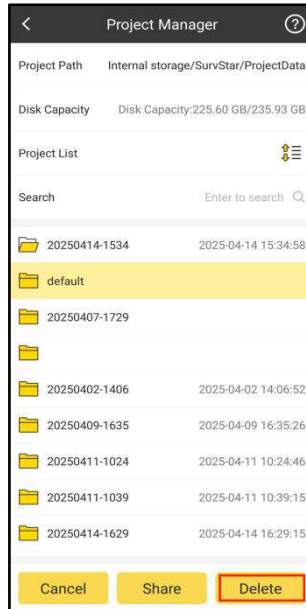
Choose the project, Click **Open**, then the project selected will be opened.





3-2-3 Delete project

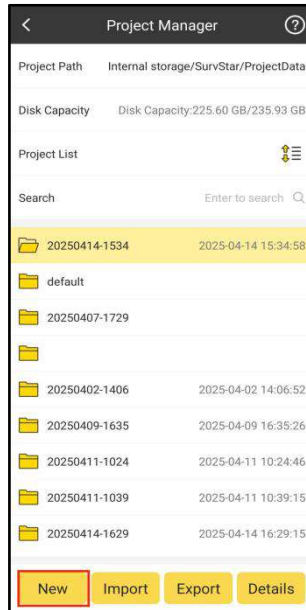
Long press for 1 second, the toolbar below will display delete button, click **Delete**, and this project will be deleted.



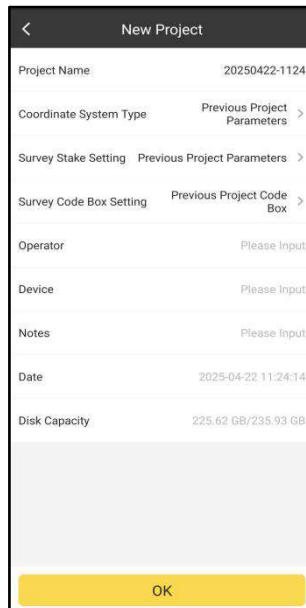
3-2-4 Create new project

When we run Survstar, we need to create a project and define basic information such as project name, operator and coordinate system type.

Click **New** to create a new project.



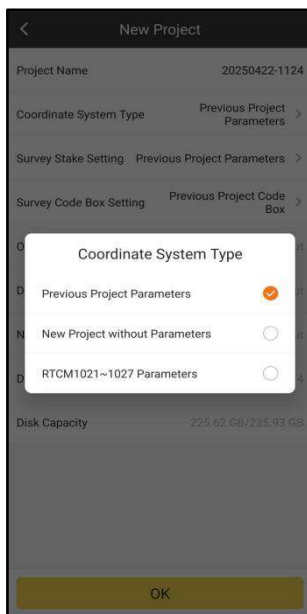
Input the Project Name, project name doesn't not support "space", supports numbers/letters/-



Coordinate system type: Previous Project Parameters (use the same coordinate system



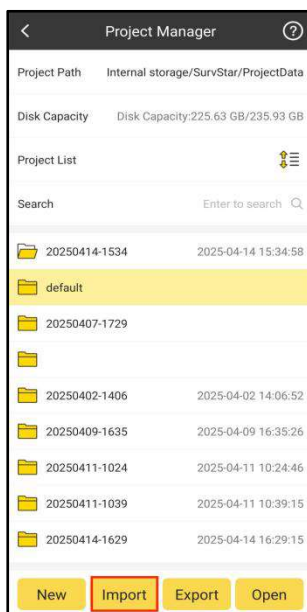
parameters in previous project), New project without parameters (no projection and ellipsoid parameter, you need to set it on Survstar-Project-Coordinate system later), RTCM1021~1027 Parameters (if select this one, then the Coordinate System parameter in Survstar will not be used, Survstar will use the coordinate system parameters which received by NTRIP CORS with RTCM1021~1027).



3-2-5 Import Project

If projects from other controllers are copied into Survstar/ProjectData, we can open them directly; if they are copied into other directory, we can import them by loading their project file (*.configure).

Click **Import** in Project Manager.



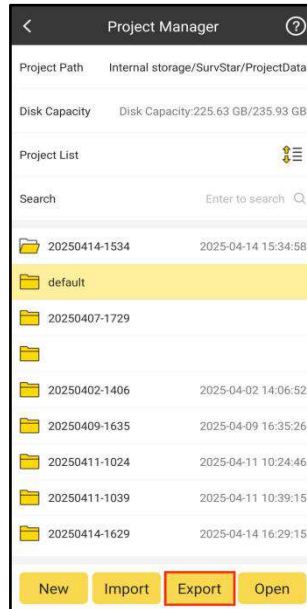
Find the target project folder, choose the project file (*.configure) saved before, and click OK. Then the project will be opened.





3-2-6 Export Project

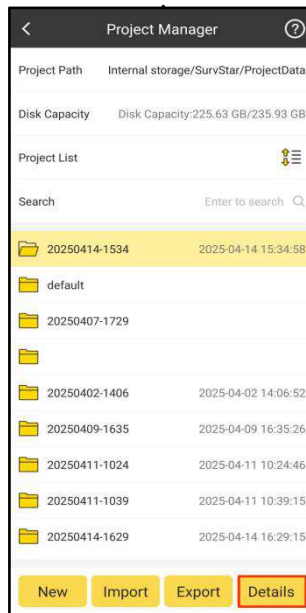
Click **Export** in Project Manager.



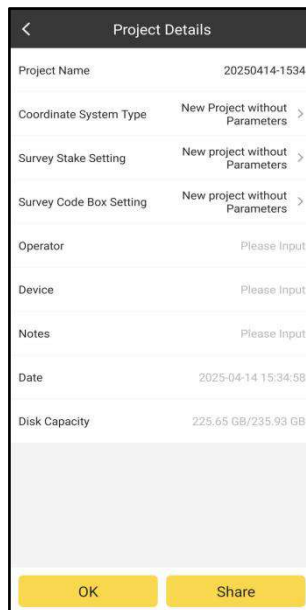
Choose the directory we want to save the project. Click OK. Then the project will be saved.

3-2-7 Project Details

Choose the target project, and Click Details



2. We can find relevant project information, such as Project Name, Coordinate System type etc.



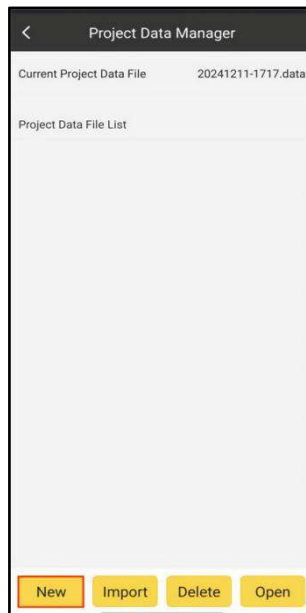


3-3 Project Data Manager

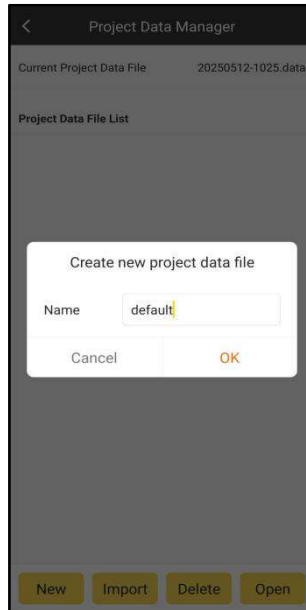
With that function we can manage the surveyed data. We can create, import, delete and change the surveyed data.

New Project Data:

1. Click **New**.



2. Input the name of the new project data and click **OK**.



3.The new project data created successfully.

Import Project Data:



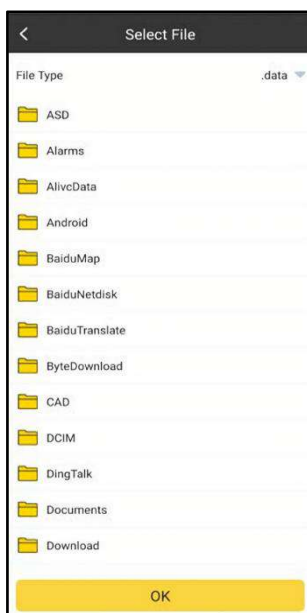


We can import the project data from the file (*.data).

Click **Import**



2.Find the correct location of the project data file and choose that file we wanted. Click **OK**.





Delete Project Data:

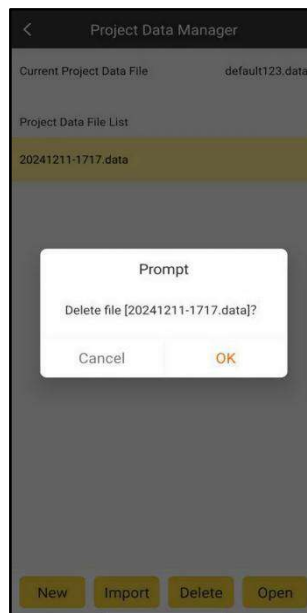
1. Choose the project data we wanted to delete. Then click **Delete**.



2. Click **OK**



. The project data file will be deleted.

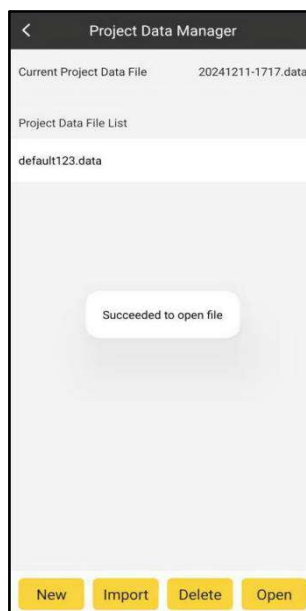


Open Project Data:

1. Choose the project data we wanted to open. Then click **Open**.

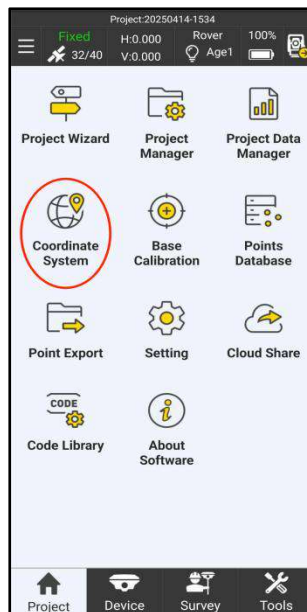


2. Then the chosen project data is opened.

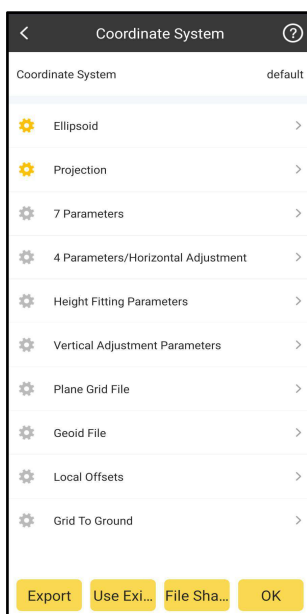




3-4 Coordinate System

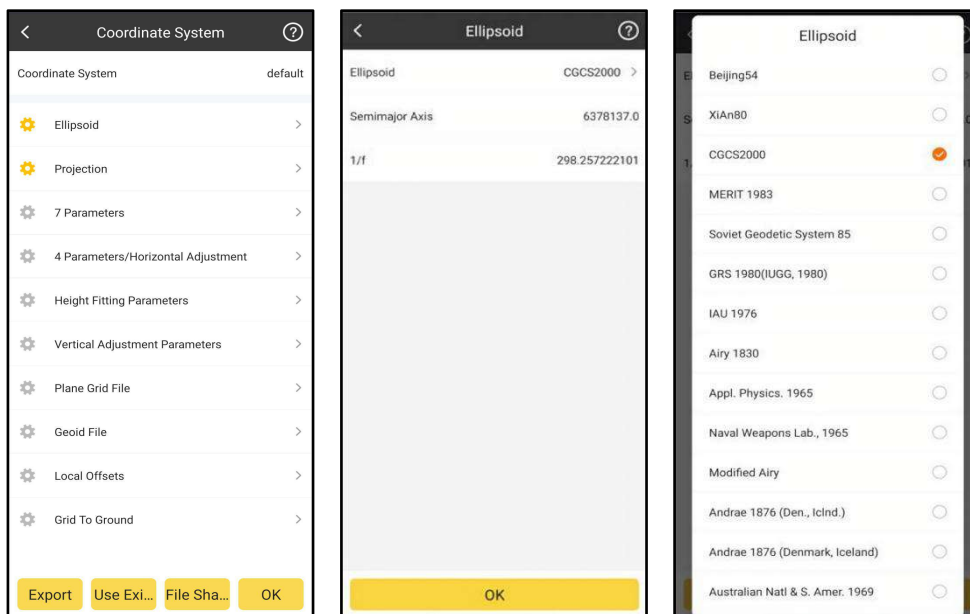


In coordinate system, we can create new coordinate system by defining the name, ellipsoid, projection, 7 parameters, 4 parameters, height fitting parameters, vertical adjustment parameters, plane grid file, geoid file and local offsets.



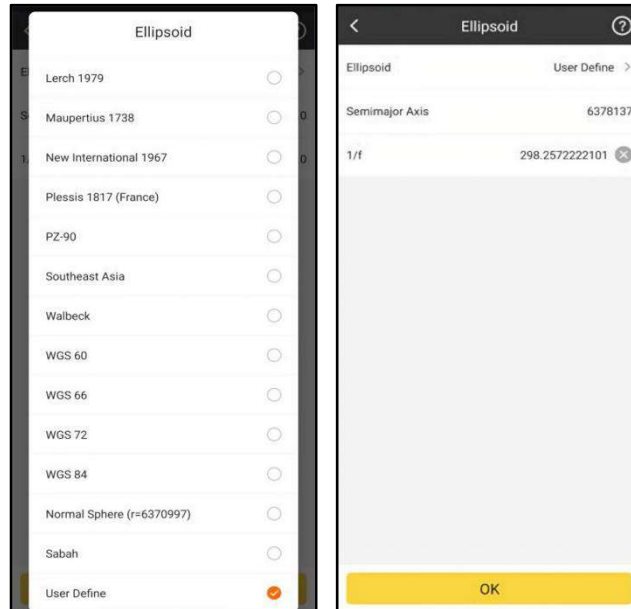
Ellipsoid:

1. In Ellipsoid, we can define the existing Ellipsoid for current project.



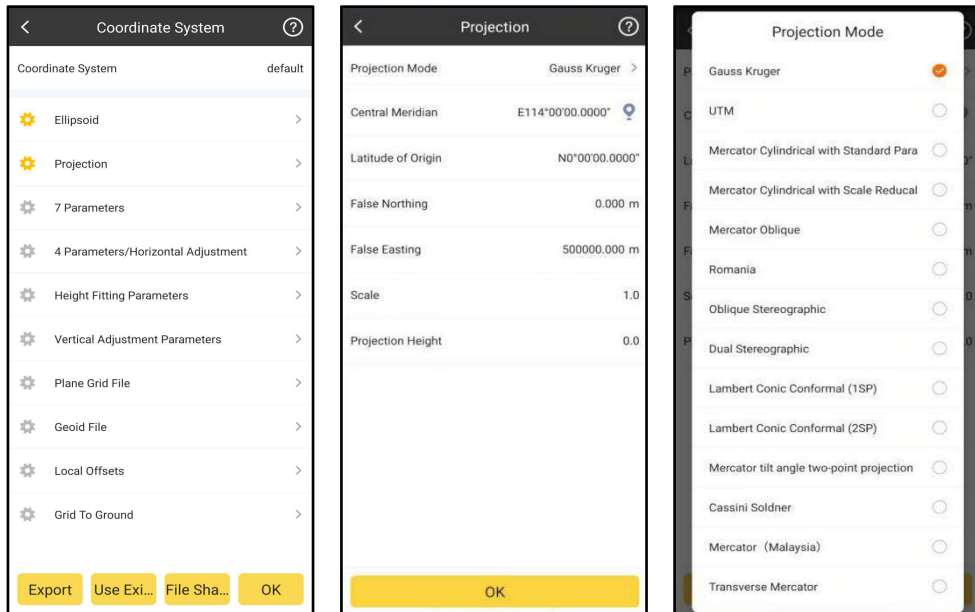


2. Also in **User Define** ,, we can define the ellipsoid by inputting Semimajor Axis and $1/f$ parameters.



Projection:

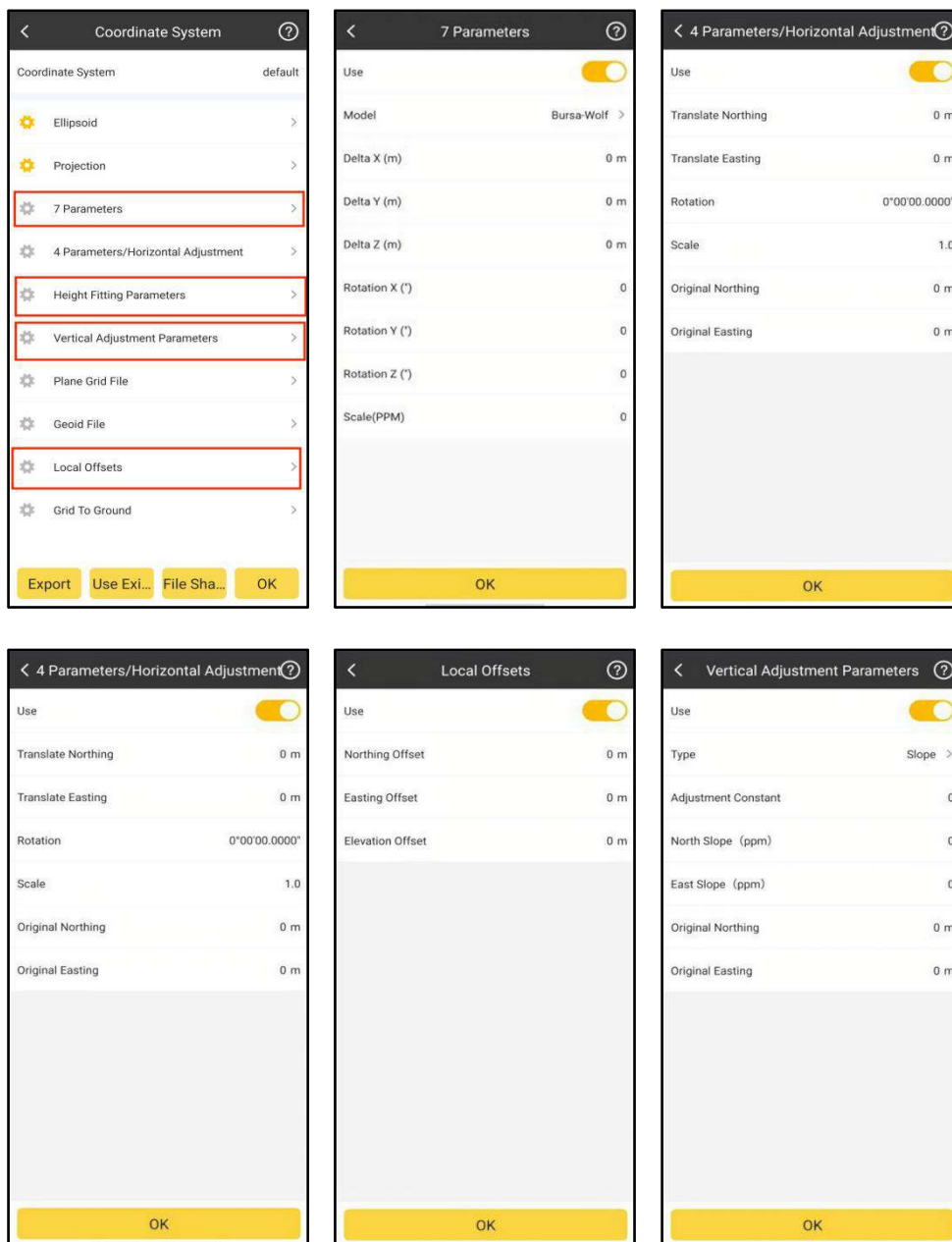
In Projection, we can define relevant projection parameters such as Projection Mode, Central Meridian, Latitude of Origin and so on.



Note: We can acquire Central Meridian of current position by clicking

Coordinate Parameters:

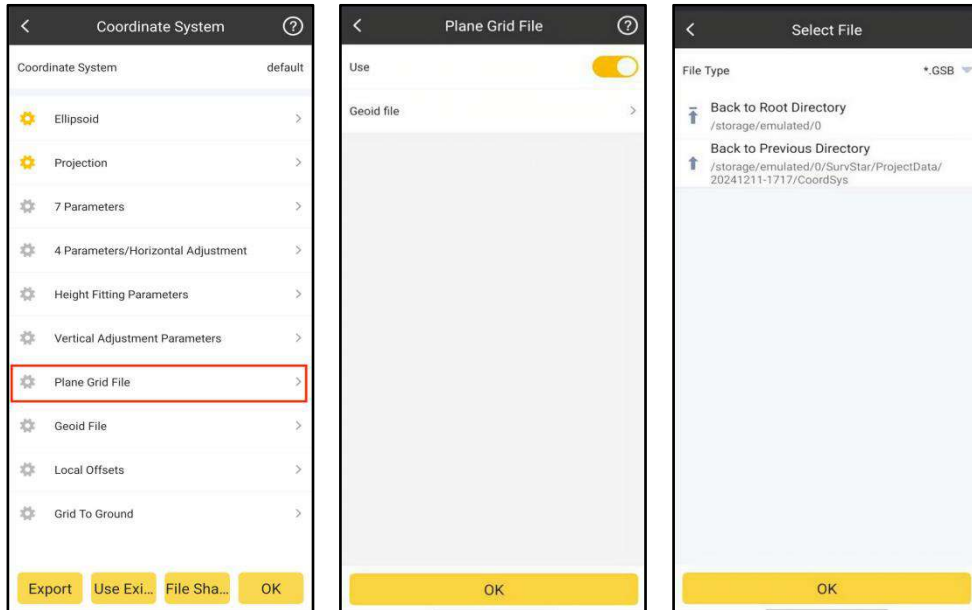
Also we can define 7 Parameters, 4 Parameters, Height Fitting Parameters, Vertical Adjustment Parameters and Local Offsets.



If the function is enabled, the icon  in front of it will turn to .

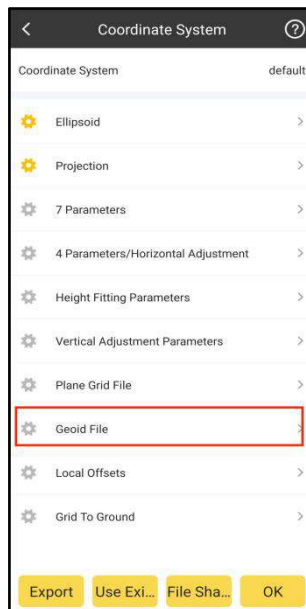
Plane Grid File:

In Plane Grid File, we can add *.GSB format file to adjust plane coordinates.



Geoid File:

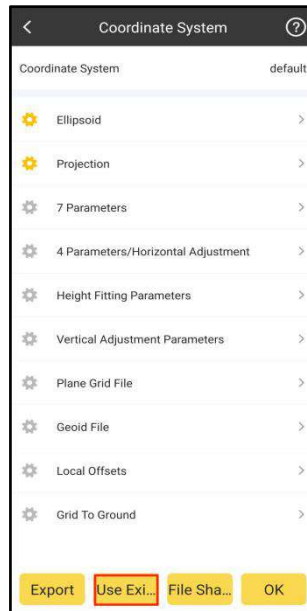
In Geoid File, we can add *.SGF or *.GGF format file to adjust elevation coordinates.



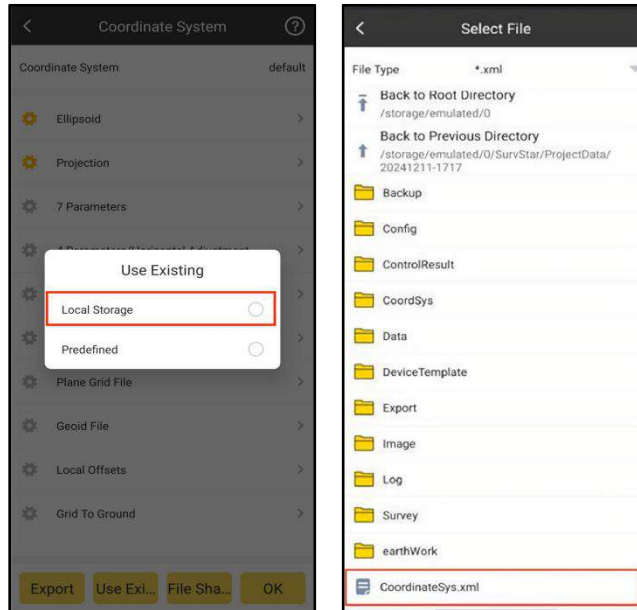


Use Existing File:

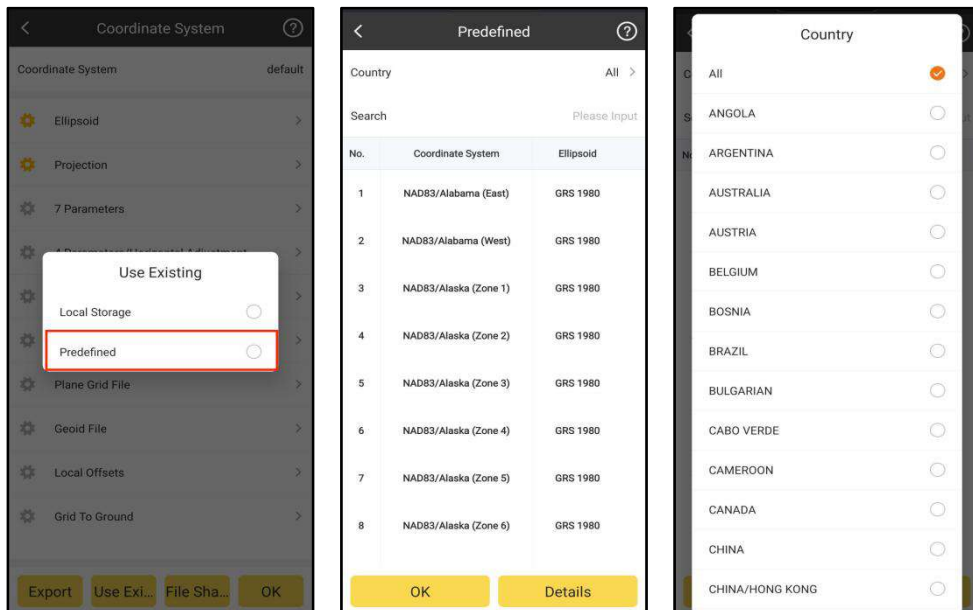
We can click **User Existing** ,to select and apply the existing predefined coordinate system or use the coordinate system file (*.xml).



Click **Local Storage** , find the coordinate system file (*.xml) and click it, the coordinate system will be applied.

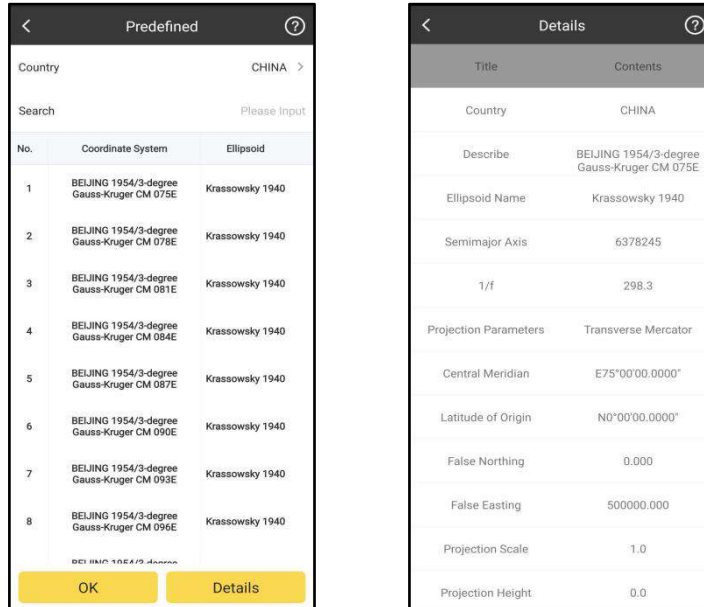


Click **predefined**, then click **Country** and select the country or region (Alphabetical) where the needed coordinate system is located.

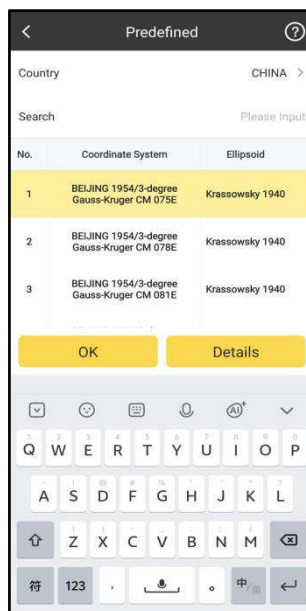




Then select the needed coordinate system and click **OK** to apply it, we can click **Details** to check its information.



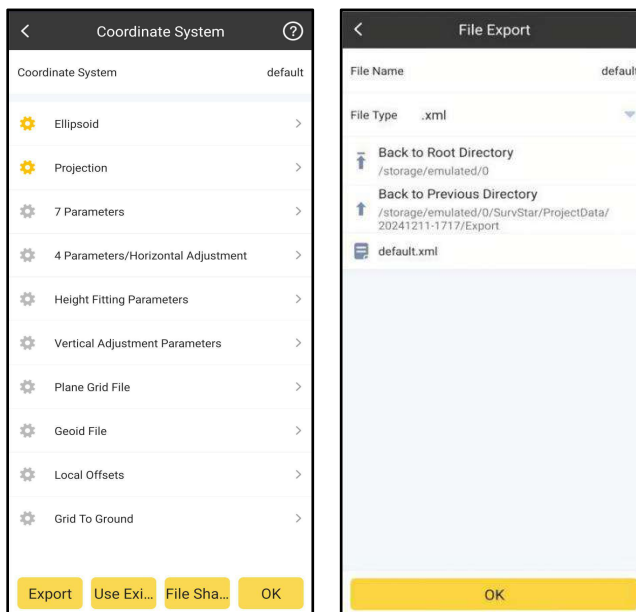
We can also search coordinate system with keywords in Search bar.





Export:

If we need to save the coordinate system in file, we can click **Export**, input File Name, select the path to save it and click **OK**, the coordinate system file will be exported.



3-5 Base Calibration

We can calibrate the base coordinate using this function.

There are two ways to calibrate: one is Base on Known Point Calibration, set up base on a known point, and when rover gets fixed solution, input known point coordinates to calibrate; the other is Base on Unknown Point Calibration, set up base on an unknown point, when rover gets fixed solution, put rover on a known point and known point coordinates to calibrate.



The screenshot shows the 'Base Calibration' screen. At the top, there is a title bar with a back arrow, the text 'Base Calibration', and a help icon. Below the title bar, the text 'Base Calibration mode:' is followed by two radio button options: 'Base on Known Point' and 'Base on Unknown Point'. The 'Base on Unknown Point' option is selected, indicated by an orange dot. Below the options, there is a 'Note:' section with the text: '[Base on known point] mode will not be available, if Rover doesn't receive Base's correction data and get Fixed solution..'. At the bottom of the screen, there is a yellow button labeled 'Next'.

Base on Known Point:

Set up base on a known point, after rover gets fixed solution, we can start do the calibration.

1. Choose **Base on Known Point**, and click **Next**.

This screenshot is identical to the one above, showing the 'Base Calibration' screen with 'Base on Unknown Point' selected. It includes the title bar, mode selection, note, and the 'Next' button.

The screenshot shows the 'Base Calibration' screen after selecting 'Base on Known Point'. The 'Base on Known Point' option is now selected with an orange dot. The 'Note' section remains the same. Below the note, there are several input fields: 'Base NEH' with a link 'Previous Base Info >', 'Name' (Please Input), 'Northing' (Please Input), 'Easting' (Please Input), 'Height' (Please Input), 'Measured Antenna Height' (Please Input), 'Antenna Height Type' (Pole Height >), 'Base SN' (No base station information >), 'Base BLH', 'Latitude' (N22°59'58.2000"), and 'Longitude' (E112°59'58.2000"). At the bottom, there is a yellow button labeled 'Calibrate'.



2. In this page, we can click **Base NEH**, to find the historical base station information.

Base Calibration

Base NEH Previous Base Info >

Name

Please Input

Northing

Please Input

Easting

Please Input

Height

Please Input

Measured Antenna Height

Please Input

Antenna Height Type

Pole Height >

☒ Base SN

No base station information >

Base BLH

Latitude

N22°59'58.2000"

Longitude

E112°59'58.2000"

Calibrate

Historical base station

Total 1 Page 1/1

Id	Longitude	Latitude	Elevation	North
1	E112°59'58.2000"	N22°59'58.2000"	30.500	2544832.1

3. Find the right historical base station, and click **Choose**, then the relevant coordinates information will be applied.

Base Calibration

Base NEH Previous Base Info >

Name

P1

Northing

2544811.37

Easting

39752.124

Height

30.682

Measured Antenna Height

1.80

Antenna Height Type

Pole Height >

☒ Base SN

No base station information >

Base BLH

Latitude

N22°59'58.2000"

Longitude

E112°59'58.2000"

Calibrate



4. Also we can input base information manually.

Base Calibration

Base NEH [Previous Base Info](#)

Name P1

Northing 2544800.37

Easting 39738.124

Height 29.632

Measured Antenna Height 1.80

Antenna Height Type Pole Height

☒ Base SN No base station information

Base BLH

Latitude N22°59'58.2000"

Longitude E112°59'58.2000"

Calibrate

5. Then we can select right antenna type and input relevant antenna height.

Base Calibration

Base NEH [Previous Base Info](#)

Name P1

Northing 2544800.37

Easting 39738.124

Height 29.632

Measured Antenna Height 1.80

Antenna Height Type Pole Height

☒ Base SN No base station information

Base BLH

Latitude N22°59'58.2000"

Longitude E112°59'58.2000"

Calibrate

Antenna Height Type

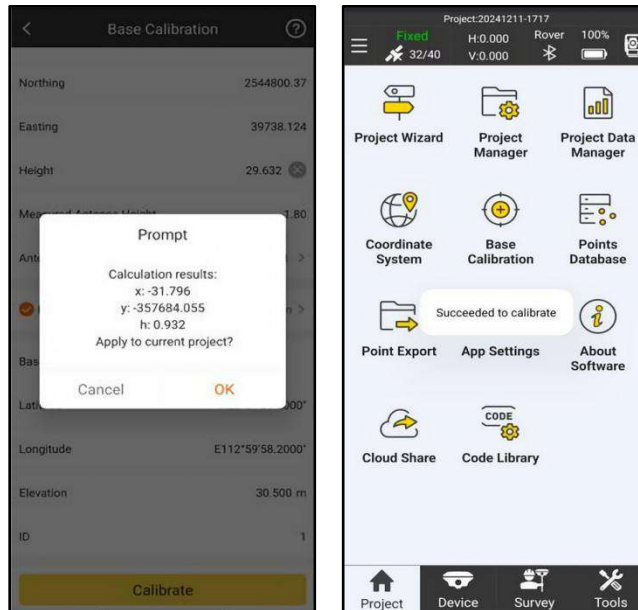
Real Height

Pole Height

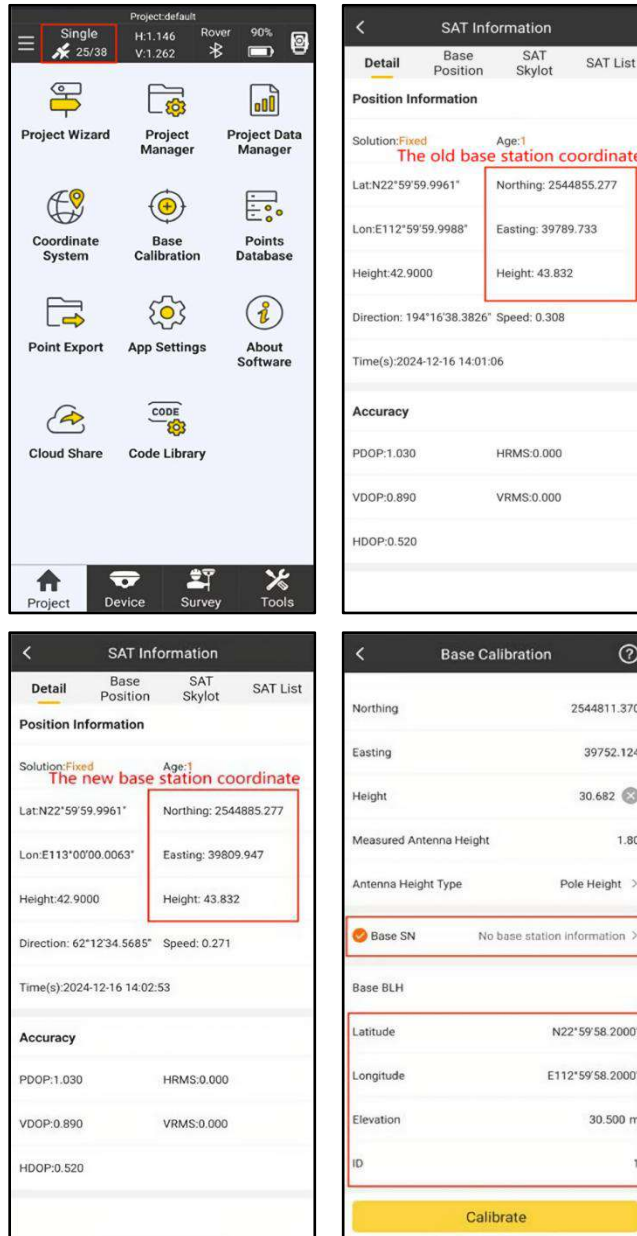
Measuring Plate Height



6. Click Calibrate and then there will be a popup to show the calculation results. Click OK then the results will be applied.

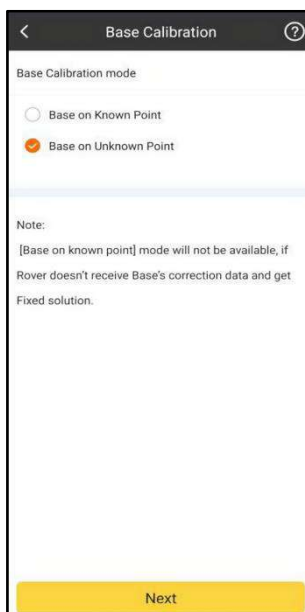


7. And then in Survstar, we can go to SAT Information, find the base position has been changed.



Base on Unknown Point: Set up base on a unknown point, after rover gets fixed solution, we move rover on a known point and then start calibration.

Choose **Base on Unknown** Point and click **Next**.



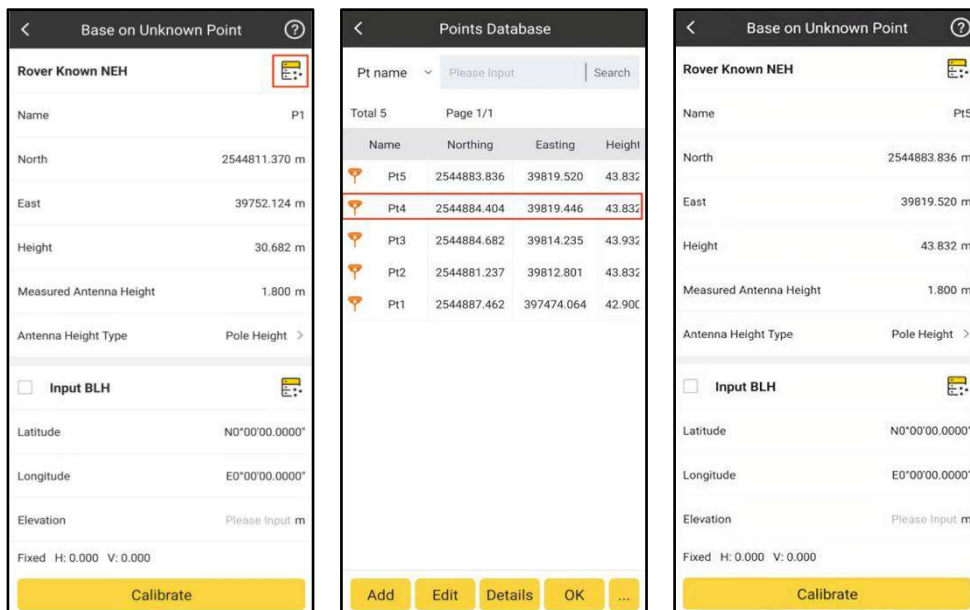
Base Calibration mode

☐ Base on Known Point
☒ Base on Unknown Point

Note:
 [Base on known point] mode will not be available, if
 Rover doesn't receive Base's correction data and get
 Fixed solution.

Next

2. We can input the known points coordinates by selecting it from data base (if it is in the Point Data base).



Base on Unknown Point

Rover Known NEH

Name P1

North 2544811.370 m

East 39752.124 m

Height 30.682 m

Measured Antenna Height 1.800 m

Antenna Height Type Pole Height >

☐ Input BLH

Latitude N0°00'00.0000"

Longitude E0°00'00.0000"

Elevation Please Input m

Fixed H: 0.000 V: 0.000

Calibrate

Points Database

Pt name Please Input Search

Total 5 Page 1/1

Name	Northing	Easting	Height
Pt5	2544883.836	39819.520	43.832
Pt4	2544884.404	39819.446	43.832
Pt3	2544884.682	39814.235	43.932
Pt2	2544881.237	39812.801	43.832
Pt1	2544887.462	397474.064	42.900

Add Edit Details OK ...

Base on Unknown Point

Rover Known NEH

Name Pt5

North 2544883.836 m

East 39819.520 m

Height 43.832 m

Measured Antenna Height 1.800 m

Antenna Height Type Pole Height >

☐ Input BLH

Latitude N0°00'00.0000"

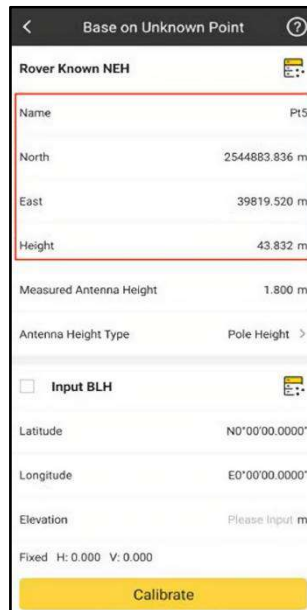
Longitude E0°00'00.0000"

Elevation Please Input m

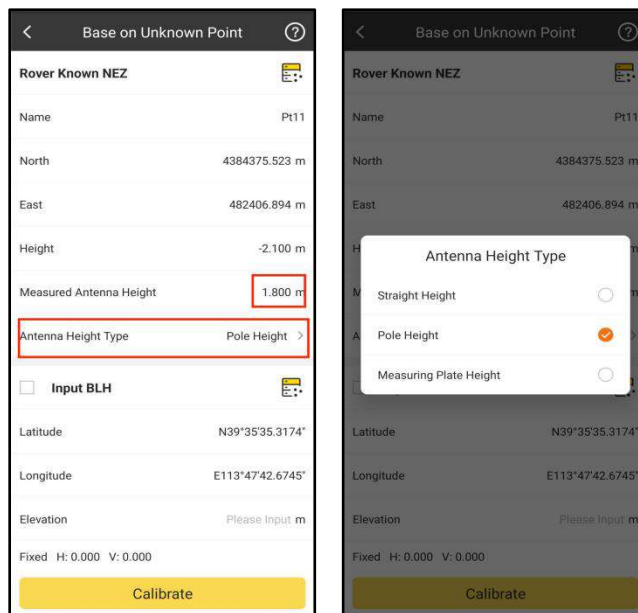
Fixed H: 0.000 V: 0.000

Calibrate

Or we can input NEH information manually.



3. Then we can select right antenna type and input relevant antenna height.



Then click Calibration to calculate the calibration parameters.

Note: we can acquire current position's BLH automatically here. if ReadFrom GPS(average



count) is enabled, then ARCSuer will collect current position's BLH for 5 times and take the average value.

< Base on Unknown Point ?

Name

Pt5

North

2544883.836 m

East

39819.520 m

Height

43.832 m

Measured Antenna Height

1.800 m

Antenna Height Type

Pole Height >

☐ Input BLH

Latitude

N0°00'00.0000"

Longitude

E0°00'00.0000"

Elevation

Please Input m

Fixed H: 0.000 V: 0.000

☐ Read From GPS(average count)

Calibrate

< Base on Unknown Point ?

Name

Pt5

North

2544883.836 m

East

39819.520 m

Height

43.832 m

Measured Antenna Height

1.800 m

Antenna Height Type

Pole Height >

☐ Input BLH

Latitude

N0°00'00.0000"

Longitude

E0°00'00.0000"

Elevation

Please Input m

Fixed H: 0.000 V: 0.000

☒ Read From GPS(average count)

Calibrate

It will show the calculation results, and click **OK** to apply the result.

< Base on Unknown Point ?

Name

Pt5

North

2544883.836 m

East

39819.520 m

Height

43.832 m

Measured Antenna Height

1.800 m

Antenna Height

4/5, Collecting...

Pole Height >

☐ Input BLH

Latitude

N0°00'00.0000"

Longitude

E0°00'00.0000"

Elevation

Please Input m

Fixed H: 0.000 V: 0.000

☒ Read From GPS(average count)

Calibrate

< Base on Unknown Point ?

Name

Pt5

North

2544883.836 m

East

39819.520 m

Height

43.832 m

Measured Antenna Height

1.800 m

Antenna Height

4/5, Collecting...

Pole Height >

☐ Input BLH

Latitude

N0°00'00.0000"

Longitude

E0°00'00.0000"

Elevation

Please Input m

Fixed H: 0.000 V: 0.000

☒ Read From GPS(average count)

Calibrate

Project: 20241211-1717

Fixed H: 0.000 V: 0.000

Rover 32/40 100%

Project Wizard

Project Manager

Project Data Manager

Coordinate System

Base Calibration

Points Database

Succeeded to calibrate

Point Export

App Settings

About Software

Cloud Share

Code Library

Project

Device

Survey

Tools



Note: if we enable Input BLH here, we can input current BLH manually or get it from Point Database directly.

The first screenshot shows the 'Base on Unknown Point' screen with the 'Input BLH' checkbox checked. The second screenshot shows the 'Input BLH' checkbox checked and the BLH values being entered. The third screenshot shows the 'Input BLH' checkbox checked and the BLH values being entered.

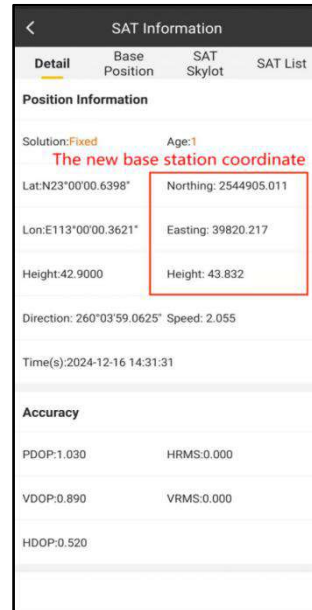
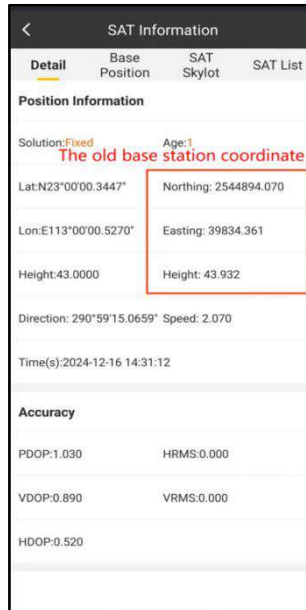
Field	Value
Name	Pt5
North	2544883.836 m
East	39819.520 m
Height	43.832 m
Measured Antenna Height	1.800 m
Antenna Height Type	Pole Height
Input BLH	<input checked="" type="checkbox"/>
Latitude	N0°00'00.0000"
Longitude	E0°00'00.0000"
Elevation	Please Input m
Fixed H: 0.000 V: 0.000	
Read From GPS(average count)	<input type="checkbox"/>
Calibrate	Button

The first screenshot shows a 'Prompt' dialog box with the following text: 'Calculation results: x: 14.430 y: -25.235 h: 0.040 Apply to current project?'. The second screenshot shows the 'Succeeded to calibrate' message.

Calculation results:
x: 14.430
y: -25.235
h: 0.040
Apply to current project?

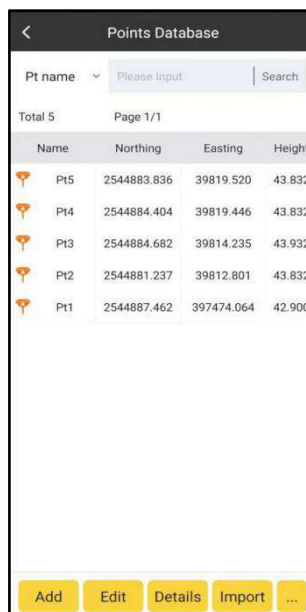
Succeeded to calibrate

And then in Survstar, we can goto SAT Information, find the base position has been changed.



3-6 Points Database

In Points Database, we can manage points by Add, Edit, Check Details, Import and other operations.





Add:

Click **Add**, we can input points coordinates manually here and add it to the Database.

Firstly, we need to define the Point Name.

The first screenshot shows the 'Points Database' screen with a table of points. The second and third screenshots show the 'Add' screen with fields for Name, Code, Coordinate Type, Northing, Easting, Height, and an 'Append Continuously' checkbox.

Name	Northing	Easting	Height
Pt5	2544883.836	39819.520	43.832
Pt4	2544884.404	39819.446	43.832
Pt3	2544884.682	39814.235	43.932
Pt2	2544881.237	39812.801	43.832
Pt1	2544887.462	397474.064	42.900


Then the Code:

If we don't need Code property, we can leave it blank.

If we plan to attach Code property to the point, we can input code directly.

Add


Name Pt6

Code Please Input 

Coordinate Type >

Northing 2445963.467 m

Easting 39468.412 m



Height 59.781 m 

☒ Append Continuously

OK

Add

Name Pt6

Code ArrowLeft  

Coordinate Type >

Northing 2445963.467 m

Easting 39468.412 m

Height 59.781 m


☒ Append Continuously

OK

There are predefined codes in the data base, by searching and selecting, we can try to find the code we need.

Add

Name Pt6

Code 

Coordinate Type >

Northing 3.467 m

Easting 8.412 m



Height 9.781 m

☒ Append Continuously

OK

Add

Name Pt6

Code BridgeAbutment  

Coordinate Type >

Northing 2445963.467 m

Easting 39468.412 m

Height 59.781 m

☒ Append Continuously

OK

If we want to check the predefined code data base, we can click the icon to access.



The first screenshot shows the 'Code' screen with a search bar and a list of codes. The second screenshot shows the 'Add' screen with fields for Name, Code, Coordinate Type, North, East, and Height, and a checkbox for 'Append Continuously'. The third screenshot shows the 'Edit' screen with fields for Name, Code, Coordinate Type, North, East, and Height, and a keyboard.

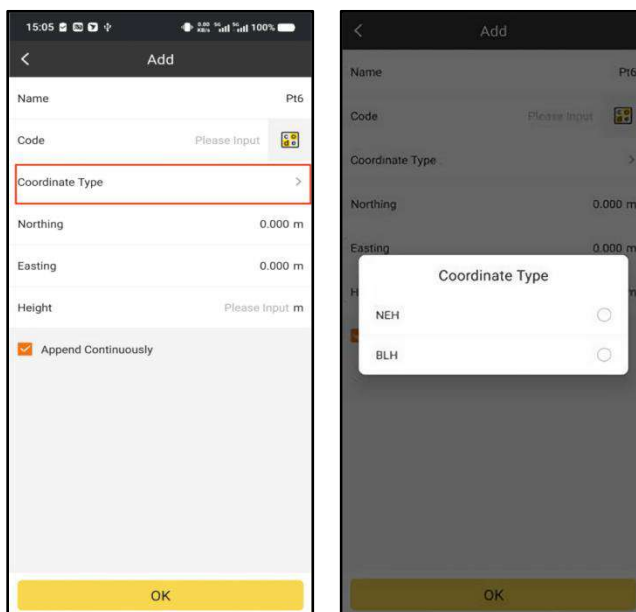
No	Code Name	Code
0	A	Arrow
1	ACP	AcPad
2	AFR	ArrowForwardRight
3	AL	ArrowLeft
4	AR	ArrowRight
5	ATA	AnyTree
6	AW	Awning
7	BA	BridgeAbutment
8	BC	BackCurb
9	BLDG	building
10	BP	BarrierPost
11	BRSH	BRUSH
12	BSH	BUSH

In Manage . We can manage the code database. It includes Add, Edit, Delete, Choose and Import. Click Add to add a code library. We can create the code we need.

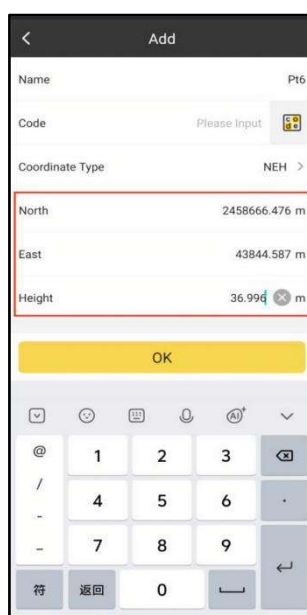
The first screenshot shows the 'Code Library' screen with a table of file names and full paths. The second screenshot shows the 'Code Library' screen with a 'No data' message. The third screenshot shows the 'Edit' screen with fields for Name, Describe, Feature Type, Layer, Point symbol, and Attribute.

File Name	Full path
GlobalFeatures	SurvStar/Config/GlobalFeatures.txt

Then we need to choose the Coordinate Type. There are two types: NEH and BLH.



Then we can input the coordinate of the point.



Click **OK**. The new point is created in point database.



Points Database

Pt name Search

Total 6 Page 1/1

Name	Northing	Easting	Height
Pt6	2458666.476	43844.587	36.996
Pt5	2544883.836	39819.520	43.832
Pt4	2544884.404	39819.446	43.832
Pt3	2544884.682	39814.235	43.932
Pt2	2544881.237	39812.801	43.832
Pt1	2544887.462	397474.064	42.900

Add Edit Details Import ...

Eidt:

Select the point we want to edit and click **Edit**. We can edit the coordinate, code and name of the selected point.

Points Database

Pt name Search

Total 6 Page 1/1

Name	Northing	Easting	Height
Pt6	2458666.476	43844.587	36.996
Pt5	2544883.836	39819.520	43.832
Pt4	2544884.404	39819.446	43.832
Pt3	2544884.682	39814.235	43.932
Pt2	2544881.237	39812.801	43.832
Pt1	2544887.462	397474.064	42.900

Add Edit Details Import ...

Edit

Name

Code

Coordinate Type

North

East

Height

OK



Note: for Survey Points and Stakeout Points, we can only edit Point Name and Code.

Details:

Select the point we want to check and click Detail We can check the details of the selected point.

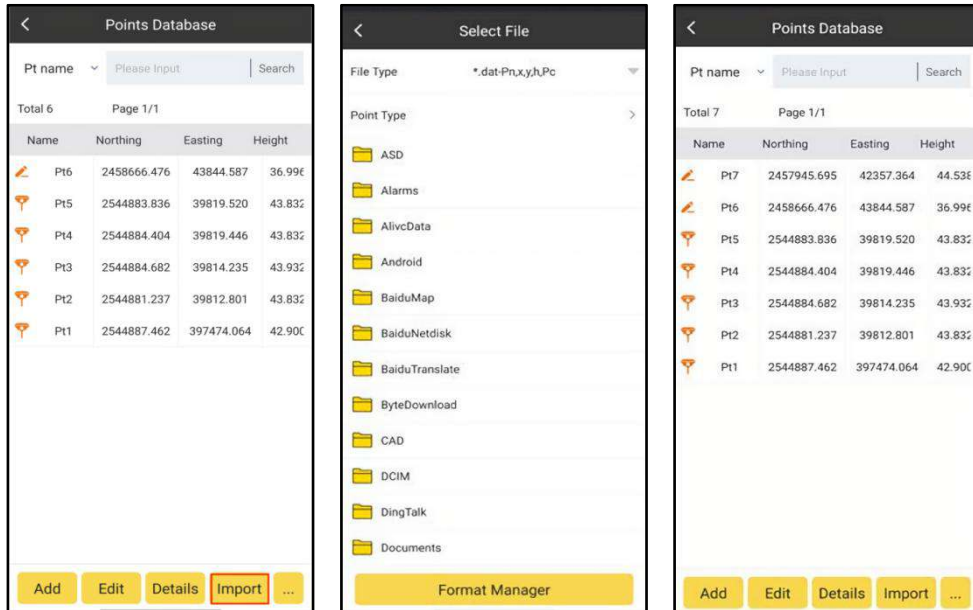
Points Database			
Pt name	Please Input		Search
Total 6	Page 1/1		
Name	Northing	Easting	Height
Pt6	2458666.476	43844.587	36.996
Pt5	2544883.836	39819.520	43.832
Pt4	2544884.404	39819.446	43.832
Pt3	2544884.682	39814.235	43.932
Pt2	2544881.237	39812.801	43.832
Pt1	2544887.462	397474.064	42.900

Detail	
Name	Pt6
Code	
Northing	2458666.476 m
Easting	43844.587 m
Height	36.996 m
Latitude	N22°13'18.3810"
Longitude	E113°02'41.0644"
Altitude	36.064
Solution	NONE
Coordinate Type	NEH
Local Time	2024-12-16 15:09:59
SD to Base	87.018 m
HD to Base	86.130 m

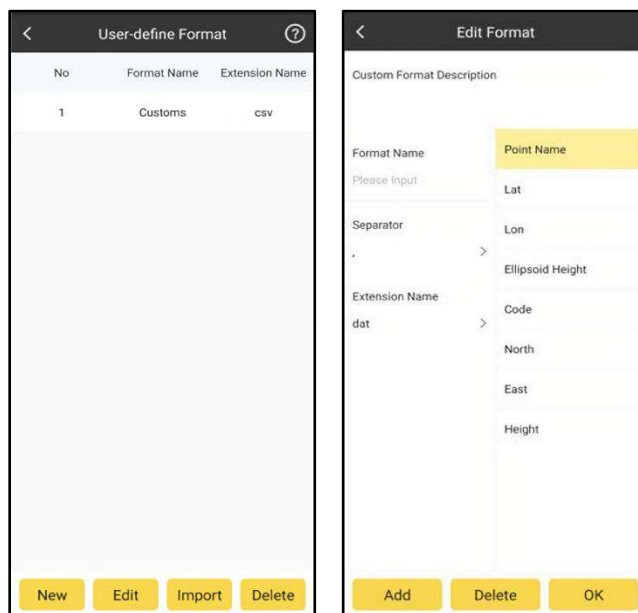
Detail	
Local Time	2024-12-16 15:09:59
SD to Base	87.018 m
HD to Base	86.130 m
HD to Last	86311.264 m
SD to Last	86311.264 m
PDOP	0.000
HRMS	0.000
VRMS	0.000
Antenna Height	0.000 m
Antenna Height Type	Slant Height
Record Mode	Input Point
Age	1
Locked SAT	0

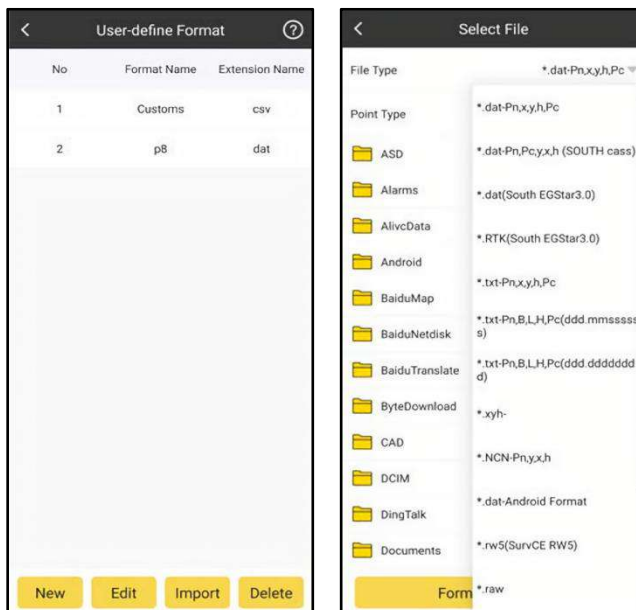
Import:

We can import points to Points Database Directly. When we import file, in Format Manager, we need to select the Import File Format, Point Type and Files Directory, then we can find the target file and load those points to Point Database.



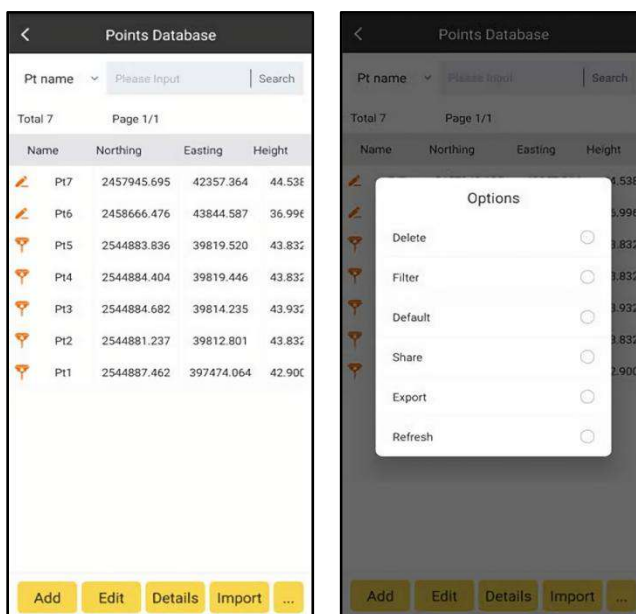
In Format Manager, we can define the imported file's format and contents. Then when we import files to Survstar, we just need to get the relevant format file, and import it directly.





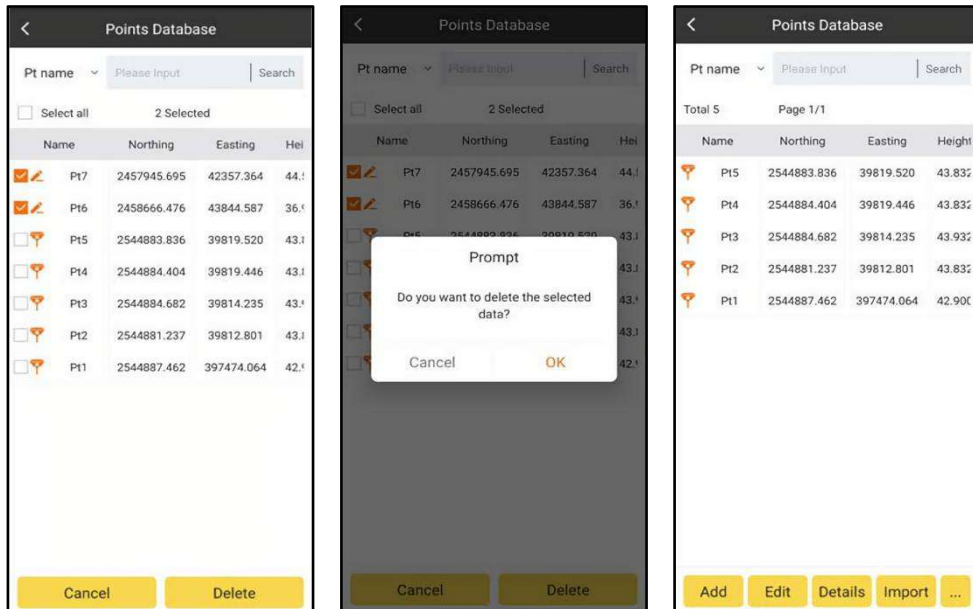
Options:




Besides basic, Add, Edit, Details and Import functions, by Clicking ... in the right of the tool bar. Then we can use the other function as Delete, Filter, Recover, Share, Export and Refresh.



**Delete:**

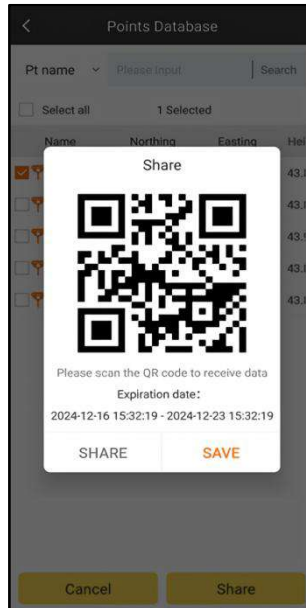
We can delete the points selected.

**Filter:**

We can let Point Database filter and display the points (Survey Point , Input Point  or Stake Point ) we need automatically.

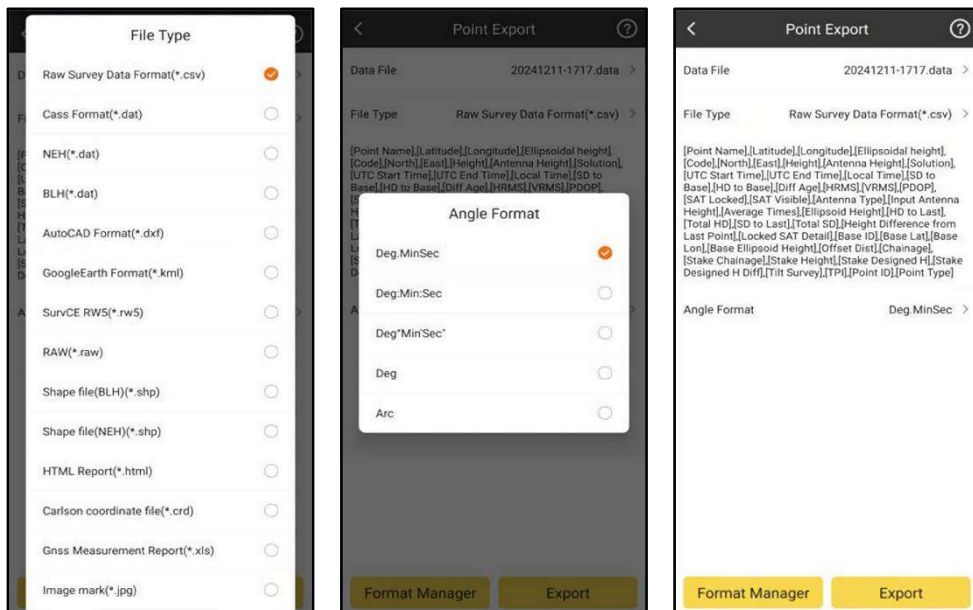
Share:

We can share the points to other users by QR code or Text format.

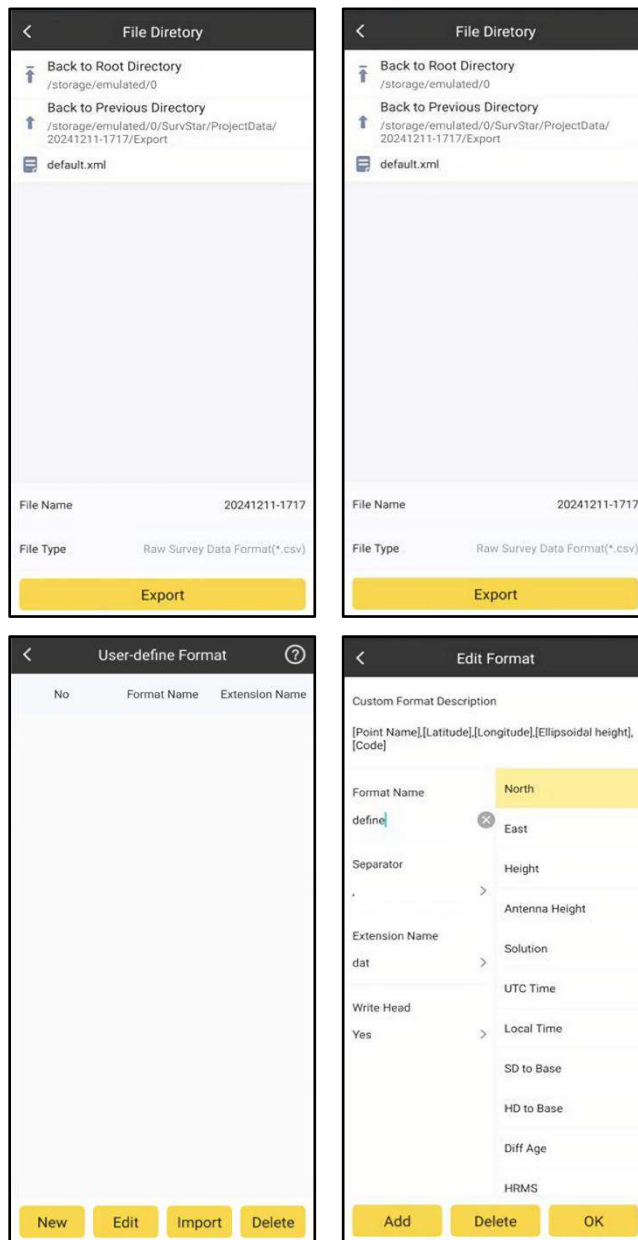


Export:

We can export data file in existing formats or self-define formats.

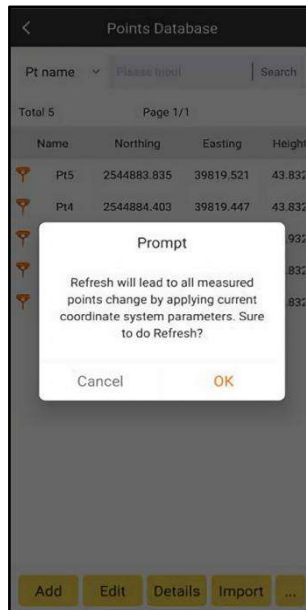


Select the export file path and click **Export**.



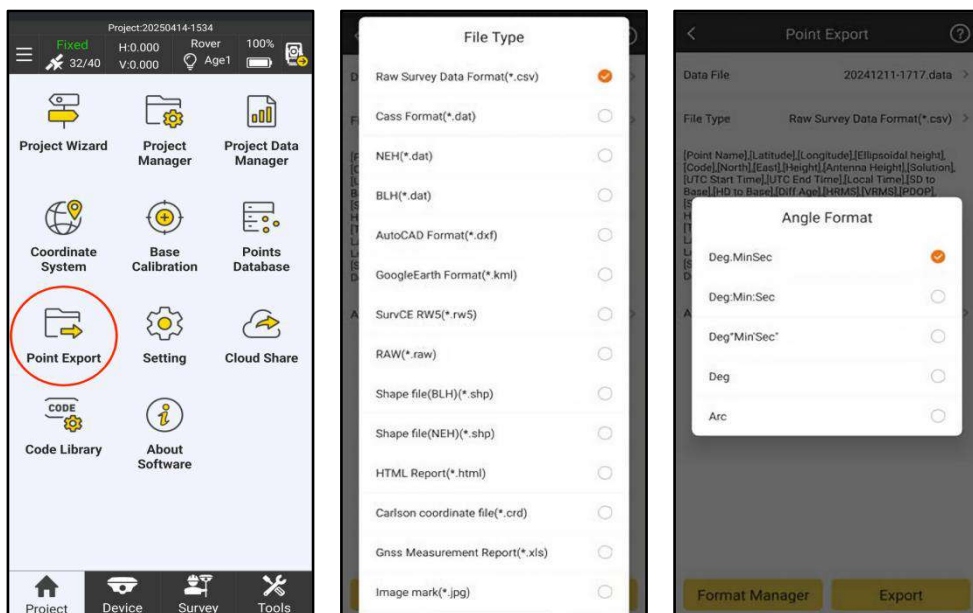
Refresh:

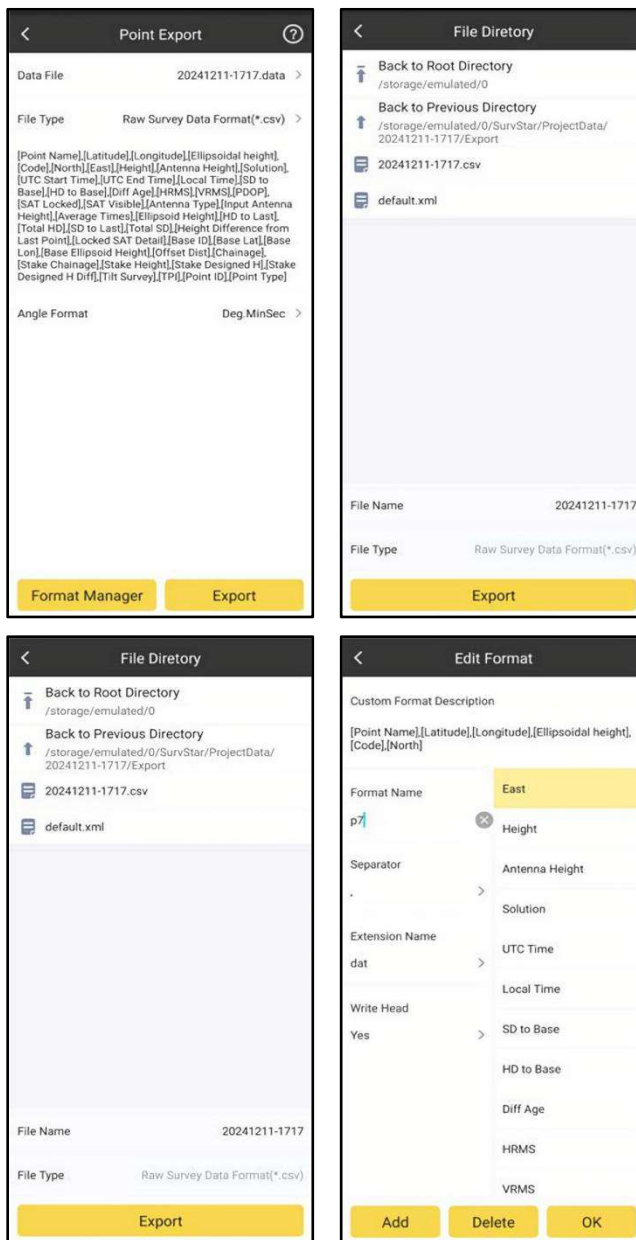
Click Refresh , we can apply the new Coordinate system parameters to the points in database.



3-7 Point Export

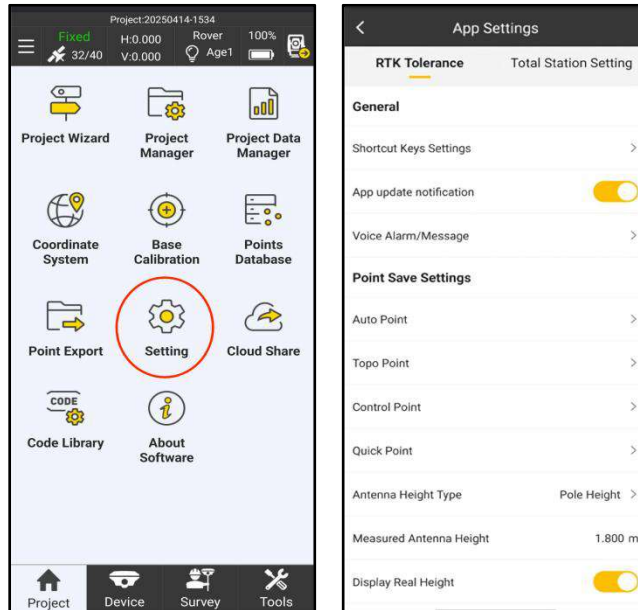
It is the same config as Point Export in Points Database.



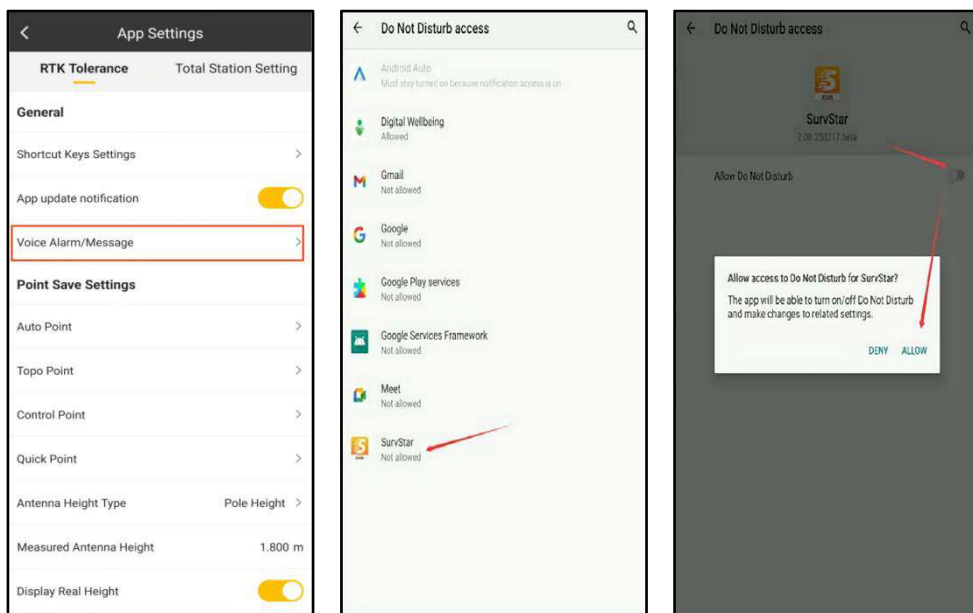


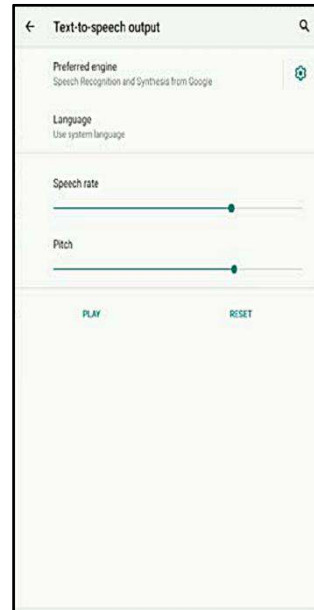
3-8 APP Settings - RTK

In APP Settings, we can do basic configurations (such as General config, Point Save Settings, System Settings and Display Settings) for Survstar.

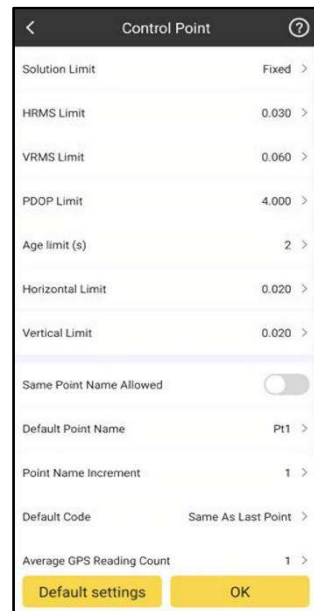
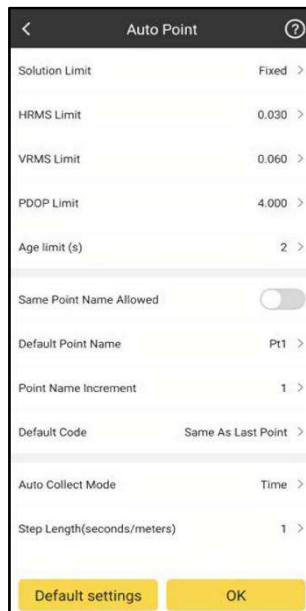
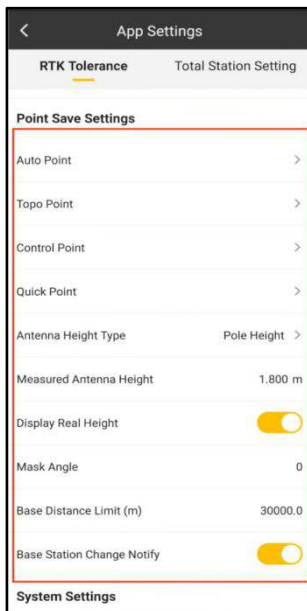


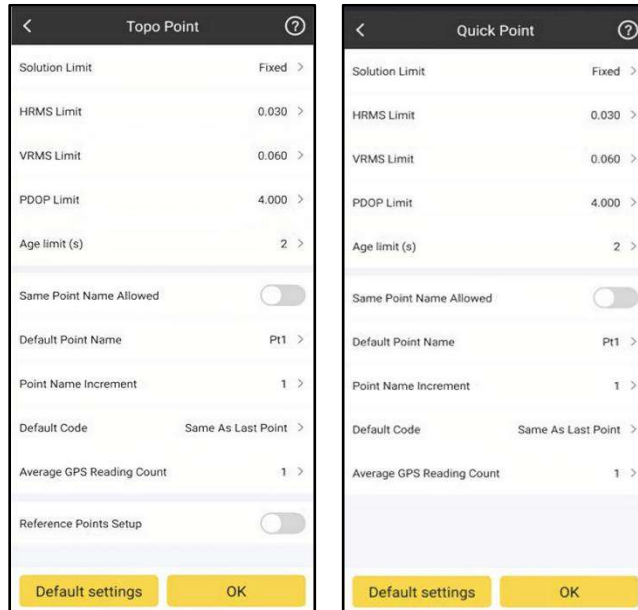
In General Config, we can set App update notification and App Voice Alarm.



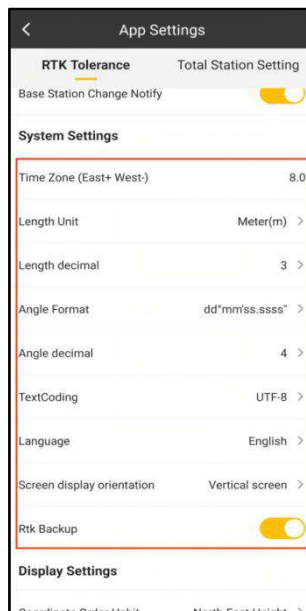


In Point Save Settings, we can set Point collection limits and parameters, Antenna Height, mask angle and so on.



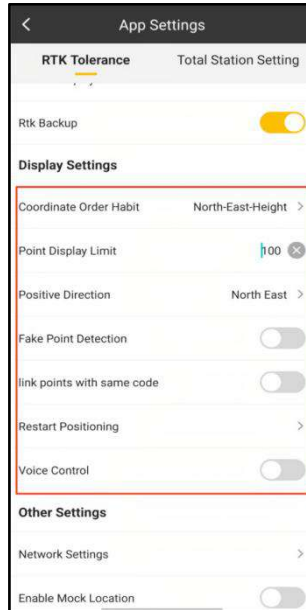


In System Settings, we can set the Time Zone, Length Unit, Length decimal, Angle Format, Angle decimal, Textcoding, Language, Screen display orientation. And set RTK backup on/off.





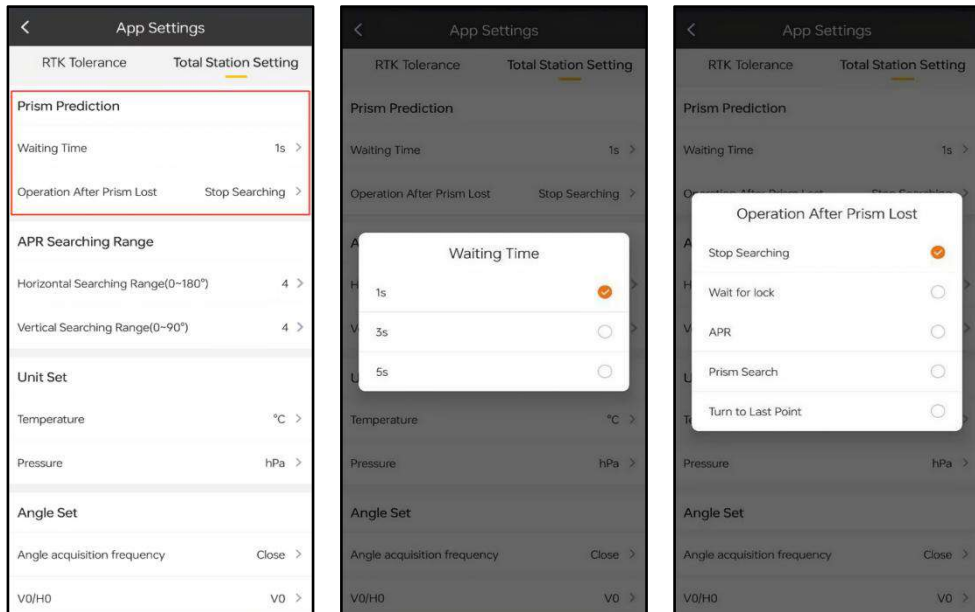
In Display Settings, we can set the Coordinate Order Habit, Point Display Limit, Positive Direction, Restart Positioning. And set Fake Point Detection , link points with same code and Voice Control on/off.



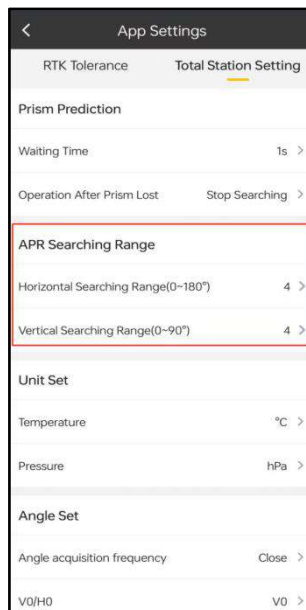
3-9 APP Settings – Total Station

By clicking this, we can set the settings of Survstar. It contains RTK and Total Station Settings.

In Prism Prediction, we can set the waiting time after the prism lost and what the total station will do next.

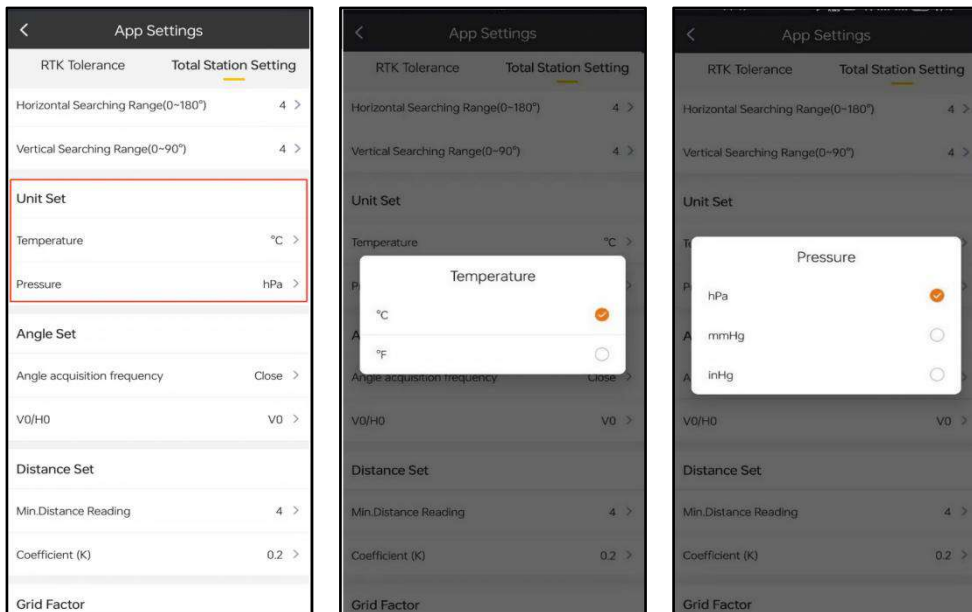


In APR Searching Range, we can set the horizontal and vertical search range.

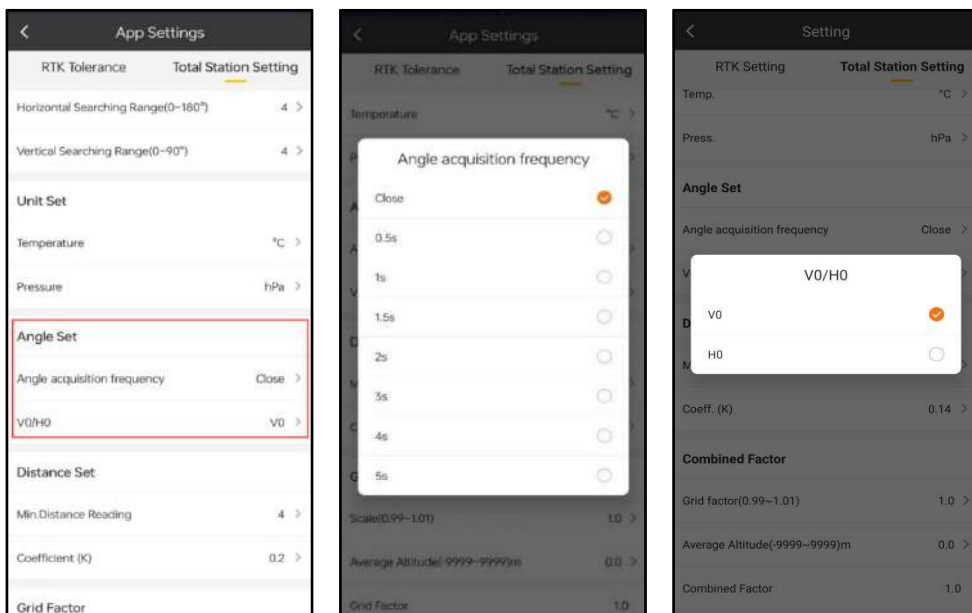




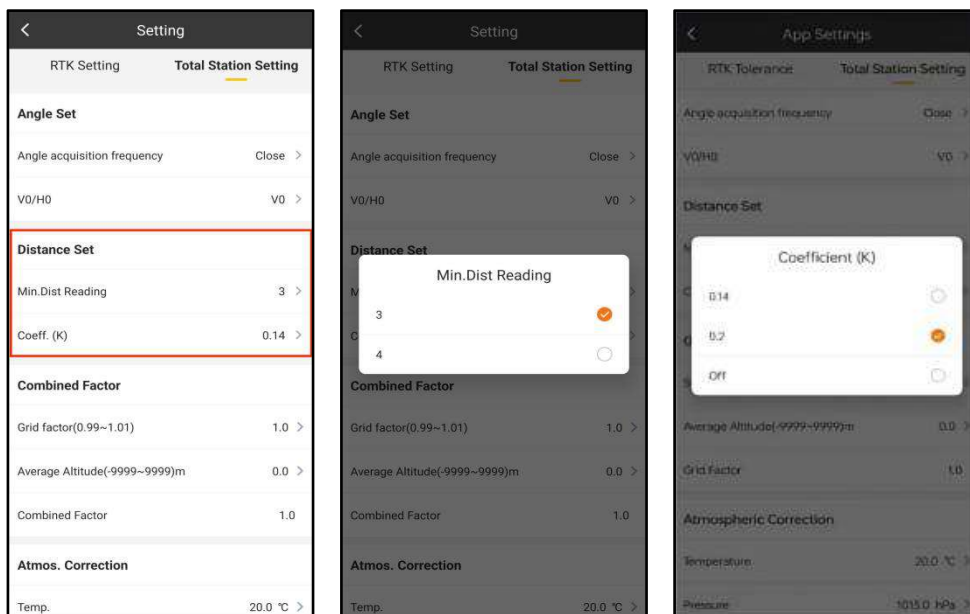
In Unit Set, we can set the units of temperature and pressure.



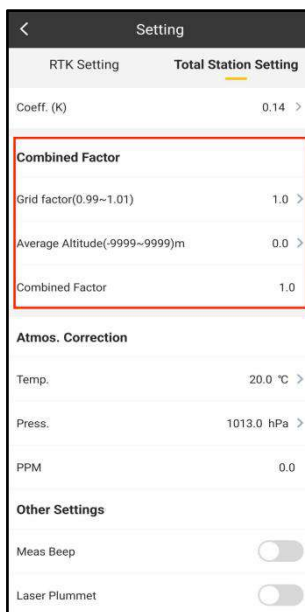
In Angle Set, we can set angle acquisition frequency and V0/H0.



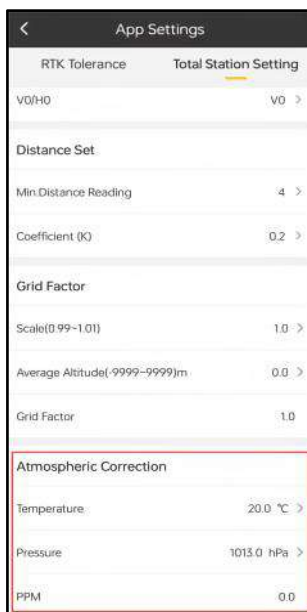
In Distance Set, we can set min. distance reading and coefficient.



In Grid Factor, we can set scale and average altitude.

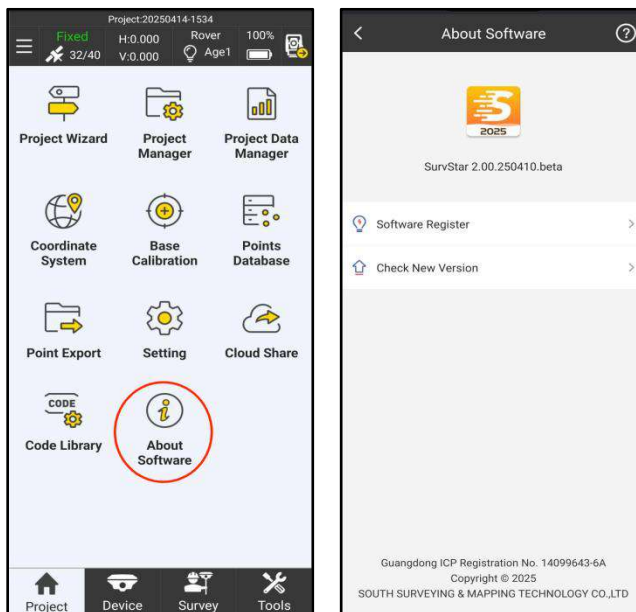


In Atmosohric Correction, we can set the correction of temperature and pressure.



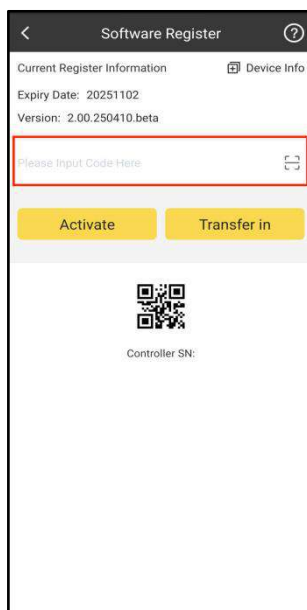
3-10 About Software

By clicking this, we can check the version of Survstar, register the Survstar and check new version manually.



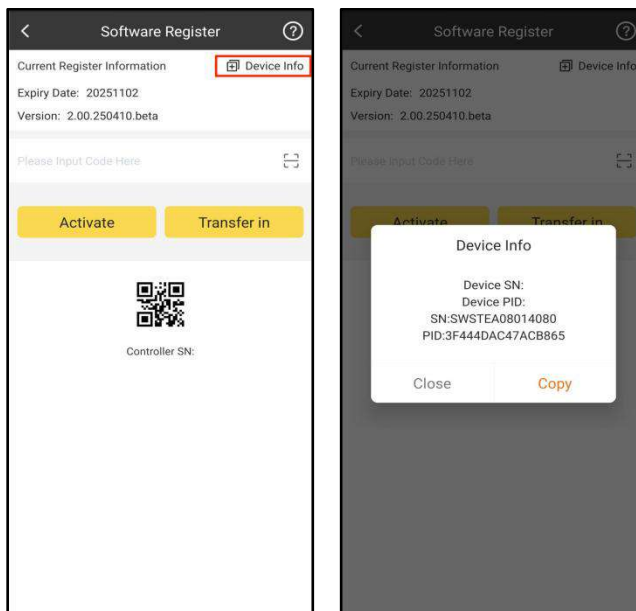
Software Register:

When we get the register code, we can click Soft Register , input the code in the bar,and click activate.

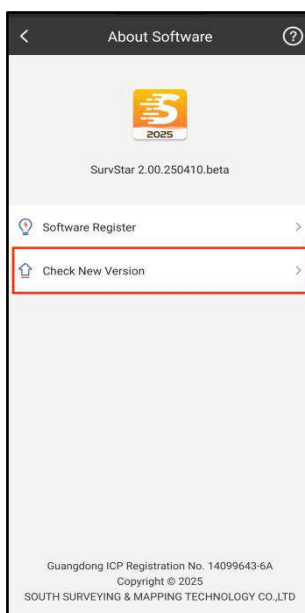




We can also check the information about the Register ID, Controller SN a, Expiry Date and PID.



We can click Check New Version to see if there is update or not.



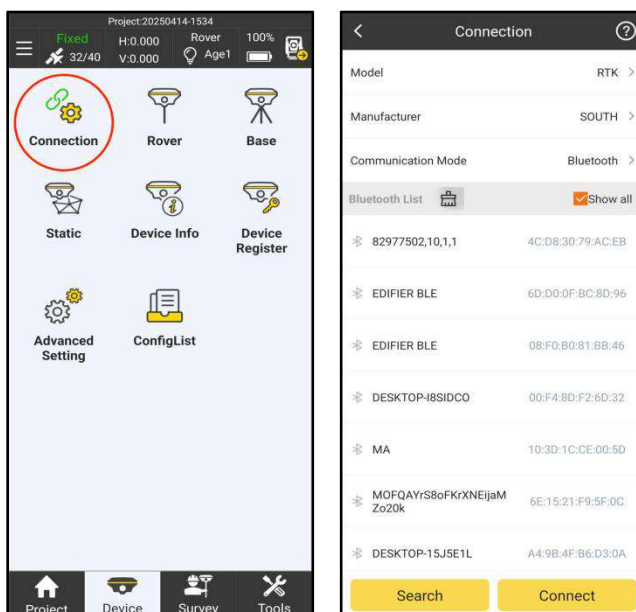


Chapter 4 Device - RTK

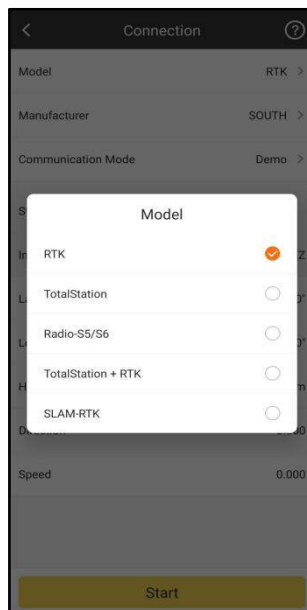
4-1 Communication

It is used to connect and communicate with receiver.

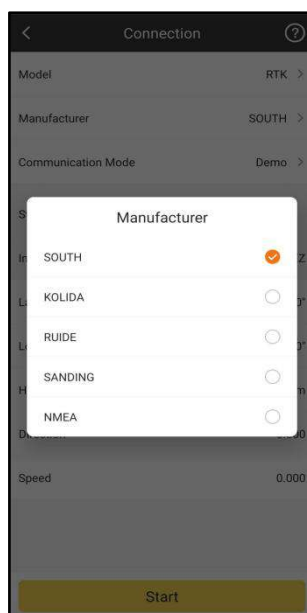
Click **Device** -> **Connection** or tap the  icon in the top to enter this interface.



Select Model

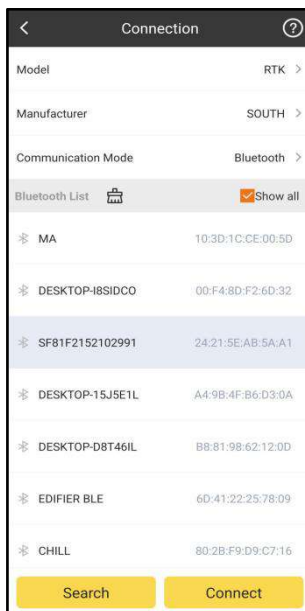


Set the correct Manufacturer.

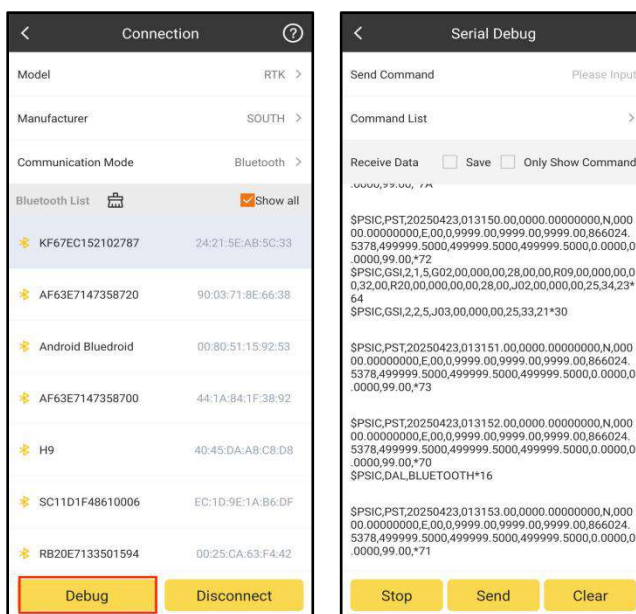




2. Select the receiver's serial number, and click Connect to connect receiver. The chosen device will highlight with yellow.



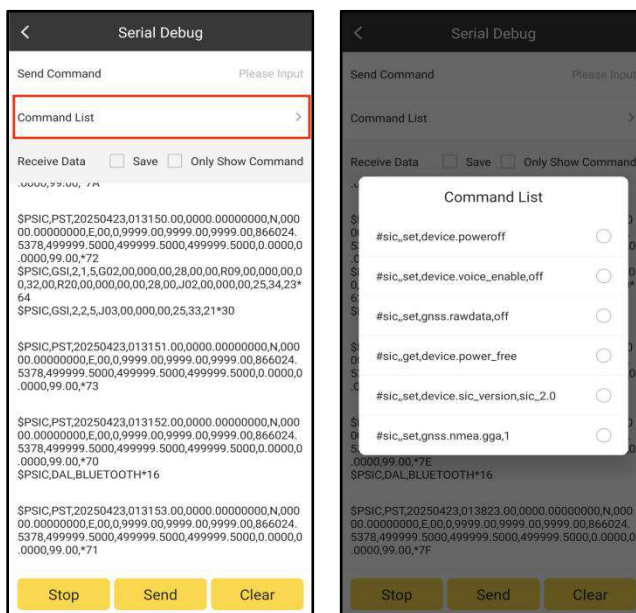
3. In Debug, we can monitor the data stream from the connected receiver.



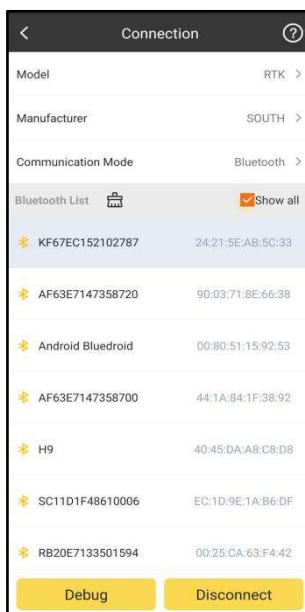


Start\Stop: Start\Stop data stream from the receiver; Send: send commands to communicate with receiver; Clear: Clear contents of the page;

Below are some commonly used commands' list.

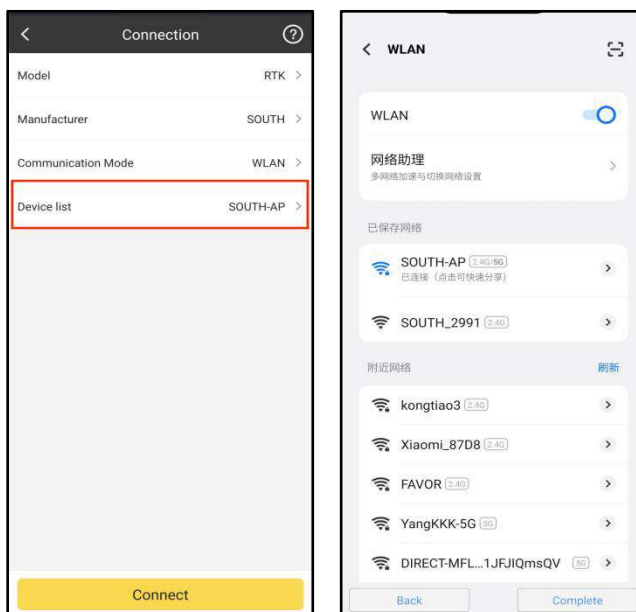


4. If we want to break communication with receiver, we can click Disconnect.

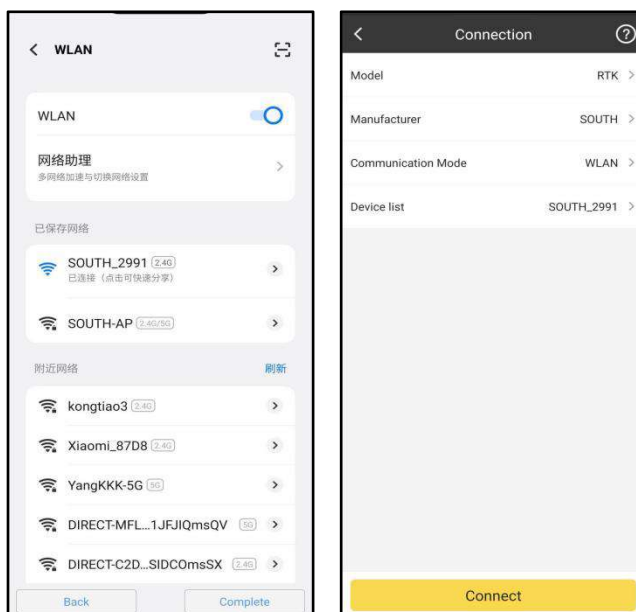


WLAN: Connect receiver by WIFI (It only supports the receiver with WIFI and WEB UI; and while connecting the receiver by WIFI, the android controller won't have access to the internet.)

1. Click the Device list bar to enter this page, choose Wi-Fi point name you want to connect.



wipe down the screen then click the BACK icon to connect the WLAN of the receiver.



Demo: It is a mode used monitoring position to use Survstar (usually for tuition and test



purpose) without connecting real receiver. In this mode, we can define the starting point's coordinates, receiver moving direction and speed.

Connection

Model RTK >

Manufacturer SOUTH >

Communication Mode Demo >

Start Point Coordinate

Input Type ☒ BLH ☐ NEZ

Lat N23°00'00.0000"

Lon E113°00'00.0000"

Height 45.000 m

Direction 0.000

Speed 0.000

Start

Serial port: Connect the receiver by cable (Not used so often)

Connection

Model RTK >

Manufacturer SOUTH >

Communication Mode Serial Port >

Communication Mode

Bluetooth ☐

WLAN ☐

Demo ☐

Serial Port ☒

Internal GPS ☐

Connect



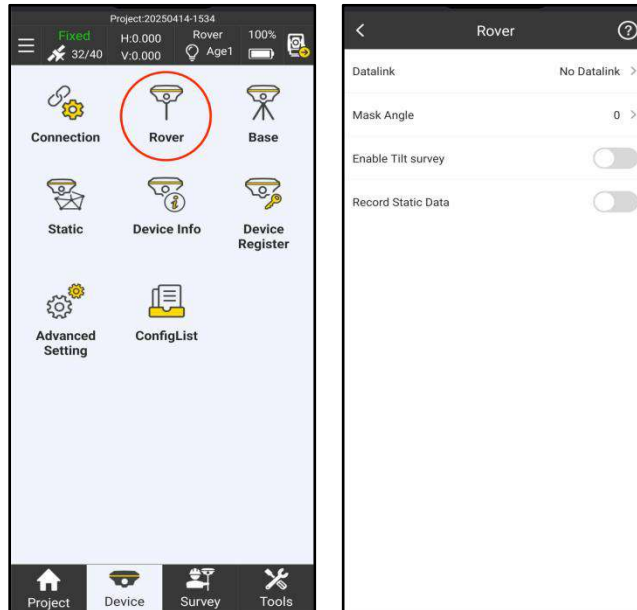
Internal GPS: Suitable for device with satellites antenna port, like N80T



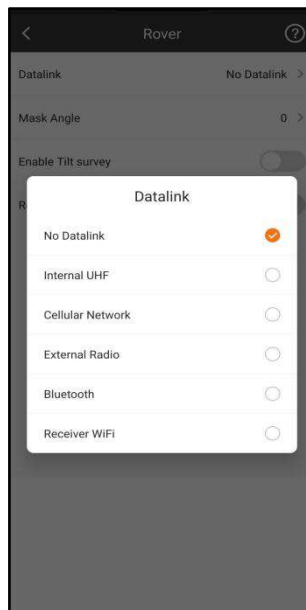
4-2 Rover Mode

In Rover Mode, we can set receiver to rover mode and do some configurations

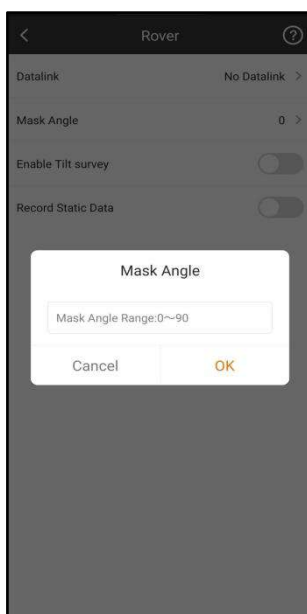
Click **Device**-> **Rover** to enter the interface of Rover Mode.



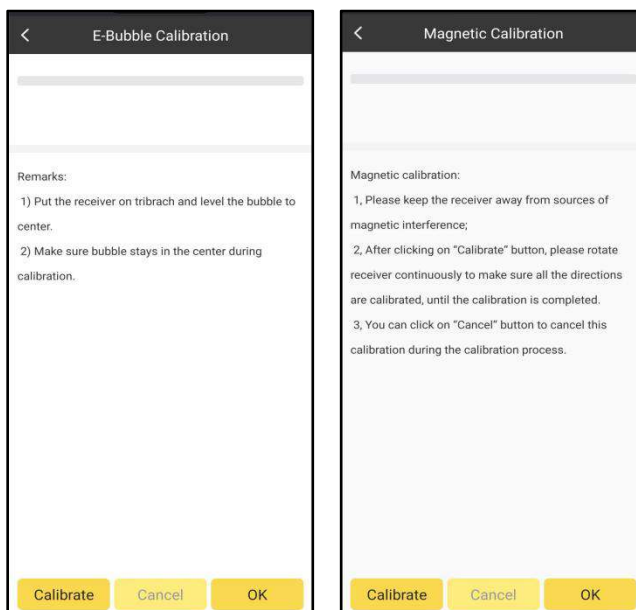
Datalink Mode: set datalink for rover.



Mask Angle: to setting receiver mask angle, generally, the angle is higher, receive few number satellites, but quality is better. Default is 10.

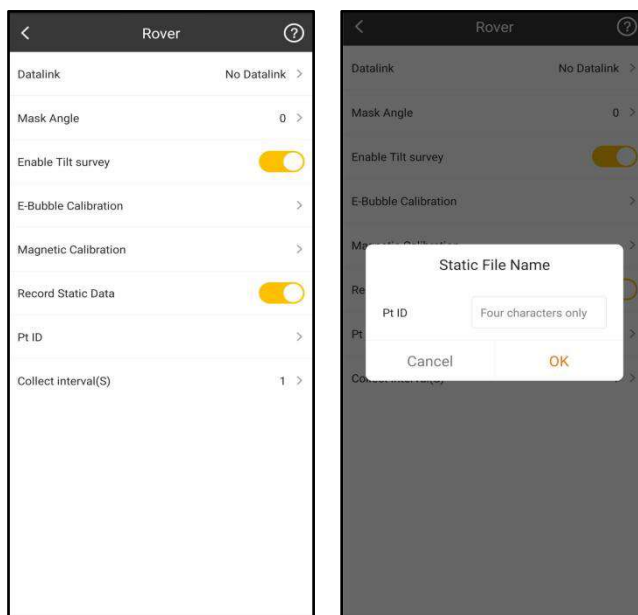


Enable Tilt Survey: by enabling it, we can do E-Bubble Calibration and Magnetic Calibration for IMU sensor.

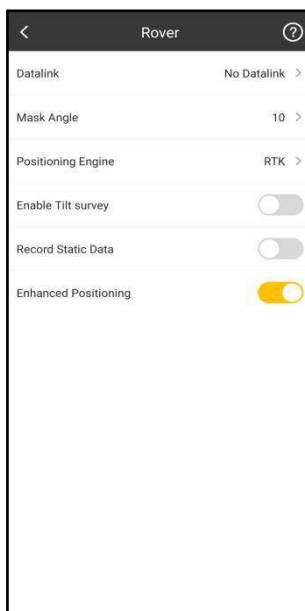




Record Static Data: Enable receiver to record raw data automatically (usually used in PPK mode).



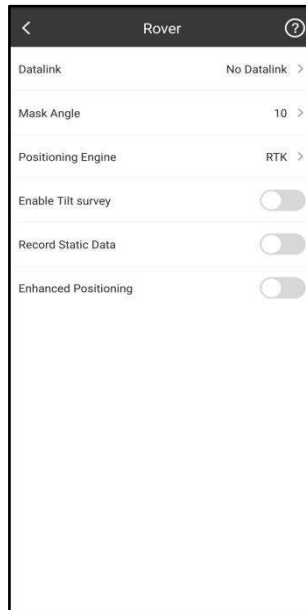
Enhanced Positioning: Improve RTK performance when affected by the ionosphere.





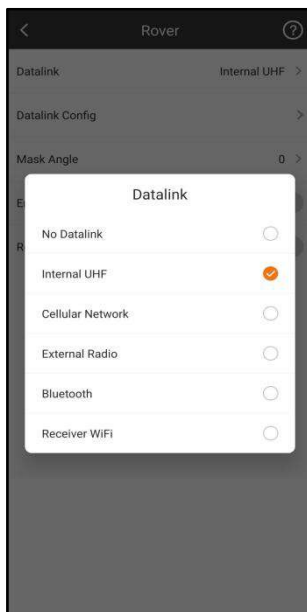
4-2-1 Rover-No Datalink

In No Datalink mode, rover's data link is empty, and cannot receive corrections from base.

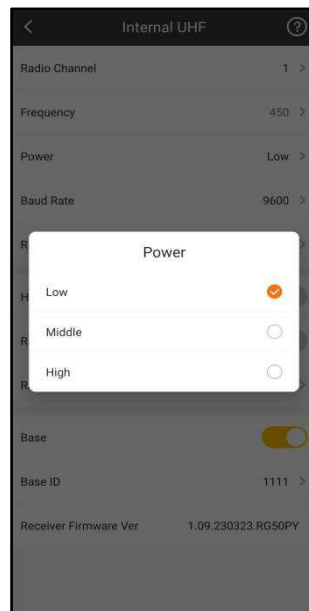
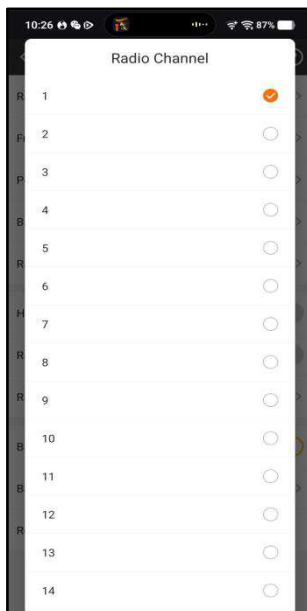
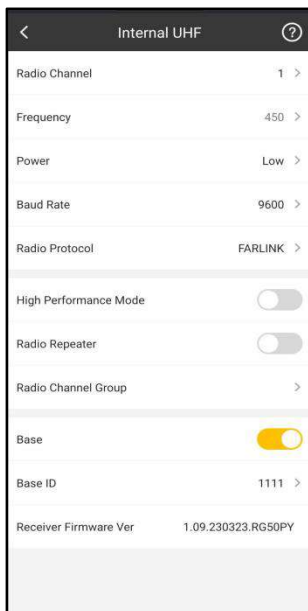


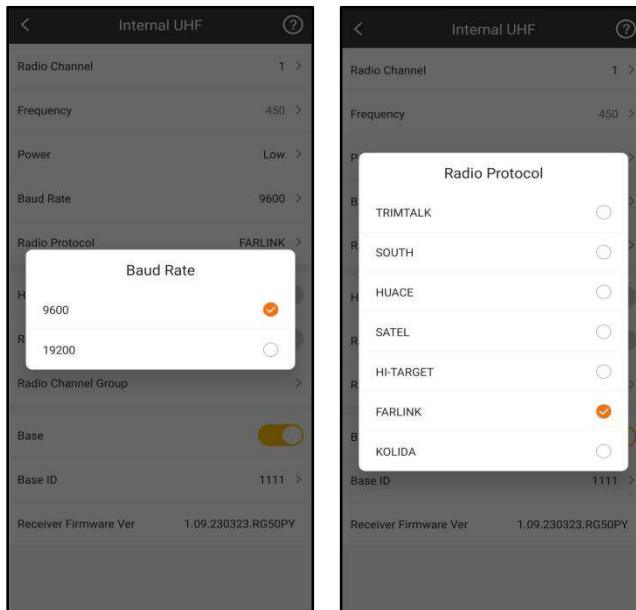
4-2-2 Rover-Internal UHF

In UHF mode, rover is able to receive corrections from base by internal radio.

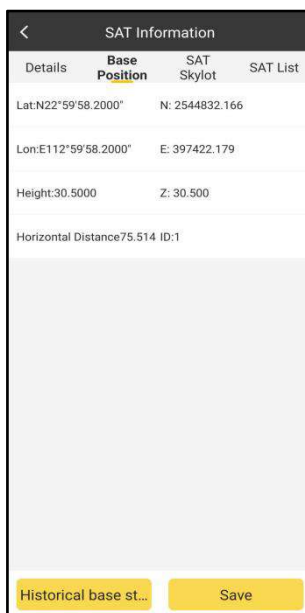


In UHF data link, we can set Channel, Frequency, Power, Baud Rate and Radio Protocol for rover, and you can turn on Radio Repeater if necessary, you can change frequency in Radio channel group. Here will showing base ID when you connect to base, and you can check receiver firmware version in here.





After those parameters above are set the same as base, rover can receive corrections from base and get base information.

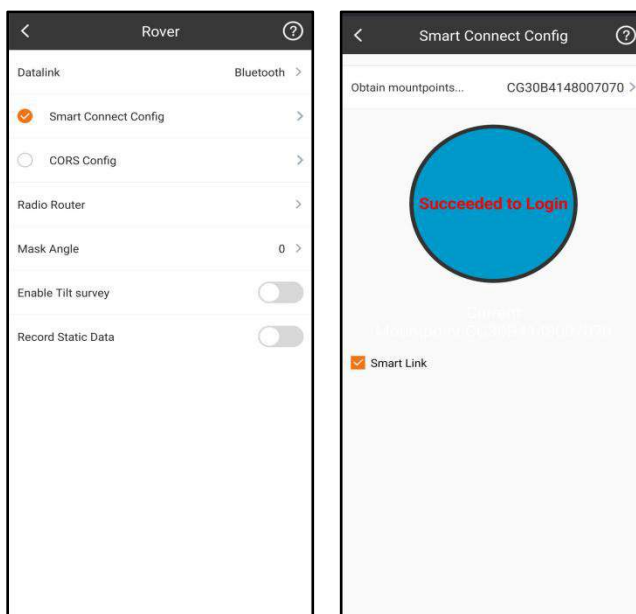




4-2-3 Rover-Cellular Network

Input SIM card in receiver first, via SIM card to connect network, then choose Ntrip Connection account to log server and get fixed solution.

1.Choose Smart Connect Config and select mountpoint to one button connect network, then you will get fixed one click.



2.Choose CORS config to connect network, add one CORS account, enter IP Port Username and password, then select mountpoint and Mode.

< Ntrip(Eagle) Connection - Bluetooth

Network<47.107.86.207:6070>

123<219.135.151.189:6600>

Add

Edit

Delete

Connect

Disconnect

OK

< Datalink Config - Bluetooth

Select Server >

Name

Network

IP

net.southgnss.com

Port

2010

Username

User

Password

Please Input

Select Mountpoint

>

Mode:

NTRIP(Rover) >

Auto Connect

☒

Cancel

OK

3.Click OK then receiver will be auto log on server.

< Connect

✓ Connect

✓ SIM Check

✓ Network Register

✓ Network Connect

✓ Log on Server

Succeeded to Login

OK

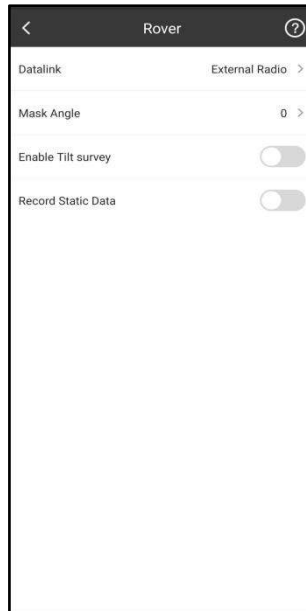
Cancel



4-2-4 External Radio

In External Radio datalink, Rover can use external radio to receive radio signal from base.

1. Connect the receiver to external radio.
2. Click the Datalink mode bar, set the receiver to Rover- External mode.



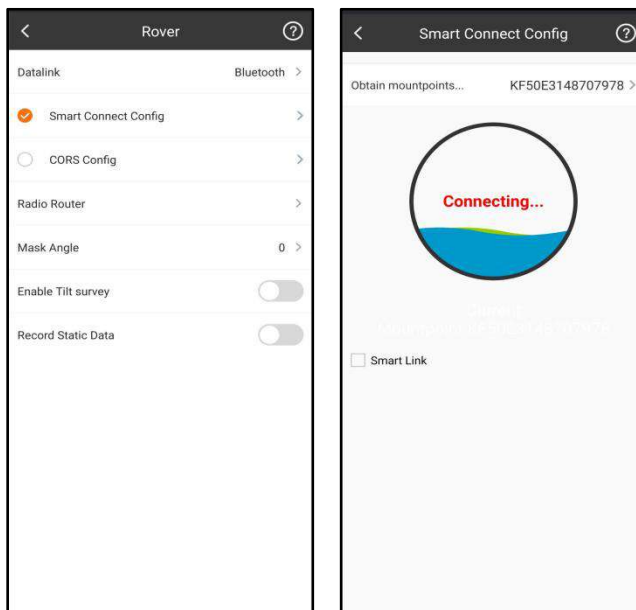
3. Config the external radio the same as base UHF.

note: Configurations on external radio must be done on external radio itself.

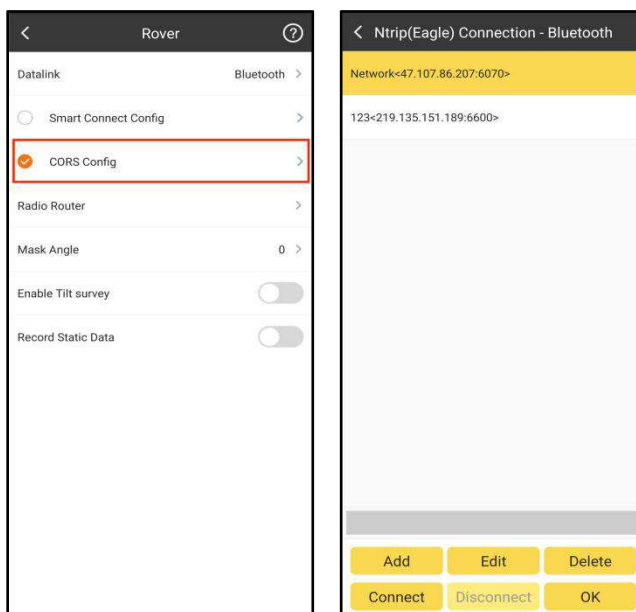
4-2-5 Rover-Bluetooth Data Link

In Bluetooth datalink, we can use controller's internet to access CORS server and download corrections. (Note: the controller must have access to the internet).

1. Click the Datalink mode bar, set the receiver to Bluetooth mode



2. Click the Datalink Config bar to enter the Ntrip(Eagle) Connection-Bluetooth page.\



3. Click Add In this interface, we can define a network config by inputting IP, Port,

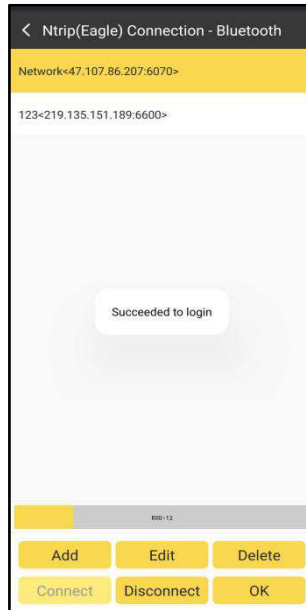


Username and mountpoint.

The image displays two screenshots of the SurvStar application interface. The left screenshot shows the 'Ntrip(Eagle) Connection - Bluetooth' screen. It features a header bar with a back arrow and the title. Below the header, there is a yellow bar with the text 'Network<47.107.86.207:6070>'. Below this, there is a list of networks, with the first one being '123<219.135.151.189:6600>'. At the bottom, there are three buttons: 'Add', 'Edit', and 'Delete'. The right screenshot shows the 'Datalink Config - Bluetooth' screen. It features a header bar with a back arrow and the title. Below the header, there is a 'Select Server' section with a right arrow. Below this, there are fields for 'Name', 'IP', 'Port', 'Username', and 'Password'. The 'Name' field is set to 'Network', the 'IP' field is set to 'net.southgnss.com', the 'Port' field is set to '2010', the 'Username' field is set to 'User', and the 'Password' field is set to 'Please Input'. Below these fields, there is a 'Select Mountpoint' section with a right arrow. Below this, there is a 'Mode' field set to 'NTRIP(Rover)' and an 'Auto Connect' toggle switch that is currently turned on. At the bottom, there are two buttons: 'Cancel' and 'OK'.

4. In Select Mountpoint, by Refreshing Mountpoints, we can get all the mountpointsavailable, select the one needed to finish Network config.

5. Click Connect, and differential corrections from base will be downloaded from the server.

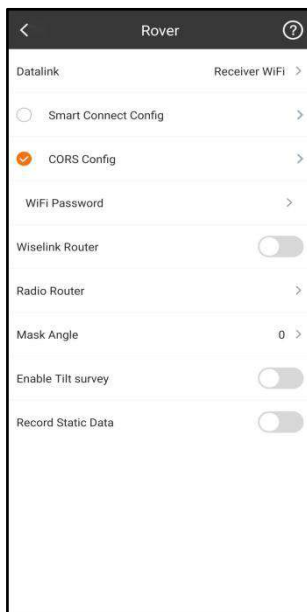


4-2-6 Rover-Receiver Network

In Receiver Network mode, we must ensure receiver itself has access to the internet, usually there are 2 ways: by receiver's WIFI or by receiver's network module.

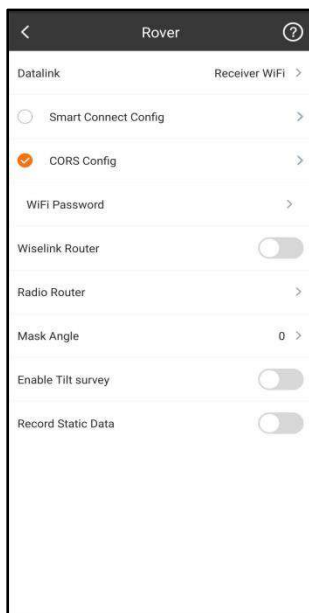
By WIFI:

1. Click the Datalink mode bar, set the receiver to the Receiver WIFI mode.



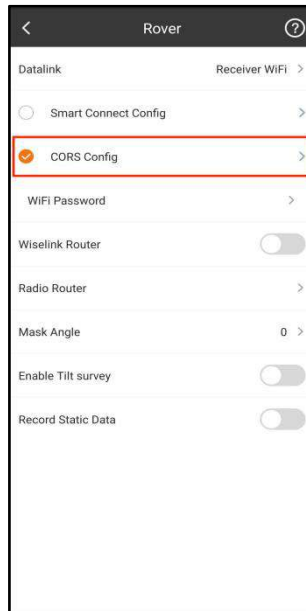
2. Receiver must be able to switch to WIFI client mode and connect to a WIFI hot spot.

Click **WiFi Pssword** bar, and Click **Refersh WIFI List** to search for WIFI nearby. Then Click **WiFi Pssword** bar again to connect WIFI network.





3. Click the **CORS Config** bar to enter the Ntrip(Eagle) Connection-Receiver WIFI page.



4.. Build Network Config and connect (Operation is the same as we do when config Rover Bluetooth data link).

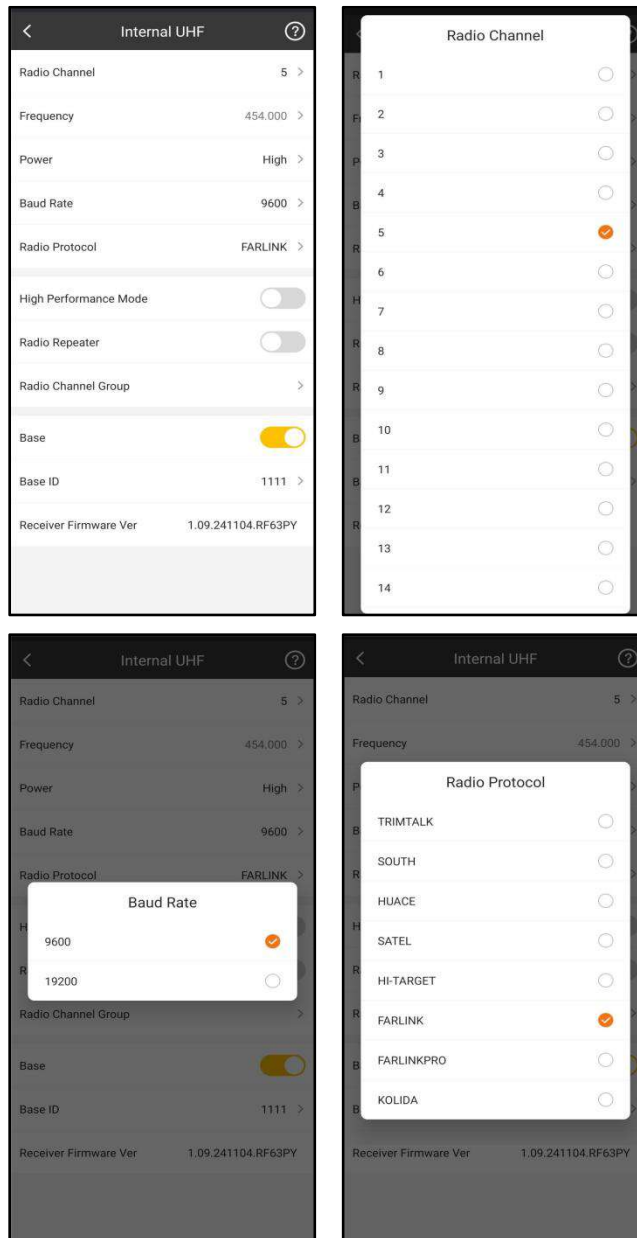
4-3 Base Mode

Base Mode is used to start base and transmit differential corrections in UHF, Network, and External Radio.



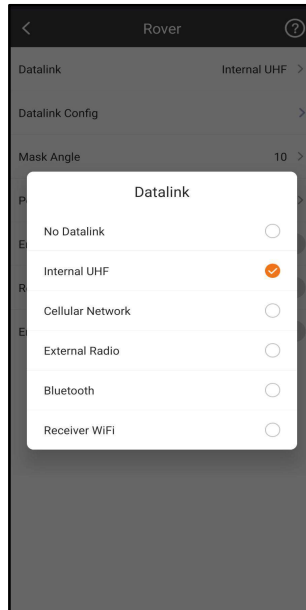
In Base Parameter config, we can set Base Correction Format, Transmit Interval, different Base Start Mode, Antenna Type and Height, Mask Angle, PDOP limit and transmit Data Link.

In UHF data link, we can set Channel, Frequency, Power, Baud Rate and Radio Protocol for base.

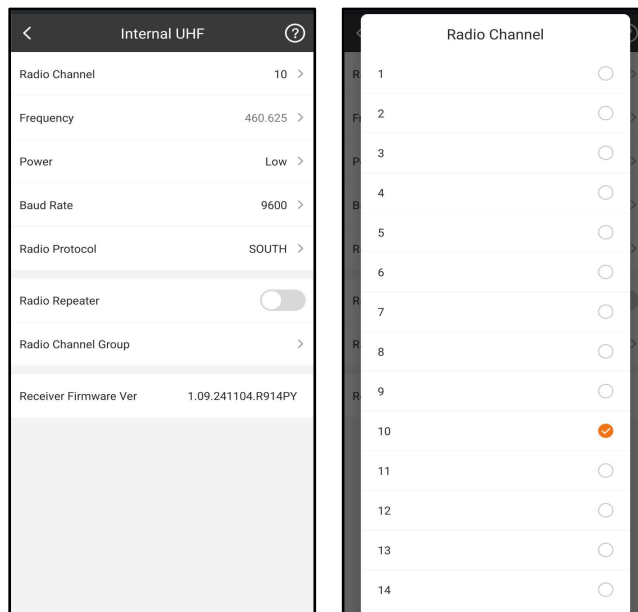


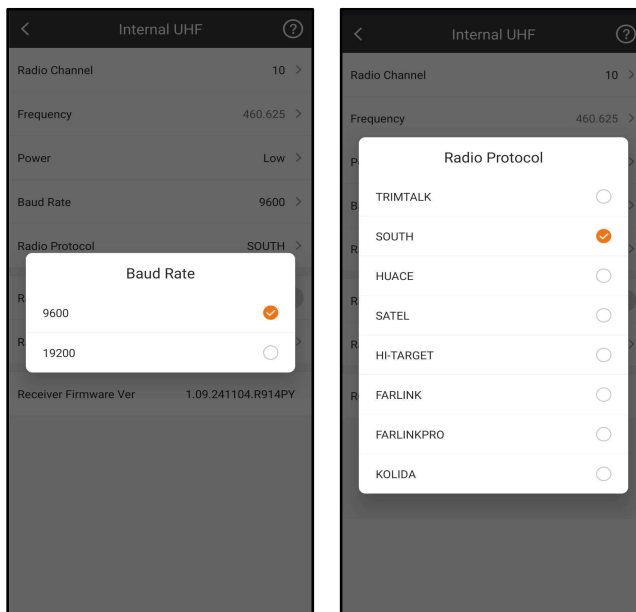
4-3-1 Base-Internal UHF

In this mode, Base is using its Internal UHF module to transmit differential corrections.



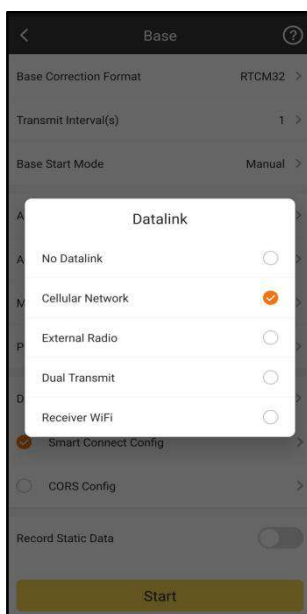
In UHF data link, we can set Channel, Frequency, Power, Baud Rate and Radio Protocol for base.





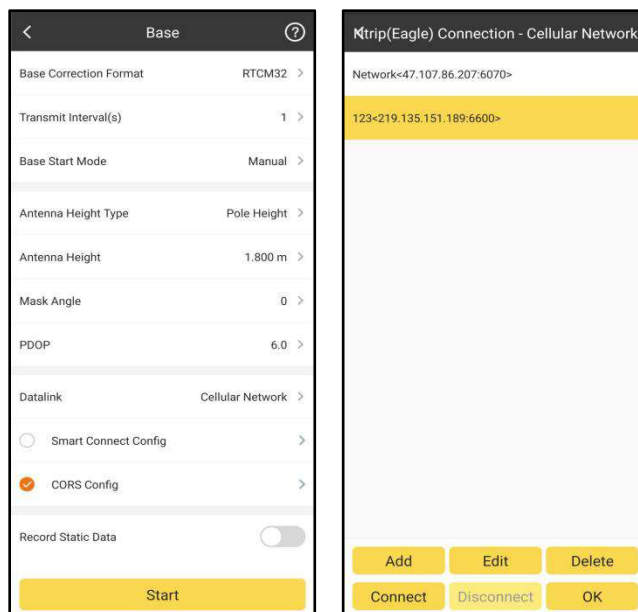
4-3-2 Base-Cellular Network

1. In this mode, Base is uploading its differential corrections to CORS server by Network. Then rover can download the corrections and get fixed solution.





2. Click the **Datalink Config** bar to enter the Ntrip(Eagle) Connection-Cellular Network page.



3. Click **Add**. In this interface, we can define a network config by inputting IP, Port, Username and Password. If set before, we can click Read from Module to get them.



< Datalink Config - Cellular Network

Select Server >

Name Network

IP net.southgnss.com

Port 2010

Username User

Password Please Input

Select Mountpoint 0700_MSM4 >

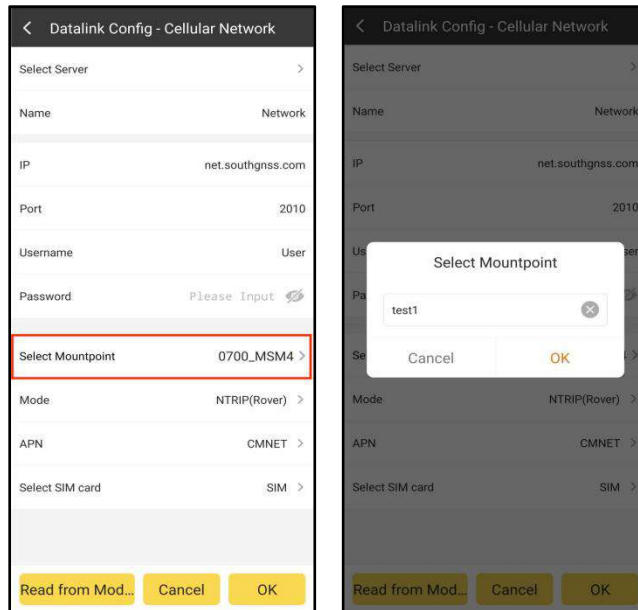
Mode NTRIP(Rover) >

APN CMNET >

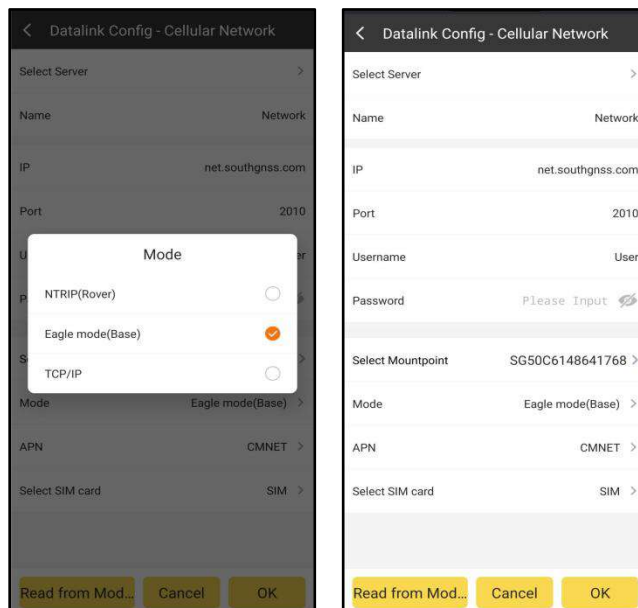
Select SIM card SIM >

Read from Mod... Cancel OK

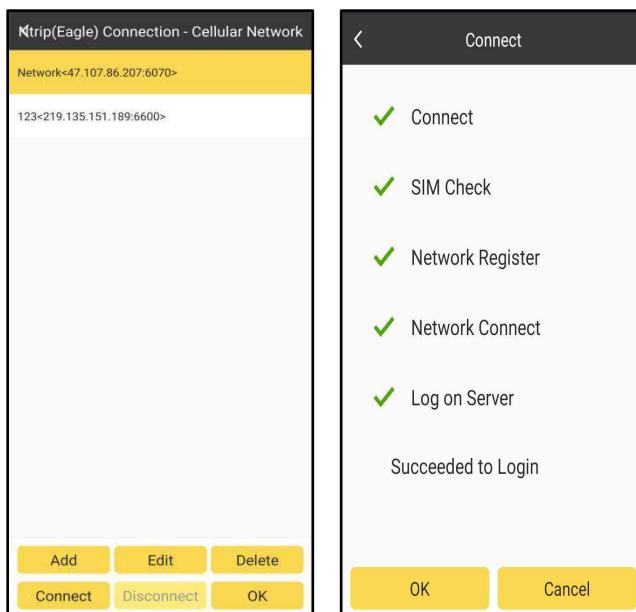
4. Click Select Mountpoint bar to set the uploading differential corrections' access points, which cannot be set already exist in CORS.



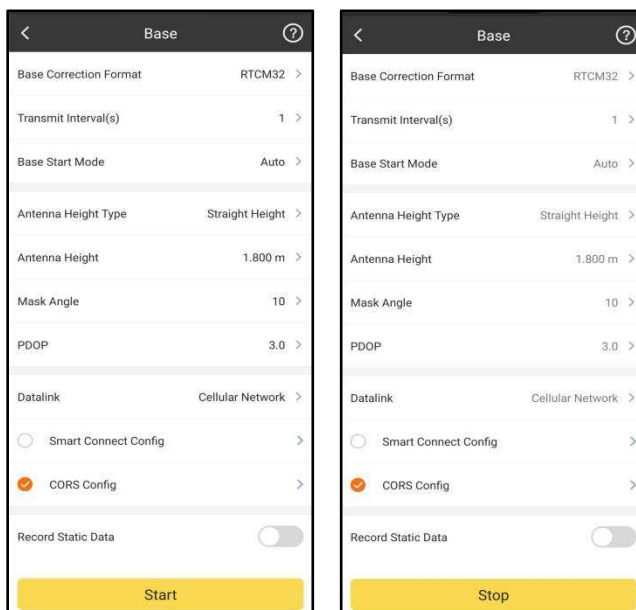
5. Set the Mode as Eagle mode (Base), and set the APN settings.



6. Click Connect bar to connect CORS server.



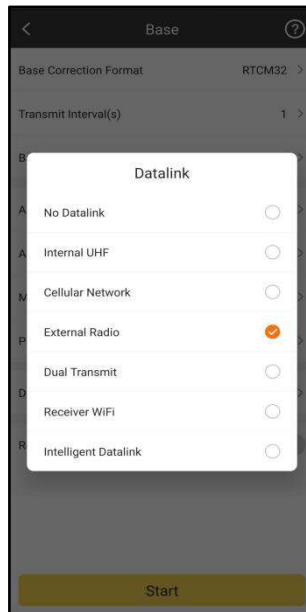
Once set, click Start to upload differential corrections.





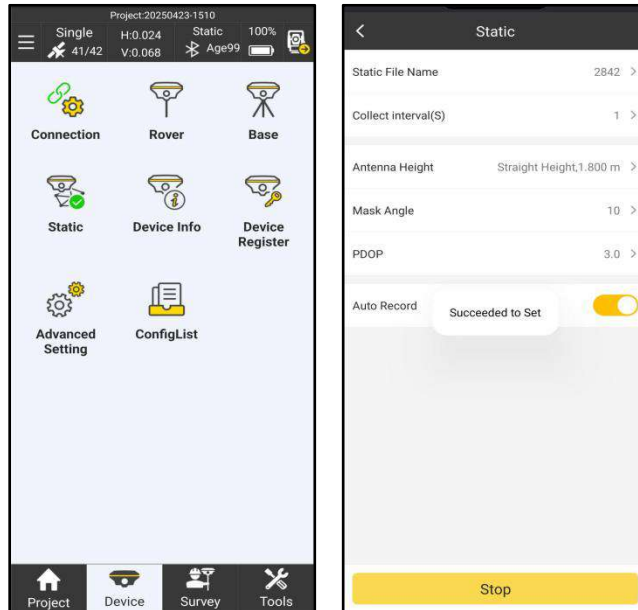
4-3-3 Base-External Radio

In this mode, Base is using External Radio to transmit differential corrections.

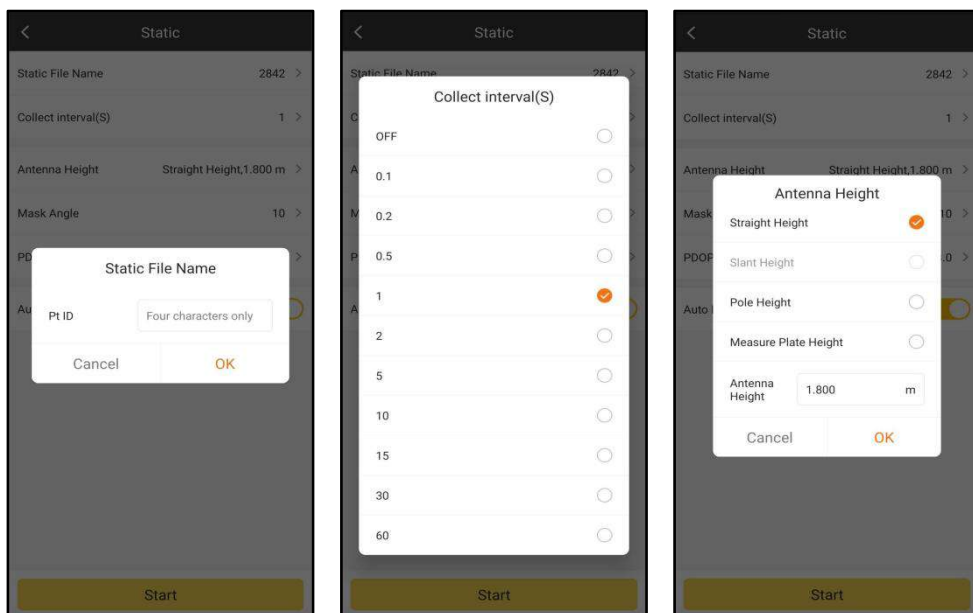


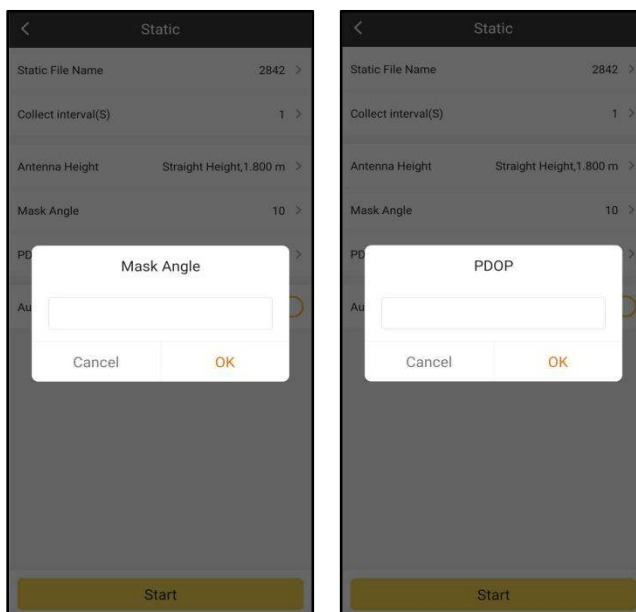
4-4 Static Mode

When we need to use receiver to do static work, we can go to Survstar-Device, set receiver into Static Mode.



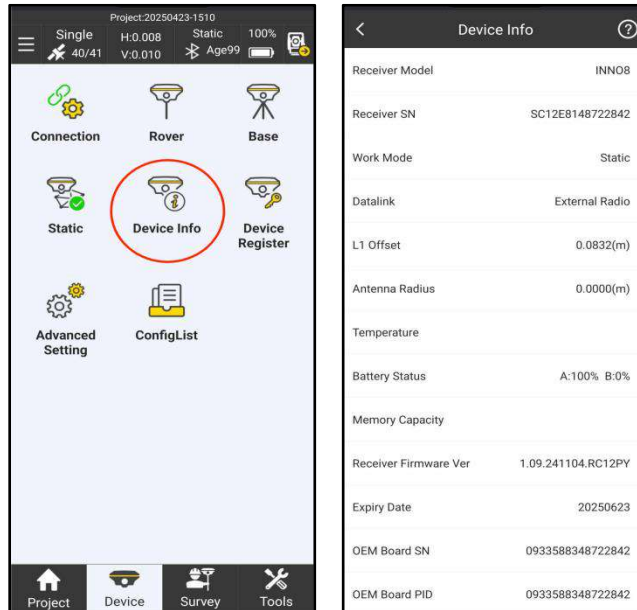
In Static Mode, we need config Static File Name, Collect Interval, Antenna Height and Type, Mask Angle, PDOP limit and Auto\Manual Record.





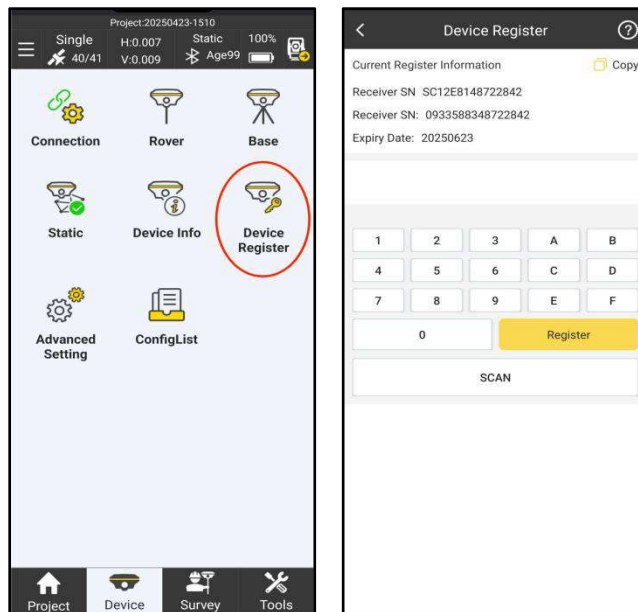
4-5 Device Info

In this sector, we can check the information of the device. It includes Receiver Model, Receiver SN, Work Mode, Datalink, L1 Offset, Antenna Radius, Temperature of the device, Battery Status, Memory, Receiver Firmware Version, Expiry Data, OEM Board SN, OEM Board Firmware Version, UHF Module SN and UHF Module Firmware Version.



4-6 Device Register

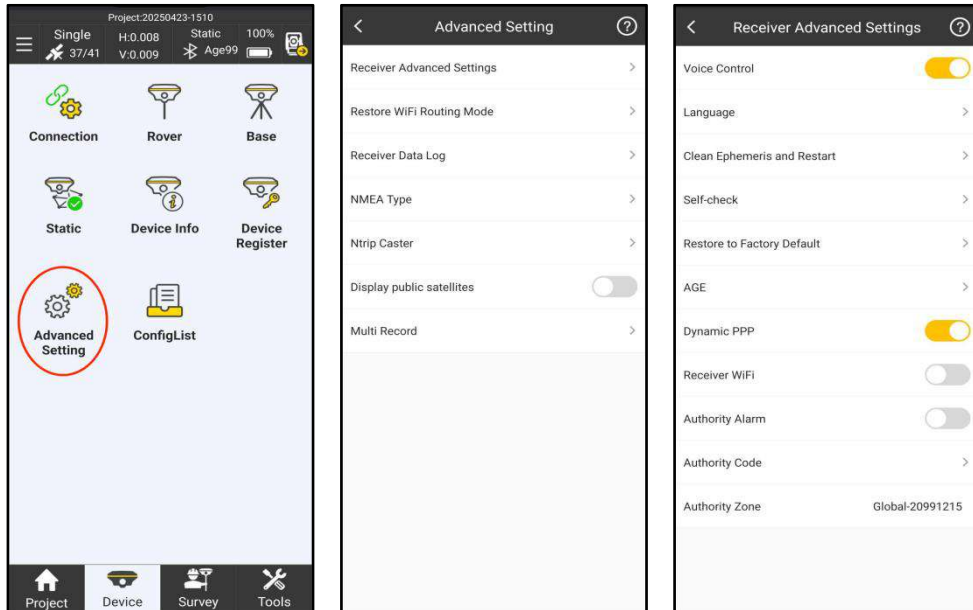
In this page, we can check the device registration information and register device. Click Copy will copy the receiver SN. Input the registration code in the bar, and click Register, then the device will be registered. We can also Click **SCAN** to scan the QR code to register.



4-7 Advanced Setting

4-7-1 Receiver Advanced Setting

In this page, we can control weather track one satellite system and set the settings of the receiver. We can set the Voice of the device, Language of the device, Clean Ephemeris, Self-check, Restore to Factory Default and Dynamic PPP and so on.



4-7-2 Other Advanced Setting

Restore WiFi Routing Mode: Setting Restore WiFi Routing to reset WiFi routing.

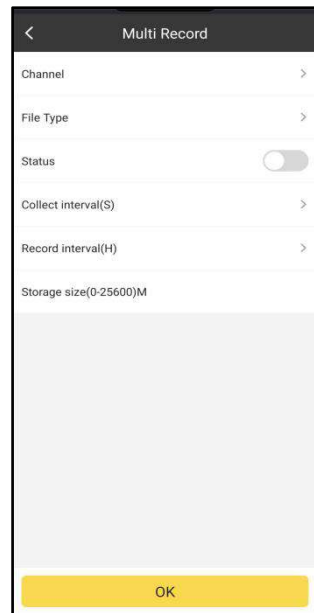
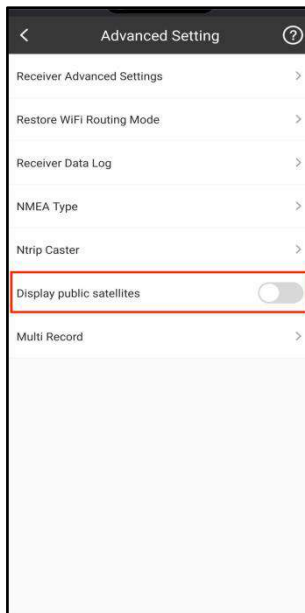
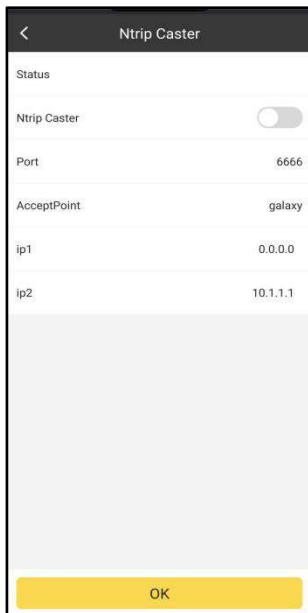
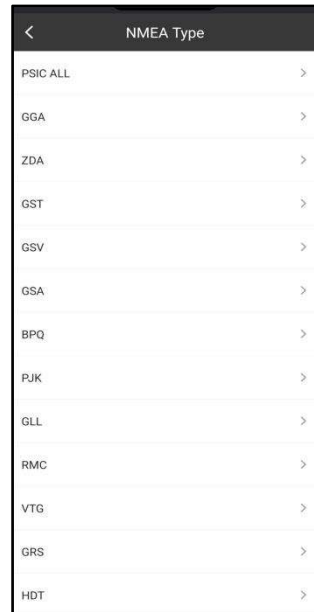
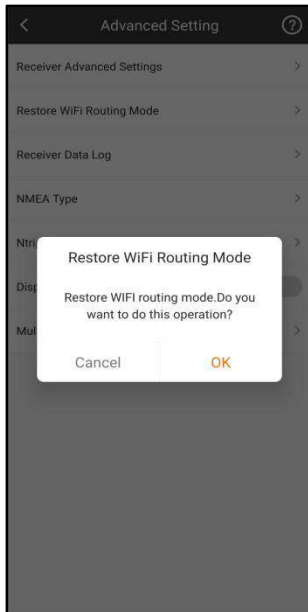
Receiver Data Log: Record receiver system data to check receiver status.

NAME Type: Choose NAME type that you want to export.

Ntrip Caster: Enter access point and port and receiver IP, and then, our receiver can acquire differential data broadcasted by another RTK base via Wi-Fi.

Display public satellites: Default turn off.

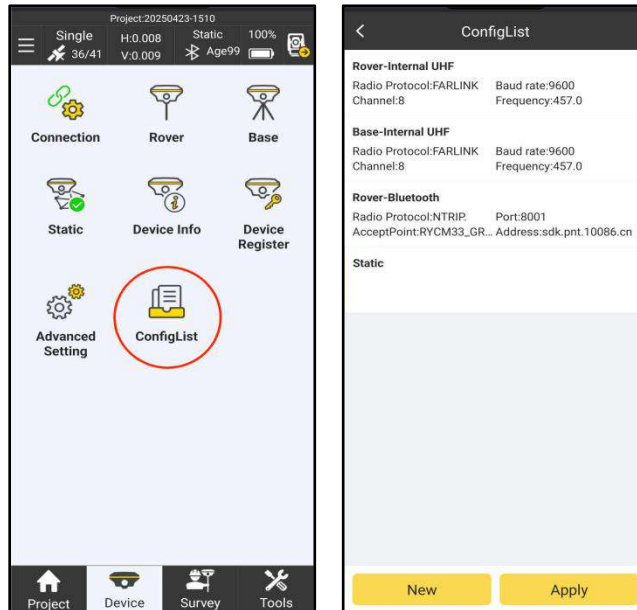
Multi Record: You can choose channel and file type to record receiver data, and then you can set collect interval and record interval.





4-8 ConfigList

You can one-click setup datalink for in rover or base mode.



Click new button to add a configlist, you can set working mode and different settings in different datalink mode.

Such as rover mode and Internal UHF datalink.



Create Config

Working mode Rover >

Datalink Internal UHF >

Radio Channel 1 >

Frequency 457.0 >

Power Low >

Baud Rate 9600 >

Radio Protocol FARLINK >

High Performance Mode ☐

Radio Repeater ☐

Base ☐

Base ID >

Apply OK

Create Config

Working mode Rover >

Datalink Internal UHF >

Radio Channel 1 >

Frequency 457.0 >

Power Low >

Baud Rate 9600 >

Radio Protocol FARLINK >

High Performance Mode ☐

Radio Repeater ☐

Base ☐

Base ID >

Apply OK

Create Config

Working mode Rover >

Datalink Internal UHF >

Radio Channel 1 >

Frequency 457.0 >

Power Low >

Baud Rate 9600 >

Radio Protocol FARLINK >

High Performance Mode ☐

Radio Repeater ☐

Base ☐

Base ID >

Apply OK

Create Config

Working mode Rover >

Datalink Internal UHF >

Radio Channel 1 >

Frequency 457.0 >

Power Low >

Baud Rate 9600 >

Radio Protocol FARLINK >

High Performance Mode ☐

Radio Repeater ☐

Base ☐

Base ID >

Apply OK

Base Cellular Network mode



The left screenshot shows the 'Create Config' screen with a modal for selecting the Datalink type. The modal has the title 'Datalink' and lists several options: 'No Datalink', 'Cellular Network' (selected with a checkmark), 'Internal UHF', 'External Radio', 'Bluetooth', and 'Receiver WiFi'. The right screenshot shows the 'Create Config' screen with the 'Cellular Network' option selected. The screen displays fields for 'Name' (south), 'IP' (219.135.151.189), 'Port' (6600), 'Username' (test), 'Password', 'Select Mountpoint', 'Mode', and 'APN'. At the bottom, there are 'Apply' and 'OK' buttons.

Click OK when you successful create Config, then click Apply, you can great use this ConfigList to use your receivers. Swipe right you can delete or edit this Config.

The left screenshot shows the 'ConfigList' screen with a list of configurations. The configurations are: 'Rover-Internal UHF' (Radio Protocol: FARLINK, Baud rate: 9600, Channel: 8, Frequency: 457.0), 'Base-Internal UHF' (Radio Protocol: FARLINK, Baud rate: 9600, Channel: 8, Frequency: 457.0), 'Rover-Bluetooth' (Radio Protocol: NTRIP, Port: 8001, AcceptPoint: RYCM33_GR_..., Address: sdk.pnt.10086.cn), 'Static', and 'Rover-Cellular Network' (Radio Protocol: NTRIP, Port: 6600, AcceptPoint: 0001_H_DGPSAddress: 219.135.151.189). The 'Rover-Cellular Network' item is highlighted in yellow. The right screenshot shows the same list, but the 'Rover-Cellular Network' item is highlighted in yellow and has an 'Edit' button next to it. At the bottom, there are 'New' and 'Apply' buttons.



Chapter 5 Device – Total Station

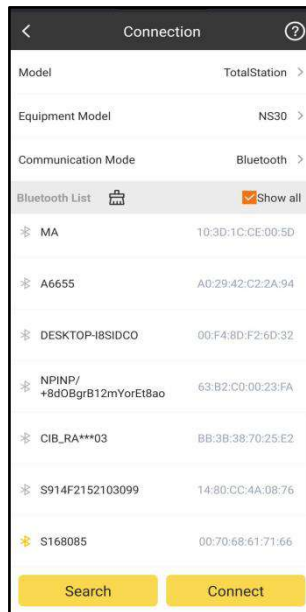
5-1 Connection

If you need to connect a robotic total station to a device such as a handbook or tablet, first open TServer on the onboard side.

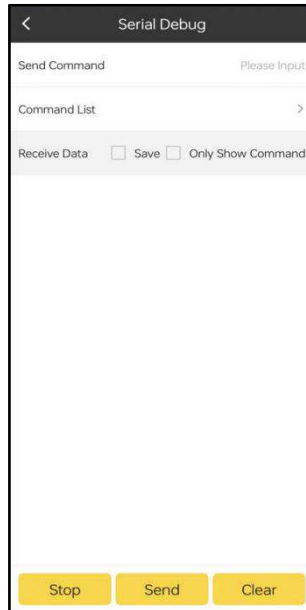
Click **Device** -> **Connection** to enter this interface .

Select the model of device needed, equipment model. If you need to connect to a total station, the software only supports Bluetooth communication mode.

Search for nearby Bluetooth devices, when a Bluetooth device with the same name as the total station serial number appears, select the device and click Connect.



Click **Debug** to monitor the data stream from the connected receiver.

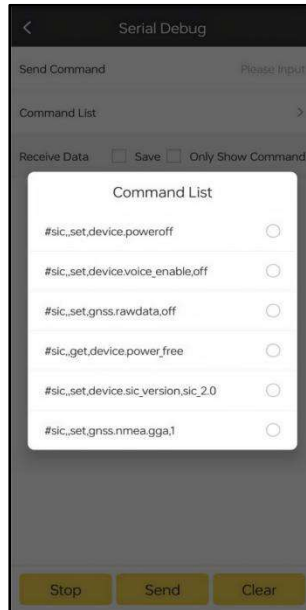


Click **stop** or **start** to stop/start the data stream from the receiver.

Input the commands at the Send Command bar, and click the **Send** to the commands to the receiver.

Click **Clear** to clear the contents of the page.

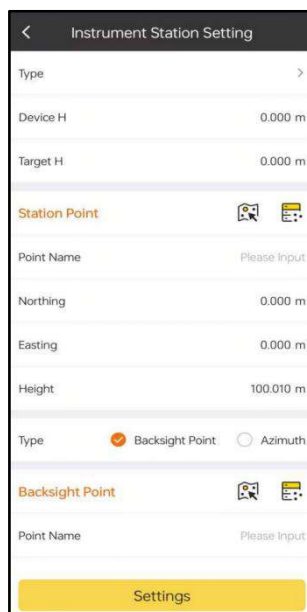
There are some useful commands in the Command List bar.



Break the blue tooth connection with the receiver by clicking **Disconnect**.


5-2 Instrument Station Setting

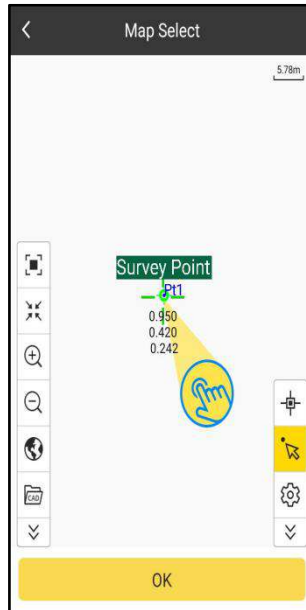
Click **device**->**instrument** station setting to enter this interface.




We can choose **Known point** or **Resection**.


Known point: First enter the instrument altitude and the target altitude. Known points can be obtained in three ways.


Map Select: Click on the  icon to open the chart selection interface. If there is a measured point on the map, click the right arrow icon, long press the green arrow in the middle of the screen, drag the arrow to the position of the measured point, 'Survey Point' will appear on the map, proving that the point has been selected, click OK to complete the point selection.




 :Full map

 :Go to map center

 :Map enlarge

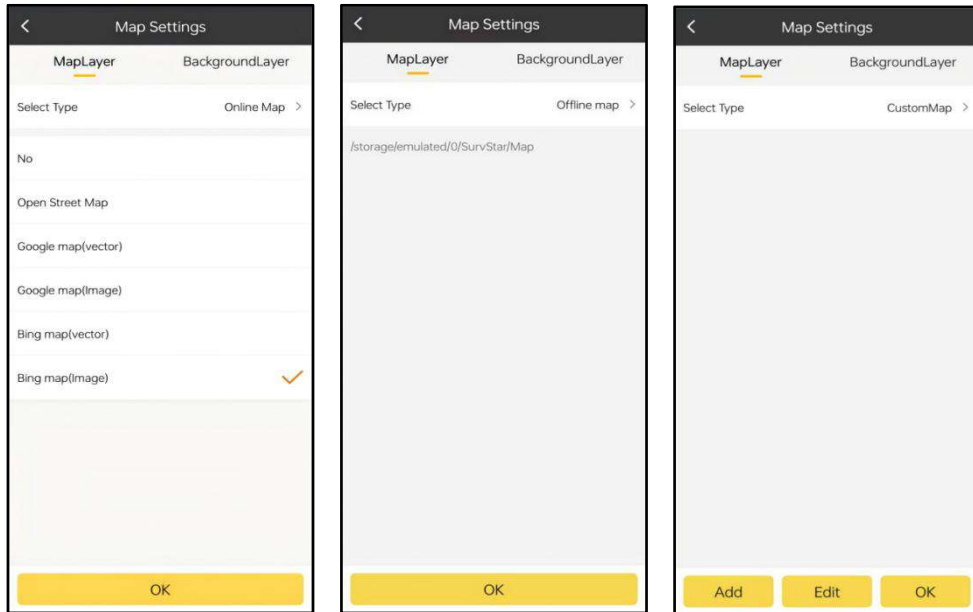
 :Map reduce

 :Map settings. Select map layer or background layer. In 'Map Layer', there are three types of layers.

Online Map: Offer five online maps or choose 'no.'

Offline Map: Offline maps are stored in a specified path and can be loaded when needed.

Custom Map: Enter the correct URL for the map.



In 'Background Layer', store layers in shp, tif, jpg, kml formats under the specified storage path. Select the corresponding layer for adding, editing, moving, deleting and other operations when needed.



: Open CAD. Adding cad files by specified path or full disc search.

W: Point selection tool, click the button and drag the green arrow in the middle of the screen to select a point.



Point Database: Select the icon to choose a point from the Points Database, and manage all points by adding, editing, deleting, etc.



Name	Northing	Easting	Height
Pt6	0.363	0.364	99.98
Pt5	0.362	0.362	99.98
Pt4	0.363	0.364	99.98
Pt3	0.000	0.000	0.00
Pt2	0.000	0.000	0.00
Pt1	0.000	0.000	0.00

Input: Manually enter point name and coordinate information.

The station type consists of two types: Backsight Point and Azimuth.

Station Point

Point Name: Please Input

Northing: 0.000 m

Easting: 0.000 m

Height: 100.010 m

Type: ☒ Backsight Point ☐ Azimuth

Backsight Point

Point Name: Please Input

Northing: Please Input m

Easting: Please Input m

Height: Please Input m

Settings

Resection: Set device height and add backsight point.

5-3 BS Check



- 1、Check whether the current angle value is consistent with the azimuth when setting up the station
- 2、Check whether the current back sight point coordinate measurement value is consistent with the existing value.
- 3、It is necessary to set up the station first to carry out the BS Check.

BS Check			
Station Pt	11	BS Pt	22
Azimuth	69°21'34"	HA	
dHA			
Survey Point			
Northing	m	Height	m
Easting	m		
Residual			
dN	m	dVD	m
dE	m	dSD	m
Measure Settings			

5-4 STN. Ht

The elevation of the current station is obtained by measuring a known elevation point, and the elevation of the station can be obtained by this method if the elevation of some stations is unknown.

In the case that the elevation of some stations is unknown, the station elevation can be obtained by this method.

It is necessary to set up the station in order to set the station elevation.



<

STN.Ht

Device H

0.000 m

Target H

0.000 m

Target point

Pt name

>

Height

Please Input m

VD

SD

Station

Pt name

11

Calcu.Ht:

Measure

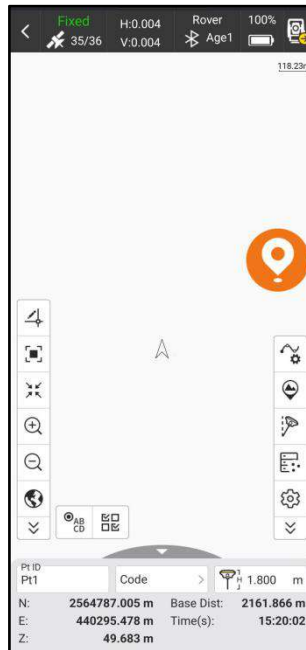
Settings



Chapter 6 Survey - RTK

6-1 Point Survey

By clicking this, we can enter to the point survey page.



In this page, the icons in upper toolbar describe as follows:



: Close/exit Point Survey page.



: Receiver positioning information, pressing to jump to satellite positioning information page.



: Receiver operation mode, pressing to jump to Base/Rover/Static setting page.



: Receiver battery power.



Solution status: includes single, float, dgnss and fixed.

Age1: current differential delay is 1.

e.g., Single, 0: current solution is single, and differential delay is 0.

Static, 0: “Static” shows sensor status when the pole tilt survey is enabled, and “0” means that the tilt angle is 0.

H: HRMS, the value represents the horizontal accuracy of current point. V:

VRMS, the value represents the vertical accuracy of current point.

35/35: current number of satellites which used to solution, and the total tracked satellites number.

The icons in left toolbar describe as follows:



Map Display



Map Reduce



Map Enlarge



Go to Map center



Full Map



CAD



Offset Distance/angle



Angle Calculation



Auto Map Center



Antenna Parameter



Screen survey



Open CAD



Perimeter and Area



Coordinate Inverse



Slope Distance



Intersection



Resection



Forward Intersection



Coordinate Traverse



Offset Point



Divide Line Equally



Compass



Area measure



Distance measure



Pt, Code, H Display



Layer



hide



Redraw

The icons in right toolbar describe as follows:



Graphic plot. Point collected by Survstar and then auto plotting with graphic plot.




: set the point type (Topo Point, Control Point, Quick Point, Auto Point, PPK).

The following introduces collecting process of all point types.

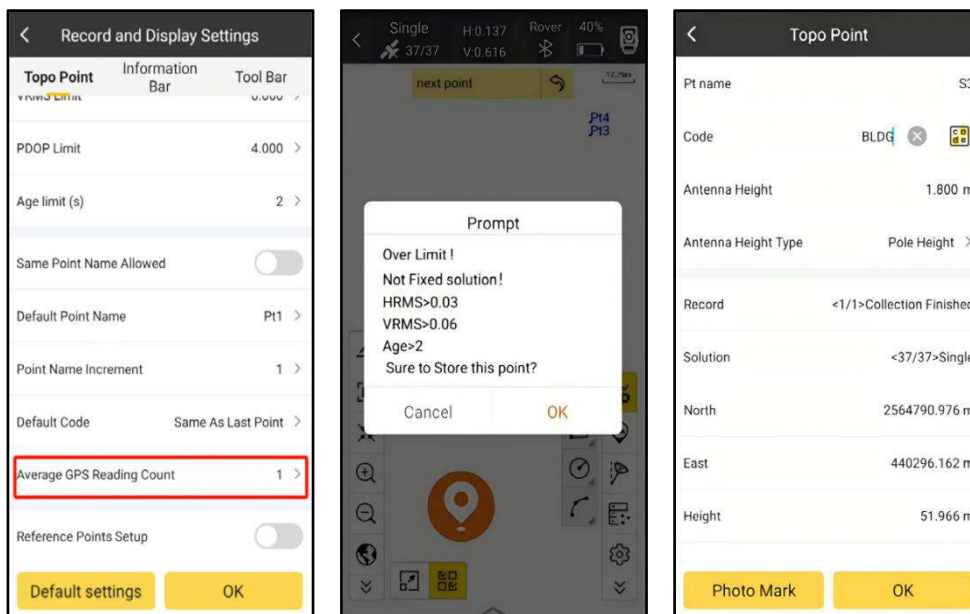
Topo points:



The “Average GPS Recoding Count” in record options refers to the number of points which could be consecutive recorded. It means that it could collect one point every time and this point should meet record limit. When you click  to record the topo point, if the measured point does not meet record limit, there will be a prompt message. If the measured point meets record limit, the measured point info (HRMS, VRMS, delay,



PDOP, date and date and time) will be displayed in the screen. Then click **OK** to save the topo point.

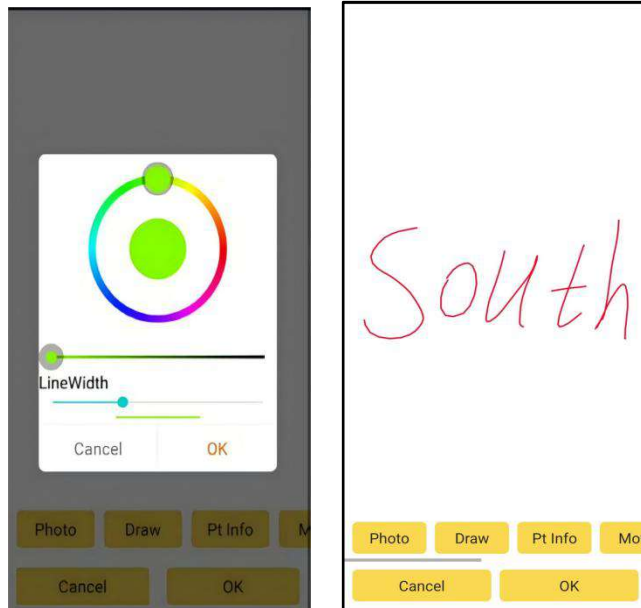


Click **Photo Mark**, we can make information note on collected points, such as documents, pictures and graphs

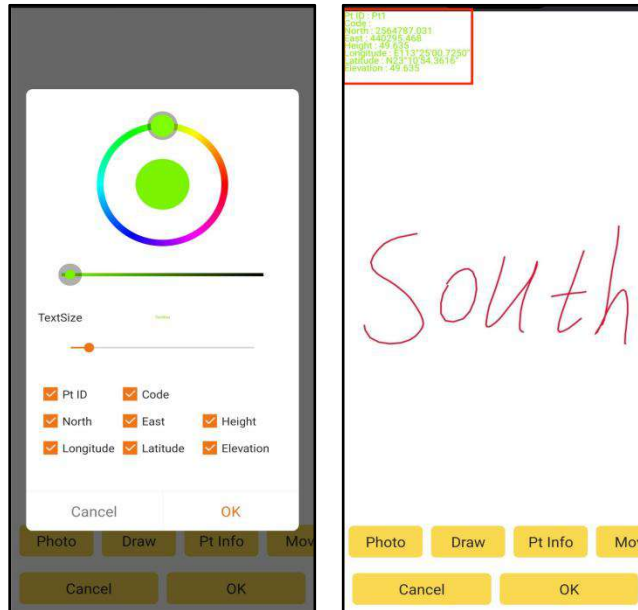




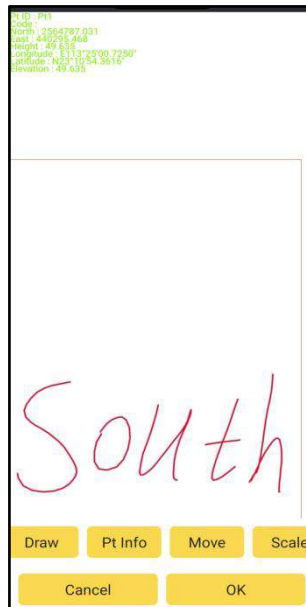
Click **Draw**, we need to choose the color of the draw line firstly. And we can draw the shape we need.



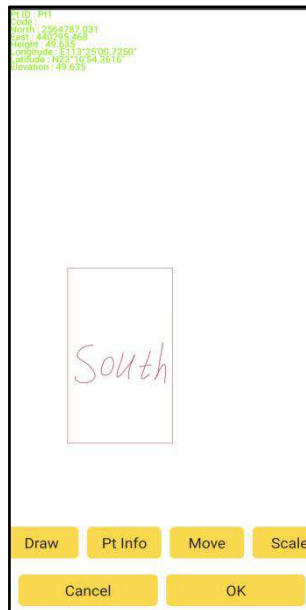
Click **Pt info**, we can label the photo information. We can select to on/off Pt name, Code, North, East, Height, Longitude, Latitude and Elevation.



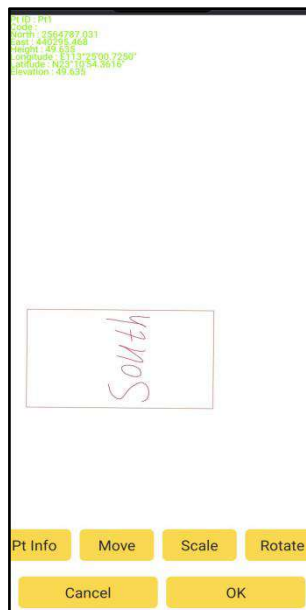
Click **Move** and select any drawn shape, we can move it.



Click **Scale** and select any drawn shape or photo, we can scale it.



Click **Rotate** and select any drawn shape or photo, we can rotate it.





Click **Photo** and select any drawn shape or photo, we can directly invoke system camera to take a picture.

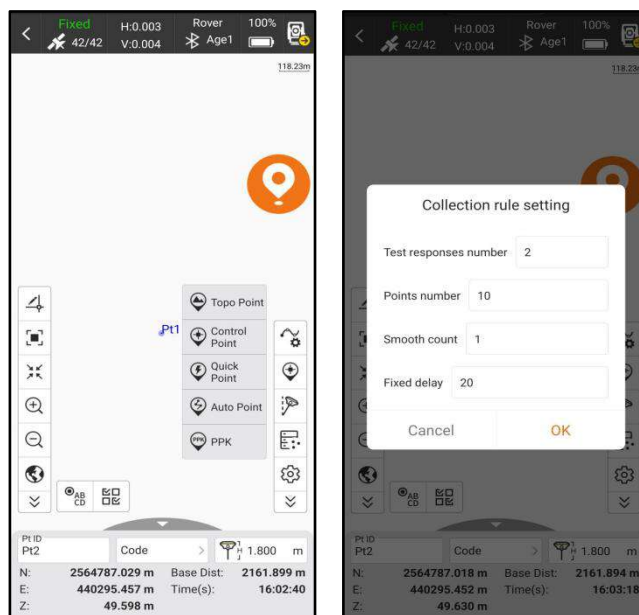
Click **Delete** and select any drawn shape or photo, we can delete it.


Click **Rollback**, it will roll the previous operation back.

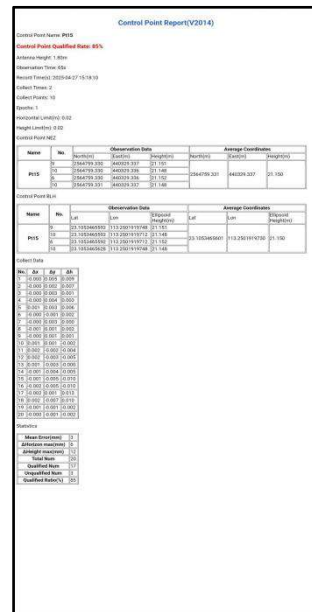
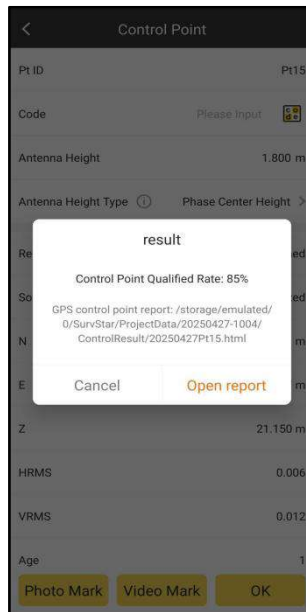
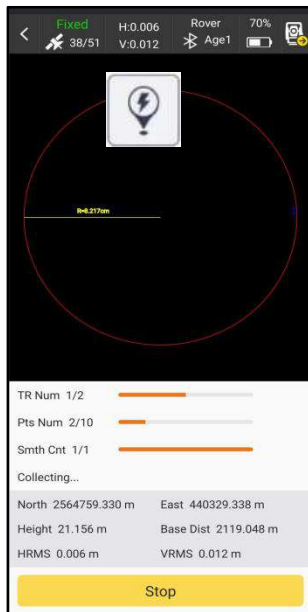
Control point:



We can set the control point surveyed parameters in Record and Display Settings.



Click  and wait for 20s delay for fixed solution, then it starts to collect data. It records one point every 1s, continuously records 10 points and collects 2 sets of 10 points (the above data is taken for example according to the control points record settings). **When collection is finished, it will output a Control Point Report automatically.**





Quick point:

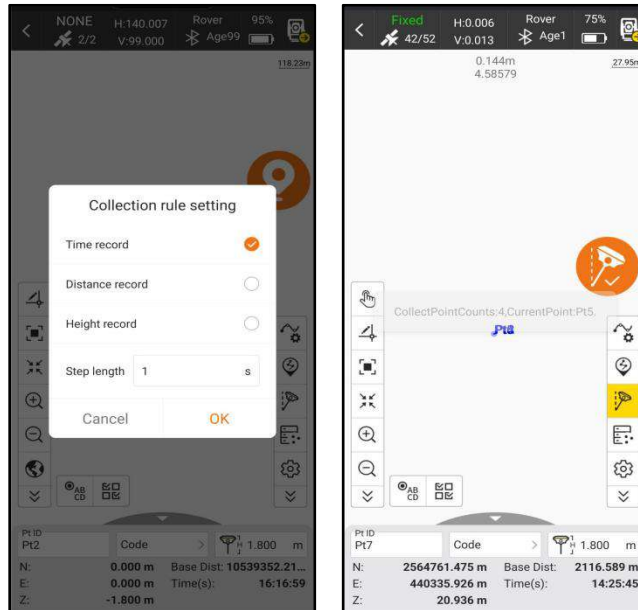
When you collect quick point, if the measured point meets record limit, then it will finish collection after prompt voice, and there will not show storage page.



Auto point:



Click  and set record parameters, click **OK** to start collection. Click  again to end the auto points recording.



Coordinate point database. Points collected by Survstar are stored in coordinate point database.

Points Database				
Pt Name		Please Input		Search
Total 44		Page 1/1		
	Name	North	East	Height
	Pt45	25647614.745	402546.110	76.000
	Pt44	2564761.167	440332.354	39.813
	Pt43	2564760.773	440333.318	39.818
	Pt42	2564760.948	440332.446	39.807
	Pt41	2564761.202	440332.080	39.882
	Pt40	2564760.877	440332.233	39.835
	Pt39	2564761.162	440332.162	39.807
	Pt38	2564761.218	440332.164	39.875
	Pt37	2564761.257	440332.179	39.925
	Pt36	2564761.223	440332.196	39.914
	Pt35	2564761.226	440332.187	39.896
	Pt34	2564761.257	440332.185	39.892
	Pt33	2564761.672	440332.582	39.802
Add Edit Details Import ...				



Record and Display Settings.



Topo/Control/Quick/Auto Point: settings for display limit of collected points on the basis of set point type that defaults to topo points. It can be Topo/Control/Quick/Auto.

< Record and Display Settings		
Topo Point	Information Bar	Tool Bar
Solution Limit		Fixed >
HRMS Limit		0.030 >
VRMS Limit		0.060 >
PDOP Limit		4.000 >
Age limit (s)		2 >
Same Point Name Allowed	<input type="checkbox"/>	
Default Point Name		Pt1 >
Point Name Increment		1 >
Default Code	Same As Last Point >	
Default settings		OK



< Record and Display Settings		
Control Point	Information Bar	Tool Bar
Solution Limit		Fixed >
HRMS Limit		0.030 >
VRMS Limit		0.060 >
PDOP Limit		4.000 >
Age limit (s)		2 >
Horizontal Limit		0.020 >
Vertical Limit		0.020 >
Same Point Name Allowed	<input type="checkbox"/>	
Default Point Name		Pt1 >
Default settings		OK

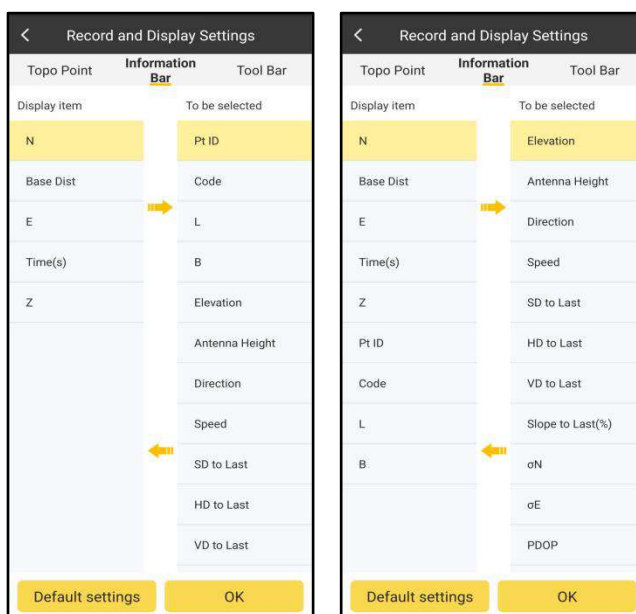
< Record and Display Settings		
Quick Point	Information Bar	Tool Bar
Solution Limit		Fixed >
HRMS Limit		0.030 >
VRMS Limit		0.060 >
PDOP Limit		4.000 >
Age limit (s)		2 >
Same Point Name Allowed	<input type="checkbox"/>	
Default Point Name		Pt1 >
Point Name Increment		1 >
Default Code	Same As Last Point >	
Default settings		OK

< Record and Display Settings		
Auto Point	Information Bar	Tool Bar
Solution Limit		Fixed >
HRMS Limit		0.030 >
VRMS Limit		0.060 >
PDOP Limit		4.000 >
Age limit (s)		2 >
Same Point Name Allowed	<input type="checkbox"/>	
Default Point Name		Pt1 >
Point Name Increment		1 >
Default Code	Same As Last Point >	
Default settings		OK

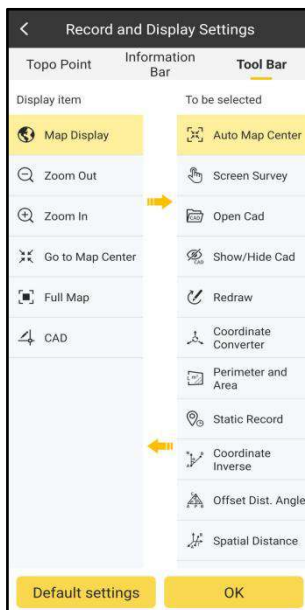


Information: it can select the displayed information in the status bar at interface bottom.

Select an item in the to be selected list, then click to  move this item to the Display item list. In the same way, select an item on the Display item list, and click to  move this item to the to be selected list. If click Default Settings, the default items will be added to the Display item list, including Pt name, North, East, Height.



Tool Bar: settings what function keys to display in left toolbar in Point Survey interface.



: Collect point coordinates: this icon changes along with open/close status of tilt survey.




Open tilt survey, it will change to . And if the tilt mode available, it will change



to .

6-2 Detail Survey

By clicking this, it will enter to detail survey page. Its upper toolbar information is same as that of Point Survey. Detail Point is a simplified point survey mode, which is suitable for rapid and continuous coordinate survey.

Click **Settings** and set recording limit and click **OK** to return to detail survey page. to Set Pt name, Code, Antenna Height and Antenna Height Type, click  to complete point collection.



Fixed

32/40

H:0.000
v:0.000

Rover
Age 1

100%

N:	2544887.383 m	B:	N23°00'00.0062"
E:	397473.902 m	L:	E113°00'00.0027"
Z:	43.000 m	H:	43.000 m

Pt ID

Pt46

Code

AW

Antenna Height

1.800 m

Antenna Height Type

Straight Height >

Collect Progress

Settings

Detail Survey

Solution Limit

Fixed >

HRMS Limit

0.030 >

VRMS Limit

0.060 >

PDOP Limit

4.000 >

Age limit (s)

2 >

Enable Duplicate Point Names

☐

Default Point Name

Pt1 >

Point Name Increment

1 >

Default Code

Same As Last Point >

Average GNSS Reading

1 >

Observation time

0s >

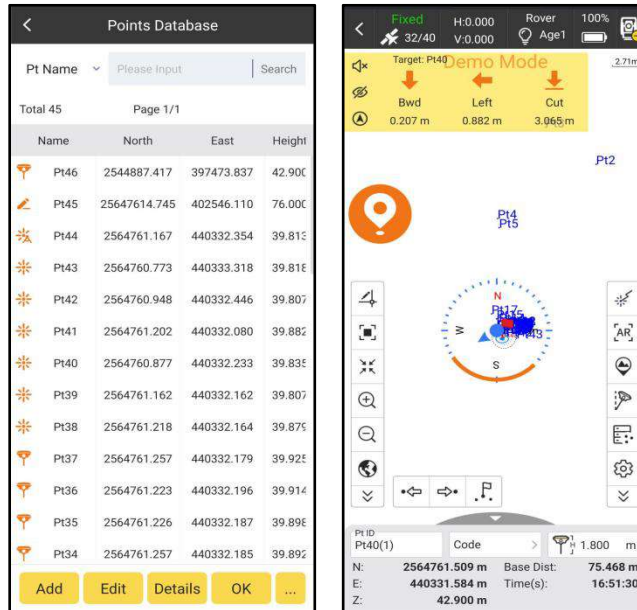
Reference Point Code

Cancel

OK

6-3 Point Stakeout

Point stakeout is the process of inputting target coordinate in software and stakeout in field. By clicking this, we will enter to points database. Select any point, and click OK. Then we will enter to the point stakeout page.



Arrows in top bar describe as follows:

To Forward/Backward: distance that receiver needs to move Forward/Backward from current position to stakeout point. To Forward arrow shows up and to Backward arrow shows down.

To Left/Right: distance that receiver needs to move Left / Right from current position to stakeout point. To Left arrow shows left and to Right arrow shows right.

Fill/Dig: dig in stakeout point position. If the value is positive, perform excavation; if not, perform fill. If current height is higher than stakeout point arrow shows down. If current height is higher than stakeout point arrow shows up.



: open/close stakeout voice prompt.



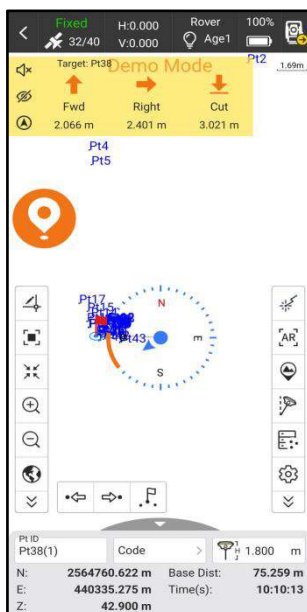
: hide or show left arrow bar.



: switch compass mode or distance mode.



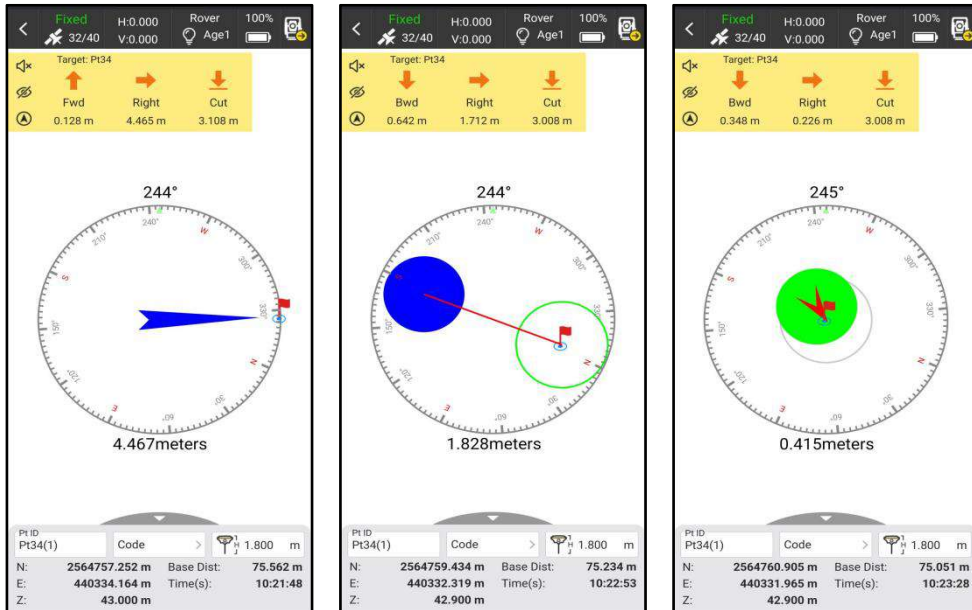
This is the distance mode.



There are two states for compass mode.

State 1: Red flag represents target point, blue arrow represents moving direction from current receiver position to stakeout point, green arrow represents the direction from the collector pass and words below represents distance to target point.

State 2: In gray/green circle the red flag represents stakeout target, and blue circle represents receiver position. When stakeout distance doubles Prompt Range, it would change state 1 into state 2; when stakeout distance meets Prompt Distance, state 2 blue circle would turn into green.



The icons in side toolbar describe as follows:



: Points database.



: Tilt Survey



: Nearest Point.



: Next Point.



: Last Point.



: Point stakeout settings.

It can set stakeout settings, including Prompt Distance, Stake Limit, Display Information (Not Display, Point Name, Code), and Reference Direction (Forward, North); settings for



Topo Point, Inform and Tool Bar are the same as that of Point Survey. Click **Default Settings** and it can restore the changed settings.

Prompt Distance: taking stakeout point as center of a circle and drawing three concentric circles with radii are multiples of 1, 2 and 3 times of the prompt range, area covered by these three concentric circles is prompt range.

Point stakeout steps:

1. Select a point to stakeout in the points database, then click **OK** to enter points stakeout page. Red flag is target stake point. Circle is current position of receiver. Arrow is direction indicator, indicating the direction of current receiver. When the arrow direction is same with the direction to the target point, please move in this direction, then you can reach the target point.
2. According to left status bar, move from the current point to the stakeout point, and excavate or fill the soil according to the height difference of the elevation.



3. When current point is within prompt range, there will be three concentric circles, which indicate it enters precise stakeout.
4. After you reach the stakeout point, please stake it.

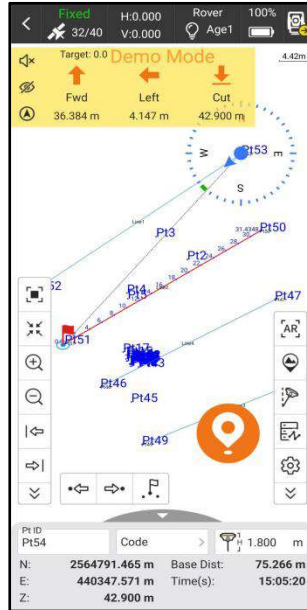
6-4 Line Stakeout

Line stakeout is the stakeout of designed line, including line mileage, left and right offset and elevation control within line. By clicking this, we will enter to Line List. Click Add, we can add the designed line with Line Name, the Start Point, End Point and Start Chainage. We can also import line file(*.SL).

The image displays three screenshots of the SurvStar application interface:

- Line List:** Shows a table with columns: Name, Start Pt E, Start Pt Z, End Pt N, and End Pt. The table is currently empty, displaying "Total 0" and "Page 0/0". A "No data" message is shown in the center. At the bottom, there are buttons: Add, Edit, Delete, OK, and ...
- Line Para.:** Shows the configuration for a line named "Line1". Fields include: Start Chainage (0.000 m), Input Method (Start Point + End Point), Start Pt (with location and measurement icons), Start Pt ID (Please Input), N (0.000 m), E (0.000 m), Z (0.000 m), End Pt (with location and measurement icons), End Pt Name (Please Input), and N (0.000 m). An OK button is at the bottom.
- File Import:** Shows the File Type selection screen. It has a "Line File" option and a "Line library(.SL)" option. Below these, there is a list of supported file formats: [Line Name], [Start Pt N], [Start Pt E], [Start Pt Z], [End Pt N], [End Pt E], [End Pt Z], [Mileage], [Start Pt ID], [End Pt Name]. An OK button is at the bottom.

Then we will enter to the line stakeout page.



The icons in side toolbar describe as follows:



: Line List.



: Next Point.



: Last Point.



: Next Line.



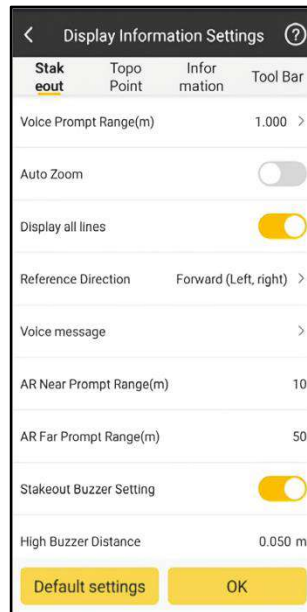
: Last Line.



: Line Stakeout Settings.



It can set line stakeout settings, including Prompt Distance, Reference Direction (Forward, North); settings for Topo Point, Inform and Tool Bar are the same as that of Point Survey. Click **Default settings** and it can restore the changed settings.



6-5 AR Stakeout

Augmented Reality (AR) stakeout revolutionizes conventional surveying methods by integrating various sensory modalities, including visual and auditory. This approach eliminates the proficiency gap between experienced surveyors and novices by providing real-time visual guidance within authentic environments. Additionally, voice prompts are employed when nearing designated targets. This streamlined process allows surveyors to stake out targets without the need for leveling the pole, relying on visual and auditory

guidance for precise stakeout each time.



Features: Users can easily find the target points in real world through real-time images and virtual arrow guidance.

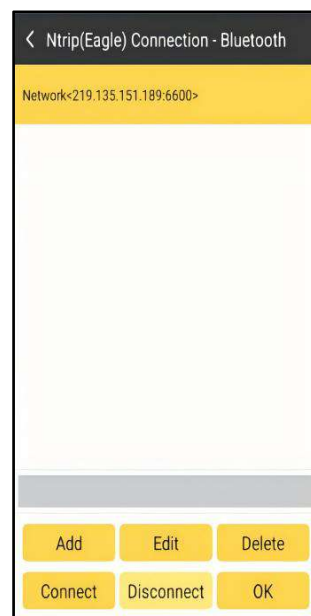
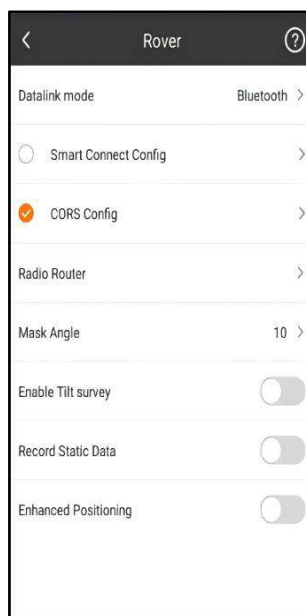
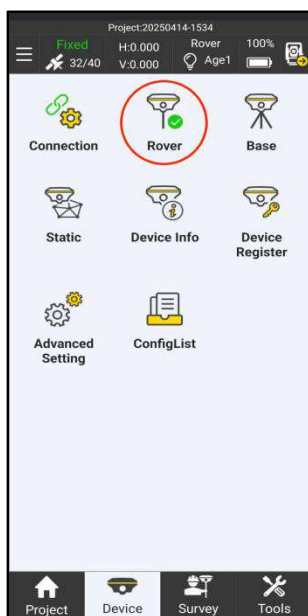
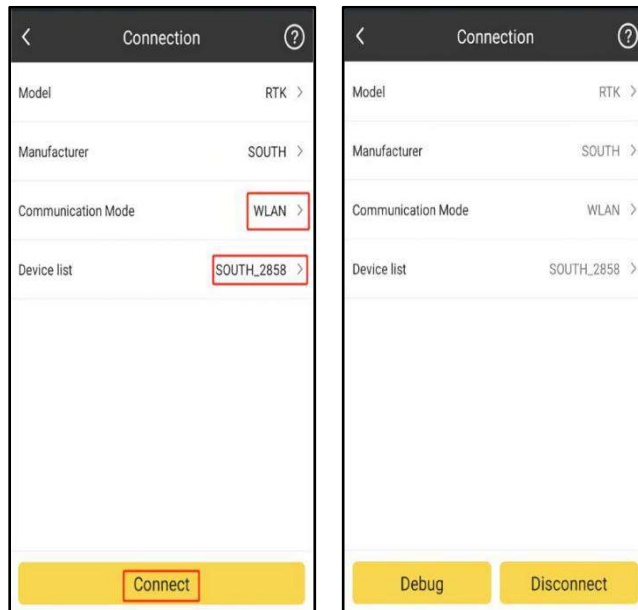
This function must initialize the IMU firstly. After completing the tilt survey initialization, select the point to stakeout, click the [AR] icon on the right side of the screen, and then stakeout points according to the direction and position displayed on the interface. (Note that the direction of the device camera is the same as the direction of the controller), the detailed steps are as below.

6-5-1 WIFI connection

In communication please select WLAN mode, as the picture shown below, switch on the WiFi of your controller, and then let the controller connect to the WiFi hotspot of receiver.

6-5-2 Datalink settings

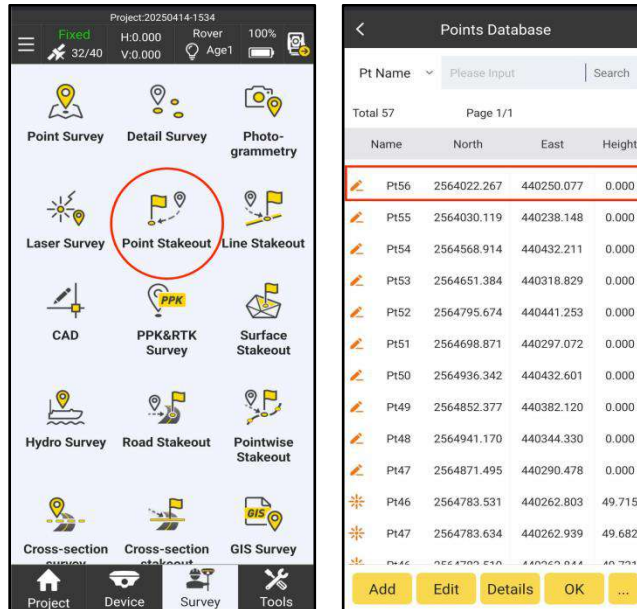
Please set the correction data datalink make the receiver connect to CORS to achieve a fixed solution.



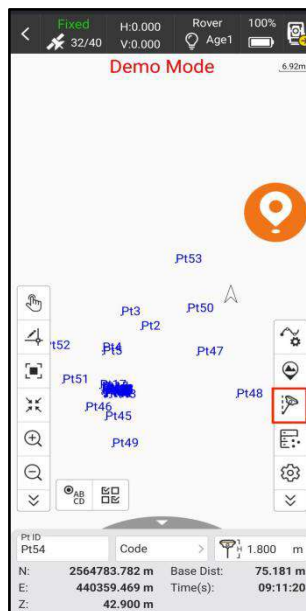
6-5-3 Point Stakeout



Click the "Point stakeout" function, select a point and turn on the tilt survey function. Shake the device as prompted to initialize the tilt survey. (Note that the pole height is consistent with the actual pole height)



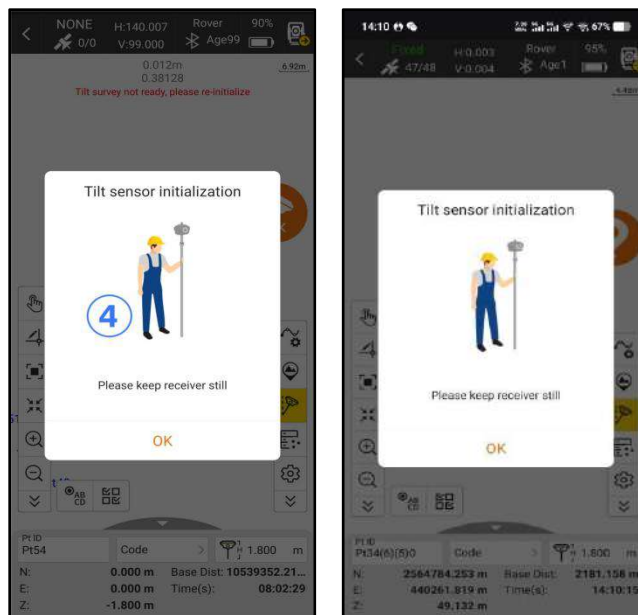
Enable the Tilt survey function, it will prompt you to initialize IMU.



Tips:Tilt Survey (colour gray denotes not active)Click it to enable IMU, and shake pole

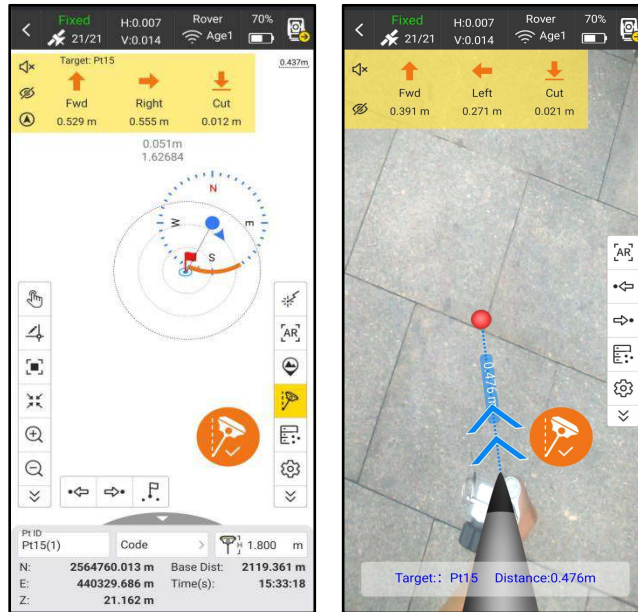
6-5-3-1 IMU initializing

According to the prompt to perform operations, 1. please keep receiver still till the next prompt screen, then shake the pole front and forth till you hear the voice “tilt survey is available” at this moment, tilt survey is available. Watch that tilt survey icon is displayed from gray to bright colour.

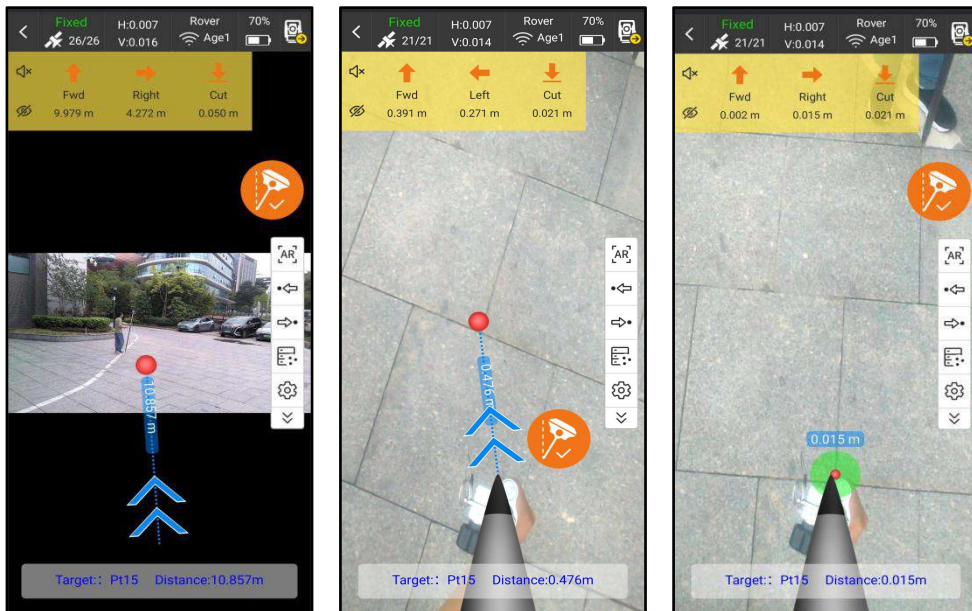


6-5-3-2 AR is working

After initializing IMU,users can Enable AR, Click the AR icon to turn on the real scene stakeout.



Over 10 meters (default) use the side camera for orientation, after approaching the target point to switch the bottom camera;





For example: side camera and bottom camera



Side camera



Bottom camera

6-6 Photogrammetry

Visual positioning broadens the scope of RTK applications through the synergistic integration of photogrammetry and RTK positioning technologies. With an 8-megapixel

camera, “Fast” IMU and the latest positioning algorithm, Our receiver is adept at capturing and processing images or videos to derive precise coordinates. Therefore, it excels in surveying targets that pose challenges for traditional methods, including intricate corners beneath roofs, obstructed fields, and bridges spanning rivers. This capability enhances surveying versatility, allowing for the efficient and accurate surveying and mapping of locations that were previously difficult to access with RTK surveying techniques.

When surveyors have a high-quality internet connection, they can process image data online through the network and cloud servers. Finally to obtain coordinate data for image

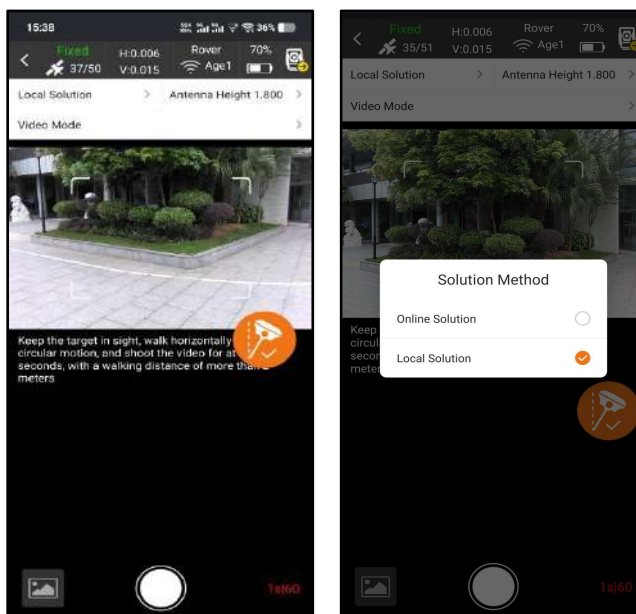


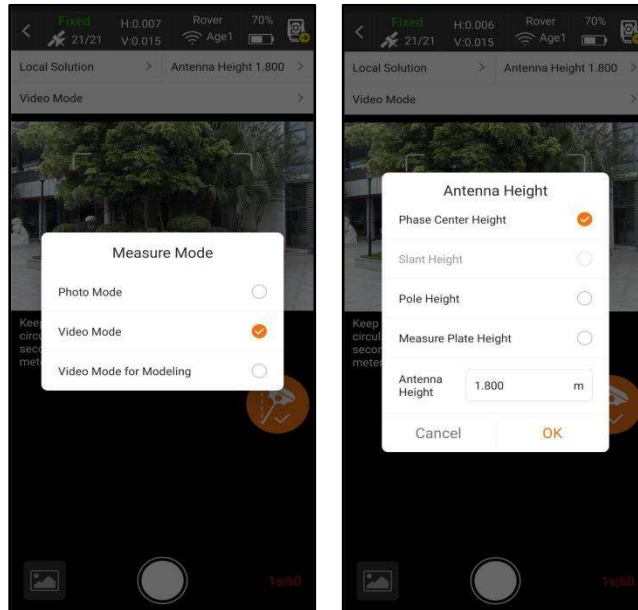
measurements with 2cm accuracy in just a few minutes. This processing mode balances high accuracy and fast processing speed.

When outside the coverage area of internet, surveyors also can achieve offline processing of image data through Survstar on the controller. This processing mode boosts the fastest processing speed by saving time of uploading image data, providing 4cm accuracy results within 30 seconds, people who care about the data safety, they could consider this offline solution.

There are three modes for you to choose from: ‘**Takin Photos Mode**’, ‘**Taking Videos Mode**’ and ‘**Modeling for Post-processing**’. Use ‘Taking Videos Mode’, keep the target inside the frame, take at least 5 photos around or in a circular motion, with a walking distance of more than 2 meters.

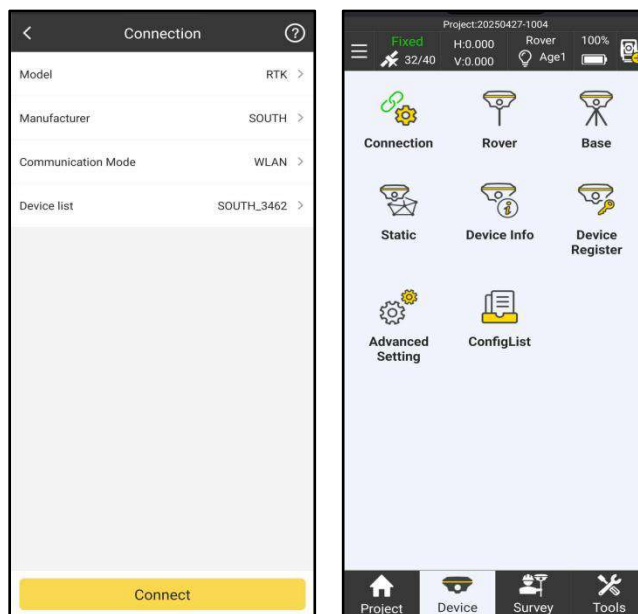
Use ‘Taking Videos Mode’, click to start shooting, keep the target to be measured in sight, walk horizontally or in a circular motion to shoot video for at least 5 seconds, and walk more than 2 meters. Click to end the shoot.

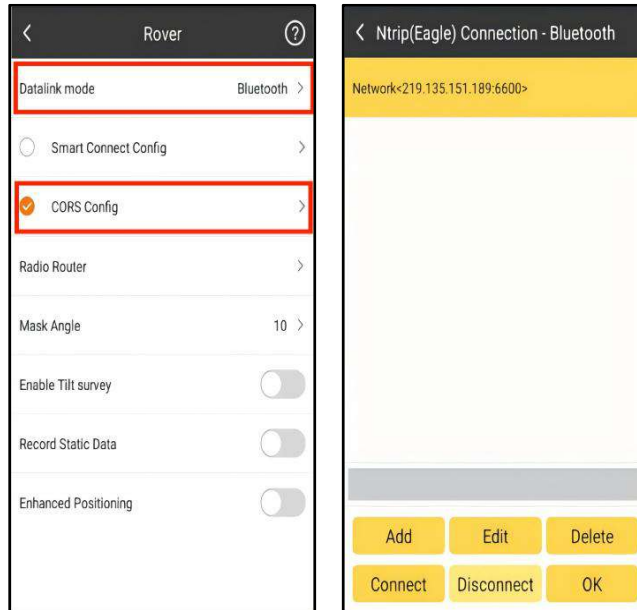




6-6-1 Online solution

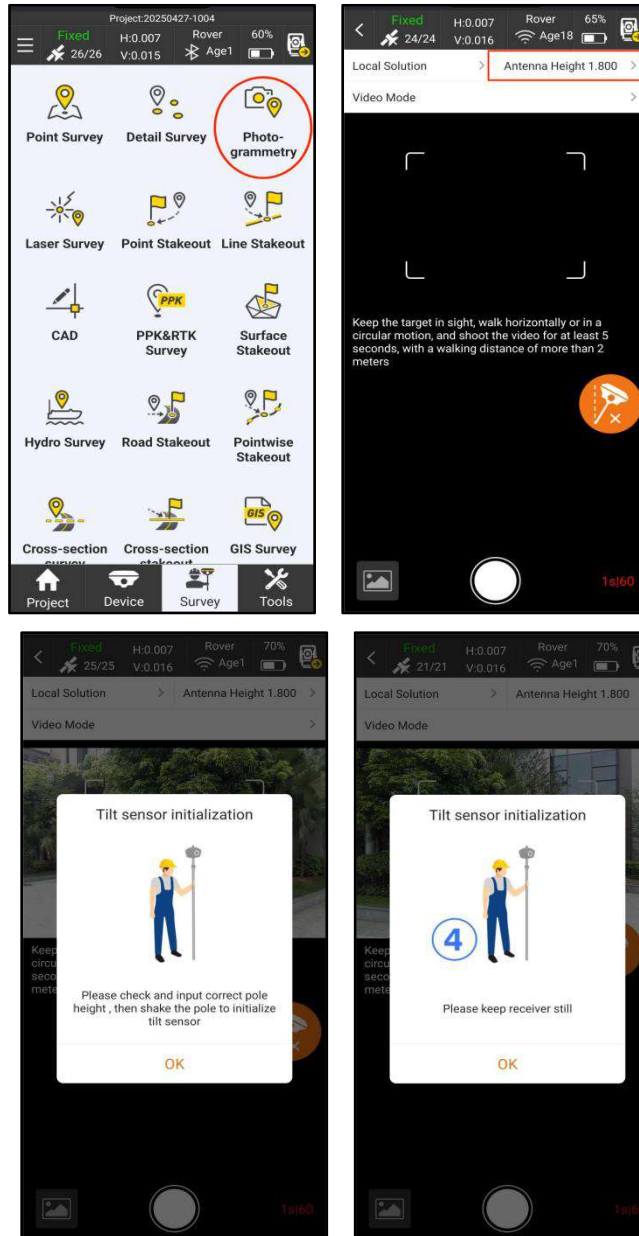
1) Use wifi connection to connect to the device. The device is connected to CORS to achieve a fixed solution.





Tips: About the datalink options, if SIM card was installed in controller, users can select Bluetooth, if SIM card was installed in receiver, users can select cellular.

2) Enter photogrammetry, software will prompt you to initialize IMU, please keep receiver still till the next prompt screen, then shake the pole front and forth till you hear the voice “tilt survey is available” at this moment, tilt survey is available. Watch that tilt survey icon is displayed from gray to bright colour. (Note that the pole height is consistent with the actual pole height)

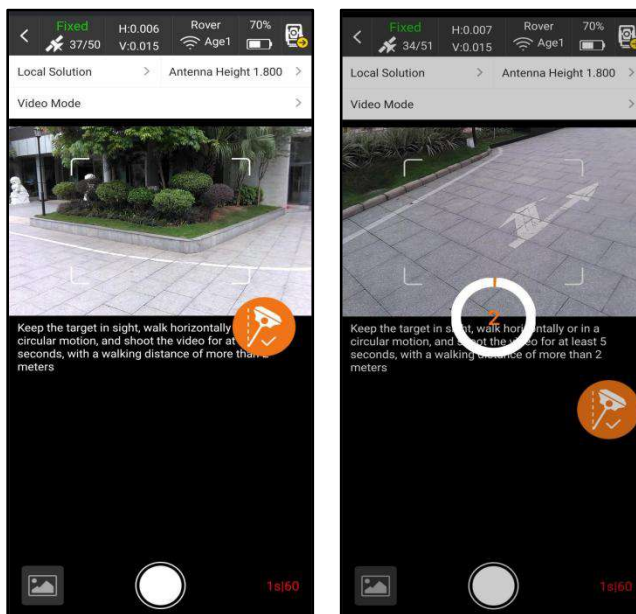


3) There are three modes for users to choose: ‘Taking Photos Mode’、‘Taking Videos Mode’and ‘Modeling for Post-processing’.

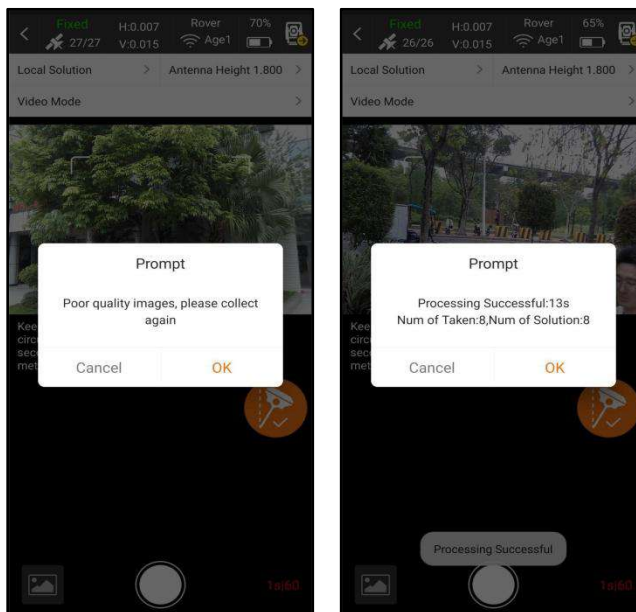
Use ‘Taking Videos Mode’, click to start shooting, keep the target to be measured in sight all the time, walk horizontally and in a circular motion to shoot video for at least 5 seconds,



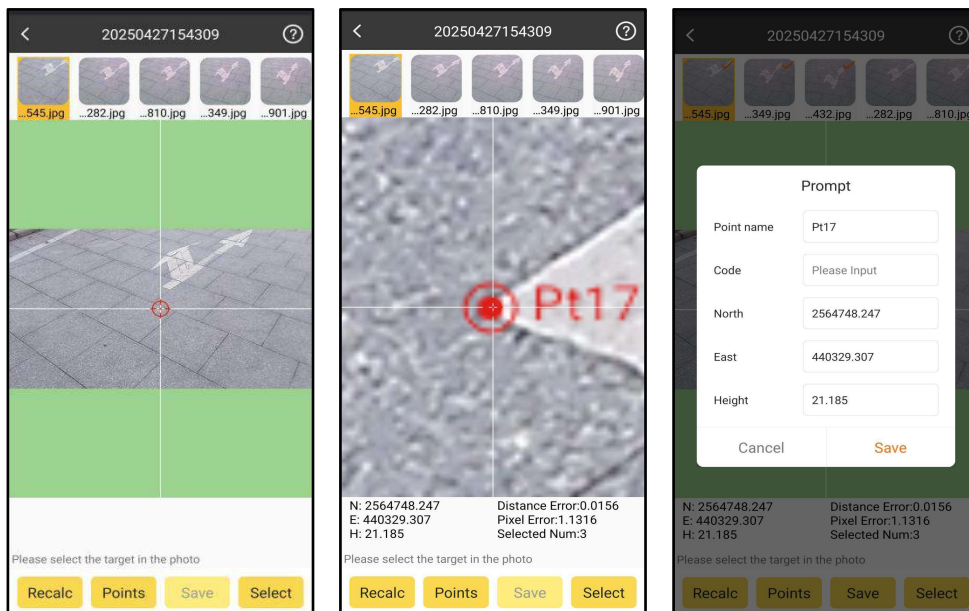
and walk more than 2 meters. Click to end the shoot. (Photo transfer in progress: The picture taken by the device is being transferred to the controller)



4) Click OK to perform the upload server calculation. (The calculation time is related to the number of uploaded pictures, the more pictures, the longer it takes)



5) After the solution is completed, click OK, select three pictures, select the same target point, you can calculate the coordinates

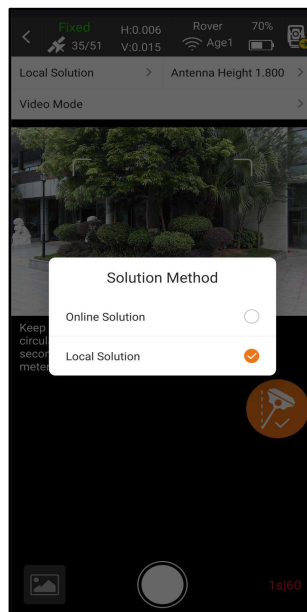




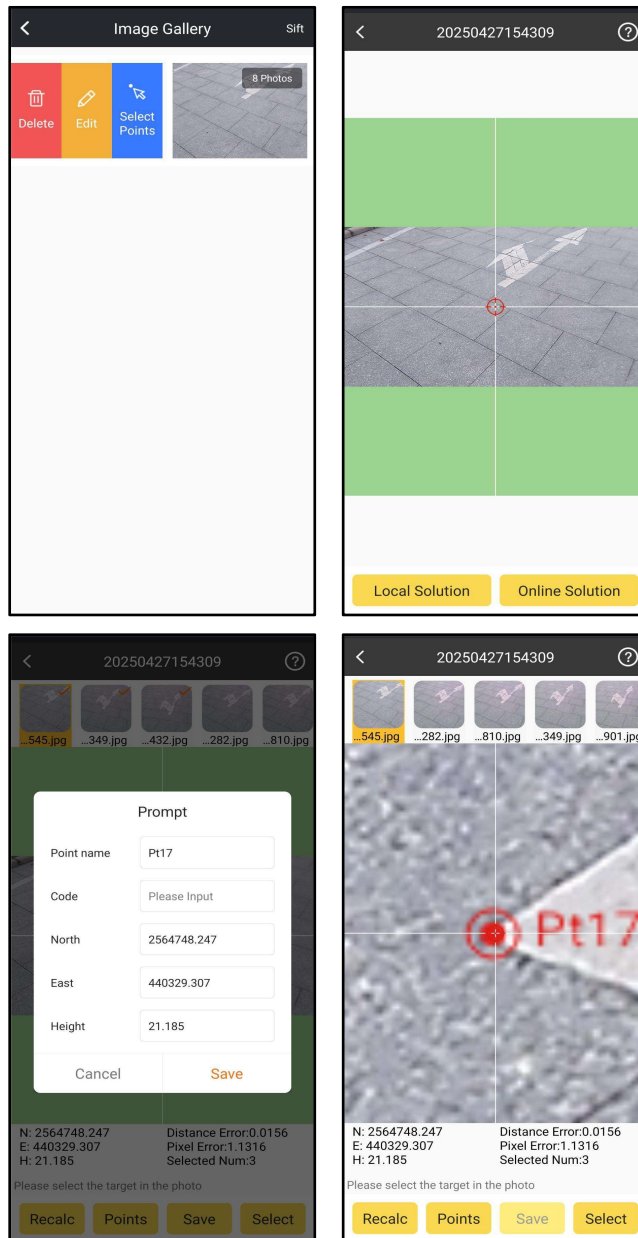
6-6-2 Local solution:

This feature can be used when the controller or phone without SIM card or cannot access the internet, not need to upload images or videos to the server for processing and calculation. The calculation is done solely by the device's processor, you can use the photogrammetry to be performed normally even in areas without internet access, greatly convenience work in difficult environments.

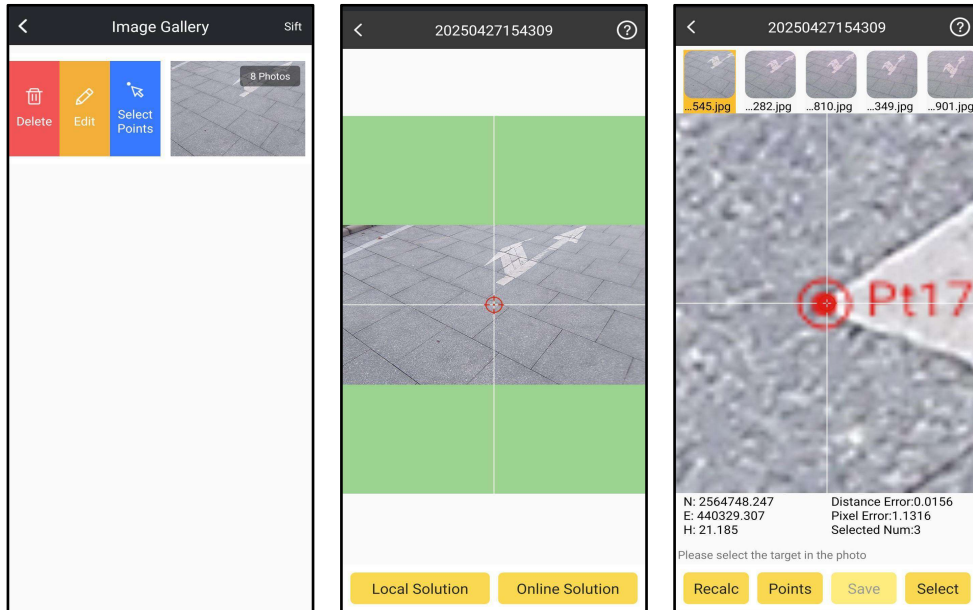
- 1) Photogrammetry when the device does not have Internet access. Click on top left corner in main page for Photogrammetry, then choose Solution method Location Solution.



- 2) After online solution successful, if you want to local recalculate, choose Select photos to click **Select Points** when enter Image Gallery, click **Local Solution** at the bottom left corner.



3) After online solution failed, if you want to offline recalculate, choose Select photos when enter Image Gallery, then click Local Solution.



6-6-3 3D modeling

SOUTH's 3D modeling technology are fully utilized and transformed in SOUTH Receivers. The results of image measurements by receiver, can be seamlessly integrated with data outcomes from UAV.

UAV surveys often face challenges of data gaps, leading to incomplete model outcomes. In such cases, surveyors can use SUTH receiver to collect image data on the ground and use SGO to modeling then incorporate it into aerial survey data as a supplement, thereby enhancing the overall model outcome.



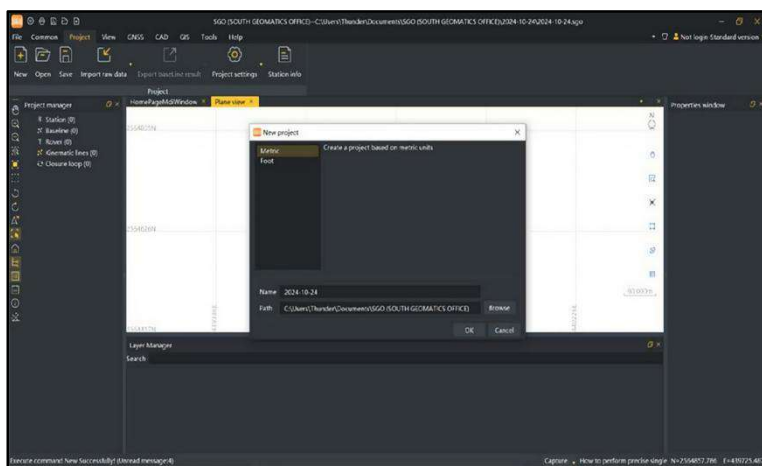
UAV Survey for SOUTH building, Lion statue detail lost



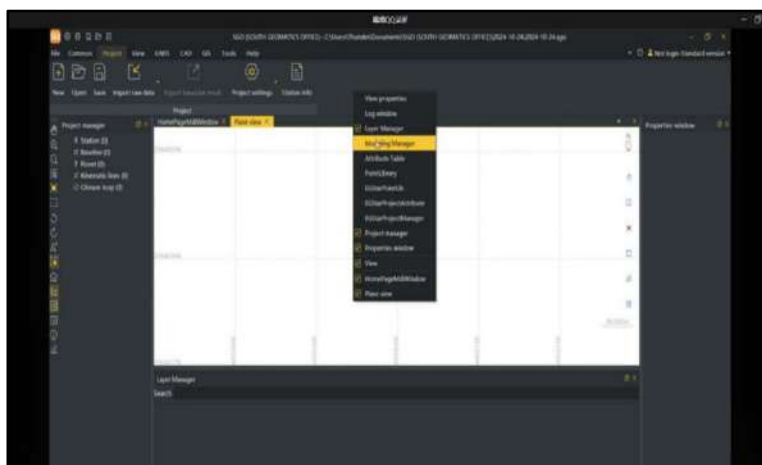
Scan the Lion statue

Detailed steps:

- 1) New project in SGO. Set the coordinate system parameter which you need.

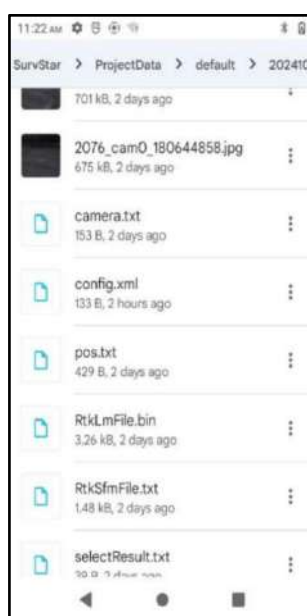
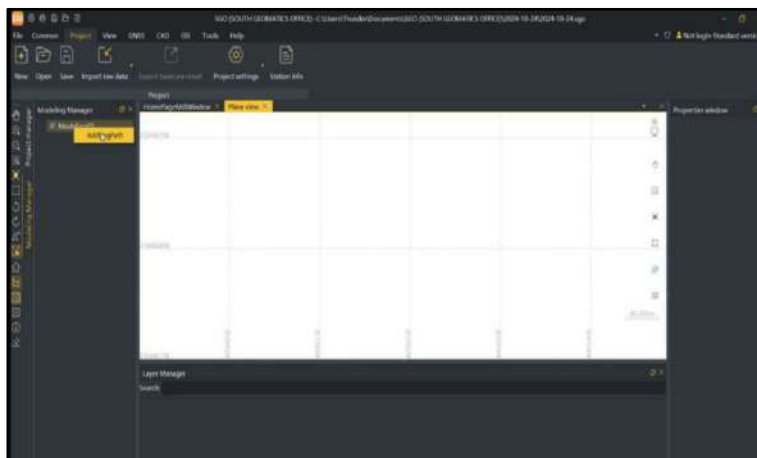


Right-click Toolbar area to choose Modeling manager.

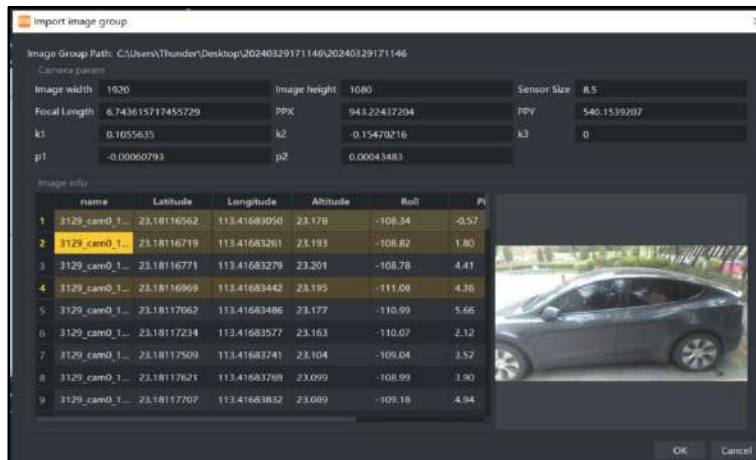


2) Right-click Modeling manager to choose photos folder. In Survstar-projectdata-default.

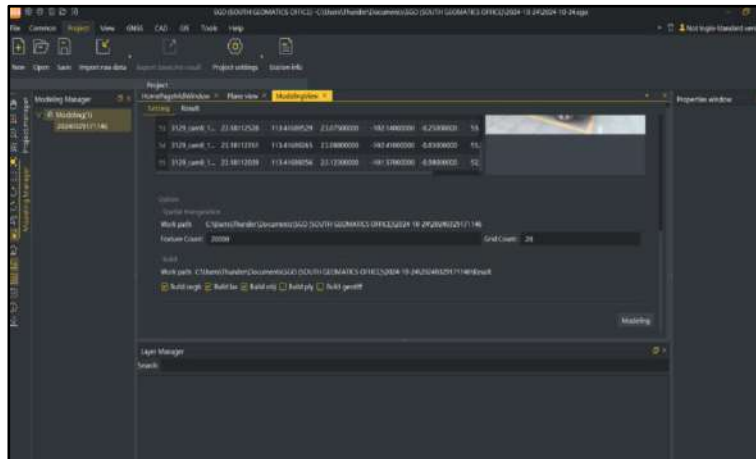
Or find the photogrammetry images in the receiver disk.

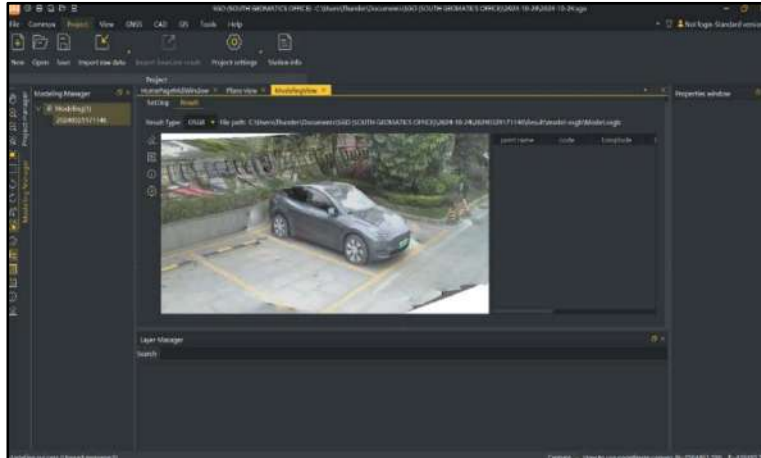


- 4) Set the parameters and preview photos in Import image group page.



5) Click Modeling when you finished settings.





6-7 Laser Survey

Laser survey is an instrument that accurately measures the distance to a target by modulating a certain parameter of the laser. Pulse laser ranging involves emitting a brief pulse or sequence of pulses towards the target during operation, with the photodetector receiving the reflected laser beam from the target. The timer measures the time it takes for the laser beam to travel from emission to reception, allowing for calculation of the distance from the rangefinder to the target. Point acquisition is carried out according to the position of the laser point.

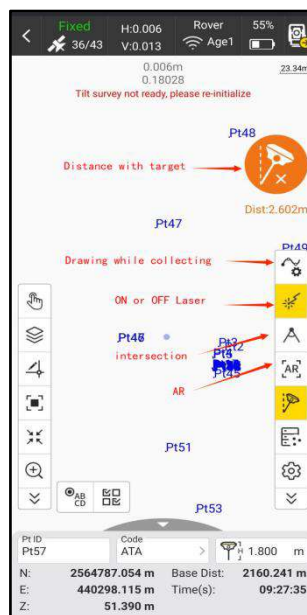
Features:

- 1) **Laser Survey**, It can measure the target point via laser beam in daily survey work, especially somewhere users can not arrived at, such as roads that have been opened to traffic, under eave of buildings, tunnel portal, bridges... semi-occluded area.
- 2) **Drawing while point collecting**, According to the ground features to select the graphics (line polyline, arc, curve...) to draw while collecting point in the laser survey function, it can help the users to get the sketch drawing which is convenient for further data process in the next work.

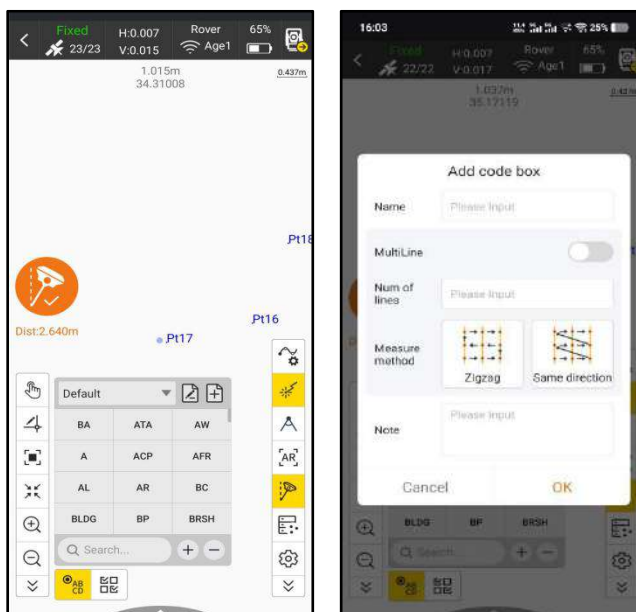


- 3) **AR**, it can help users to advantageously get the point in Laser Survey function.
- 4) **Laser Intersection**, It can get the quality result via measuring 2 times or many times on one target point. It can improve the accuracy of measured results.
- 5) **Laser ranging**, It can measure the distance value between the target and the receiver laser device in door or out door.

Functional main interface.

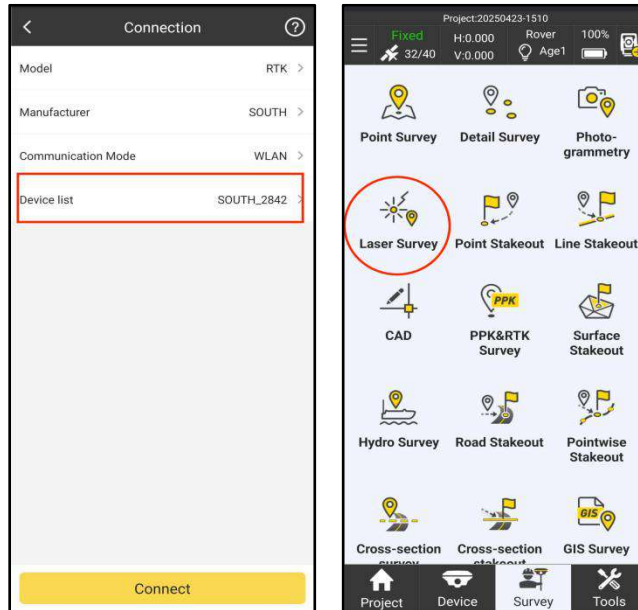


Codes and measure method, the details please refer to the section of Point Survey function.

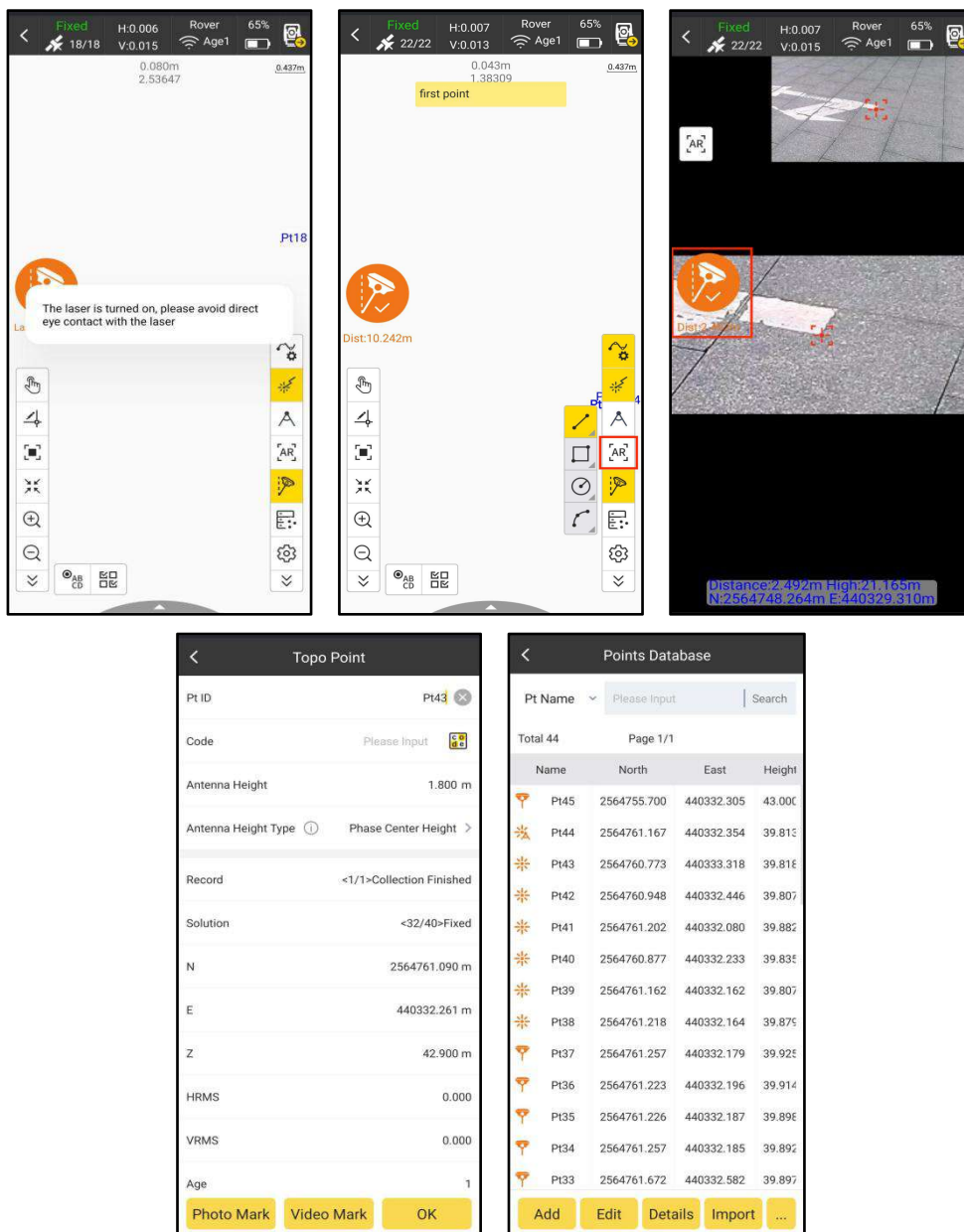


6-7-1 Laser Survey

Make the WiFi of controller connect the WiFi hot-spot of receiver, choose “Laser Survey” in “Survey”MENU. Set the datalink to make the receiver get fixed solution.



1. According to the prompt screen to initialize the IMU to be available.
2. Turn on laser function,
3. Turn on “AR”. As the picture shown below (According to the demand to switch on/off the “AR”). Start to collect the point, make the center of laser cross hair aim on the target point, click the collecting button to save the point data. Then continue to next collecting.

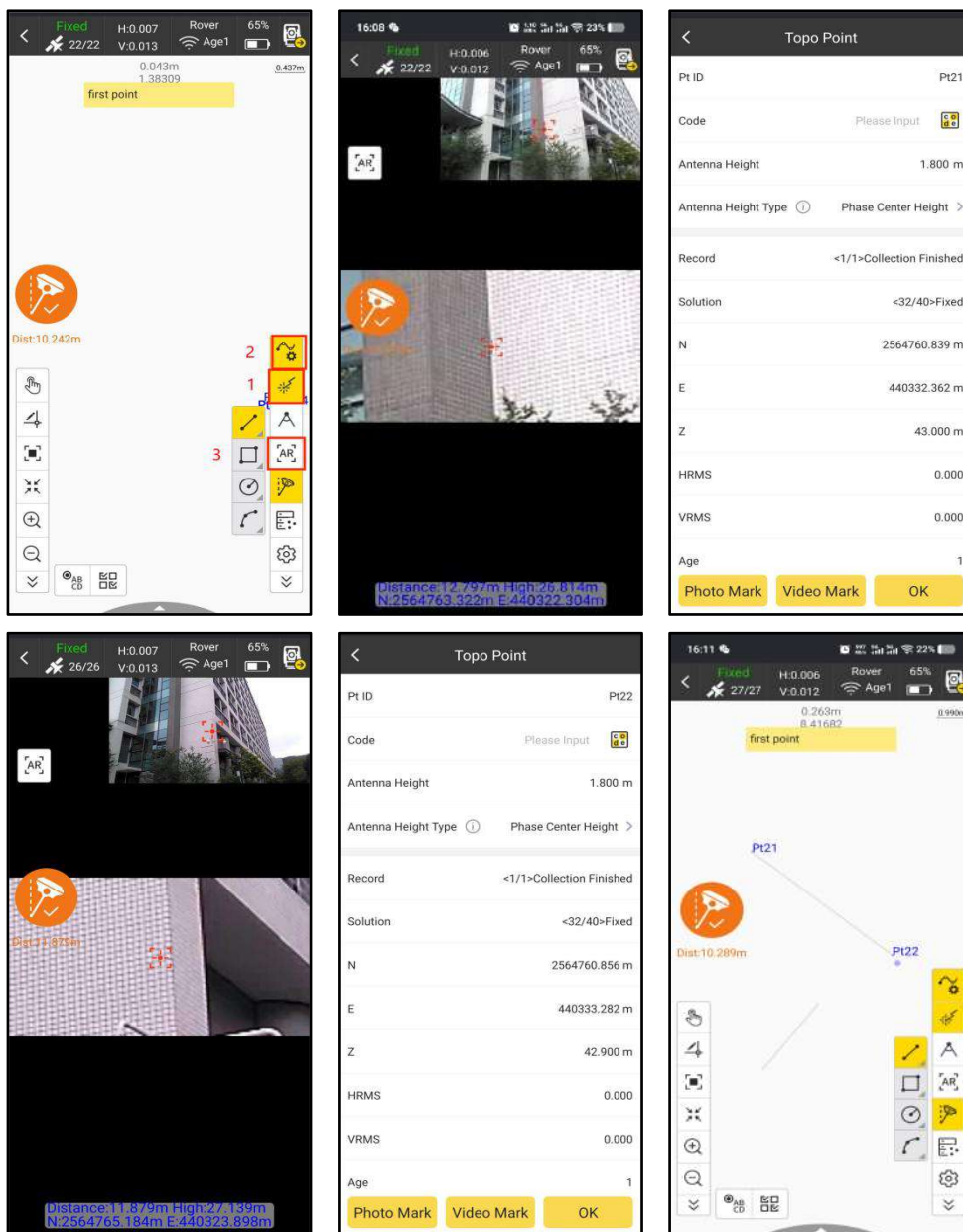


6-7-2 Drawing while collecting

After initializing IMU, 1.enable laser 2.enable graphics to select the graphics which you need 3.enable AR, start to collect the point, make the center of laser cross hair aim on the



target point, click the collecting button to save the point data. Then continue to collect the next point, the points will be connected to form graphics till you completing it.

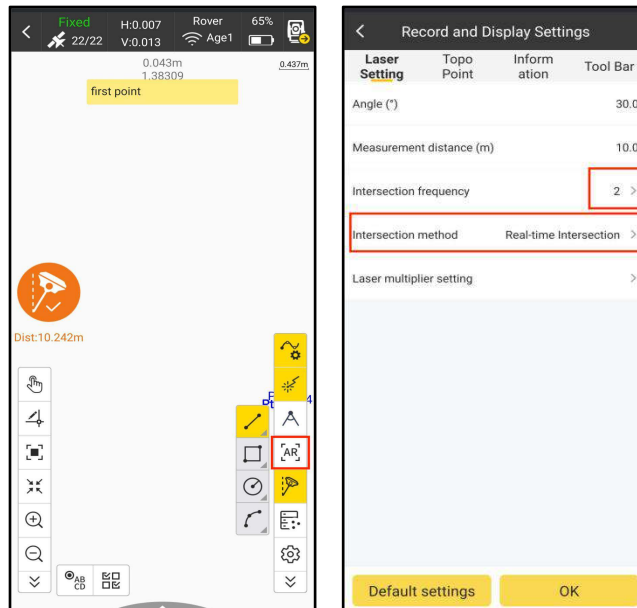


There multiple graphics can be selected



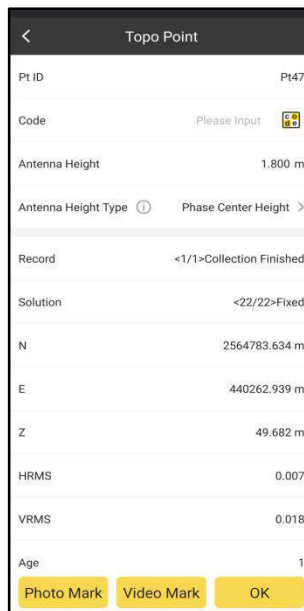
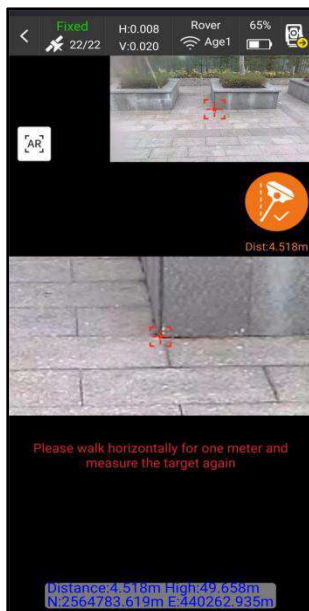
6-7-3 Intersection function

By intersecting two or more points, you will get more accurate point coordinate. Click the setting menu, choose the intersection method.

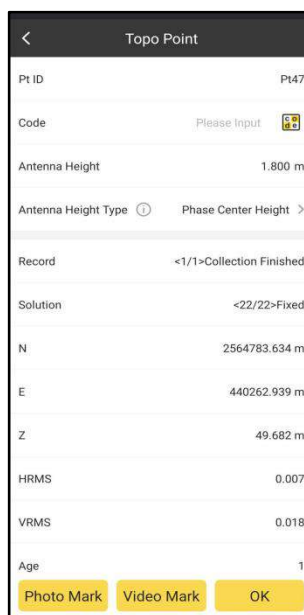
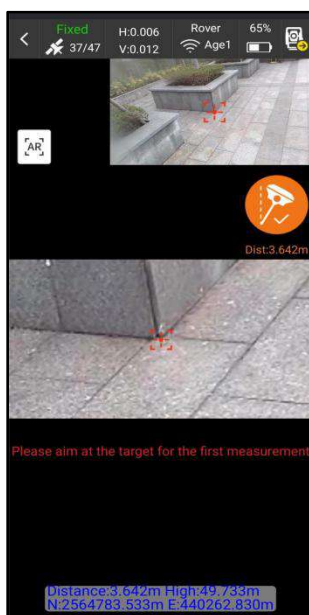




First collecting

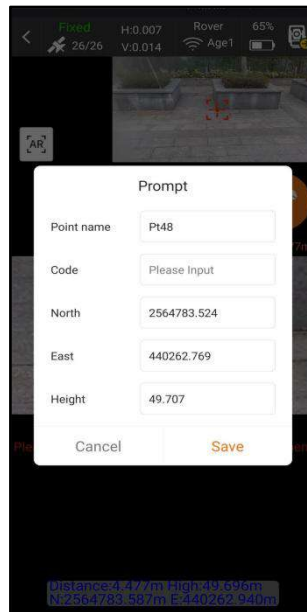


Second collecting





Got the result of Intersection , After second collect will calculate the final coordinate of the target point, then save it. As the picture shown below.

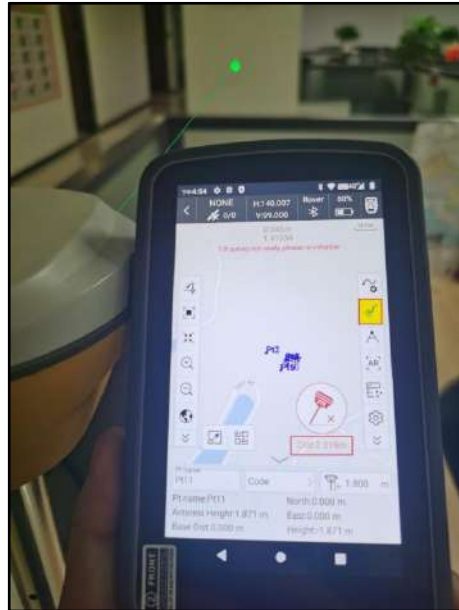


Direct rendezvous is when the points are collected, you will directly obtain directly the coordinates of the intersection points.

Point library rendezvous is choose the points in point database, then obtain the coordinates of the intersection points.

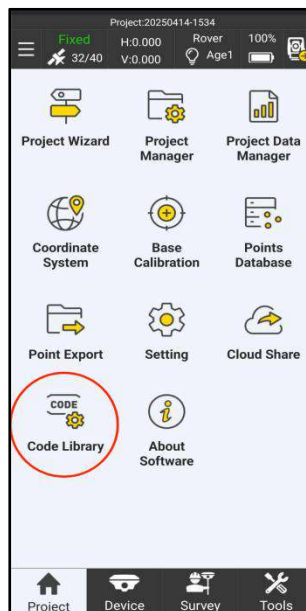
6-7-4 Laser Ranging

Just enable the laser, laser beam will reach the surface of target, it will be reflected, then laser device will measure the distance value between target and receiver laser device, as the picture shown below. Note that this function can be used without tracking satellites.

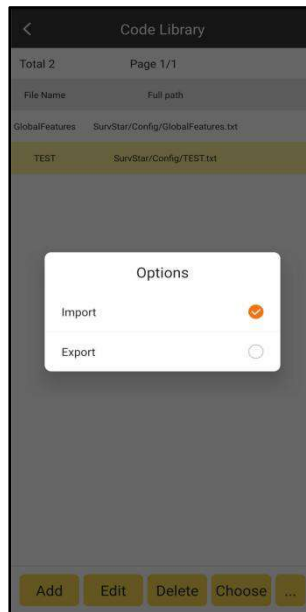


6-8 Code, Survey and Plot

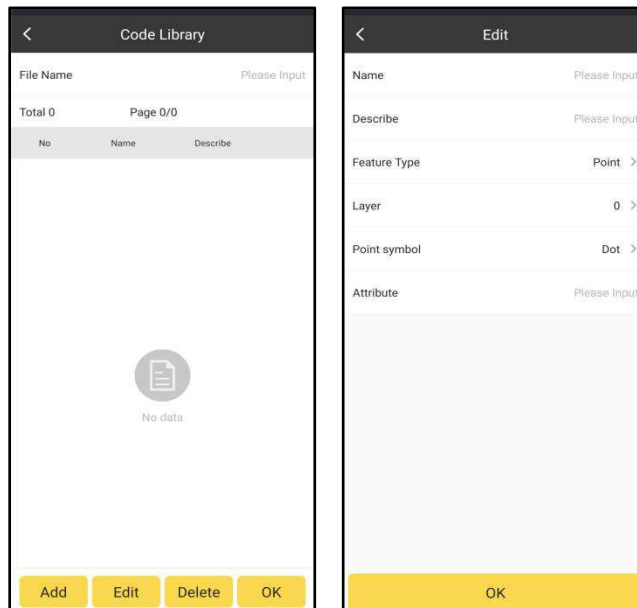
6-8-1 Code library



1) Code library management: ato add, edit, delete, use, import, export code table file;

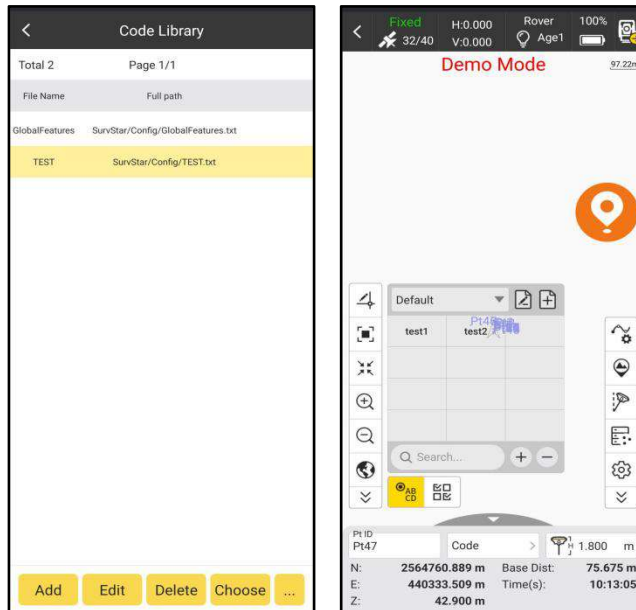


2) Add: support user to add code table and add custom code;

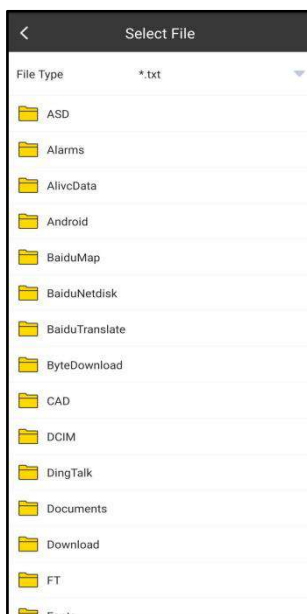





- 3) Edit: support users to edit the existing code table;
- 4) Delete: support to delete the code table;
- 5) Choose: Select the code table to be used, **which will be associated with the code box in the point measurement**, and display when the user adds the code to the code box;

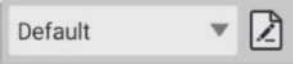


- 6) Export code file: Support to export TXT/CSV/DAT and other formats code file;
- 7) Import code file: Support the import of TXT/CSV/DAT and other formats code files, import file format requirements are consistent with the export format;




6-8-2 Code box part

① Associated code library, support user to create a custom code box  ;

② Code box switching selection and editing  ; all codes of the current code library are added to the 'default' code box and cannot be modified.


③ Add coding: Select a custom code box, click the blank cell, add code from code library currently in use;



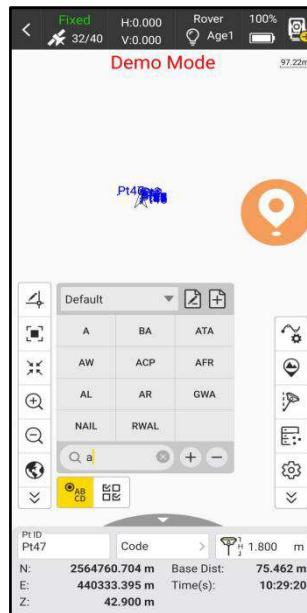
④ Add repeated code: Select an existing code and click Add  (Repeated coding will be numbered to distinguish);






⑤ Delete the code: Select the existing code, click delete  or long press to select the target code to delete;

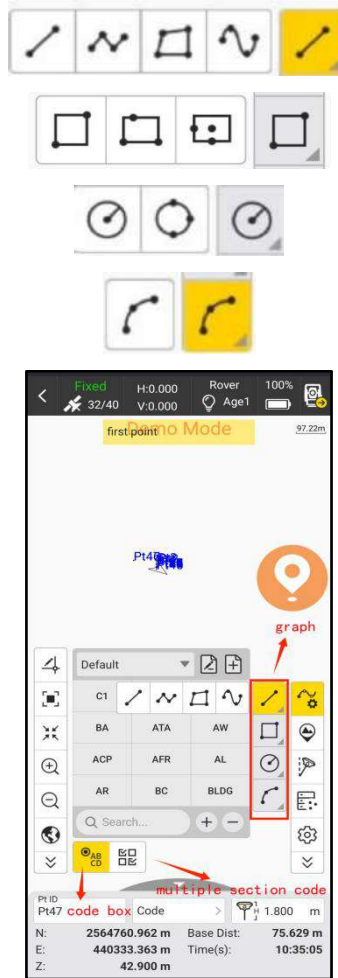
⑥ Code search: Support fuzzy search code;




⑦ Enable multiple selection code, support the same point to save multiple encoding attributes ;

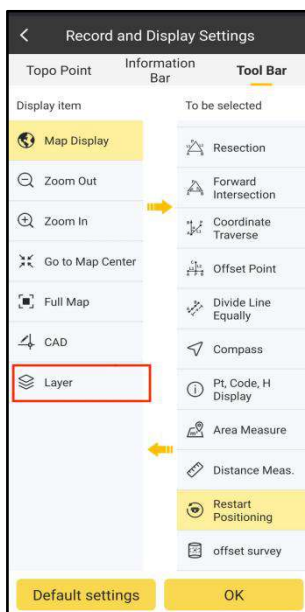
6-8-3 Graph Part

Support linear measurement such as straight line, multi-segment line, polygon, curve, two-point rectangle, three-point rectangle, two-point circle, three-point circle, three-point arc, etc. Long press to select a type.

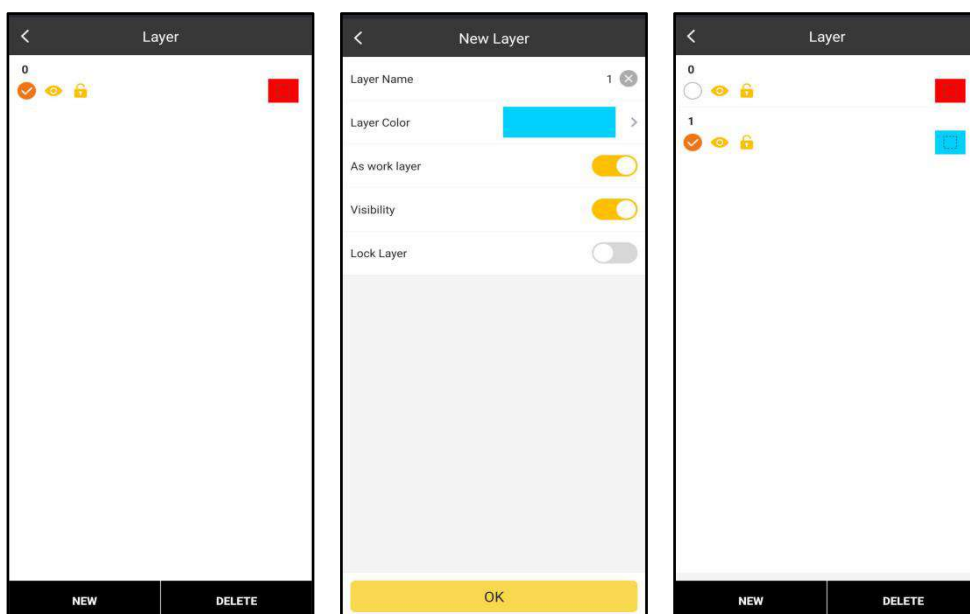


Layer manage

Add Layer button in Settings 

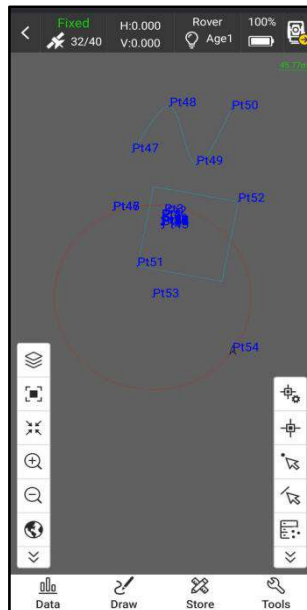


Open Layer Management to add a new layer, input layer name and select layer color.



Select whether to use it as work layer, visibility and lock layer.

The drawing opens in CAD function.



6-8-4 Main operation process:

Conventional measuring points: using code for measuring points;

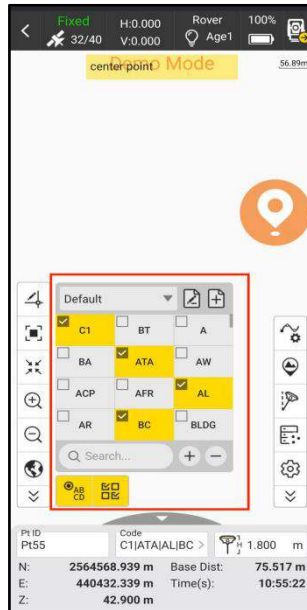
Graphic mapping: measuring line segments, polygons, curves, rectangles, arcs and other independent features;

Multi-line surveying and mapping: multiple lines simultaneously surveying and mapping operations, Z-type measurement, multi-line measurement in the same direction;

1) Conventional measuring points:

① Click the code box, select the code you need to use, and the code will be automatically filled into the code input box for saving;

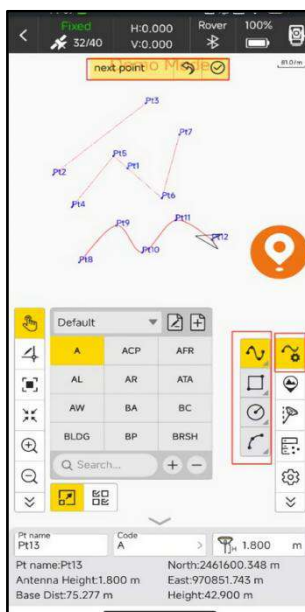
@ Open multi-selection coding, multi-selection to select the required coding, coding automatically fill in the coding input box, save;



2) Graphic mapping:

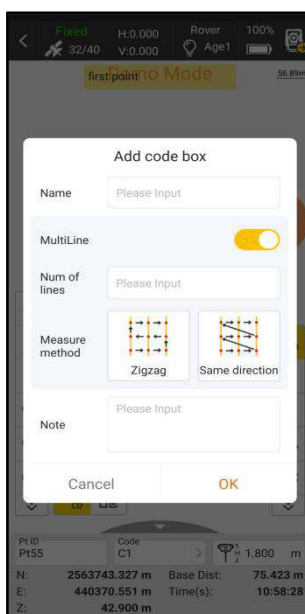
① Open the code box, add a custom code box, or use the default code box;

@ Turn on the graphic control function, select the graph to be drawn, long press to select more types and perform the measurement drawing according to the prompt information at the top of the interface;

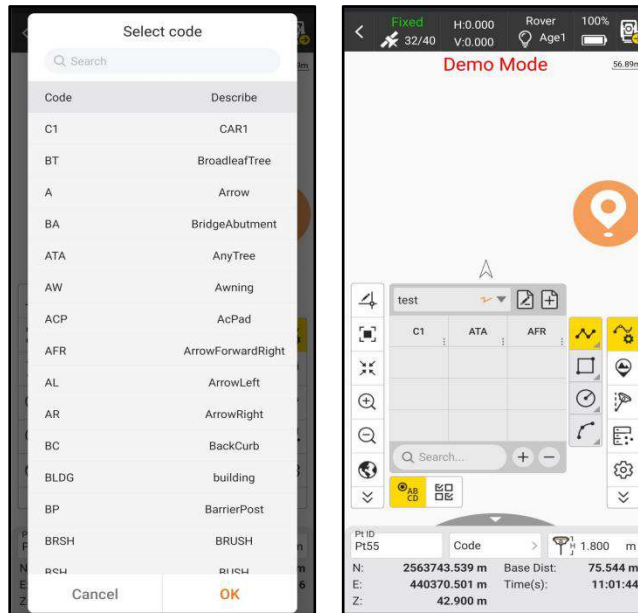


3) Multi-line mapping - Z-type mapping:

- ① Open the coding box, add the multi-line coding box, select the number of lines, Z-type measurement mode, click OK;

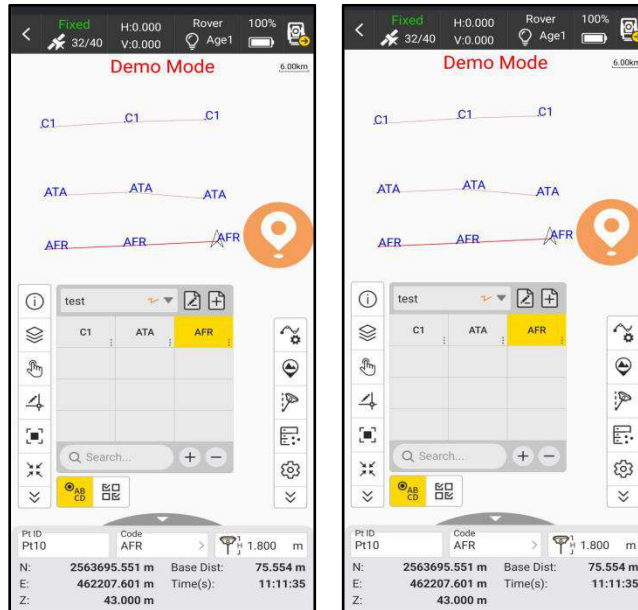


@ Add custom codes, select Start code;



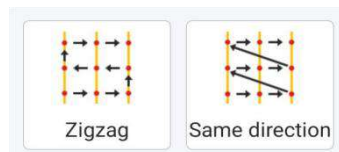
③ The user selects the polyline/curve line for measurement drawing;

④ In the measurement process, the measurement point drawing is carried out according to the selected measurement method, and the user needs to measure the number of lines in turn according to the number of lines set. The code of the same line is the same, and the coding order in the coding box is automatically switched to use;



4) Multi-line mapping - Multi-line in the same direction:

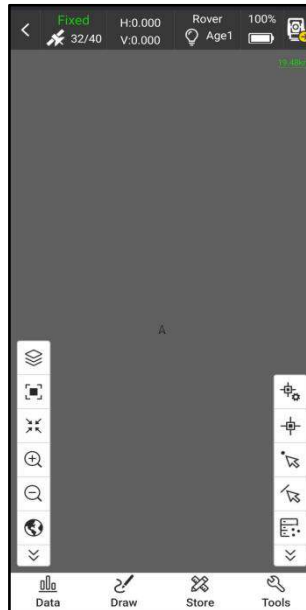
The process of multiline mapping in the same direction is basically the same as that of Z-type mapping. Attention should be paid to the difference of multiline mapping in the same direction.



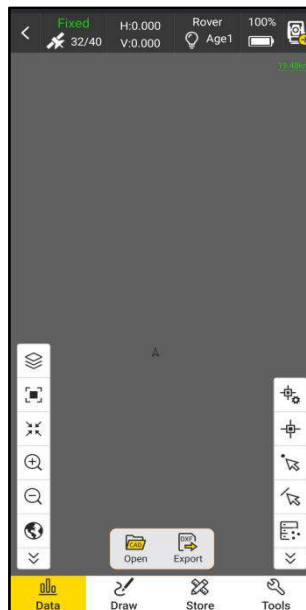
6-9 CAD

CAD is mainly used to stakeout lines in the existing CAD graphics. By clicking this, we can enter to the CAD page.

The icons in side toolbar describe as follows:

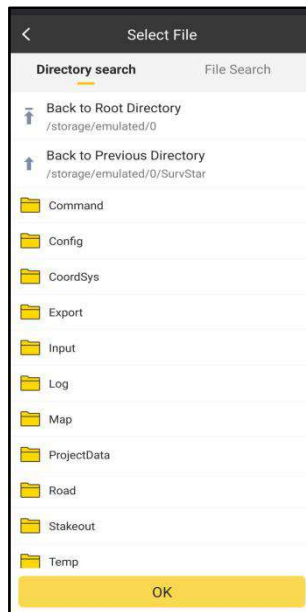


:Tap Data icon will show CAD file open and export function.

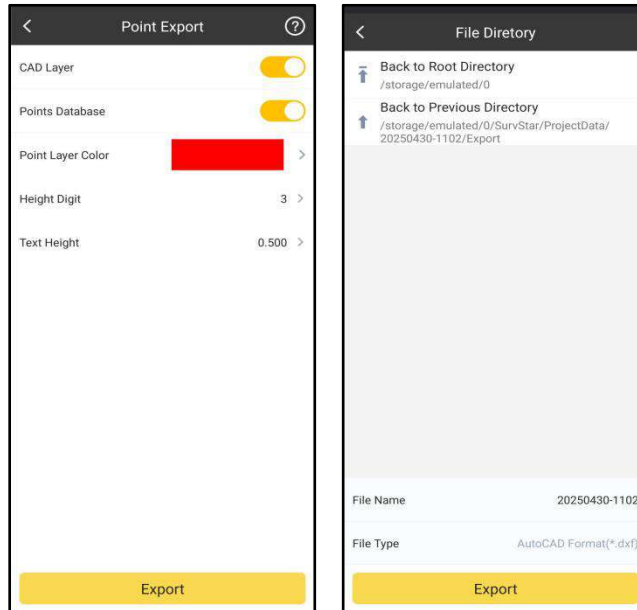




: Import CAD file(*.dxf/*.dwg).



: Export CAD file(*.dxf/*.dwg).



:By tapping this drawing function, we can plot many graph in screen (line,polyline,polygon,square,rect,rectcenter,circle2p,circle3p,arc,spline)



:many function included(Two-circle intersection, two line intersection, element intersection, distance offset point, element offset etc.)



:delete , CAD back ground , Redraw , angle survey , distance survey , area survey , drawing unit , Explode.



:CAD layer.

We can manage and check CAD layer by tapping this icon.



: Layer switches, controlling layer display.



: Layer freeze, cannot edit or modify after freezing.



: Layer locking, cannot select after locking.

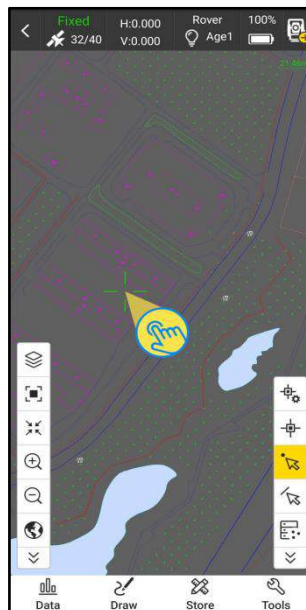


: Select target point.

By clicking this, we can select a surface feature in project. And it will be a target surface feature. The point closest to the selected feature is used as the target point.



: Select target line.



: CAD stakeout settings.



It can set CAD stakeout settings, Prompt Distance; settings for Topo Point, Inform and Tool Bar are the same as that of Point Survey. Click Default settings and it can restore the changed settings.

6-10 PPK Survey

PPK (Post Processed Kinematic) is a post-processing differential technology to obtain centimeter level positioning accuracy information. Compared with RTK (Real Time Kinematic) positioning, PPK can record the data of mobile terminal and base station respectively for post-processing kinematic, so it is not limited to the communication link and protocol between base station and mobile station. It is also called Stop & Go.

1. We need to set a base station as static mode firstly. And then we start it with another device as rover mode.

The screenshot shows the 'PPK&RTK Survey' settings screen. At the top, there is a title bar with a back arrow, the text 'PPK&RTK Survey', and a help icon. Below the title bar, the screen is divided into several sections. The first section has two tabs: 'Epochs' and 'Time(s)'. Below this, there are input fields for 'Pt ID' (with 'pt2' entered) and 'Code' (with 'Please Input' and a QR code icon). The next section has a label 'Antenna Height Type' and a dropdown menu showing 'Phase Center Height'. Below this is an 'Antenna Height' field with '1.800 m' entered. There are two toggle switches: 'Record Static Data' and 'Auto Save Point', both currently turned off. At the bottom, there is a 'Record Time(s)' field with '10' entered. At the very bottom, there are two yellow buttons: 'Default' and 'Start'.



2. Set the Pt name, Code, Antenna Height Type, Antenna Height, Record Static Data On/Off, Sampling Time, Minimum Satellites and PDOP Limit. Before starting work, we need to take about 30 seconds standing to initialize the device, for the higher accuracy.

Epochs	Time(s)
Antenna Height Type	Phase Center Height >
Antenna Height	1.800 m
Record Static Data	<input checked="" type="checkbox"/>
Auto Save Point	<input checked="" type="checkbox"/>
Record Time(s)	30 >
Minimum Satellites	15 >
PDOP Limit	3 >
RTK Setting	<input type="checkbox"/>

Default Start

3. Put the device in the first point and click **Start**. It will collect this point and write the information of this point into the record file. We can click **Stop** to stop it.



PPK&RTK Survey	
Epochs	2
Time(s)	2
N: 2564658.548	E: 440293.877
VRMS: 0.000	HRMS: 0.000
Antenna Height Type	Phase Center Height >
Antenna Height	1.800 m
Record Static Data	<input checked="" type="checkbox"/>
Auto Save Point	<input checked="" type="checkbox"/>
Record Time(s)	30 >
Minimum Satellites	15 >
PDOP Limit	3 >
RTK Setting	<input type="checkbox"/>
Default Stop	

4. After collecting the point, we can click **save** to save the point and then go to the next point.

PPK&RTK Survey	
Epochs	14
Time(s)	14
N: 2564658.510	E: 440293.813
VRMS: 0.000	HRMS: 0.000
Antenna Height Type	Phase Center Height >
Antenna Height	1.800 m
Record Static Data	<input checked="" type="checkbox"/>
Auto Save Point	<input checked="" type="checkbox"/>
Record Time(s)	30 >
Minimum Satellites	15 >
PDOP Limit	3 >
RTK Setting	<input type="checkbox"/>
Default Stop	

PPK&RTK Survey	
Epochs	Time(s)
N: 2564658.558	E: 440293.972
VRMS: 0.000	HRMS: 0.000
Antenna Height Type	Phase Center Height >
Antenna Height	1.800 m
Record Static Data	<input type="checkbox"/>
Auto Save Point	<input checked="" type="checkbox"/>
Record Time(s)	30 >
Minimum Satellites	15 >
PDOP Limit	3 >
RTK Setting	<input type="checkbox"/>
Default Start	


5. Repeat these steps until the project done.

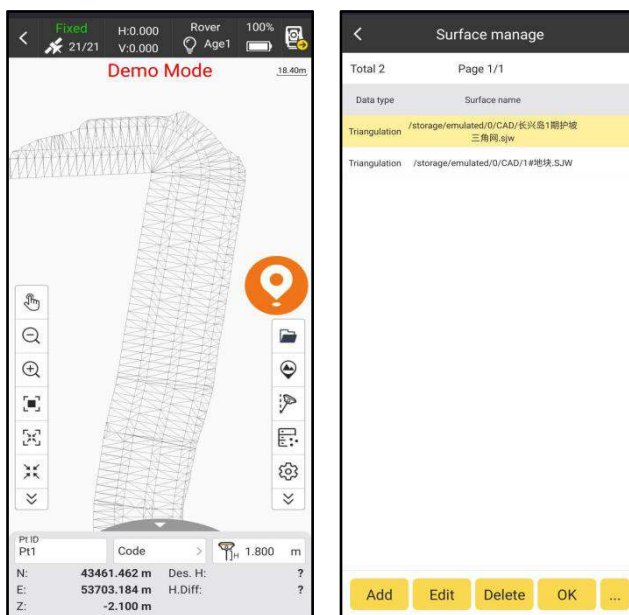


6-11 Elevation Control

Elevation control can calculate the design height of points within the range according to the design plane parameters, which is conducive to site leveling and earthwork calculation in the project.




1. Click  to open Surface manage page

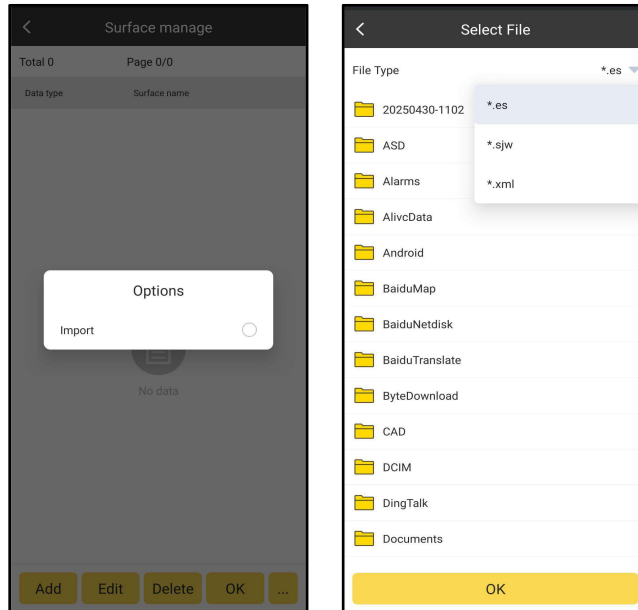


2. Add/Import Surface.

There are two ways to add/import surface. Import:

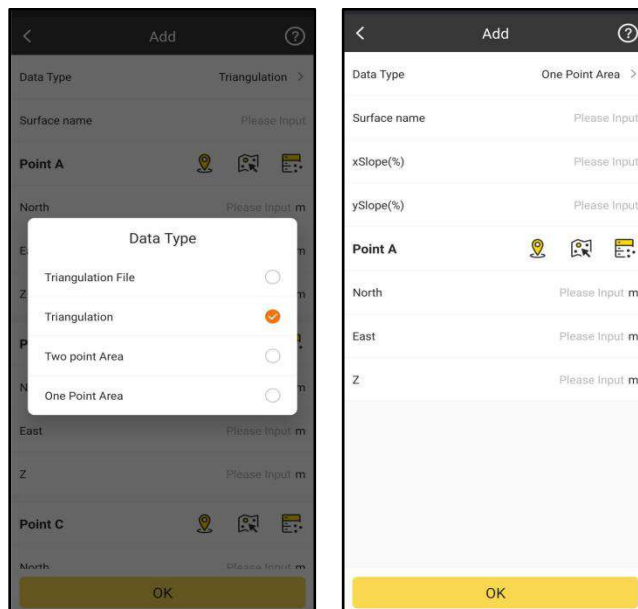
Click  and Click **Import**, select the surface file (*.es/*.sjw/*.xml) and click

OK.

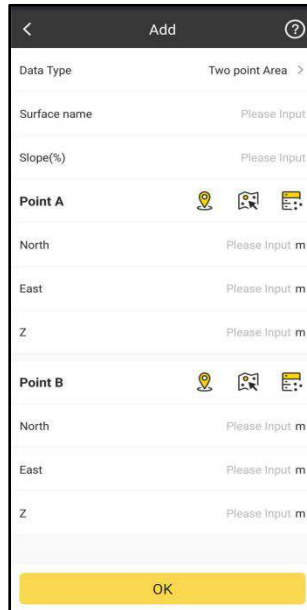


Add:

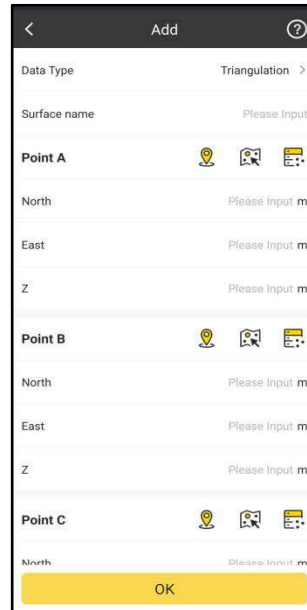
Click Add , select the Data Type to build elevation plane. We can use three ways to build it: one point with two slope, two points with one slope and Triangulation.



One point



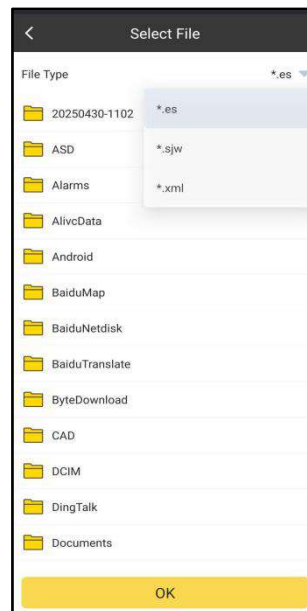
Two poin



Three point




Triangulation file

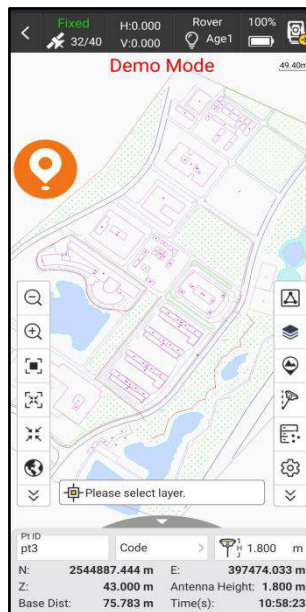


3. Then we can select the surface and click **OK** to do the elevation control.

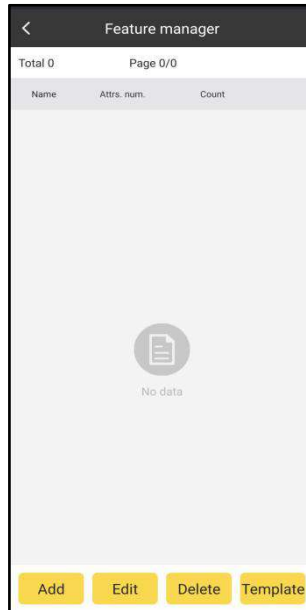
6-12 GIS Survey

GIS survey can define the required feature attribute database and collect shape data containing various required feature attributes, which is convenient for post-processing of GIS data in the later stage.

1.For the new project, we need to import or input a feature manage database. Click  and enter to feature manager page. We can also click the layer bar to enter to it.

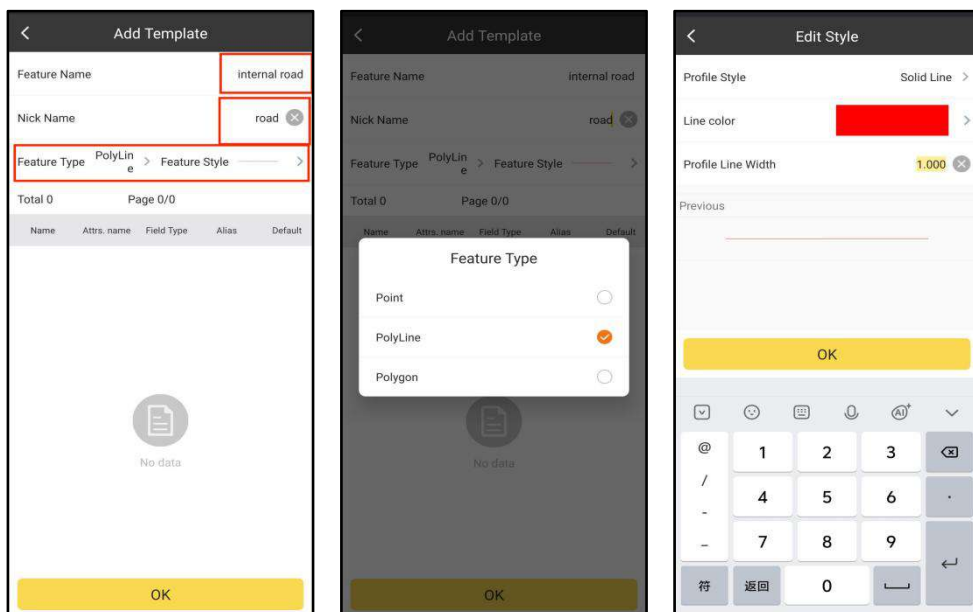


2.In feature manager, we can add, edit, delete, import and export the features.



Add:

Click **Add** input the feature name and nick name, choose the feature type (Point/PolyLine/Polygon) and set the feature style, then click **OK**.



Then we need to add the attribute of it, click **Add**. Input the Attributes Name, Nick name,



Field Type and click **OK**. If the input of the attributes finished, click **OK**.

The image shows two side-by-side screenshots of the SurvStar app interface.

The left screenshot is titled "Add Template". It has a dark header bar with a back arrow and the title. Below the header, there are input fields for "Feature Name" (with the value "internal road"), "Nick Name" (with the value "road" and a close icon), "Feature Type" (with a dropdown menu showing "PolyLine"), and "Feature Style" (with a dropdown menu showing a line style). Below these fields, it says "Total 0" and "Page 0/0". There is a table with columns: "Name", "Attrs. name", "Field Type", "Alias", and "Default". The table is empty. Below the table, there is a large grey area with a document icon and the text "No data". At the bottom, there are four yellow buttons: "Add", "Edit", "Delete", and "OK".

The right screenshot is titled "Edit Field". It has a dark header bar with a back arrow and the title. Below the header, there are input fields for "Attrs. name" (with the value "Please Input"), "Nick Name" (with the value "Please Input"), "Field Type" (with a dropdown menu showing "text"), "Data Bit" (with the value "Please Input"), and "Default" (with the value "Please Input" and a right arrow). Below these fields, there is a checkbox labeled "Field Association Setting" and a toggle switch labeled "Auto append result" (which is currently turned off). At the bottom, there is a single yellow button labeled "OK".

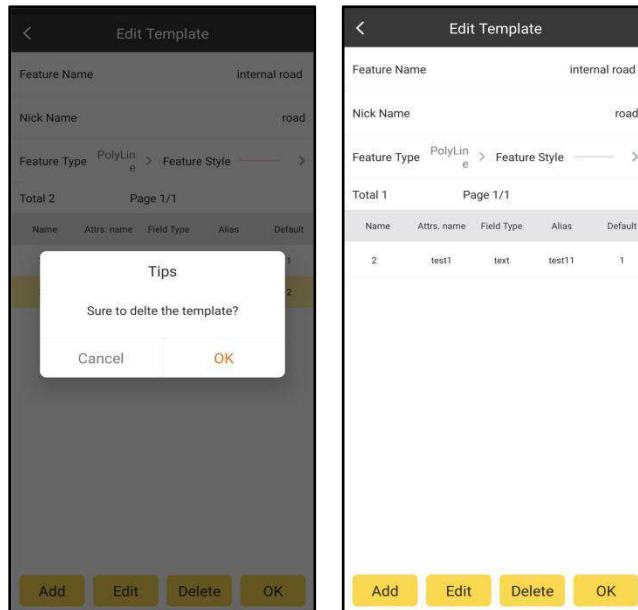
Edit: Select any feature, click **Edit**, then we can edit it.

This image is identical to the one above, showing two side-by-side screenshots of the SurvStar app interface.

The left screenshot is titled "Add Template". It has a dark header bar with a back arrow and the title. Below the header, there are input fields for "Feature Name" (with the value "internal road"), "Nick Name" (with the value "road" and a close icon), "Feature Type" (with a dropdown menu showing "PolyLine"), and "Feature Style" (with a dropdown menu showing a line style). Below these fields, it says "Total 0" and "Page 0/0". There is a table with columns: "Name", "Attrs. name", "Field Type", "Alias", and "Default". The table is empty. Below the table, there is a large grey area with a document icon and the text "No data". At the bottom, there are four yellow buttons: "Add", "Edit", "Delete", and "OK".

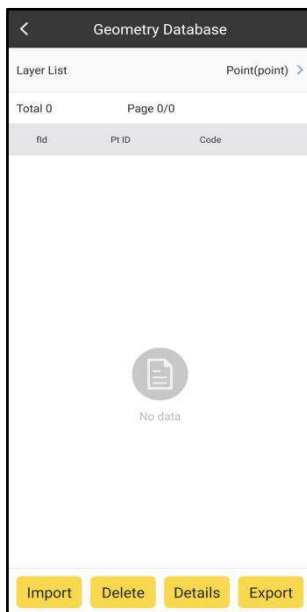
The right screenshot is titled "Edit Field". It has a dark header bar with a back arrow and the title. Below the header, there are input fields for "Attrs. name" (with the value "Please Input"), "Nick Name" (with the value "Please Input"), "Field Type" (with a dropdown menu showing "text"), "Data Bit" (with the value "Please Input"), and "Default" (with the value "Please Input" and a right arrow). Below these fields, there is a checkbox labeled "Field Association Setting" and a toggle switch labeled "Auto append result" (which is currently turned off). At the bottom, there is a single yellow button labeled "OK".

Delete: Select any feature, click **Delete**, then we can delete it.



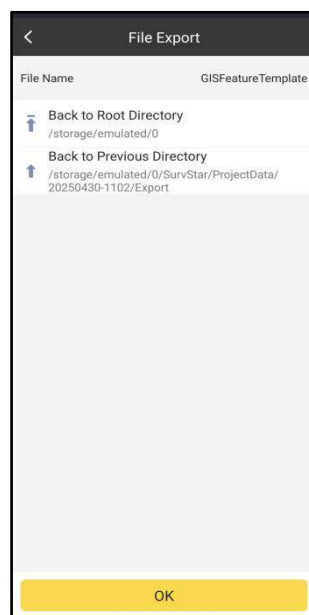
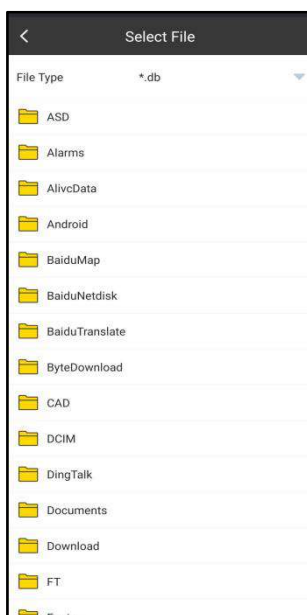
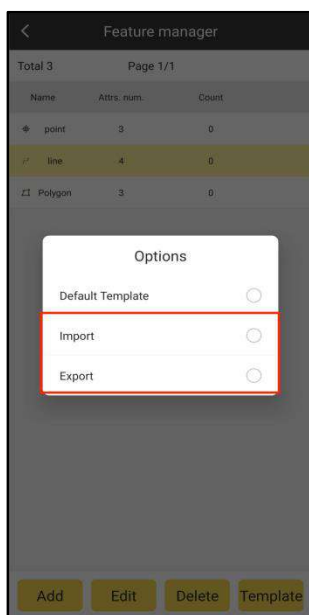
Default Template:

Click **Template** and click **Default Template**, there will load the default template to it. It has three features: Point, Line and Polygon.



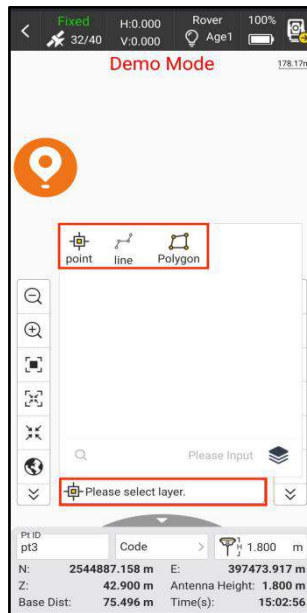
Import/Export Template:

Click **Template** and click **Import**/**Export**, there will load the default template to it. It has three features: Point, Line and Polygon.





3. After the feature manager completed, we can use it by clicking the below layer bar. Select the feature and then we can start GIS survey.



4. And then we can select a layer start to do GIS survey.




: Click this, it will go back to the previous operation

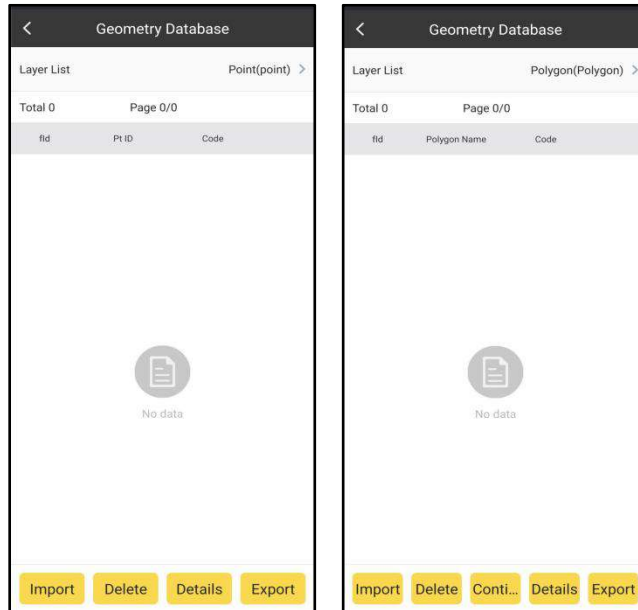


: Click this, we can edit the attributes of current feature.



: Click this, we can finish surveying this feature.

5. We can check and manage the shape in Geometry Database. Click  and enter to Geometry Database. In Geometry Database, it can import/export shape file (*.shp), delete and continue to survey the feature.



6-13 Sea Survey

This function is being improved and tested.

6-14 Line Construction Stakeout

This function is being improved and tested.

6-15 Line Pointwise Stakeout

This function is being improved and tested.

6-16 Cross-section Survey

This function is being improved and tested.

6-17 Cross-section Stakeout



This function is being improved and tested.

Chapter 7 Survey – Total Station

7-1 Point Survey

Click Survey->Point Survey to enter this interface.



: Displays information about the current angle of the device.



: APR(Automatic Prism Recognition) and Track (Prism tracking) On/ Off.



: Selection of different measurement targets, measurement modes and whether the laser pointer is switched on or off.



:Lock status (To show the status of locking prism)



:E-bubble and Setting button



:Selection of different device connection



:Set Horizontal angle



:Joystick(Manual/Auto)



:Change face



:Power search(clockwise)



:Set rotate angle(H/V)



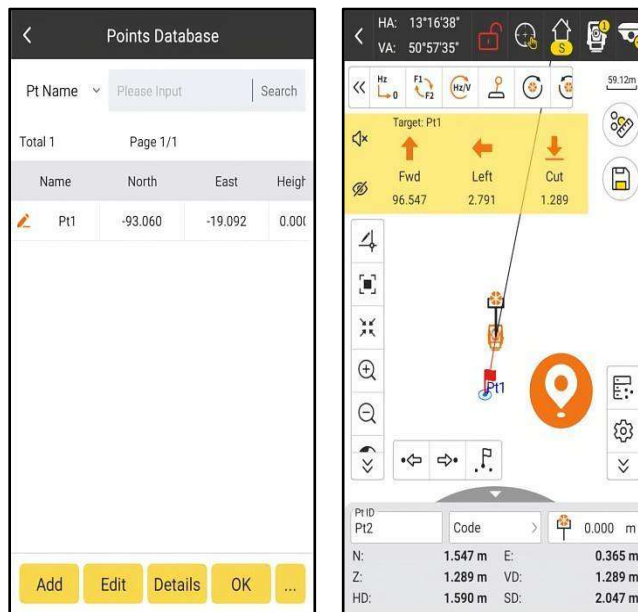
:Power search(anti-clockwise)



Note: The meaning of other icons is explained in Chapter 6-1

7-2 Point Stakeout

Point stakeout is the process of inputting target coordinate in software and stakeout in field. By clicking this, we will enter to points database. Select any point, and click OK. Then we will enter to the point stakeout page.



Arrows in left bar describe as follows:

To Forward/Backward: distance that receiver needs to move Forward/Backward from current position to stakeout point. To Forward arrow shows up and to

Backward arrow shows down.

To Left/Right: distance that receiver needs to move Left / Right from current position to stakeout point. To Left arrow shows left and to Right arrow shows right.

Fill/Dig: dig in stakeout point position. If the value is positive, perform excavation; if not, perform fill. If current height is higher than stakeout point arrow shows down. If current height is higher than stakeout point arrow shows up.



: open/close stakeout voice prompt.



: hide or show left arrow bar.

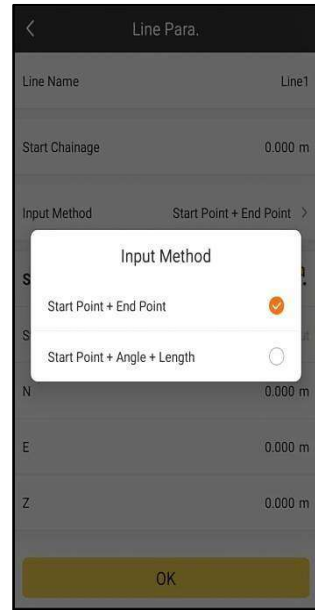
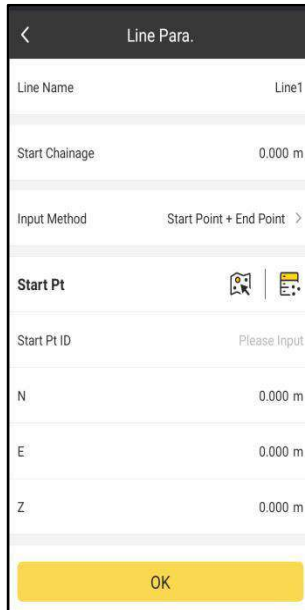
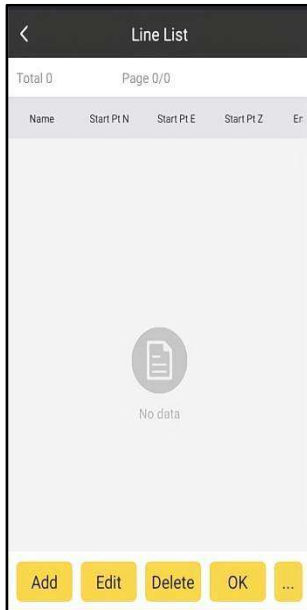
Point stakeout steps:

1. Select a point to stakeout in the points database, then click OK to enter points stakeout page. Red flag is target stake point. Circle is current position of receiver. Arrow is direction indicator, indicating the direction of current receiver. When the arrow direction is same with the direction to the target point, please move in this direction, then you can reach the target point.
2. According to left status bar, move from the current point to the stakeout point, and excavate or fill the soil according to the height difference of the elevation.
3. When current point is within prompt range, there will be three concentric circles, which indicate it enters precise stakeout.
4. After you reach the stakeout point, please stake it.

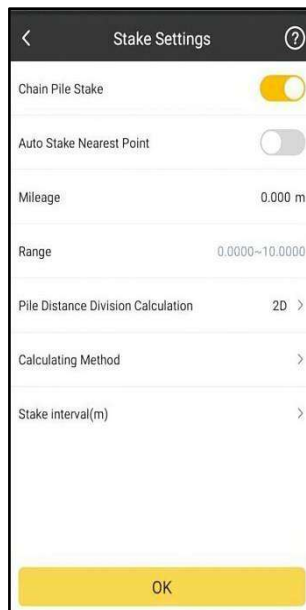
7-3 Line Stakeout

Line stakeout is the stakeout of designed line, including line mileage, left and right offset and elevation control within line. By clicking this, we will enter to Line List.

Click Add, we can add the designed line with Line Name, the Start Point, End Point and Start Chainage. We can also import line file(*.SL).

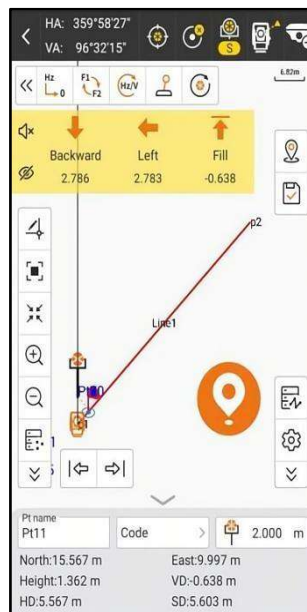


Select any line, and click OK. We can set the settings of stake, it including Chain Pile Stake On/Off, Auto Stake Nearest Point On/Off, Mileage, Range, Calculating Method and Stake interval. Click OK.





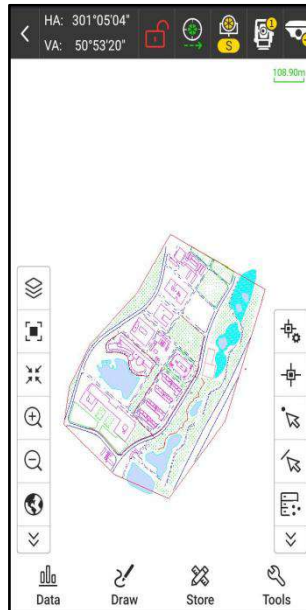
Then we will enter to the line stakeout page.



It can set line stakeout settings, including Prompt Distance, Reference Direction (Forward, North); settings for Topo Point, Inform and Tool Bar are the same as that of Point Survey. Click Default settings and it can restore the changed settings.

7-4 CAD Stakeout

CAD is mainly used to stakeout lines in the existing CAD graphics. By clicking this, we can enter to the CAD page.



: CAD Layer.

We can manage and check the CAD layer by clicking this icon



Data : Import CAD file(*.dxf/*.dwg).

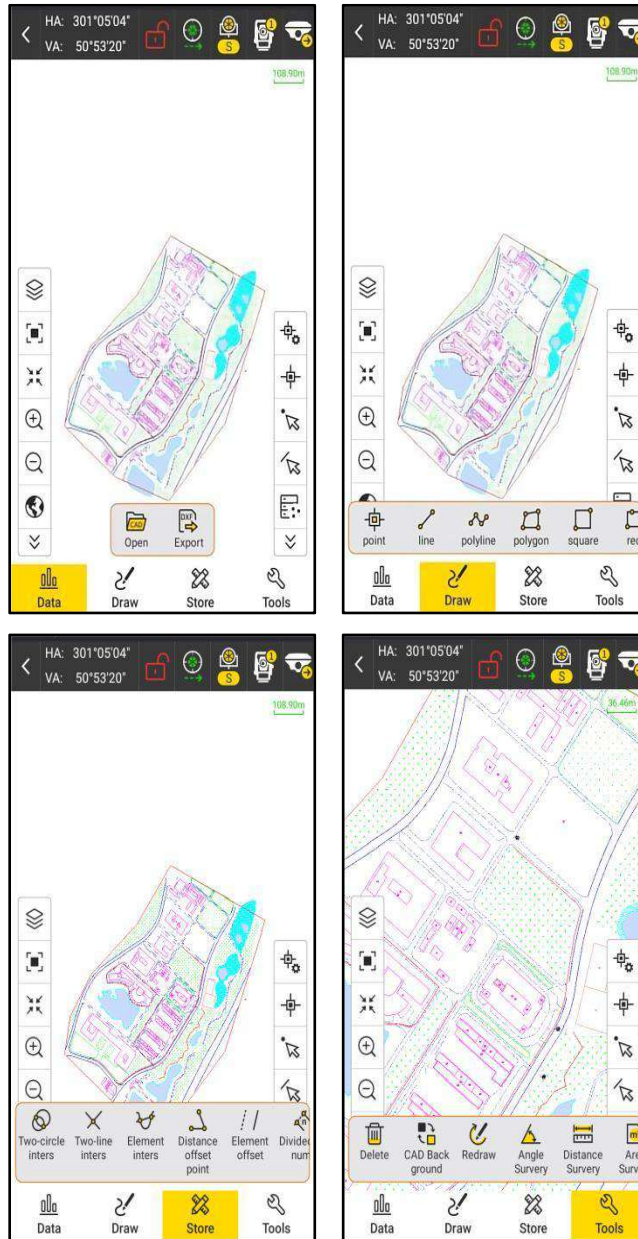


: By clicking this, there will be an arrow when touch and hold to move on the screen.

The place indicated by the arrow is the place of the target point. It can also show the coordinates of this point in the top of the page.



:Select target line.

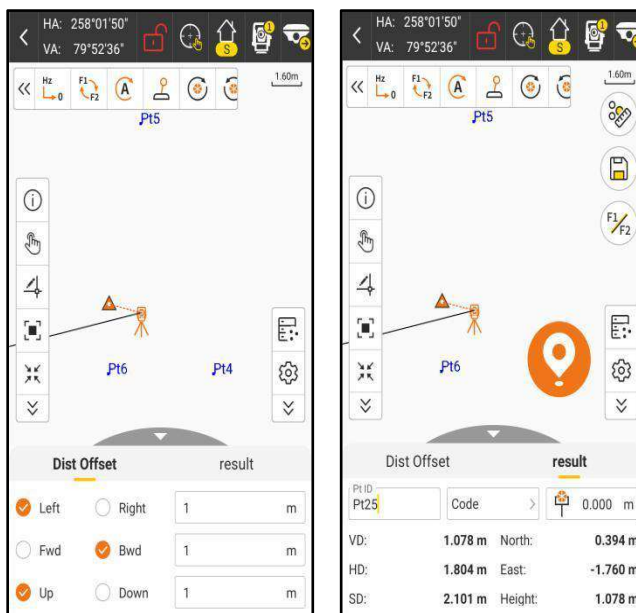


There are four modules in CAD stakeout. Click Data to open or export the dxf, dwg file. Click Draw to draw the graph. Click Store to measure. Click Tools to use tools.



7-5 Dist Offset

The distance offset calculates from measurement or coordinates with longitudinal, parallel offset and height differences of the target point relative to the known point.



Click Dist Offset to into this interface. Input lateral, longitudinal and altitude offset. Click result , measure and calculate the offset coordinates.

7-6 Plane Offset

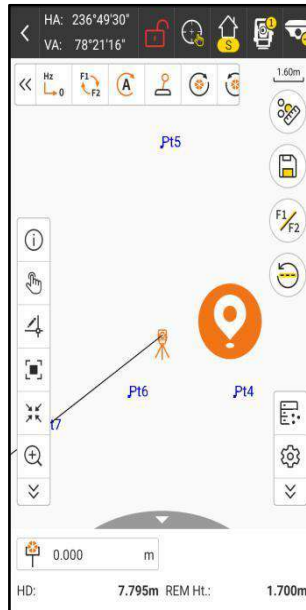
This function calculates the points which cannot be measured directly.



Click Plane Offset to into this interface. Measure three points in the same plane. In the software, it will turn to result interface automatically. Rotate the telescope, aim at the unreachable point in this plane. Click save to save the coordinate.

7-7 REM

When the target is hard to reach or hang in the air, for example, the electric cables, REM (Remote Height) can help you measure the point.

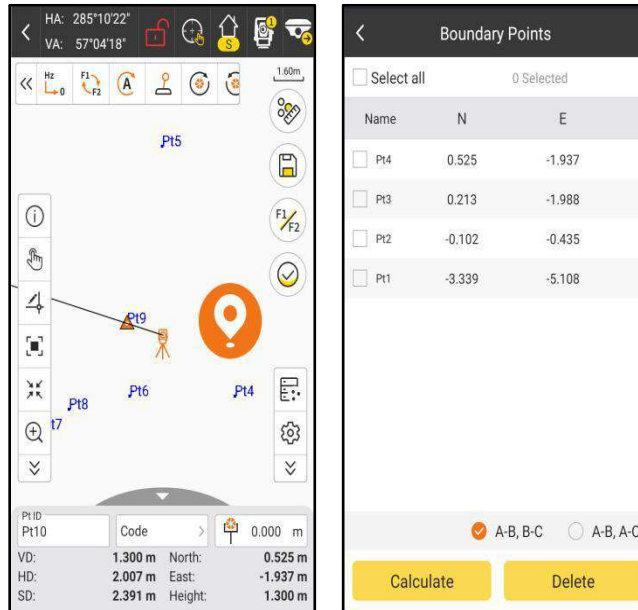


Click REM to into this interface. Before measuring, set a prism vertically under the target. Input target height and measure. Rotate the telescope to the target. It will show the REM Ht automatically.

7-8 MLM

MLM, is mainly used to compute the HD/VD/ SD/azimuth between two points.

1. MLM Radial(A-B, A-C) , lock the start point
2. MLM Cont. (A-B, B-C) , unlock the start point.



Click MLM to into this interface.Measure points that need to be measured.

Click to into the second interface where points and calculate methods can be selected.
After selecting points and calculate method, click Calculate to get the result.

Calculation Result			
Total 2	Page 1/1		
Name	ΔSD	ΔHD	
Pt1-Pt2	5.789	5.685	
Pt2-Pt3	1.946	1.585	

Calculation Result			
Total 3	Page 1/1		
Name	ΔSD	ΔHD	
Pt1-Pt2	5.789	5.685	
Pt1-Pt3	4.728	4.728	
Pt1-Pt4	4.999	4.999	

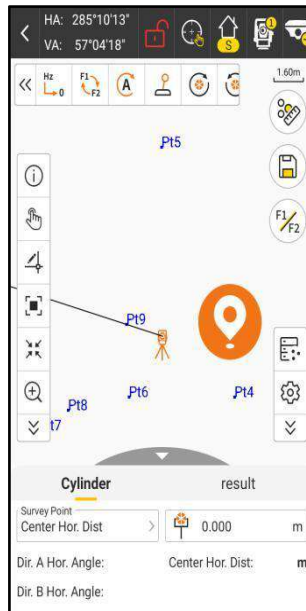
(A-B, B-C)

(A-B, A-C)

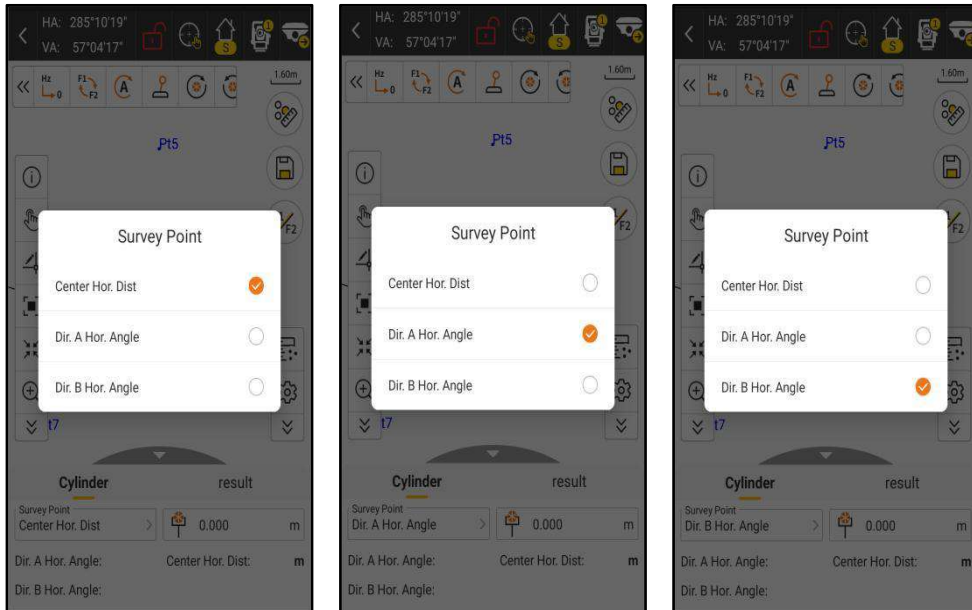


7-9 Cylinder Center

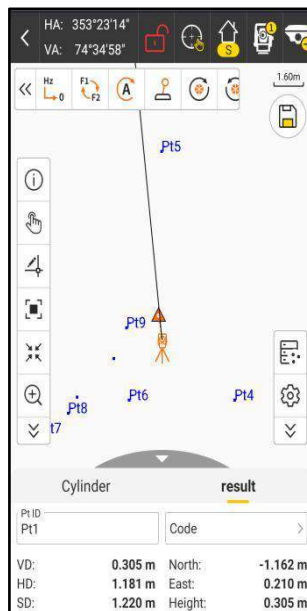
Cylinder Center is widely used in measuring a hidden point that is not directly visible, for example the center of column as picture shown. Measure the left and right edge of column. Then measure the center point in surface.



Click Cylinder Center to into this interface. Measure three parameters separately.



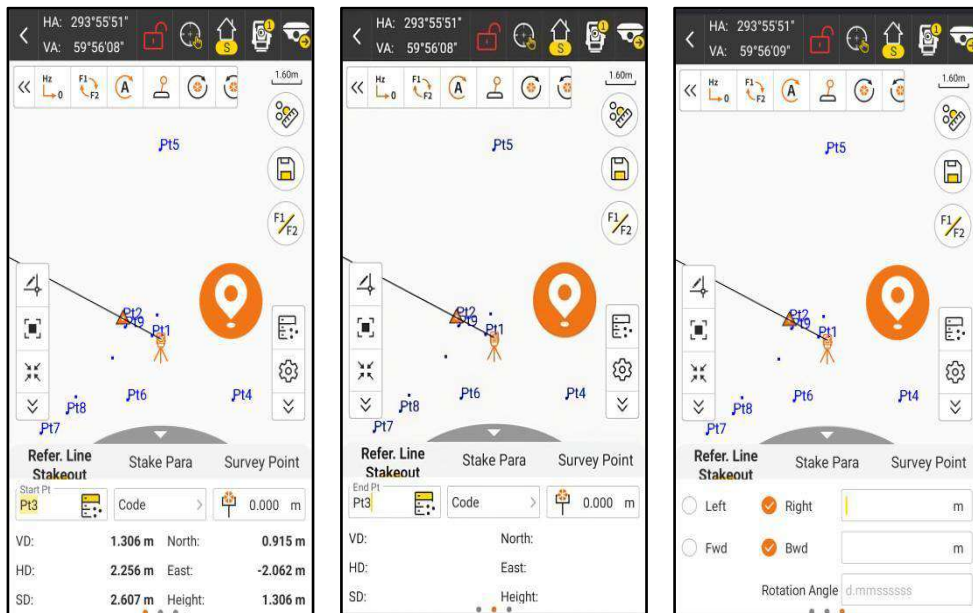
If there is no special requirement, after measuring the first parameter, it will automatically jump to measure the second parameter. Measurement parameters can be selected manually.



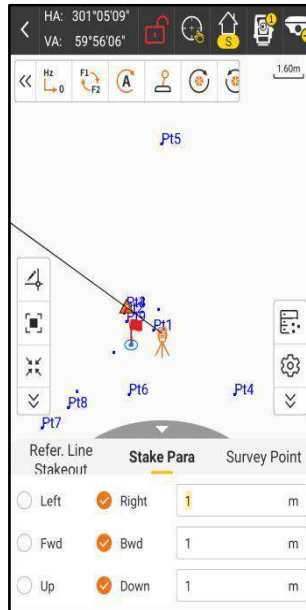
After measuring three parameters, it will turn to result interface automatically.

7-10 Refer.Line Stakeout

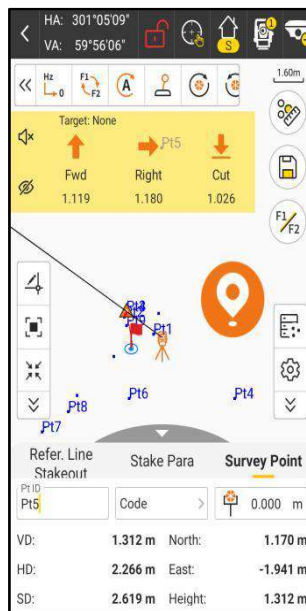
Reference Line application can be used to stake out or measure points relative to a line. The points are staked from a reference line (shifted from a baseline), and the related offset. The reference line can be offset either longitudinally or latitudinally to the baseline (defined by two known points), or be rotated around the first base point as required.



Click Refer.Line Stakeout to into this interface. There are three page to confirm the line. Measure the start point and end point, and set up the distance and the rotation of the line.Steps: Aim to the start point and measure,then pull left to into next measure page.Aim to the end point and measure, then pull left to into next setting page.Set up the distance and rotation angle.



Set up the parameters about lateral, longitudinal and altitude offset.

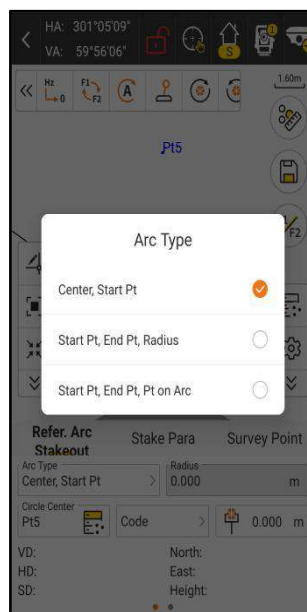


Turn into the interface of the staking out.



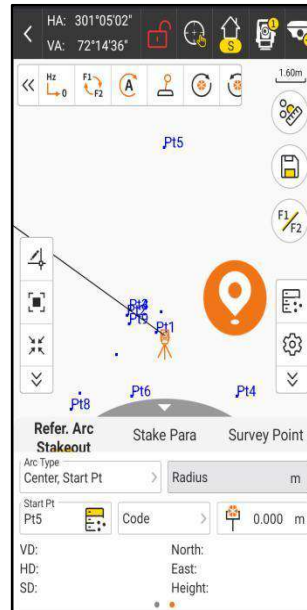
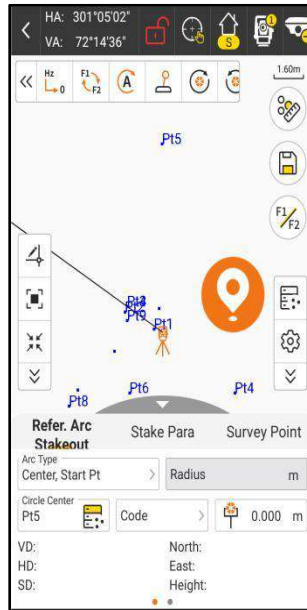
7-11 Refer.Arc Stakeout

The reference arc is used for measuring and staking where the axis is an arc. The arc is determined by the center of the circle plus the radius, or the center of the circle plus a point on the circle, or three points on the circle where the arc is located. The direction of the reference arc is the same as the clockwise direction. The offset of the reference arc is determined according to the plumb line between the measurement release point and the reference arc, and the mileage is determined according to the direction of the reference arc. Stake out an arc by center/start point, start point/end point/radius and the others factors.

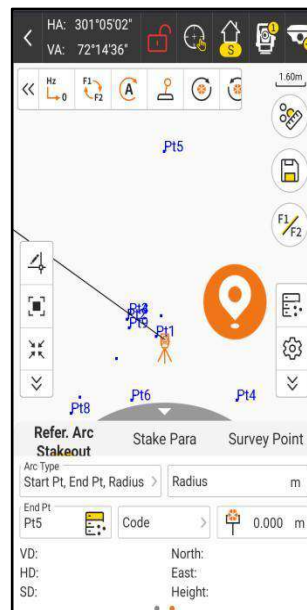
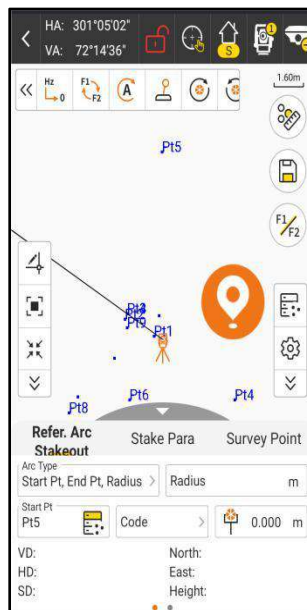


Click Refer.Arc Stakeout to into this interface. There are three methods to select.

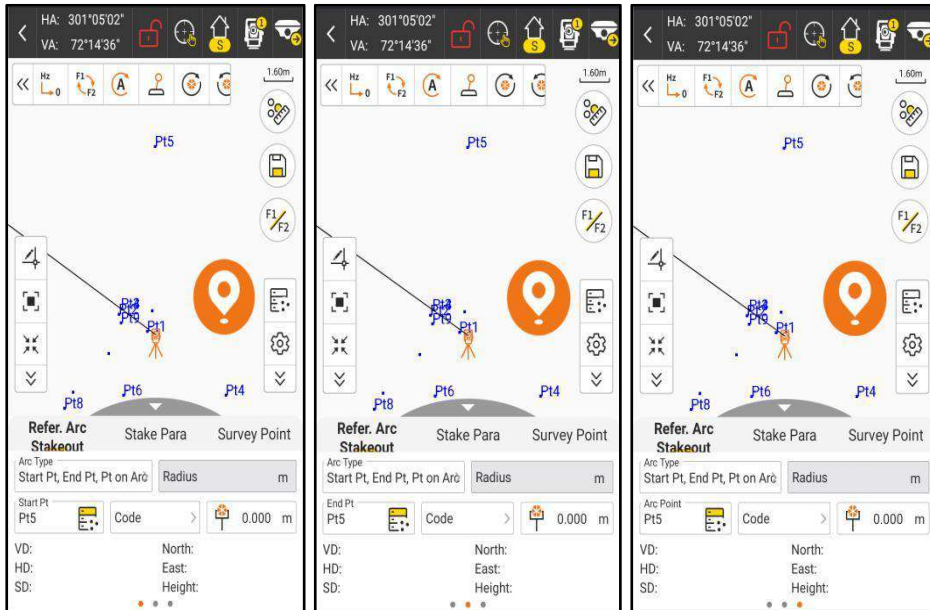
- 1.Center point and start point
- 2.Start point, end point and radius
- 3.Start point, end point and point on Arc.



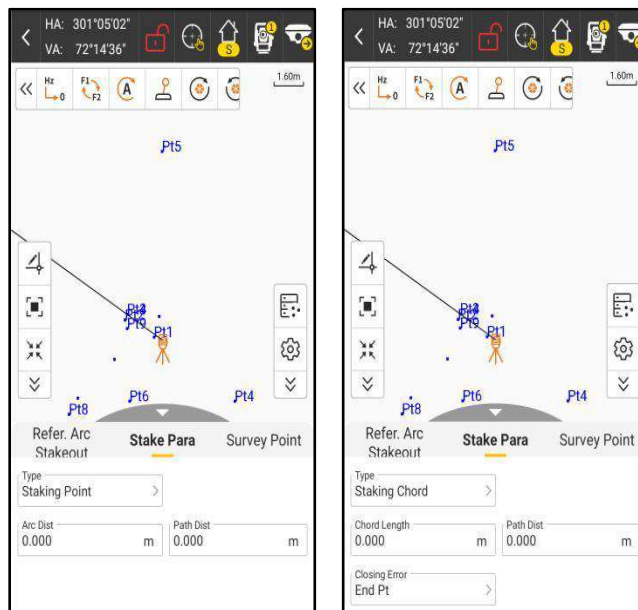
Method 1:measure center point and start point.

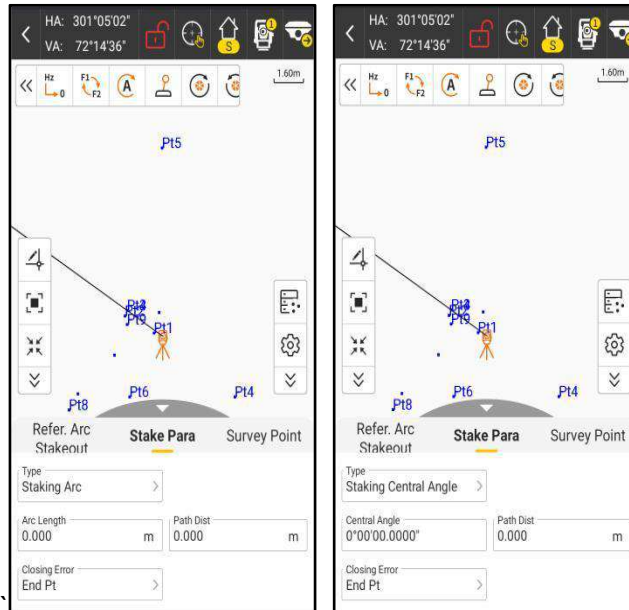


Method 2: measure the start point,end point and input radius.

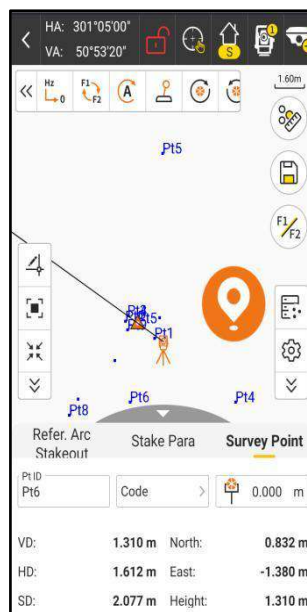


Method 3: measure the start point, end point and arc point and input radius.





Set up the stake parameters



Turn into the interface of staking out.




Chapter 8 Tools

8-1 Localization

In general, GPS receiver output data is WGS-84 latitude and longitude coordinates. The coordinates need to be converted to the construction measure coordinates, which requires software to calculate and configure coordinate conversion parameters. Localization is the main tool to complete this conversion.

It contains Add, Edit, Delete, Calculate, Import, Export and Settings operation.



No.	Name	North	East	Height
1	PI25	2544886.984	397473.841	42.900
2	PI23	2544887.000	397473.669	42.900
3	PI27	2544887.151	397473.875	43.000

Buttons: Add, Edit, Delete, Calcul..., ...

Add:

Click **Add**, we can add the coordinate point. If we have the surveyed point in database, we can click the icon in the right of the Known(local) coordinates bar. And select the coordinate transformation points with the targeted coordinate. Click **OK**. Then the NEH will input



automatically.

Localization

Known(local) coordinates

Point Name

Please Input

N

Please Input m

E

Please Input m

Z

Please Input m

Geodetic Coordinates

Coordinate Type

BLH

B:

0°00'00.0000"

L:

0°00'00.0000"

H:

Please Input

Option

Use Horizontal Control

OK

Points Database

Pt Name

Please Input

Search

Total 27

Page 1/1

Name	North	East	Height
Pt27	2544887.151	397473.875	43.000
Pt26	2544887.193	397474.023	42.900
Pt25	2544886.984	397473.841	42.900
Pt24	2544887.322	397473.845	42.900
Pt23	2544887.000	397473.669	42.900
Pt22	2564767.252	440326.378	21.095
Pt21	2564770.839	440322.028	21.018
Pt20	2564749.943	440333.038	23.457
Pt19	2564749.928	440333.057	23.501
Pt18	2564749.683	440330.970	21.193
Pt17	2564748.247	440329.307	21.185
Pt16	2564748.523	440330.478	21.211
Pt15	2564759.331	440329.337	21.150

Add Edit Details OK ...

Localization

Known(local) coordinates

Point Name

Pt25

N

2544886.984 m

E

397473.841 m

Z

42.900 m

Geodetic Coordinates

Coordinate Type

BLH

B:

23°00'00.0042"

L:

113°00'00.0007"

H:

42.9

Option

Use Horizontal Control

OK

Or we can input the coordinate directly.

and then we need to input the same point's BLH to it. If we have the surveyed BLH in point database, we can click the icon in the right of the Geodetic Coordinates bar. And select the same points with the BLH. Click **OK**. Then the BLH will input automatically.

Localization

Known(local) coordinates

Point Name Pt23

N 2544887.000 m

E 397473.669 m

Z 42.900 m

Geodetic Coordinates

Coordinate Type BLH

B: 22°59'59.9932"

L: 113°00'00.0007"

H: 42.9

Option

Use Horizontal Control ☒

OK

Points Database

Pt Name Search

Total 27 Page 1/1

Name	North	East	Height
Pt27	2544887.151	397473.875	43.000
Pt26	2544887.193	397474.023	42.900
Pt25	2544886.984	397473.841	42.900
Pt24	2544887.322	397473.845	42.900
Pt23	2544887.000	397473.669	42.900
Pt22	2564767.252	440326.378	21.095
Pt21	2564770.839	440322.028	21.018
Pt20	2564749.943	440333.038	23.457
Pt19	2564749.928	440333.057	23.501
Pt18	2564749.683	440330.970	21.193
Pt17	2564748.247	440329.307	21.185
Pt16	2564748.523	440330.478	21.211
Pt15	2564759.331	440329.337	21.150

Add Edit Details OK ...

Localization

Known(local) coordinates

Point Name Pt23

N 2544887.000 m

E 397473.669 m

Z 42.900 m

Geodetic Coordinates

Coordinate Type BLH

B: 0°00'00.0000"

L: d.mmmsssss

H: Please Input

Option

Use Horizontal Control ☒

OK

We can also input BLH directly.

We can also put the device in the point and collect the BLH in site. Click the icon in the right of the Geodetic Coordinates bar. And click OK to collect it.



Localization

Known(local) coordinates

Point Name

Pt27

N

2544887.151 m

E

397473.875 m

Z

43.000 m

Geodetic Coordinates

Coordinate Type

BLH

B:

0°00'00.0000"

L:

0°00'00.0000"

H:

Please Input

Option

Use Horizontal Control

☐

OK

Collect Point

Antenna Height

1.800m,Phase Center Height

Pt ID

Please Input

Record

<1/1>Collection Finished

Solution

<32/40>Fixed

N

2544887.183 m

E

397473.661 m

Z

42.900 m

HRMS

0.000

VRMS

0.000

Age

1

Dist to Last Point

0.217 m

L

E112°59'59.9943"

Settings

Restart

OK

Then we need to select whether to use the point with horizontal control or vertical control. And Click OK. This point will participate in calculation.

Localization

N

2544887.151 m

E

397473.875 m

Z

43.000 m

Geodetic Coordinates

Coordinate Type

BLH

B:

22°59'59.9986"

L:

113°00'00.0018"

H:

43.000

Option

Use Horizontal Control

☐

Use Vertical Control

☐

OK

Points Database

Pt Name

Please Input

Search

Total 27

Page 1/1

Name	North	East	Height
Pt27	2544887.151	397473.875	43.000
Pt26	2544887.193	397474.023	42.900
Pt25	2544886.984	397473.841	42.900
Pt24	2544887.322	397473.845	42.900
Pt23	2544887.000	397473.669	42.900
Pt22	2564767.252	440326.378	21.095
Pt21	2564770.839	440322.028	21.016
Pt20	2564749.943	440333.038	23.457
Pt19	2564749.928	440333.057	23.501
Pt18	2564749.683	440330.970	21.193
Pt17	2564748.247	440329.307	21.185
Pt16	2564748.523	440330.478	21.211
Pt15	2564759.331	440329.337	21.150

Add

Edit

Details

OK

...

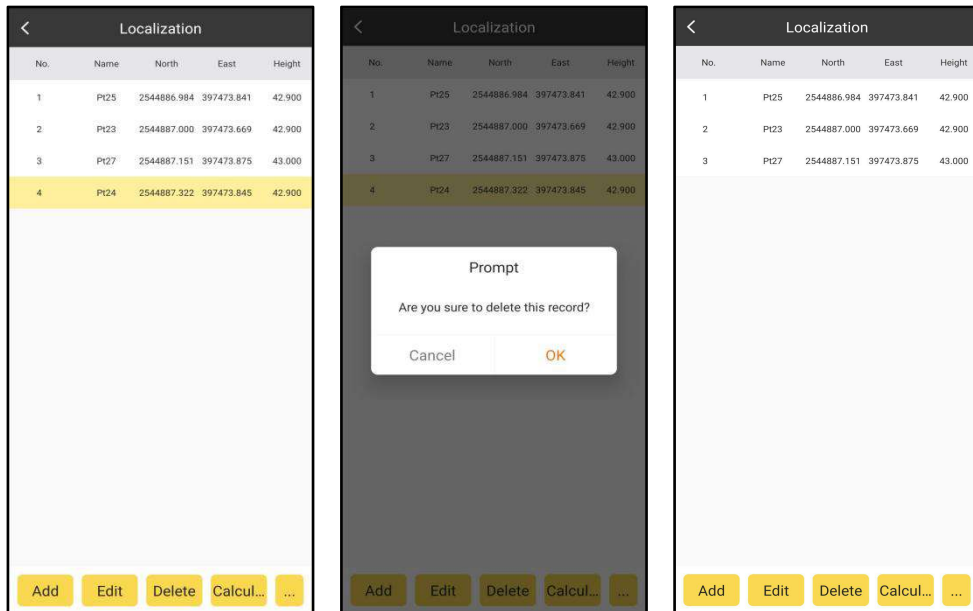


Edit:

Select any point and click **Edit**. We can edit the coordinate of the selected point and select whether to use the point with horizontal control or vertical control.

Delete:

Select any point and click **Delete**. We can delete the selected point.



Calculate:

After the coordinate transformation points all inputted. We can click Calculate. Then there will show a coordinates System report. We can save the report by clicking Save. And click Apply, the parameters will apply to the current project.



<

Coordinates System Report

Ellipsoid Parameter

Ellipsoid Name

CGCS2000

Semimajor Axis

6378137

1/f

298.257222101

Projection Parameters

Projection Mode

Gauss Kruger

Central Meridian

E114°00'00.0000"

False Northing

0.000

False Easting

500000.000

Scale Factor

1

Projection Height

0.000

Latitude of Origin

N0°00'00.0000"

Save

Apply

Import:

Click ... and Click Import . Select the file type: *.cot(dd.mmssss), *.cot(dd.dddddd) and *.loc.
Select file path and click the file. Click OK

<

Localization

No.	Name	North	East	Height
1	PI25	2544886.984	397473.641	42.900
2	PI23	2544887.000	397473.669	42.900
3	PI27	2544887.151	397473.675	43.000
4	PI24	2544887.322	397473.845	42.900

Options

Import

☐

Export

☐

Settings

☐

Add

Edit

Delete

Calcul...

...

<

Select File

File Type

*.cot(dd.mmssss) ▾

ASD

*.cot(dd.mmssss)

Alarms

*.cot(dd.dddddd)

AlivcData

*.loc

Android

BaiduMap

BaiduNetdisk

BaiduTranslate

ByteDownload

CAD

DCIM

DingTalk

Documents

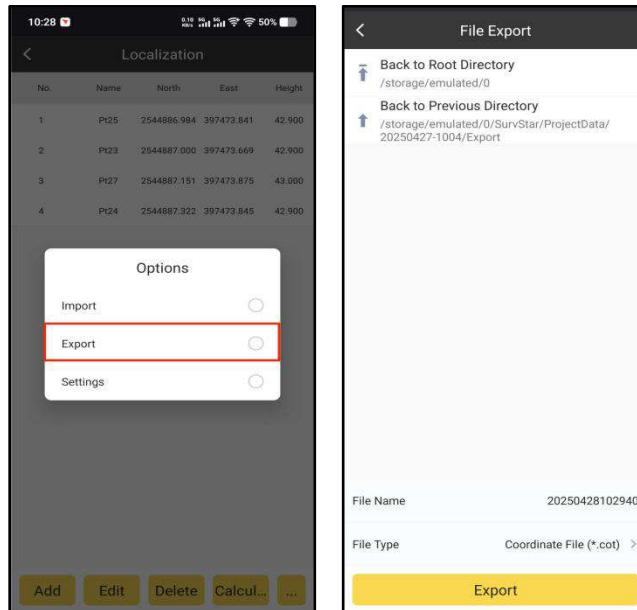
Download

OK



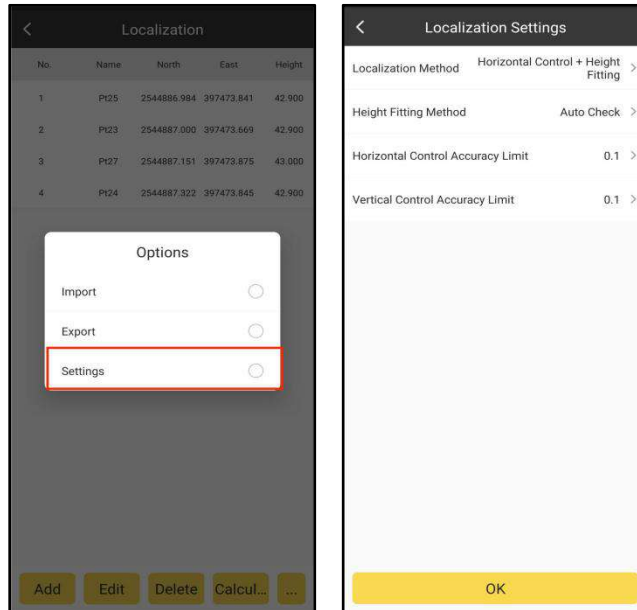
Export:

Click ... and Click Export.. Select the file type: *.cot(dd.mmsssss). Select file path and click the file. Click Export.



Ings:

Click ... and Click Setting We can set localization method, height fitting method, horizontal control accuracy limit and vertical control accuracy limit.



8-2 Coordinate Converter

By clicking this, we can convert coordinate from BLH to NEH or from NEH to BLH in the current project parameters. We need to select the Conversion Type firstly.



Coordinate Conversion

Source Coordinates

Conversion Type

B:

L:

H:

0°00'00.0000"

0°00'00.0000"

Please Input

Target Coordinates

North

East

Height

Please Input m

Please Input m

Please Input m

Convert

Save

Coordinate Conversion

Source Coordinates

Conversion Type

North

East

Height

Please Input m

Please Input m

Please Input m

Target Coordinates

B:

L:

H:

0°00'00.0000"

0°00'00.0000"

Please Input m

Convert

Save

We can input coordinate directly.

Coordinate Conversion

Source Coordinates

Conversion Type

B:

L:

H:

23°10'53.4656"

113°25'01.9197"

21.150 m

Target Coordinates

North

East

Height

Please Input m

Please Input m

Please Input m

Convert

Save

Coordinate Conversion

Source Coordinates

Conversion Type

North

East

Height

2544887.151 m

397473.875 m

43.000 m

Target Coordinates

B:

L:

H:

0°00'00.0000"

0°00'00.0000"

Please Input m

Convert

Save



If we have the surveyed point in database, we can click the icon in the right of the Source Coordinates bar. And select a point. Click **OK**. Then the BLH or NEH will input automatically

We can also put the device in the point and collect the coordinate in site. Click the icon the right of the Source Coordinates bar. And click **OK** to collect it.

Coordinate Conversion

Source Coordinates

Conversion Type: ☒ BLH ☐ NEZ

B: 0°00'00.0000"

L: 0°00'00.0000"

H: Please Input

Target Coordinates

North: Please Input m

East: Please Input m

Height: Please Input m

Convert **Save**

Collect Point

Antenna Height: 1.800m, Phase Center Height

Pt ID: Please Input

Record: <1/1>Collection Finished

Solution: <32/40>Fixed

N: 2544887.432 m

E: 397473.681 m

Z: 42.900 m

HRMS: 0.000

VRMS: 0.000

Age: 1

Dist to Last Point: 0.341 m

L: E112°59'59.9949"

Settings **Restart** **OK**

Click **convert** and the target coordinates will be calculated and shown in the below bars.

Coordinate Conversion

Source Coordinates

Conversion Type: ☒ BLH ☐ NEZ

B: 22°59'59.9973"

L: 112°59'59.9973"

H: 42.900 m

Target Coordinates

North: 2544887.111 m

East: 397473.746 m

Height: 42.900 m

Convert **Save**

Coordinate Conversion

Source Coordinates

Conversion Type: ☐ BLH ☒ NEZ

North: 2544886.944 m

East: 397473.958 m

Height: 42.900 m

Target Coordinates

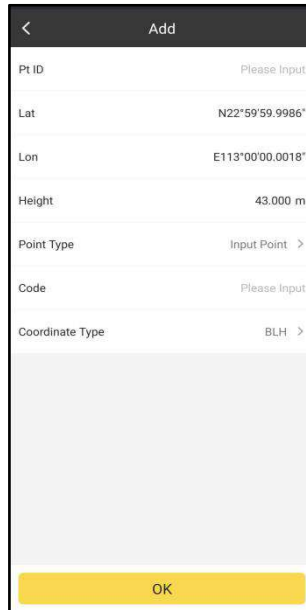
B: 22°59'59.9986"

L: 113°00'00.0018"

H: 43.000 m

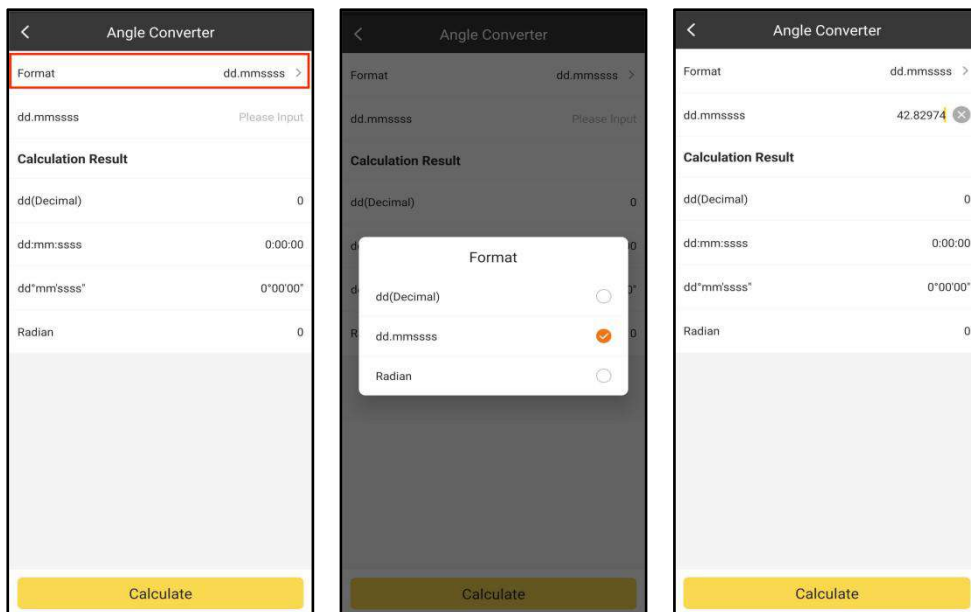
Convert **Save**

We can click Save to add the calculated coordinate to the point database.

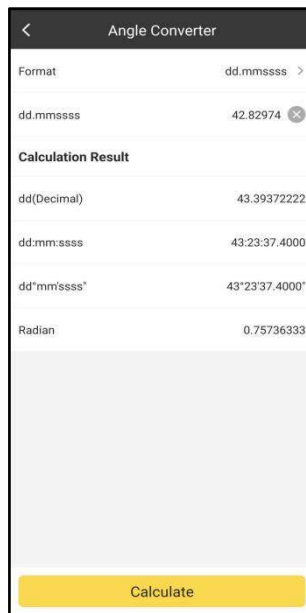


8-3 Angle Converter

We can convert the angle format in this function. Select the input format and input the angle.



Click **Calculate**. Then it will be converted to other formats



Angle Converter

Format: dd.mmssss >

dd.mmssss: 42.82974 ✕

Calculation Result

dd(Decimal): 43.39372222

dd:mm:ssss: 43:23:37.4000

dd°mm'ssss": 43°23'37.4000"

Radian: 0.75736333

Calculate

8-4 Perimeter and Area

We can use the coordinate of the points to calculate the perimeter and area. Click Add

We can input the point directly.

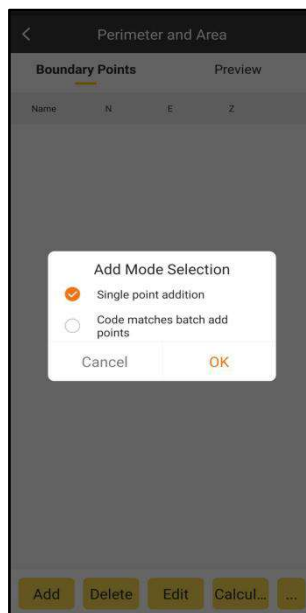


Perimeter and Area

Boundary Points Preview

Name	N	E	Z

Add Delete Edit Calcul... ⋮



Perimeter and Area

Boundary Points Preview

Add Mode Selection

☒ Single point addition

☐ Code matches batch add points

Cancel OK

Add Delete Edit Calcul... ⋮



Point coordinate

Point coordinate setting

Point Name: P127

N: 2544887.151 m

E: 397473.875 m

Z: 43.000 m

Save OK

If we have the surveyed point in database, we can click the icon in the right of the Point

Point coordinate

Point coordinate setting

Point Name

Please Input

N

Please Input m

E

Please Input m

Z

Please Input m

Save

OK

Points Database

Pt Name

Please Input

Search

Total 27

Page 1/1

Name	North	East	Height
Pt27	2544887.151	397473.875	43.000
Pt26	2544887.193	397474.023	42.900
Pt25	2544886.984	397473.841	42.900
Pt24	2544887.322	397473.845	42.900
Pt23	2544887.000	397473.669	42.900
Pt22	2564767.252	440326.378	21.095
Pt21	2564770.839	440322.028	21.010
Pt20	2564749.943	440333.038	23.457
Pt19	2564749.928	440333.057	23.501
Pt18	2564749.683	440330.970	21.193
Pt17	2564748.247	440329.307	21.185
Pt16	2564748.523	440330.478	21.211
Pt15	2564759.331	440329.337	21.150

Add

Edit

Details

OK

...

Point coordinate

Point coordinate setting

Point Name

Pt20

N

2564749.943 m

E

440333.038 m

Z

23.457 m

Save

OK

We can also put the device in the point and collect the coordinate in site. Click the icon in the right of the Point coordinate setting bar. And click **OK** to Collect it.



Point coordinate

Point coordinate setting

Point Name Please Input

N Please Input m

E Please Input m

Z Please Input m

Save OK

Click **OK**

. And the point will add to point list.

Perimeter and Area

Boundary Points Preview

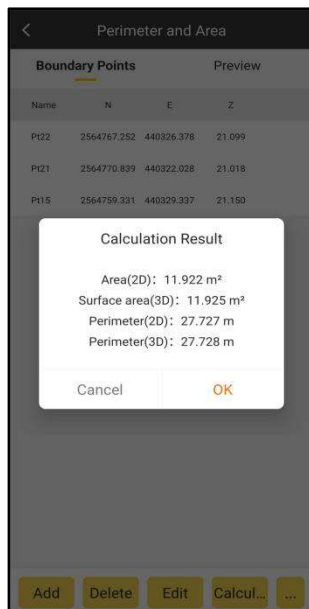
Name	N	E	Z
P128	2544887.029	397473.741	42.900

Add Delete Edit Calcul... ...

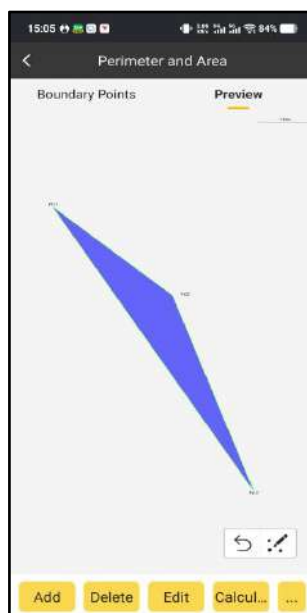
We can delete or edit a point after selecting it and then click Delete or Edit.



When we finished the input of the points, then we click Calculate and there will show the result of perimeter and area.

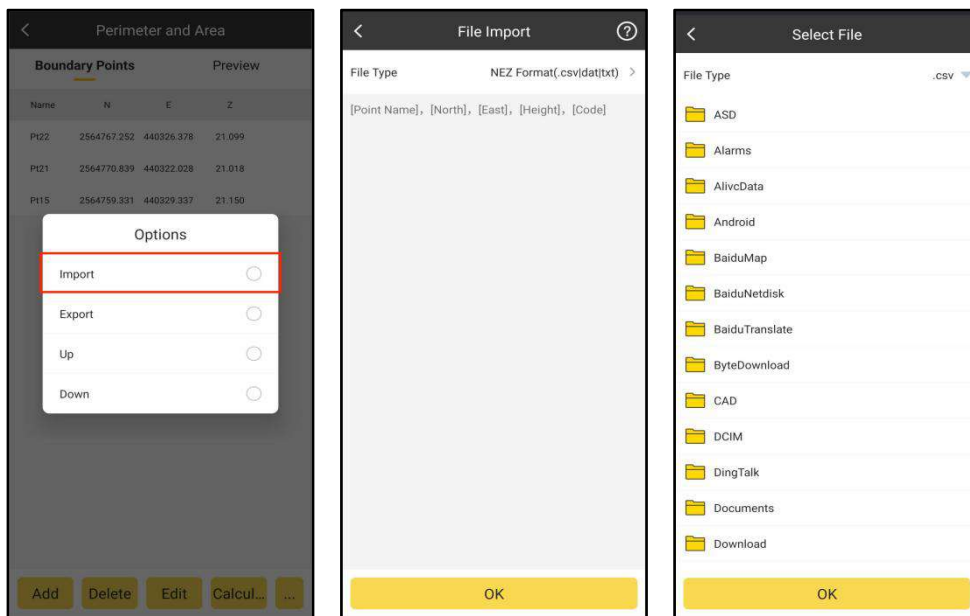


We can check the shape of the polygon by click the Preview



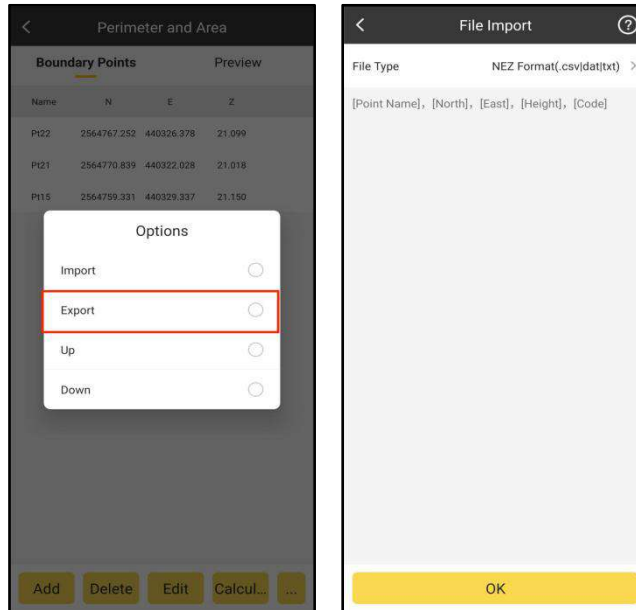


Click ... and click import . Select the file type: NEH Format(*.csv|dat|txt) or Cass Format(*.dat). Click OK. Select file path and click the file. Click



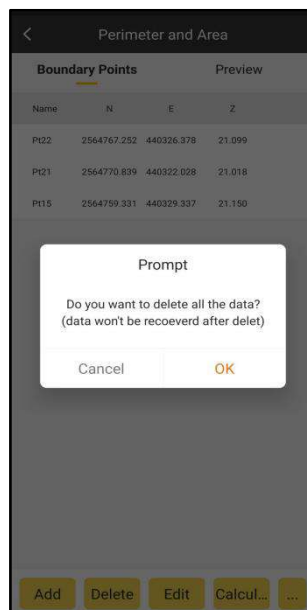
Export:

Click ... and Click Export . Select the file type: NEH Format(*.csv|dat|txt) or Cass Format(*.dat). Click OK . Select file path. Click OK



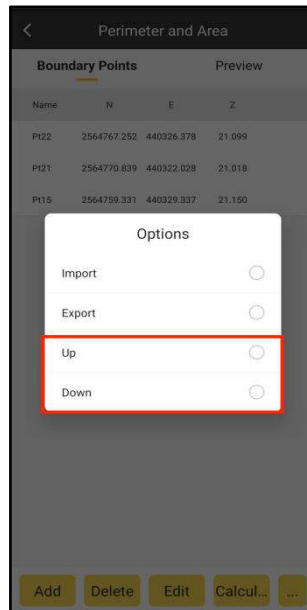
Delete Selected data:

Click Delete.Click OK.



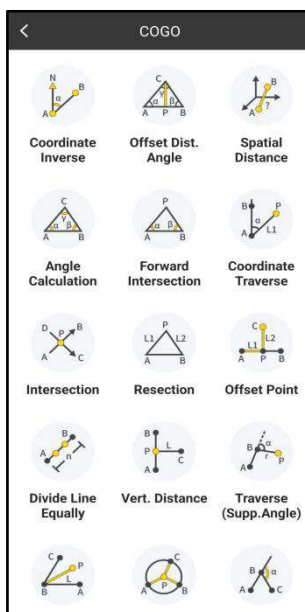
Up/Down Point:

Select a point, click **...** and click **up** / **down**. Then the selected point will move up/down.



8-5 COGO

Click COGO to enter to this page. According to the known coordinates, it can figure out position relations between point and point as well as between point and line. It includes Coordinate inverse calculation, Point line calculation, Vector, Two Lines Angle and other calculation, which will be introduced in the following.



The following three icons in COGO Calculation mean:



: Collect current coordinate.



: Points Database.


There are three ways to set points: 1. Extract coordinates from Points Database; 2. Collect current GPS coordinates; 3. directly input values of Northing, Easting and Elevation.

Calculation result in COGO calculation can be stored in Points Database with Click **Save**.

8-5-1 Coordinate Inverse

Set Start Point A and End Point B, and click Calculate to calculate the Horizontal Distance, Azimuth, H Difference, Slope Ratio and Slope Distance.

<
Inverse
(?)



Note: Known A, B, to calculate distance, azimuth, H diff, slope rate of line AB

Set Start Pt A

N	Please Input m
E	Please Input m
Z	Please Input m

Set End Pt B

N	Please Input m
E	Please Input m
Z	Please Input m

Calculation Result

Horizontal Distance	m
---------------------	---

Calculate

<
Inverse
(?)

E	397473.875 m
Z	43.000 m

Set End Pt B

N	2544887.000 m
E	397473.669 m
Z	42.900 m


Calculation Result

Horizontal Distance	0.255 m
Azimuth	233°45'29.5991"
H.Diff	-0.100 m
Slope Ratio	-39.152
Spatial Distance	0.274 m

Calculate




8-5-2 Offset Distance/Angle

Set Start Point A, End Point B and Offset Point C, and then click Calculate to calculate the Distance(AC), Distance(BC), Distance(AP), Distance(BP), Offset Distance(CP), Offset Angle and Corner Angle.



Note: Known A,B,C, to calculate AC, BC, AP, BP, CP, and angle α , β , γ

Set Start Pt A




N

Please Input m

E

Please Input m

Set End Pt B




N

Please Input m

E

Please Input m

Set Offset Pt C

N

Please Input m

E

Please Input m

Calculation Result

AP

BP

CP

Angle α

Angle β

Angle γ

Calculate

Offset Dist/Angle

Set Offset Pt C

N	2564749.683 m
E	440330.970 m


Calculation Result

Dist(AC)	47235.965 m
Dist(BC)	18.159 m
Dist(AP)	47235.962 m
Dist(BP)	3.228 m
Offset Dist(CP)	17.870 m
Angle α	0°01'18.0326"
Angle β	79°45'36.5947"
Angle γ	100°13'05.3727"


Calculate

8-5-3 Spatial Distance




Set Start Point A and End Point B, and then click **Calculate** to calculate the Spatial Distance.



Note: Known point A, B (Lat, Lon, H), to calculate spatial dist of between A and B.



Set Start Pt A

Lat


N0°00'00.0000"

Lon




E0°00'00.0000"

Ellipsoid Height(m)

Please Input



Set End Pt B

Lat

N0°00'00.0000"

Lon

E0°00'00.0000"

Ellipsoid Height(m)



Please Input

Calculation Result


Spatial Dist

m

Calculate







Spatial Dist



Note: Known point A, B (Lat, Lon, H), to calculate spatial dist of between A and B.



Set Start Pt A

Lat

N23°00'00.0000"




Lon


113.00000070


Ellipsoid Height(m)

42.900

Set End Pt B

Lat

N23°10'53.1605"

Lon

E113°25'02.0519"

Ellipsoid Height(m)

23.501

Calculation Result

Spatial Dist

47234.181 m

Calculate



8-5-4 Angle Calculation

Set Point A, Point B and Point C, and then click **Calculate** to calculate the Angle ABC, BAC and ACB.

Two Lines Angle

Note: Known point A, B, C, to calculate angle α , β , γ

Pt A

N Please Input m

E Please Input m

Pt B

N Please Input m

E Please Input m

Pt C

N Please Input m

E Please Input m

Calculation Result

Calculate

Two Lines Angle

N 2544887.151 m

E 397473.875 m

Pt B

N 2544886.984 m

E 397473.841 m

Pt C

N 2564749.683 m

E 440330.970 m

Calculation Result

Angle (α) 126°22'24.7728"

Angle (β) 53°37'34.6280"

Angle (γ) 0°00'00.5992"

Calculate

8-5-5 Intersection

Set Point A, Point B, Point C and Point D, and then press Calculate to calculate the intersection coordinates and intersect angle.

Intersection

Note: Known point A, B, C, D, to calculate intersection point

Pt A

N Please Input m

E Please Input m

Pt B

N Please Input m

E Please Input m

Pt C

N Please Input m

E Please Input m

Pt D

N Please Input m

E Please Input m

Save Calculate

Intersection

N 2564767.252 m

E 440326.378 m

Pt C

N 2564759.331 m

E 440329.337 m

Pt D

N 2564761.835 m

E 440336.893 m

Calculation Result

N 2564760.607 m

E 440333.188 m

Intersect Angle: 117°22'04.0284"

Save Calculate

8-5-6 Resection

Set Line L1, L2, Point A and Point B, and then click **Calculate** to calculate the point coordinates.

Resection

Note: known point A, B, and dist L1, L2, to calculate point P

Line L1, L2

L1 Please Input m

L2 Please Input m

Pt A

N Please Input m

E Please Input m

Pt B

N Please Input m

E Please Input m

Calculation Result

N m

Save Calculate

Resection

Line L1, L2

L1 50 m

L2 50 m

Pt A

N 2564755.895 m

E 440338.017 m

Pt B

N 2564749.928 m

E 440333.057 m

Calculation Result

N 2564721.046 m


E 440373.872 m

Save Calculate

8-5-7 Forward Intersection

Set Angle α , β , Point A and Point B, and then click **Calculate** to calculate the intersection point coordinates.

Forward Intersection



Note: known A B, $\angle A = \alpha$, $\angle B = \beta$, to calculate P.

Angle α , β




α

0°00'00.0000"

β

0°00'00.0000"

Pt A




N

Please Input m

E

Please Input m

Pt B

N

Please Input m

E

Please Input m

Calculation Result

N

m

Save

Calculate

Forward Intersection

Angle α , β




α

35

β

25°00'00.0000"

Pt A




N

2544887.193 m

E

397474.023 m

Pt B

N

2564749.943 m

E

440333.038 m

Calculation Result

N

2564823.617 m

E

409047.004 m

Save


Calculate

8-5-8 Coordinate Traverse

Set Line L1, Angle α , Point A and Point B, and then click **Calculate** to calculate the traverse point coordinates.

245

< Traverse ?




 Note: known A, $\angle A = \alpha$, $AP = L1$, calculate P

Line L1, Angle α

L1 Please Input m




α 0°00'00.0000"

Azimuth / 2 Pts Direction Reference Point Direction >

Pt A   

N Please Input m

E Please Input m

Pt B   

N Please Input m


E Please Input m

Calculation Result




Save Calculate

< Traverse ?

L1 50 m




α 15 

Azimuth / 2 Pts Direction Reference Point Direction >

Pt A   

N 2544886.984 m

E 397473.841 m

Pt B   

N 2564748.523 m

E 440330.478 m

Calculation Result

N 2544895.550 m

E 397523.102 m

Save Calculate

8-5-9 Offset Point

Set Start Point A, End Points B, Line L1(from A to P), Line L2(Offset Distance), and then click Calculate to calculate the offset point coordinates.

Offset Pt

Note: known point A, B and dist L1, L2, to calculate point C

Set Start Pt A

N: Please Input m

E: Please Input m

Set End Pt B

N: Please Input m

E: Please Input m

Set Para.

L1(from A to P): Please Input m

L2(Offset Dist): Please Input m

Calculation Result

N: m

E: m

Save Calculate

Offset Pt

Set Start Pt A

N: 2544887.151 m

E: 397473.875 m

Set End Pt B

N: 2564749.943 m

E: 440333.038 m

Set Para.

L1(from A to P): 58 m

L2(Offset Dist): 68 m

Calculation Result

N: 2544849.843 m

E: 397555.091 m

Save Calculate

8-5-10 Divide Line Equally

Set Start Point A, End Point B, and Section Number, and then click to Calculate equally divided points' coordinates.

Divide Line Equally

Note: known point A, B, to divide line AB into many sections equally

Set Start Pt A

N: Please Input m

E: Please Input m

Z: Please Input m

Set End Pt B

N: Please Input m

E: Please Input m

Z: Please Input m

Set Para.

Section Number: Please Input

Save Calculate

8-5-11 Circle Center

Set Point A, Point B, and Point C, and then click to calculate Coordinates of the circle center.

Circle Center

Known point A, point B and point C. Calculate center of a circle point P.

☒ Point A
 ☐ Point B
 ☐ Point C

Coordinate Detail

N Please Input m

E Please Input m

Z Please Input m

Calculation Result

Save Calculate

Circle Center

Known point A, point B and point C. Calculate center of a circle point P.

☐ Point A
 ☐ Point B
 ☒ Point C

Coordinate Detail

N 2544887.000 m

E 397473.669 m

Z 42.900 m

Calculation Result

N:2544887.087
E:397473.764
H:42.933

Save Calculate

8-5-12 Traverse Calculation(2 Pts direction)

Set Point A, Point B, Angle α and Line r, and then click to calculate the point coordinates.

Traverse (Supp.Angle)

Known point A and point B, known angle α , BP = r. Calculate point P.

☒ Point A ☐ Point B

Coordinate Detail

N: Please Input m

E: Please Input m

Z: Please Input m

α : 0°00'00.0000"

r: Please Input m

Calculation Result

Save Calculate

Traverse (Supp.Angle)

Known point A and point B, known angle α , BP = r. Calculate point P.

☐ Point A ☒ Point B

Coordinate Detail

N: 2544887.322 m

E: 397473.845 m

Z: 42.900 m

α : 50.00000000

r: 20 m

Calculation Result

N:2544902.632
E:397486.714
H:42.900

Save Calculate

8-6 FTP Share

In FTP Share, we can share files using FTP. And there are two FTP modes, by Client and by Server.

Project:20250427-1004

Fixed H:0.000 Rover 100%

32/40 v:0.000 Age1

Localization Coordinate Converter Angle Converter

Perimeter and Area Cutting Area COGO

FTP Share File Share Post Process Points

Static Data Download Post Processing Scan QR code

Volume Calc Slope Calc Grid To

Project Device Survey Tools

FTP Share

FTP Mode Settings

IP: Please Input

Port: 21

Username: Please Input

FTP Mode Settings

Client ☐

Server ☐

OK



Client Mode: Upload files to FTP server.

We need to have a FTP server, and input IP, Username and Password to access the server.

And then we can Select File to Share to upload files to the FTP server.



FTP Share

FTP Mode Settings >

IP Please Input

Port 21

Username Please Input

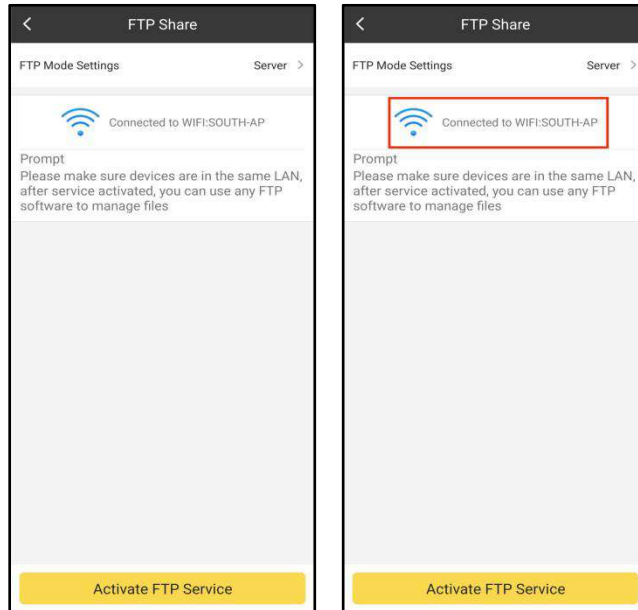
Password Please Input

Select File to Share >

OK

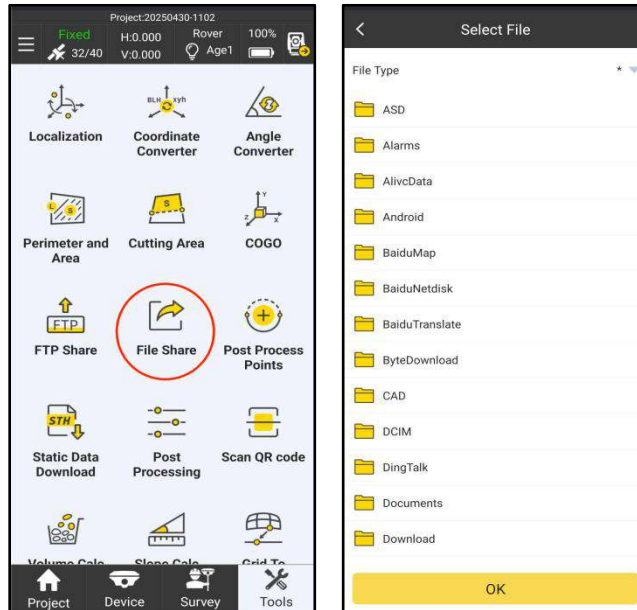
Server Mode: Make android device as FTP server

Another device must be in the same LAN of android device install Survstar. By activating this mode, we can access to the android phone internal memory by FTP:// android device LAN IP:2121.



8-7 File Share

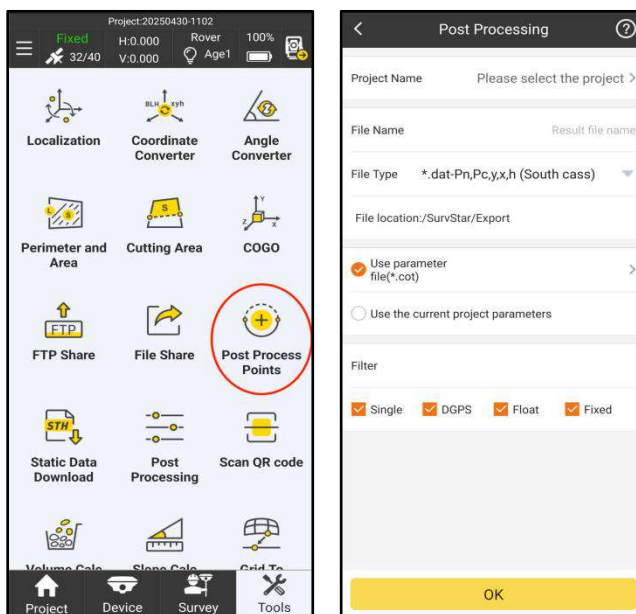
shared file and click OK, then we can share the selected file.



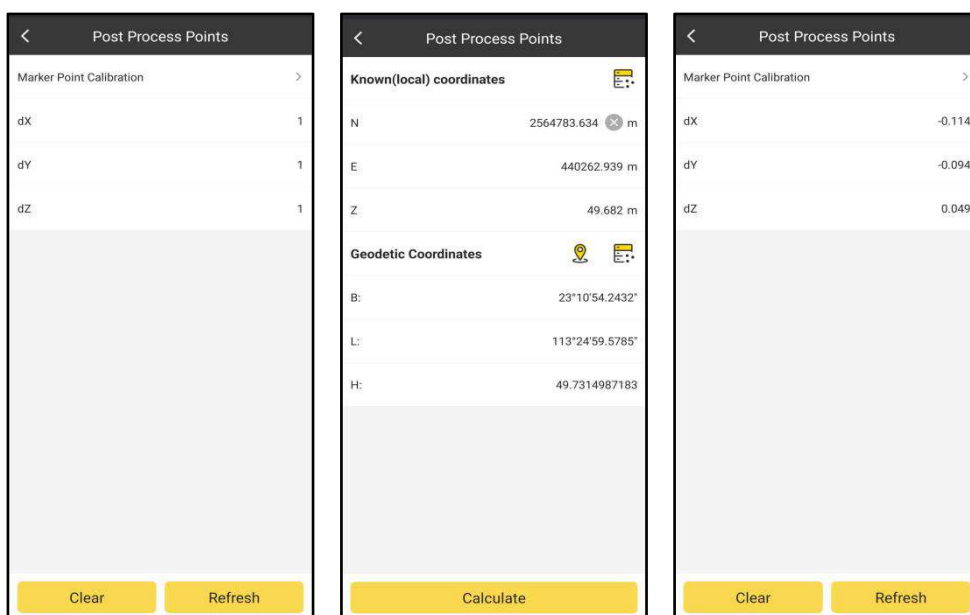
By clicking this, we can share the data file to the other app or the other device. Select the

8-8 Post-Process Points

In this section, we can make single point calibration for all collected points. If we know offsets in X, Y and H, we can input offset values directly.



We can also click Marker Point Calibration to calculate the offset parameters.





Then click **Refresh**, select the base to be calibrated, click **Refresh**. Then select the Starting Time and the Ended Time, then the surveyed point in that period will be calibrated.

<

Base Select

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Base ID	Start Time	BaseB	BaseL	BaseH
629	2025-04-23 10:45:13	23:10:537474	113:24:59893 8	71.034
0	2025-04-23 10:53:49	23:10:537474	113:24:59893 8	71.034
629	2025-04-23 13:39:23	23:10:537474	113:24:59893 8	71.034
3	2025-04-23 13:39:41	23:10:000370	113:25:48945 2	63.981
0	2025-04-23 13:40:17	23:10:000370	113:25:48945 2	63.981
0	2025-04-30 09:05:22	23:10:000370	113:25:48945 2	63.981
3	2025-04-30 09:05:23	23:10:000370	113:25:48945 2	63.981
1	2025-04-30 09:14:44	23:10:517113	113:25:00259 0	30.500
0	2017-01-01 08:02:21	23:10:000370	113:25:48945 2	63.981
3	2017-01-01 08:03:54	23:10:000370	113:25:48945 2	63.981
3	2025-04-14 15:35:46	23:10:000370	113:25:48945 2	63.981
3	2025-04-14 15:39:09	23:10:000370	113:25:48945 2	63.981
3	2025-04-14 15:42:09	23:10:000370	113:25:48945 2	63.981
629	2025-04-14 15:42:23	23:10:537474	113:24:59893 8	71.034

Refresh

<

Post Process Points

Refresh Date 2025-4-22 >

Start Time 10:48:07 >

End Time 10:48:46 >

log

$dx=-0.114$ $dy=-0.094$ $dh=0.049$

Refresh