

**SOUTH ANDROID SURVSTAR**  
**OPERATION GUIDE**

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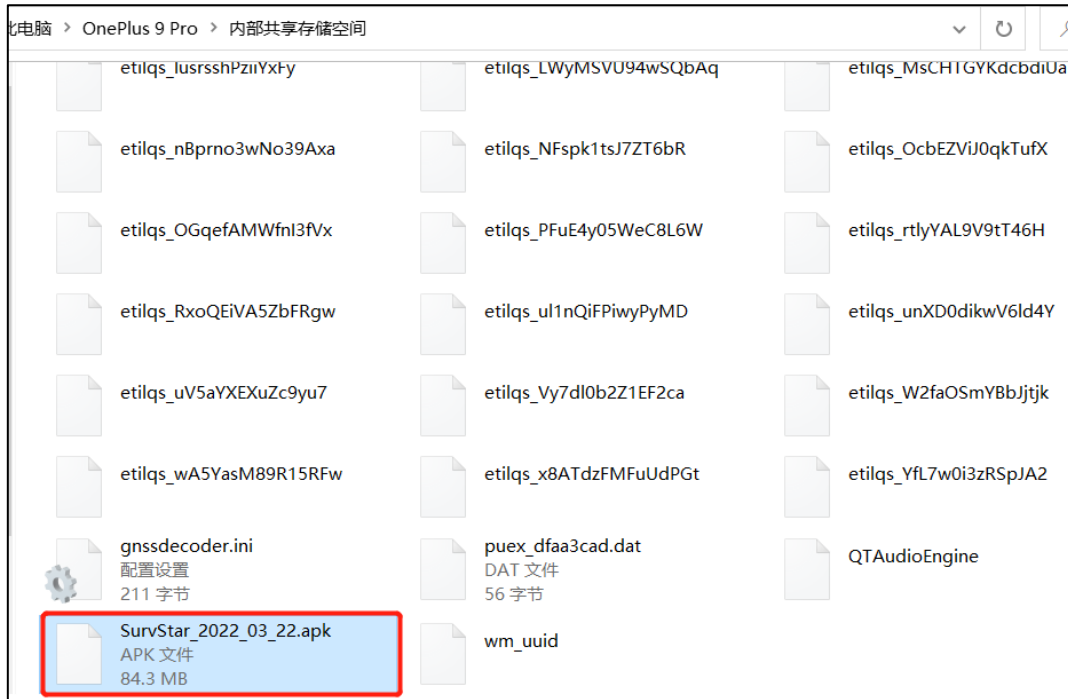
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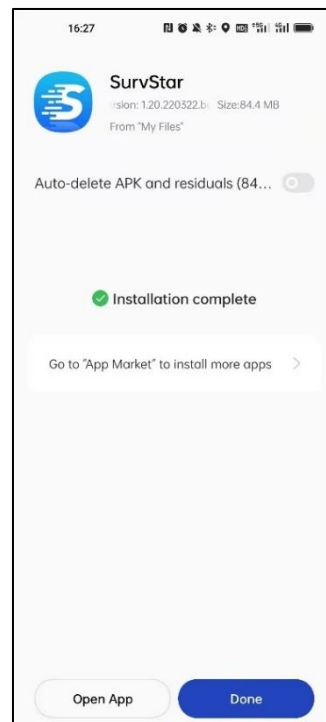
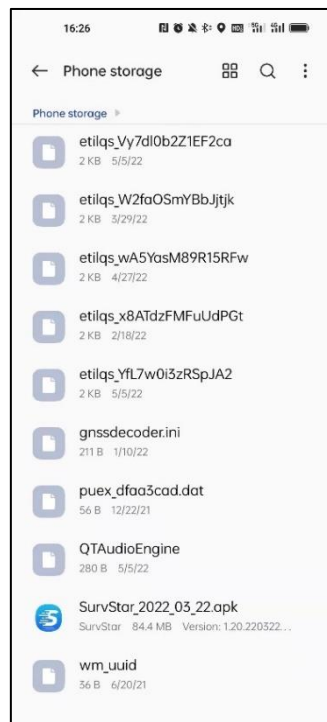
# Chapter 1 Installation & Uninstallation

## 1-1 Installation

1. Copy the APK installation file into android device.

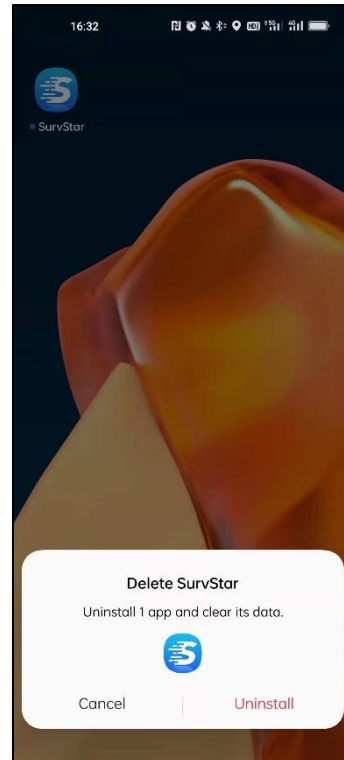
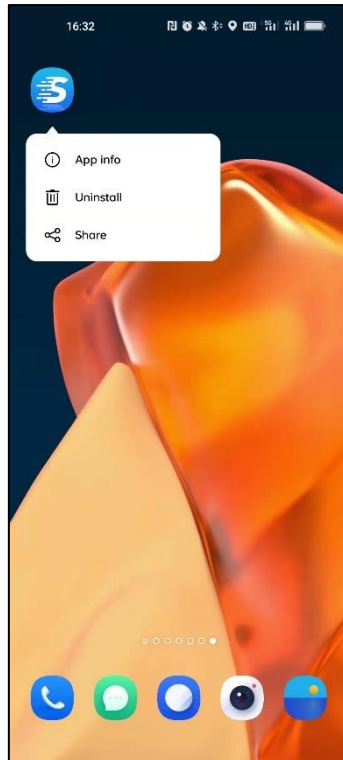


2. Find the APK installation file in android device and click it to install SurvStar.



## 1-2 Uninstallation

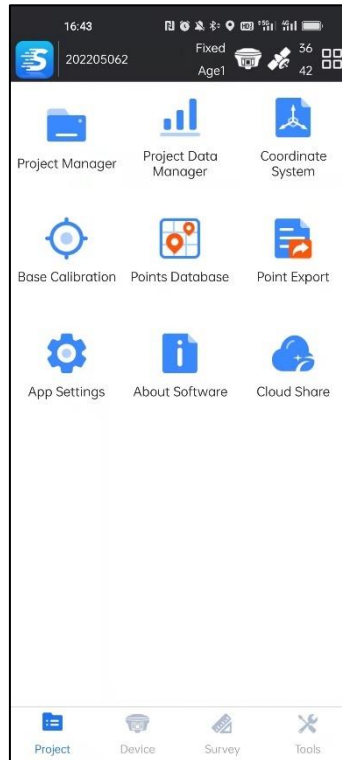
Find the SurvStar icon in android device, and long press it, and then click Uninstall, the system will uninstall it.



# Chapter 2 Main Interface

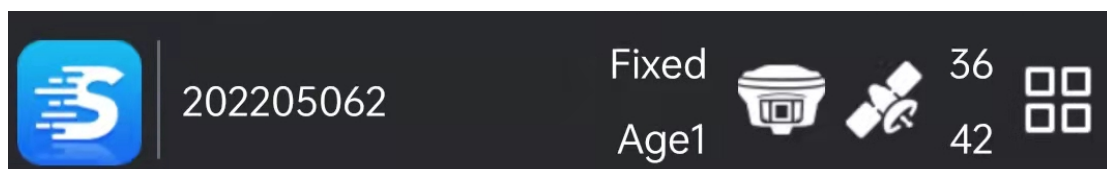
## 2-1 Introduction


Below is the main interface of SurvStar, it includes: general information at the top, function modules at the bottom and detailed function buttons in the middle.

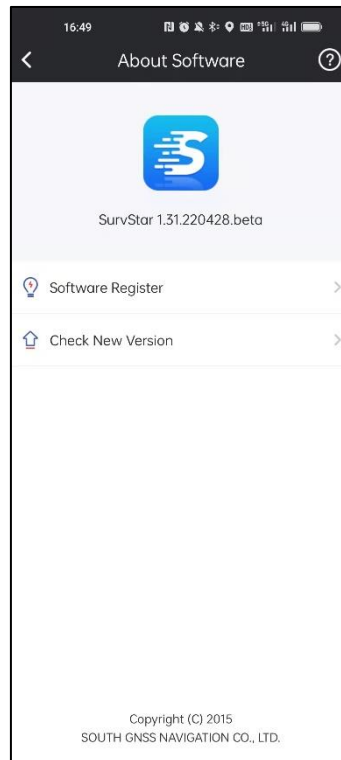


## 2-2 General Information

Below is the general information bar, where we can see the current project's name, current solution status and satellites.



Click  , we will enter to About Software page. In that page, we can see the current version of SurvStar, register the SurvStar and check new version.



This is the name of current project.



**Solution status:** includes Single, Float, DGPS and Fixed.


**Age1:** current differential delay is 1.

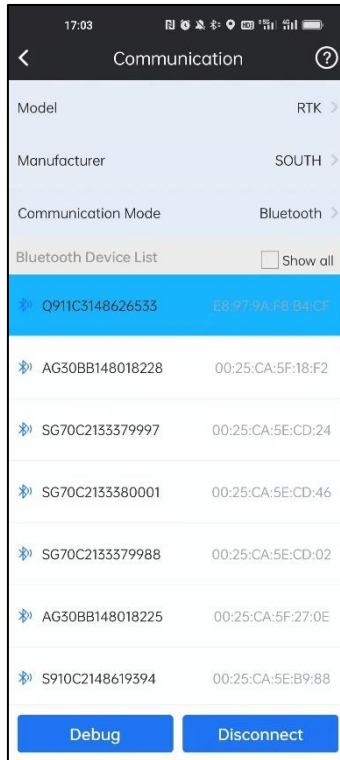
*e.g., Single, 0, current solution is single, and differential delay is 0.*

*Fixed, 1: current solution is fixed, and differential delay is 1.*


**36/42:** Used satellites and detected satellites.

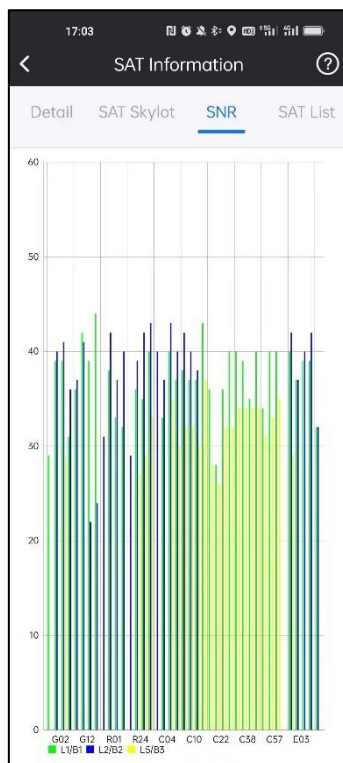
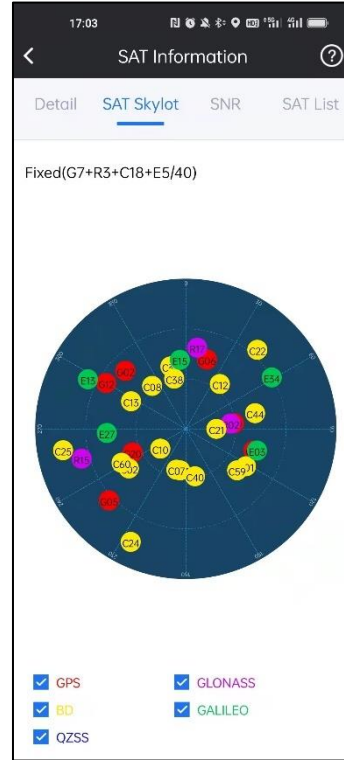
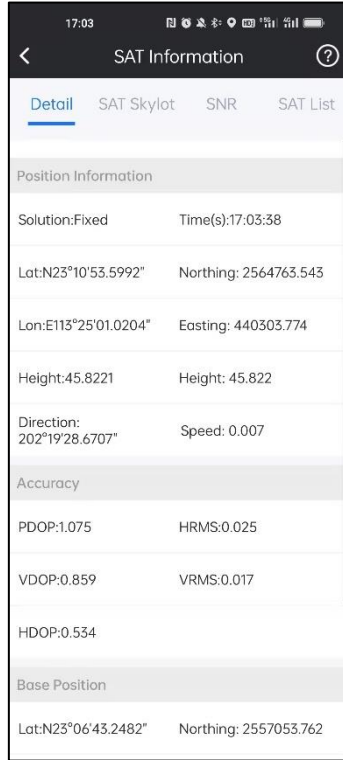


Click  , we will enter to Communication page. In that page, we can search the device and pair with it.






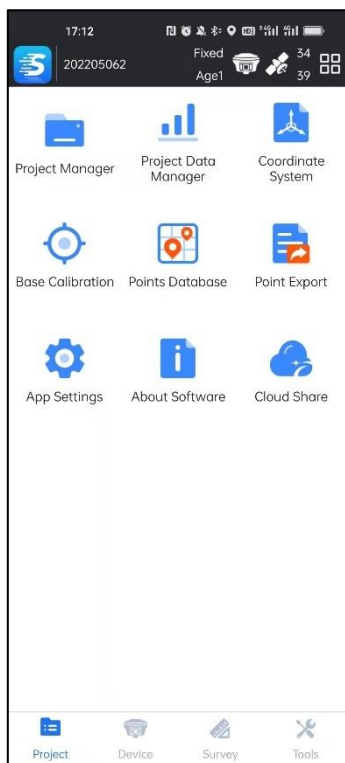
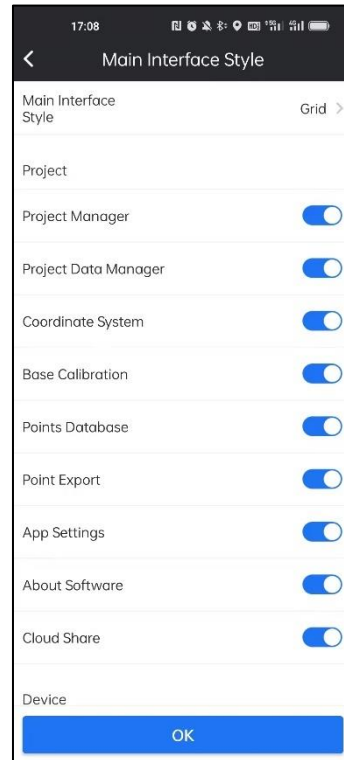
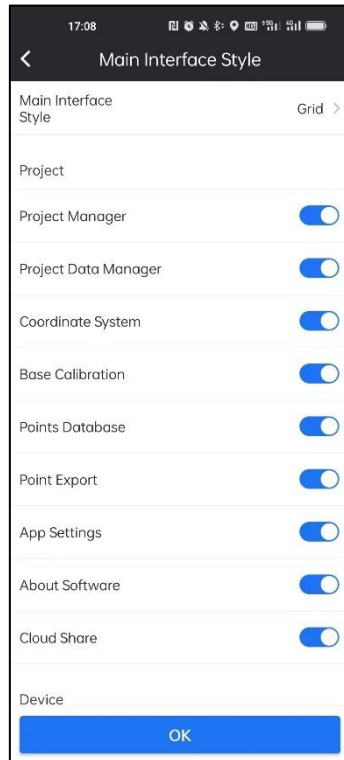
Click  , we will enter to SAT Information page. In that page, we can check the position information, accuracy, base position, SAT skylot, SNR and SAT list.



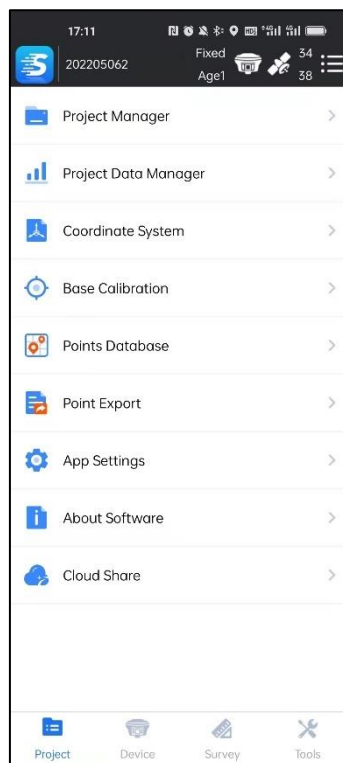
SAT No.	SNR	Elevation Angle	Azimuth	Status
G02	29.0/0.0/0.0	38.0	314.0	Locked
G05	39.0/40.0/0.0	25.0	227.0	Locked
G06	39.0/41.0/29.0	45.0	17.0	Locked
G09	31.0/36.0/0.0	27.0	73.0	Locked
G12	36.0/37.0/0.0	33.0	300.0	Locked
G17	42.0/41.0/0.0	46.0	108.0	Locked
G19	39.0/22.0/0.0	60.0	84.0	Locked
G20	44.0/24.0/0.0	54.0	246.0	Locked
R01	0.0/31.0/0.0	15.0	31.0	Visible
R02	38.0/42.0/0.0	62.0	85.0	Locked
R15	33.0/37.0/0.0	23.0	254.0	Locked
R17	32.0/40.0/0.0	39.0	8.0	Locked
R24	0.0/29.0/0.0	26.0	71.0	Visible
C01	36.0/39.0/27.0	46.0	122.0	Locked
C02	35.0/42.0/29.0	47.0	235.0	Locked



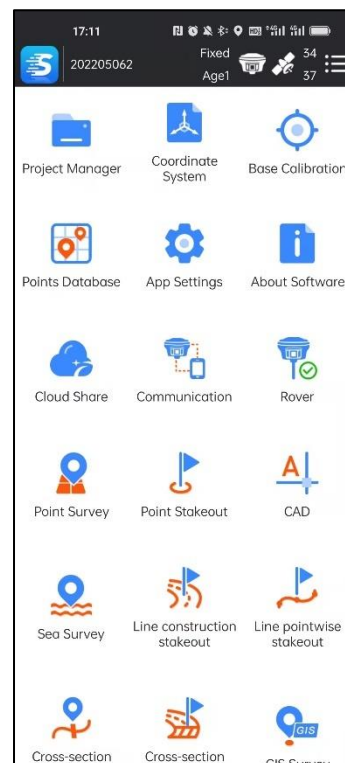
Click  , we will enter to Main Interface Style page. In that page, we can define main interface style and decide which function modules to be displayed.



Grid



List

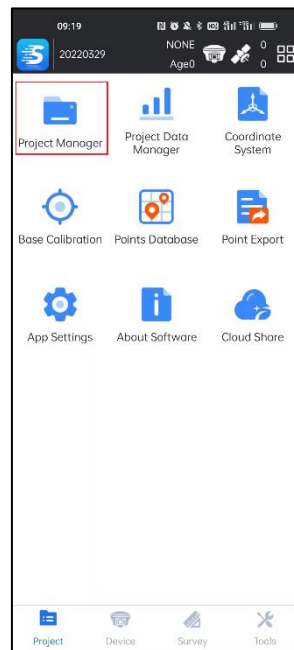


Simple

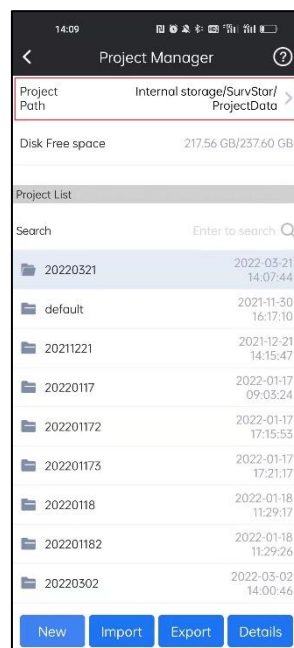
# Chapter 3 Project

## 3-1 Project Manager

Click this icon to enter this function.

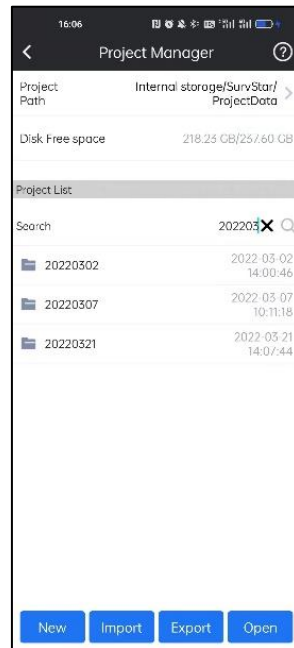


Projects we created are saved in the default directory of controller: Internal storage/SurvStar/ProjectData.



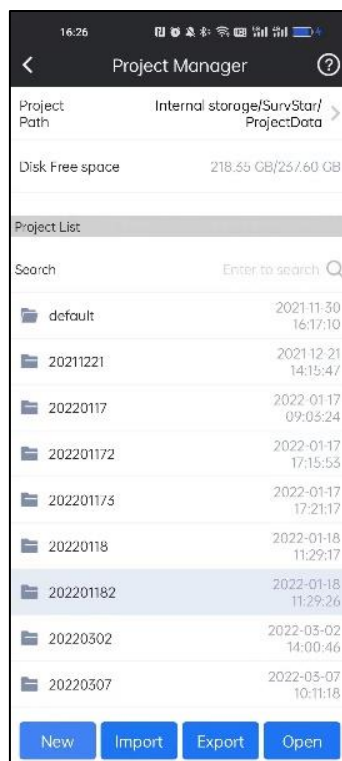
## Search Project:

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



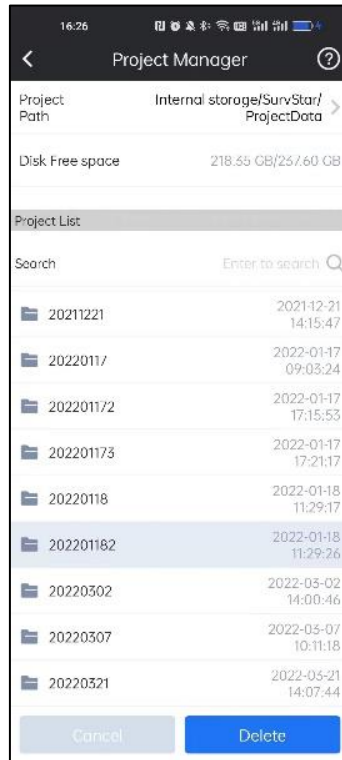
## Open Project:

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



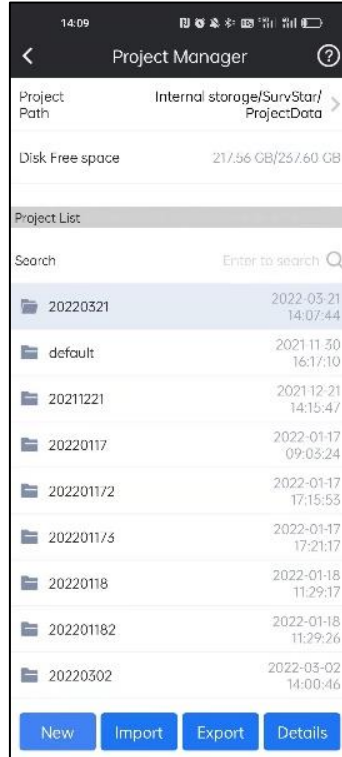
## Delete project:

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



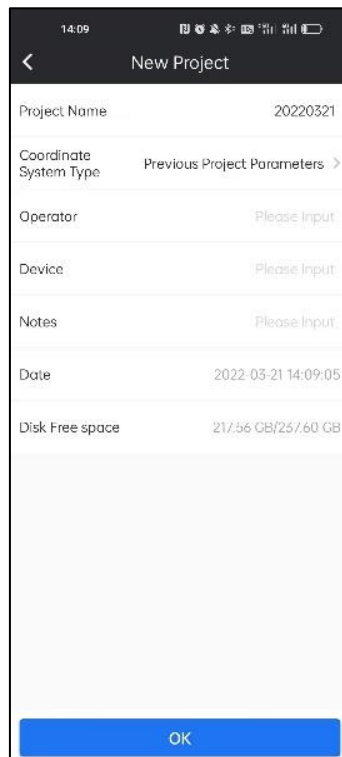
## Create new project:

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

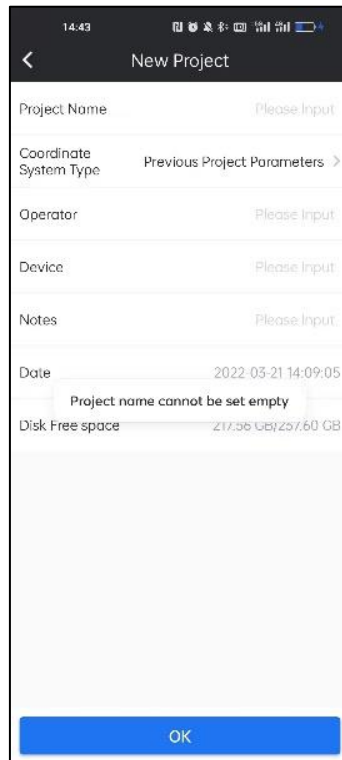


## New Project:

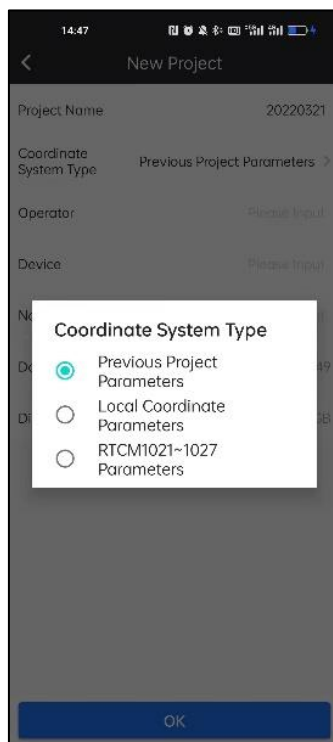
1. Click **New** to create a new project.



2. Input the Project Name. If we input nothing, it will show the tip.



3. Choose coordinate system type. There are three types we can choose: Previous Project Parameters, Local Coordinate Parameters and RTCM1021~1027 Parameters.



#### 4. Complete other information of the project.

14:49

< New Project

Project Name xxxx project

Coordinate System Type Previous Project Parameters >

Operator Mr.Kun

Device SOUTH G7

Notes some notes ✕

Date 2022-03-21 14:47:33

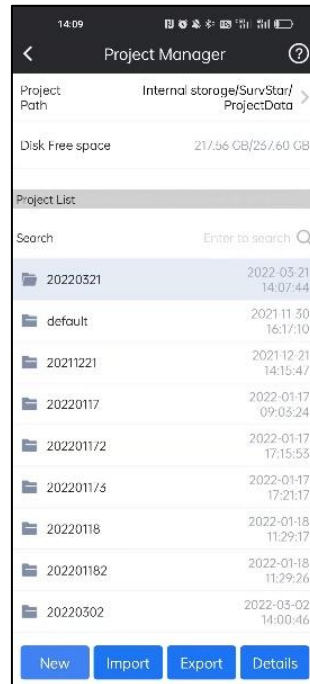
Disk Free space 217/78 GB/257.60 GB

OK

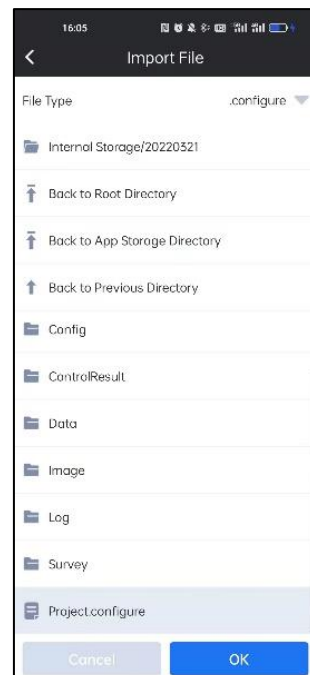
## Import Project:

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).

1. Click **Import** in Project Manager.

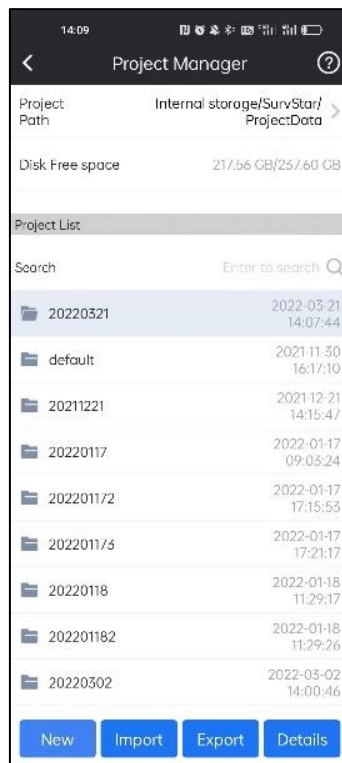


2. Find the target project folder, choose the project file (\*.configure) saved before, and click OK. Then the project will be opened.

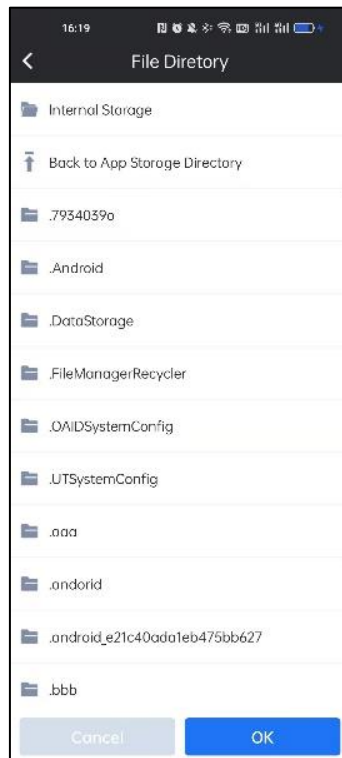


## Export Project:

1. Click **Export** in Project Manager.

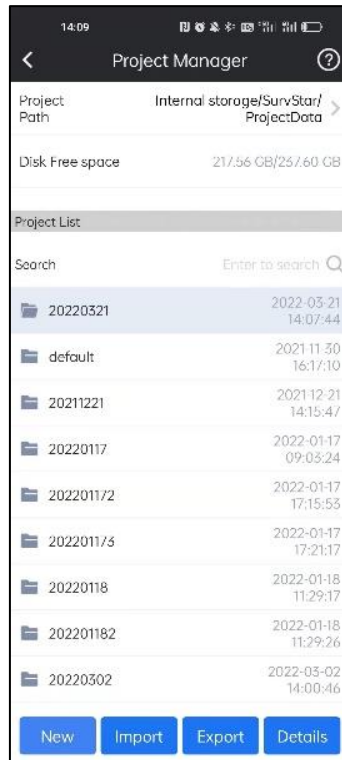


2. Choose the directory we want to save the project. Click OK. Then the project will be saved.

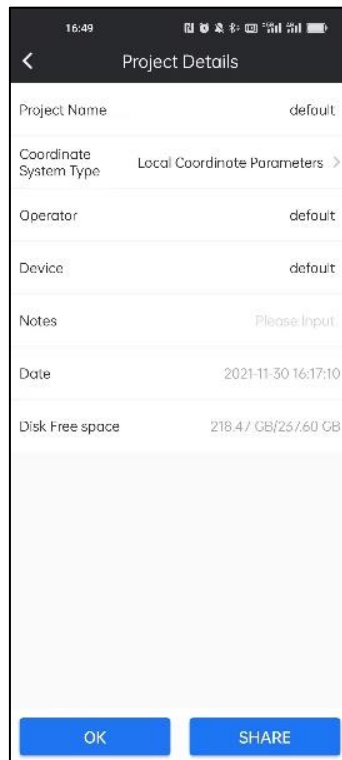


## Project Details:

1. Choose the target project, and Click **Details**.



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

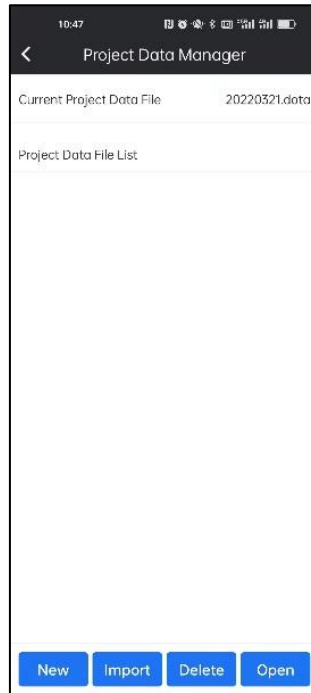


## 3-2 Project Data Manager

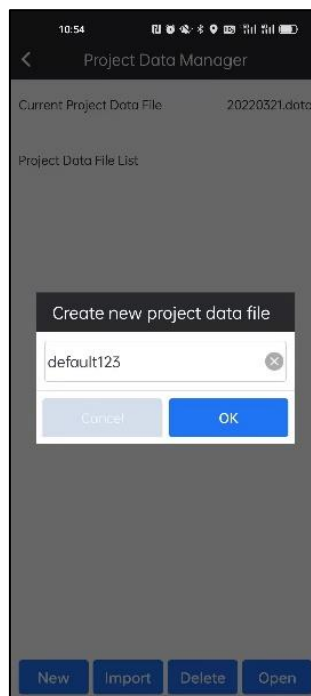
With that function we can manage the surveyed data. We can create, import, delete and change the surveyed data.

### New Project Data:

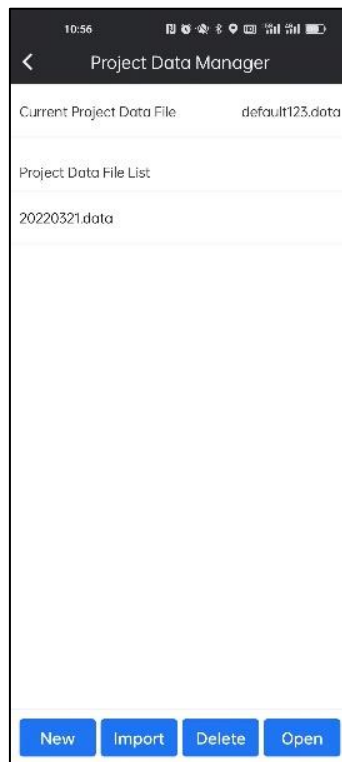
1. Click **New**.



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



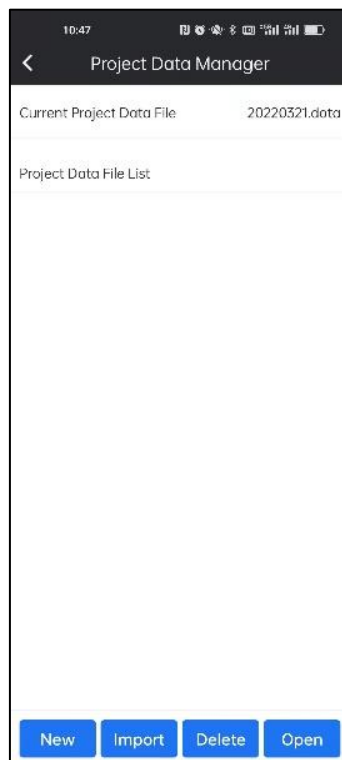
3. The new project data created successfully.



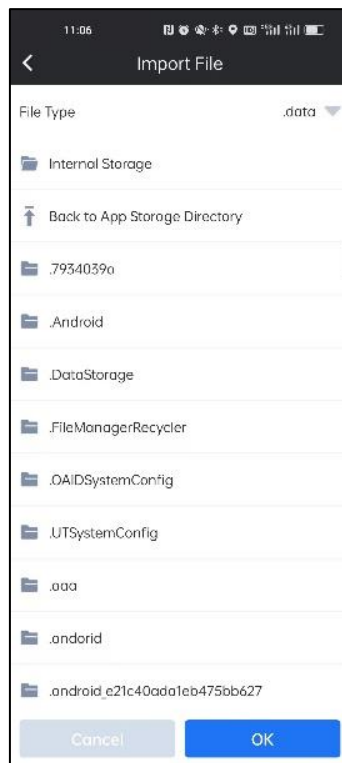
### Import Project Data:

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

1. 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**.

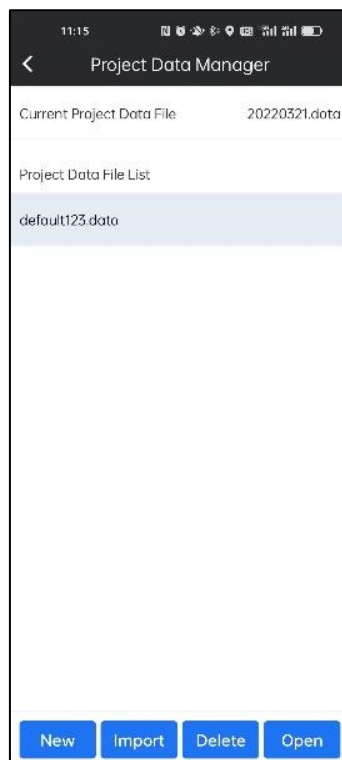


2. Click **OK**. The project data file will be deleted.

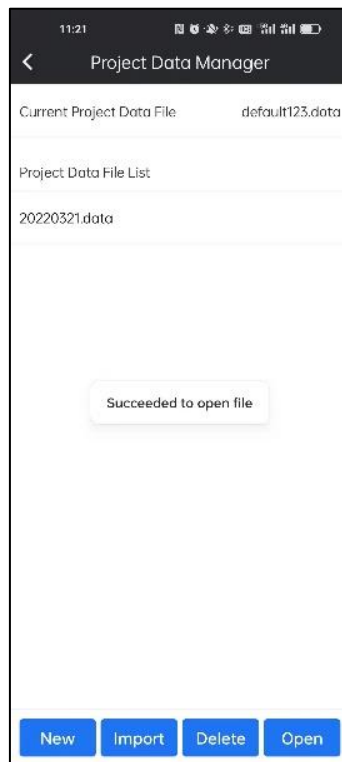


### Open Project Data:

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

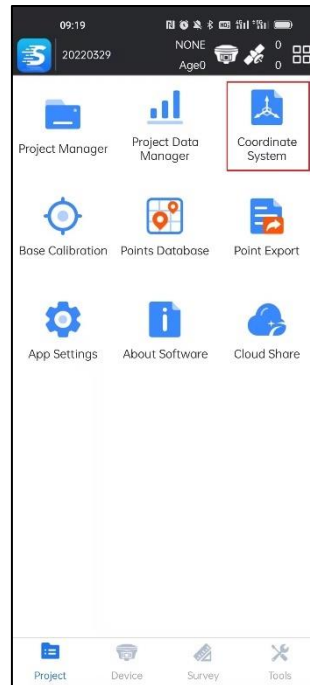


2. Then the chosen project data is opened.

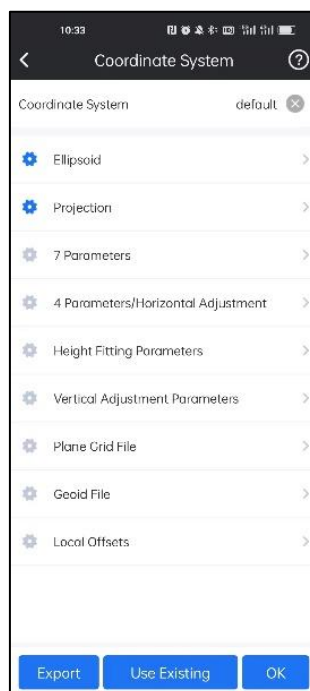


### 3-3 Coordinate System

Click this icon to enter this function.

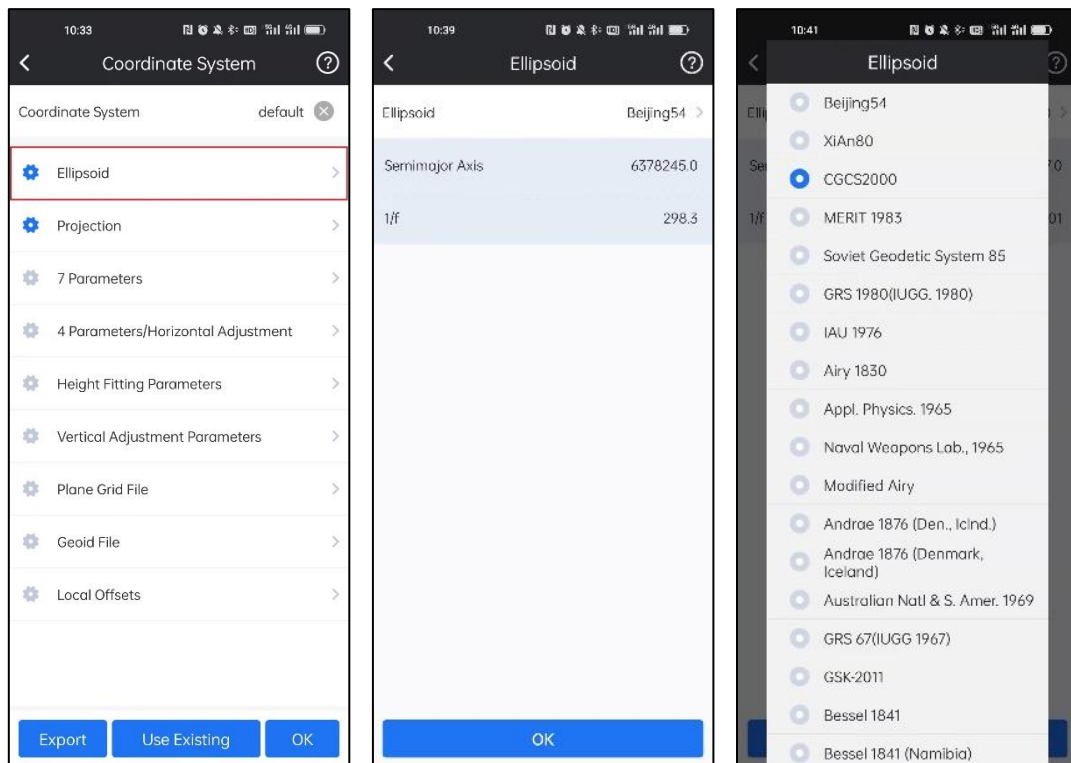


In coordinate system, we can create new coordinate system by defining the name, ellipsoid, projection, 7 parameters, 4 parameters, height fitting parameters, vertical adjustment parameters, plane grid file, geoid file and local offsets.

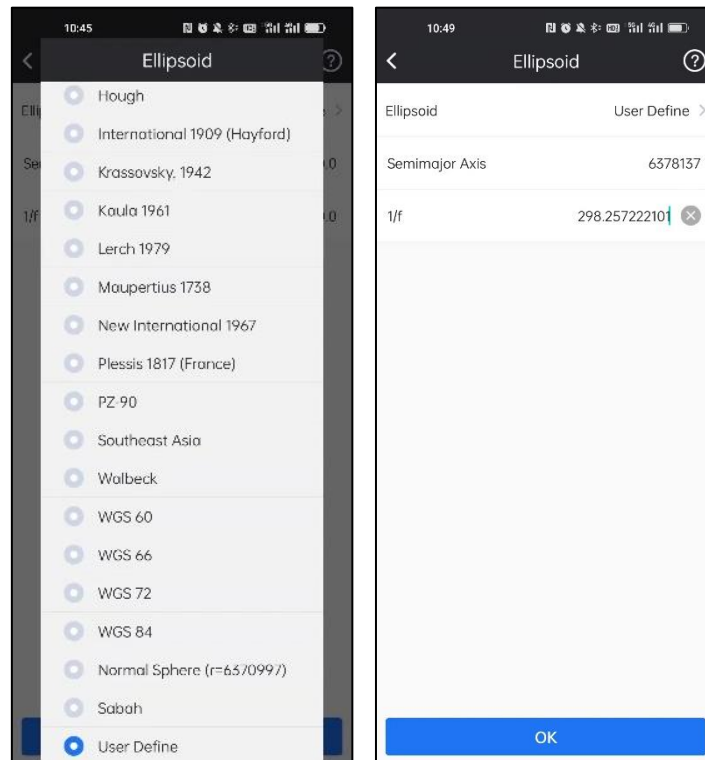


## Ellipsoid:

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

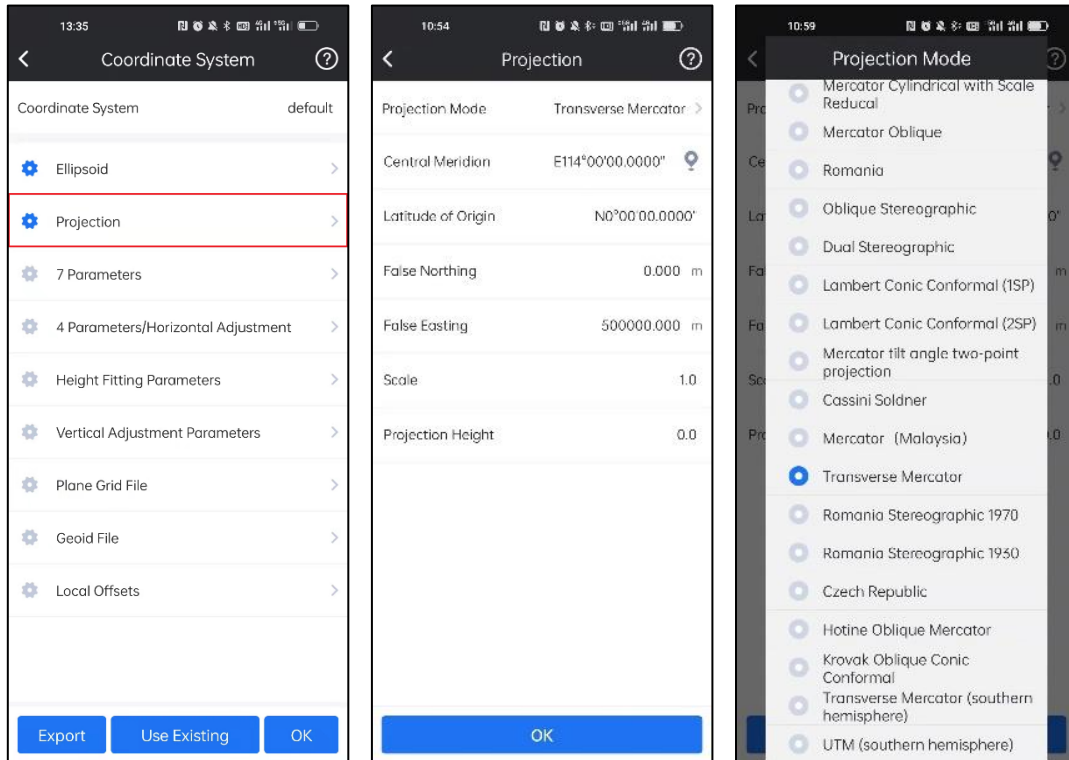



2. Also in **User Define**, we can define the ellipsoid by inputting Semimajor Axis and 1/f parameters.



## Projection:

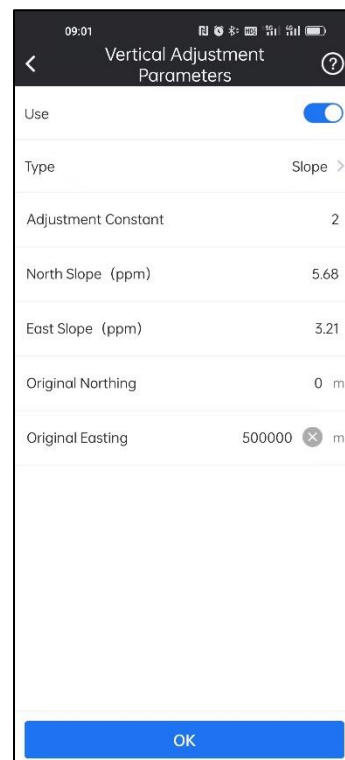
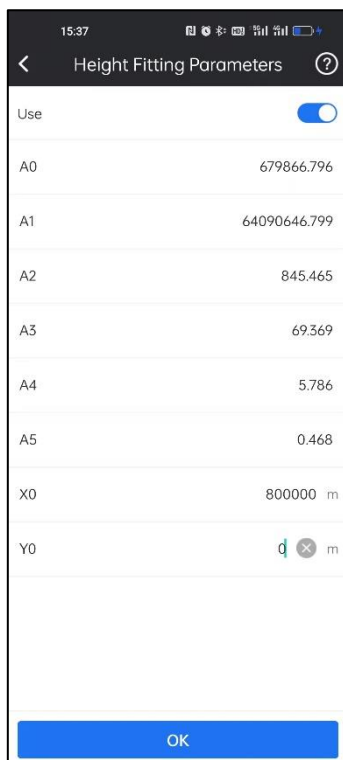
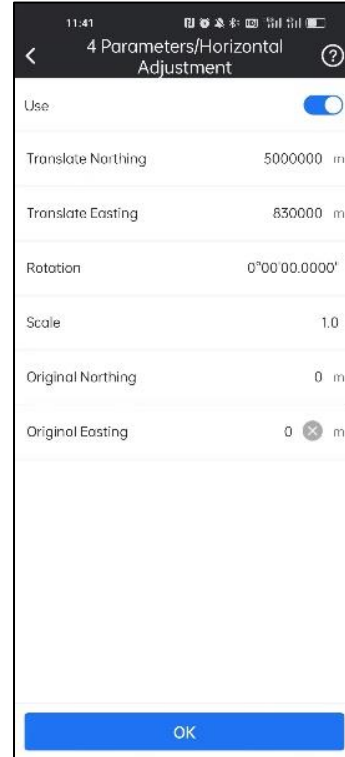
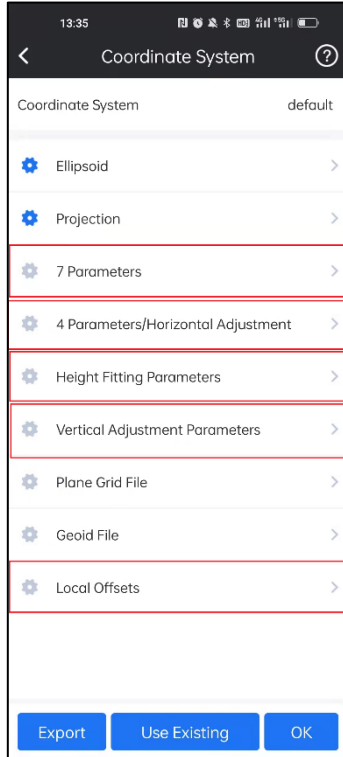
In Projection, we can define relevant projection parameters such as Projection Mode, Central Meridian, Latitude of Origin and so on.



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

## Coordinate Parameters:

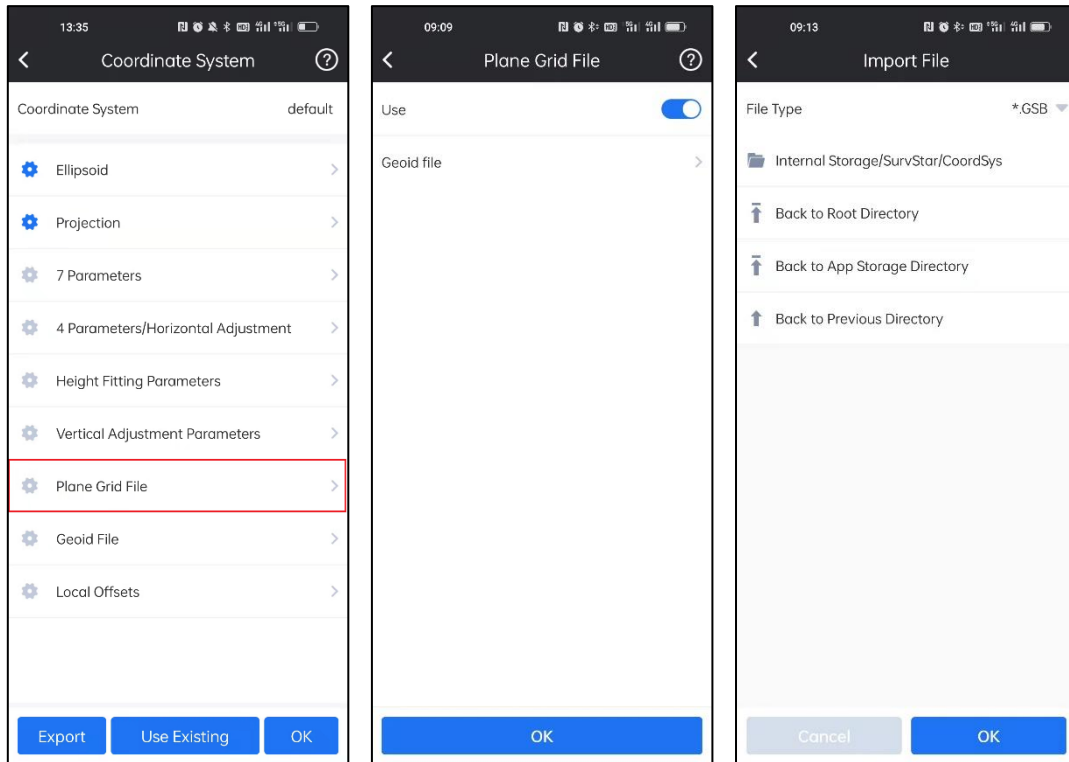
Also we can define 7 Parameters, 4 Parameters, Height Fitting Parameters, Vertical Adjustment Parameters and Local Offsets.



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

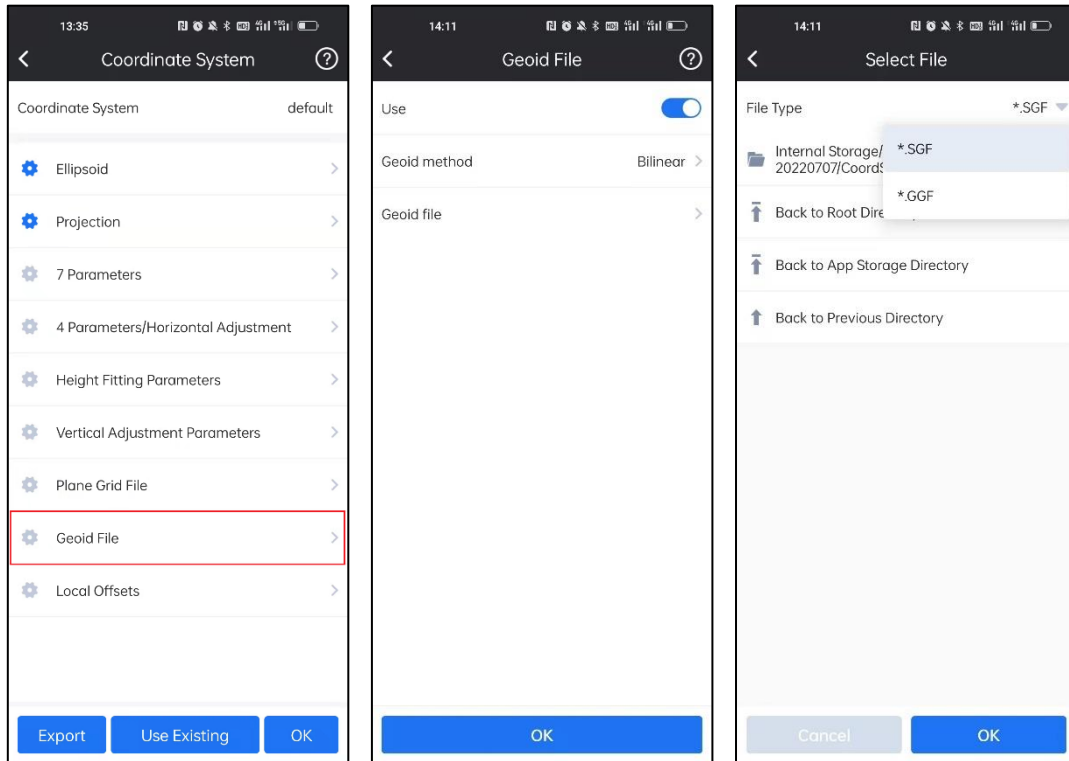
## Plane Grid File:

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



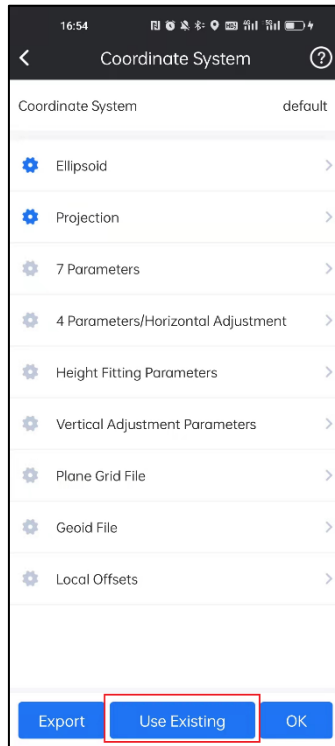
## Geoid File:

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

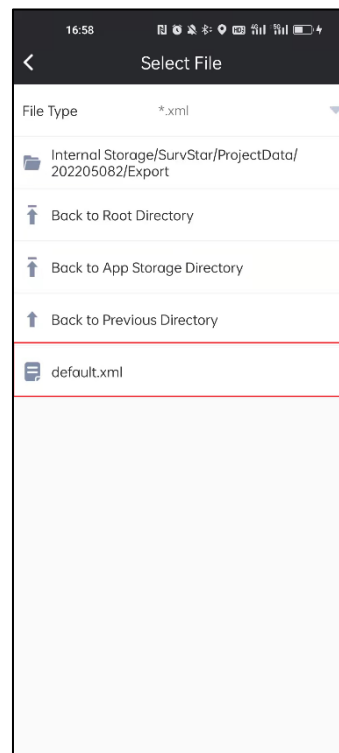
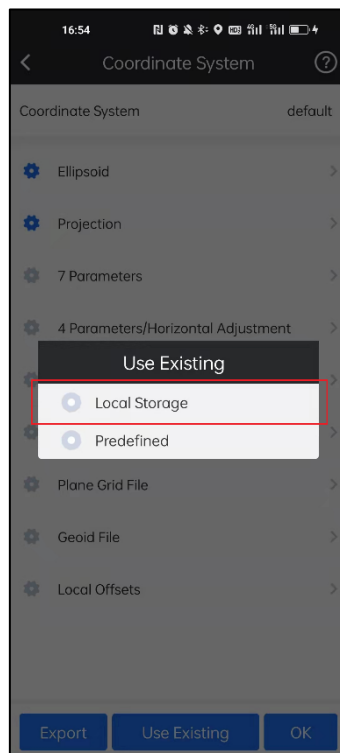


## Use Existing File:

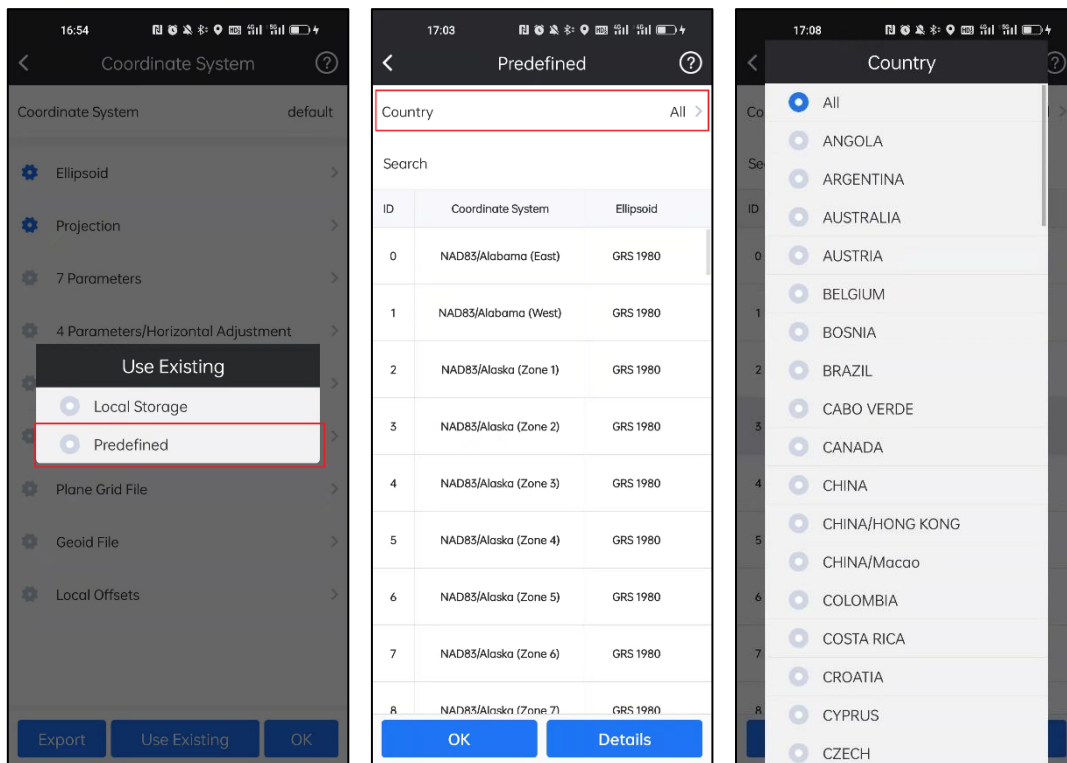
We can click **Use Existing** to select and apply the existing predefined coordinate system or use the coordinate system file (\*.xml).



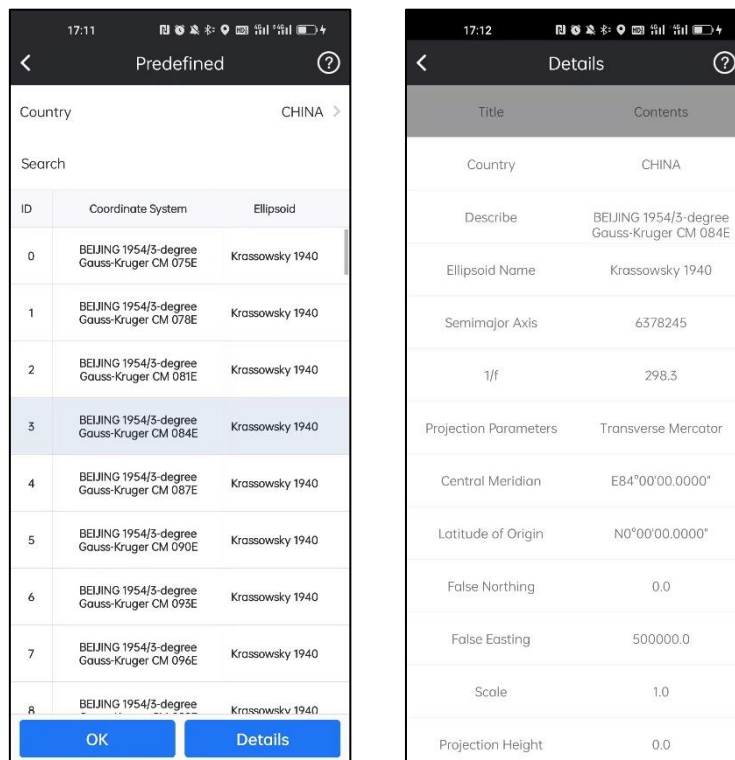
Click **Local Storage**, find the coordinate system file (\*.xml) and click it, the coordinate system will be applied.



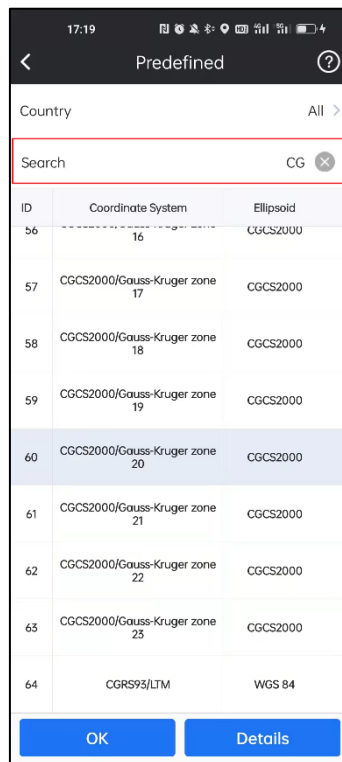
Click **Predefined**, then click **Country** and select the country or region (Alphabetical) where the needed coordinate system is located.



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

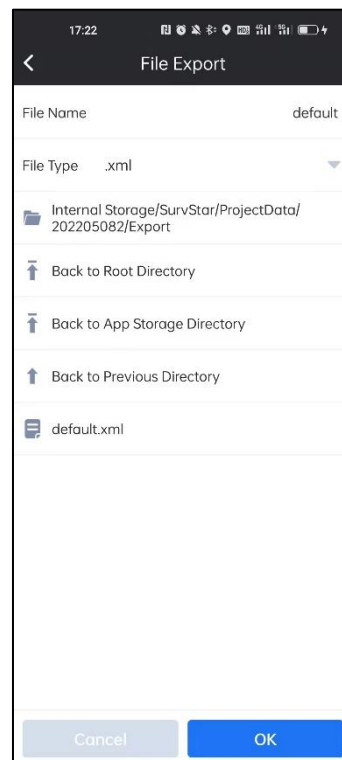
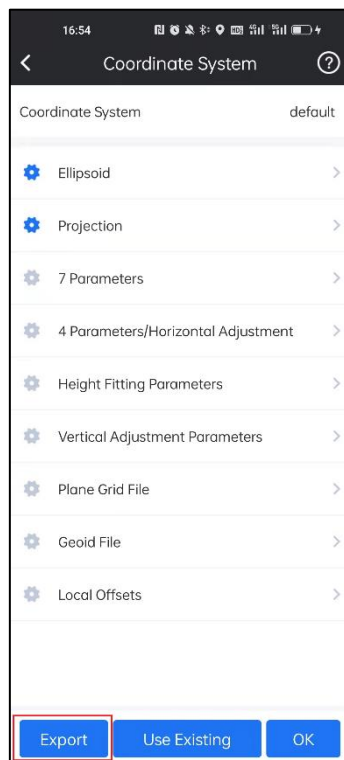


We can also search coordinate system with keywords in Search bar.



### Export:

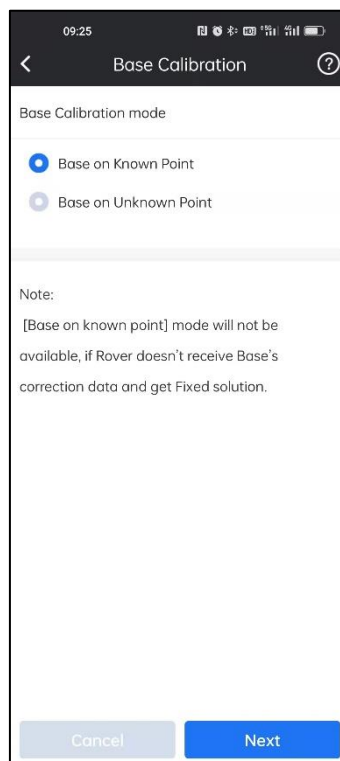
If we need to save the coordinate system in file, we can click **Export**, input File Name, select the path to save it and click **OK**, the coordinate system file will be exported.



## 3-4 Base Calibration

We can calibrate the base coordinate using this function.

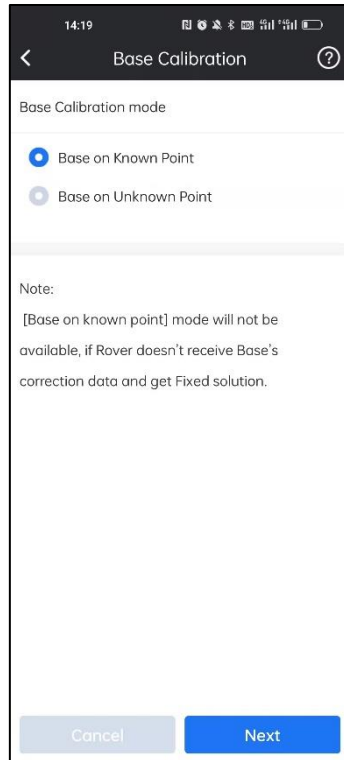
There are two ways to calibrate: one is Base on Known Point Calibration, set up base on a known point, and when rover gets fixed solution, input known point coordinates to calibrate; the other is Base on Unknown Point Calibration, set up base on an unknown point, when rover gets fixed solution, put rover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



## 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**.



14:19

Base Calibration

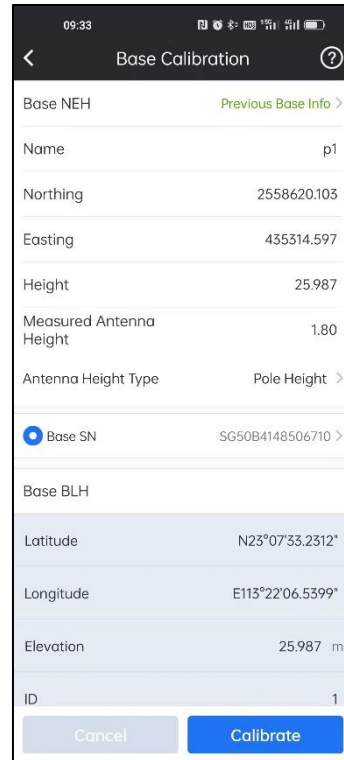
Base Calibration mode

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.

Cancel Next



09:33

Base Calibration

Base NEH [Previous Base Info >](#)

Name p1

Northing 2558620.103

Easting 435314.597

Height 25.987

Measured Antenna Height 1.80

Antenna Height Type Pole Height >

Base SN SG50B4148506710 >

Base BLH

Latitude N23°07'33.2312"

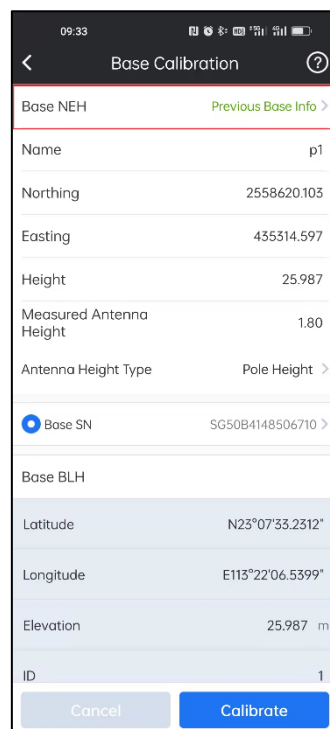
Longitude E113°22'06.5399"

Elevation 25.987 m

ID 1

Cancel Calibrate

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



09:33

Base Calibration

Base NEH [Previous Base Info >](#)

Name p1

Northing 2558620.103

Easting 435314.597

Height 25.987

Measured Antenna Height 1.80

Antenna Height Type Pole Height >

Base SN SG50B4148506710 >

Base BLH

Latitude N23°07'33.2312"

Longitude E113°22'06.5399"

Elevation 25.987 m

ID 1

Cancel Calibrate



09:33

Historical base station

Total 28 Page 1/1

id	Longitude	Latitude	Elevation	North
0	E113°11'56.7508"	E23°18'45.5324"	10.019	2579388.7
1	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
1	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
1	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
0	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
1	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
1	E112°59'58.2000"	E22°59'58.2000"	30.500	2544832.1
1	E112°59'58.2000"	E22°59'58.2000"	30.500	2544832.1
1	E112°59'58.2000"	E22°59'58.2000"	30.500	2544832.1
1	E112°59'58.2000"	E22°59'58.2000"	30.500	2544832.1
1	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
0	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
1	E113°22'06.5399"	E23°07'33.2312"	25.987	2558620.103
0	E113°25'00.3595"	E23°10'52.9945"	46.576	2564745.0
1	E112°59'58.2000"	E22°59'58.2000"	30.500	2544832.1

BACK Choose

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

The screenshot shows the 'Base Calibration' app interface. At the top, the time is 09:33. The title bar reads 'Base Calibration' with a back arrow on the left and a help icon on the right. Below the title bar, there are two main sections: 'Base NEH' and 'Base BLH'. The 'Base NEH' section is currently selected and shows the following data: Name: p1, Northing: 564766.380, Easting: 40312.183, Height: 56.950, Measured Antenna Height: 1.80, and Antenna Height Type: Pole Height. A green link 'Previous Base Info >' is visible next to the 'Base NEH' header. Below this, the 'Base SN' section is selected with a blue radio button, showing the value SG50B4148506710. The 'Base BLH' section is visible below but not selected, showing Latitude: N23°07'33.2312", Longitude: E113°22'06.5399", Elevation: 25.987 m, and ID: 1. At the bottom, there are two buttons: 'Cancel' and 'Calibrate'.

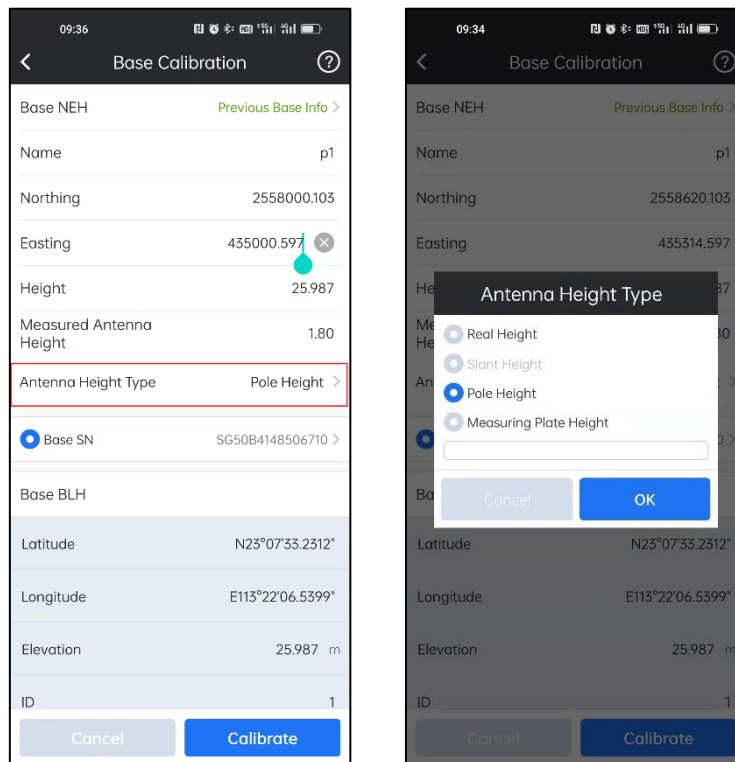
Field	Value
Name	p1
Northing	564766.380
Easting	40312.183
Height	56.950
Measured Antenna Height	1.80
Antenna Height Type	Pole Height
Base SN	SG50B4148506710
Latitude	N23°07'33.2312"
Longitude	E113°22'06.5399"
Elevation	25.987 m
ID	1

4. Also we can input base information manually.

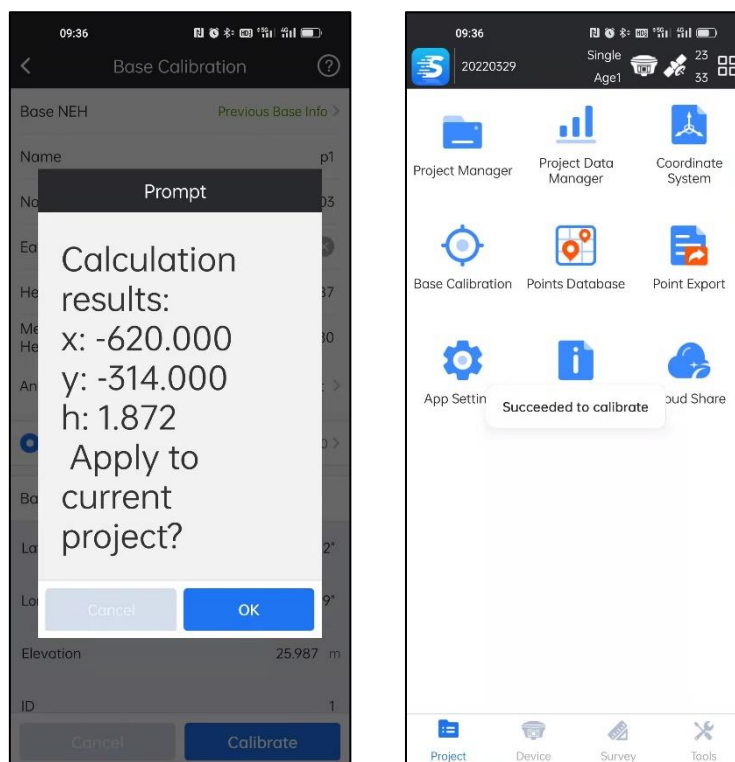
The screenshot shows the 'Base Calibration' app interface, similar to the previous one, but with manual input for the 'Base NEH' section. The 'Base NEH' section is highlighted with a red box. The data shown is: Name: p1, Northing: 2558000.103, Easting: 435000.597, and Height: 25.987. The 'Easting' field has a small 'x' icon next to it, indicating it is a text input field. The 'Base SN' section is still selected with a blue radio button, showing the value SG50B4148506710. The 'Base BLH' section is visible below but not selected, showing Latitude: N23°07'33.2312", Longitude: E113°22'06.5399", Elevation: 25.987 m, and ID: 1. At the bottom, there are two buttons: 'Cancel' and 'Calibrate'.

Field	Value
Name	p1
Northing	2558000.103
Easting	435000.597
Height	25.987
Measured Antenna Height	1.80
Antenna Height Type	Pole Height
Base SN	SG50B4148506710
Latitude	N23°07'33.2312"
Longitude	E113°22'06.5399"
Elevation	25.987 m
ID	1

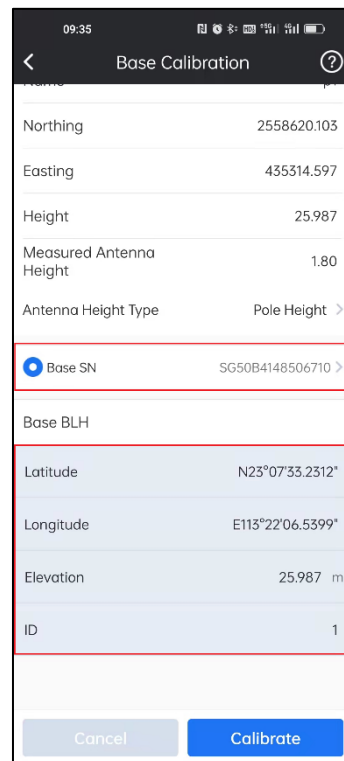
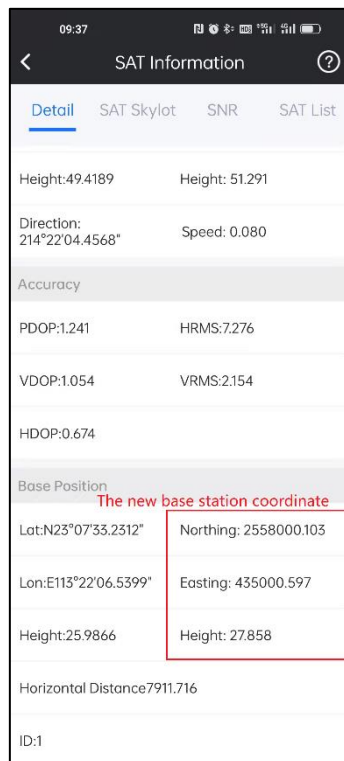
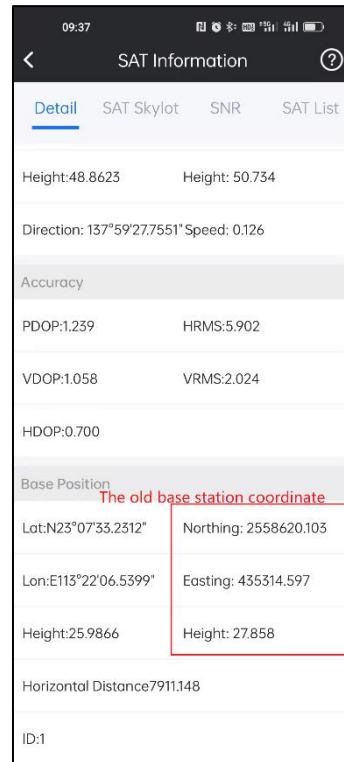
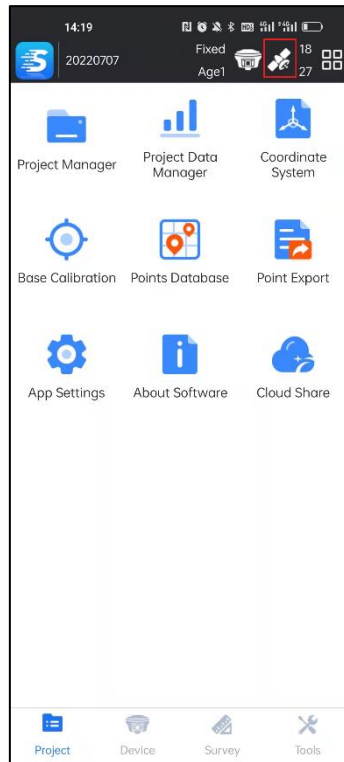
5. Then we can select right antenna type and input relevant antenna height.



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



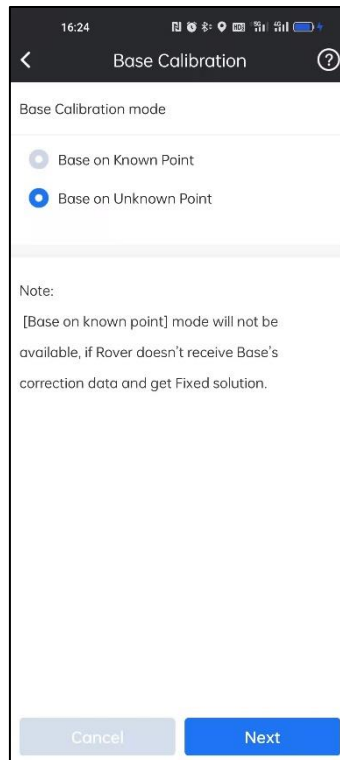
7. And then in SurvStar, we can go to SAT Information, find the base position has been changed.



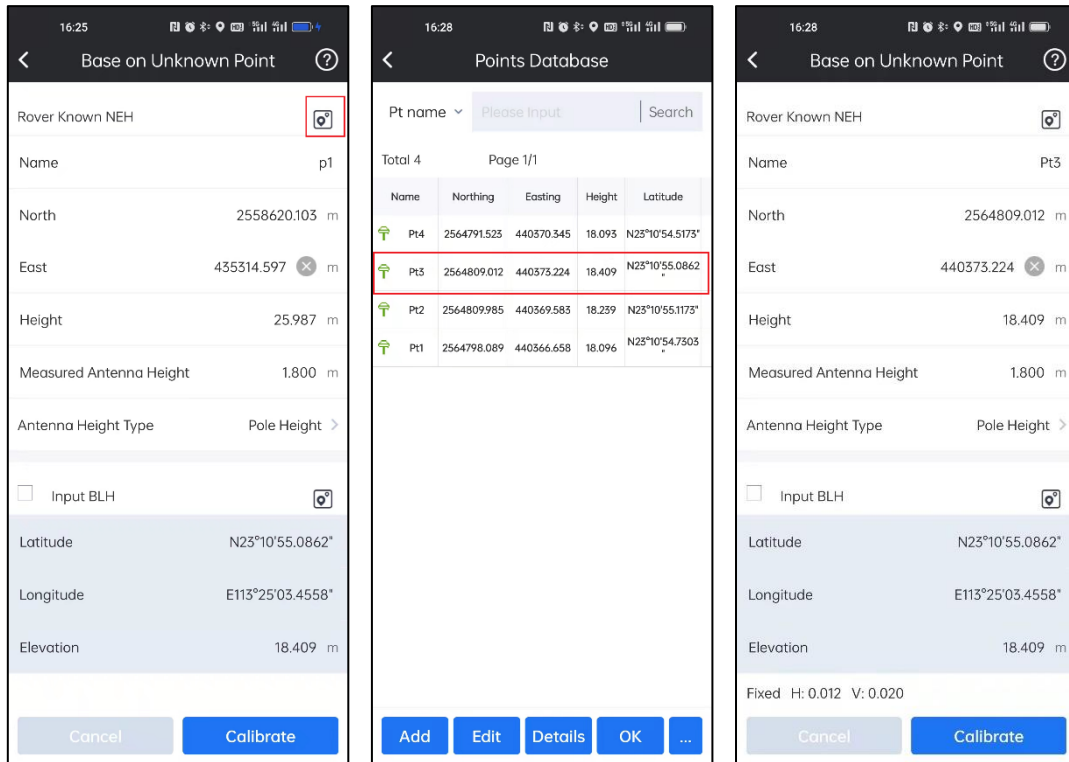
### Base on Unknown Point:

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

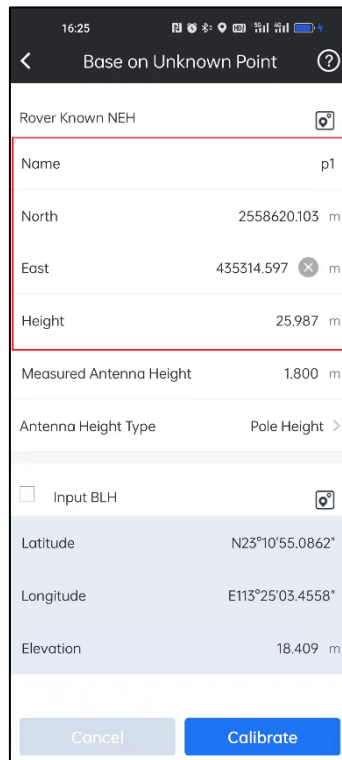
Choose **Base on Unknown Point**. And Click **Next**.



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



Or we can input NEH information manually.



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

16:29

Base on Unknown Point

Rover Known NEH

Name Pt3

North 2564809.012 m

East 440373.224 m

Height 18.409 m

Measured Antenna Height 1.800 m

Antenna Height Type Pole Height >

Input BLH

Latitude N23°10'55.0862"

Longitude E113°25'03.4558"

Elevation 18.409 m

Fixed H: 0.014 V: 0.021

Read From GPS(average count)

Cancel Calibrate

16:30

Base on Unknown Point

Rover Known NEH

Name Pt3

North 2564809.012 m

East 440373.224 m

Height 18.409 m

Measured Antenna Height 1.800 m

Antenna Height Type Pole Height >

Input BLH

Latitude N23°10'55.0862"

Longitude E113°25'03.4558"

Elevation 18.409 m

Fixed H: 0.014 V: 0.022

Cancel Calibrate

**Antenna Height Type**

Real Height

Slant Height

Pole Height

Measuring Plate Height

Cancel OK

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 SurvStar will collect current position's BLH for 5 times and take the average value.*

16:29

Base on Unknown Point

Rover Known NEH

Name Pt3

North 2564809.012 m

East 440373.224 m

Height 18.409 m

Measured Antenna Height 1.800 m

Antenna Height Type Pole Height >

Input BLH

Latitude N23°10'55.0862"

Longitude E113°25'03.4558"

Elevation 18.409 m

Fixed H: 0.014 V: 0.021

Read From GPS(average count)

Cancel Calibrate

16:29

Base on Unknown Point

Rover Known NEH

Name Pt3

North 2564809.012 m

East 440373.224 m

Height 18.409 m

Measured Antenna Height 1.800 m

Antenna Heig 2/5, Collecting... Pole Height >

Input BLH

Latitude N23°10'55.0862"

Longitude E113°25'03.4558"

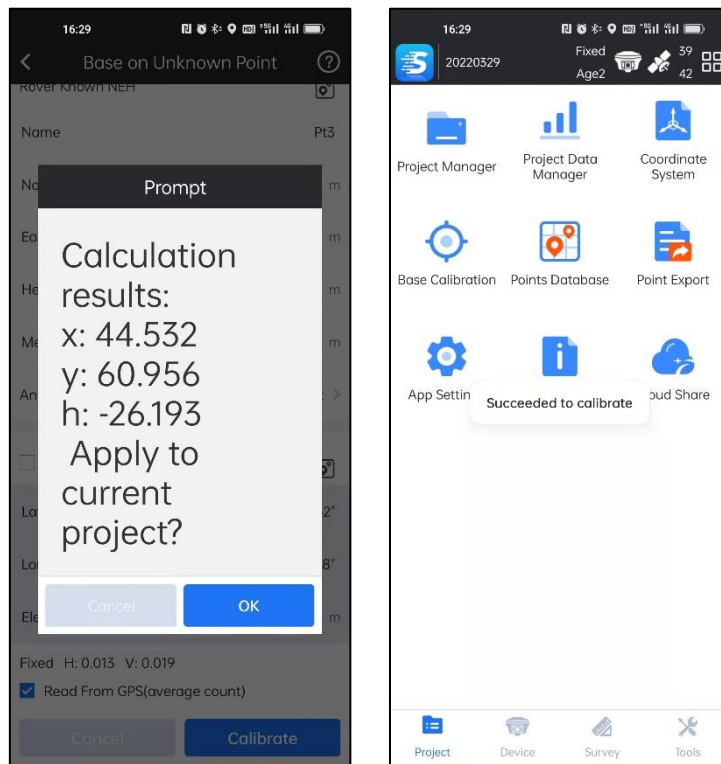
Elevation 18.409 m

Fixed H: 0.014 V: 0.018

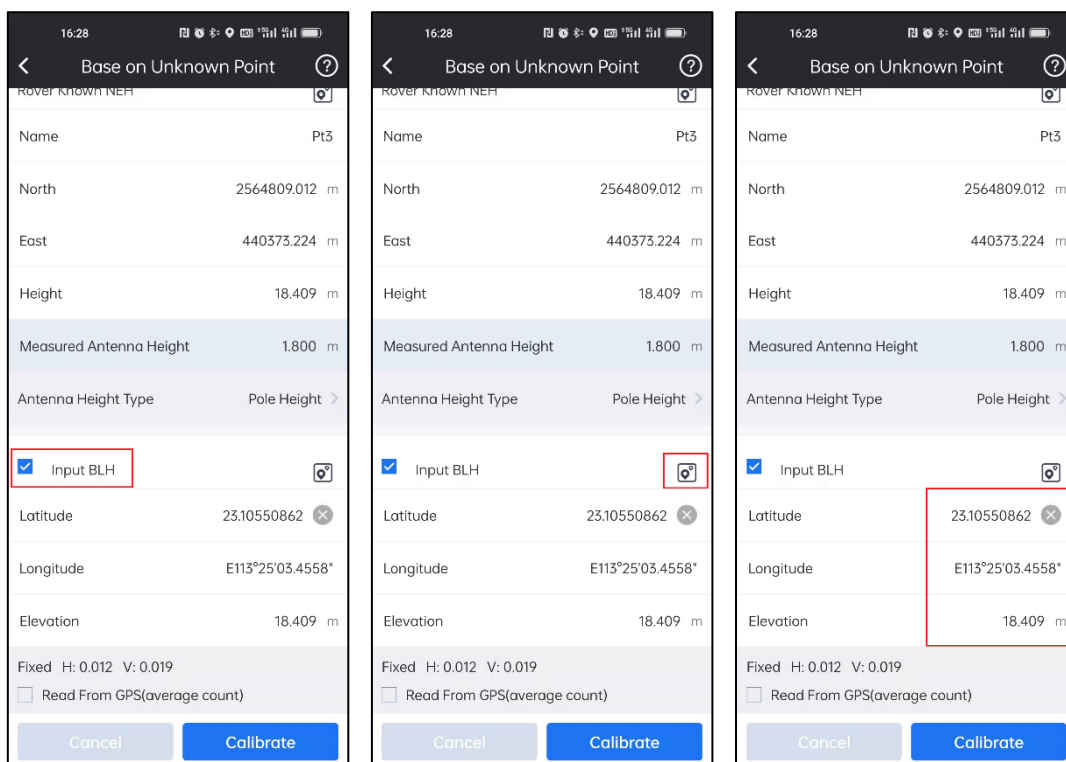
Read From GPS(average count)

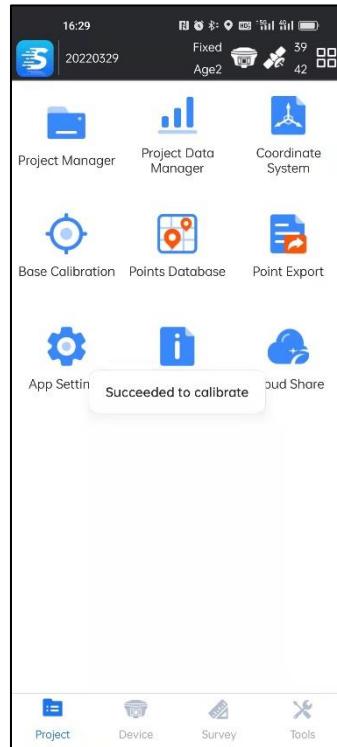
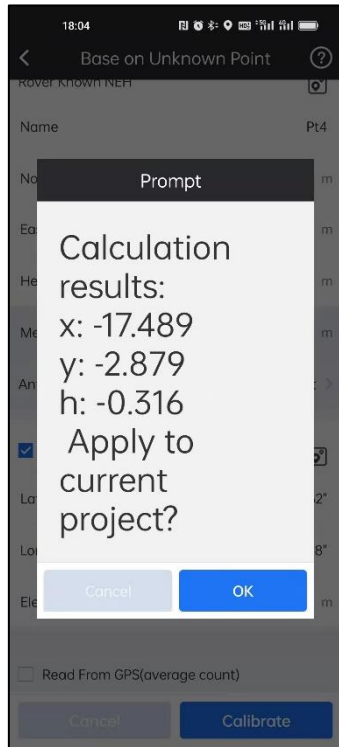
Cancel Calibrate

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

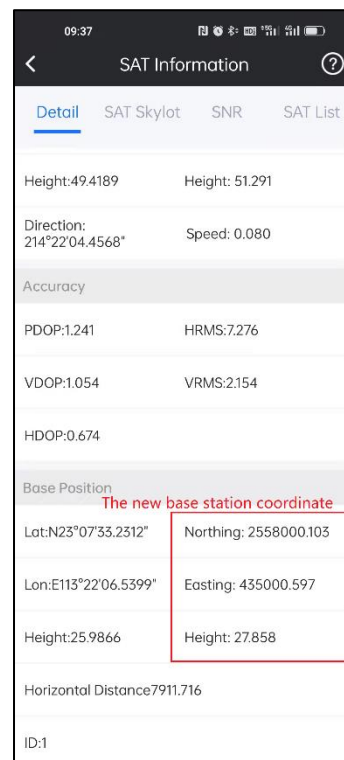
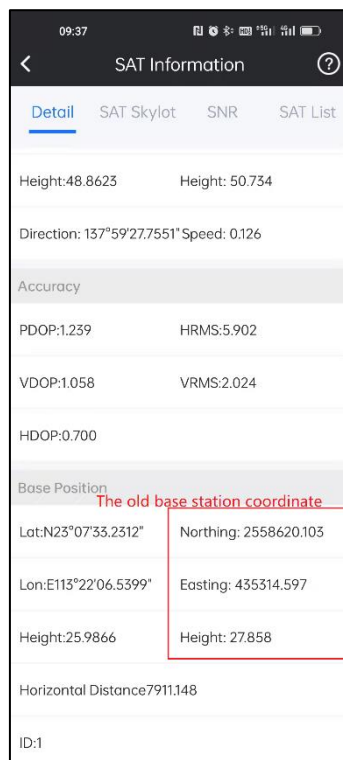
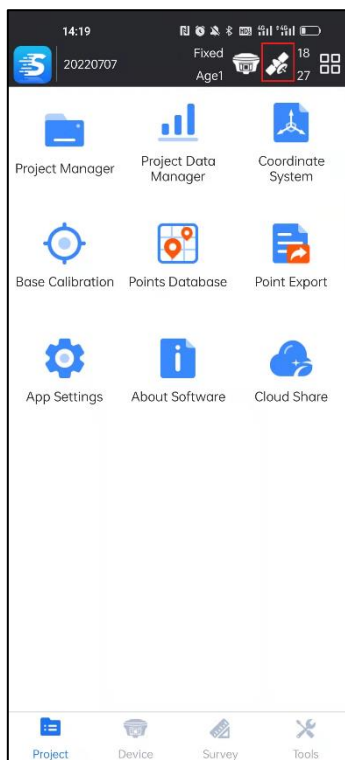


*Note: if we enable Input BLH here, we can input current BLH manually or get it from Point Database directly.*





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



### 3-5 Points Database

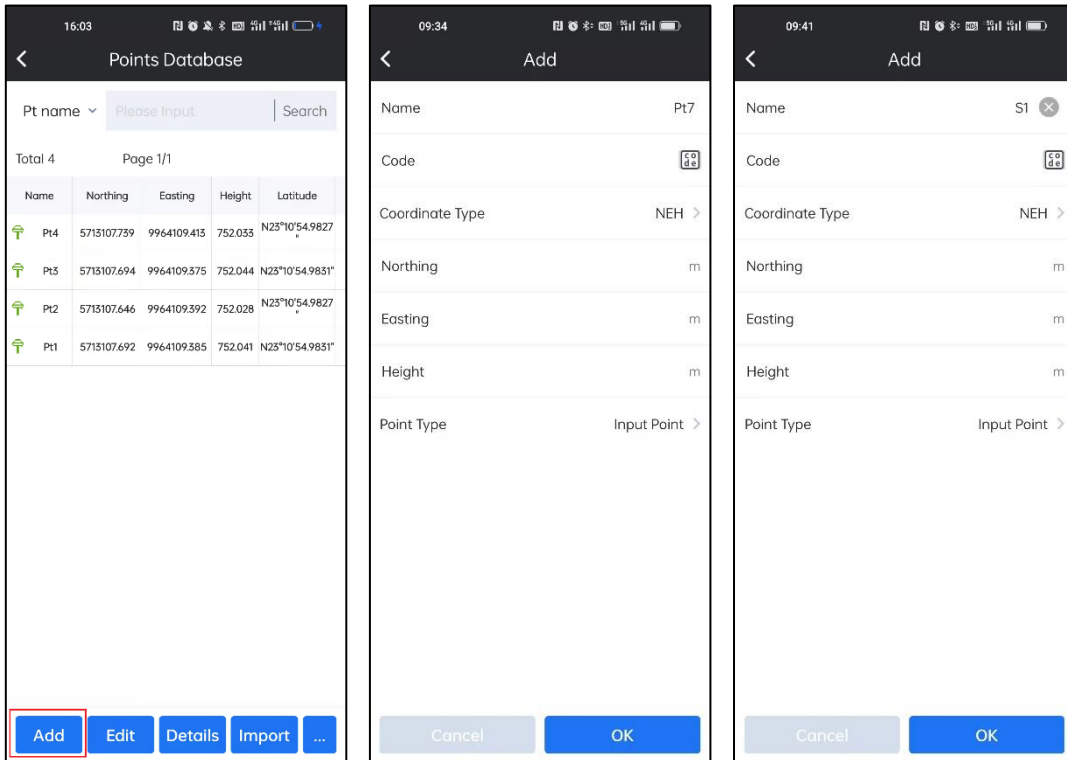
In Points Database, we can manage points by Add, Edit, Check Details, Import and other operations.



## Add:

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

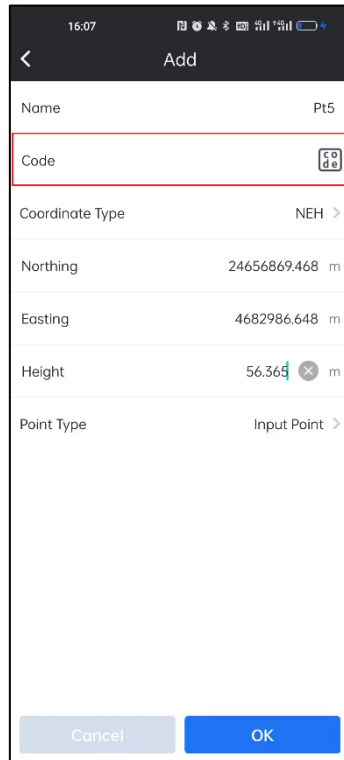
Firstly, we need to define the Point Name.



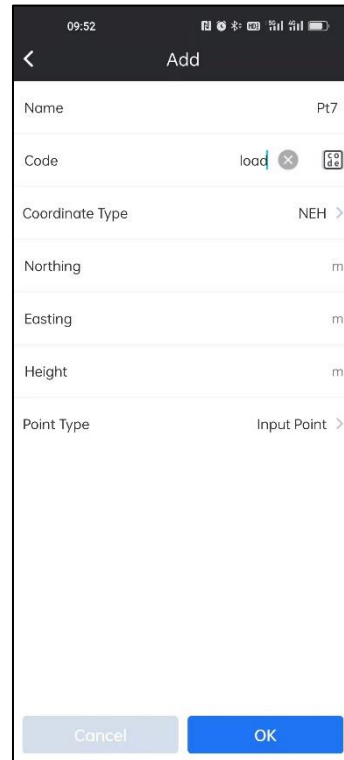
Then the Code:

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.

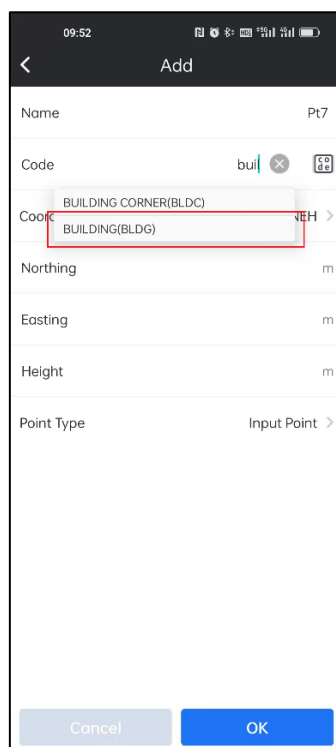


A screenshot of a mobile application's 'Add' form for a point named 'Pt5'. The form includes fields for Name, Code, Coordinate Type (NEH), Northing (24656869.468 m), Easting (4682986.648 m), Height (56.365 m), and Point Type (Input Point). The 'Code' field is highlighted with a red rectangle and contains a small icon.

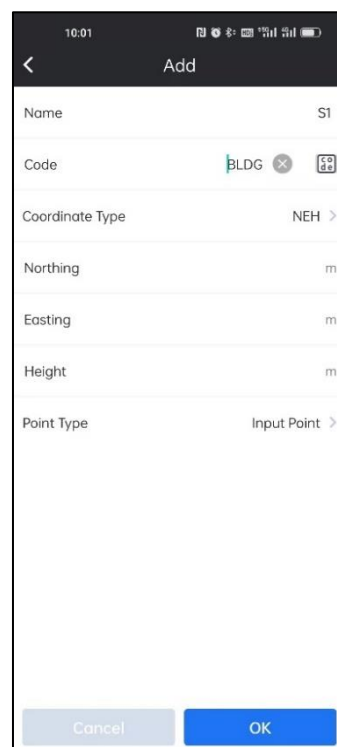


A screenshot of a mobile application's 'Add' form for a point named 'Pt7'. The form includes fields for Name, Code (containing 'load'), Coordinate Type (NEH), Northing (m), Easting (m), Height (m), and Point Type (Input Point). The 'Code' field has a small icon and a close button.

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

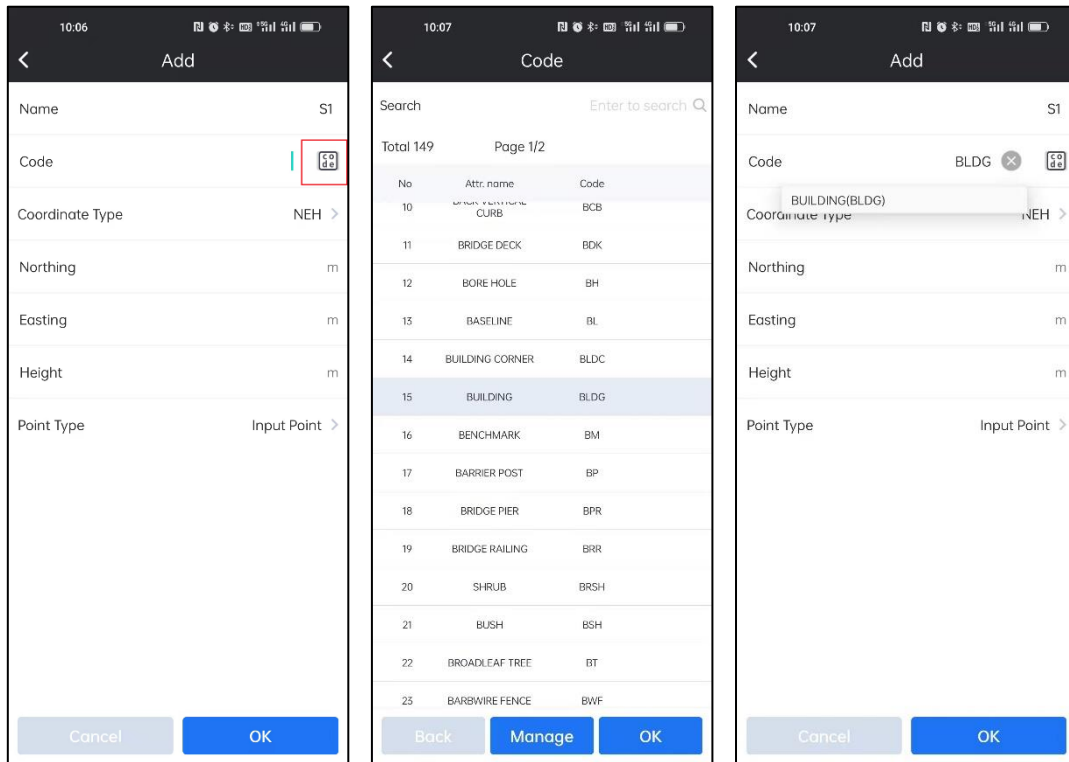


A screenshot of a mobile application's 'Add' form for a point named 'Pt7'. The form includes fields for Name, Code (containing 'buil'), Coordinate Type (NEH), Northing (m), Easting (m), Height (m), and Point Type (Input Point). A search dropdown menu is open over the 'Code' field, showing two options: 'BUILDING CORNER(BLDC)' and 'BUILDING(BLDG)'. The second option is highlighted with a red rectangle.

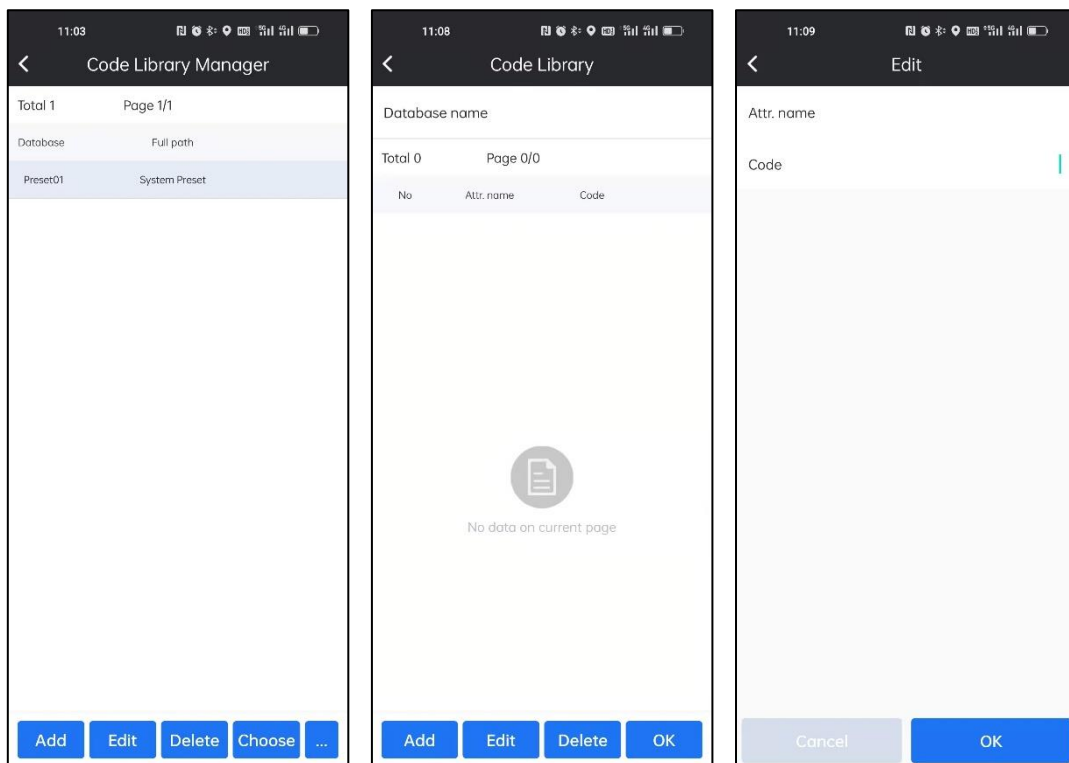


A screenshot of a mobile application's 'Add' form for a point named 'S1'. The form includes fields for Name, Code (containing 'BLDG'), Coordinate Type (NEH), Northing (m), Easting (m), Height (m), and Point Type (Input Point). The 'Code' field has a small icon and a close button.

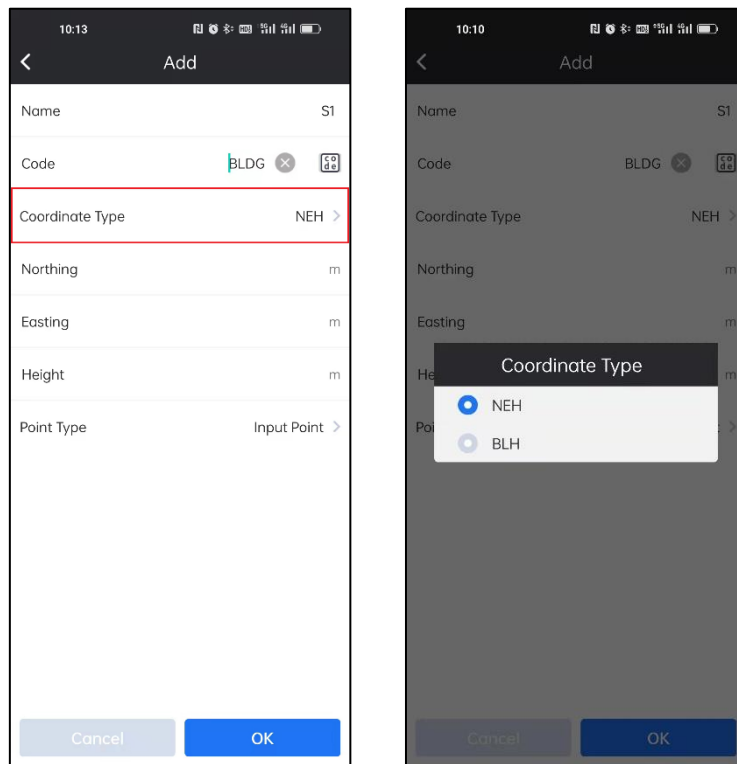
If we want to check the predefined code data base, we can click the icon to access.



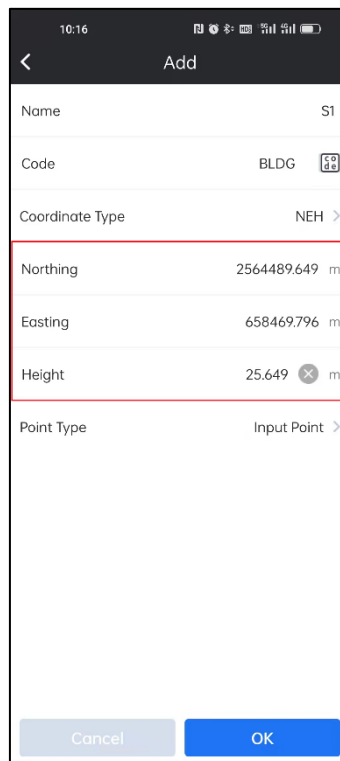
In **Manage**. We can manage the code database. It includes Add, Edit, Delete, Choose and Import. Click **Add** to add a code library. We can create the code we need.



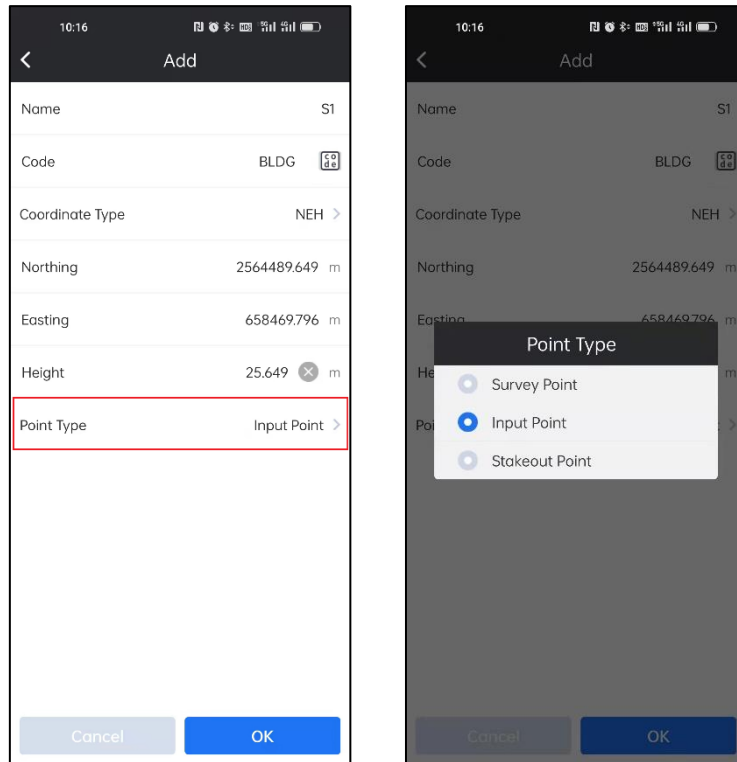
Then we need to choose the Coordinate Type. There are two types: NEH and BLH.



Then we can input the coordinate of the point.



Then choose the point Type. There are three types: Input Point, Survey Point and Stakeout Point.



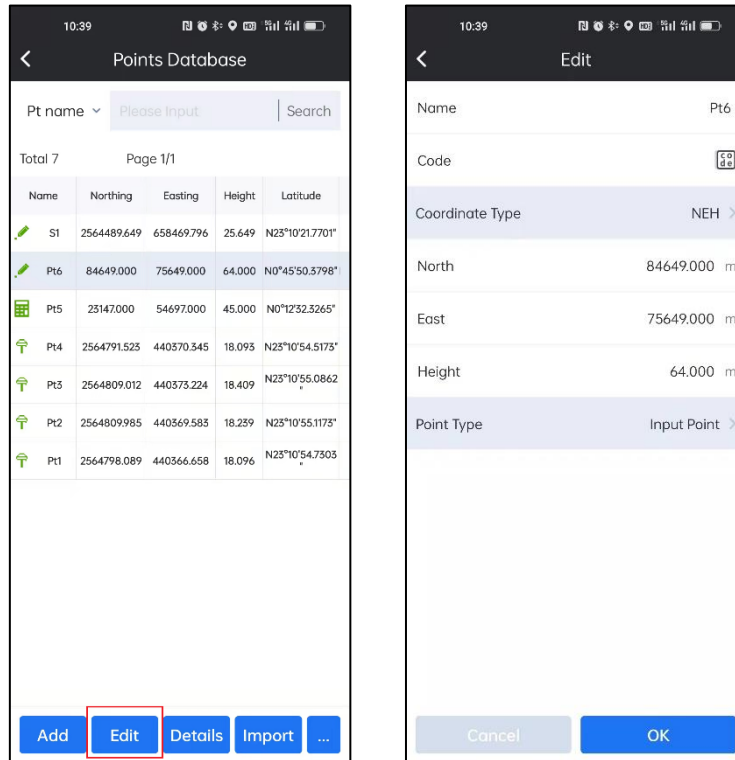
Click **OK**. The new point is created in point database.

The 'Points Database' screen displays a table with the following data:

Name	Northing	Easting	Height	Latitude
S1	2564489.649	658469.796	25.649	N23°10'21.7701"
Pt6	84649.000	75649.000	64.000	N0°45'50.3798"
Pt5	23147.000	54697.000	45.000	N0°12'32.3265"
Pt4	2564791.525	440570.345	18.093	N25°10'54.5173"
Pt3	2564809.012	440373.224	18.409	N23°10'55.0862"
Pt2	2564809.985	440369.583	18.239	N23°10'55.1173"
Pt1	2564798.089	440366.658	18.096	N23°10'54.7303"

## Edit:

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



*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 **Details**. We can check the details of the selected point.

09:34

Points Database

Pt name  Search

Total 6 Page 1/1

Name	Northing	Easting	Height	Latitude
Pt6	84649.000	75649.000	64.000	N0°45'50.3798"
Pt5	25147.000	54697.000	45.000	N0°12'52.3265"
Pt4	2564791.523	440370.345	18.093	N23°10'54.5173"
Pt3	2564809.012	440373.224	18.409	N23°10'55.0862"
Pt2	2564809.985	440369.583	18.239	N23°10'55.1173"
Pt1	2564798.089	440366.658	18.096	N23°10'54.7303"

Add Edit **Details** Import ...

10:45

Detail

Name	S1
Code	BLDG
Northing	2564489.649 m
Easting	658469.796 m
Height	25.649 m
Latitude	N23°10'21.7701"
Longitude	E115°32'51.2893"
Altitude	25.965
Solution	NONE
Coordinate Type	BLH
Local Time	2022-04-25 10:25:59
SD to Base	7967.407 m
HD to Base	7967.320 m

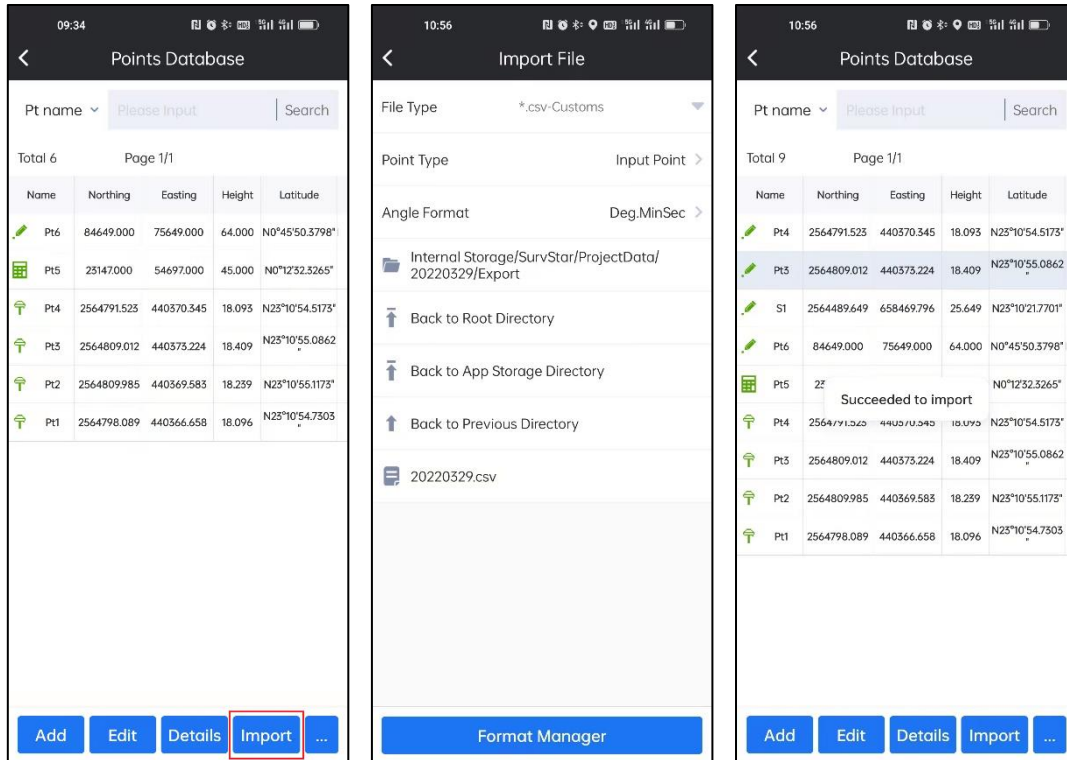
10:45

Detail

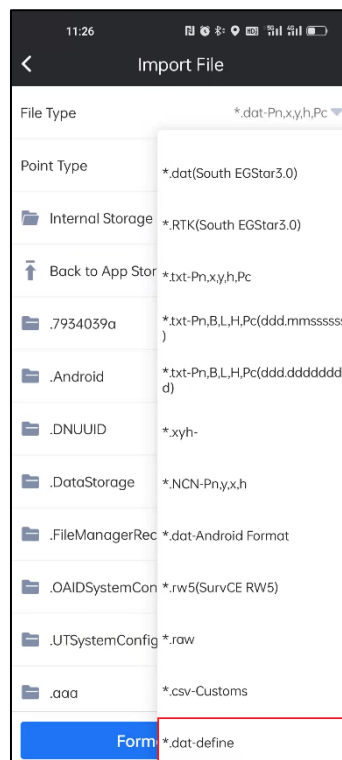
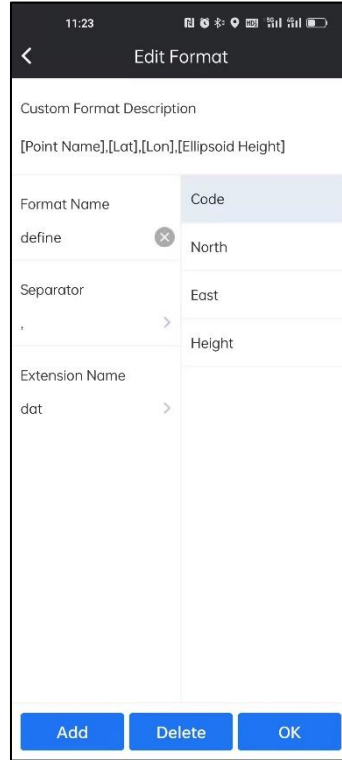
Local Time	2022-04-25 10:25:59
SD to Base	7967.407 m
HD to Base	7967.320 m
HD to Last	2547408.433 m
SD to Last	2547408.433 m
PDOP	0.000
HRMS	0.000
VRMS	0.000
Antenna Height	0.000 m
Antenna Height Type	Slant Height
Record Mode	Input Point
Age	1
Locked SAT	0

## 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.

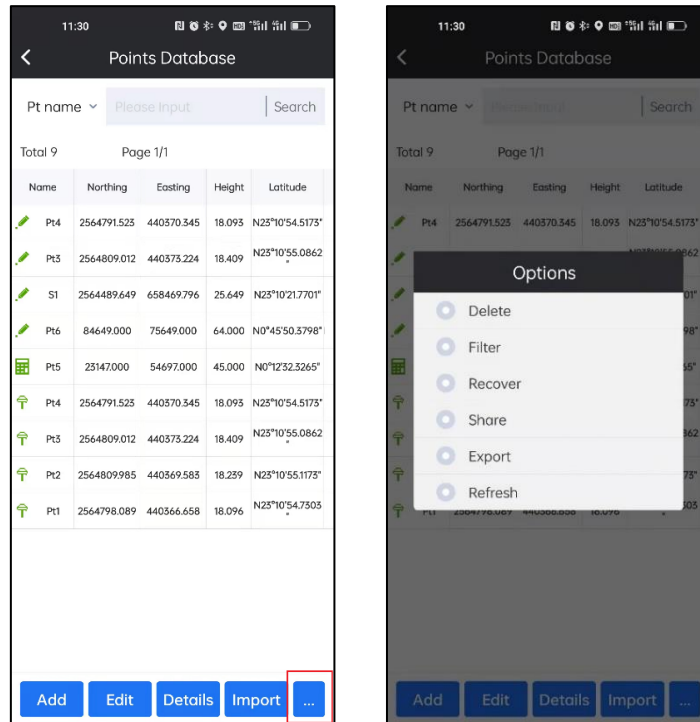


In Format Manager, we can define the imported file's format and contents. Then when we import files to SurvStar, we just need to get the relevant format file, and import it directly.



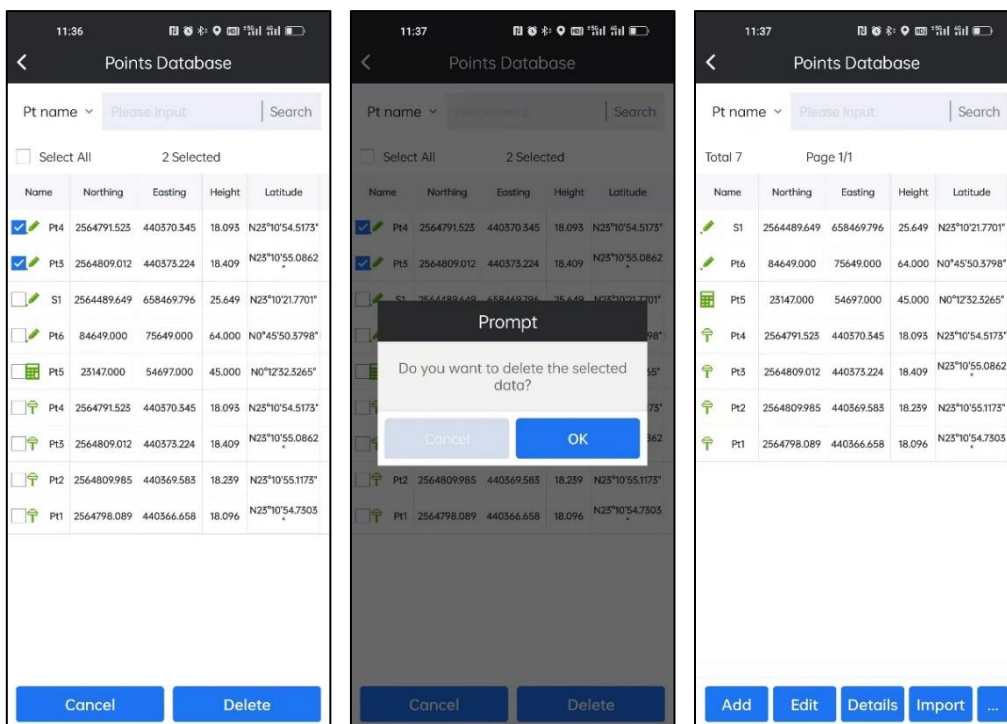
## Options:

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.



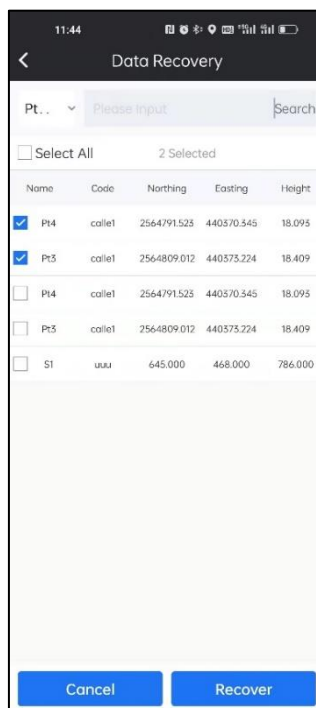
## Filter:

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



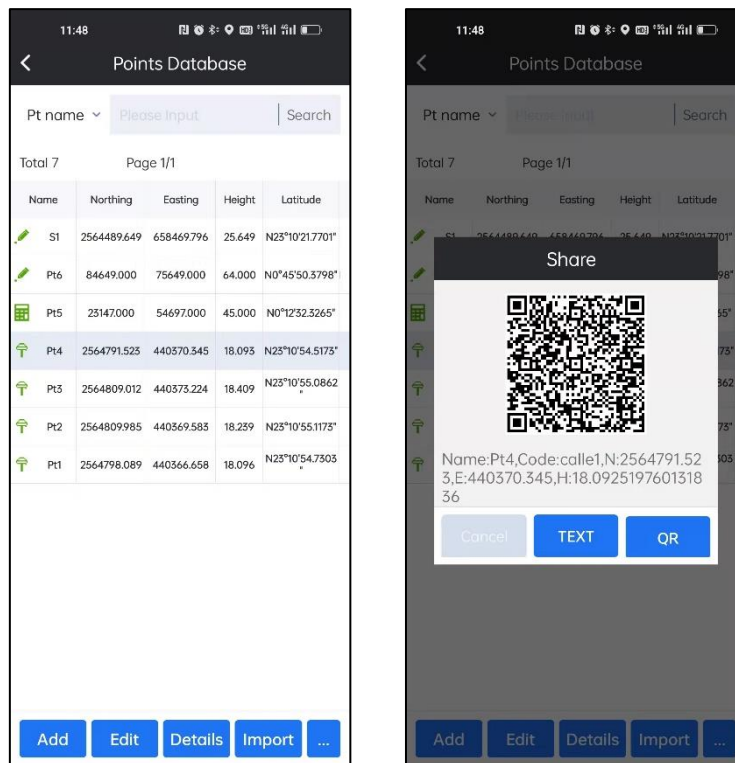
## Recover:

If we delete some points by mistake, we can recover them here.



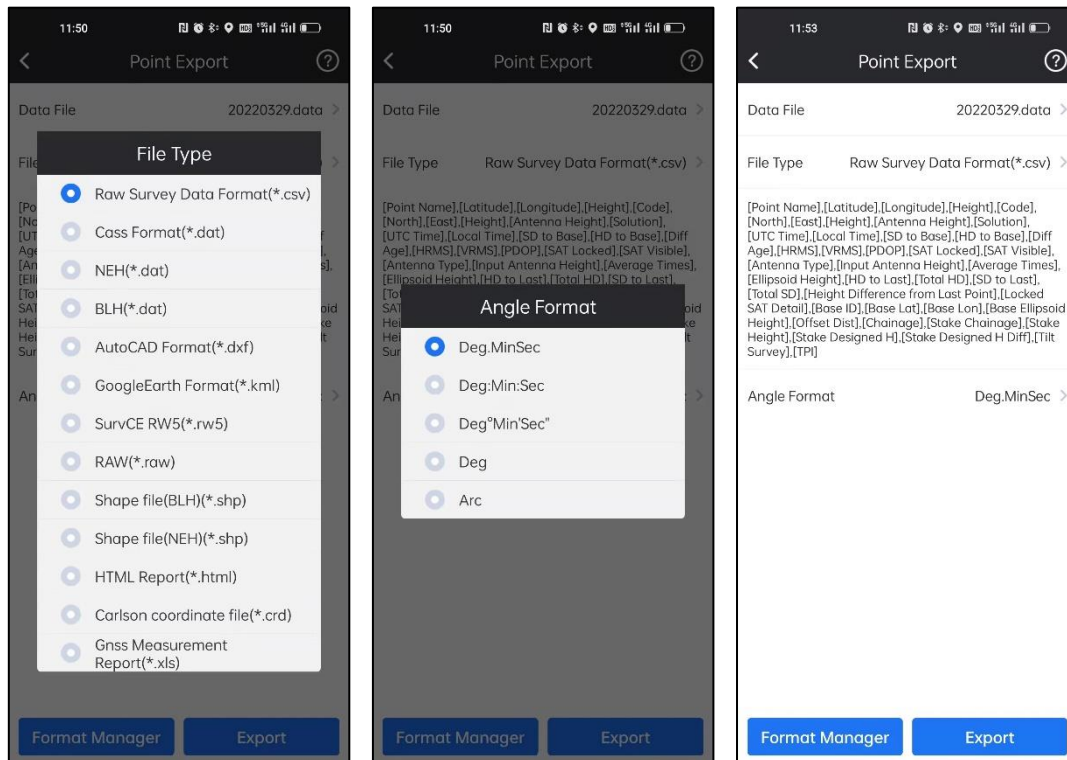
## Share:

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

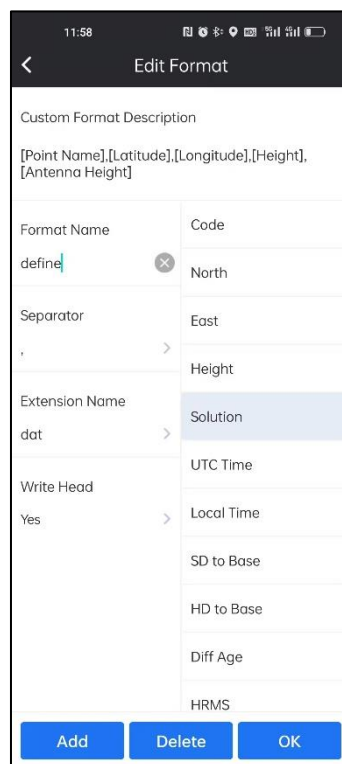
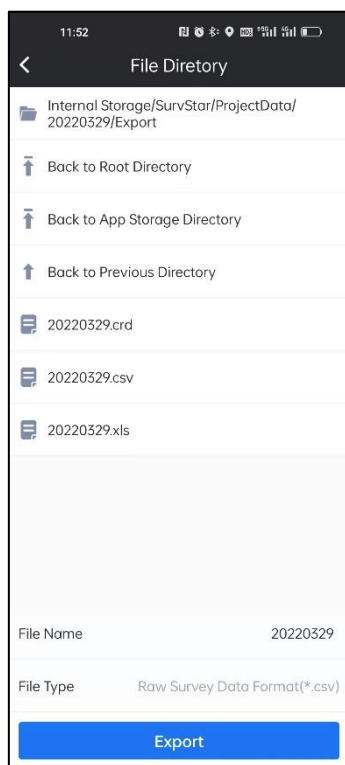


## Export:

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

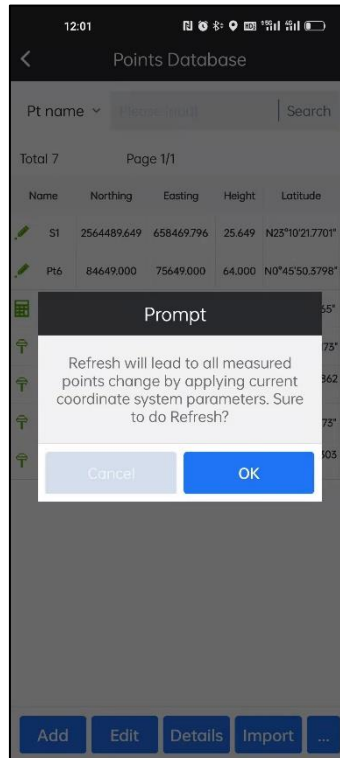


Select the export file path and click **Export**.



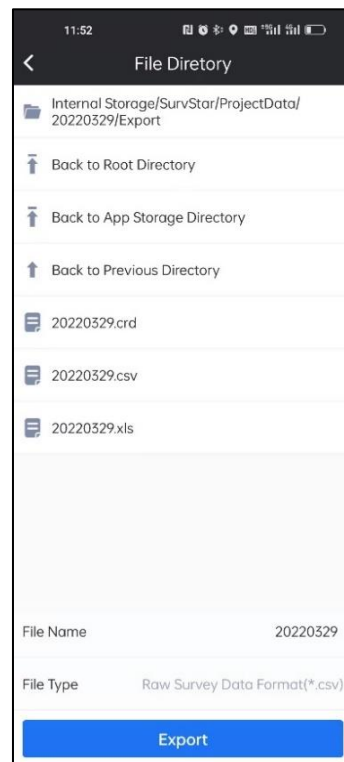
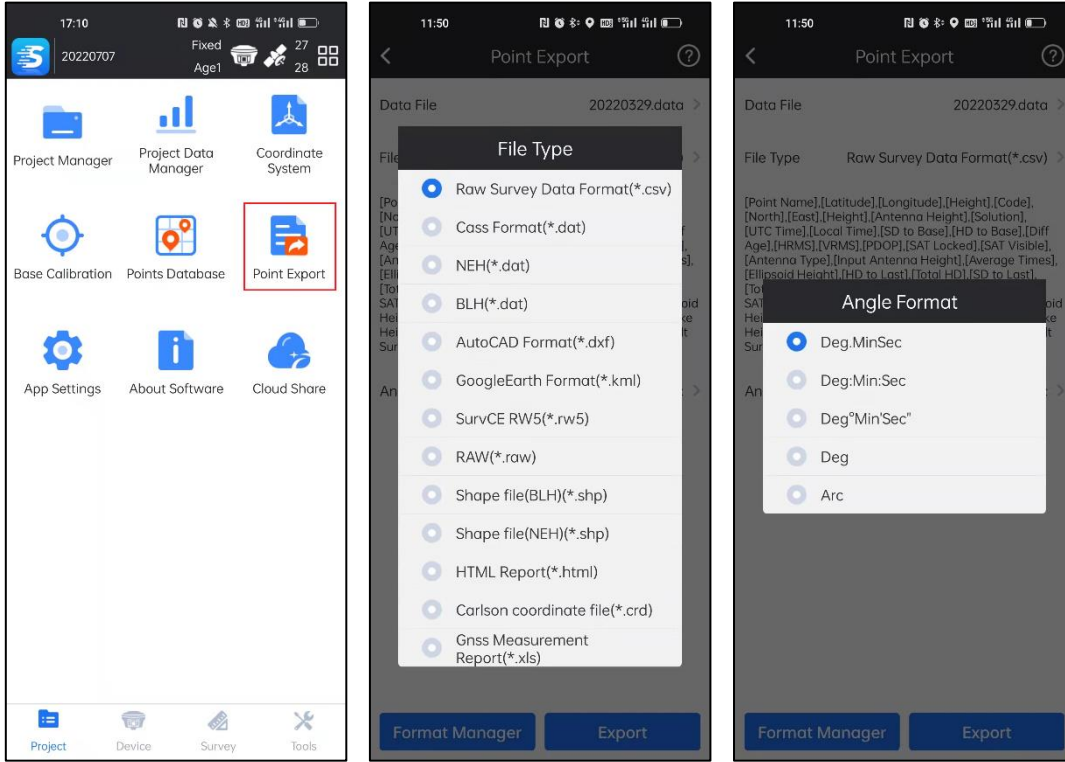
## Refresh:

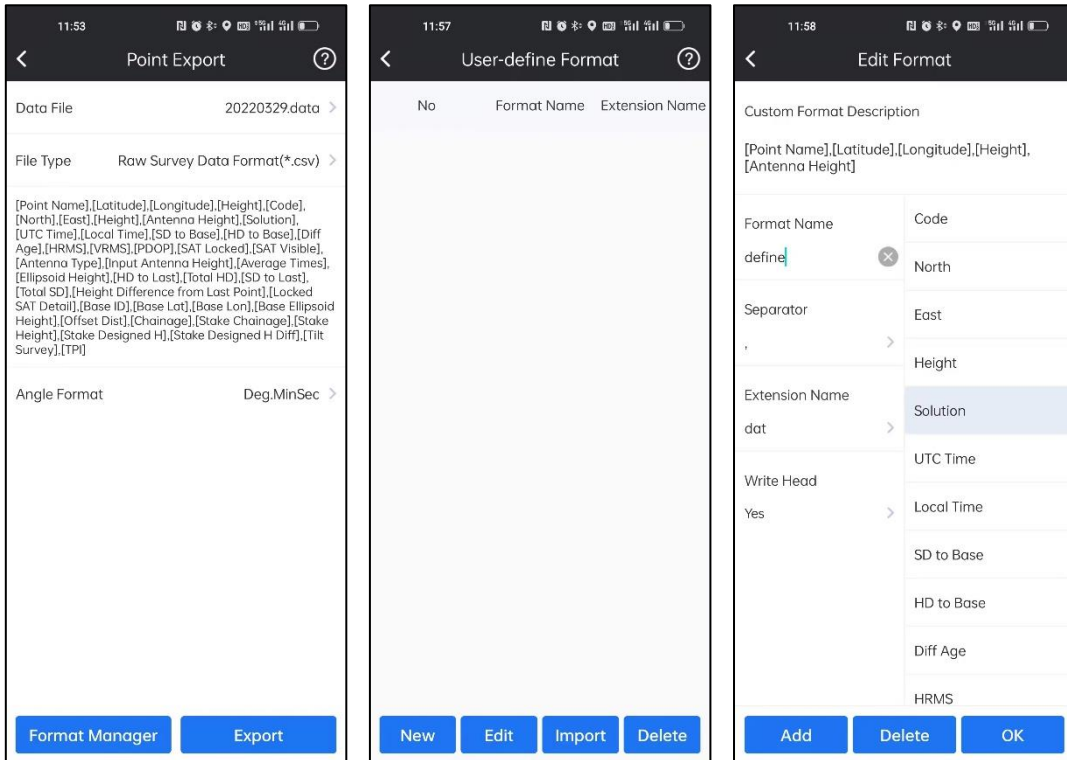
Click **Refresh**, we can apply the new Coordinate system parameters to the points in database.



# 3-6 Point Export

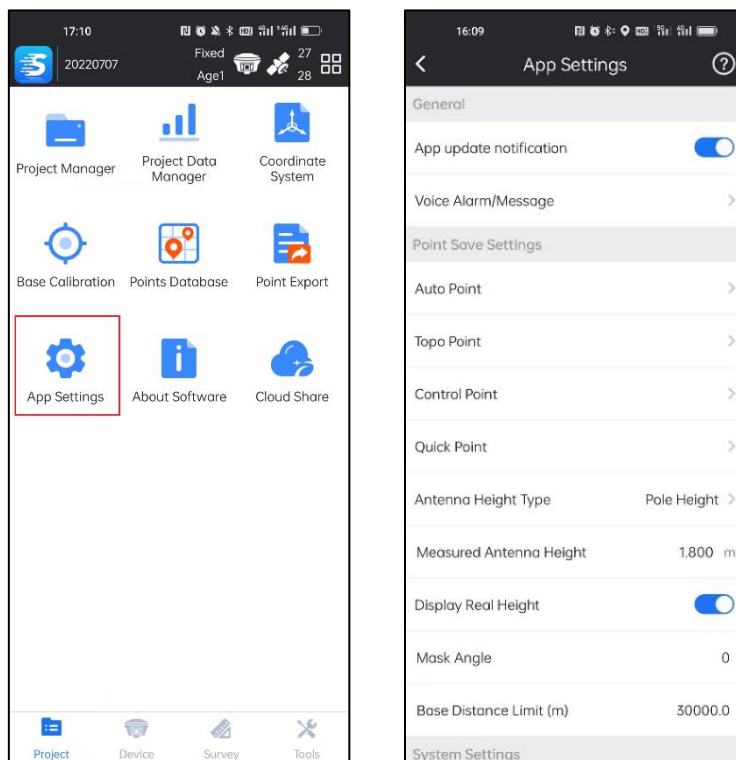
It is the same config as Point Export in Points Database.



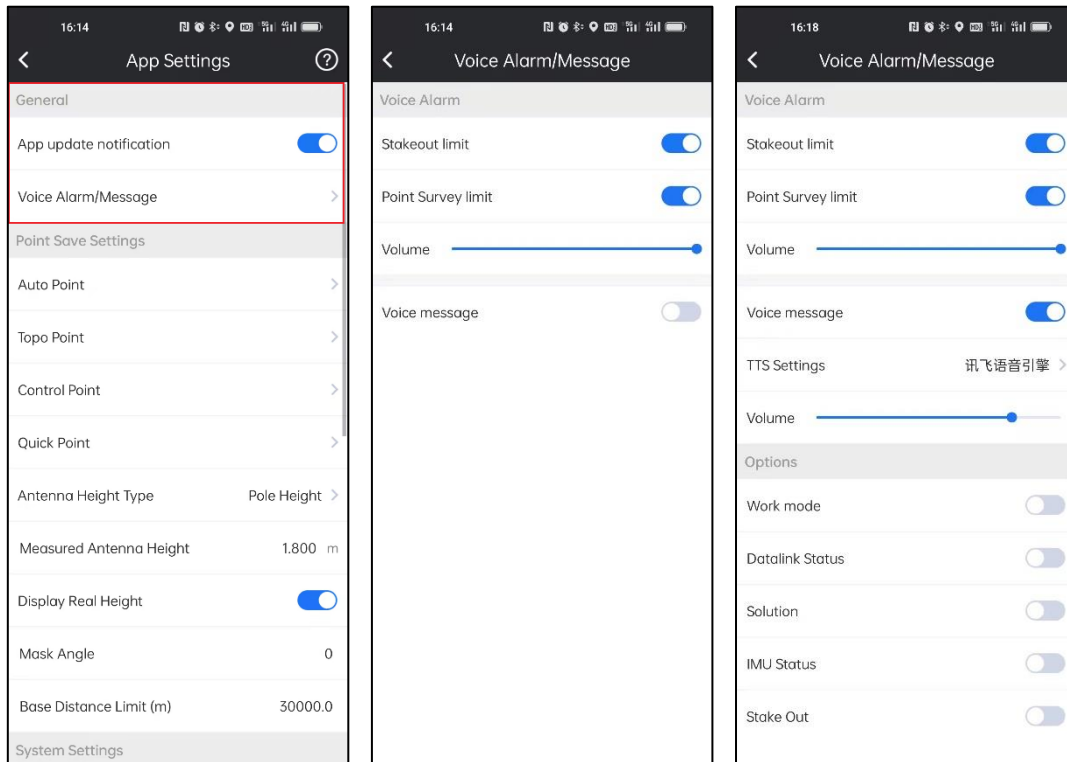


### 3-7 APP Settings

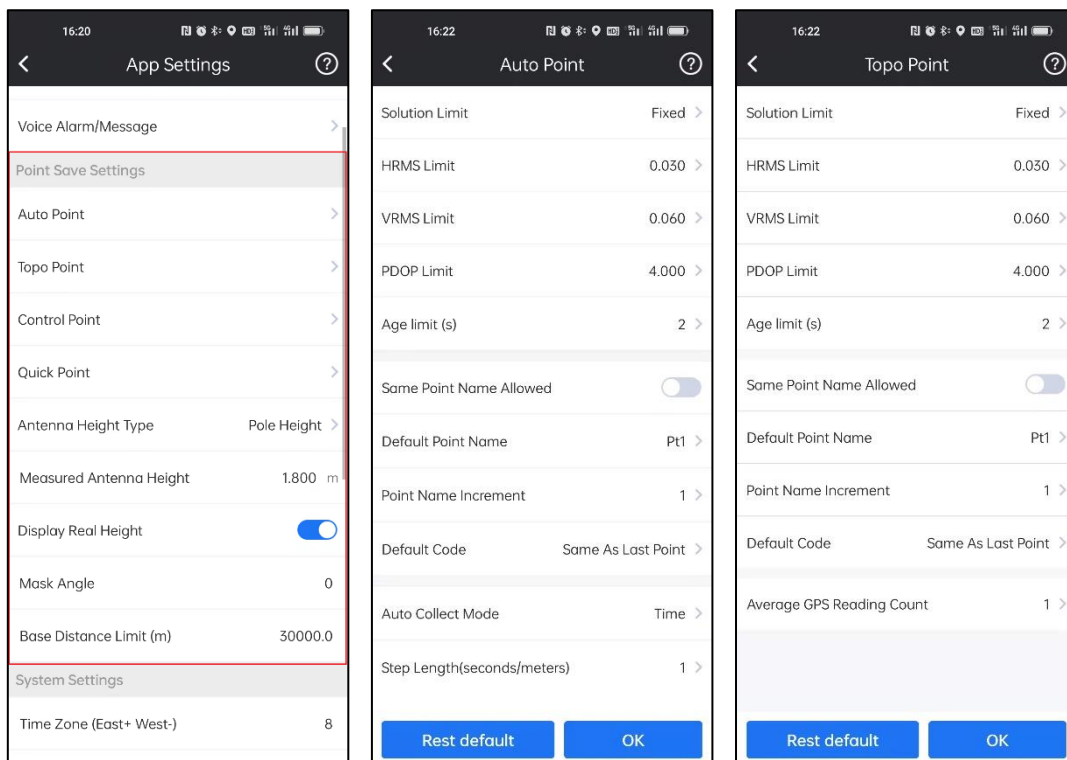
In APP Settings, we can do basic configurations (such as General config, Point Save Settings, System Settings and Display Settings) for SurvStar.

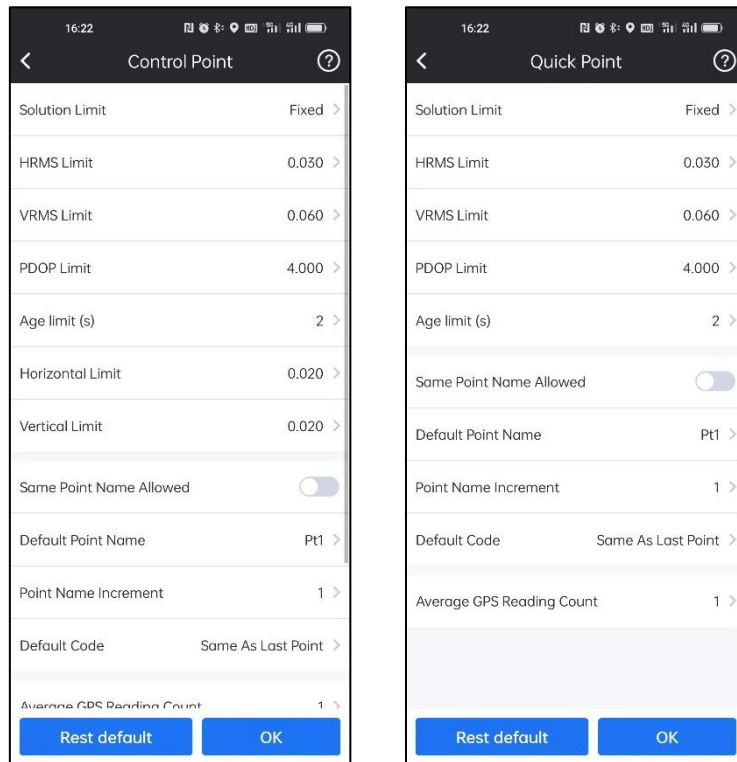


In General Config, we can set App update notification and App Voice Alarm.

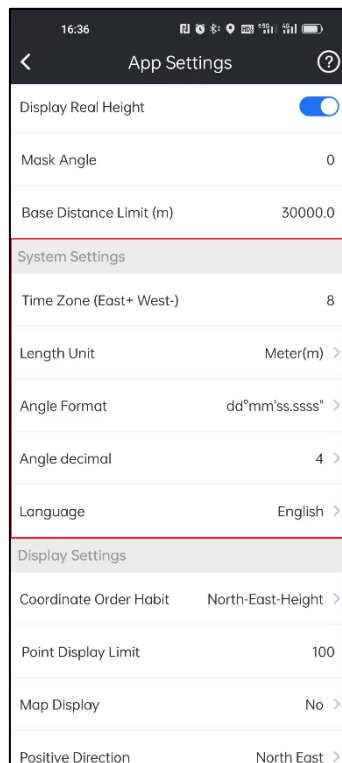


In Point Save Settings, we can set Point collection limits and parameters, Antenna Height, mask angle and so on.



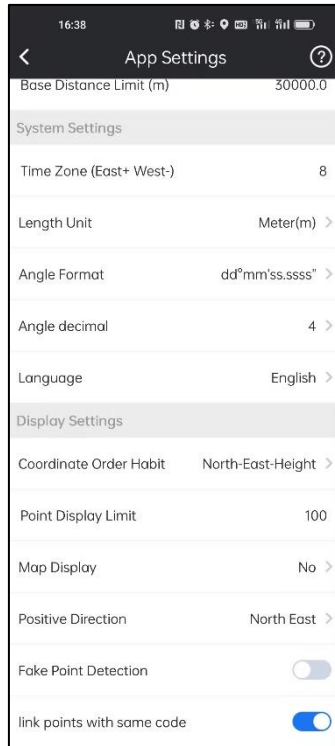


In System Settings, we can set the Time Zone, Length Unit, Angle Format, Angle decimal and Language.



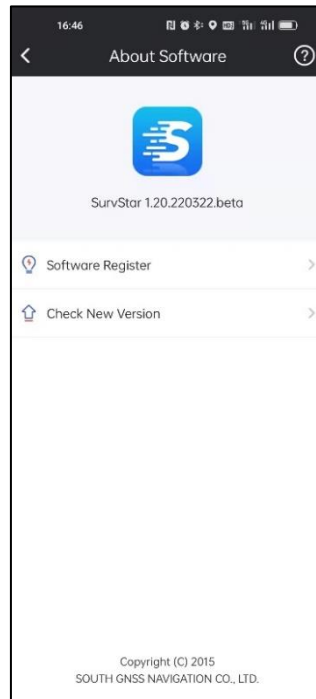
In Display Settings, we can set the Coordinate Order Habit, Point Display Limit, Map Display, Positive Direction. And set Fake Point Detection and link points with same

code on/off.



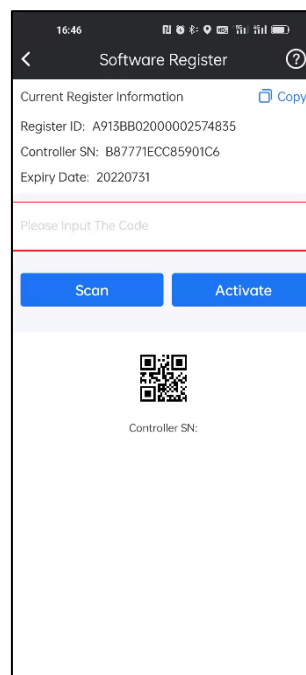
## 3-8 About Software

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

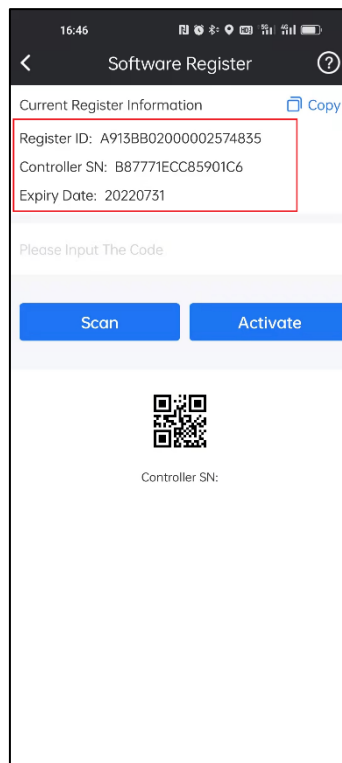


### Software Register:

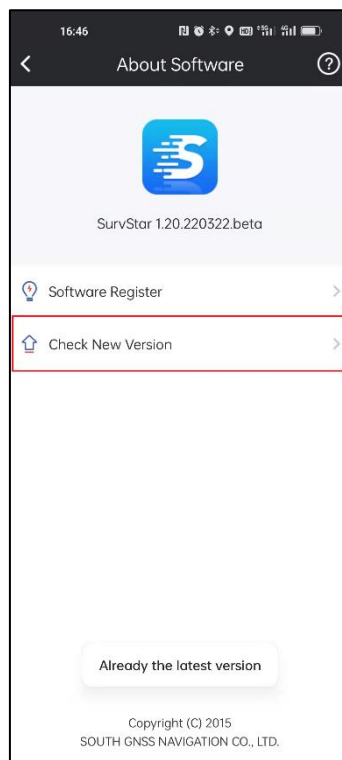
When we get the register code, we can click **Software Register**, input the code in the bar, and click Activate.



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



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

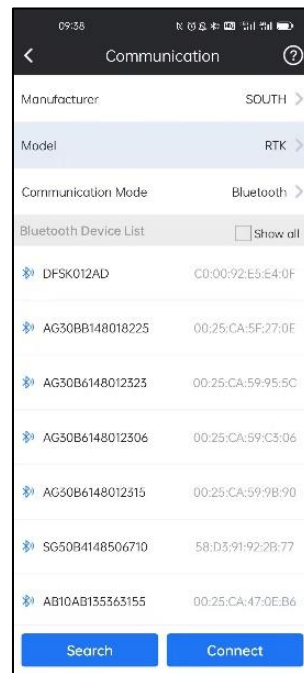
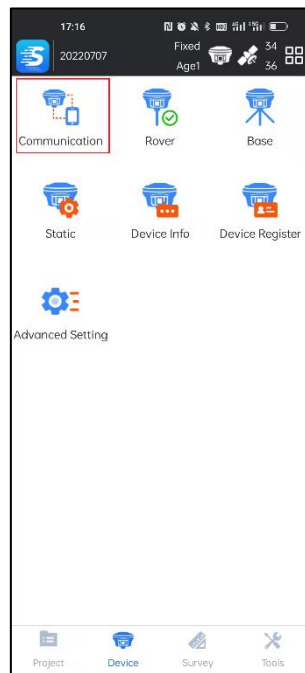


# Chapter 4 Device

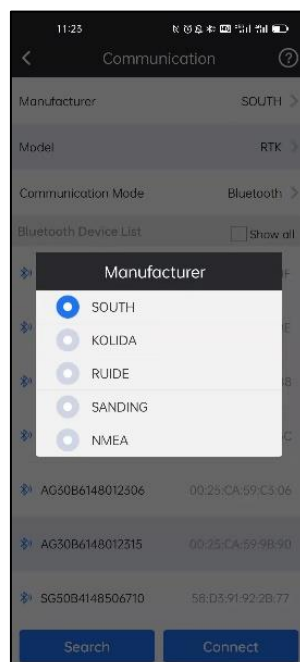
## 4-1 Communication

It is used to connect and communicate with receiver.

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

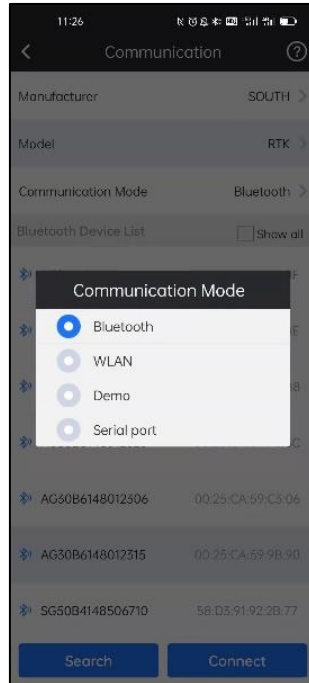


Set the correct Manufacturer.



Select the Communication Mode. There are four kinds of Communication Mode:

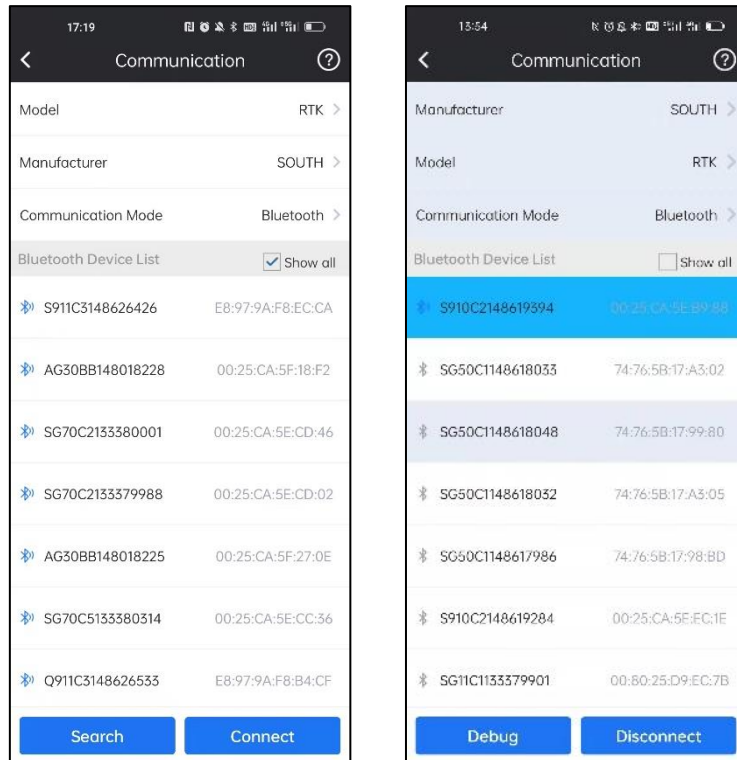
**Bluetooth:** connect receiver by Bluetooth. It is the most common used way to connect the receiver.



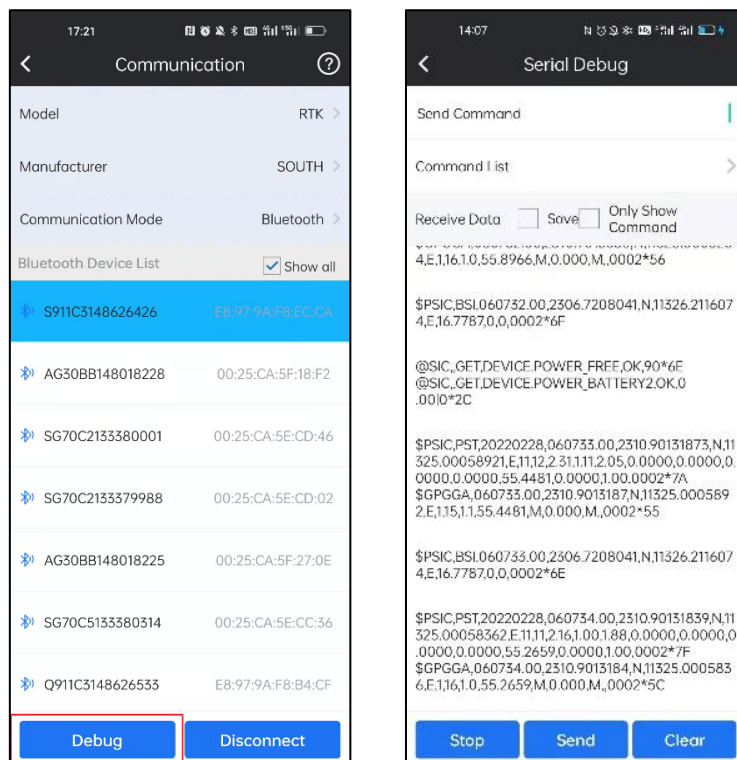
1. Click **Search** to detect the Bluetooth devices around us



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



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

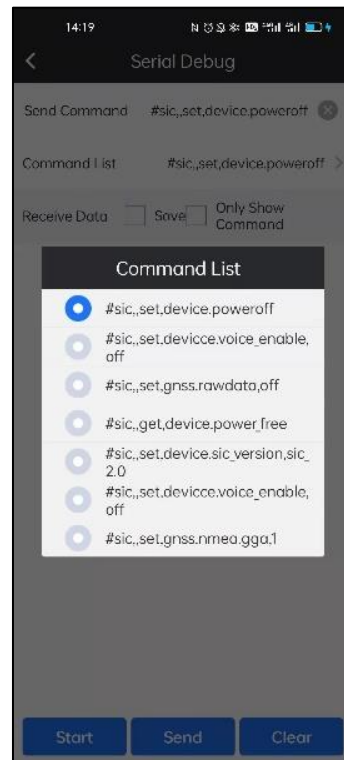
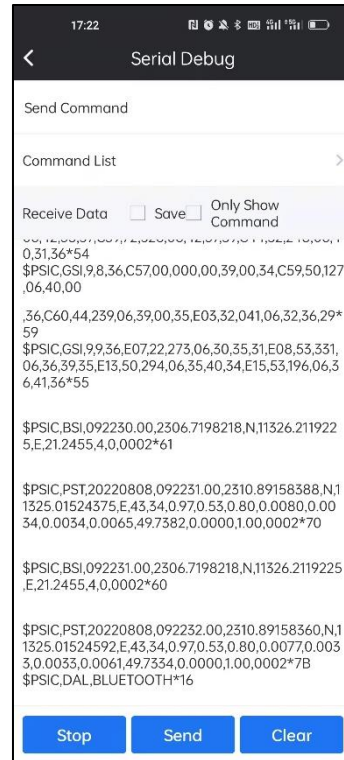


Start\Stop: Start\Stop data stream from the receiver;

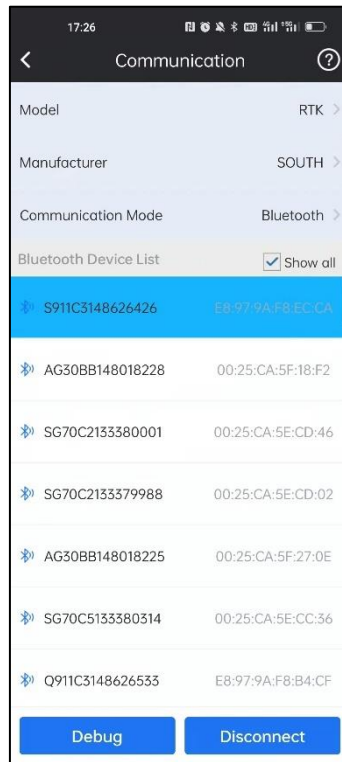
Send: send commands to communicate with receiver;

Clear: Clear contents of the page;

Below are some commonly used commands' list.



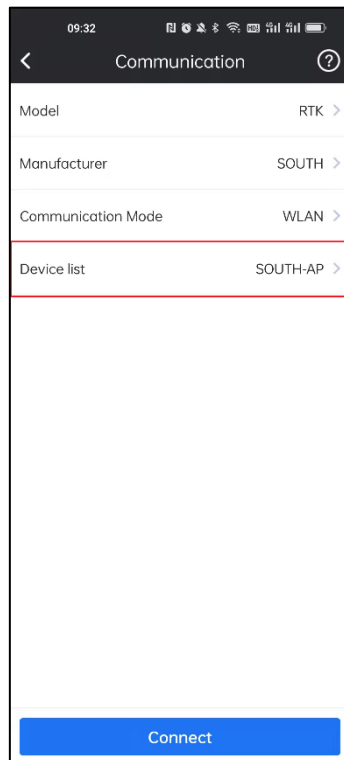
4. If we want to break communication with receiver, we can click **Disconnect**.



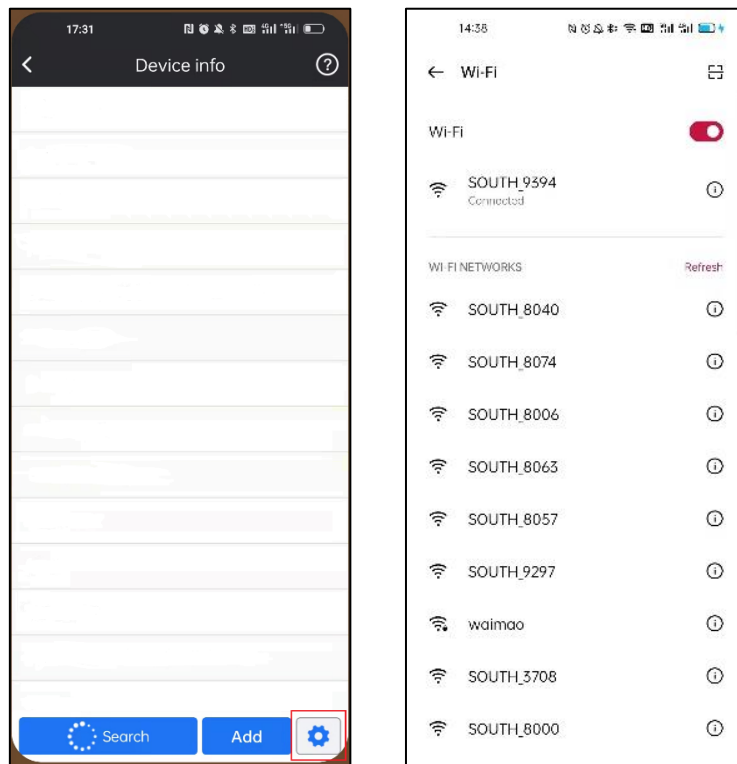
**WLAN:** Connect receiver by WIFI (It only supports the receiver with WIFI and WEB UI; and while connecting the receiver by WIFI, the android controller won't have access to the internet.)



1. Click the **Device list** bar to enter this page.



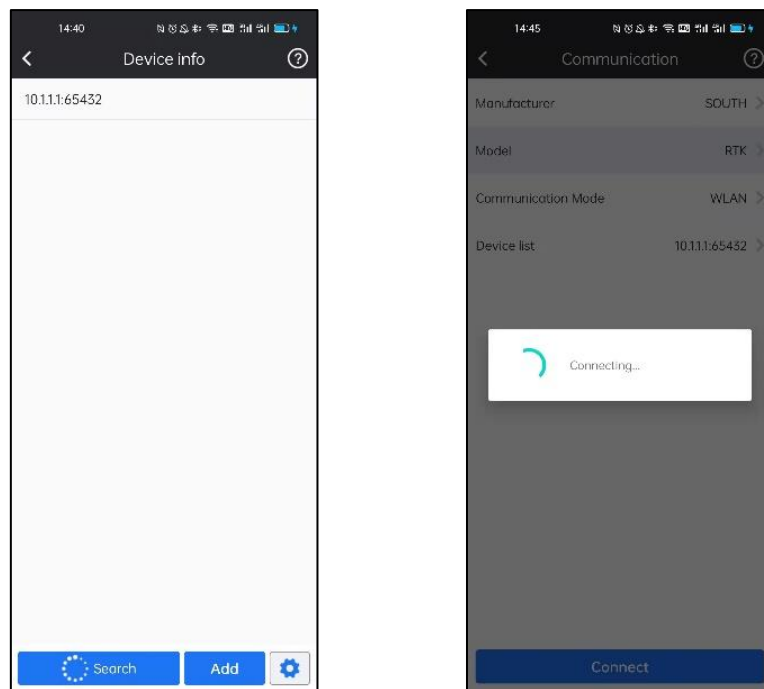
2. Click the settings icon to connect the WLAN of the receiver.



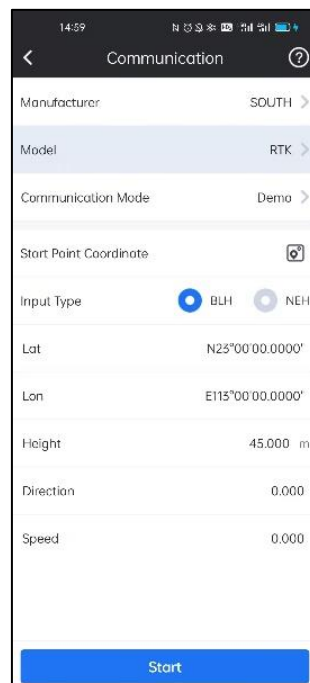
3. Click **Add** to input the IP: 10.1.1.1 and port: 65432.



4. Click this IP information and click Connect. It will connect 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.

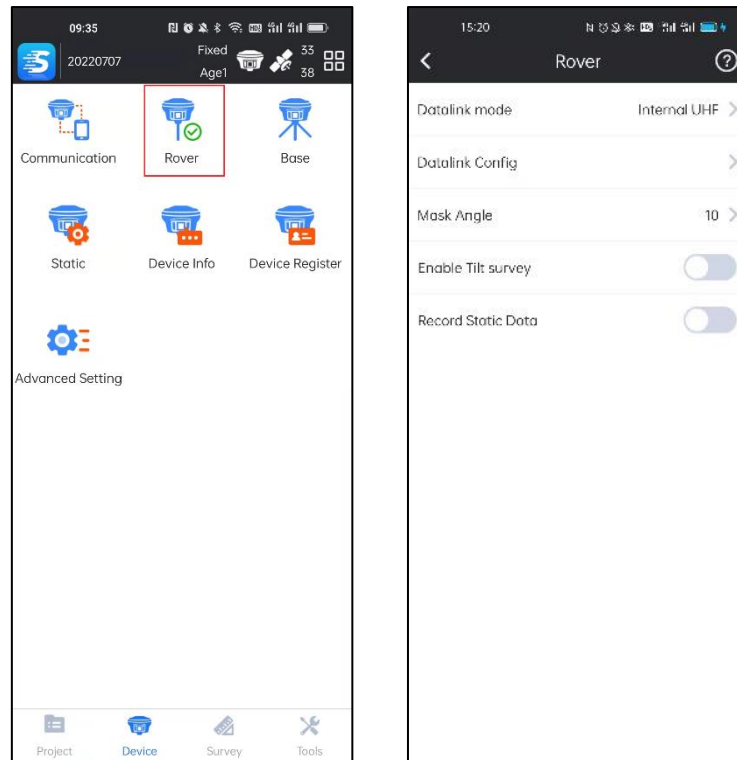


**Serial port:** Connect the receiver by cable (Not used so often)

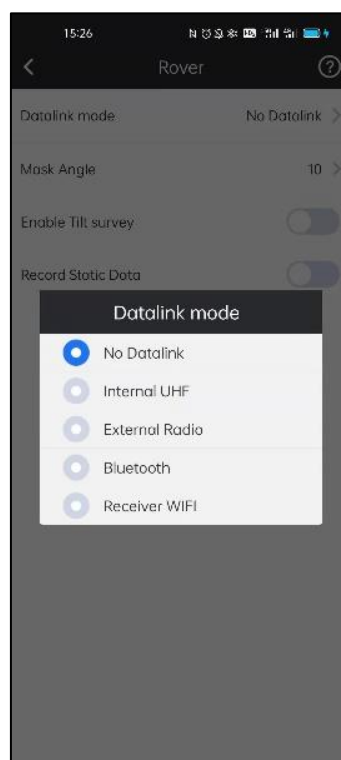
## 4-2 Rover Mode

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

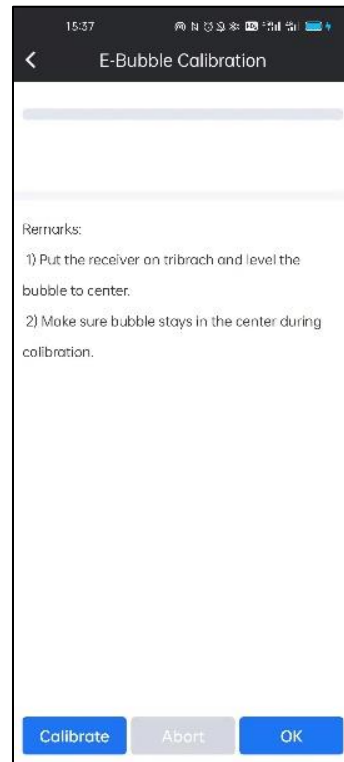
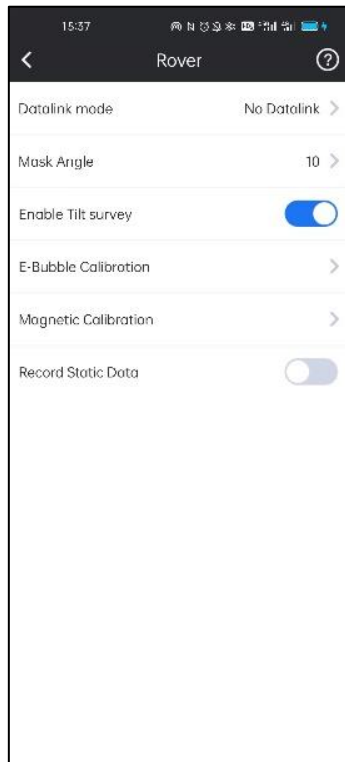
Click **Device** > **Rover** to enter the interface of Rover Mode.



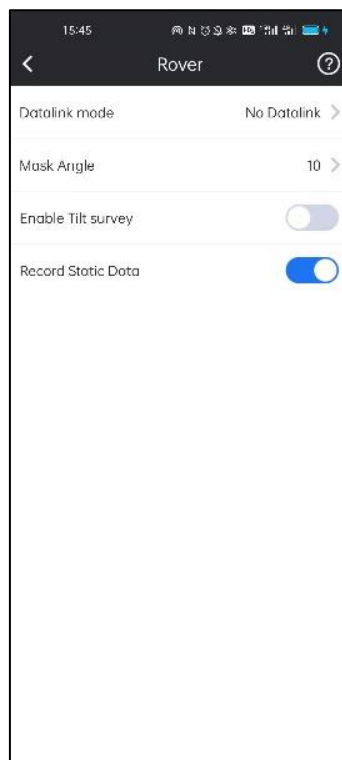
Datalink Mode: set datalink for rover.



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

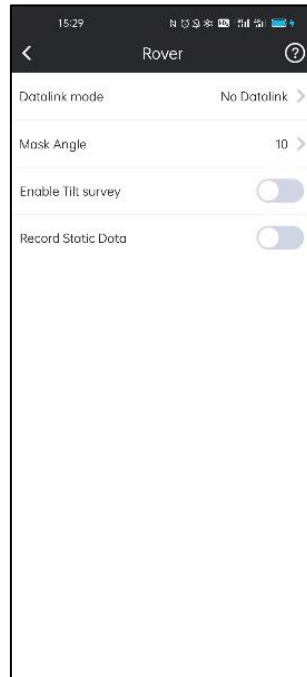


Record Static Data: Enable receiver to record raw data automatically (usually used in PPK mode).



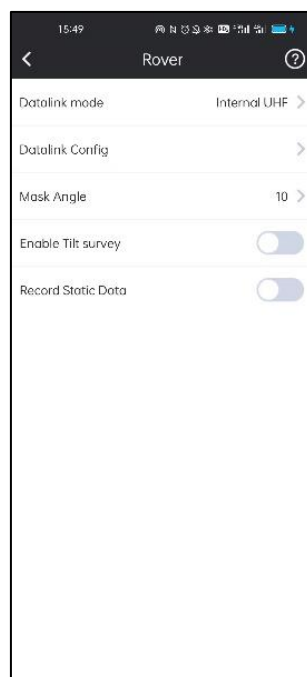
## 4-2-1 Rover-No Datalink

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

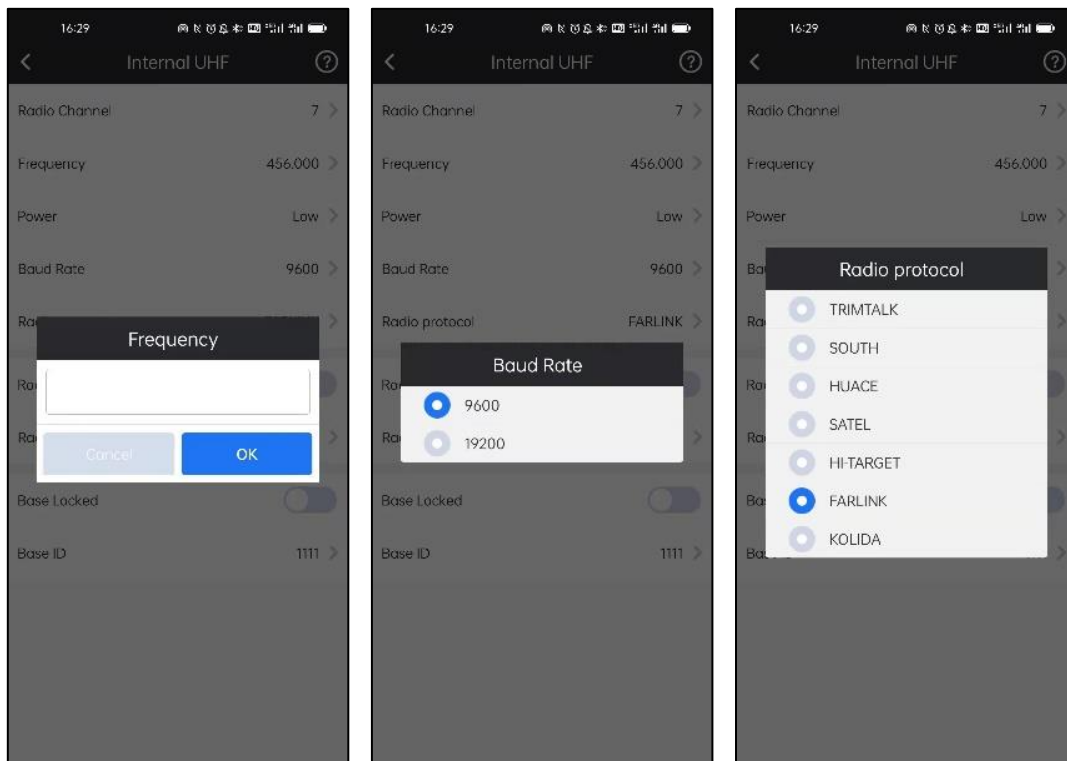
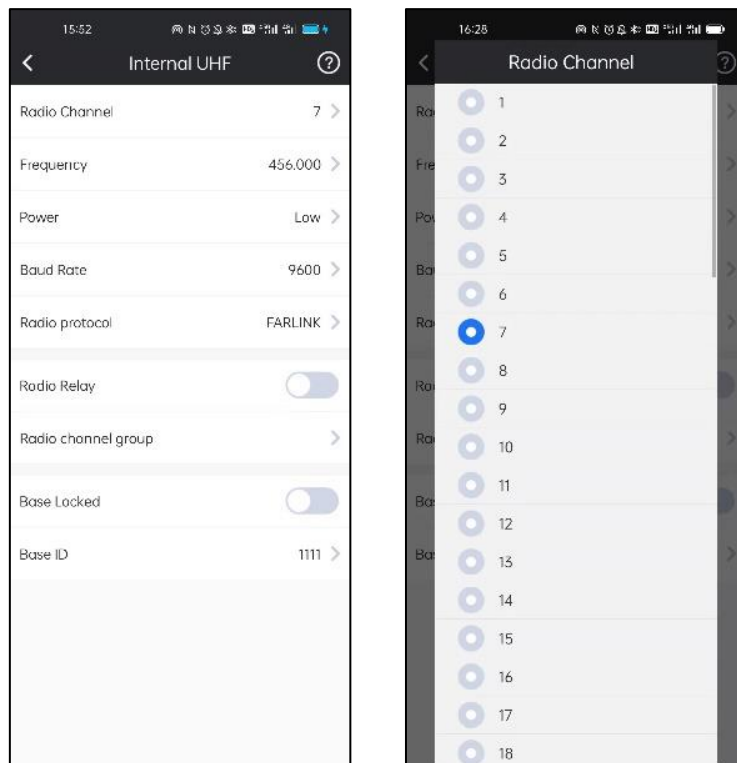


## 4-2-2 Rover-Internal UHF

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.



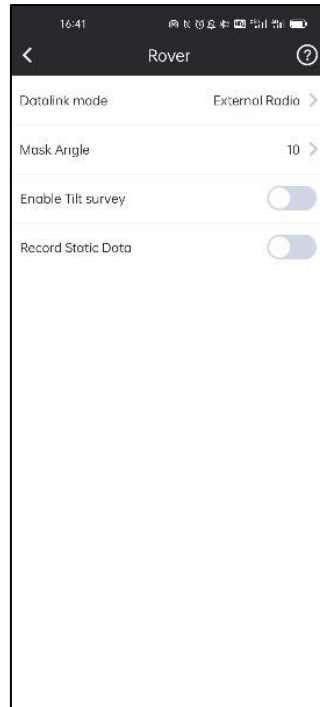
After those parameters above are set the same as base, rover can receive corrections from base and get base information.

SAT Information			
Detail	SAT Skyplot	SNR	SAT List
Height:54.8508	Height: 54.851		
Direction: 0°00'00.0000" Speed: -0.000			
Accuracy			
PDOP:1.460	HRMS:0.772		
VDOP:1.200	VRMS:2.116		
HDOP:0.660			
Base Position			
Lat:N25°06'43.2482"	Northing: 2557053.762		
Lon:E113°26'12.6964"	Easting: 442312.574		
Height:16.7787	Height: 16.779		
Horizontal Distance7991.159			
ID:0			

## 4-2-3 Rover-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.



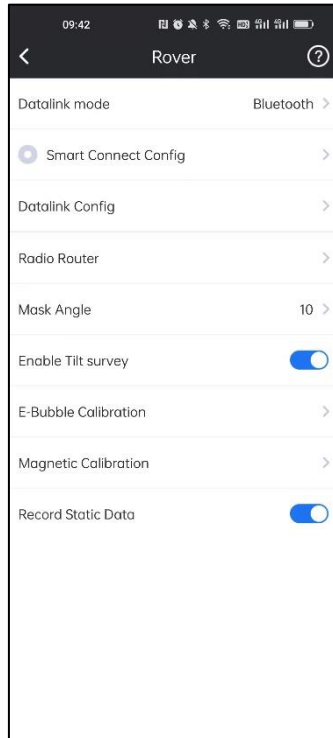
3. Config the external radio the same as base UHF.

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

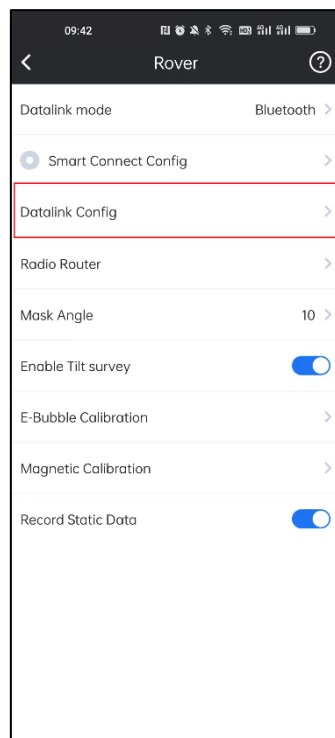
## 4-2-4 Rover-Bluetooth Data Link

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).

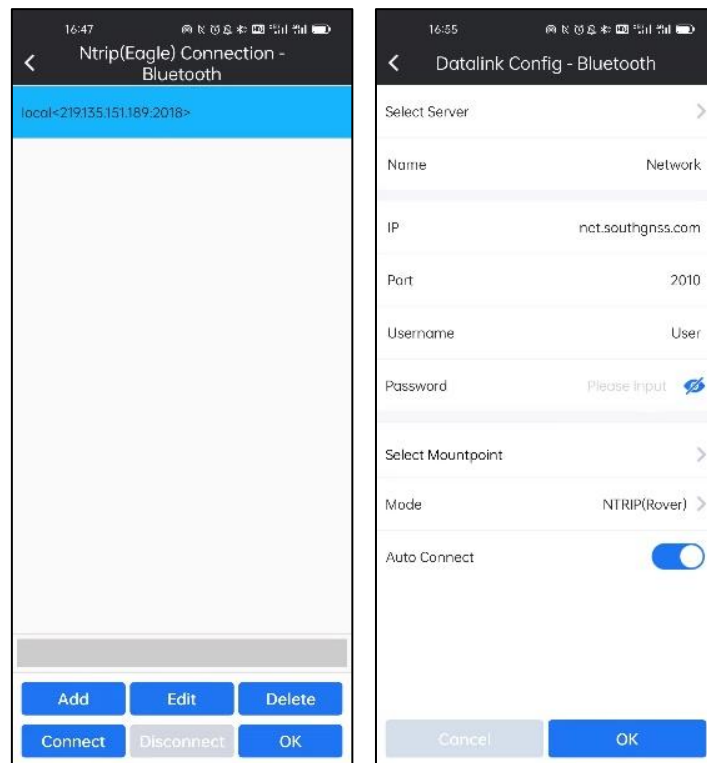
1. Click the Datalink mode bar, set the receiver to Bluetooth mode.



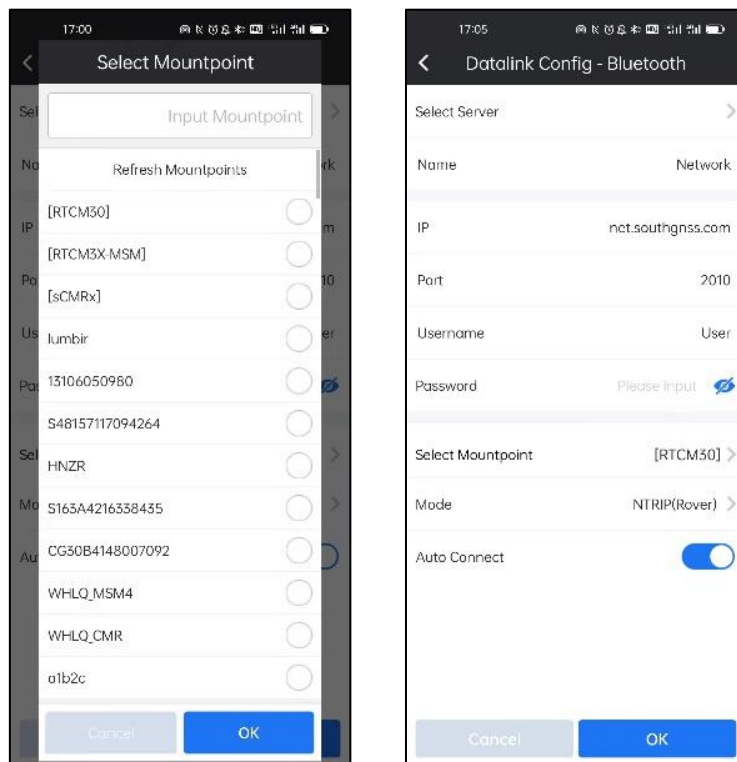
2. Click the **Datalink Config** bar to enter the Ntrip(Eagle) Connection-Bluetooth page.



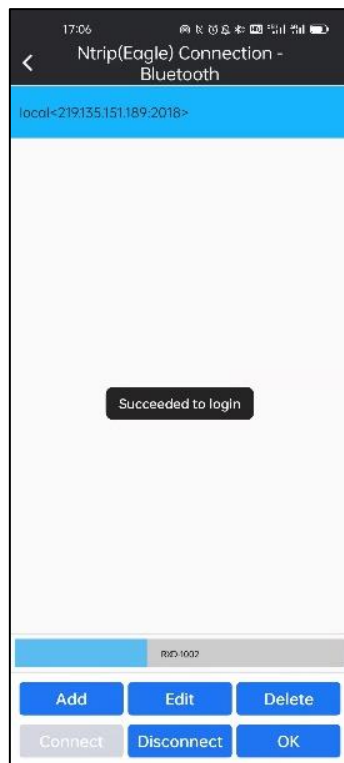
3. Click **Add**. In this interface, we can define a network config by inputting IP, Port, Username and mountpoint.



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



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

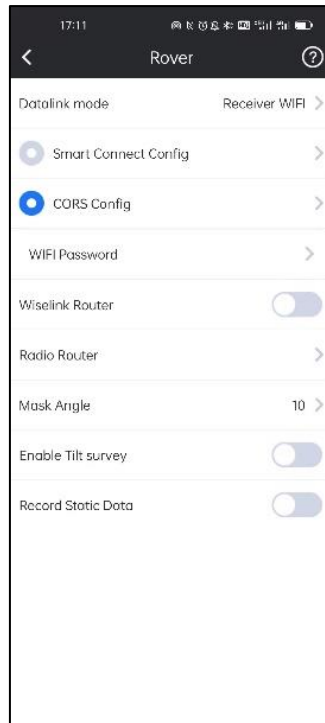


## 4-2-5 Rover-Receiver Network

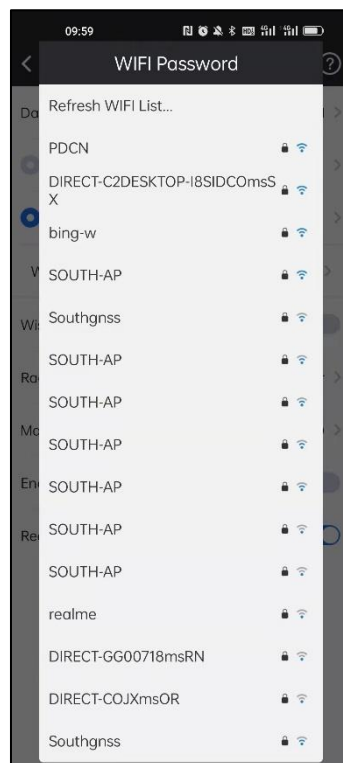
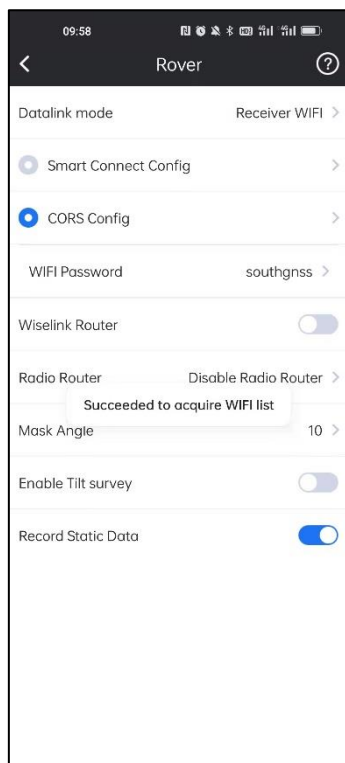
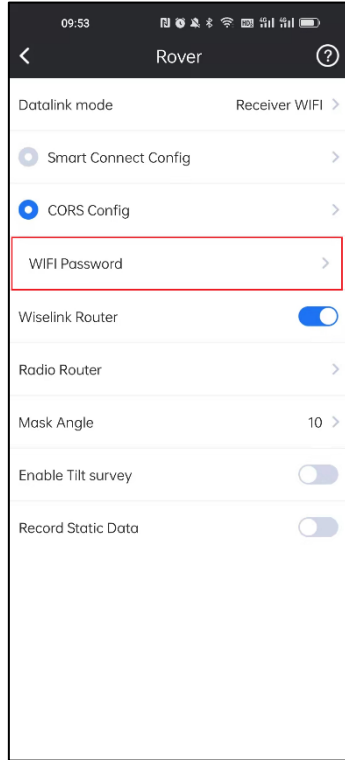
In Receiver Network mode, we must ensure receiver itself has access to the internet, usually there are 2 ways: by receiver's WIFI or by receiver's network module.

### By WIFI:

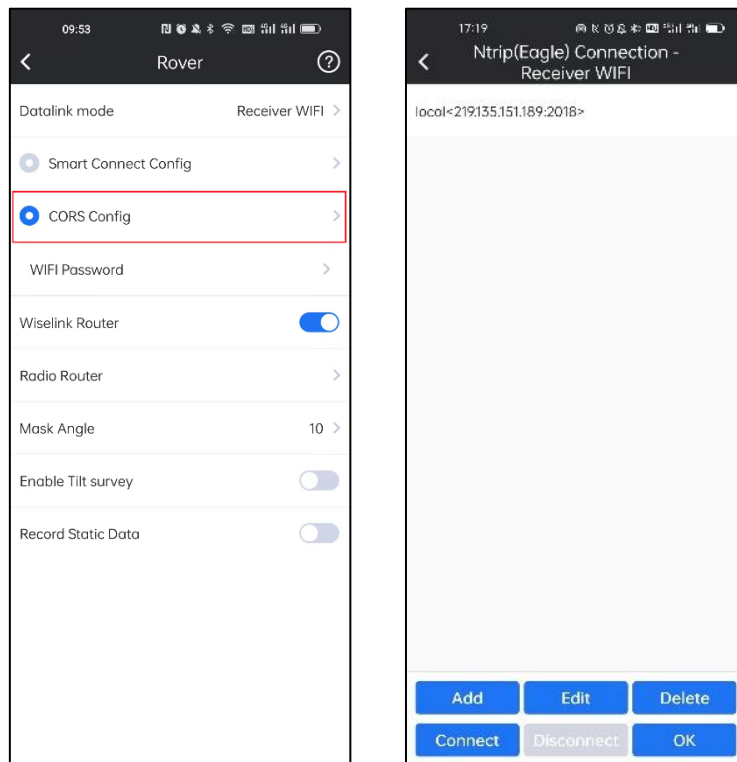
1. Click the Datalink mode bar, set the receiver to the Receiver WIFI mode.



2. Receiver must be able to switch to WIFI client mode and connect to a WIFI hot spot.  
Click **WIFI Password** bar, and click **Refresh WIFI List...** to search for WIFI nearby.  
Then click **WIFI Password** bar again to connect WIFI network.



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

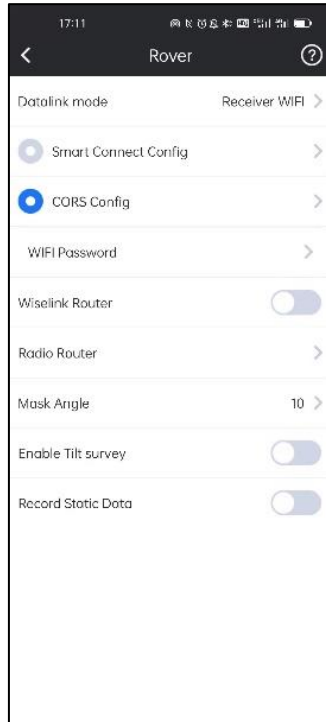


3. Build Network Config and connect (Operation is the same as we do when config Rover-Bluetooth data link).

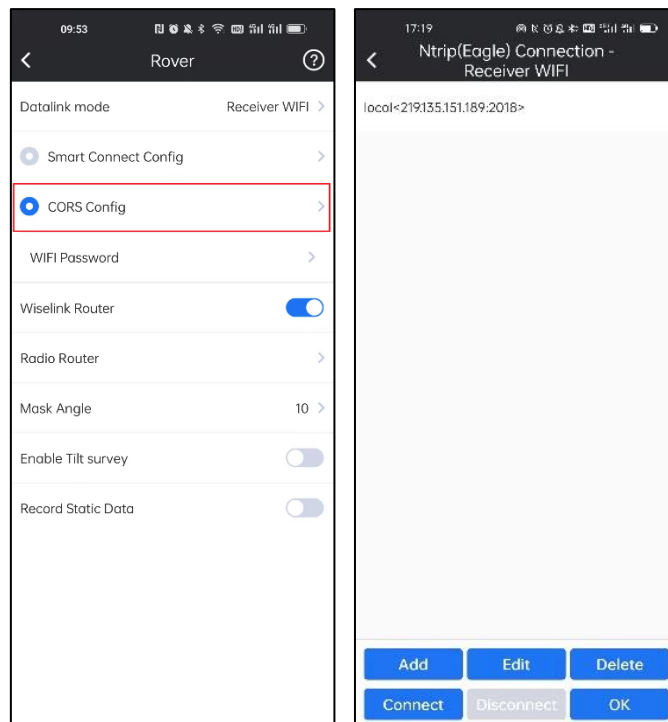
## By Network:

Receiver must have the network module and make sure the SIM card has been inserted into the device correctly.

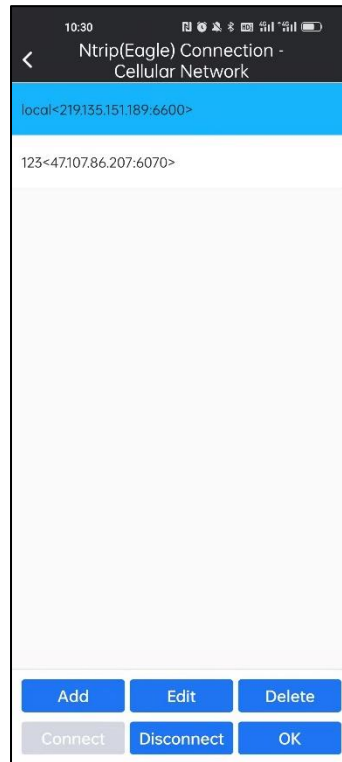
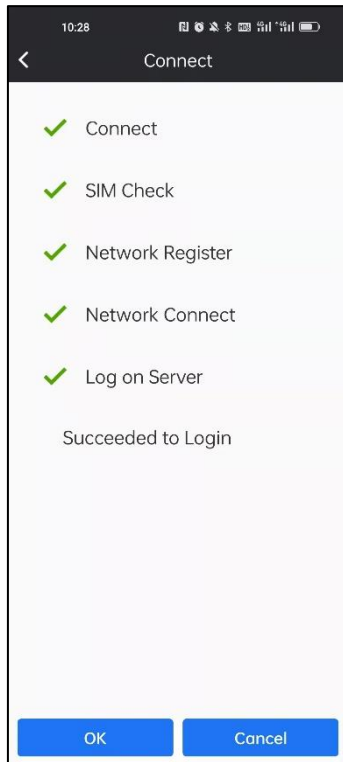
1. Click the Datalink mode bar, set the receiver to the Receiver WIFI mode.



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

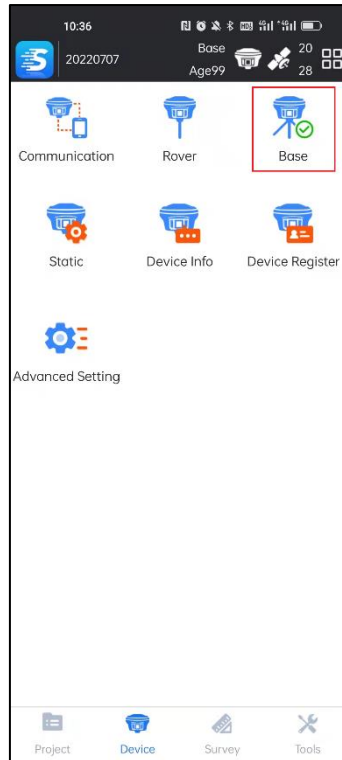


3. Build Network Config and connect (Operation is the same as we do when config Rover-Bluetooth data link).

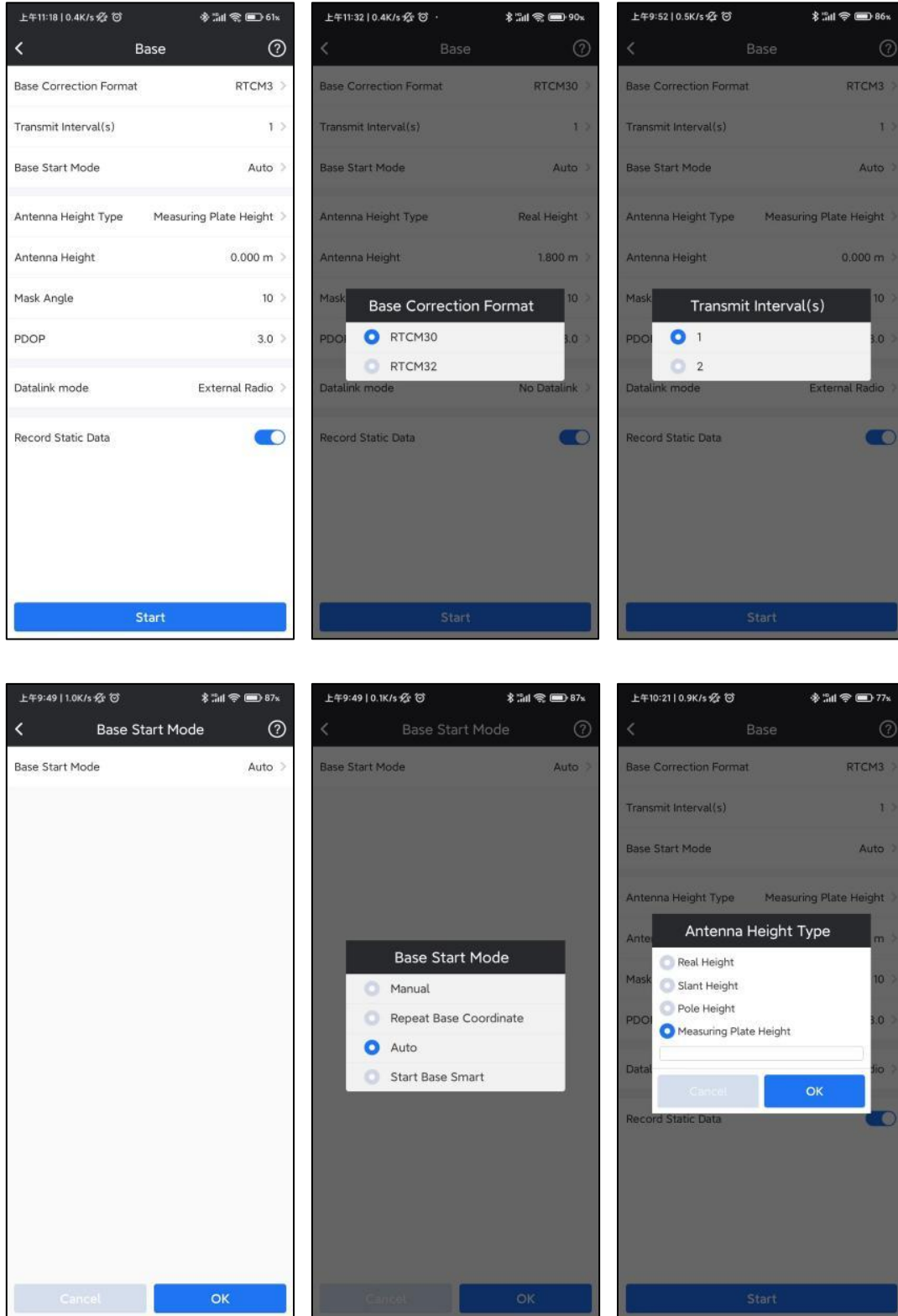


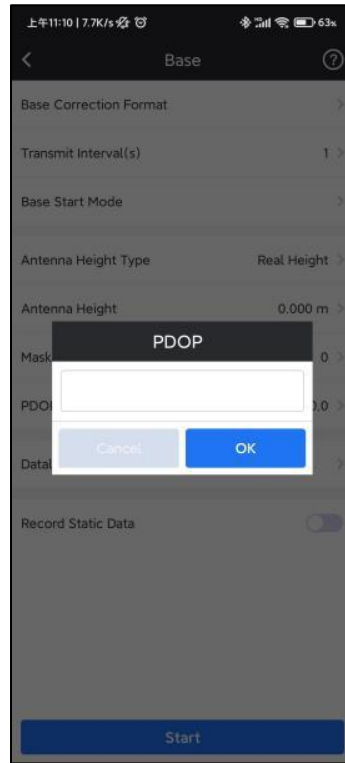
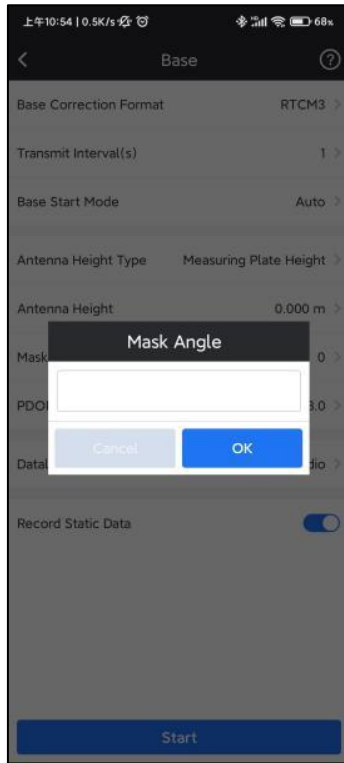
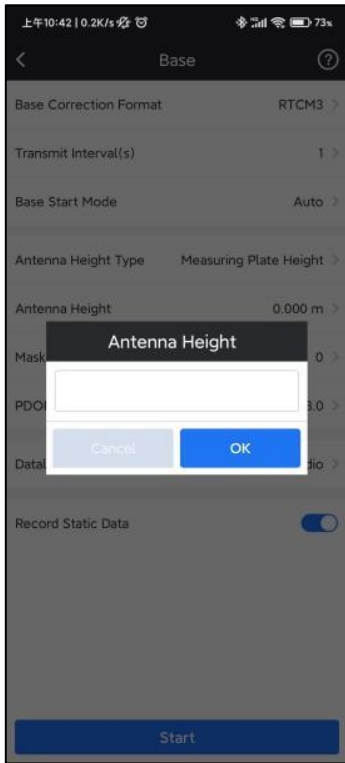
## 4-3 Base Mode

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



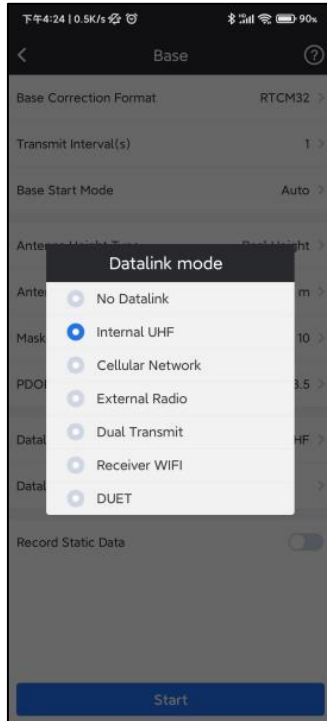
In Base Parameter config, we can set Base Correction Format, Transmit Interval, different Base Start Mode, Antenna Type and Height, Mask Angle, PDOP limit and transmit Data Link.



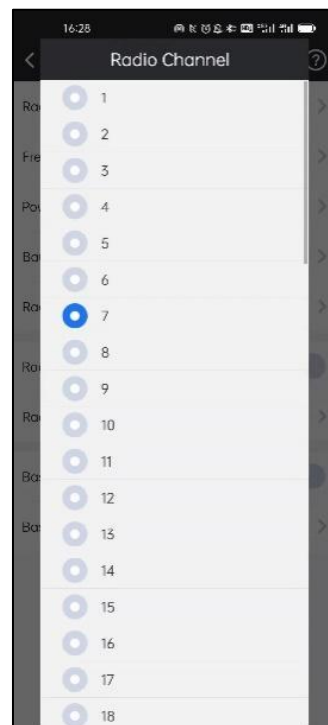
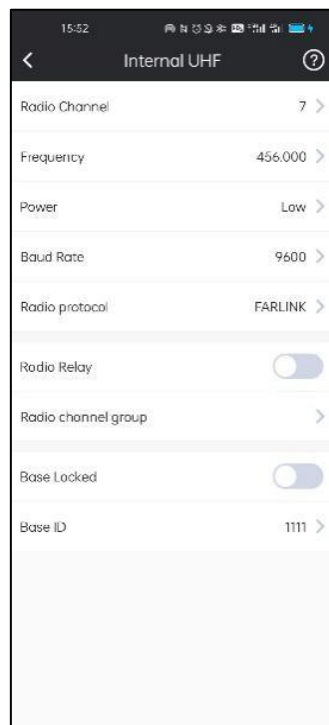


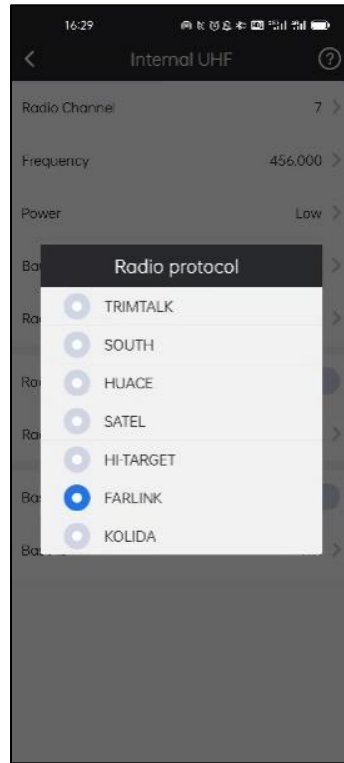
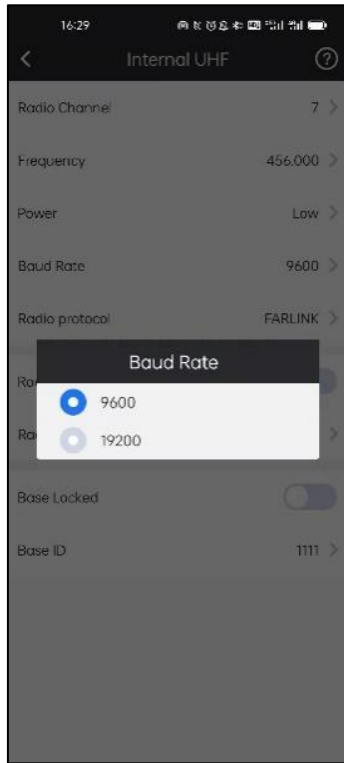
### 4-3-1 Base-Internal UHF

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



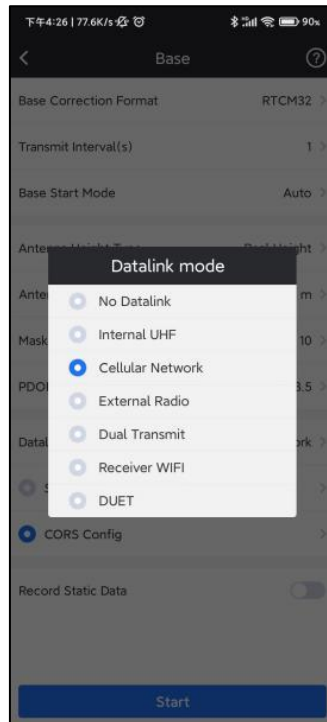
In UHF data link, we can set Channel, Frequency, Power, Baud Rate and Radio Protocol for base.



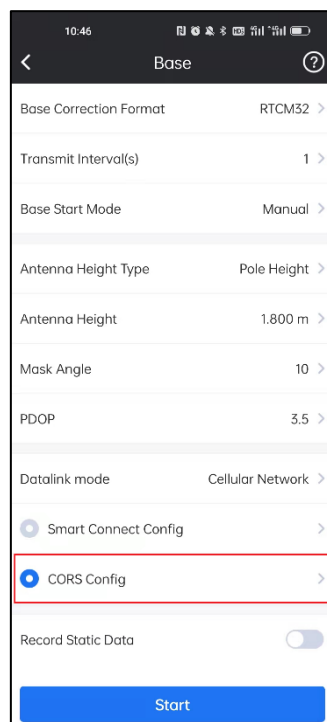


## 4-3-2 Base-Cellular Network

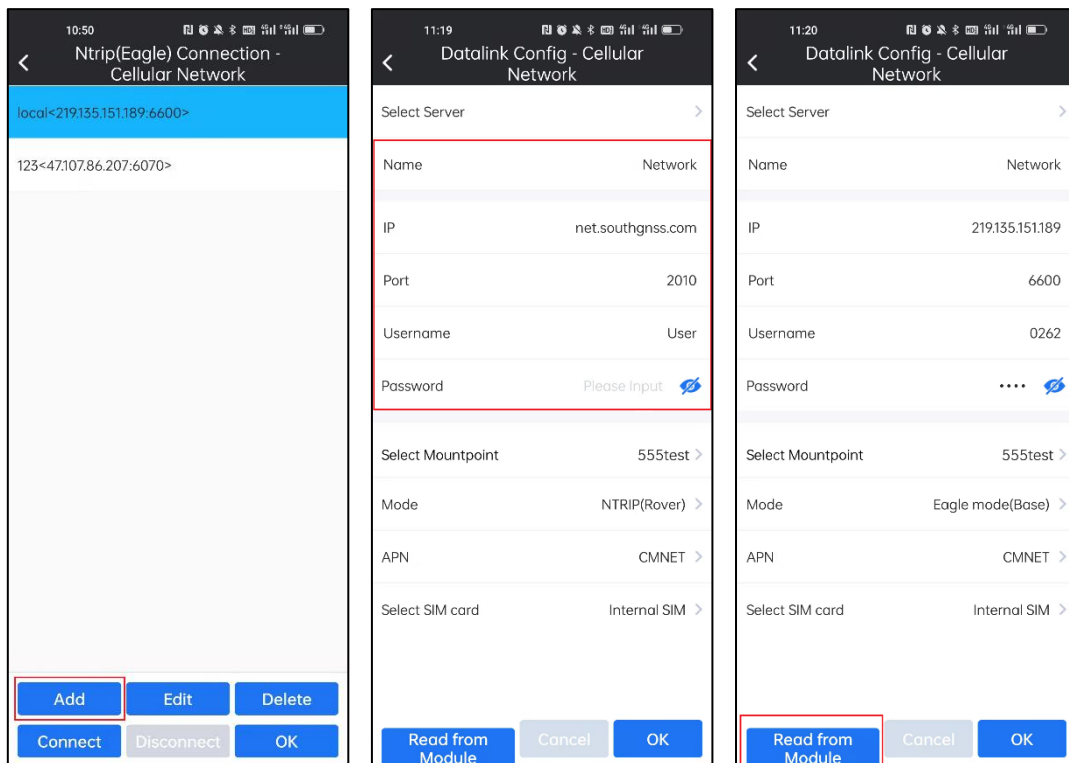
In this mode, Base is uploading its differential corrections to CORS server by Network. Then rover can download the corrections and get fixed solution.



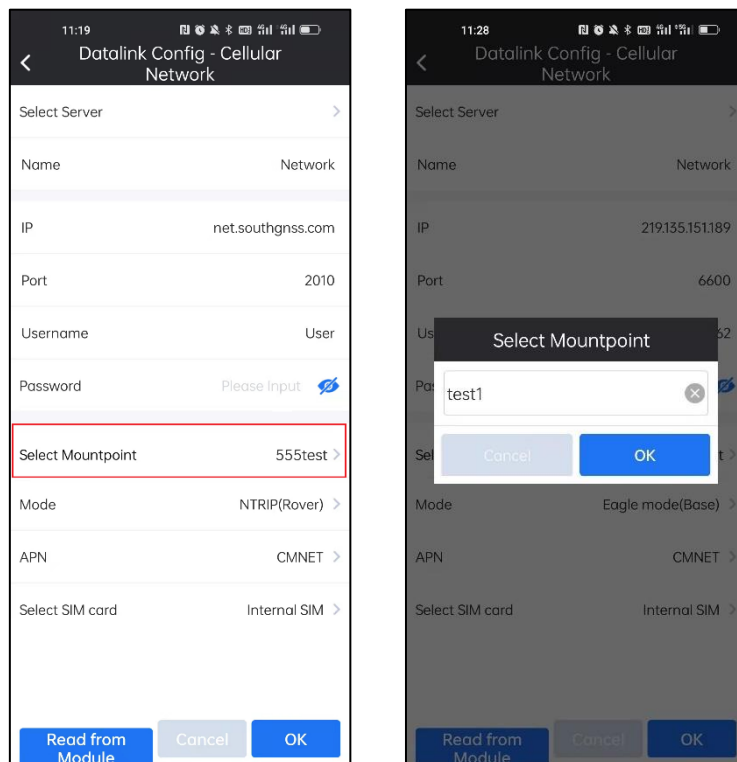
2. Click the **Datalink Config** bar to enter the Ntrip(Eagle) Connection-Cellular Network page.



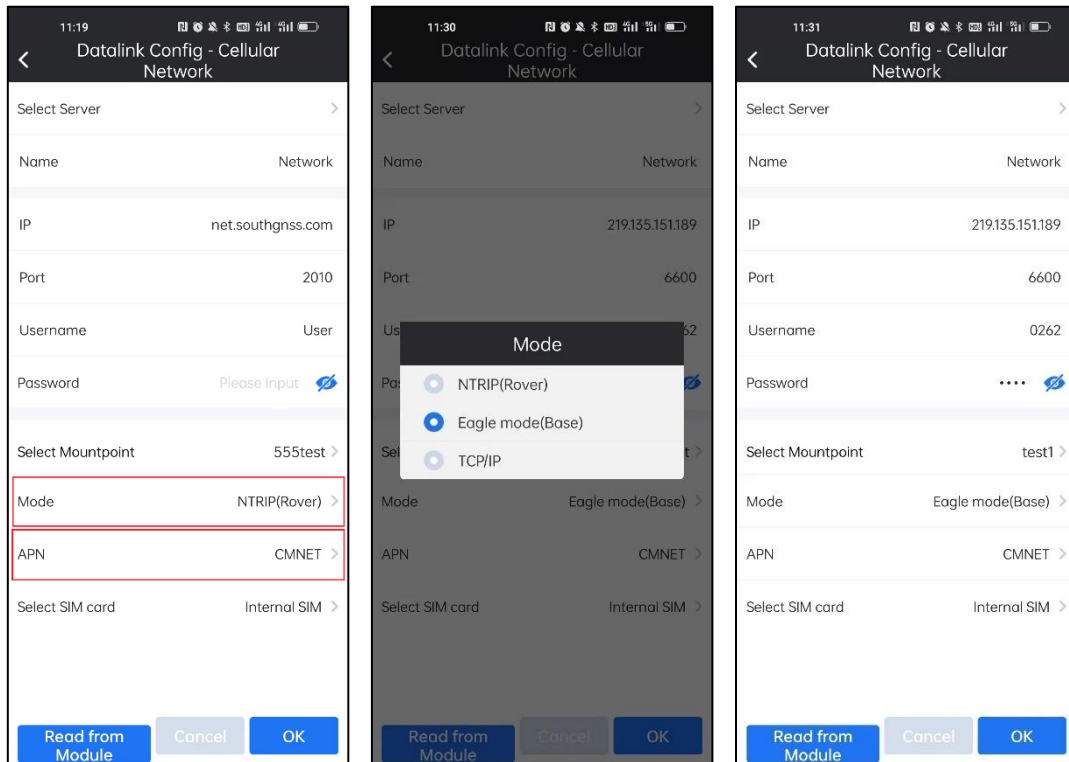
3. Click **Add**. In this interface, we can define a network config by inputting IP, Port, Username and Password. If set before, we can click **Read from Module** to get them.



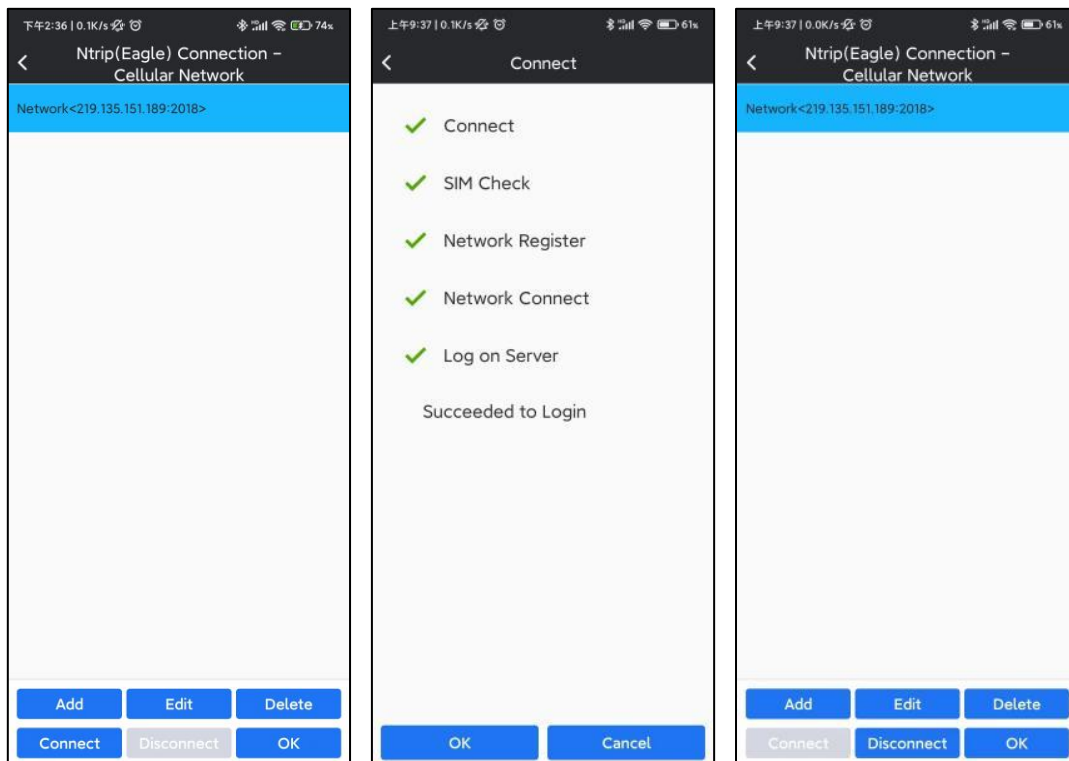
4. Click **Select Mountpoint** bar to set the uploading differential corrections' access points, which cannot be set already exist in CORS.



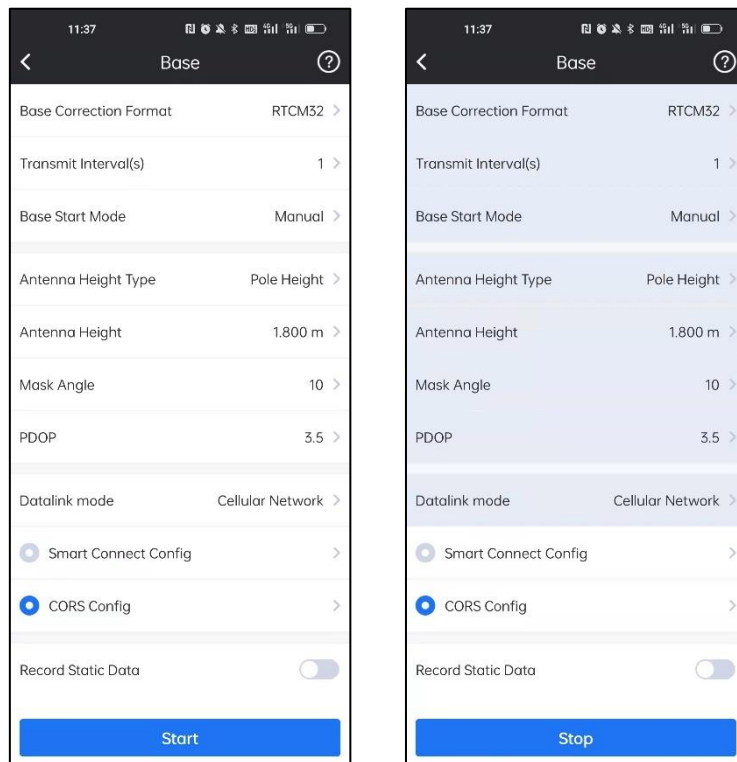
5. Set the Mode as Eagle mode (Base), and set the APN settings.



5. Click **Connect** bar to connect CORS server.

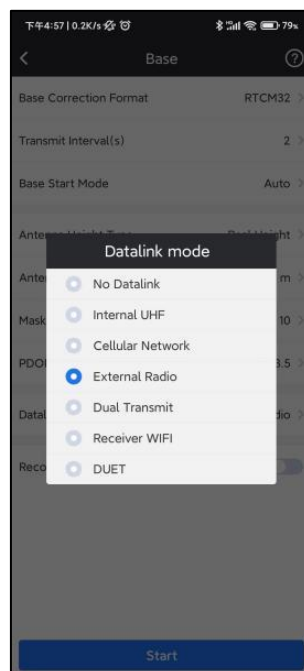


6. Once set, click **Start** to upload differential corrections.



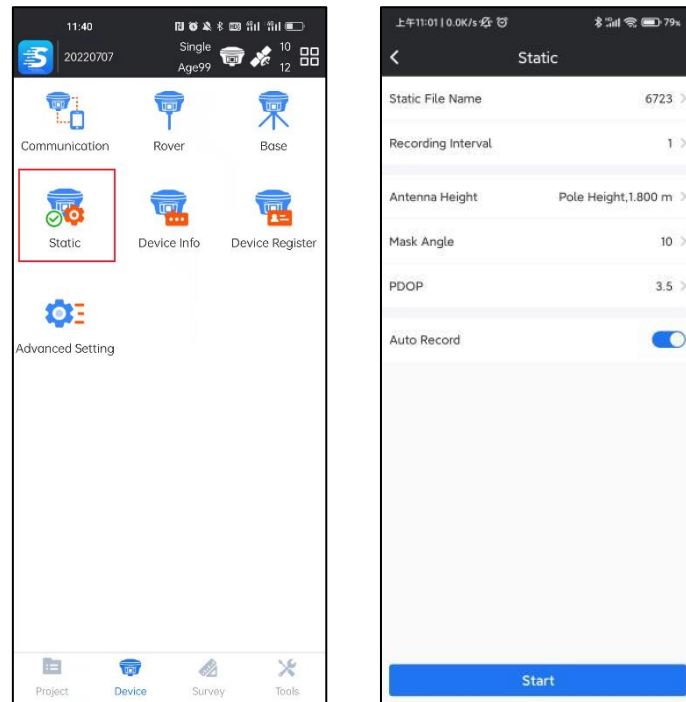
### 4-3-3 Base-External Radio

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

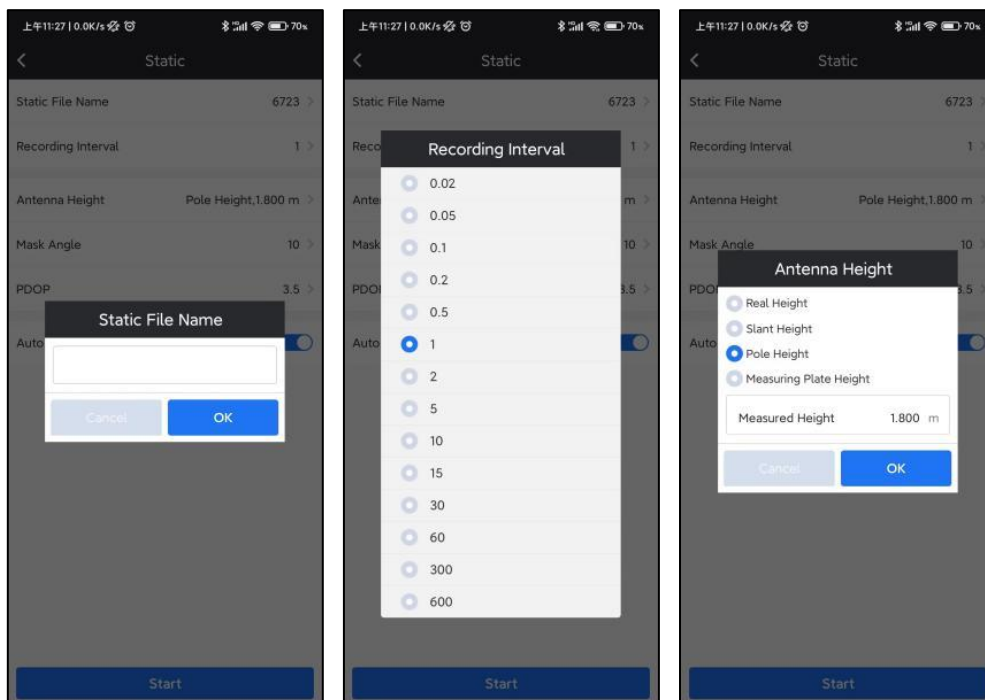


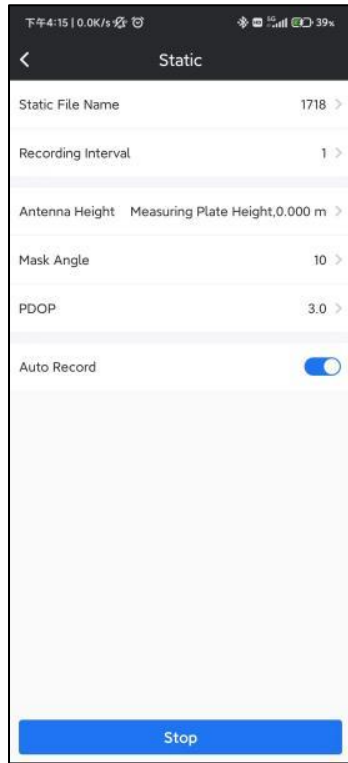
## 4-4 Static Mode

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



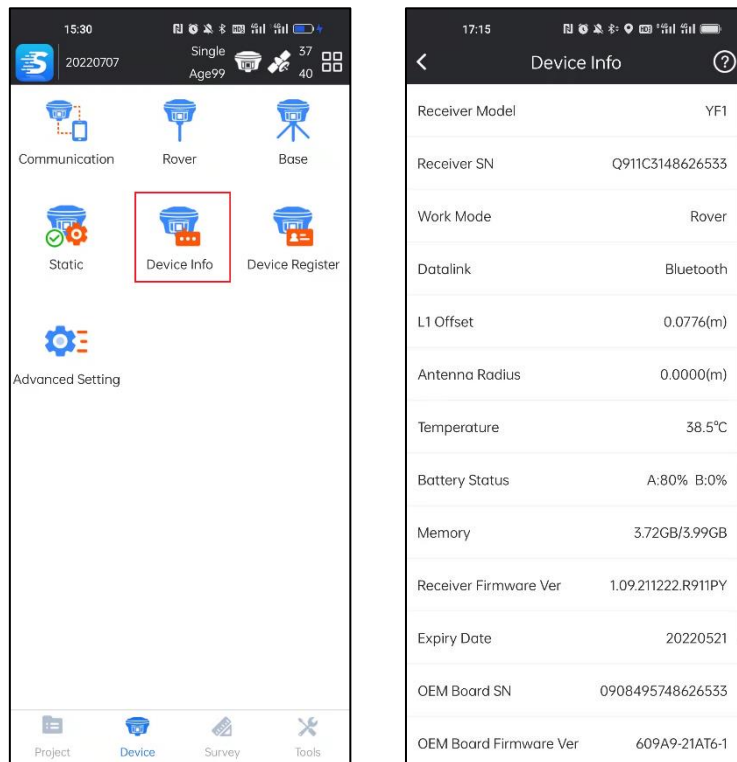
In Static Mode, we need config Static File Name, Recording Interval, Antenna Height and Type, Mask Angle, PDOP limit and Auto\Manual Record.





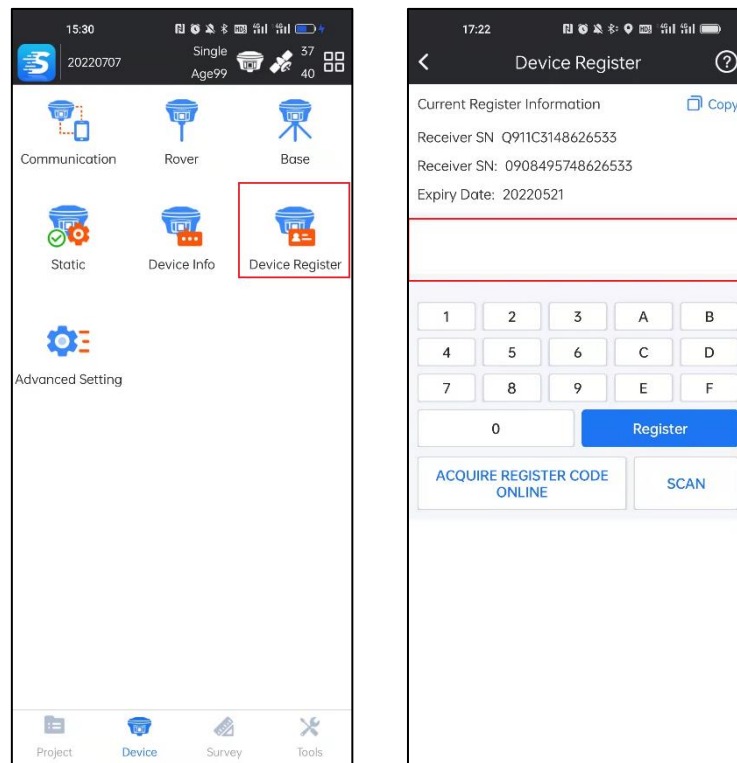
## 4-5 Device Info

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.



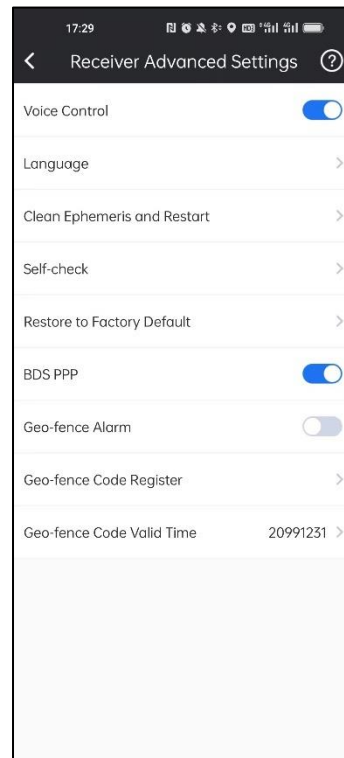
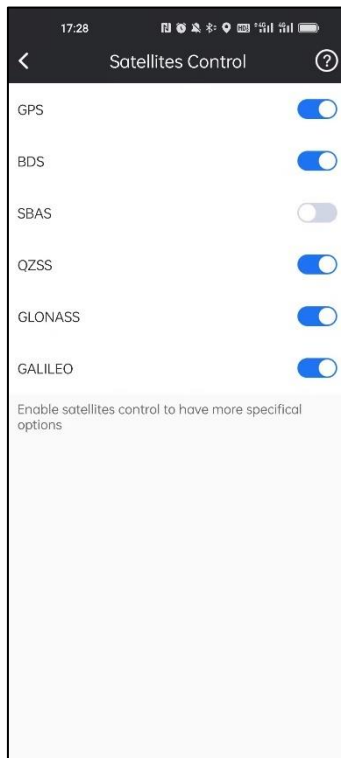
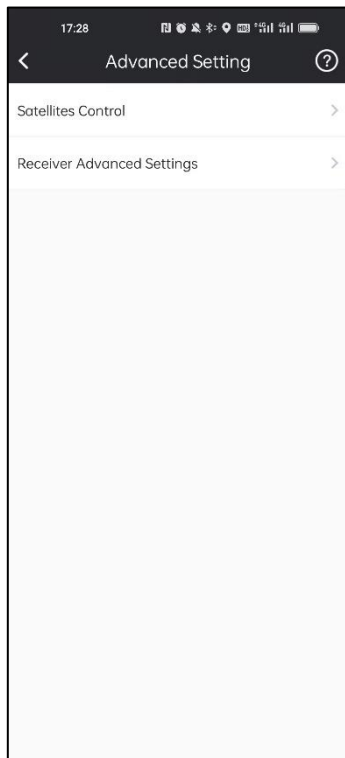
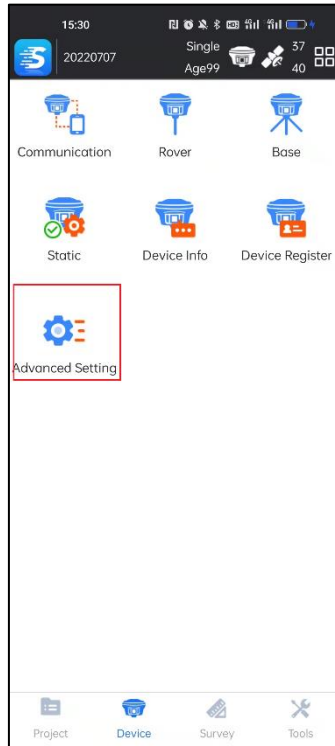
## 4-6 Device Register

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

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 so on.

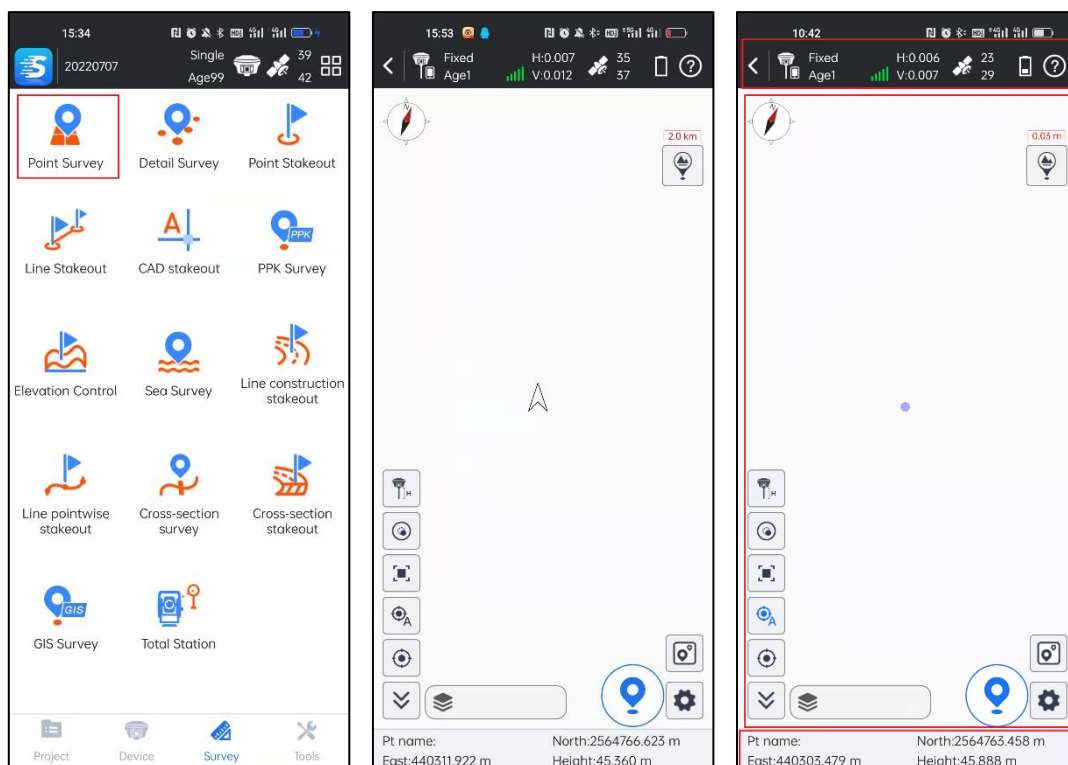


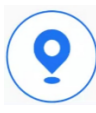
# Chapter 5 Survey

## 5-1 Point Survey

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

It can be divided into 3 parts: the top status bar, the middle acquisition interface (the left can be edited and added, and the right can be different acquisition point schemes, settings and layers), and the bottom coordinate information display.



In this page,  is the Point Collect icon; when IMU is enabled, it will turn to



, and after IMU initialization and it will turn to



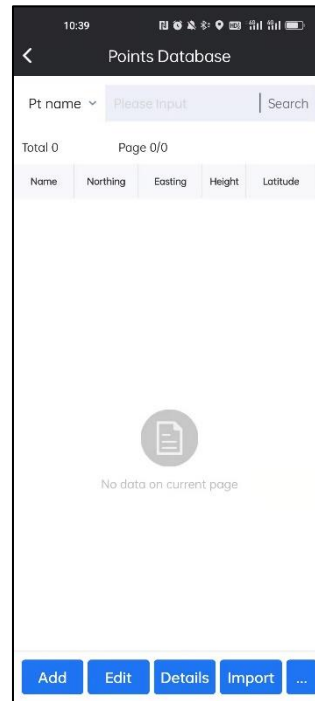
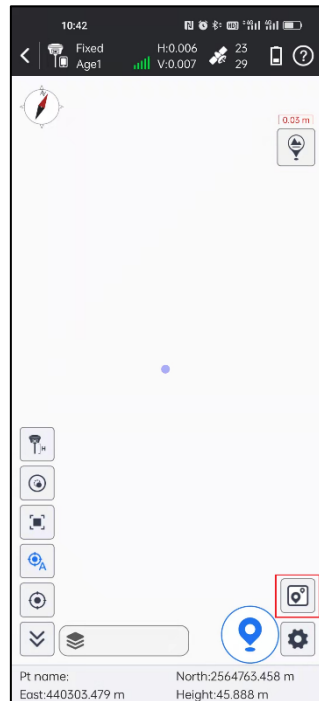
.



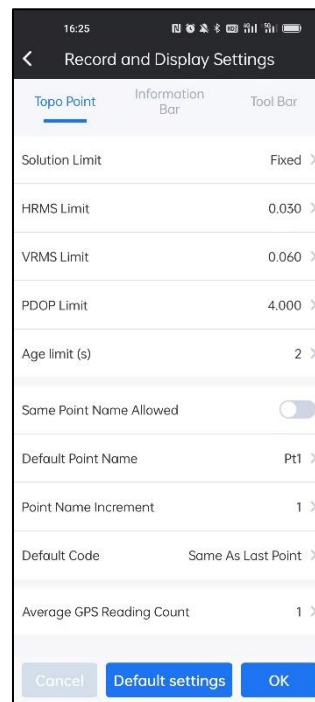
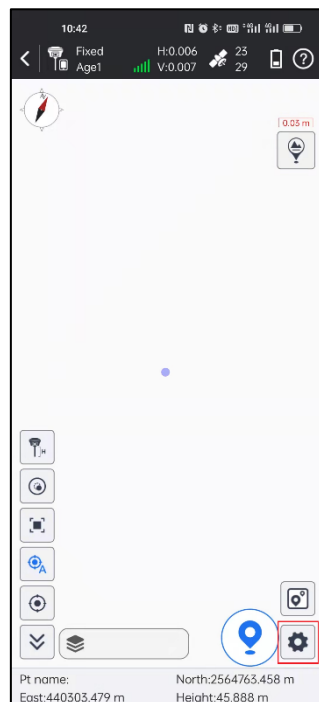
is the Point Type icon, which decides the points collected will be which type (Topo Point, Control Point, Quick Point and Auto Point).



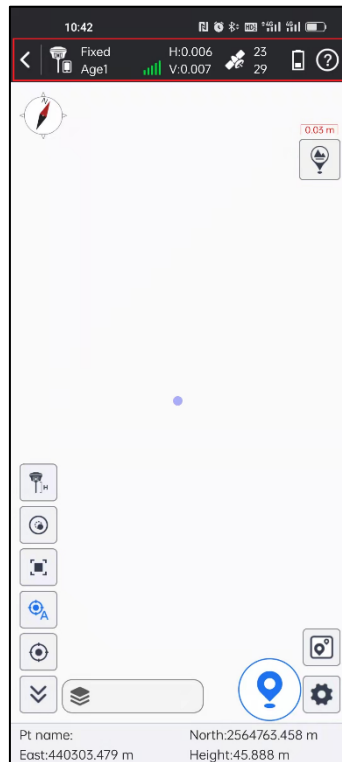
is coordinate point database. Points collected by SurvStar are stored in coordinate point database.



is Record and Display Settings, which can set the collection point type, the limit conditions for the collection accuracy of the point position, the replacement of display of the bottom information and the toolbar. There are 3 sections: Point Collect, Information Bar and Tool Bar.



## The Top Status Bar



In this page, the top status bar icons describe as follows:



: Close/exit Point Survey page.



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



: Receiver signal.



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



: Receiver battery power.

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

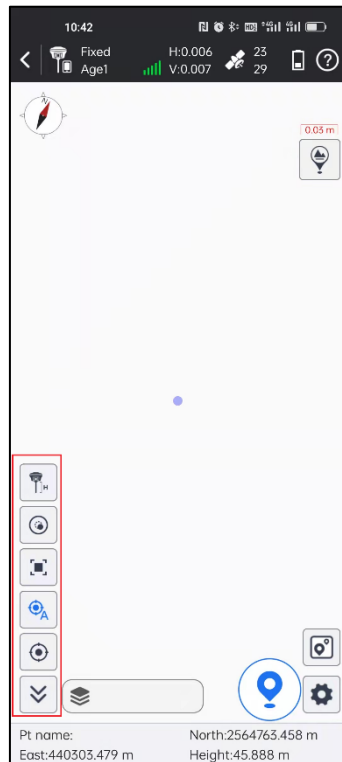
Age1: current differential delay is 1. *e.g., Single, 0: current solution is single, and differential delay is 0. Fixed, 1: current solution is fixed, and differential delay is 1.*


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

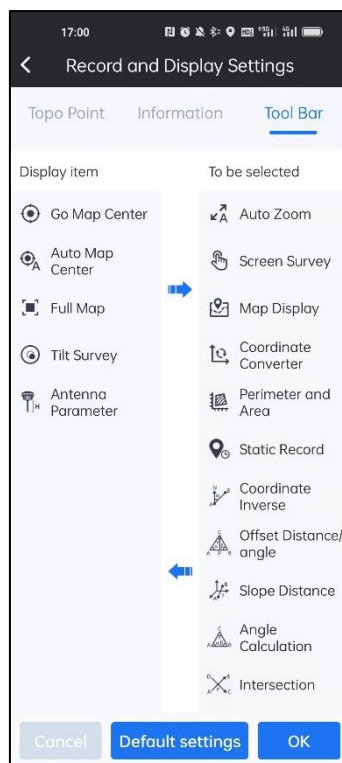
V: VRMS, the value represents the vertical accuracy of current point.

35/37: current number of satellites which used to solution, and the total tracked satellites number.

## The Left Toolbar



Click  to enter to this page. In Tool Bar, we can decide which function quick launch to be displayed in left of main interface.



**The icons in left toolbar describe as follows:**



Go Map Center



Full Map



Antenna Parameter



Screen Survey



Coordinate Converter



Static Record



Offset Distance/angle



Angle Calculation



Resection



Coordinate Traverse



Divide Line Equally



Pt, Code, H Display



Auto Map Center



Tilt Survey



Auto Zoom



Map Display



Perimeter and Area



Coordinate Inverse



Slope Distance



Intersection



Forward Intersection

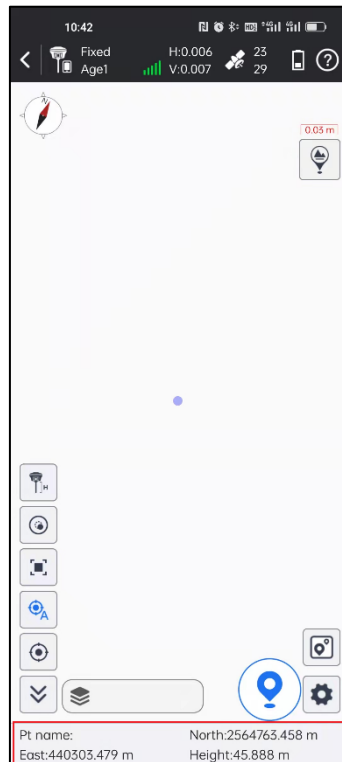



Offset Point

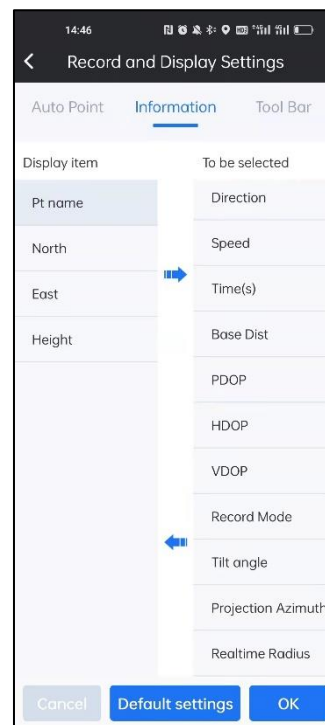
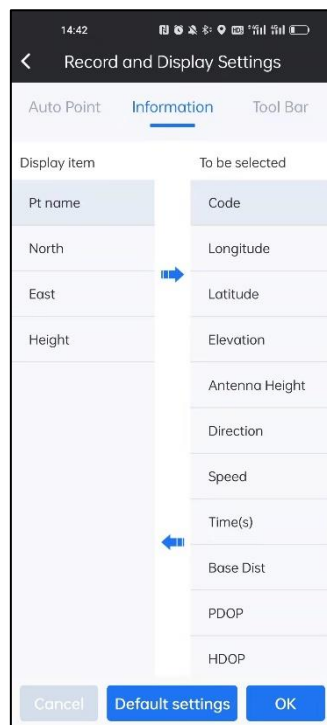



Compass

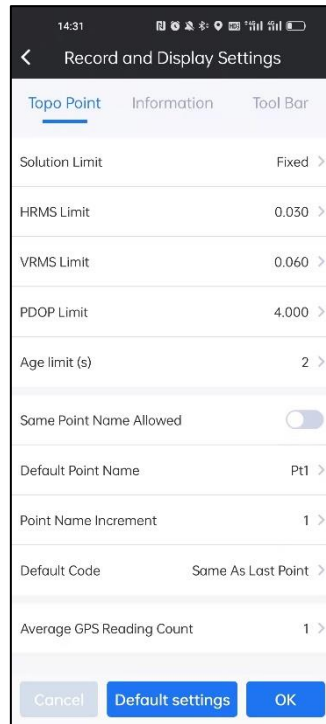
## The Bottom Information Display



Click  to enter to this page. In Information Bar, we can config which information to be displayed at the bottom of main interface.



Click  to enter to this page. In Point Collect, we can set Limit while doing Topo Point\Control Point\Quick Point\Auto Point collection.



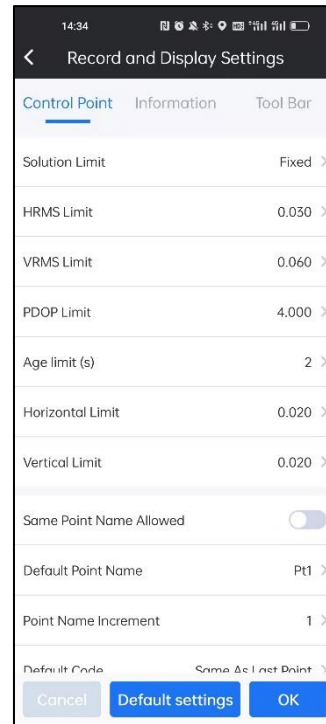
14:31

Record and Display Settings

Topo Point Information 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 >
Average GPS Reading Count	1 >

Cancel Default settings OK



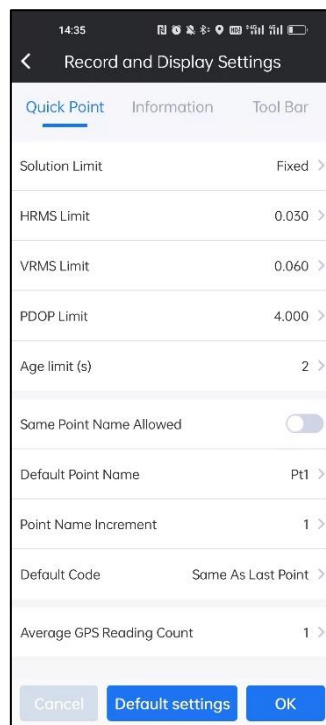
14:34

Record and Display Settings

Control Point Information 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 >
Point Name Increment	1 >
Default Code	Same As Last Point >

Cancel Default settings OK



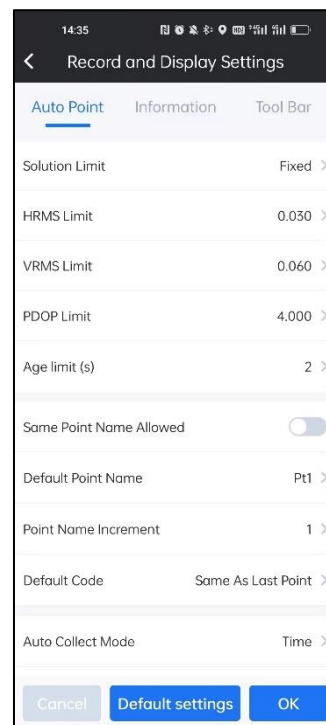
14:35

Record and Display Settings

Quick Point Information 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 >
Average GPS Reading Count	1 >

Cancel Default settings OK



14:35

Record and Display Settings

Auto Point Information 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 >
Auto Collect Mode	Time >

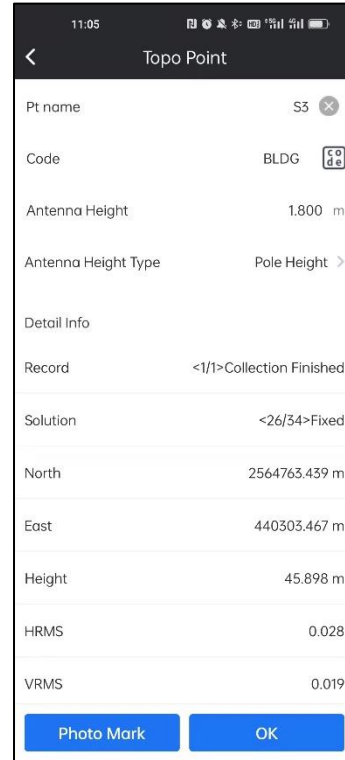
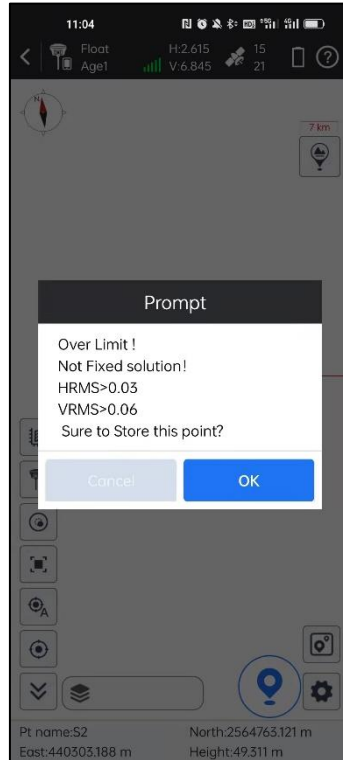
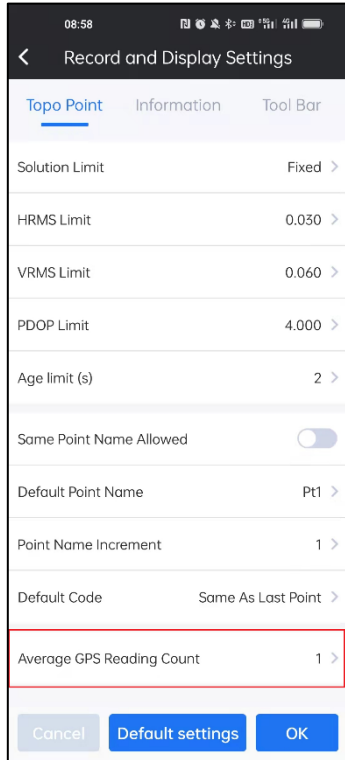
Cancel Default settings OK

**Topo points:**



Topo Point collection: this method is the most used way to collect points, after setting the record limit and average times, SurvStar will collect Topo Point by clicking the

button  .

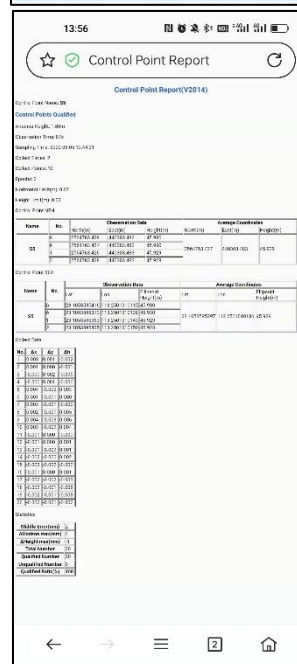
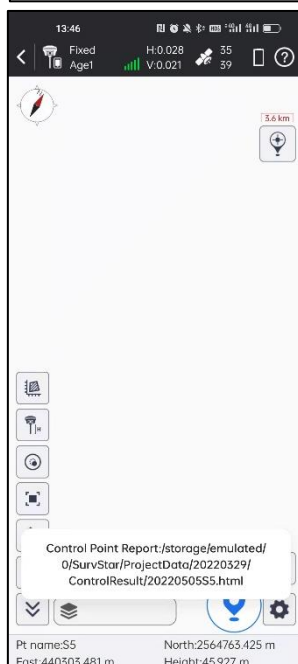
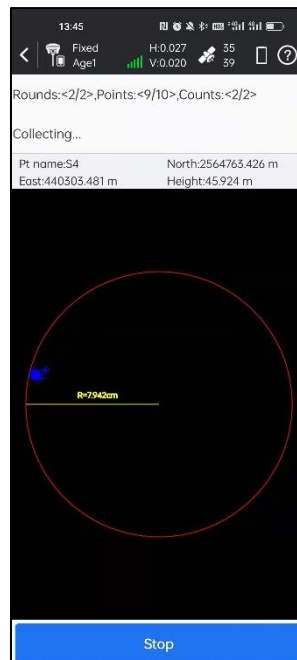
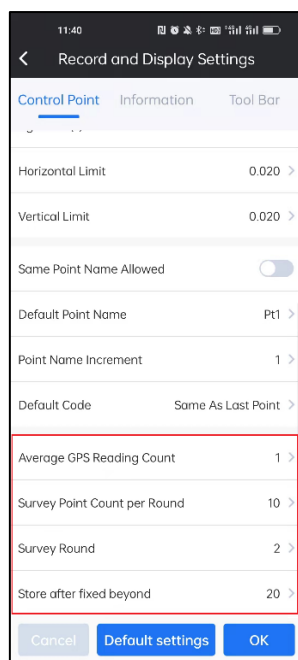


**Control point:**



Control Point collection: this method is used to collect Control Points, so the key points are high accuracy collect and control points report. To get high accuracy results, we need to collect one position as many as possible and get the average coordinates. In this config, the total data collected for one control point will be 20 times (1 (Average GPS Recording Count)\*10 (Survey Point Count per Round)\*2 (Survey Round) ), and each data will only be recorded after 20 seconds fixed solution.

And after collection, SurvStar will generate a Control Point report in Html format.





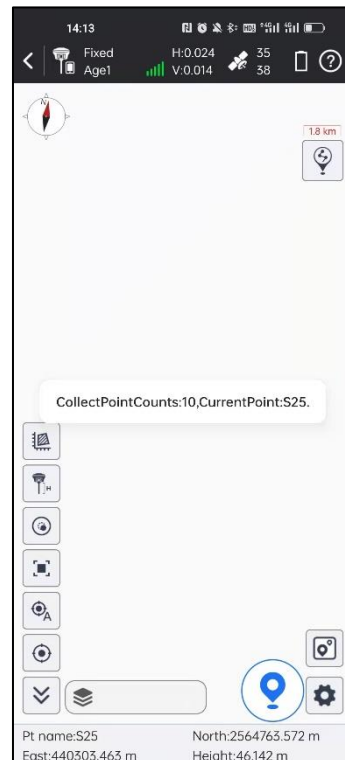
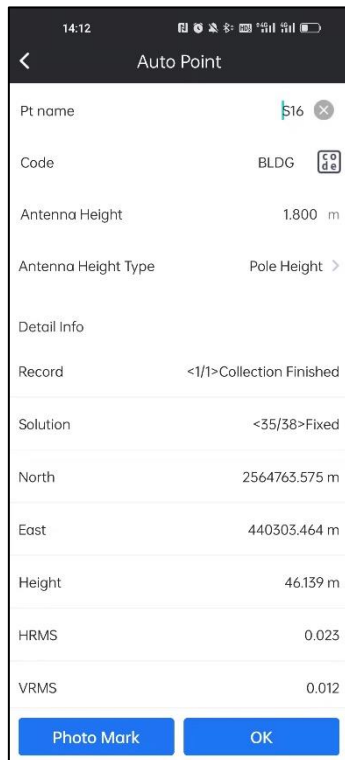
**Quick point:**

Quick Point collection: this method is used for quick collect. Just click collect button, and points will be recorded without any tips.



**Auto point:**

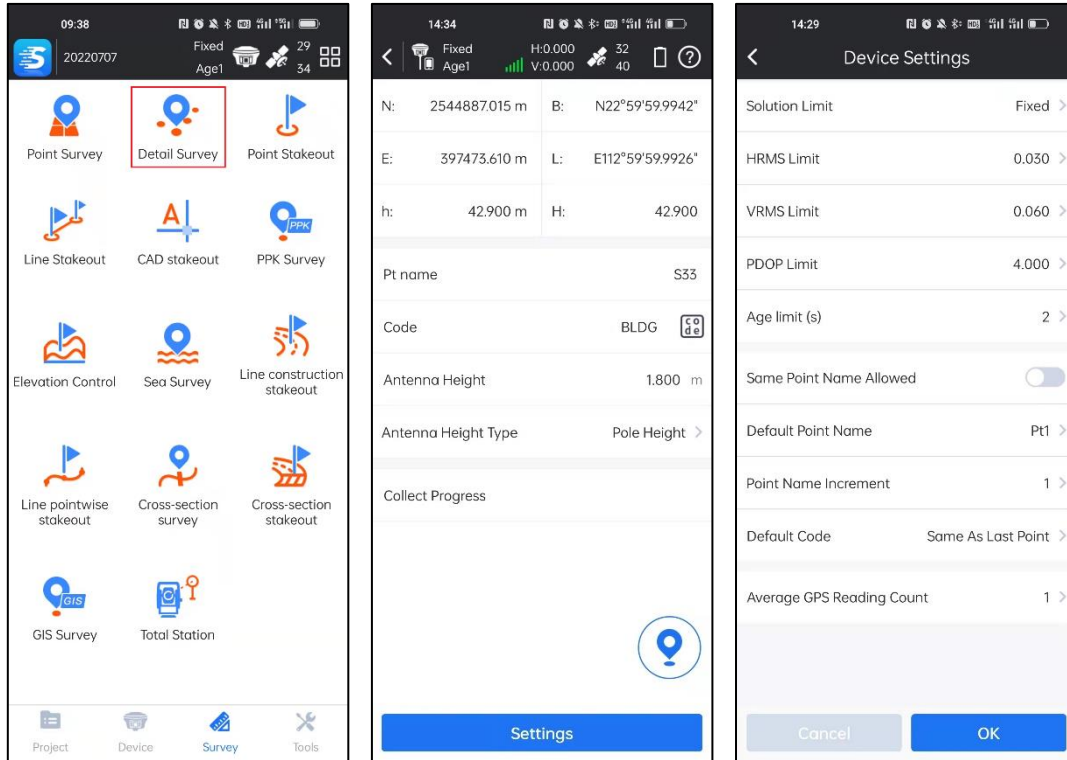
Auto Point collection: sometimes when we need to collect points by time or distance, we can use this method.



## 5-2 Detail Survey

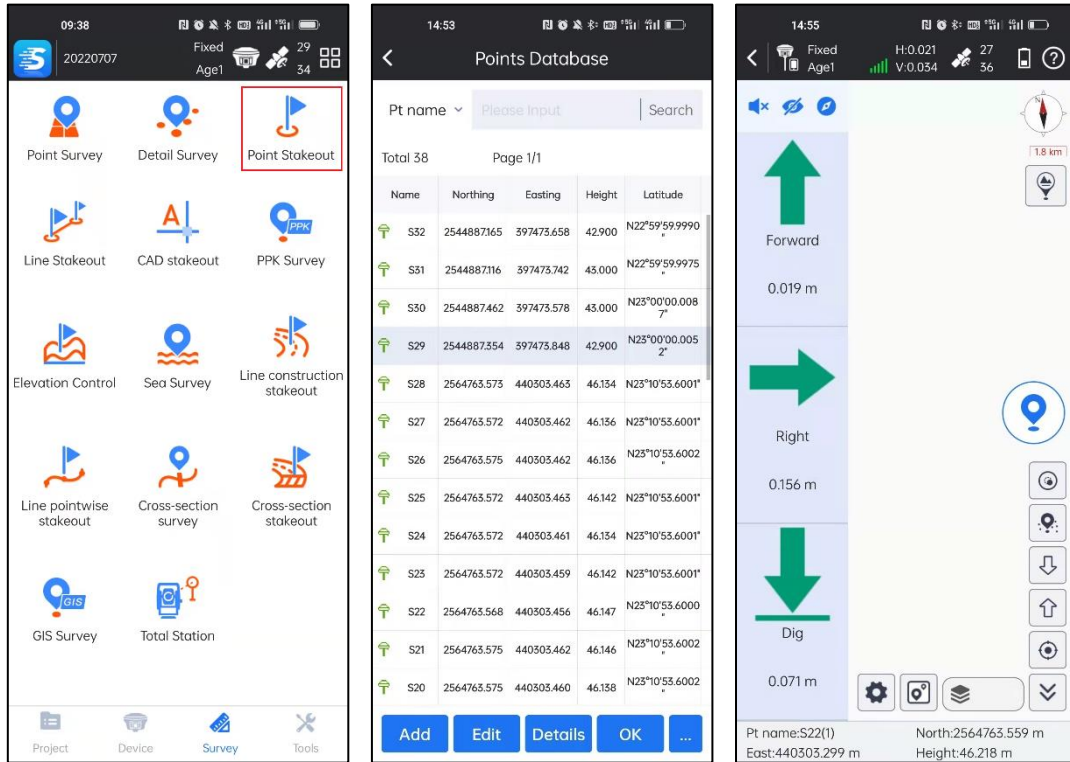
Detail Survey is a simplified Point Survey mode, which is for rapid and continuous coordinates collection.

When we do Detail Survey, SurvStar will keep in this interface showing detailed collect points information. And by clicking Settings, we can config the limit of recording.



## 5-3 Point Stakeout

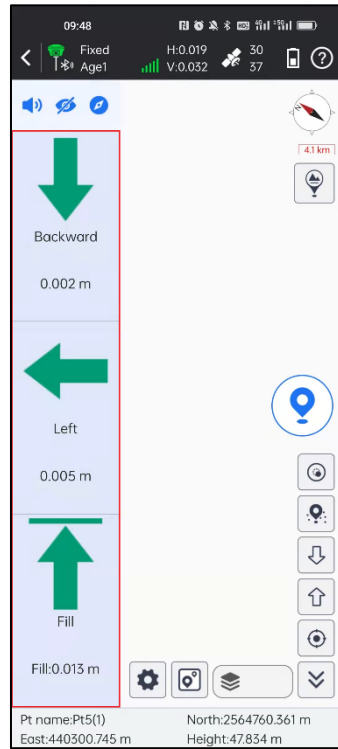
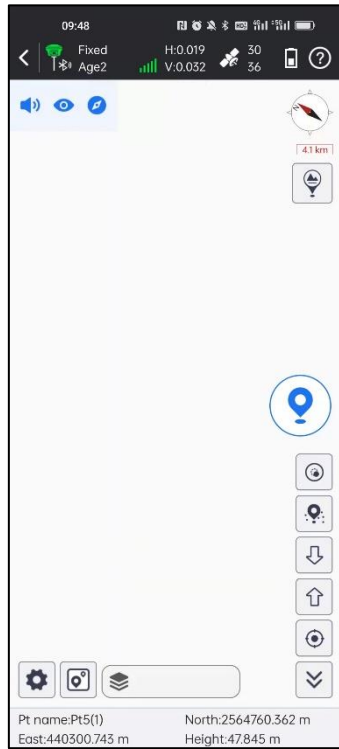
In Point Stakeout, we can select target point and do the stake out.




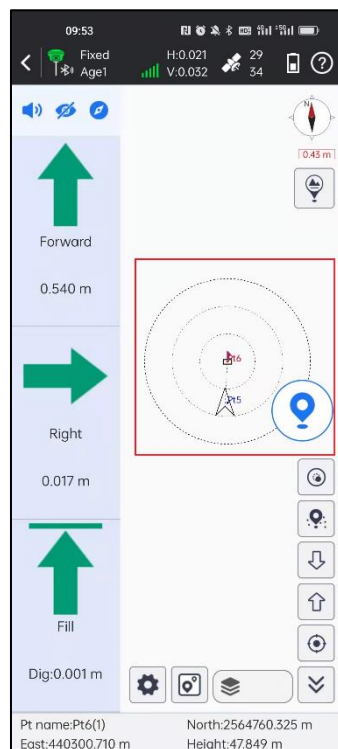
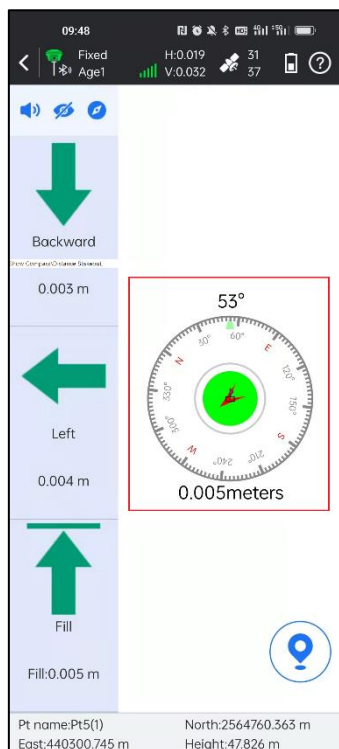
**Below are icons' descriptions of Stake out interface:**

  : Enable\Disable Voice Prompt;

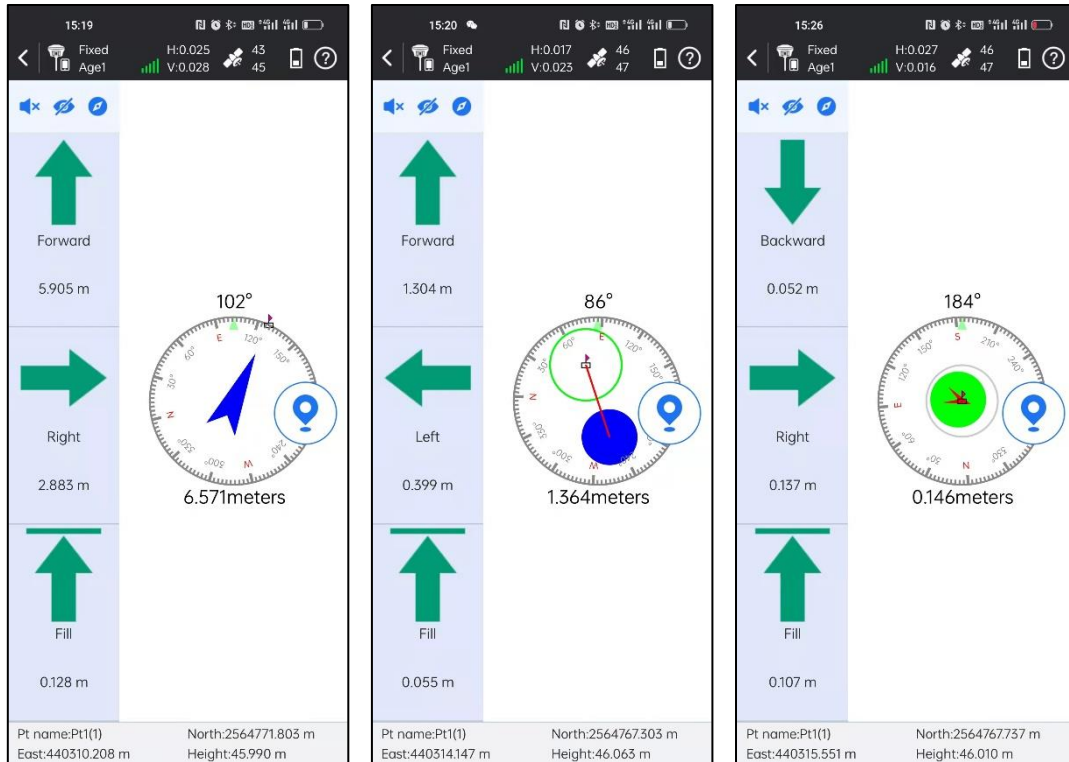
  : Display\Hide Stakeout Direction;



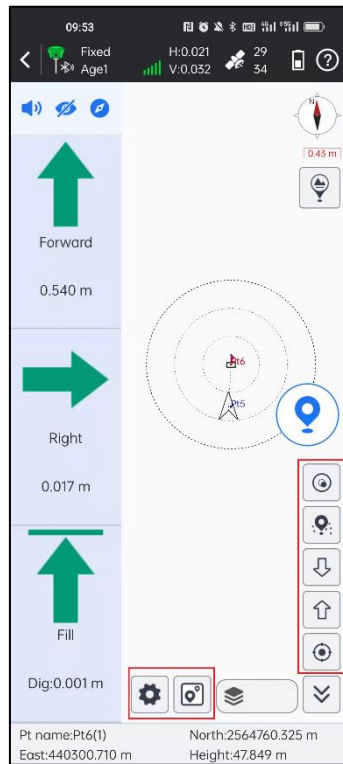
 : Show Compass\Distance Stakeout.




In Compass mode, when receiver is far from target point, receiver position will be displayed as an arrow; when it is near to the target point (2 times of prompt range), receiver position will be displayed as blue dot; when it almost reaches target point (1 time of prompt range), the blue dot will turn to green.



In Distance Mode, icons are as follows:




 : Points database.


 : Tilt Survey

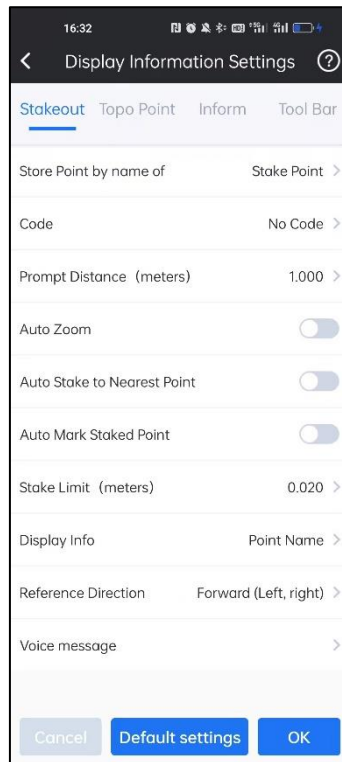
 : Nearest Point.

 : Next Point.

 : Last Point.

 : Point stakeout settings.

Note: In Point Stakeout settings (  ), we 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:** If we set Prompt Distance as 1 meter, and then in Stakeout Interface, SurvStar will draw 3 circles using target point as center, and  $1\sqrt{3}$  meters as radius.

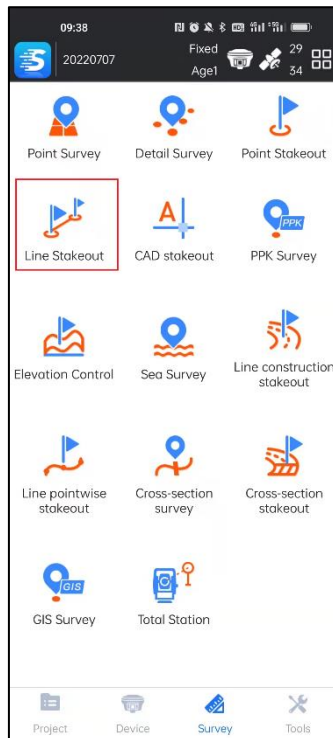
**Point stakeout steps:**

1. Select a point to stakeout in the points database, then click  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 accesses to precise stakeout.
4. After you reach the stakeout point, please stake it.

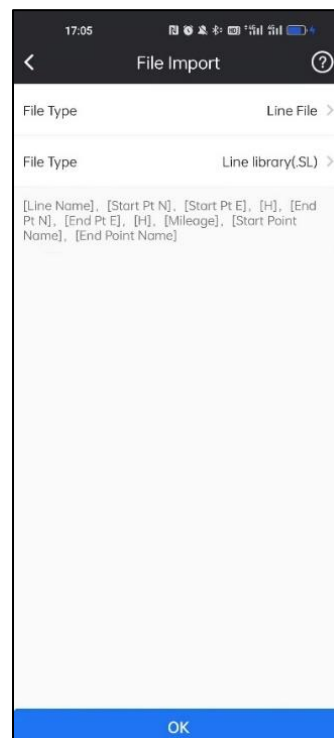
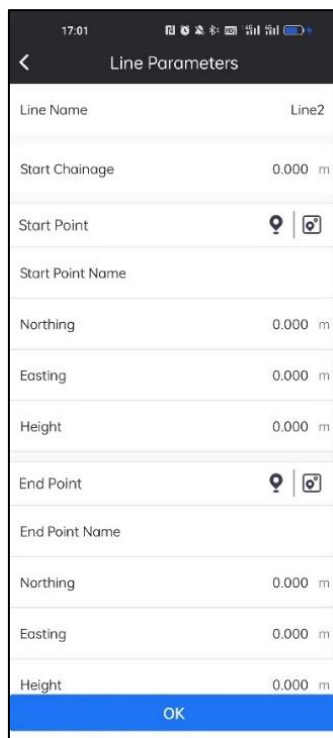
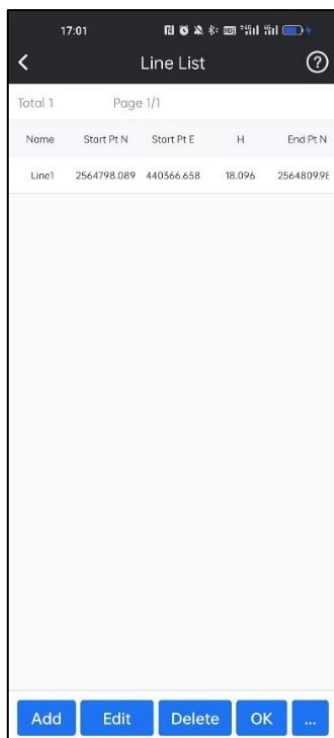
## 5-4 Line Stakeout

Line stakeout is the stakeout of designed line.

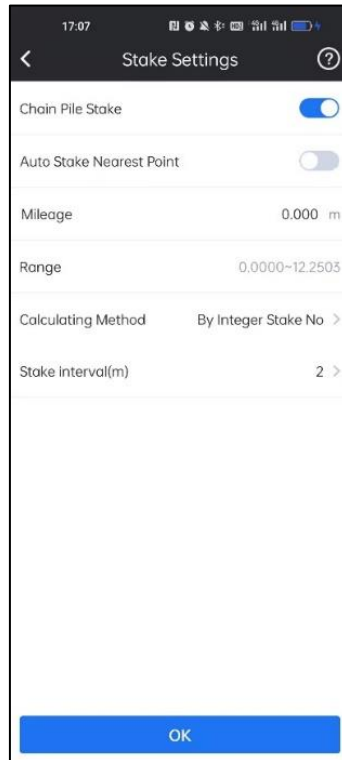
By clicking this, we will enter to Line List.



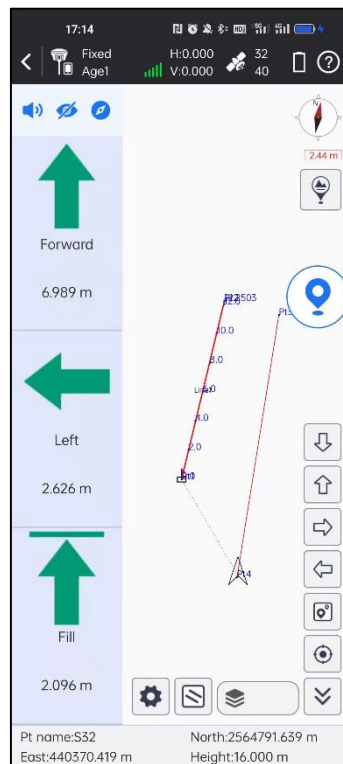
Click **Add**, we can add the designed line with Line Name, the Start Point, End Point and Start Chainage. We can also import line file(\*.SL).








Select target line, and click **OK**. And then we need to set stake parameters, which includes Chain Pile Stake On/Off, Auto Stake Nearest Point On/Off, Mileage, Range, Calculating Method and Stake interval.



Then we will access to the line stakeout page.



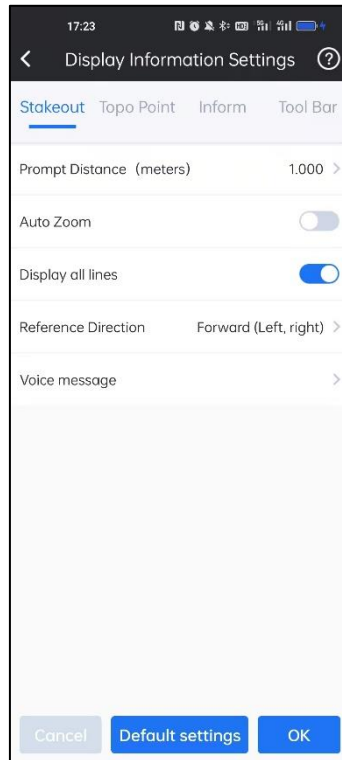
The icons in side toolbar are describe as follows:

-  : Line List.
-  : Next Point.
-  : Last Point.
-  : Next Line.
-  : Last Line.



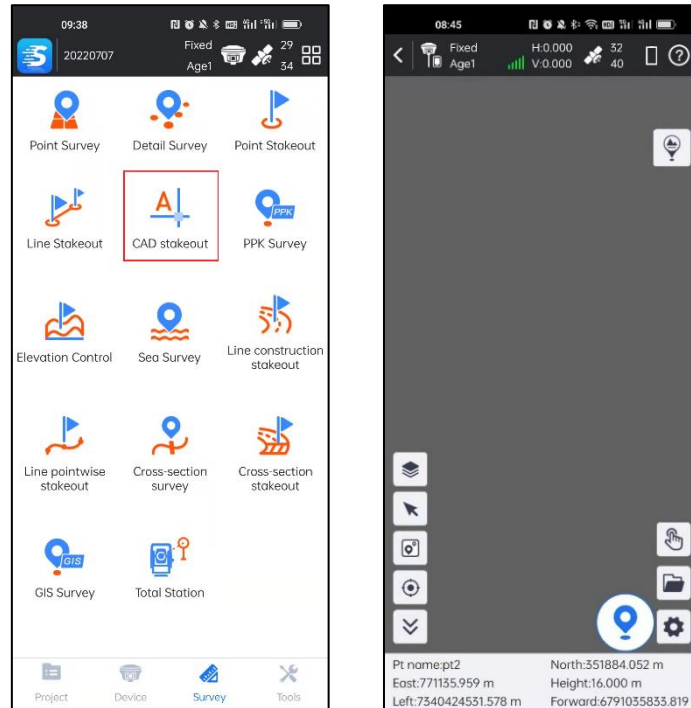
: Line Stakeout Settings.

In Line Stakeout Settings, we can set Prompt Distance, Reference Direction (Forward, North); As for Topo Point, Information and Tool Bar settings, it is the same as Point Survey. If we click **Default Settings**, and it can restore the changed settings.



## 5-5 CAD

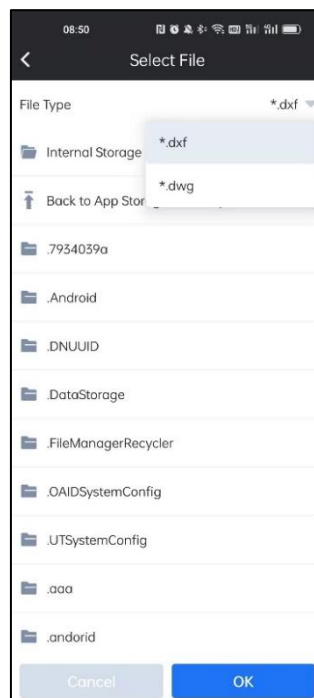
CAD function is mainly used to stake out CAD elements (Points, Line) of imported CAD file.



The icons in side toolbar describe as follows:



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





: CAD Layer.

We can manage and check the CAD layers by clicking this icon.



: Layer switches, controlling layer display.



: Layer freeze, cannot edit or modify after freezing.

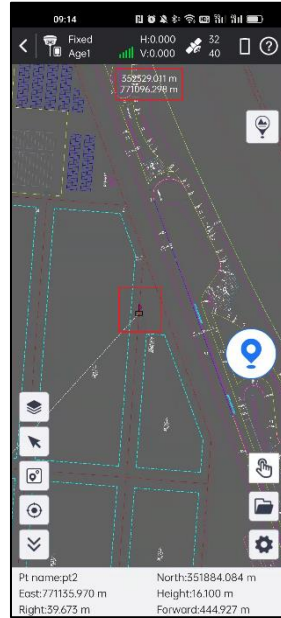
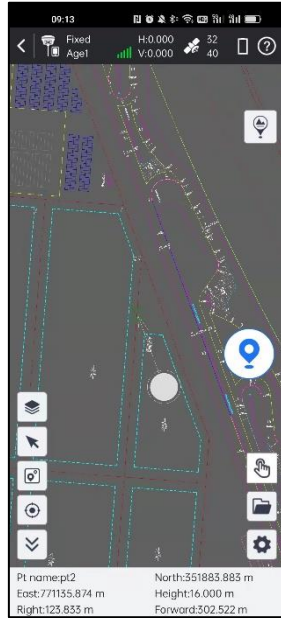


: Layer locking, cannot select after locking.



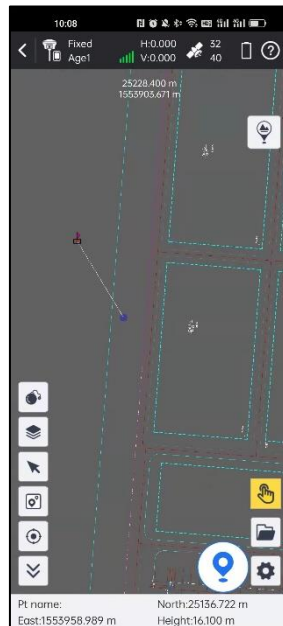
: Select Point Mode.

By clicking it, an arrow will come out. With the help of the arrow, we can move to any position on the map, get coordinates, and do Point stakeout.



: Select CAD Element Mode.

By clicking this, We can select Point, Line, Surface elements of loaded CAD file and do a stakeout.





: CAD stakeout settings.

In CAD Stakeout Settings, we can set Prompt Distance; settings for Topo Point, Inform and Tool Bar are the same as that of Point Survey.



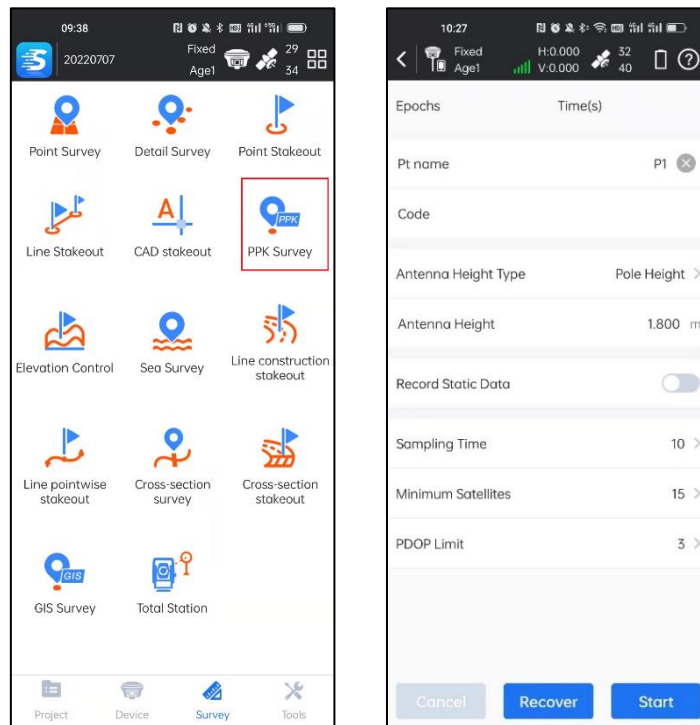
## 5-6 PPK Survey

PPK (Post Processed Kinematic) is a post-processing differential technology to obtain centimeter level positioning accuracy information. Compared to RTK (Real Time Kinematic) positioning, PPK doesn't need direct communication between base station and rover station. It is also called Stop & Go.

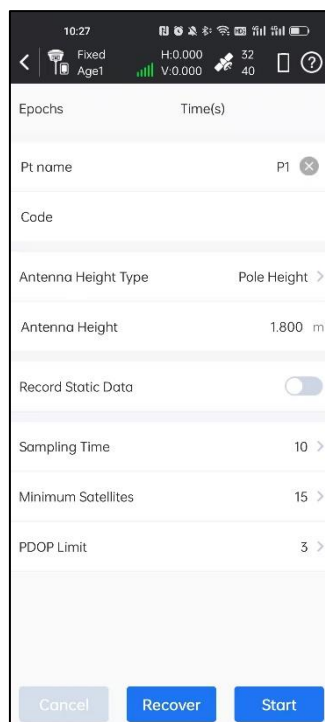
1. We need to enable Raw data record in WEB UI for both base and rover.

The screenshot displays the web interface for configuring a receiver. On the left is a navigation menu with the following items: Status, Configuration (expanded), General Config (highlighted with a red box), Base Setup, Antenna Setup, Satellite Tracking, Receiver Operation, System Setup, Receiver Security, Satellite Information, Data Record, Data Transfer, Network Config, Radio Config, Firmware Update, Track Manage, Coordinate System, and Online Service. The main content area shows registration details (Code, ExpiredDate, OnlineRegistration, OEMRegisterCode) and a 'Mode Setting' section. In the 'Mode Setting' section, the following options are visible: Work Mode (Rover), Datalink (Bluetooth), Radio Router (None), Radio Transfer (unchecked), RTK Record (checked and highlighted with a red box), xFillEnable (unchecked), 1PPS (checked), BDSPPP (unchecked), WiseLinkRoute (checked), EVENT (unchecked), and EVENT Polarity (Negative). 'Enter' and 'Cancel' buttons are located at the bottom of the configuration area.

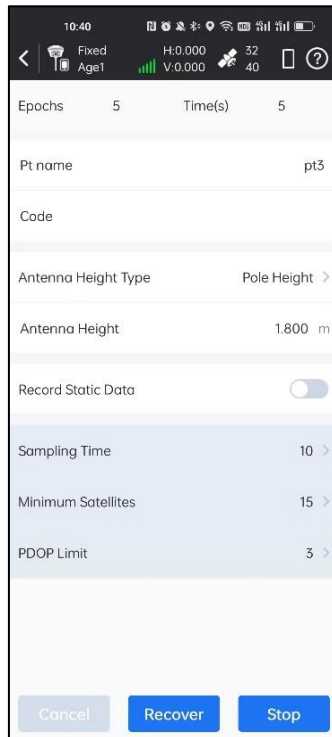
2. After connecting rover in SurvStar, go to Survey-Point Survey-PPK, we can access to the PPK collect interface.



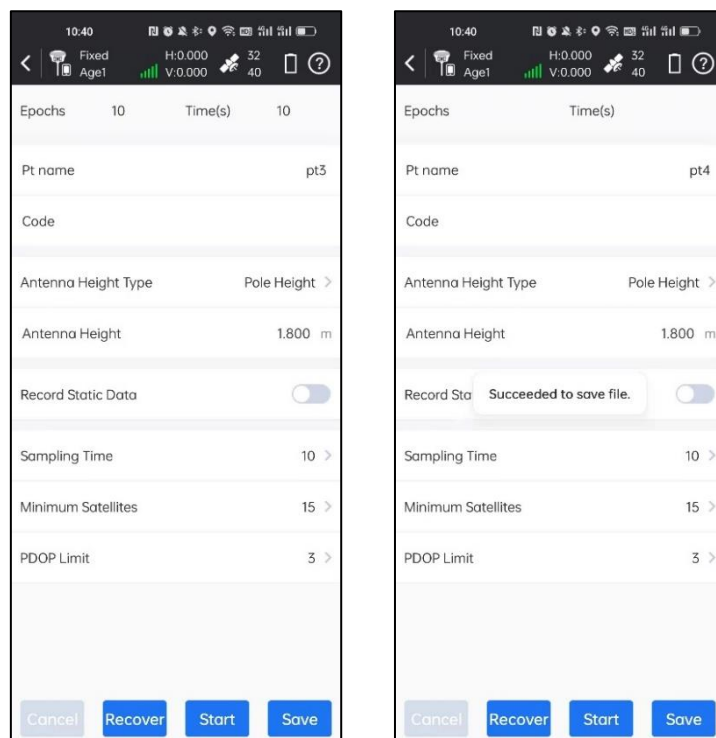
3. In PPK collection, we can set the Pt name, Code, Antenna Height Type, Antenna Height, Record Static Data On/Off (make sure Record Static Data choice is on), Sampling Time, Minimum Satellites and PDOP Limit. For the Sampling Time setting, 30 seconds or more is recommended to achieve better accuracy.



4. And then we go to the first target point, click start and SurvStar will collect the point's PPK information. After previous set Sampling Time ends, PPK collection will stop.



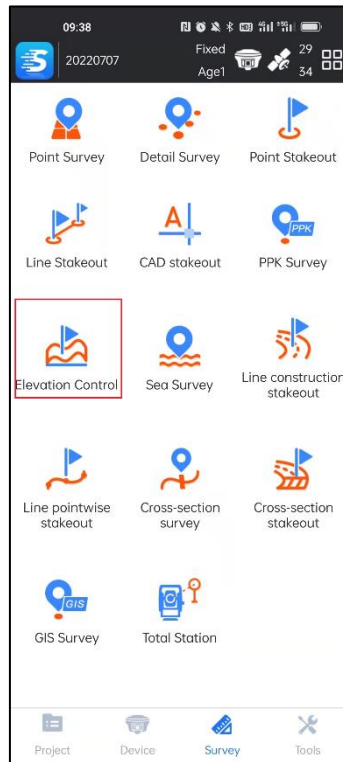
5. After collecting the point, we can click **Save** to save the point and then go to the next point.




5. Repeat these steps until the project done. And then copy relevant files into post processing software to do PPK processing.

## 5-7 Elevation Control

Elevation Control is using known points to calculate designed Height surface, or loading designed Height surface directly, and we can compare current position's Height with designed Height surface to do site leveling and earthwork calculation work.



1. Click  to open Surface manage page.

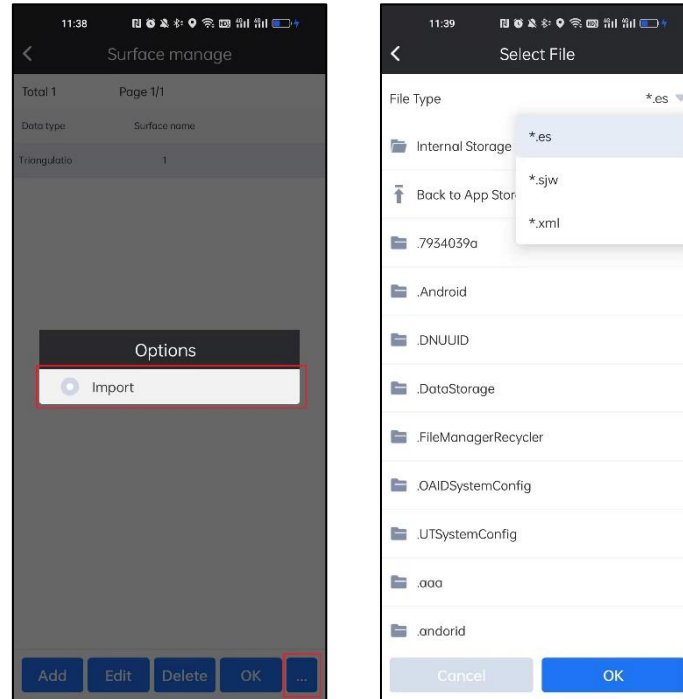


## 2.Add/Import Surface.

There are two ways to add/import surface.

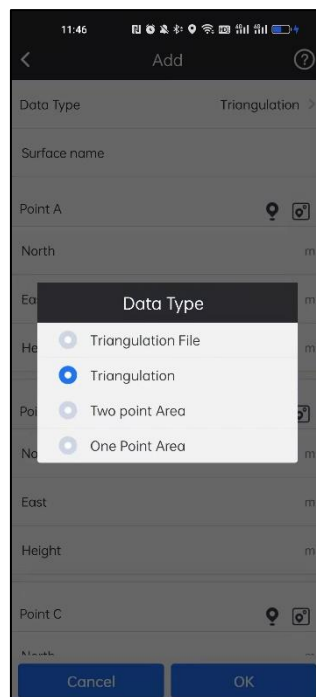
### Import:

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.



11:48



Add

Data Type One Point Area >

Surface name

xSlope(%)

ySlope(%)

Point A  

North m

East m

Height m

Cancel OK

**One point**



11:48

Add

Data Type Two point Area >

Surface name



Slope(%)

Point A  

North m

East m

Height m

Point B  

North m

East m

Height m

Cancel OK



**Two points**

11:48

Add

Data Type Triangulation >



Surface name

Point A  

North m

East m



Height m

Point B  

North m

East m

Height m

Point C  

North m

East m



Height m

Cancel OK

**Three points**

11:48



Add

Point A  

North m

East m



Height m

Point B  

North m

East m

Height m

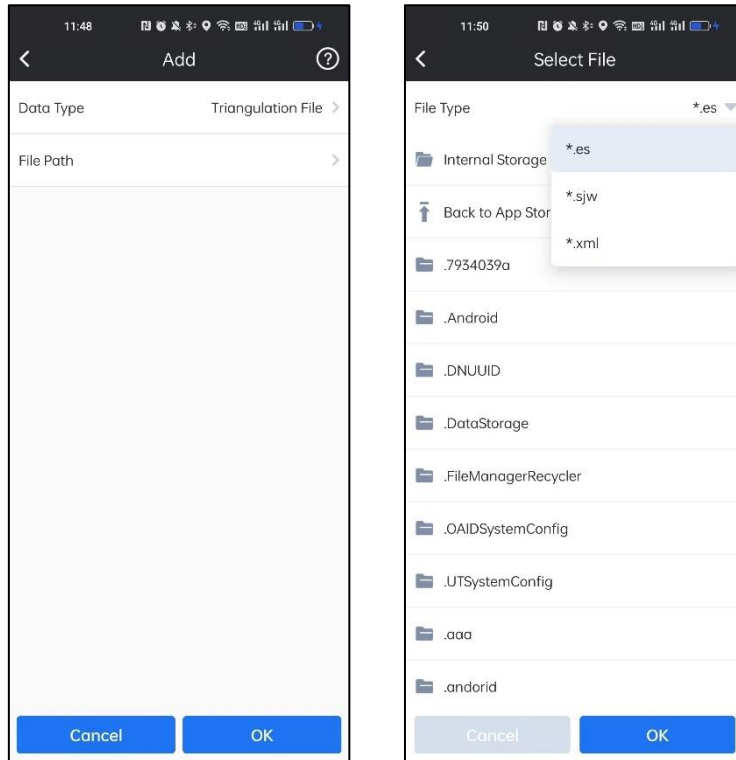
Point C  

North m

East m

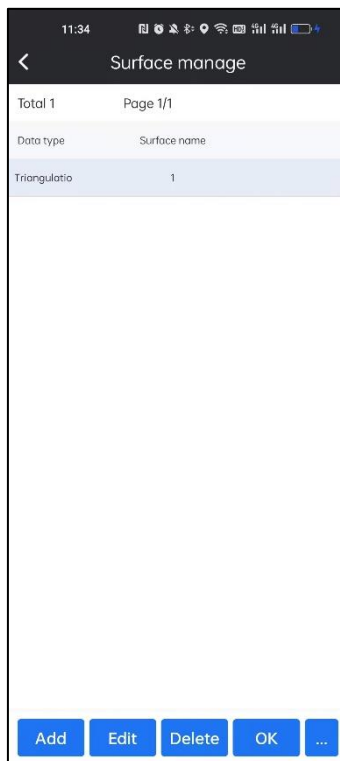
Height m

Cancel OK

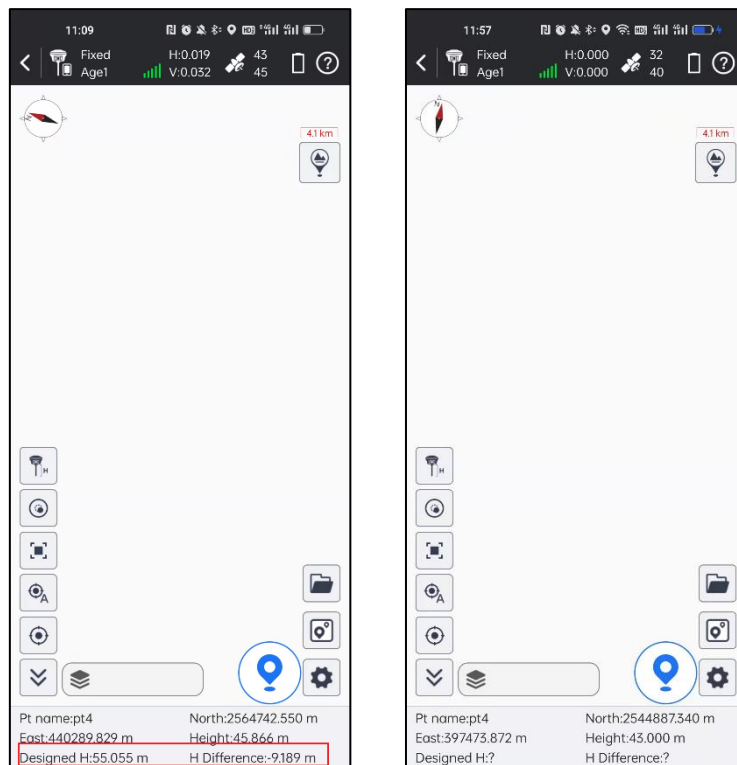


**Triangulation file**

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



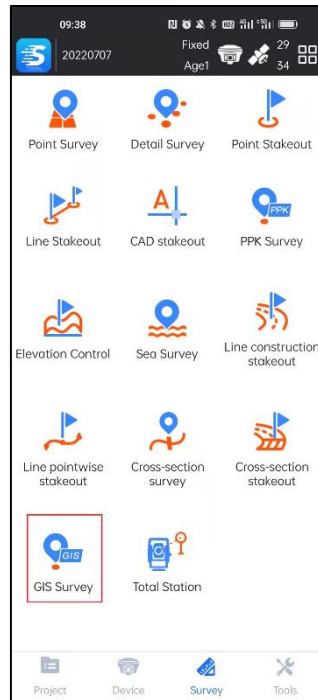
4.If the device is in the surface, there will be designed height and H difference shown in the below bar. If it is outside, there will be ‘?’.



We can control the elevation with the designed surface. And know the any point H difference in the range of the surface.

## 5-8 GIS Survey

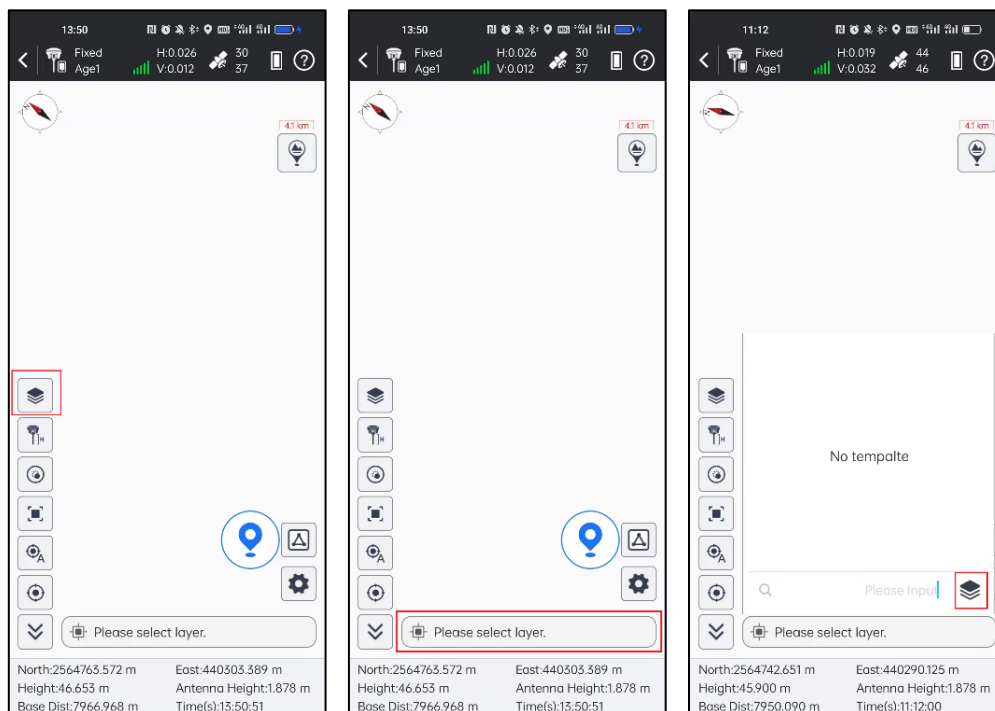
In GIS survey, we can define GIS template and collect GIS entities.



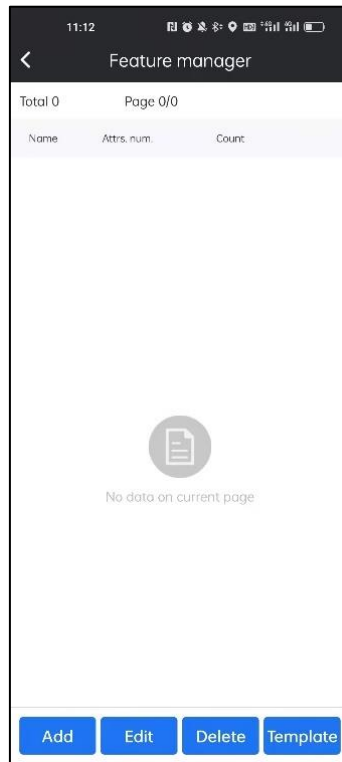
1. For a new project, we need to import predefined GIS template or make GIS entities'

features for current project in SurvStar. Click  and enter to feature manager page.

We can also click the layer bar to enter to it.

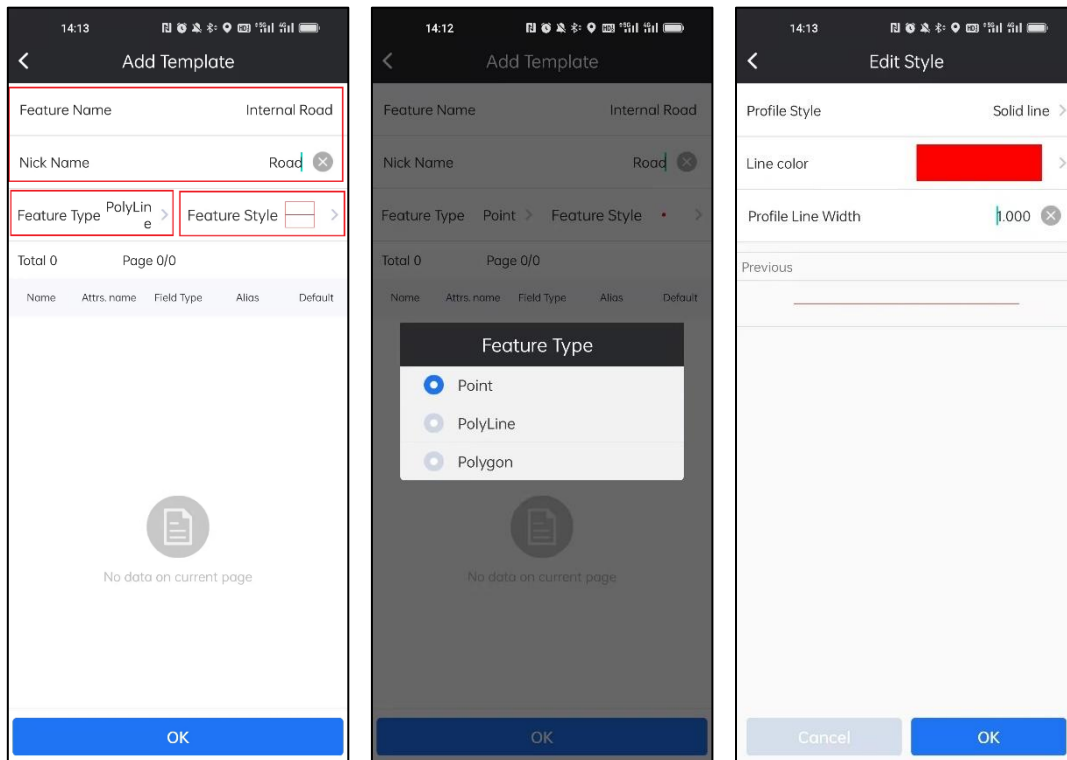


2. In feature manager, we can add, edit, delete, import and export the features.

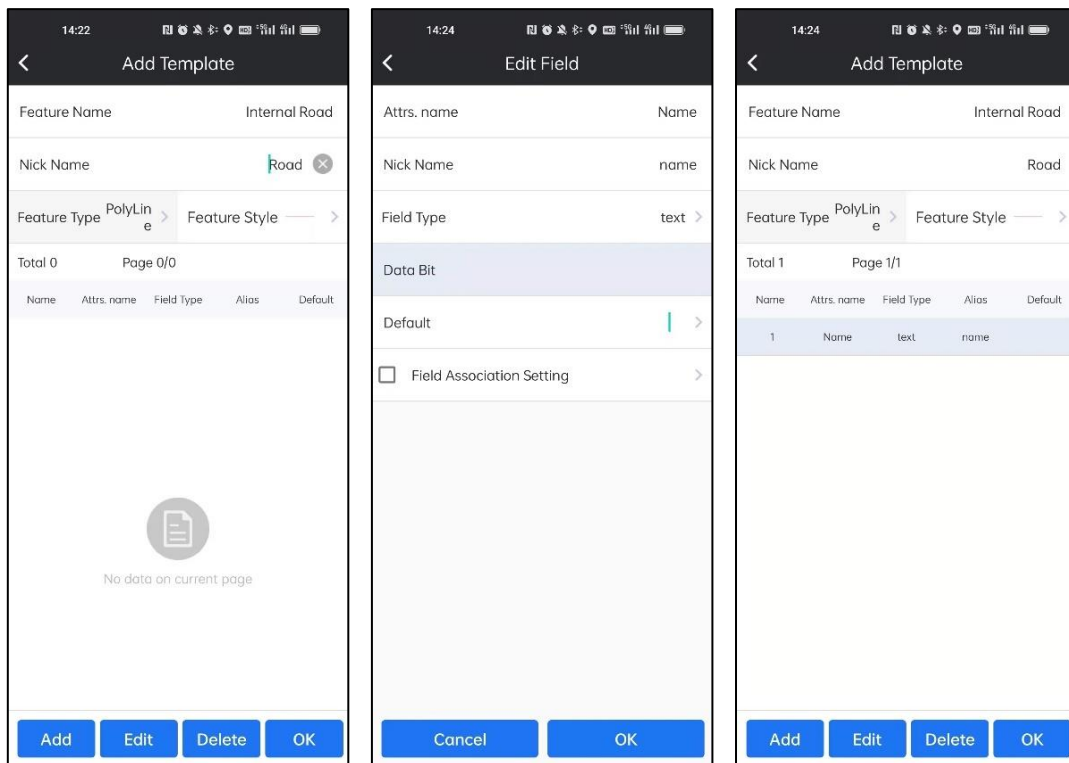


**Add:**

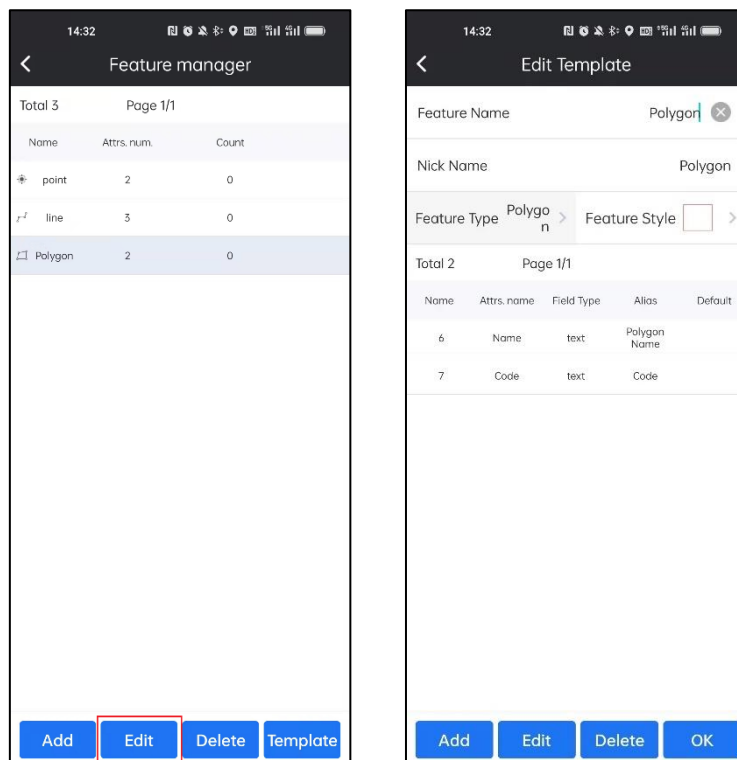
Click **Add**, input the feature name and nick name, choose the feature type (Point/PolyLine/Polygon) and set the feature style, then click **OK**.



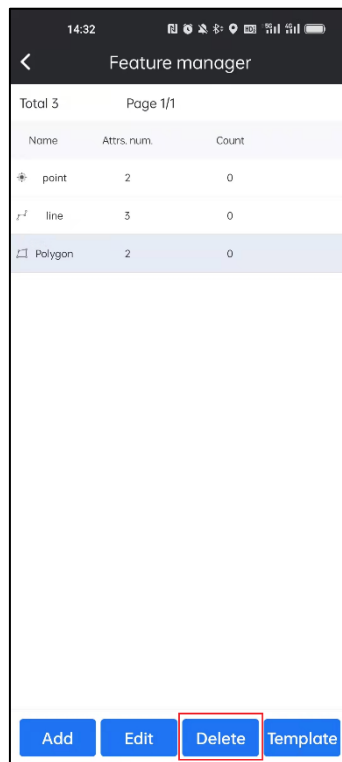
Then we need to add the attribute of it, click **Add**. Input the Attributes Name, Nick name, Field Type and click **OK**. If the input of the attributes finished, click **OK**.



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

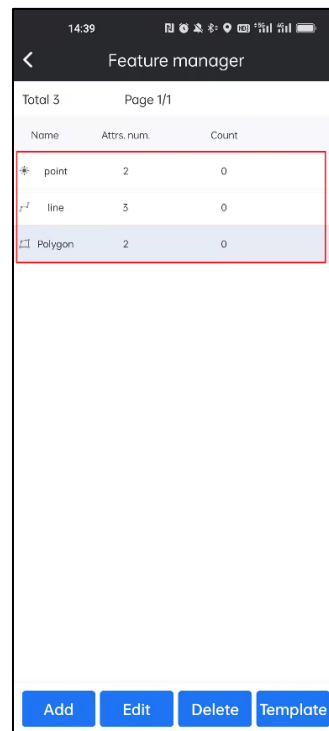
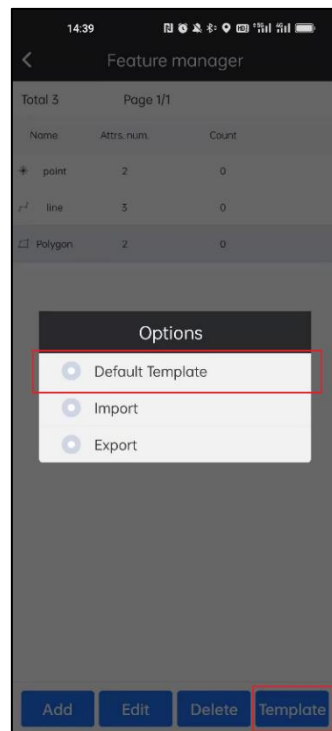


**Delete:** Select any feature, click **Delete**, then we can delete it.



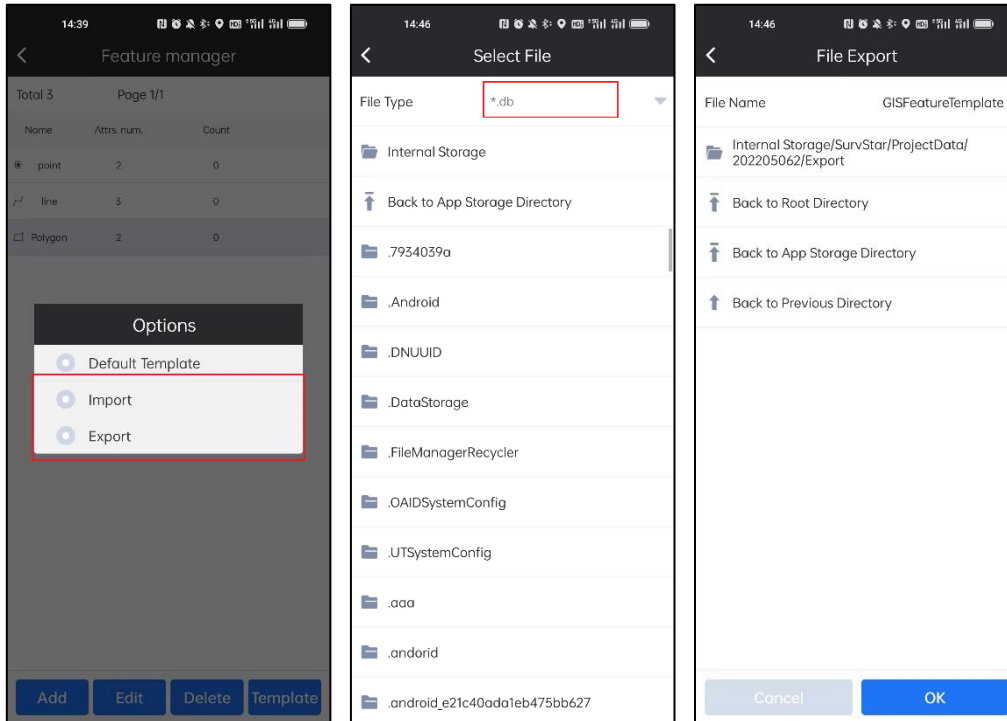
**Default Template:**

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

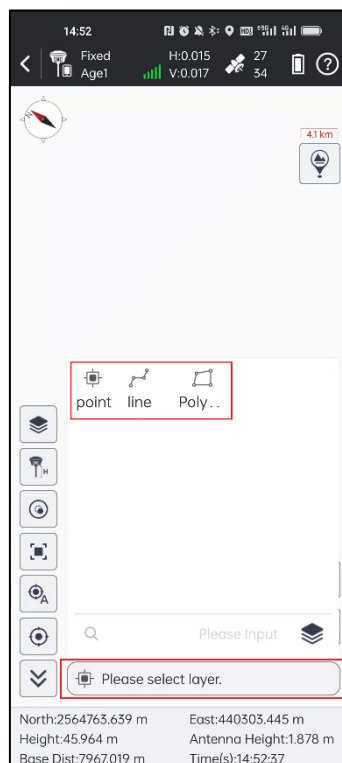


### Import/Export Template:

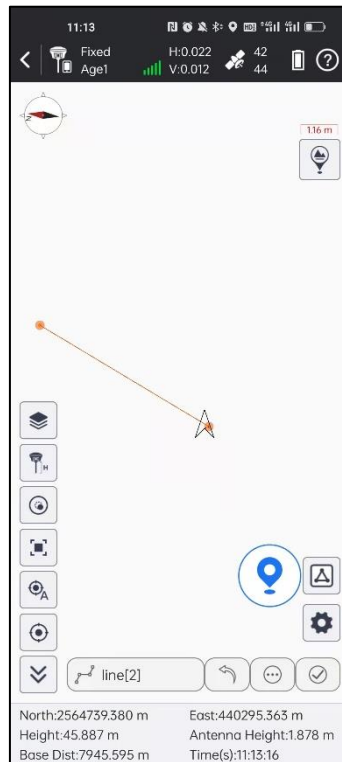
Click **Template** and click **Import/Export**, select the template file(\*.db)/select the export path and click **OK**. The template file will be imported or exported.





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. For example, select a line feature template. And start to do GIS survey.

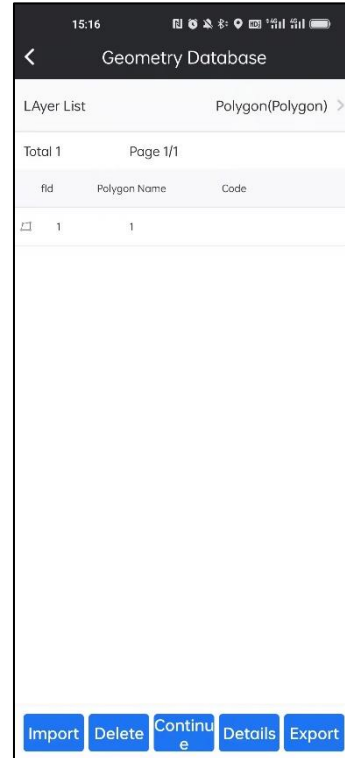
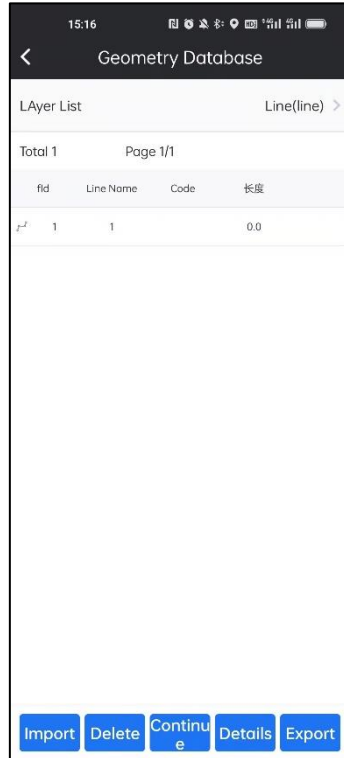


: Click this, it will go back to the previous operation

: 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.

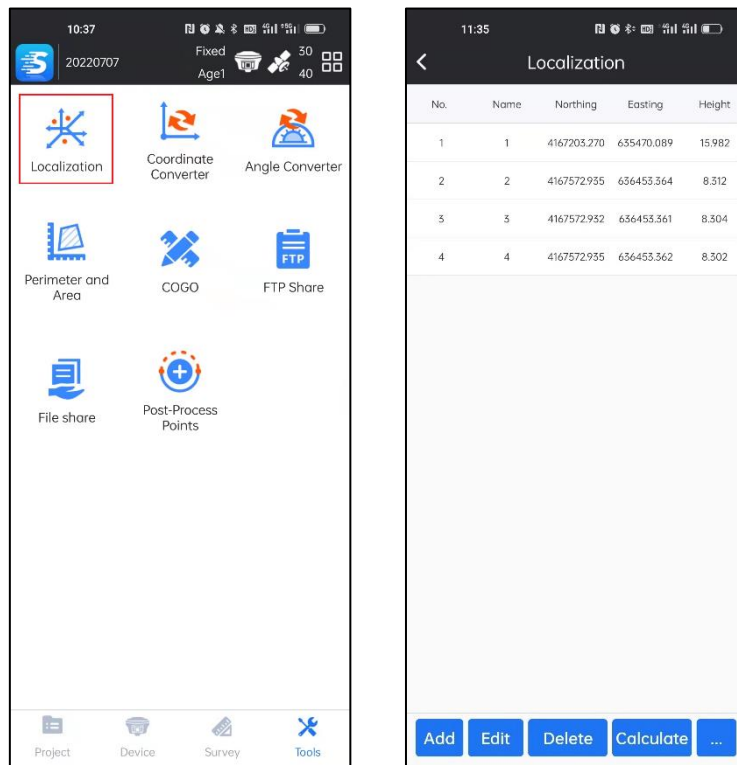


# Chapter 6 Tools

## 6-1 Localization

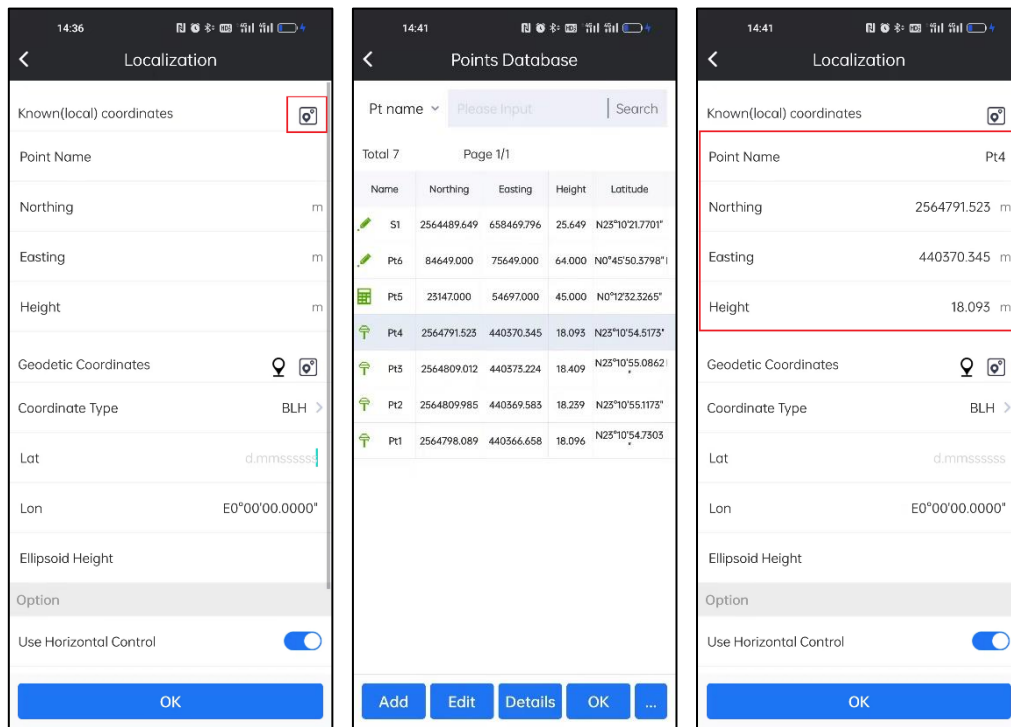
Sometimes we don't know target coordinate system parameters except for a few known points, in this case, we need to do Localization to convert current coordinate system to target coordinate system.

When we go to Localization tool, we can do the Add, Edit, Delete, Calculate, Import, Export and Settings operation.

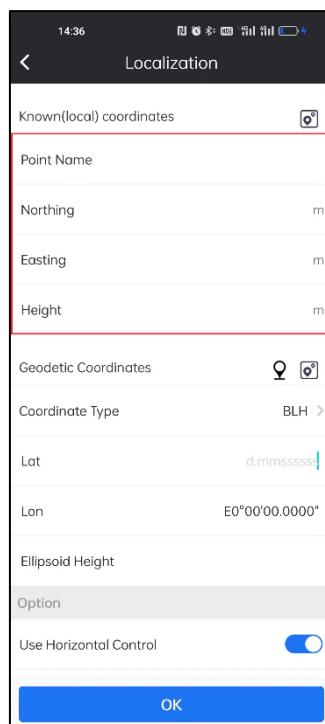


### Add:

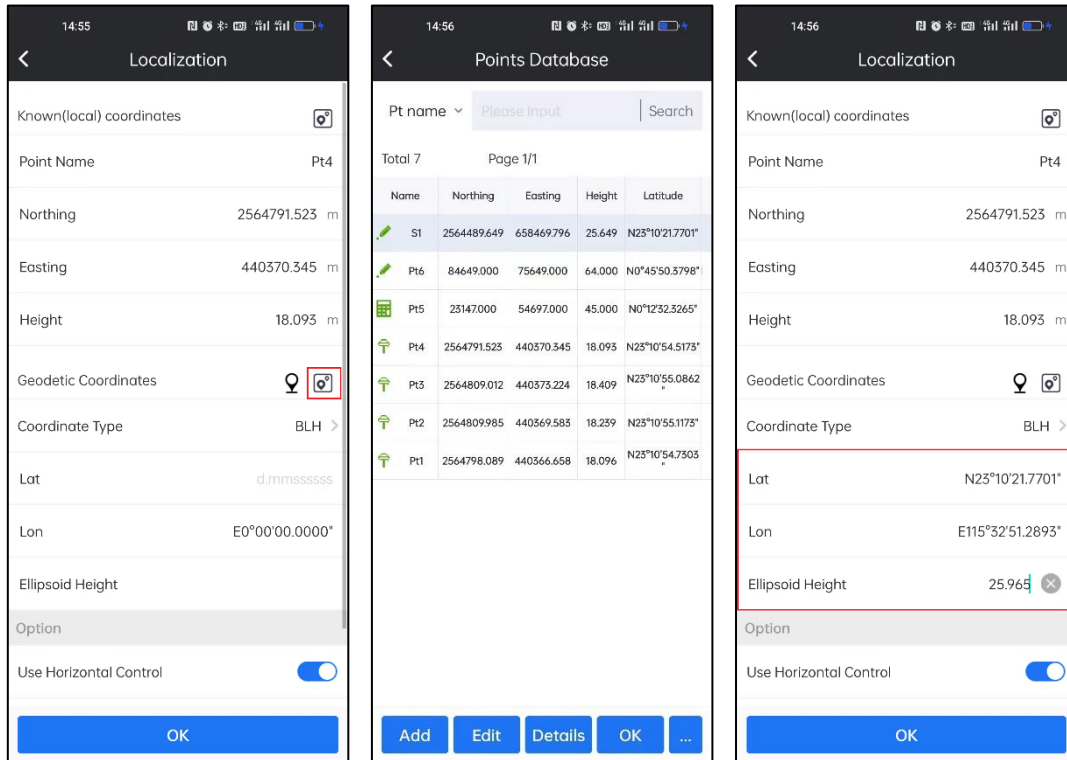
Click **Add**, we can add Coordinates of the same point under target coordinate system (known point) and current coordinate system. If we have input known points NEH in database before, we can click the icon in the right of the Known(local) coordinates bar. And select it directly.



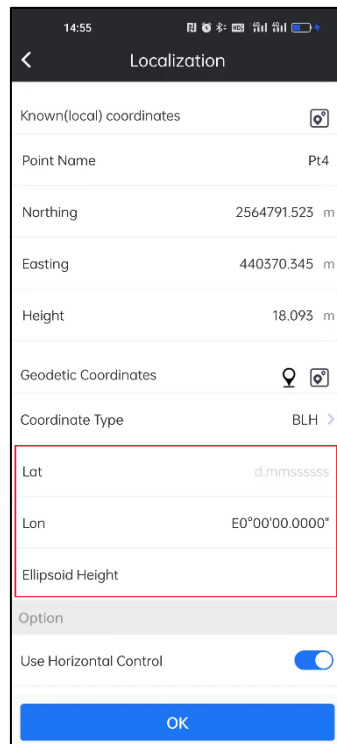
Or we can input the coordinate directly.



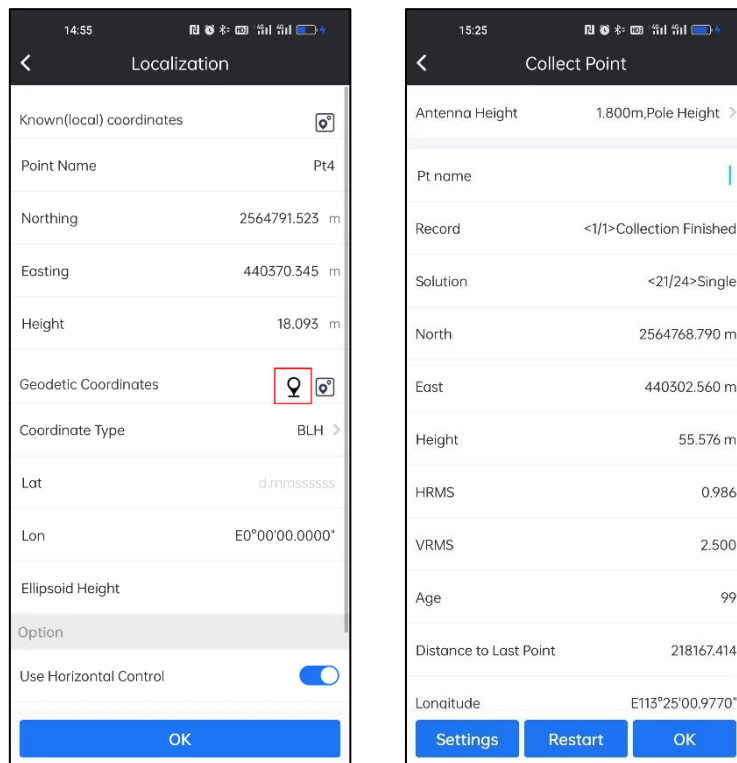
And then we need to input the same point's Coordinates under current coordinate system. If we collected it before, we can click the icon in the right of the Geodetic Coordinates bar and select it directly.



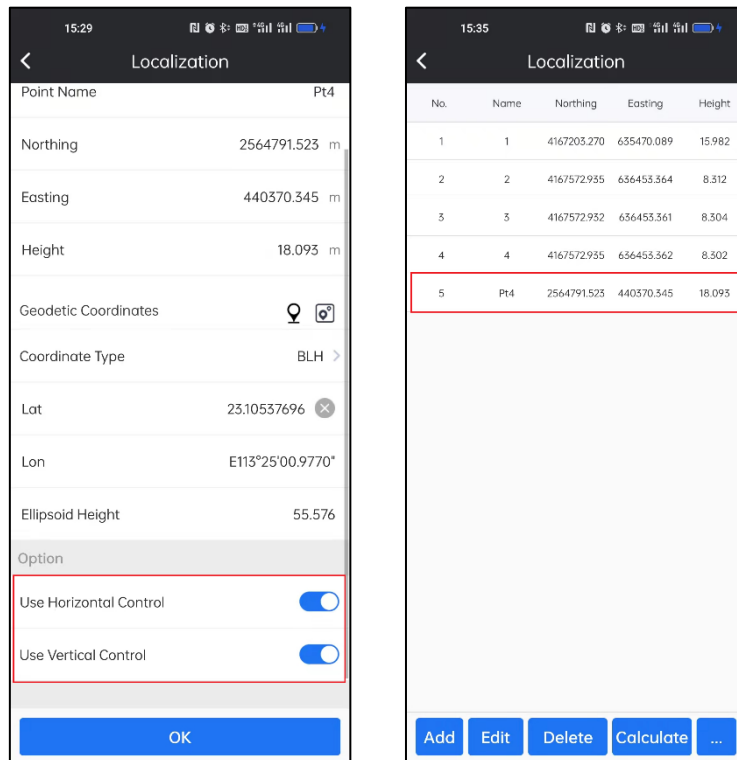
We can also input BLH directly.



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

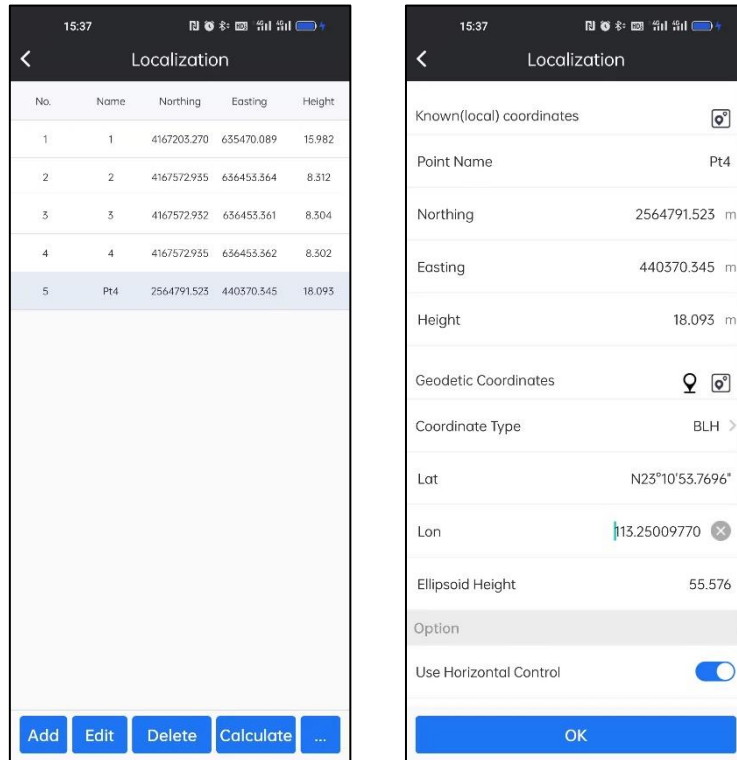


Then we need to select whether to use the point with horizontal control or vertical control. And Click OK. This point will participate in calculation.



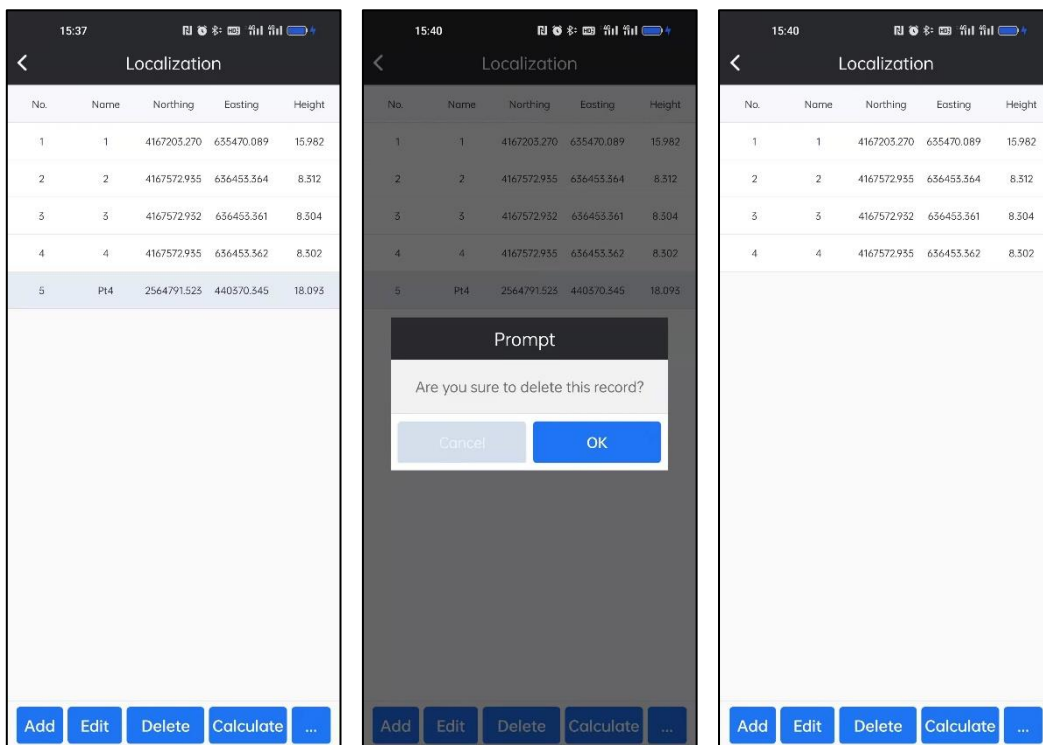
### Edit:

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.



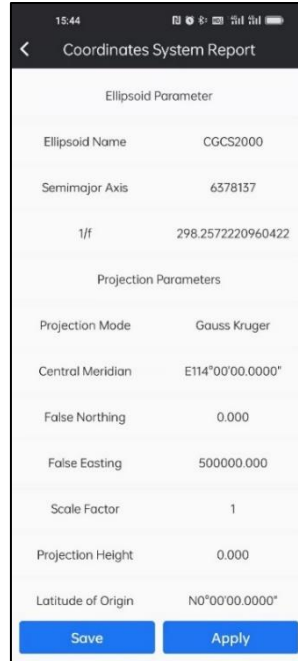
### Delete:

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



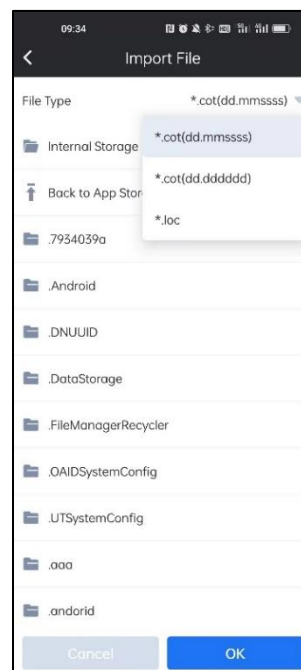
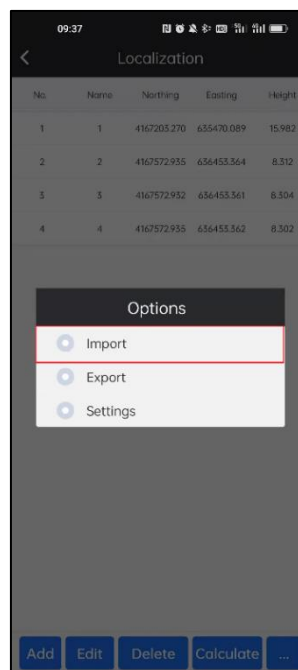
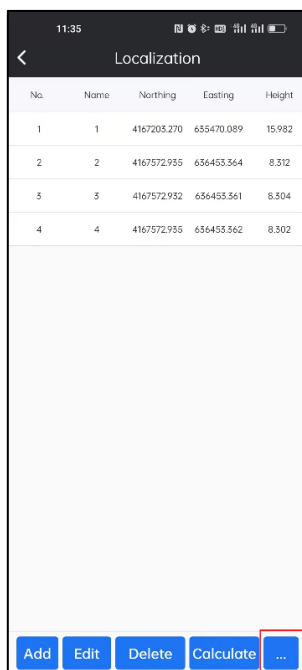
## Calculate:

After finishing inputting localization points' information, we can click Calculate. Then there will show a coordinates System report with converting parameters. We can save the converting parameters by clicking Save. And click Apply, the parameters will apply to the current project.



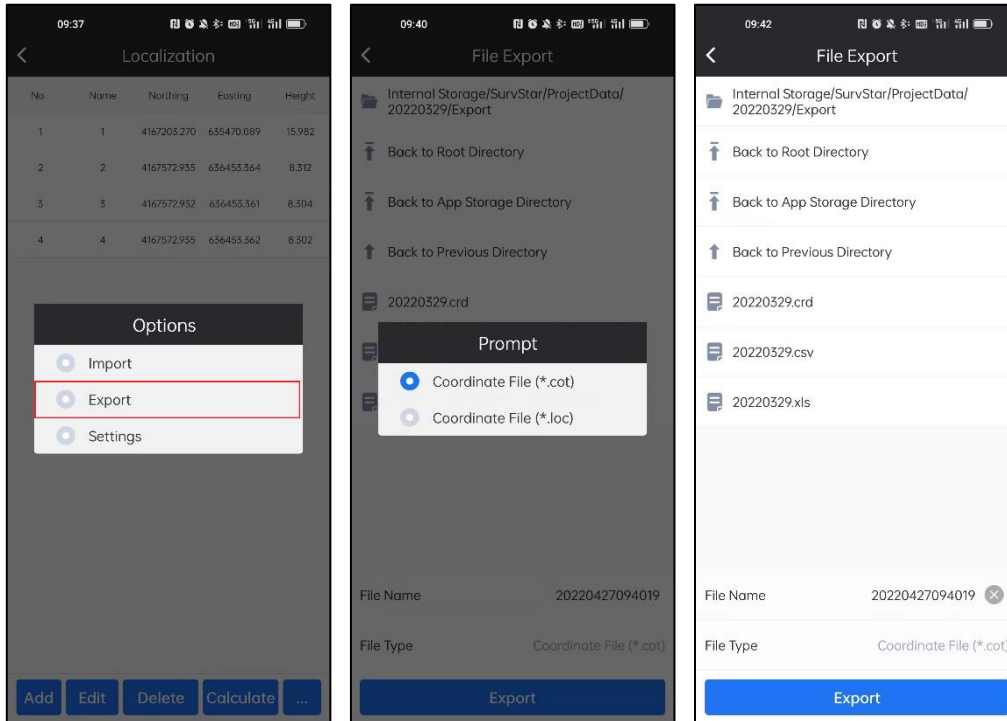
## Import:

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**.



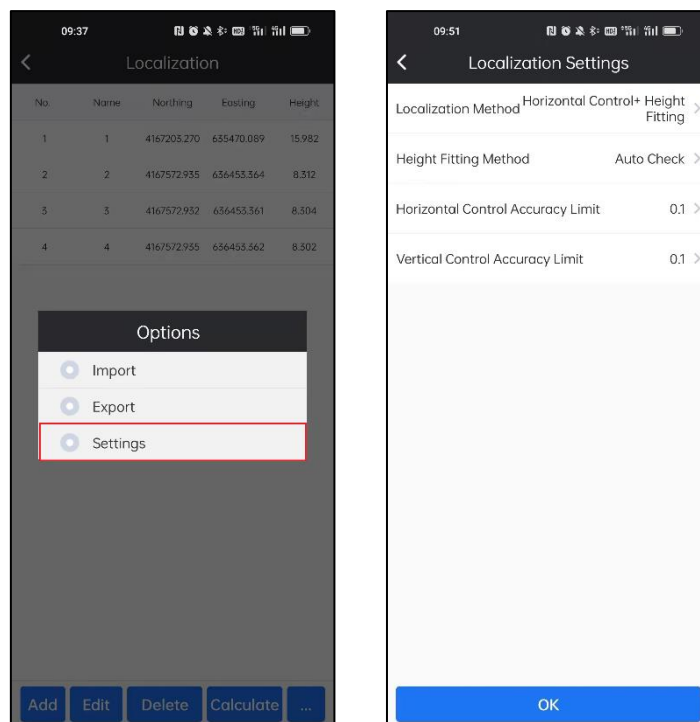
## Export:

Click **...** and Click **Export**. Select the file type: \*.cot(dd.mmssss) or \*.loc. Select file path and click the file. Click **Export**.



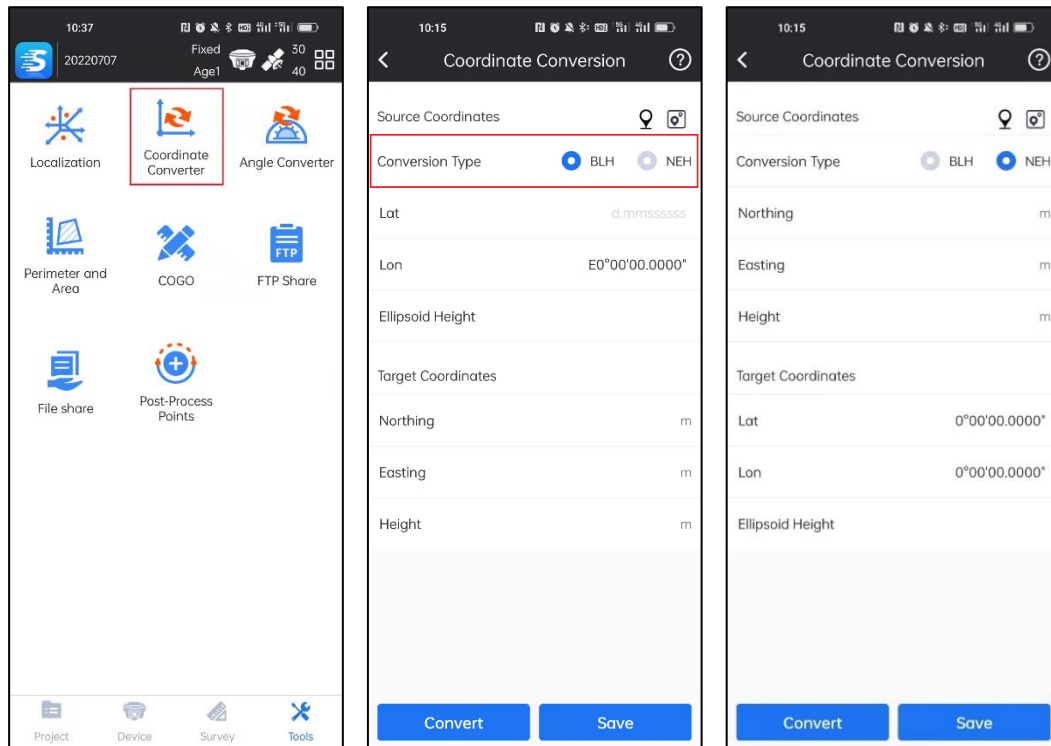
## Settings:

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

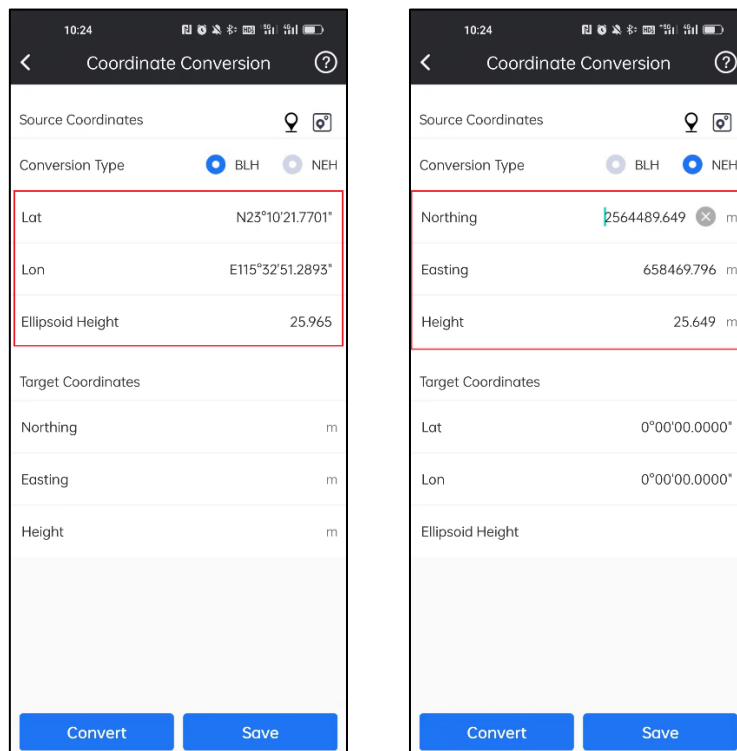


## 6-2 Coordinate Converter

In Coordinate Converter, 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.



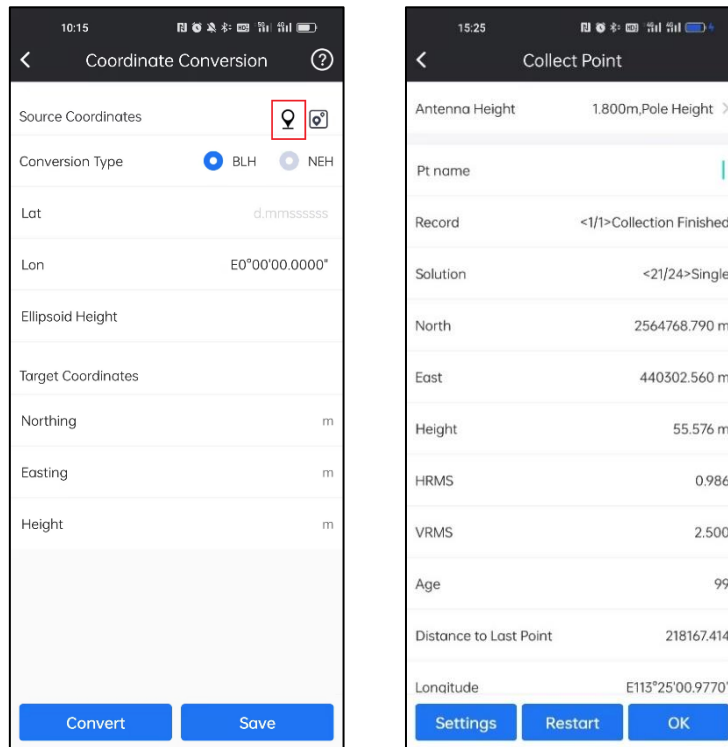
We can input coordinate directly.



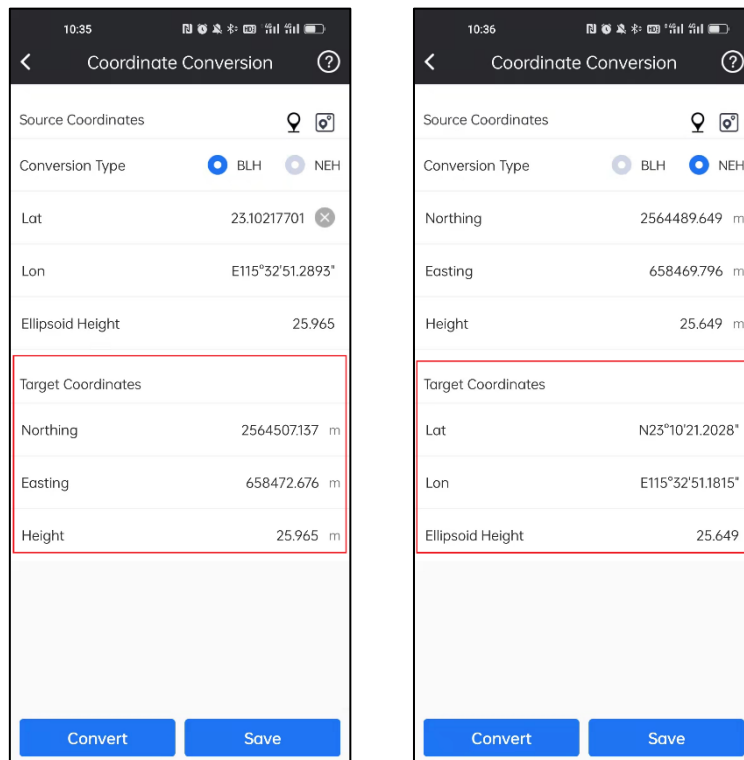
If we have the surveyed point in database, we can click the icon in the right of the Source Coordinates bar. And select a point. Click **OK**. Then the BLH or NEH will input automatically.

The screenshot displays the 'Coordinate Conversion' app interface. At the top, the status bar shows the time 10:15 and various system icons. The app title 'Coordinate Conversion' is centered at the top. Below the title, there is a 'Source Coordinates' field with a location icon (a square with a camera symbol) highlighted by a red box. To the right of this field is a female gender symbol. Below the source coordinates, the 'Conversion Type' is set to 'BLH' (selected with a blue radio button) and 'NEH' (unselected with a grey radio button). The 'Lat' field contains the placeholder 'd.mmssssss' and the 'Lon' field contains 'E0°00'00.0000\*'. Below these are fields for 'Ellipsoid Height' and 'Target Coordinates'. The 'Target Coordinates' section includes 'Northing', 'Easting', and 'Height', each with a unit 'm' to its right. At the bottom of the screen, there are two blue buttons: 'Convert' and 'Save'.

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



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



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

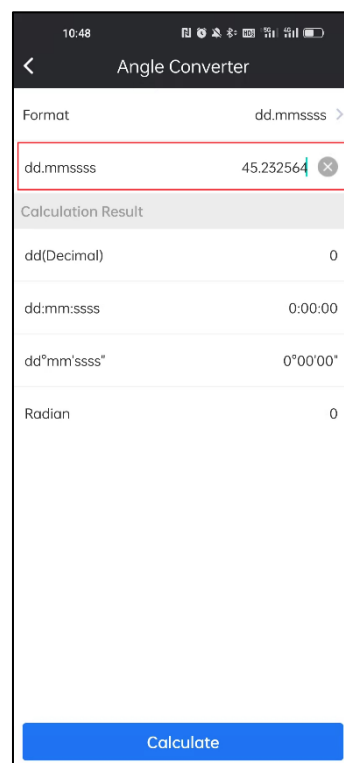
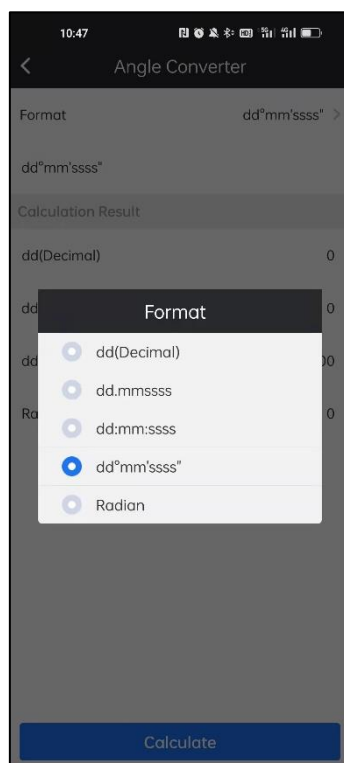
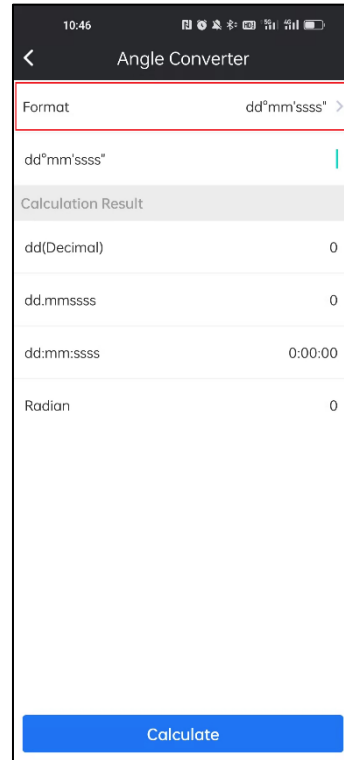
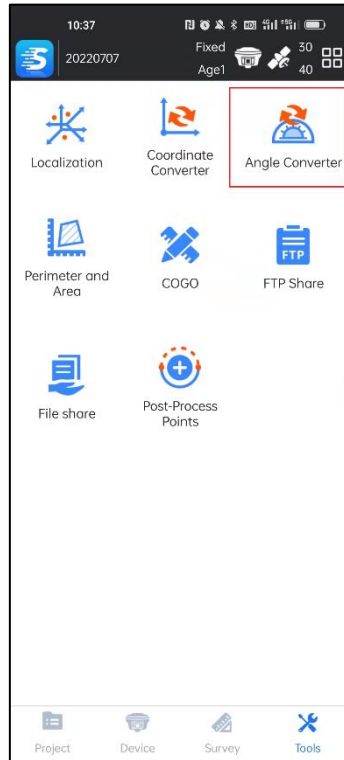
The screenshot shows a mobile application interface titled "Add". At the top, the time is 10:40 and there are various status icons. Below the title bar, there is a list of fields for adding a point to a database:

- Pt name: (empty text input field)
- Northing: 2564507.137 m
- Easting: 658472.676 m
- Height: 25.965 m
- Point Type: Input Point >
- Code: (empty text input field)
- Coordinate Type: NEH >

At the bottom of the screen, there is a blue button labeled "OK".

## 6-3 Angle Converter

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



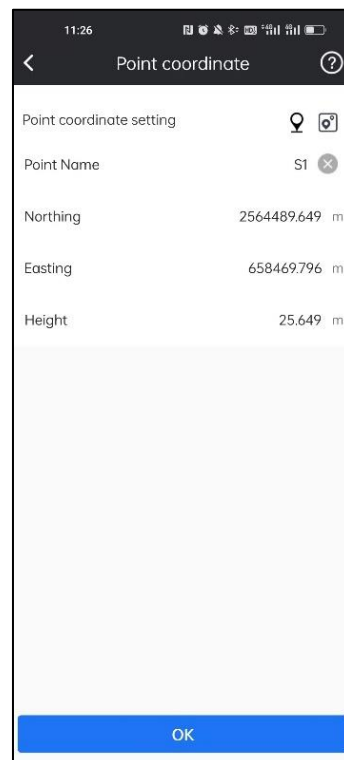
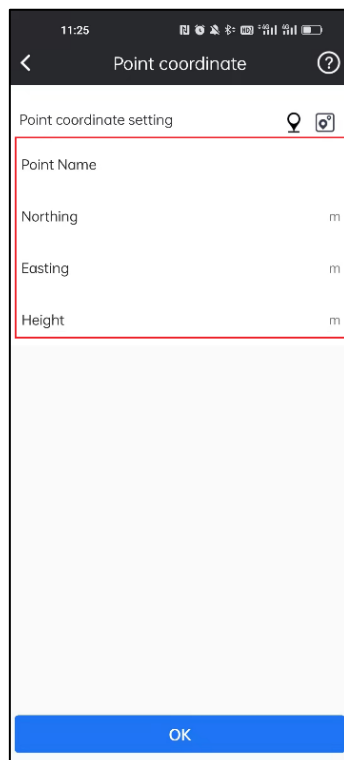
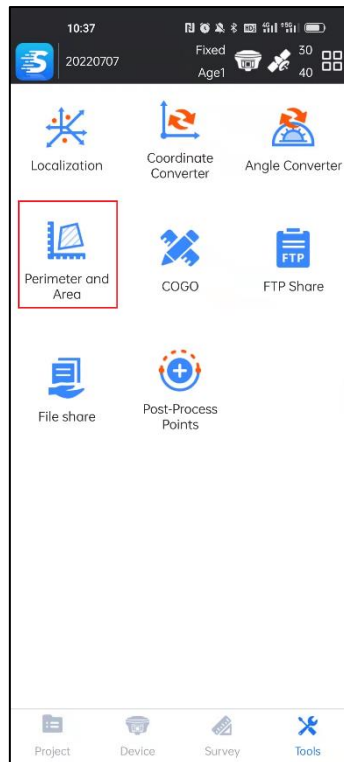
Click **Calculate**. Then the angle value input will be converted to other formats.

The screenshot shows a mobile application titled "Angle Converter". At the top, the time is 10:48. Below the title, there is a "Format" dropdown menu set to "dd.mmssss". The input field contains the value "45.232564" with a clear button (X) to its right. Below the input, a section titled "Calculation Result" is highlighted with a red border. This section contains a table with four rows of conversion results. At the bottom of the screen, there is a blue "Calculate" button.

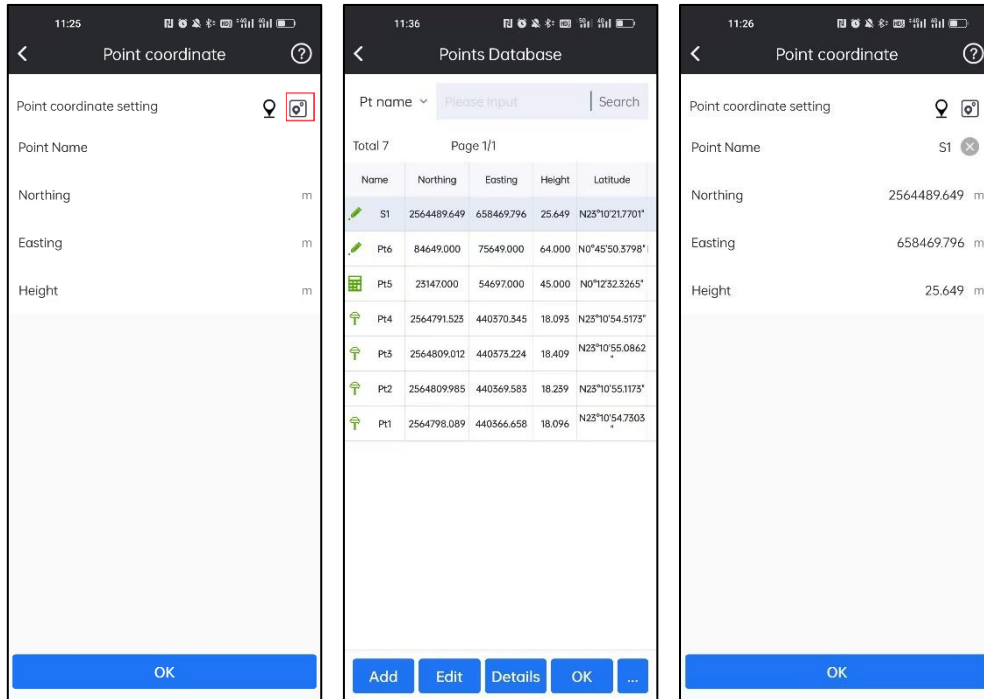
Calculation Result	
dd(Decimal)	45.39045556
dd:mm:ssss	45:23:25.6400
dd°mm'ssss"	45°23'25.6400"
Radian	0.79221290

## 6-4 Perimeter and Area

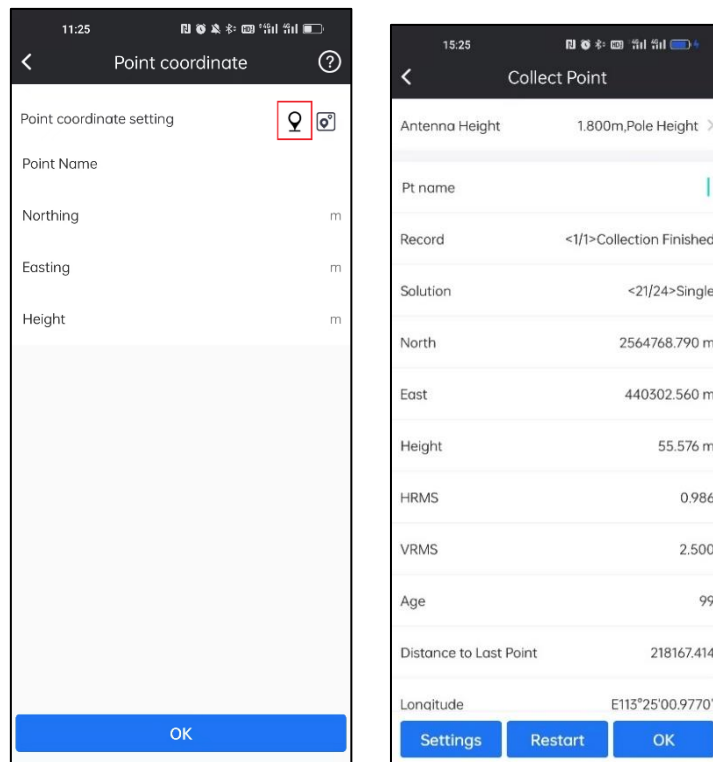
In Perimeter and Area, we can use the coordinate of the points to calculate the perimeter and area. Click **Add**. We can input the point directly.



If we have the surveyed point in database, we can click the icon in the right of the Point coordinate setting bar. And select a point. Click **OK**. Then the NEH will input automatically.



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.

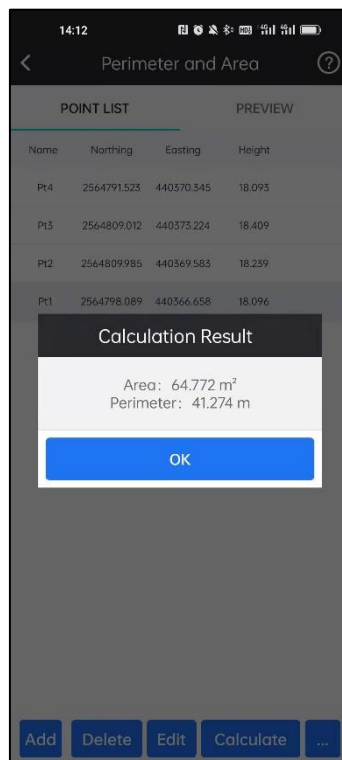


Click **OK**. And the point will add to point list.

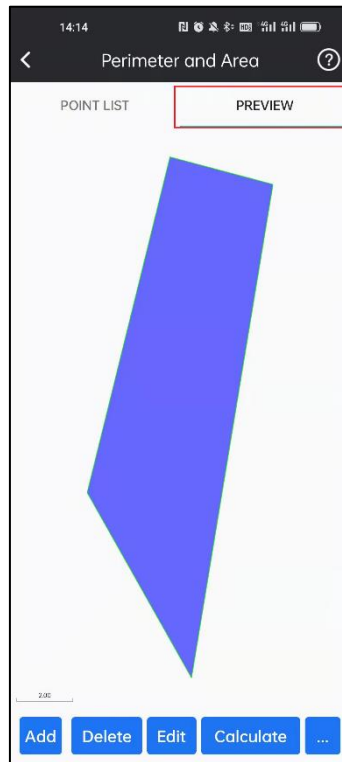


We can delete or edit a point after selecting it and then click **Delete** or **Edit**.

When we finish inputting points, then we click **Calculate** and there will show the result of perimeter and area.

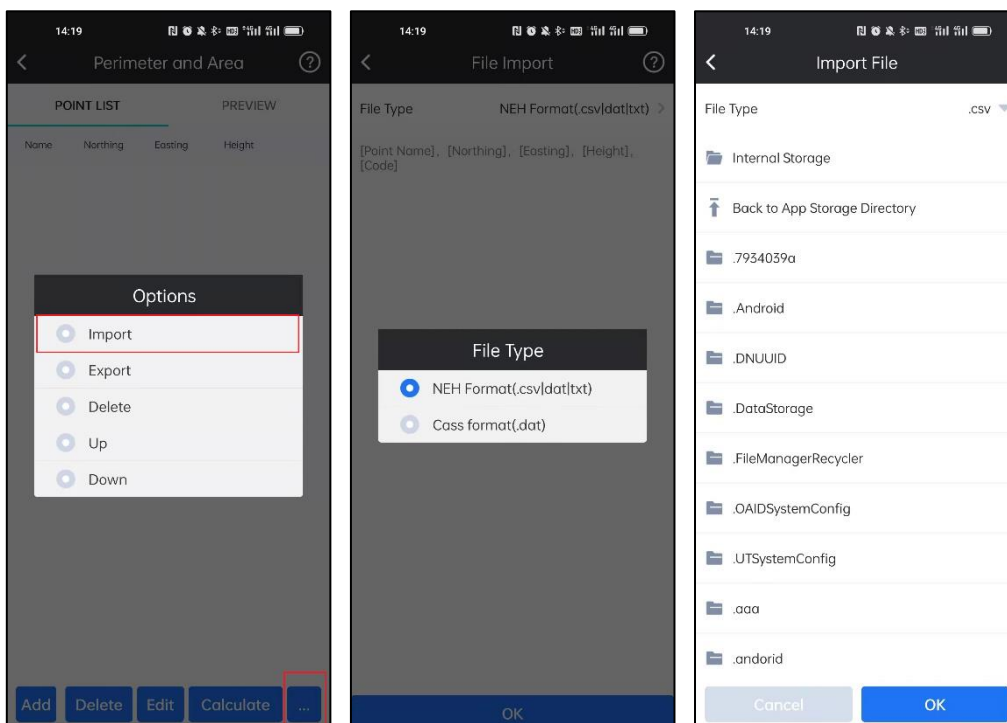


We can check the shape of the polygon by click the **PREVIEW**.



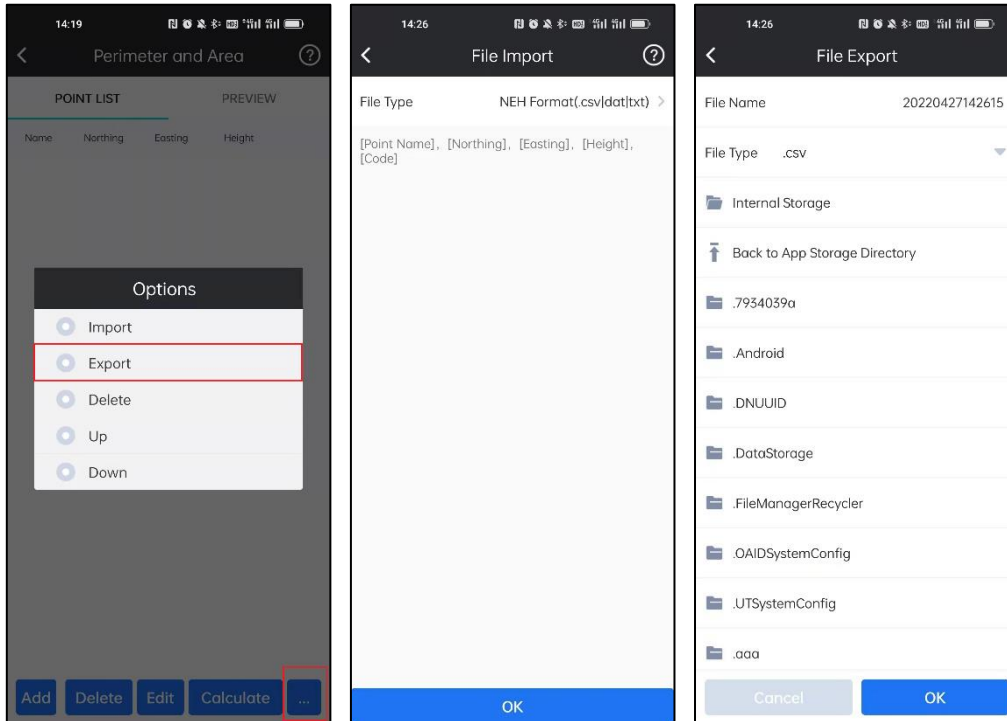
### Import:

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 **OK** and then points will be loaded into Point List for calculation.



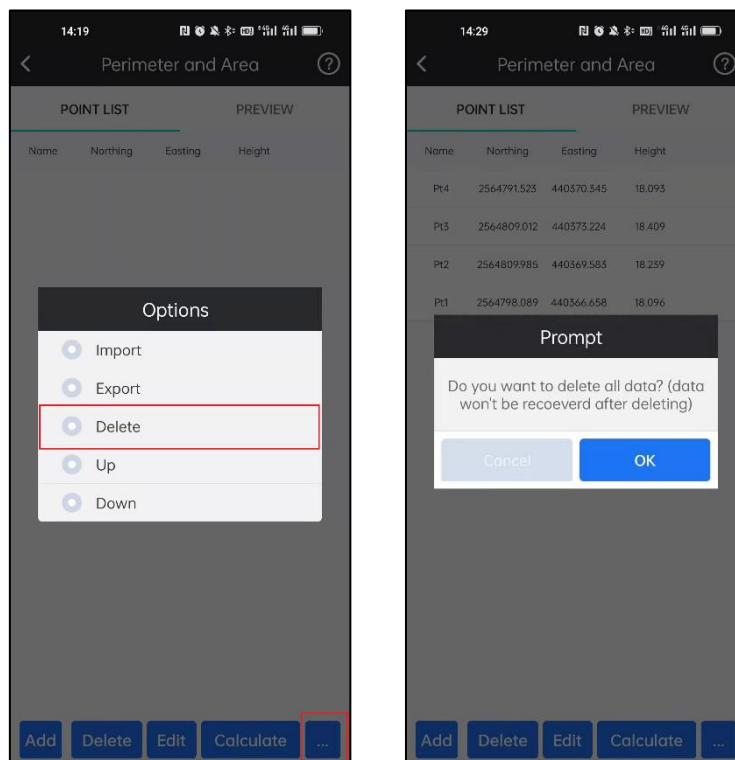
## Export:

Click  and Click . Select the file type: NEH Format(\*.csv|dat|txt ) or Cass Format(\*.dat). Click . Select file path. Click  to export points in Point List.



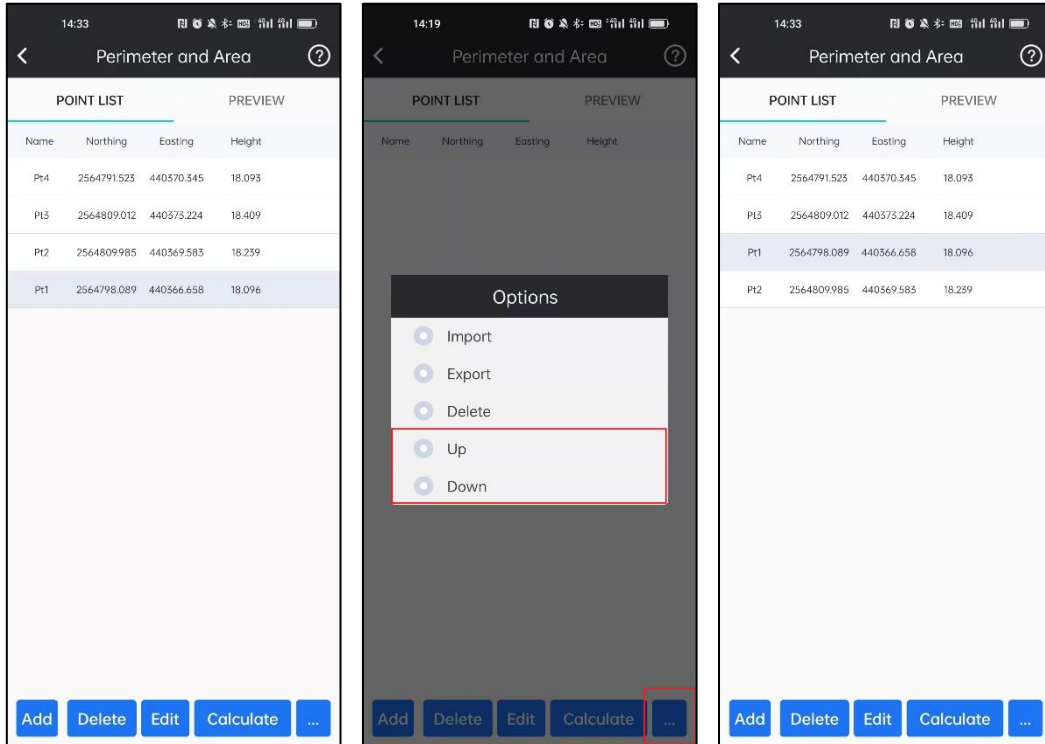
## Delete all data:

Click  and Click . Click  to delete all points in Point List.



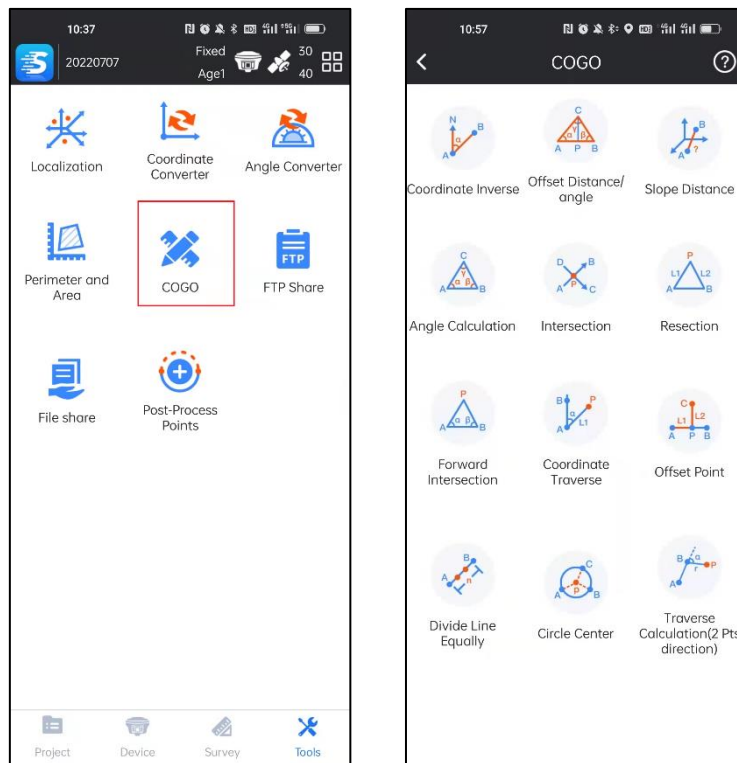
## Up/Down Point:

Select a point, click  and Click Up/Down. Then the selected point will move up/down.



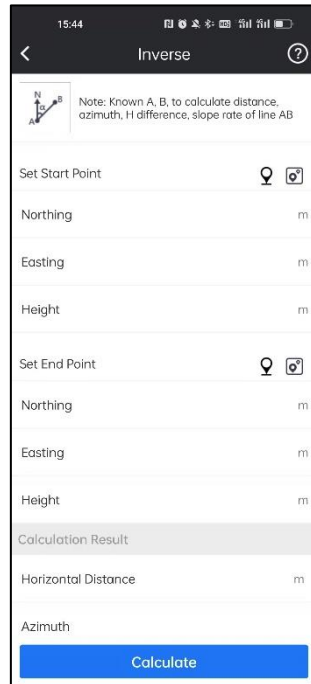
## 6-5 COGO

In COGO, we can do some calculation to get coordinates, distance, intersection points and so on. And those calculations including Coordinate Inverse, Offset Distance/angle, Slope Distance, Slope Distance, Angle Calculation, Intersection, Resection, Forward Intersection, Coordinate Traverse, Offset Point, Divide Line, Circle Center and Traverse Calculation



## 6-5-1 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.



15:44

Inverse

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

Set Start Point

Northing m

Easting m

Height m

Set End Point

Northing m

Easting m

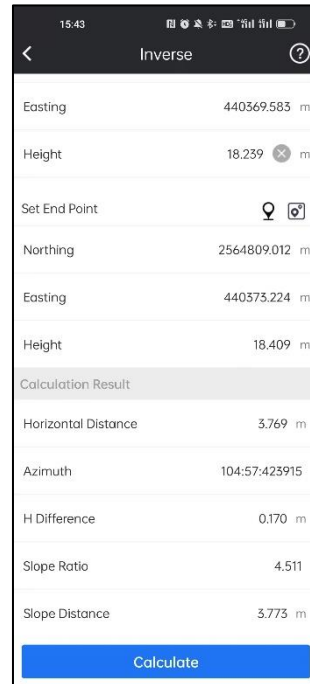
Height m

Calculation Result

Horizontal Distance m

Azimuth

Calculate



15:43

Inverse

Easting 440369.583 m

Height 18.239 m

Set End Point

Northing 2564809.012 m

Easting 440373.224 m

Height 18.409 m

Calculation Result

Horizontal Distance 3.769 m

Azimuth 104:57:423915

H Difference 0.170 m

Slope Ratio 4.511

Slope Distance 3.773 m

Calculate

## 6-5-2 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.

16:20

Offset Distance/ angle

Note: Known A, B, C, to calculate AC, BC, AP, BP, CP, and angle  $\alpha, \beta, \gamma$

Set Start Point

Northing m

Easting m

Set End Point

Northing m

Easting m

Set Offset Point

Northing m

Easting m

Calculation Result

Distance(AC) m

Calculate

16:20

Offset Distance/ angle

Easting 440369.583 m

Set Offset Point

Northing 2564809.012 m

Easting 440373.224 m

Calculation Result

Distance(AC) 12.745 m

Distance(BC) 3.769 m

Distance(AP) 12.175 m

Distance(BP) 0.075 m

Offset Distance(CP) 3.768 m

Offset Angle (右)17:11:487658

Corner Angle (右)91:08:523208

Calculate

### 6-5-3 Slope Distance

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

16:33

Spatial Distance

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

Set Start Point

Lat d.mmmsssss

Lon E0°00'00.0000"

Ellipsoid Height(m)

Set End Point

Lat N0°00'00.0000"

Lon E0°00'00.0000"

Ellipsoid Height(m)

Calculation Result

Spatial Distance m

Calculate

16:35

Spatial Distance

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

Set Start Point

Lat 23.10547303

Lon E113°25'03.2265"

Ellipsoid Height(m) 18.096

Set End Point

Lat N23°10'55.1173"

Lon E113°25'03.3277"

Ellipsoid Height(m) 18.239

Calculation Result

Spatial Distance 12.249 m

Calculate

## 6-5-4 Angle Calculation

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

16:48

Two Lines Angle

Note: Known point A, B, C, to calculate angle  $\alpha, \beta, \gamma$

Point A

Northing m

Easting m

Point B

Northing m

Easting m

Point C

Northing m

Easting m

Calculation Result

Angle (a)

Calculate

16:51

Two Lines Angle

Northing 2564798.089 m

Easting 440366.658 m

Point B

Northing 2564809.985 m

Easting 440369.583 m

Point C

Northing 2564809.012 m

Easting 440373.224 m

Calculation Result

Angle (a) 17°11'48.7658"(342°48'11.2342")

Angle (β) 88°51'07.6792"(271°08'52.3208")

Angle (γ) 73°57'03.5550"(286°02'56.4450")

Calculate

## 6-5-5 Intersection

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

17:01

Intersection

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

Point A

Northing m

Easting m

Point B

Northing m

Easting m

Point C

Northing m

Easting m

Point D

Save Calculate

17:00

Intersection

Northing 2564791.523 m

Easting 440370.345 m

Point C

Northing 2564809.985 m

Easting 440369.583 m

Point D

Northing 2564809.012 m

Easting 440373.224 m

Calculation Result

Northing 2564813.005 m

Easting 440358.282 m

Intersect Angle 45.43:218888

Save Calculate

## 6-5-6 Resection

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

17:05



Resection

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

Line L1, L2



L1 m

L2 m

Point A  

Northing m

Easting m

Point B  

Northing m

Easting m

Calculation Result

Northing m

Save Calculate



17:05

Resection

Line L1, L2



L1 12 m

L2 12 m

Point A  

Northing 2564798.089 m

Easting 440366.658 m

Point B  

Northing 2564809.985 m

Easting 440369.583 m

Calculation Result

Northing 2564806.501 m

Easting 440358.100 m

Save Calculate

## 6-5-7 Forward Intersection

Set Angle  $\alpha$ ,  $\beta$ , Point A and Point B, and then click **Calculate** to calculate the intersection point coordinates.

17:09

Forward Intersection

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

Angle  $\alpha$ ,  $\beta$

$\alpha$  0°00'00.0000"

$\beta$  d.mmssssss

Point A

Northing m

Easting m

Point B

Northing m

Easting m

Calculation Result

Northing m

Save Calculate

17:09

Forward Intersection

Angle  $\alpha$ ,  $\beta$

$\alpha$  30°00'00.0000"

$\beta$  3d

Point A

Northing 2564798.089 m

Easting 440366.658 m

Point B

Northing 2564809.985 m

Easting 440369.583 m

Calculation Result

Northing 2564804.881 m

Easting 440364.686 m

Save Calculate

## 6-5-8 Coordinate Traverse

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

17:14

Traverse

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

Line L1, Angle  $\alpha$

L1 m

$\alpha$  d.m.m.s.s.s.s.s.s

Azimuth / 2 Pts Direction Reference Point Direction >

Point A

Northing m

Easting m

Point B

Northing m

Easting m

Calculation Result

Save Calculate

17:14

Traverse

L1 100 m

$\alpha$  30

Azimuth / 2 Pts Direction Reference Point Direction >

Point A

Northing 2564798.089 m

Easting 440366.658 m

Point B

Northing 2564809.985 m

Easting 440369.583 m

Calculation Result

Northing 2564870.248 m

Easting 440435.890 m

Save Calculate

## 6-5-9 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.

17:21

Offset Point

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

Set Start Point

Northing m

Easting m

Set End Point

Northing m

Easting m

Set Parameters

L1(from A to P) m

L2(Offset Distance) m

Calculation Result

Northing m

Save Calculate

17:21

Offset Point

Set Start Point

Northing 2564798.089 m

Easting 440366.658 m

Set End Point

Northing 2564809.985 m

Easting 440369.583 m

Set Parameters

L1(from A to P) 5 m

L2(Offset Distance) 5 m

Calculation Result

Northing 2564801.751 m

Easting 440372.707 m

Save Calculate

## 6-5-10 Divide Line Equally

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

17:24

Divide Line Equally

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

Set Start Point

Northing m

Easting m

Height m

Set End Point

Northing m

Easting m

Height m

Set Parameters

Section Number

Calculation Result

Save Calculate

17:24

Divide Line Equally

Set End Point

Northing 2564809.985 m

Easting 440369.583 m

Height 18.239 m

Set Parameters

Section Number 3

Calculation Result

Northing 1 2564802.054

Easting 1 440367.633

Height 1 18.144

Northing 2 2564806.020

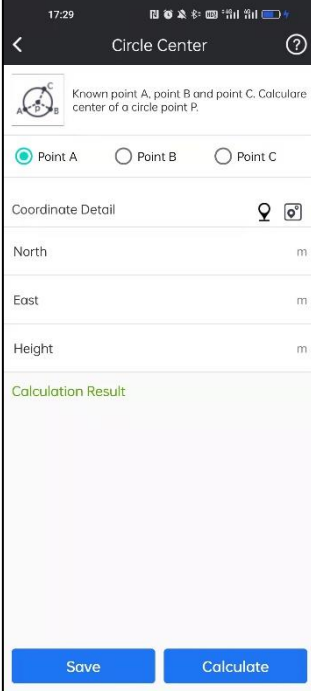
Easting 2 440368.608

Height 2 18.191

Save Calculate

## 6-5-11 Circle Center

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



17:29

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

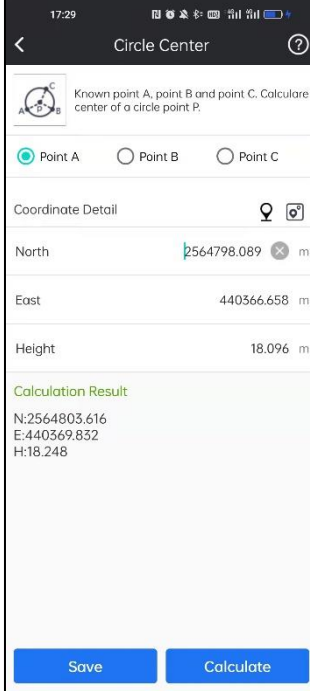
North m

East m

Height m

Calculation Result

Save Calculate



17:29

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

North 2564798.089 m

East 440366.658 m

Height 18.096 m

Calculation Result

N:2564803.616  
E:440369.832  
H:18.248

Save Calculate

## 6-5-12 Traverse Calculation(2 Pts direction)

Set Point A, Point B, Angle  $\alpha$  and Line  $r$ , and then click **Calculation** to calculate the point coordinates.

17:32

Traverse Calculation(2 Pts direction)

Known point A and point B, known angle  $\alpha$ ,  
BP = r. Calculate point P.

Point A  Point B

Coordinate Detail

North m

East m

Height m

$\alpha$  d.m.m.s.s.s.s.s

r m

Calculation Result

Save Calculate

17:32

Traverse Calculation(2 Pts direction)

Known point A and point B, known angle  $\alpha$ ,  
BP = r. Calculate point P.

Point A  Point B

Coordinate Detail

North 2564809.985 m

East 440369.583 m

Height 18.239 m

$\alpha$  30°00'00.0000"

r 5 m

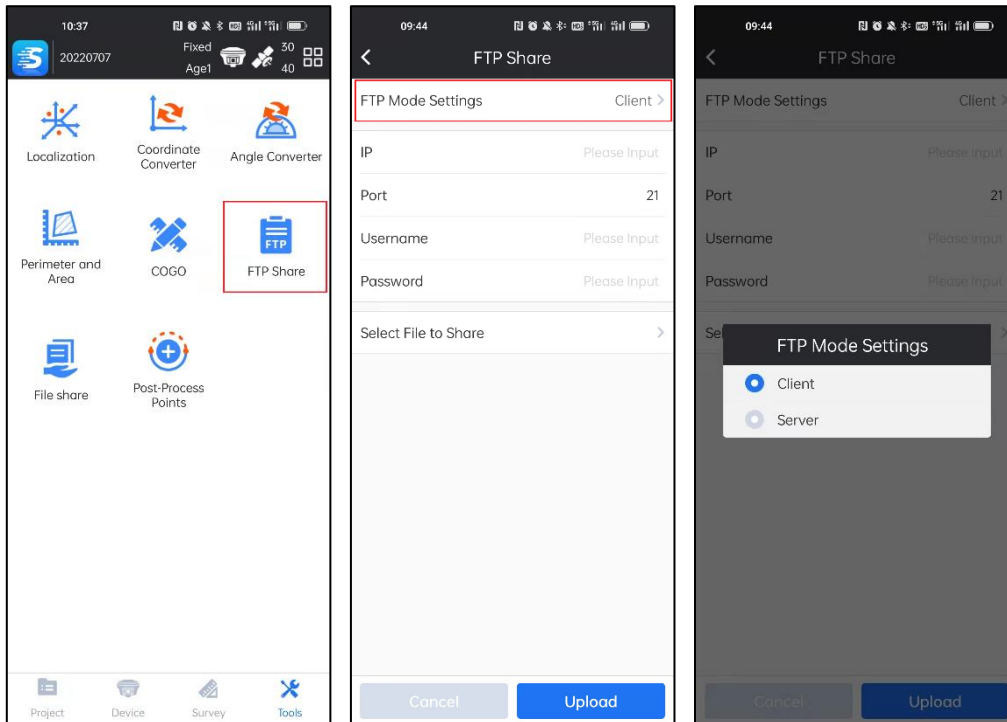
Calculation Result

N:2564813.593  
E:440373.045  
H:18.239

Save Calculate

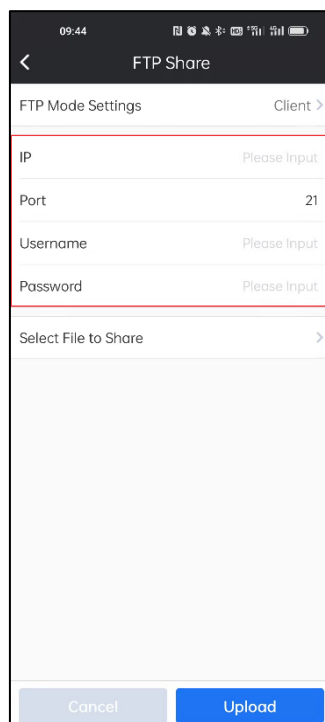
## 6-6 FTP Share

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

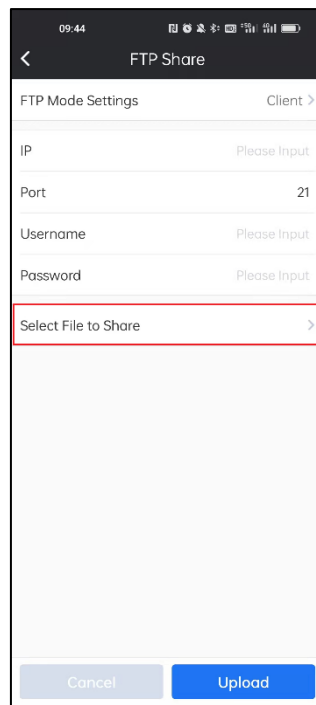


**Client Mode:** Upload files to FTP server.

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

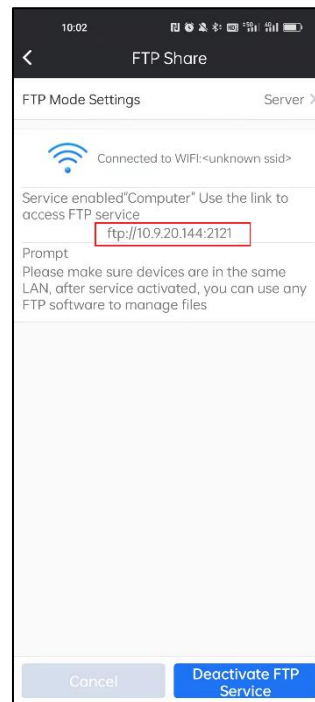


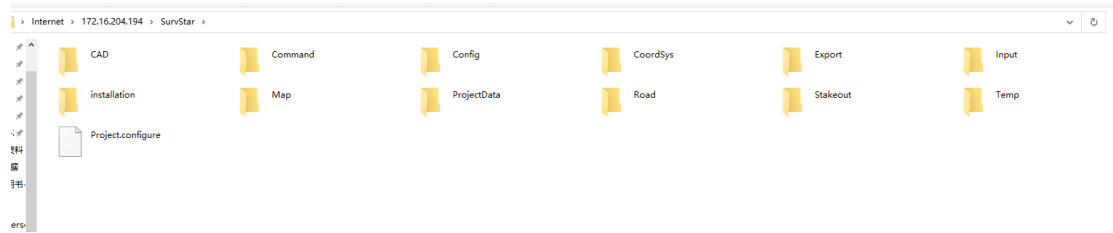
And then we can Select File to Share to upload files to the FTP server.



**Server Mode:** Make android device as FTP server

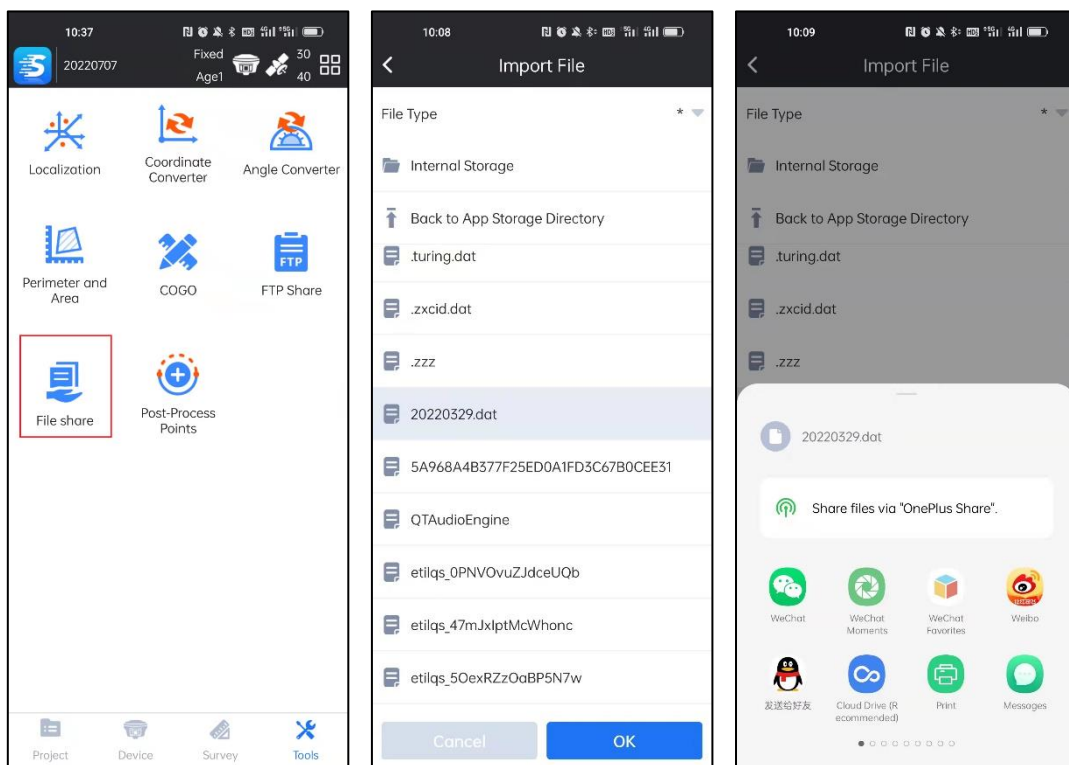
Another device must be in the same LAN of android device install SurvStar. By activating this mode, we can access to the android phone internal memory by FTP://android device LAN IP:2121.





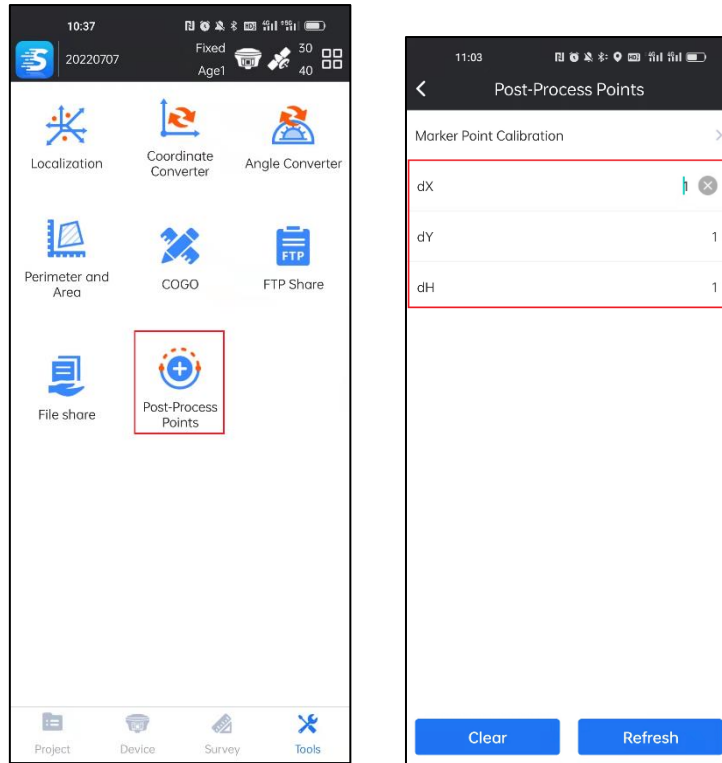
## 6-7 File Share

By clicking this, we can share the data file to the other app or the other device. Select the shared file and click OK, then we can share the selected file.

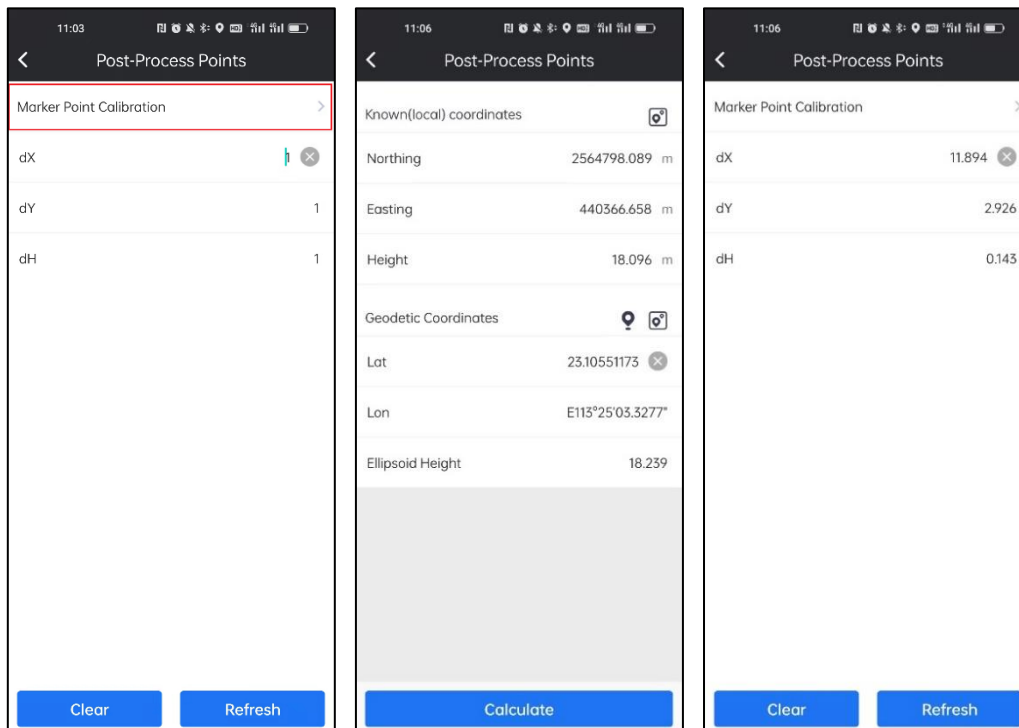


## 6-8 Post-Process Points

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.

11:09

Base Select

Total 86 Page 1/1

Base ID	Starting Time	BaseB	BaseL	BaseH
1	2022-05-29 14:02:54	23:07:352312	115:22:065399	25.987
0	2022-05-29 14:05:07	23:07:352312	115:22:065399	25.987
1	2022-05-29 14:05:12	23:07:352312	115:22:065399	25.987
0	2022-05-29 14:05:42	23:10:529943	115:25:003593	46.576
0	0002-11-30 10:21:57	23:07:352312	115:22:065399	25.987
0	0002-11-30 17:16:30	23:10:529943	115:25:003593	46.576
0	0001-11-30 10:21:45	23:10:529943	115:25:003593	46.576
0	0001-11-30 15:52:03	23:10:529943	115:25:003593	46.576
0	0001-11-30 16:54:43	23:10:529943	115:25:003593	46.576
1	2020-11-05 09:59:20	22:59:582000	112:59:582000	30.500
1	2020-11-05 11:23:41	22:59:582000	112:59:582000	30.500
1	2020-11-05 11:24:09	22:59:582000	112:59:582000	30.500
1	2020-11-05 11:24:25	22:59:582000	112:59:582000	30.500
1	2020-11-05 14:01:53	22:59:582000	112:59:582000	30.500
1	2020-11-05	22:59:582000	112:59:582000	30.500

Refresh

11:11

Post-Process Points

Refresh Date 2022-3-29 >

Starting Time 14:05:42 >

Ended Time 10:21:57 >

log

dx=11.894 dy=2.926 dh=0.143

Refresh