SinoGNSS®
By ComNav Technology Ltd.

P8 Tablet

High Precision Version

User Guide



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Trademark notice

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FCC Notice

SinoGNSS® P8 Tablet High Precision Version comply with the limits for a Class B digital device, pursuant to the Part 15 of the FCC rules when it is used in the Portable Mode.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference;
(2) It must accept any interference received, including interference that may cause undesired operation.

Copyright Notice

This is the V1.0 (November, 2021) revision of the P8 Tablet High Precision Version User Guide. It cannot be copied or translated into any language without the written permission of ComNav Technology.

Technical Assistance

If you have any question and can't find the answer in this manual, please contact your local dealer from which you purchased the P8 Tablet High Precision Version. Alternatively, request technical support from ComNav Technology Website: *www.comnavtech.com* or technical support email: *support@comnavtech.com*. Your feedback about this Guide will help us to improve it with future revisions.

Safety Information

Before using the P8 Table

please make sure that you have read and understood this User Guide, as well as the safety requirements.

- Connect your devices strictly based on this User Guide
- Avoid falling to ground, or colliding with other items

- Take lighting protection measures when installing antennas
- Change the cable if damaged

Related Regulations

The device contains integral Bluetooth® wireless technology. Regulations regarding the use of the datalink vary greatly from country to country. In some countries, the unit can be used without obtaining an end-user license. But in some countries the administrative permissions are required. For license information, please consult your local dealer.

Use and Care

The device can withstand the rough treatment that typically occurs in the field. However, the device is high-precision electronic equipment and should be treated with reasonable care.

Warning and Caution

An absence of specific alerts does not mean that there are no safety risks involved. A Warning or Caution information is intended to minimize the risk of personal injury and/or damage to the equipment.

WARNING- A Warning alerts you to a potential risk of serious injury to your person and/or damage to the equipment, because of improper operations or wrong settings of the equipment.
CAUTION- A Caution alerts you to a possible risk of damage to the equipment and/or data loss.

Warranty Notice

ComNav Technology does not warranty devices damage because of force majeure (lighting, high voltage or collision).
ComNav Technology does not warranty the disassembled devices.

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1 Introduction

The SinoGNSS® P8 Tablet High Precision Version User Guide is aimed to help you get familiar with the P8 Tablet High Precision Version and start your project effectively. We highly recommend you to read this manual before surveying, even you have used other Global Positioning System (GPS) receivers before.

1.1 About the P8 Tablet High Precision Version

With SinoGNSS® Quantum™ algorithm, P8 Tablet High Precision Version can be applied in RTK mode with all GNSS constellations. P8 Tablet High Precision Version has ultra-small size and strong anti-interference ability to make it possible to work even in harsh environments. It is the ideal RTK/GNSS product for surveyors.

1.2 P8 Tablet High Precision Version features

The SinoGNSS® P8 Tablet High Precision Version key features:

- Ultrasmall and super light
  - Size: 237*144*14mm
  - Weight: 560g
- Drop Test Survive from a 1.2m drop
- IP67 waterproof
- LCD 8’’HD 1280*800 500Nit (Sunlight readable)
- Satellite BeiDou/GPS/GLONASS/GALILEO/QZSS/SBAS
- Increased measurement traceability with SinoGNSS® Quantum™ algorithm technology
- Cable-free Bluetooth wireless technology
- Integrated WIFI module
- External Interface USB, UART, GPIO
- Battery 9000mAh
- Battery working time: 15 hours
- Input Voltage: 5V,2A
- External Interface: USB, UART, GPIO

1.3 P8 Tablet High Precision Version parts list

This section provides overall P8 Tablet High Precision Version parts list, including P8 Tablet High Precision Version, external antenna, USB cable, charger and manual.

Item	Picture
P8 Tablet High Precision Version	
Optional Antenna	
	 

USB cable	
Charger head	
User’s manual	

2 Setting up the P8 Tablet High Precision Version

This chapter provides general information on environmental requirements, setup, power supply and connection of the P8 Tablet High Precision Version.

2.1 Environmental requirements

To keep the receiver with a reliable performance, it is better to use P8 Tablet High Precision Version in safe environmental conditions:

- Operating temperature: -20°C to +60°C
- Storage temperature: -30°C to +70°C
- Out of corrosive fluids and gases
- With a clear view of sky

2.2 Front panel

On the front of the P8 Tablet High Precision Version are some buttons for operation.



2.3 Power supply

P8 Tablet High Precision Version supports external power input.
The P8 Tablet High Precision Version need USB cable and charging head to charge.





Tip: If you only use a USB cable or use an unmatched USB cable and charging head, it may cause slow charging

3 Real-Time Kinematic Survey (RTK)

This chapter introduces how to conduct RTK Survey with Survey Master Software, including software installation, start a new project, receiver connection and RTK working mode.

3.1 Installation of Survey Master

Survey Master is available on Google play, you can download for free and install the software.

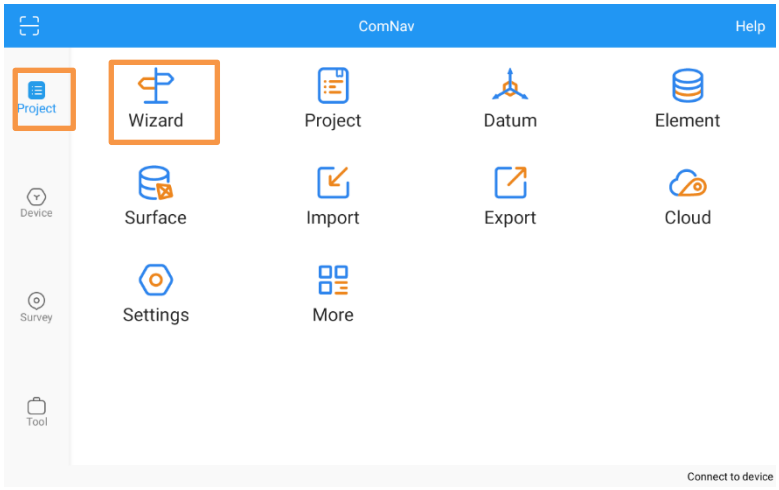
Also you can download the latest version from our website:
http://comnavtech.com/download.asp?bigclassid=28

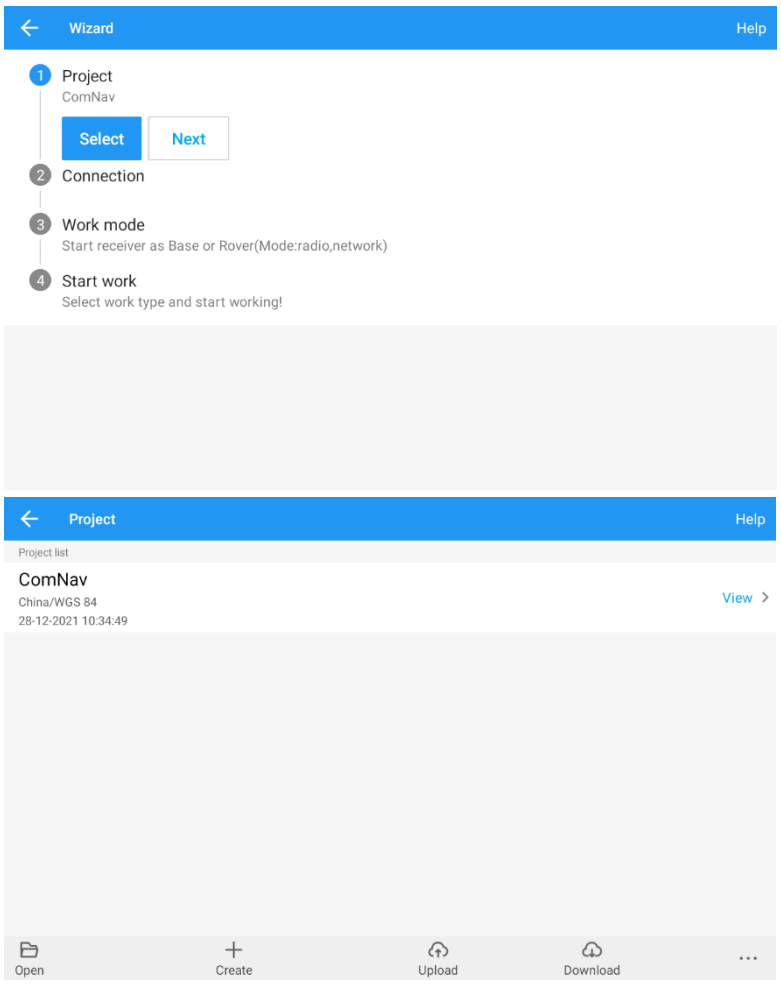
3.2 Wizard function in Survey Master

Follow the Wizard, you can quickly learn the general workflow of Survey Master, also you can quick start your survey by this function no matter you are experienced one or new user.

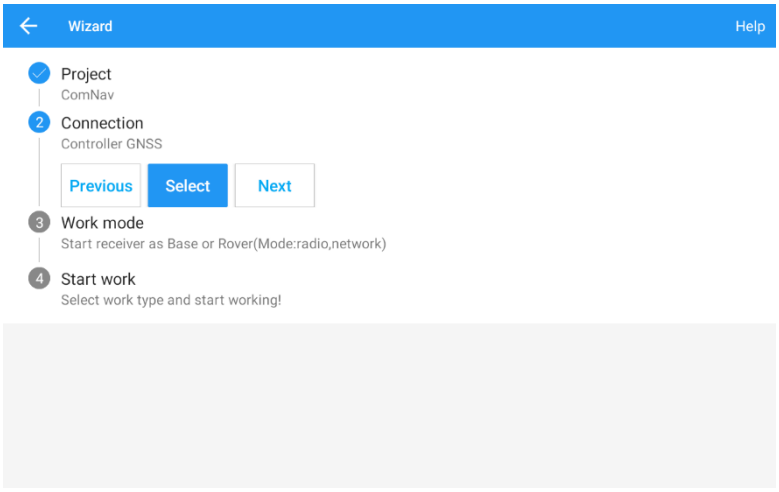
In Project menu, tap Wizard.

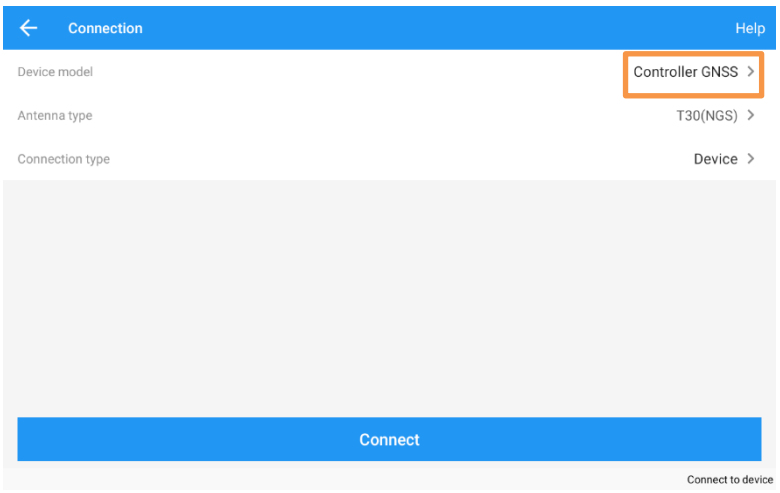
1. ***Project***: Click ***Select*** to go into Project interface to create or select a project.





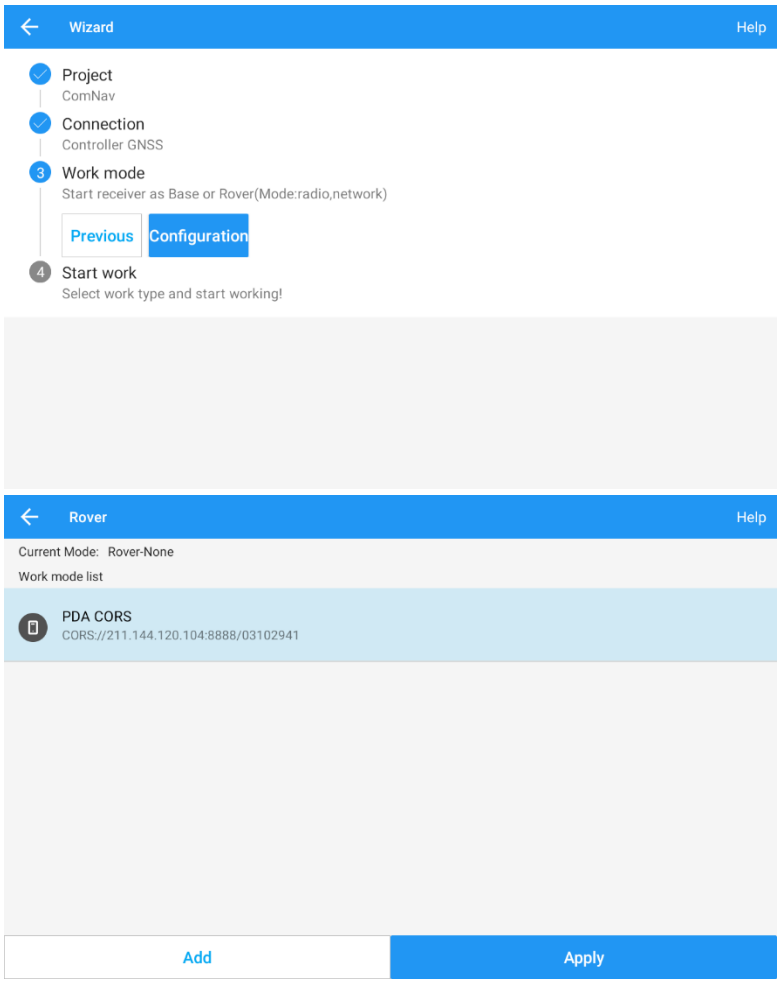
2.Connection: Click ***Select*** to go into Bluetooth connection interface.

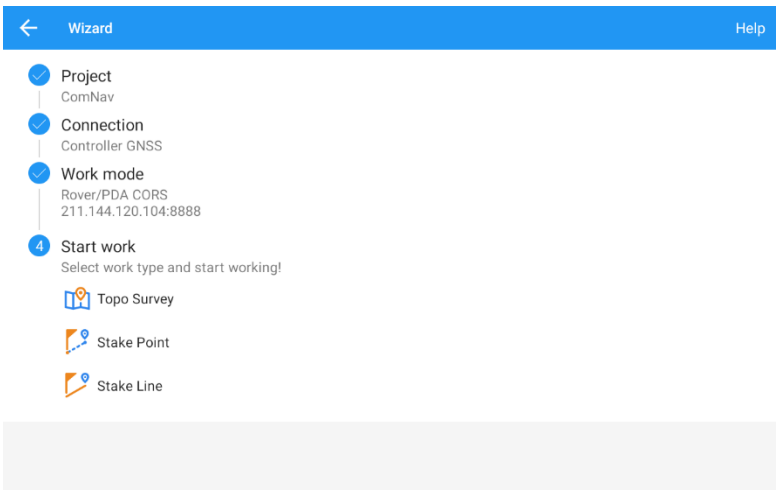




3.***Work mode***: Click ***Select*** to go into Quick Setup interface to start your P8 Tablet High Precision Version as Rover.

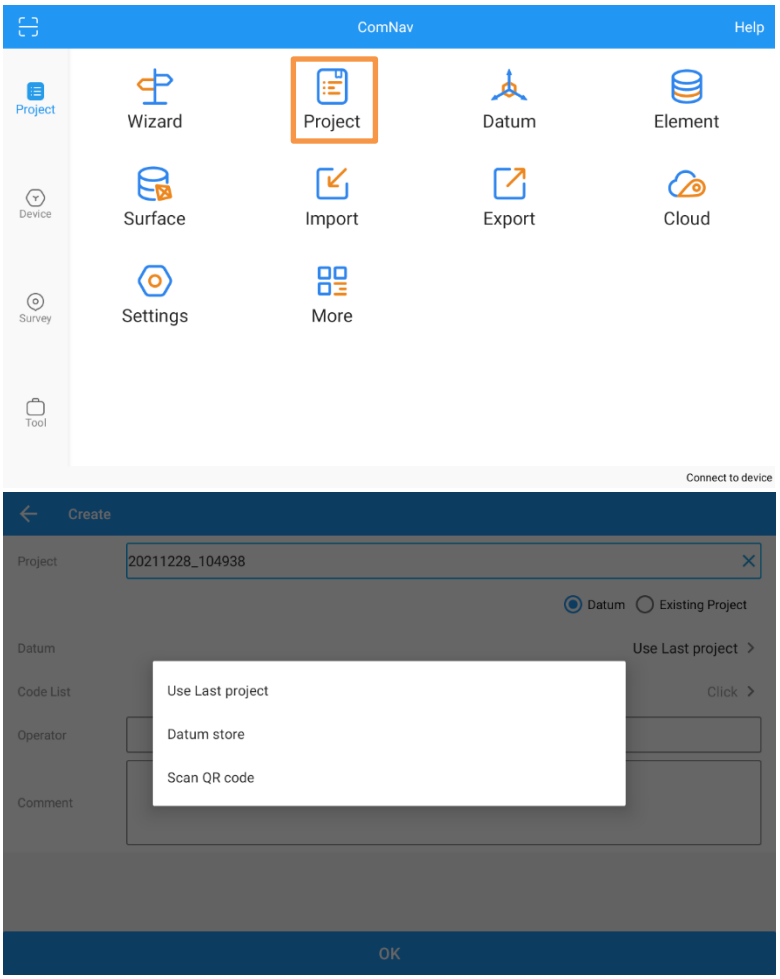
After you start your P8 Tablet High Precision Version as Rover, you can start work directly of topo survey or stakeout.



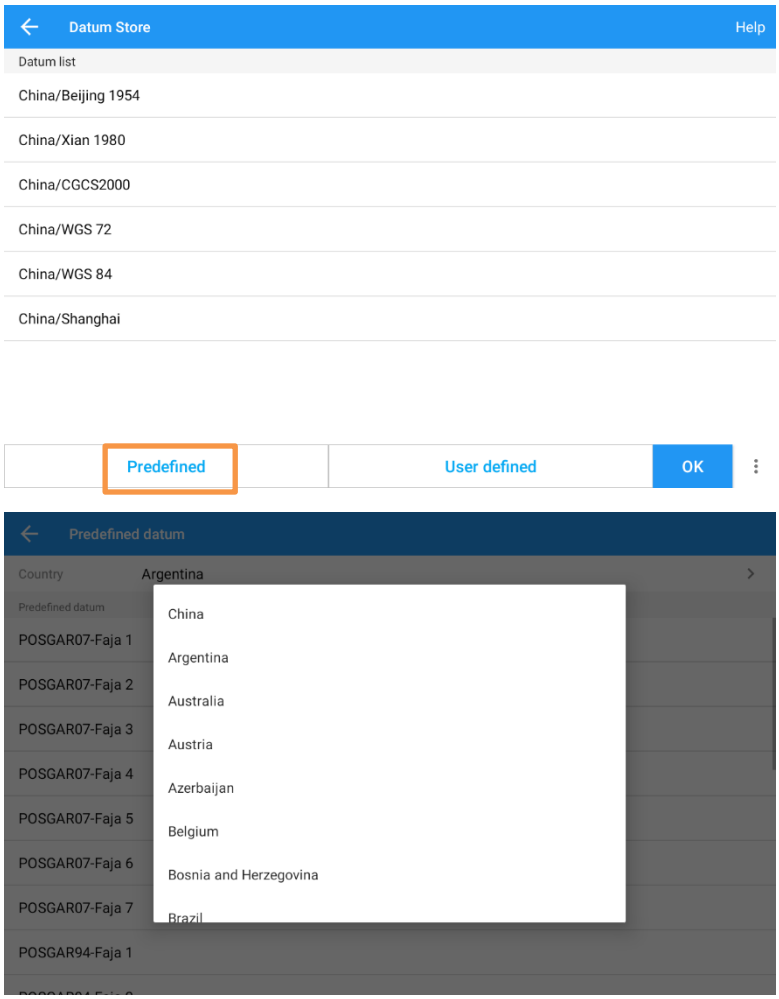

Wizard
Help
Project
ComNav
Connection
Controller GNSS
Work mode
Rover/PDA CORS
211.144.120.104:8888
4
Start work
Select work type and start working!
Topo Survey
Stake Point
Stake Line

3.3 Start a New Project

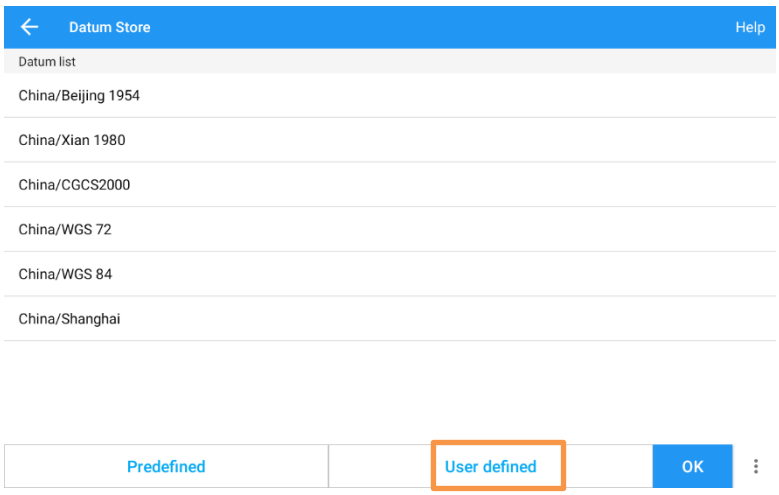
Click ***Project***, you can use the same Datum with last project, choose a datum in store and scan QR code from other controller to add Datum, even sharing project with cloud.

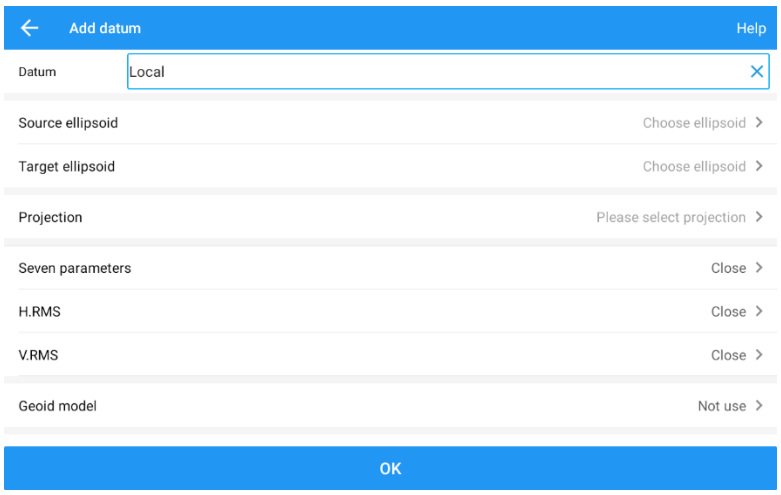


- Select a Predefined datum: You can select datum directly from the list. Survey Master currently has 49 countries datum and will add more afterwards.



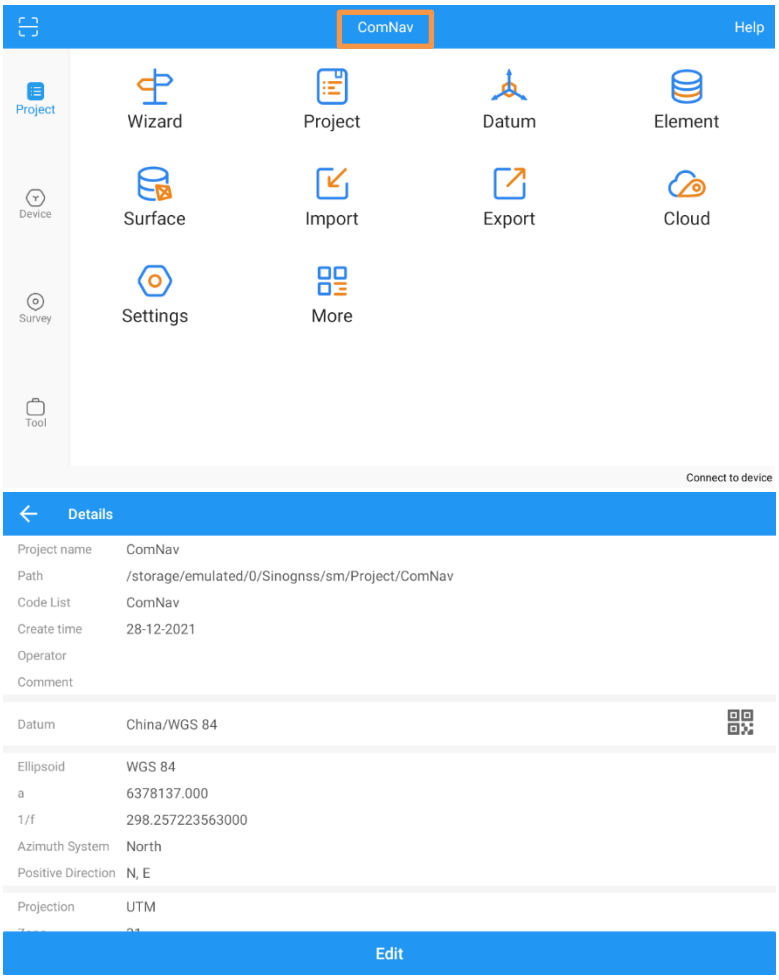
- Create a User defined datum: If you cannot find datum you want in the list, follow instructions below to add one: select Ellipsoid, Projection for your datum, and even seven parameters, geoid model based on your request.





*Tip1: if asked username and password for seven parameters, enter **admin** **admin***
*Tip2: For H.RMS and V.RMS, it will show if do **Site Calibration**.*

- Share Datum via QR code.
- After you build a project, press the project name, it will generate a QR code. Users can use the Scan function in the main interface to access the coordinate system.

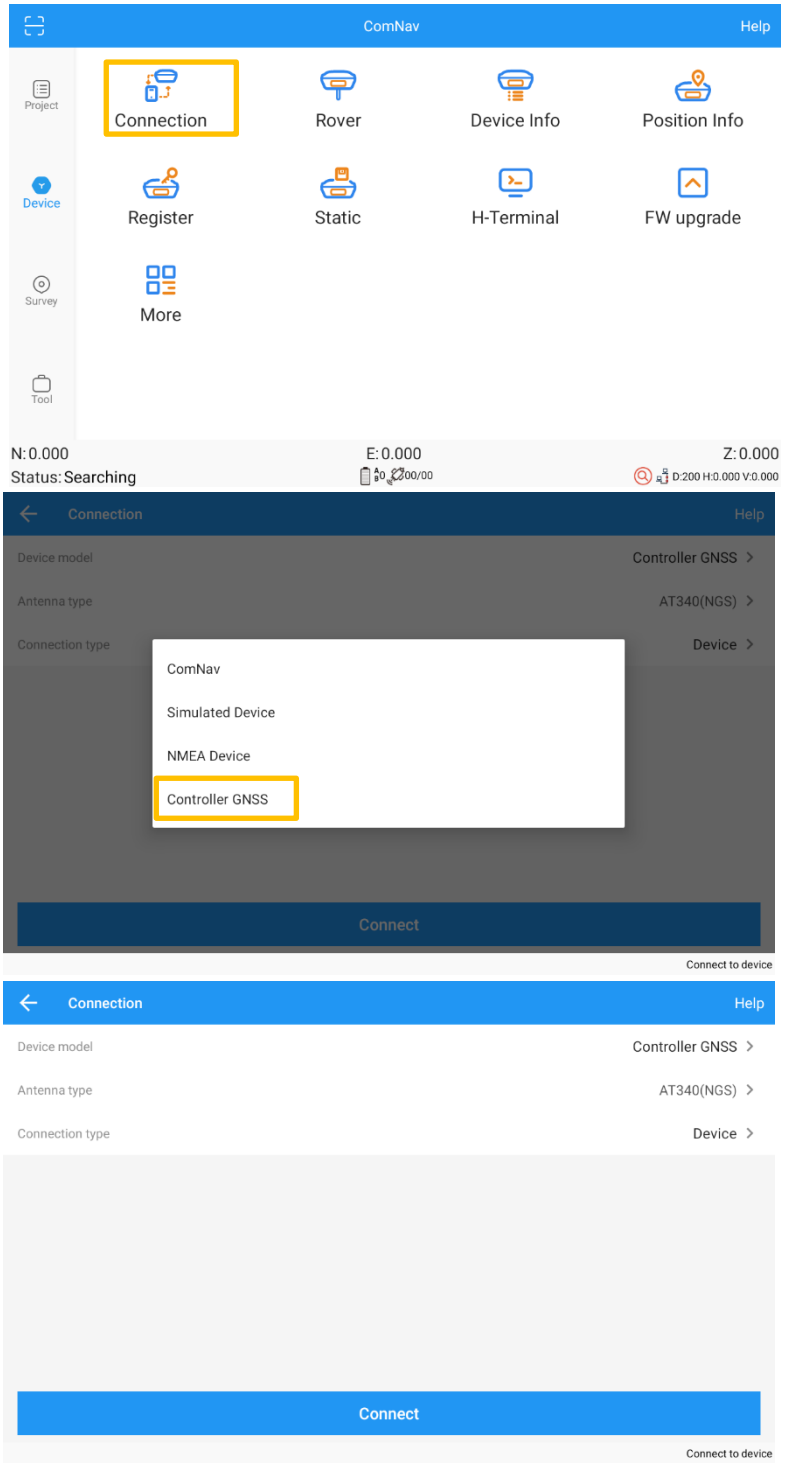


3.4 Device connection

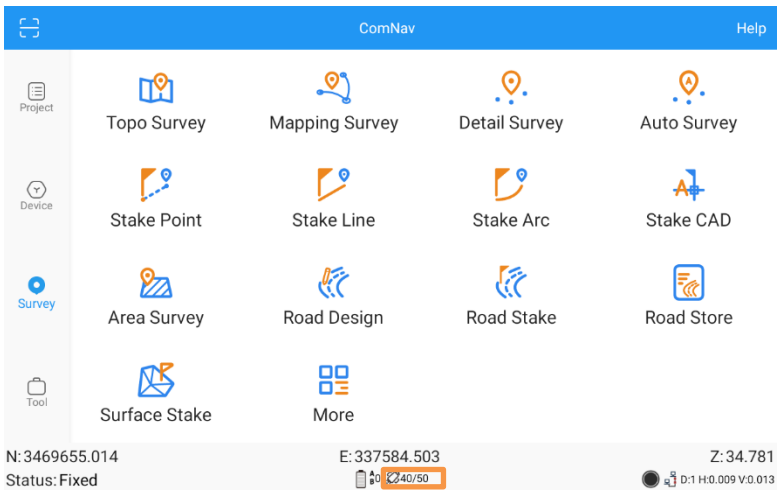
To connect Survey Master with P8 Tablet High Precision Version, switch to ***Device*** interface, tap ***Connection*** to go into connection interface.

- Click Device model—select Controller GNSS—select the Antenna type you use

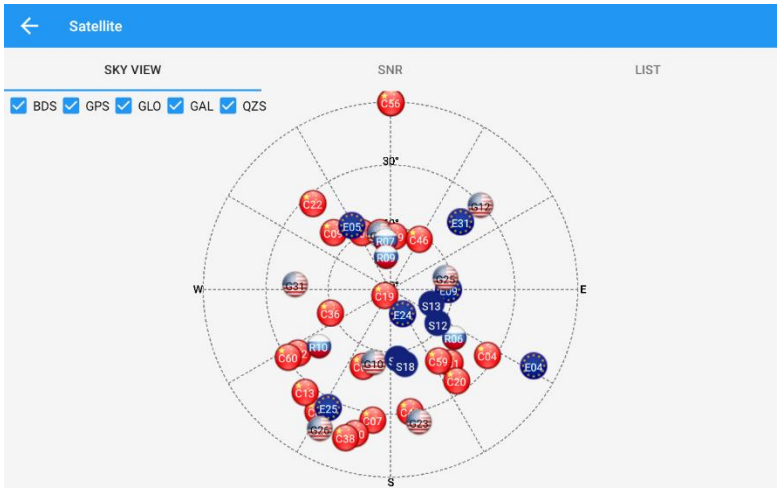
After connecting the P8 Tablet High Precision Version, you can check the device version in ***Device Info.***

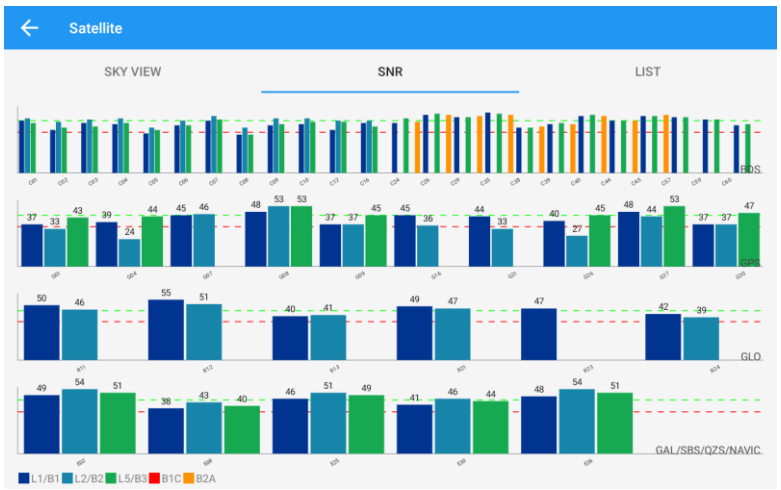


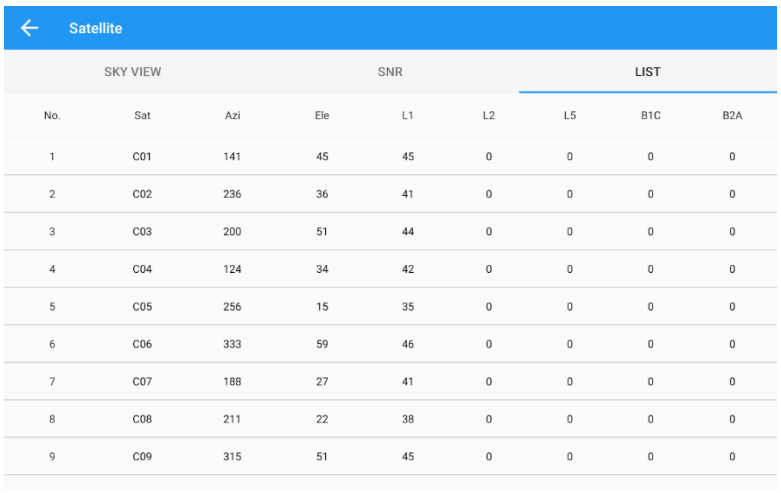
After connected successfully, the bottom will show the positioning status.



Click on the satellite, you can see the SKY VIEW, SNR, satellite list.





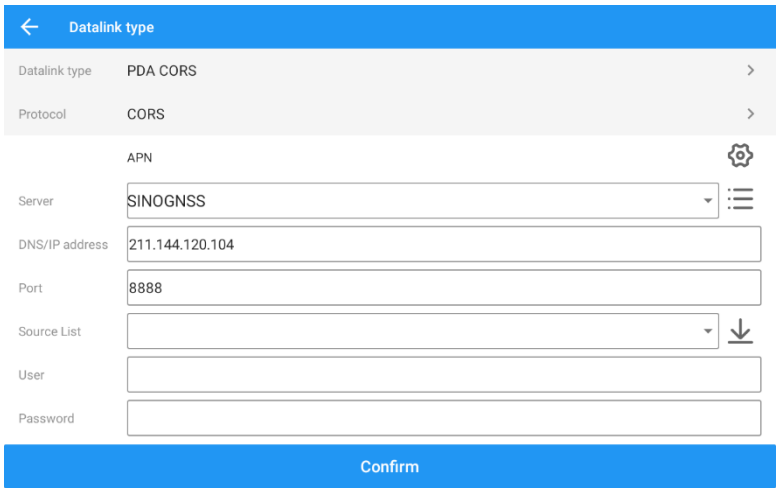


3.5 PDA CORS Mode

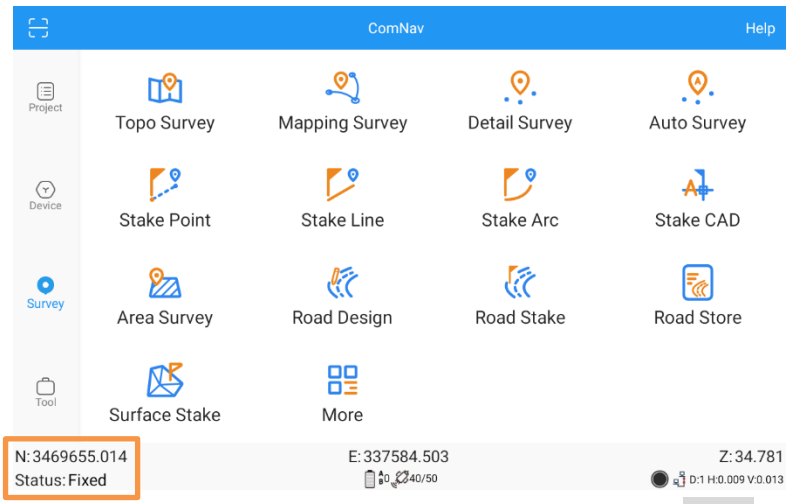
Without setting up your own base stations, the P8 Tablet High Precision Version can receive correction data transmitted from continuously operating reference station via PDA's GPRS or WIFI. To do RTK survey in PDA CORS mode, it requires:

Configure the Rover as below:

- Make sure your P8 Tablet High Precision Version can access to internet via SIM card or Wi-Fi, then run Survey Master Software.
- Build connection, Click ***Device*** -> ***Rover*** -> PDA CORS.



- Enter CORS ***DNS/IP address*** and ***port***-> Click ***Source List*** and select the proper source -> enter ***User*** and ***password***.
- It also provides TCP protocol.



- After configuring the PDA CORS, need to check if the status is "**Fixed**".

*Tip: ComNav technology provides a free static server address **211.144.120.104:8888**, anyone can upload CORS data as long as abide by the agreement.*

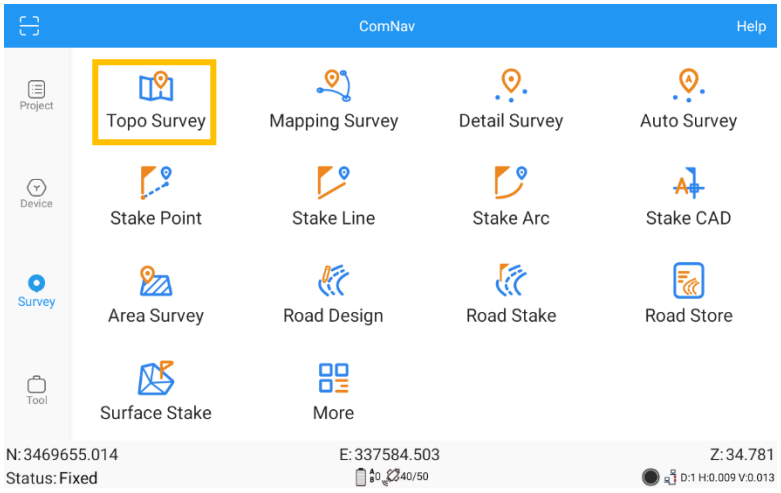
4 Basic Survey Functions

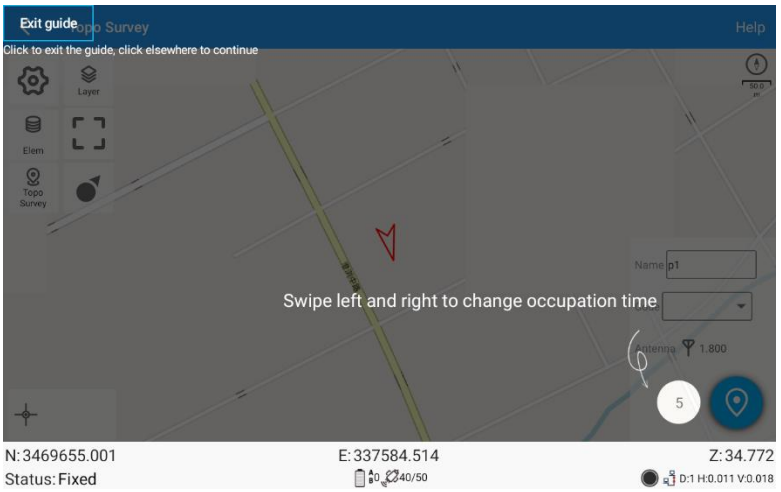
This section describes the basic survey functions of Survey Master, including point measurement, Topo survey, Auto survey, Area survey, Static, PPK, staking, import and export measured points.

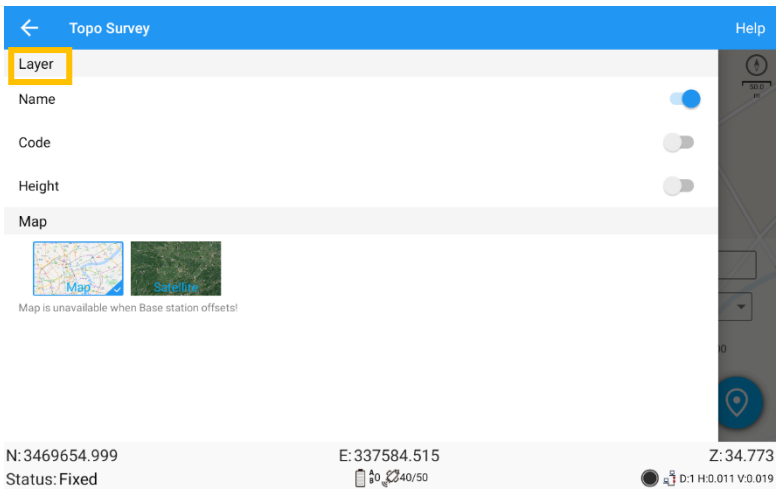
4.1 Topo survey

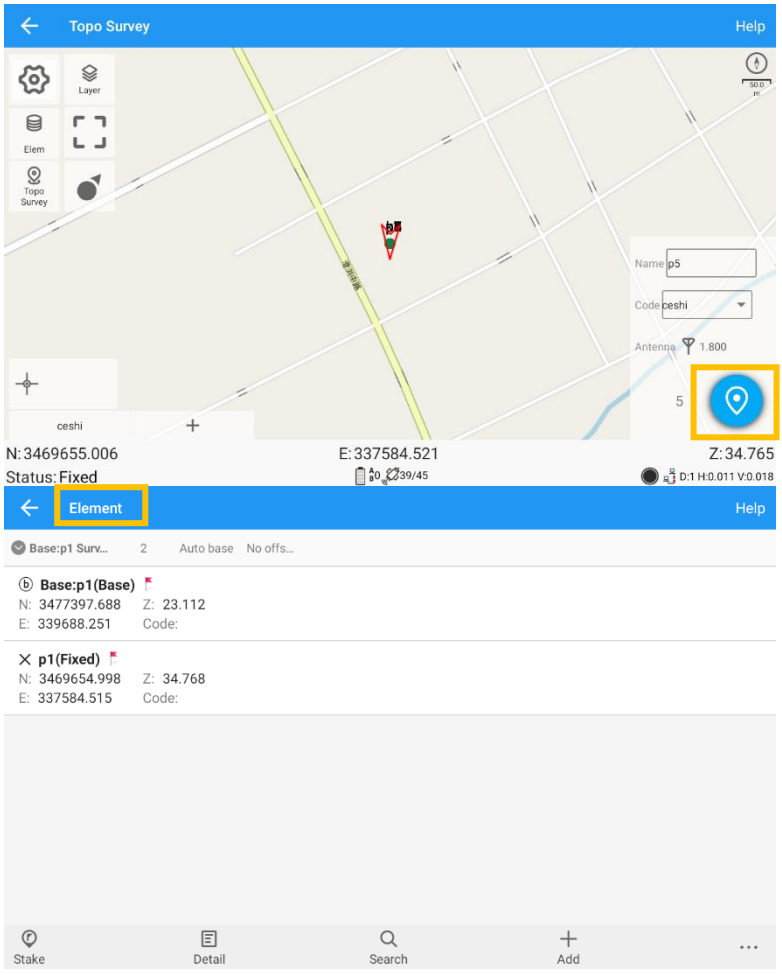
Click Topo Survey-> enter point name, ->click  to start or stop collecting data.

- You can quickly change antenna height in the survey interface.
- Tap ***Elem*** to check point coordinates.
- Tap ***Layer*** to show the layers you want display on map.



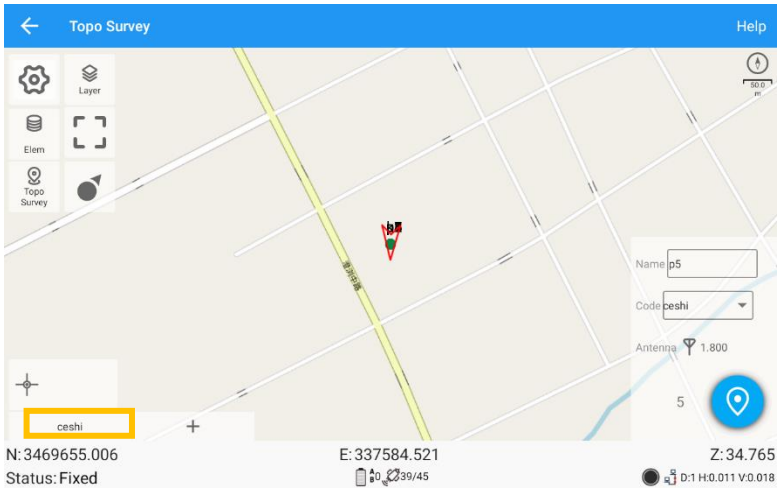


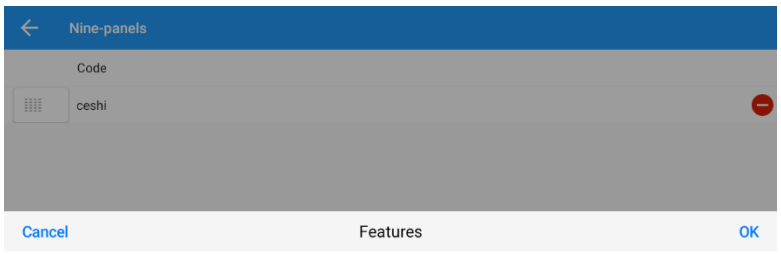

Topo Survey
Help
Layer
Name
Code
Height
Map
Map
Satellite
Map is unavailable when Base station offsets!
N:3469654.999
E:337584.515
Z:34.773
Status:Fixed
40/50
D:1 H:0.011 V:0.019


Topo Survey
Help
Layer
Elem
Topo Survey
Name p5
Code ceshi
Antenna 1.800
5
ceshi
N:3469655.006
E:337584.521
Z:34.765
Status:Fixed
39/45
D:1 H:0.011 V:0.018
Element
Help
Base:p1 Surv...
2
Auto base
No offs...
Base:p1(Base)
N: 3477397.688
Z: 23.112
E: 339688.251
Code:
p1(Fixed)
N: 3469654.998
Z: 34.768
E: 337584.515
Code:
Stake
Detail
Search
Add

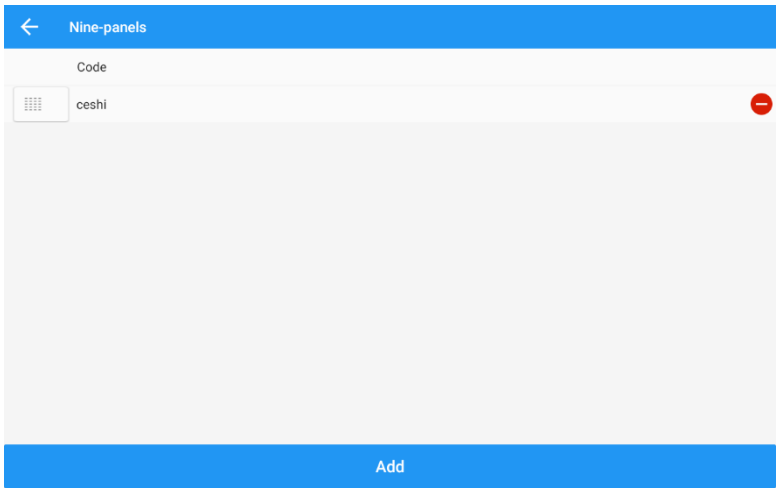
- Fast survey by pressing Code: Tap the code in nine panels, will survey the point directly.

Go into code management interface to modify code list, then you can choose code to use in nine panels.

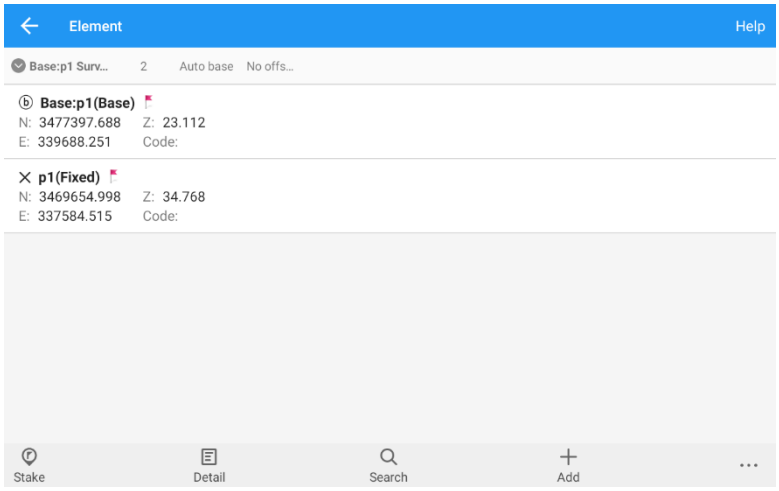


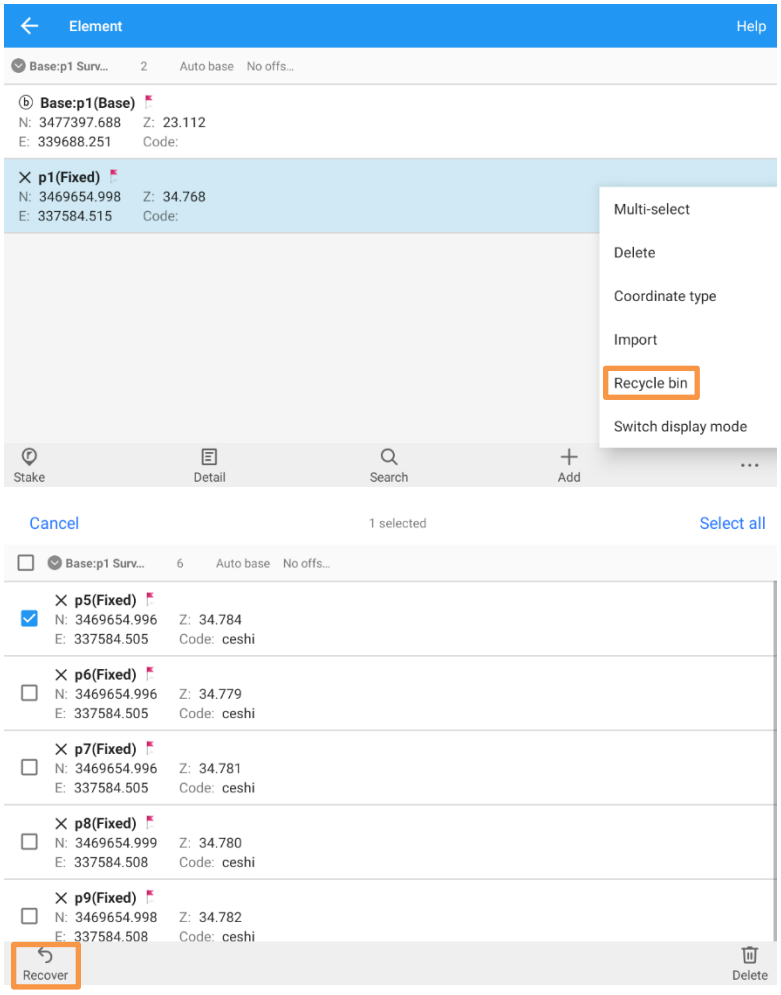


Point	Undefined	ceshi
Line		sssss
Polygon		

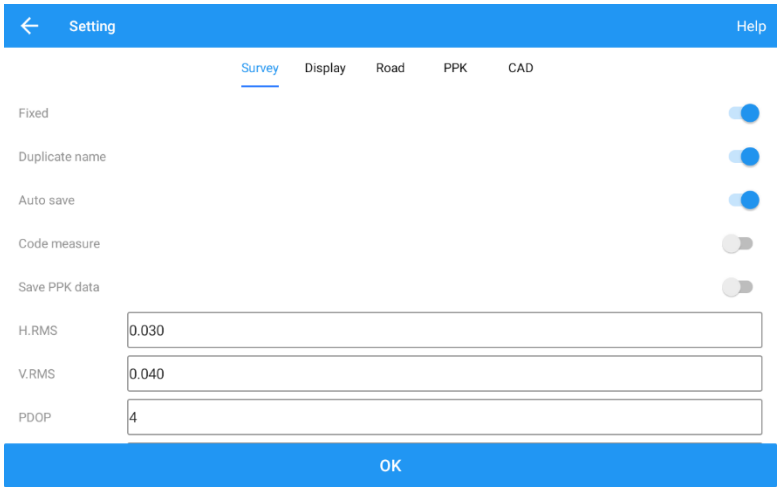


- Recover deleted points in Recycle Bin.

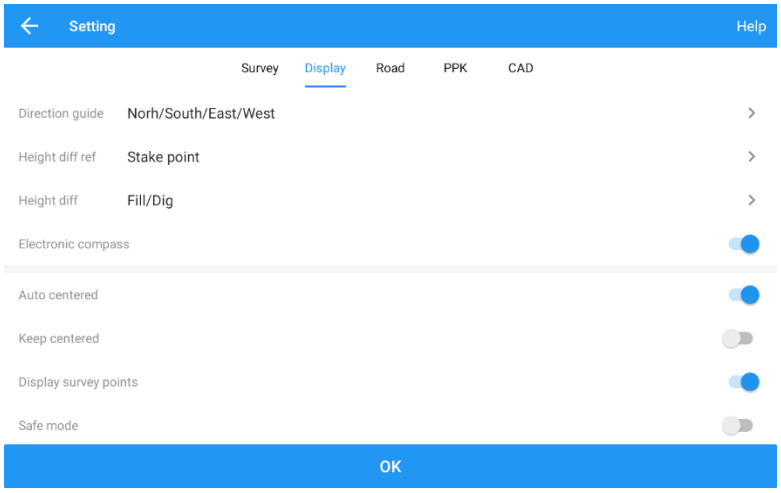




4.1.1Survey settings



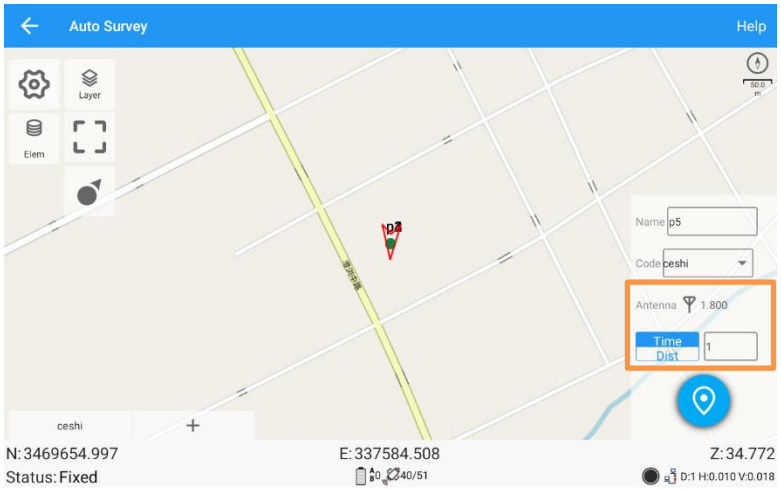
- Fixed: only fixed result can be saved;
- Duplicate name: allow point name same;
- RMS: point accuracy need higher than the value;
- Offset radius: point cannot offset bigger than the value during measure;
- Occupation time: measure times for one point;
- Point stepsize: for point name;
- Stake range: show circle when close to target point;



- Direction guide: 3 methods showing guide for stake out;
- Electronic compass: Use controller compass during stake out;
- Auto centered: Map will go to current location after 5 seconds;
- Keep centered: Map will go to current location after 1 second;
- Display survey points: will show all survey points on map;
- Display Basemap: for showing DXF/SHP file on map

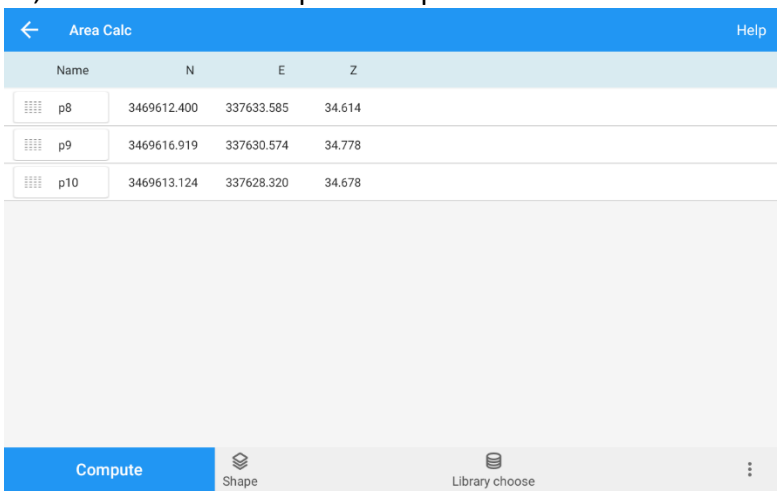
4.2 Auto survey/Area survey

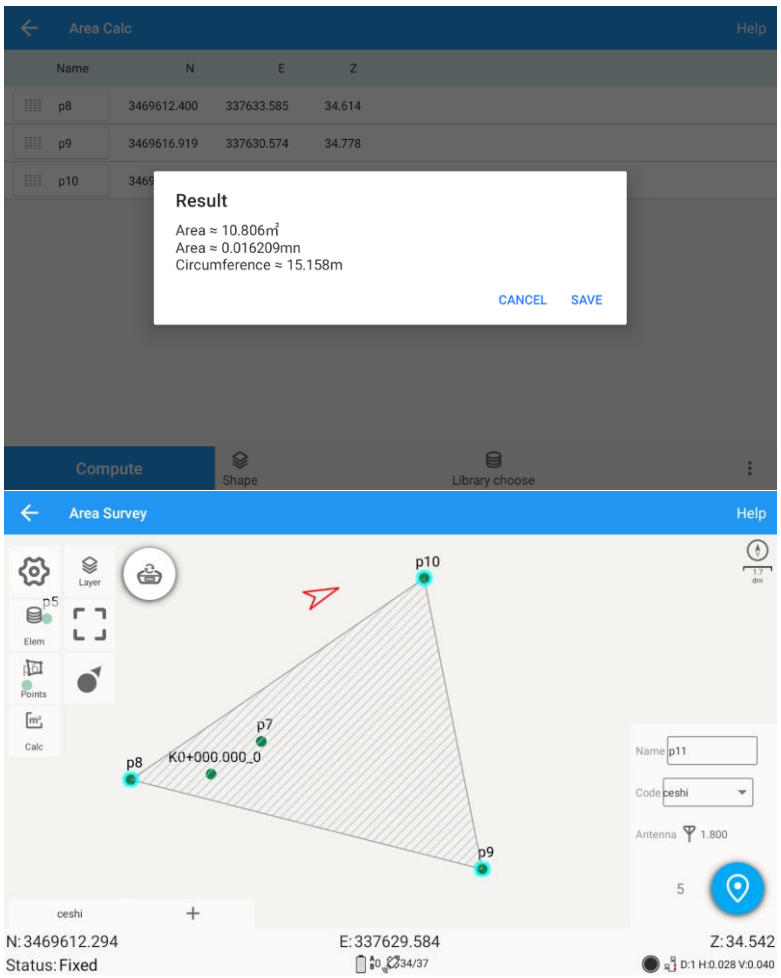
For Auto survey, it supports automatic and continuous survey according to Time or Distance.



For Area survey, it can compute area directly after getting points.

Press Points, it will show the coordinate information, press Calc, it will show the area result, press Shape, it will show the shape on map.

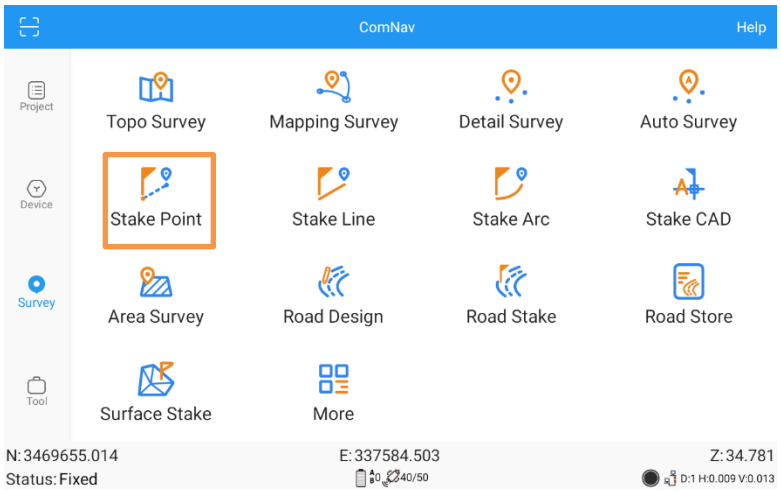


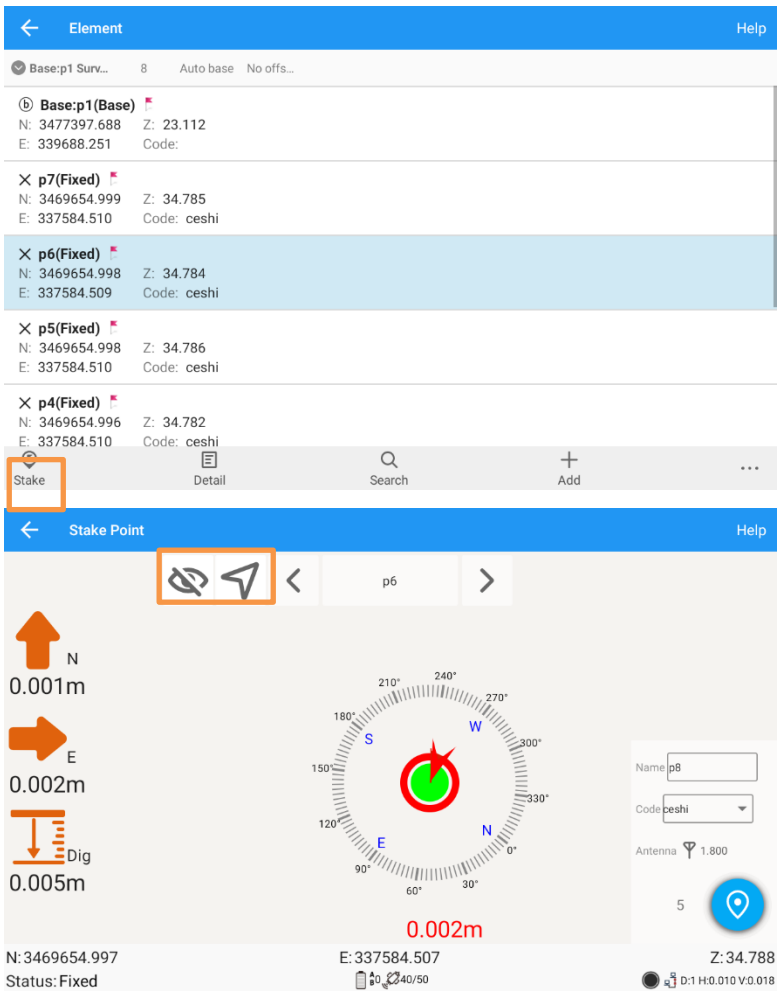


4.3 Stake points/lines

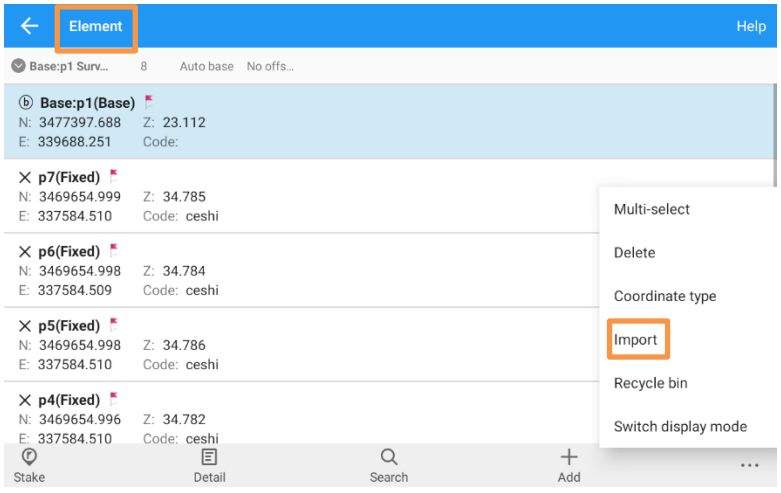
Go into ***Stake point*** interface, click to choose a point and tap ***Stake***. Survey Master provides a navigation map when staking points/lines. If you are close to the target point enough, it will alarm you based on the alarm range you set.

Enter the point name and code based on your requirements, then click 

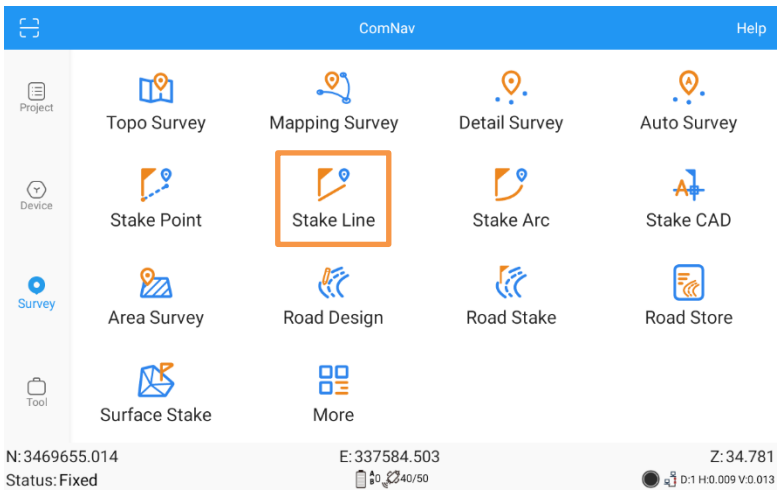


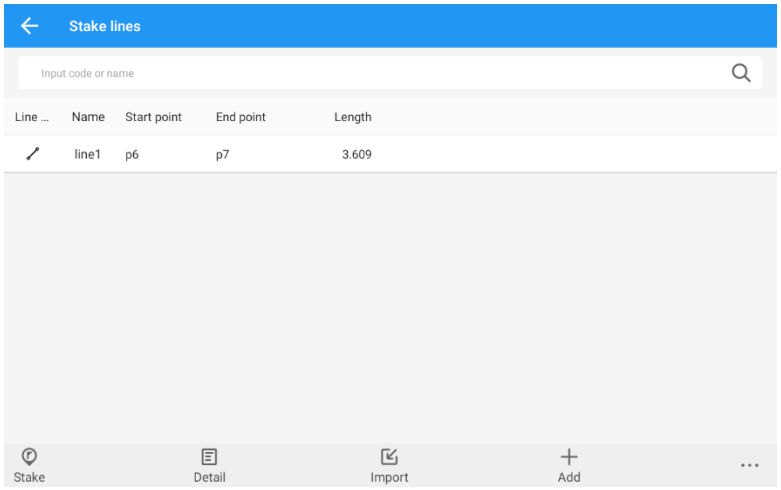


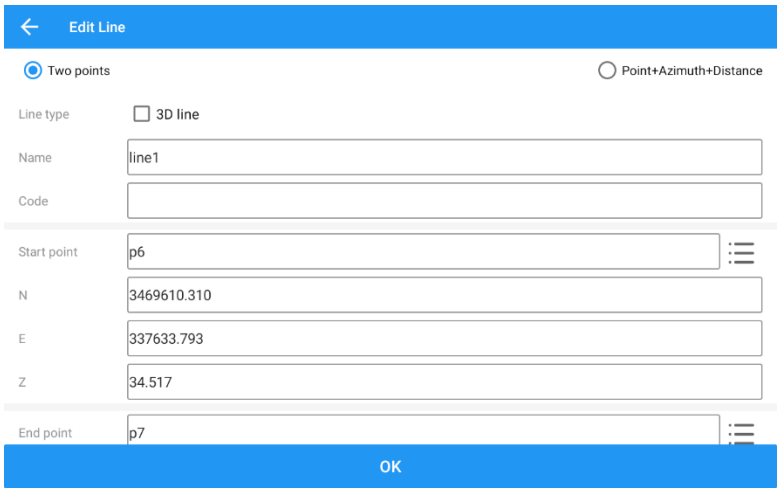
You can also ***Import*** points for staking, or add from ***Element***.

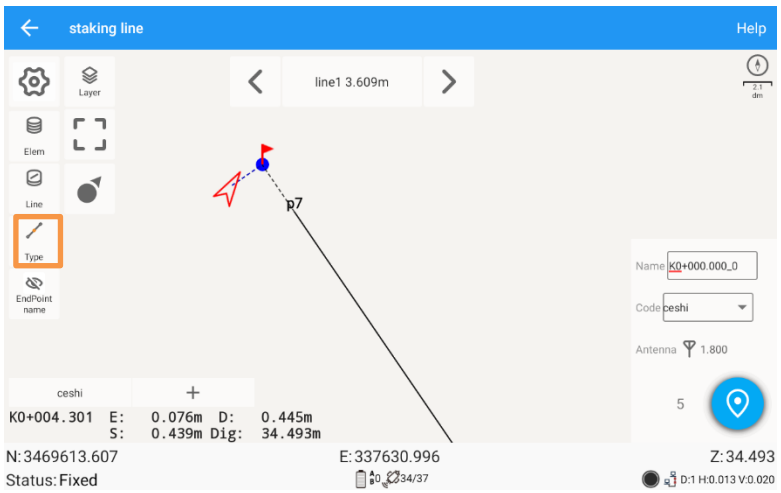


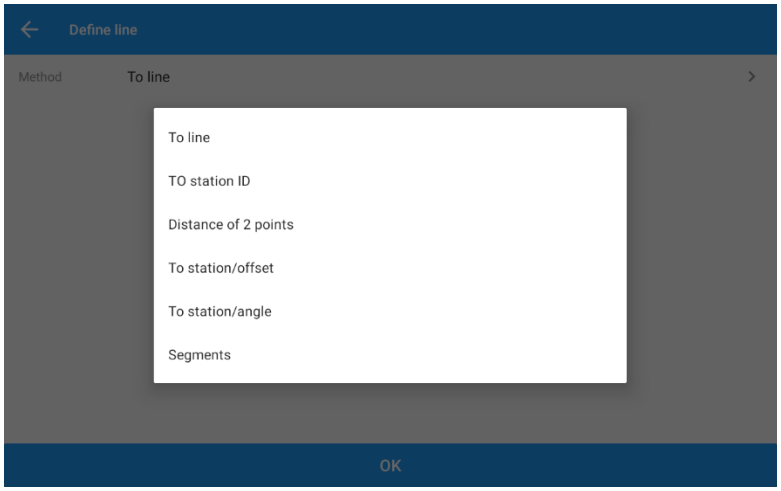
For staking lines, click -> add line (Two points or Point + Azimuth + Distance) -> click OK -> Choose one line and click Stake. The default method to stake is “To line”, press method to choose a method you want.


ComNav
Help
Project
Device
Survey
Tool
Topo Survey
Mapping Survey
Detail Survey
Auto Survey
Stake Point
Stake Line
Stake Arc
Stake CAD
Area Survey
Road Design
Road Stake
Road Store
Surface Stake
More
N:3469655.014
Status:Fixed
E:337584.503
Z:34.781


Stake lines
Input code or name
Line ...
Name
Start point
End point
Length
line1
p6
p7
3.609
Stake
Detail
Import
Add


Edit Line
Two points
Point+Azimuth+Distance
Line type
3D line
Name
line1
Code
Start point
p6
N
3469610.310
E
337633.793
Z
34.517
End point
p7
OK





- To line: show shortest way to find a point on line;
- To station ID: stake points on line by defined interval;
- Distance of 2 points: show distance of current location to the line's start point and end point;
- Segment: Stake on line by defined segment value.

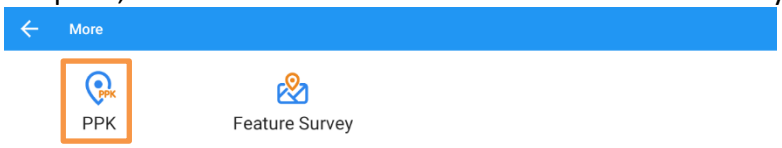
4.4 PPK

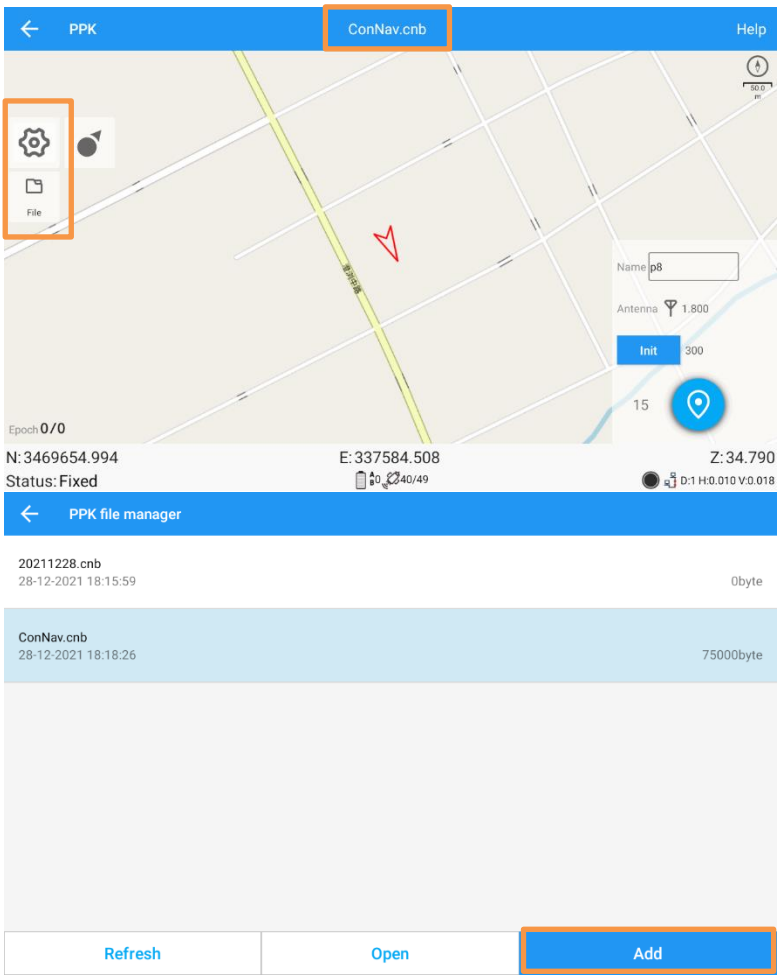
PPK (post processing kinetic) is the unique function of survey master, which is used for post-processing dynamic measurements.

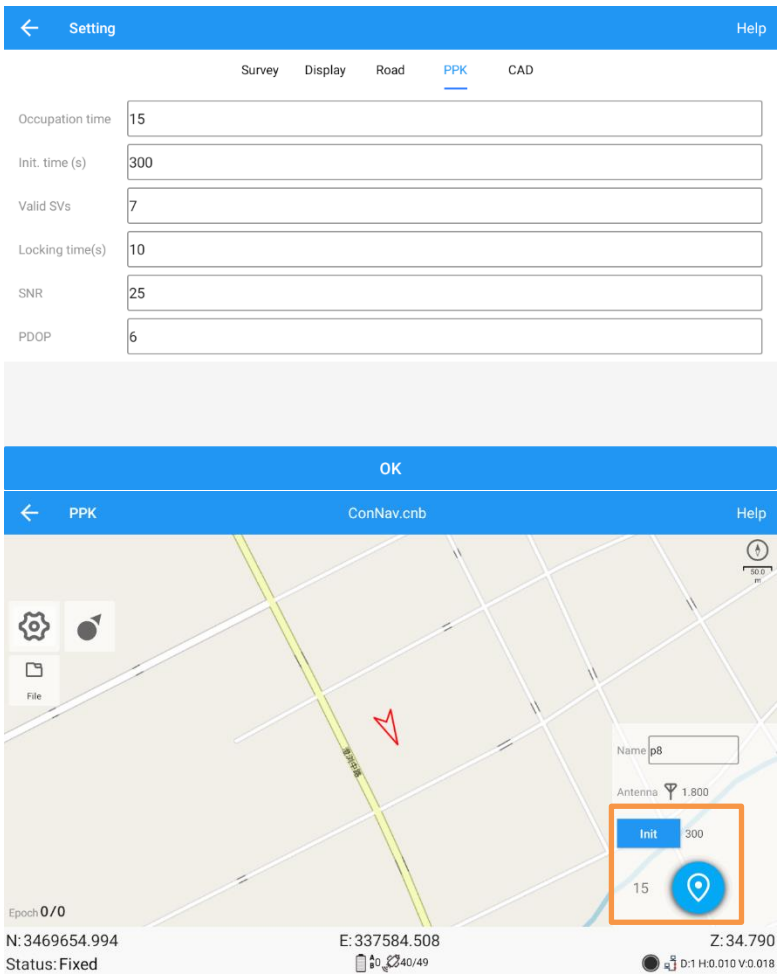
It also needs two receivers to work together, one work as Base to record static data, and another one work as Rover as shown below.

1. Click More in survey interface -> click PPK->choose or create a PPK file.

2. Go to settings, configure PPK settings based on your requirements.
3. To get stable epoch, click Init to initialize -> to start PPK survey.





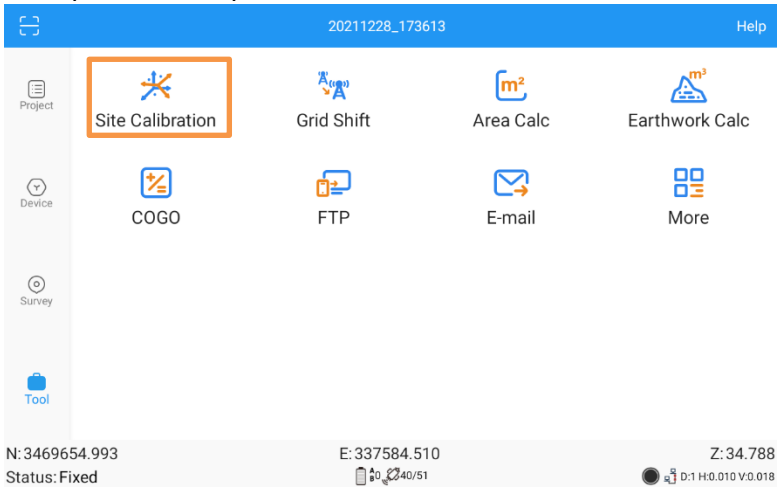


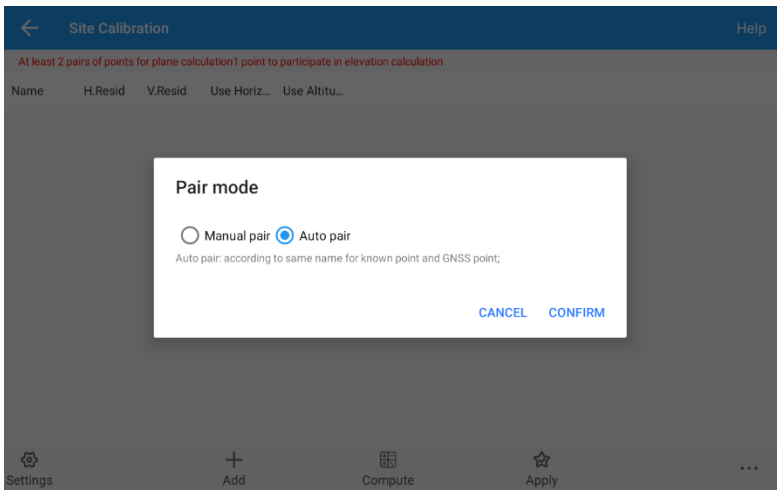
4.5 Site calibration/Grid Shift

4.5.1Site calibration

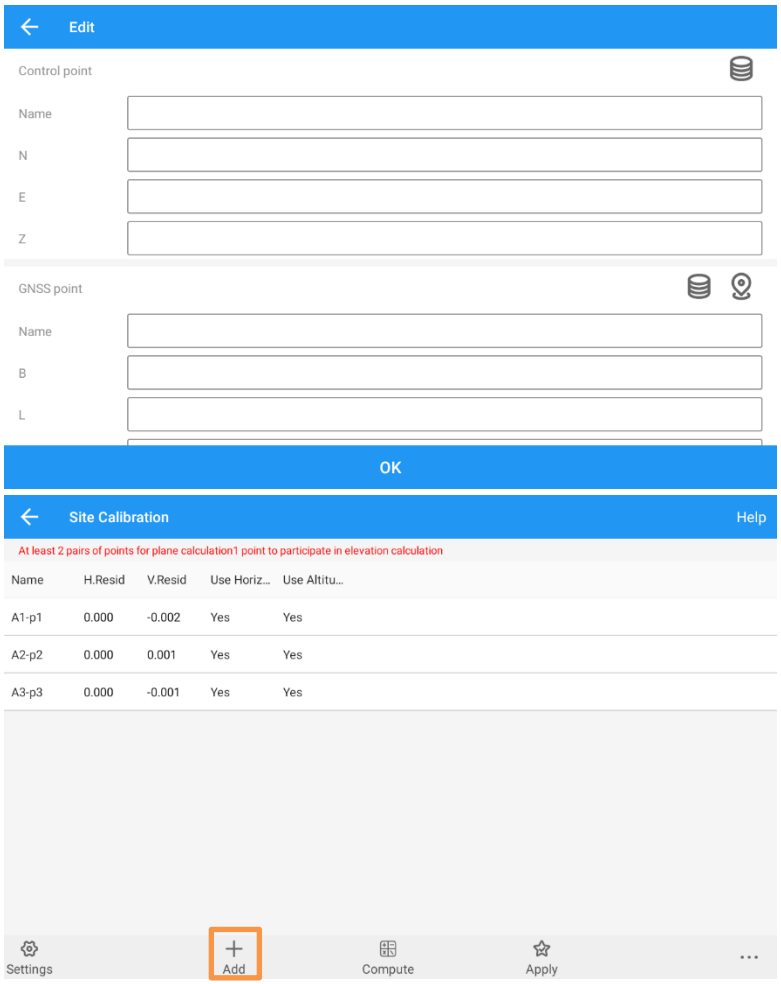
Site calibration is commonly needed once in one project, and all the points will be collected based on calibrated datum system.

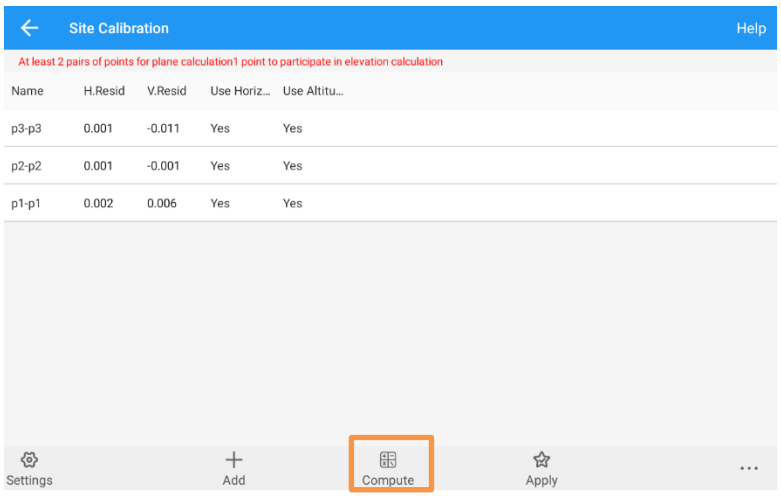
1. Choose manual pair or auto pair.



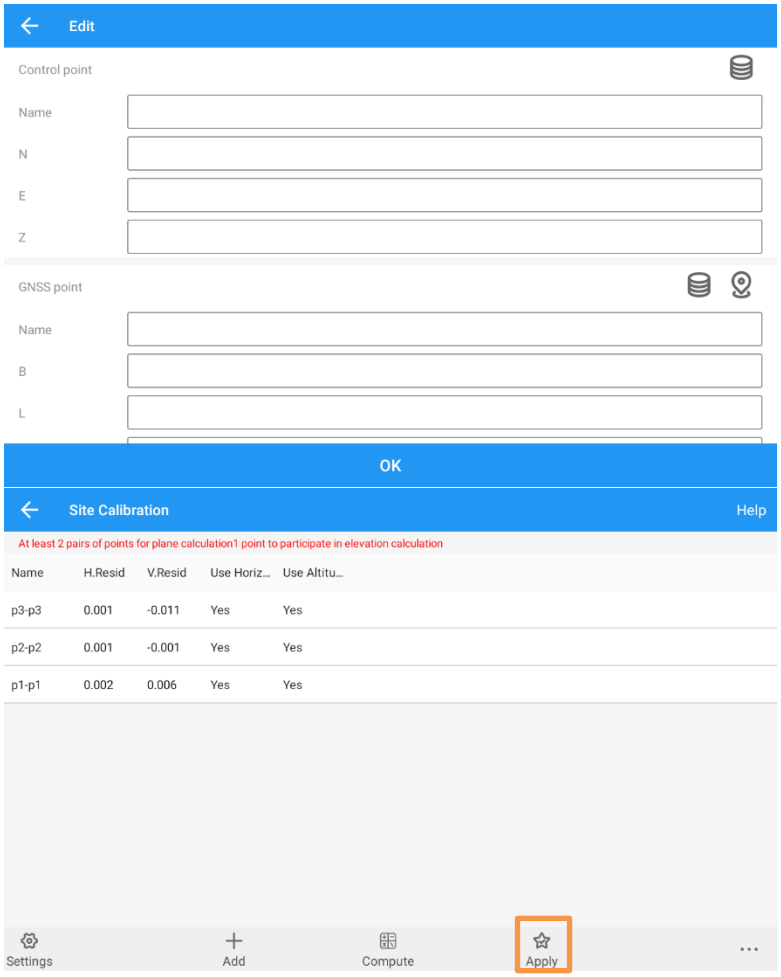


2. If you choose manual pair, you can directly enter at least three groups' point to compute. Click add to add points. (for example, take A1,A2,A3 as known points, take P1,P2,P3 as measured points) After click ***Compute*** to calculate, the software will calibrate automatically.





3. If you choose auto pair, it will auto compute according to the same name for known point and measured point. After click ***Compute*** to calculate, the software will calibrate automatically.

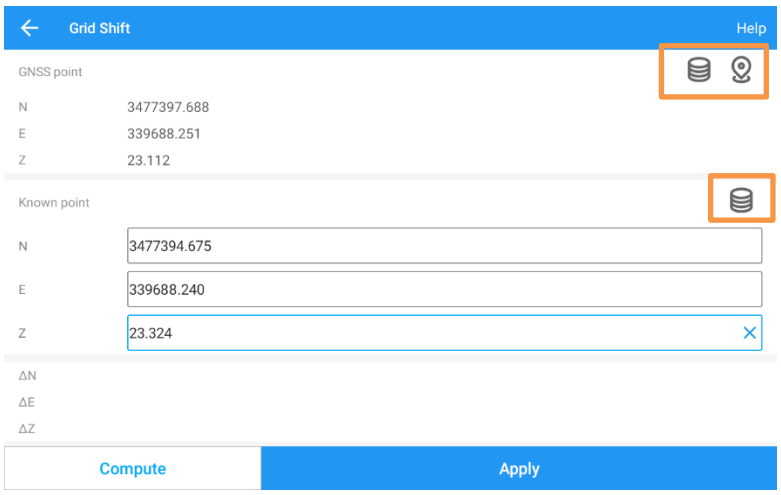


4. Click ***Apply*** to confirm to replace datum. The value of H.Resid and V.Resid should meet the requirement (H.Resid ≤ 0.015m, and V.Resid ≤ 0.02m)

4.5.2 Grid Shift

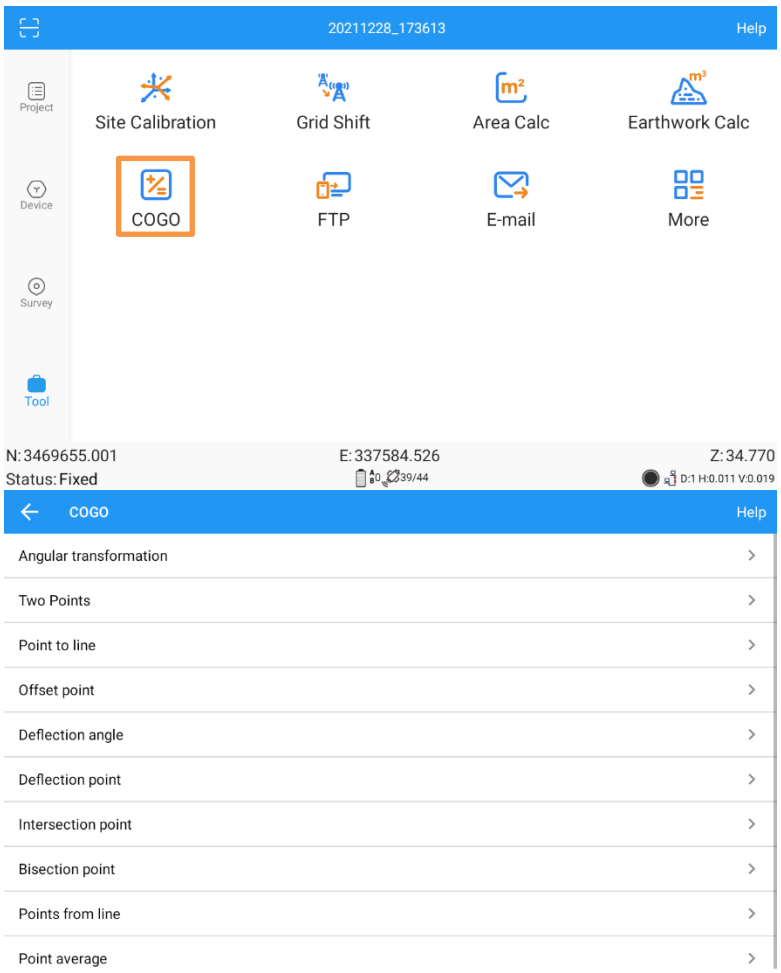
Grid reset function is applied when you need to change the position of Base station in the same project.

Click ***Grid Shift*** in Survey interface -> add current Base point and target Base point -> Click ***Compute*** -> ***Apply*** to complete grid shift.



4.6 COGO

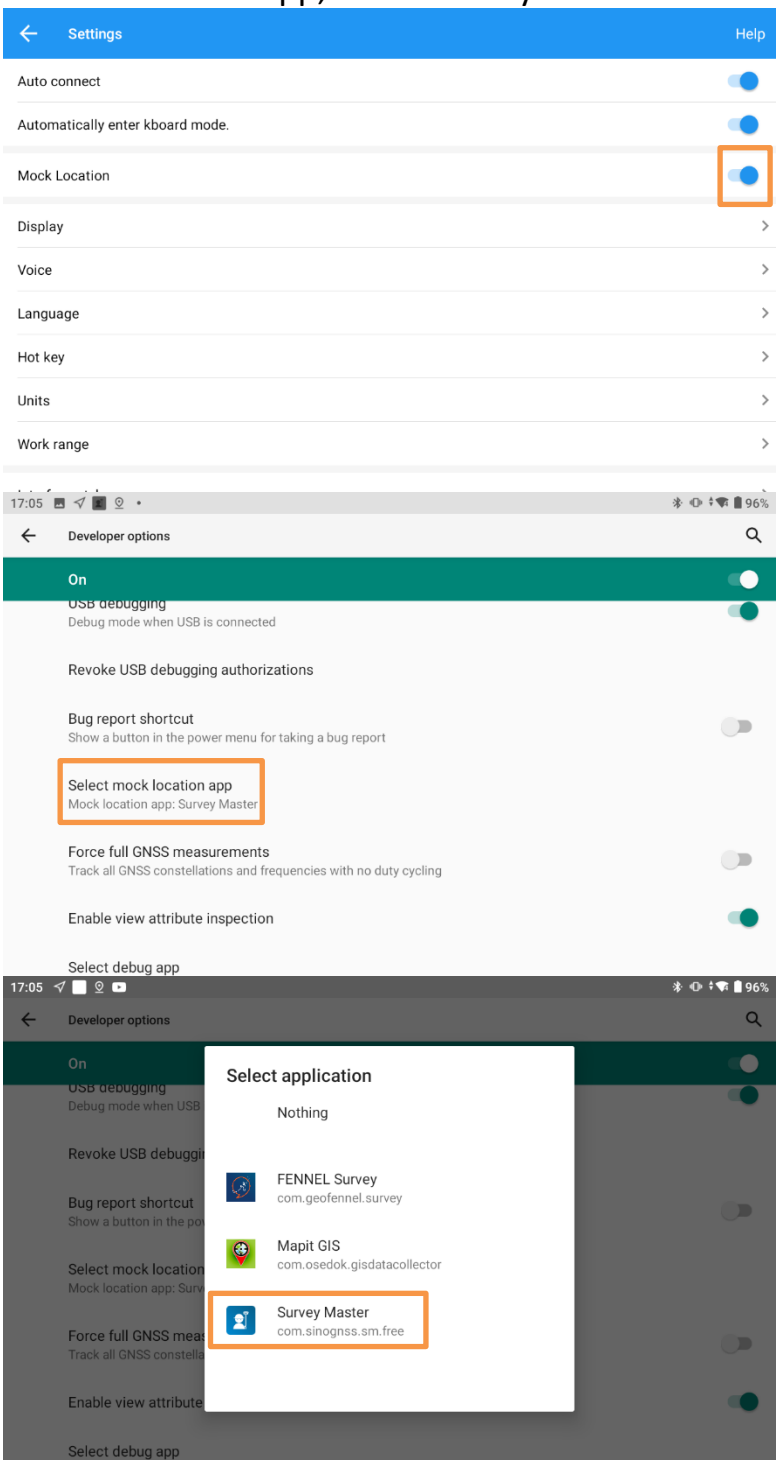
With COGO function, you can calculate points/lines/angle directly on field.



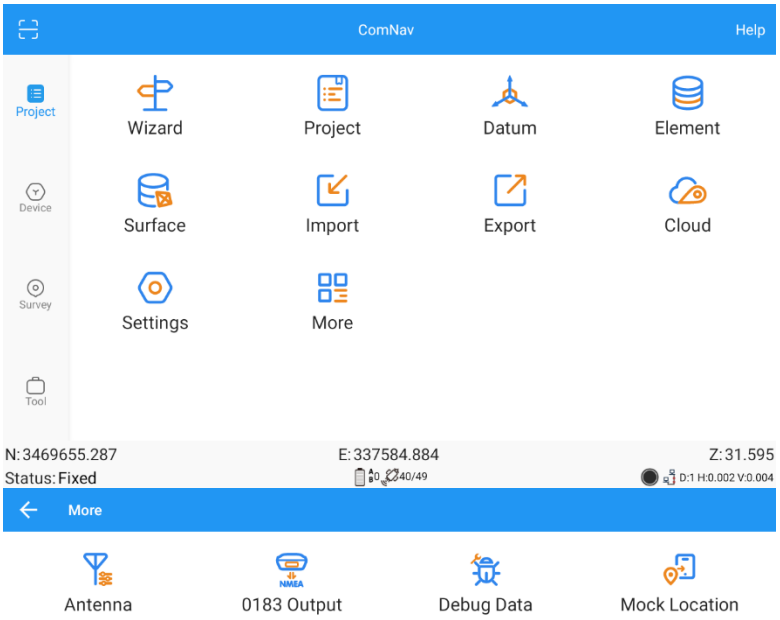
- Angular transformation: Angular type transform;
- Two points: Calculate two points distance;
- Point to line: Distance from point to one line;
- Offset point: Calculate point with azimuth and distance;
- Deflection angle: Calculate angle of two lines;
- Deflection point: Calculate point with angle and distance;
- Intersection point: Calculate intersection points from two lines;
- Bisection point: Calculate point from angle bisector;
- Points from line: Calculate points on line by distance or segment;
- Point average: Calculate average from points;

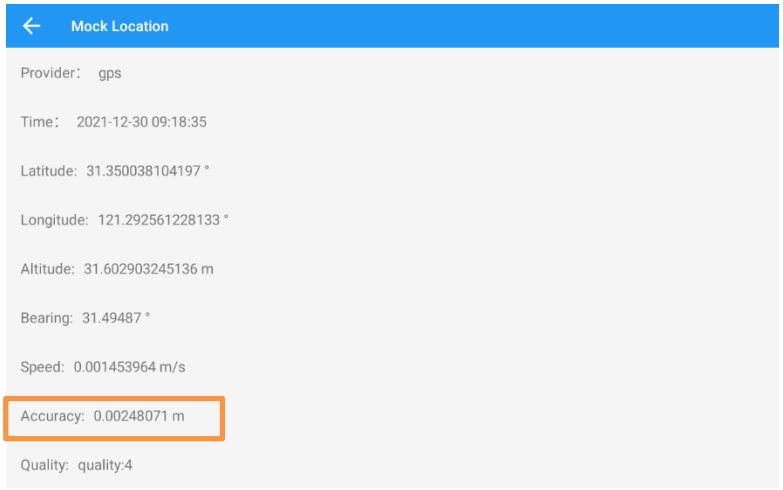
4.6 Mock location

- Turn on the Mock location function in the settings, then enter the developer options.
- Select Mock location app, select Survey Master.



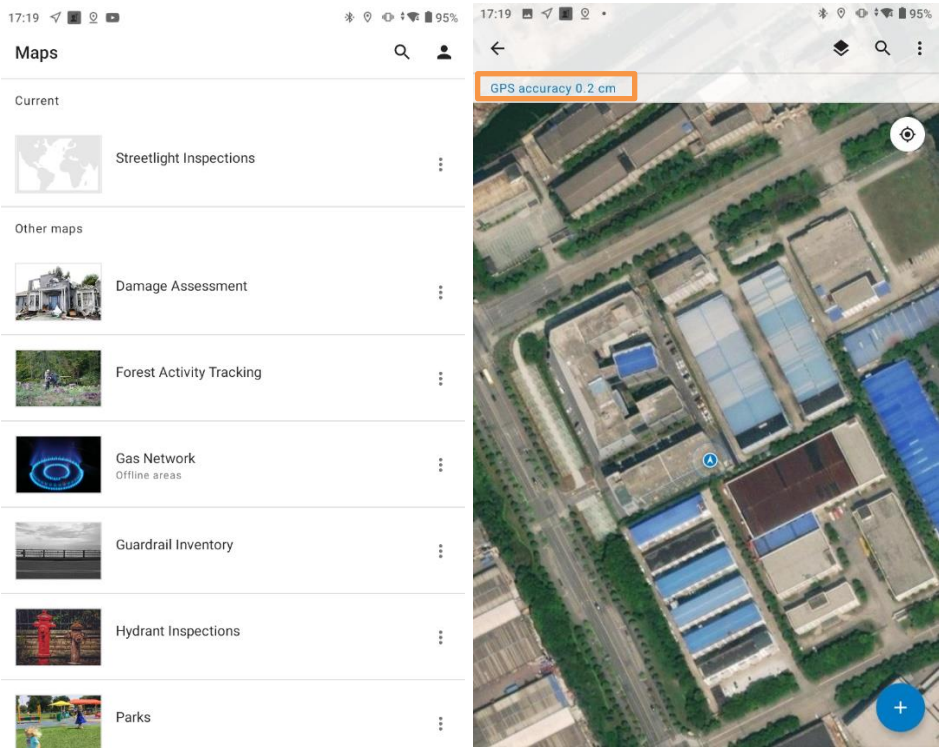
- Configure PDA CORS to keep the positioning status fixed.
- Open the Mock location function, you can see the location information and accuracy.





You can run the Mock location function to share location information with third-party GIS software.

- Open the GIS software. For example: collector.
- You can see the accuracy in the software.



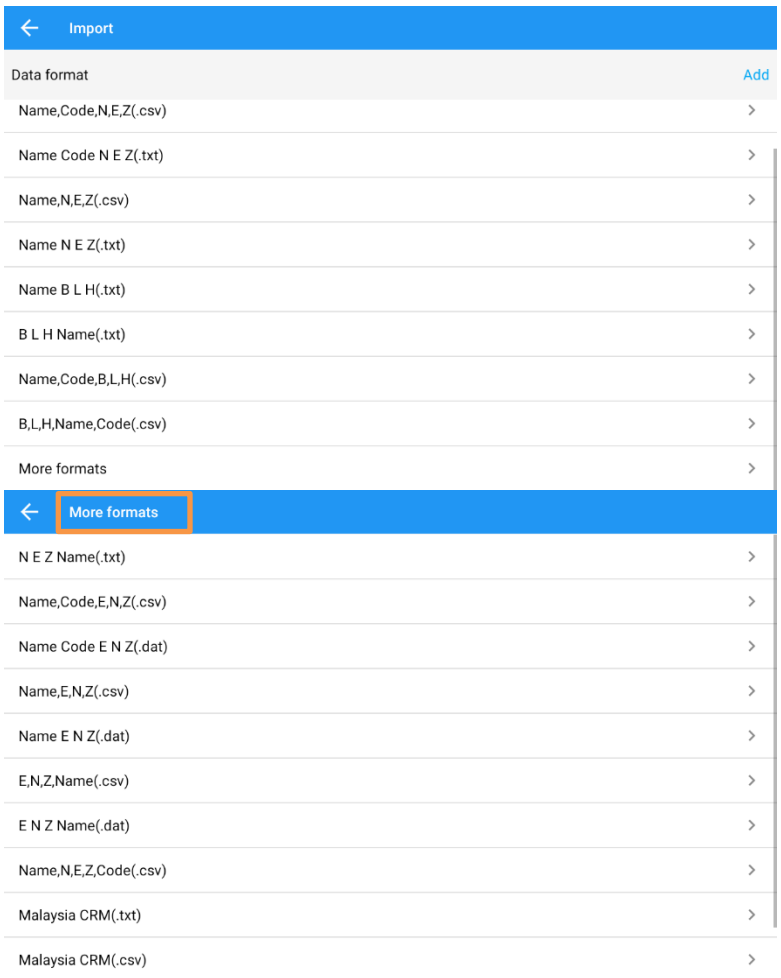
5 Data Export/Import

Survey Master supports to import/export data including grid coordinate, Lat/Lon coordinate with various data format, support import DXF/DWG file and export result of DXF/KML, etc.

5.1 Import

Tap ***Import*** in project interface, there are some predefined data formats, click ***More formats*** to get more predefined formats. Besides, you can click ***Add*** to create a User-defined type.

Long press the predefined data format that you don't use often, you can move this format to the More formats page; also, you can move the data format of More formats page to the previous page where stored the formats you usually use.



- Name: Enter the name for the format
- Delimiter: support Comma(,), Space( ), Semicolon(;)
- File format: support *.csv, *.dat, *.txt format

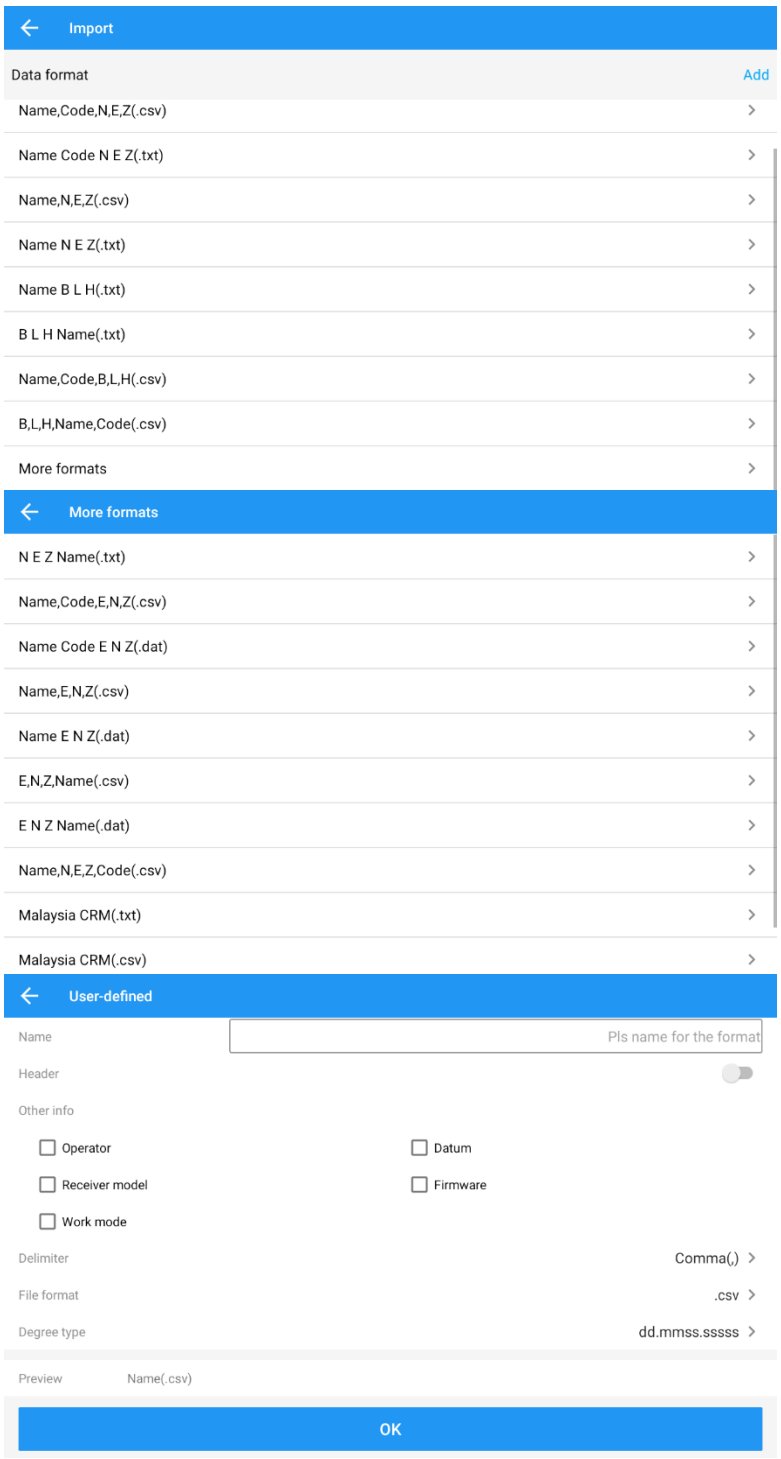
Click ***Select all*** to choose all elements, Click ***Clear*** to eliminate all elements selected.

The elements include: code, name, N, E, Z, B, L, H, X RMS, Y RMS, V.RMS, status, start time, occupation time, diff age, base ID, total AntHgt, Antenna height, measure type, antenna name, ending time, comment, RMS, PDOP, HDOP, VDOP, TDOP, GDOP, total SV, used SV, elevation, tilt offset, tilt angle, tilt distance

Tip: The format you defined will also be saved to Export interface.

Choose one format to import data.

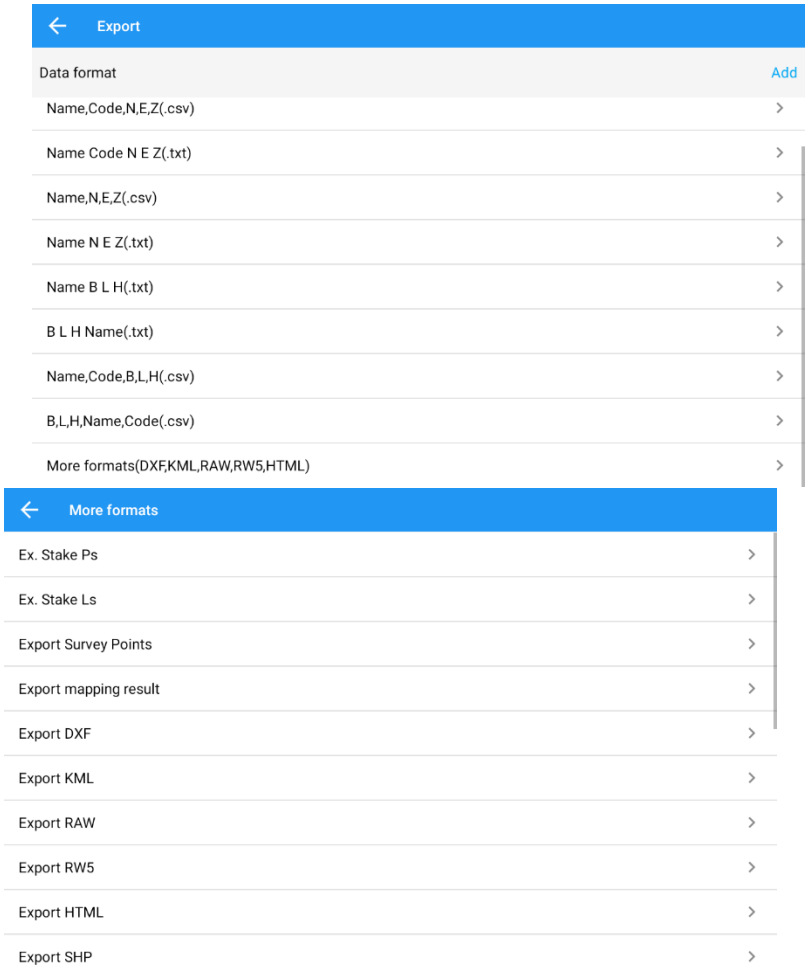
- The default Import path is …*/Sinognss/sm/data,* you can also click ***Upper folder*** to change to any other path where the file is.
- Point type: support Input point, Control point, Stake point



5.2 Export

Tap ***Export*** in Project interface to export simple data of survey points. Also, click ***More formats*** to export the survey points with detailed information or other formats like stake points/lines, DXF, SHP, KML, RAW, RW5, HTML, CASS feature result.

Same with Import result, long press the predefined data format to select the interface you want to place.

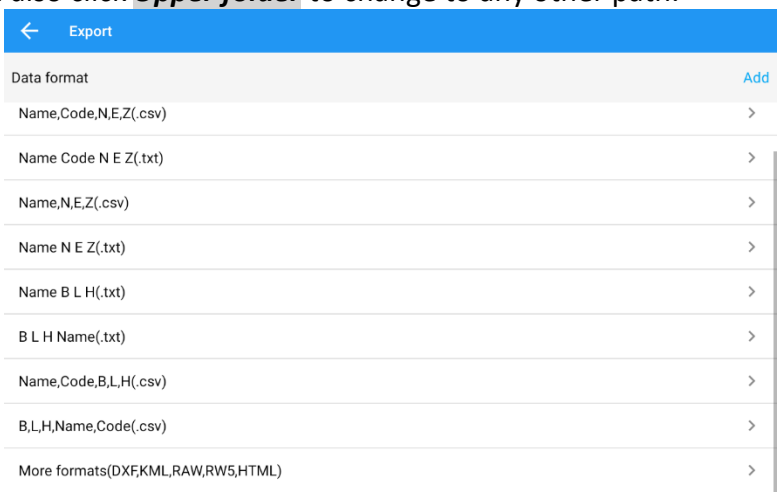


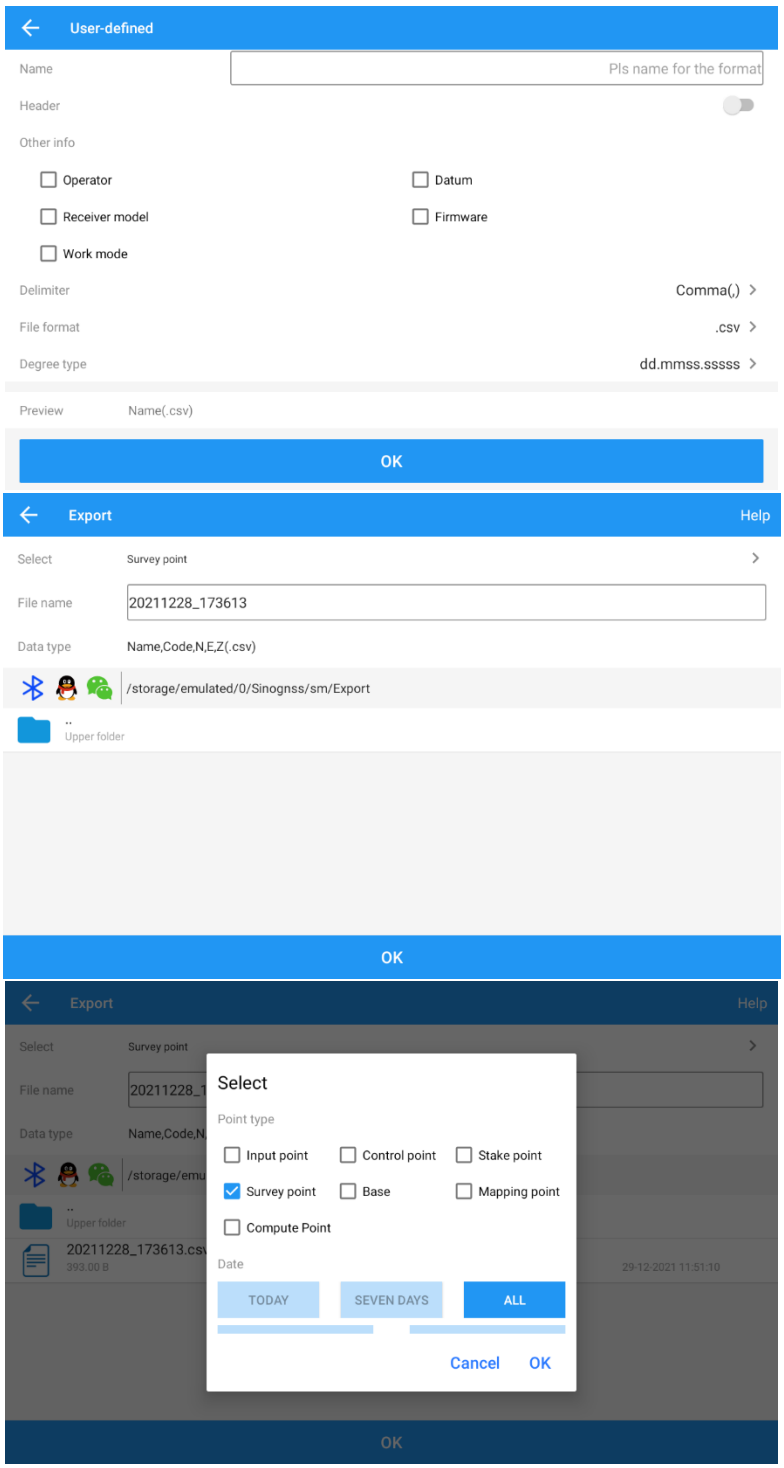
- File format: support *.csv, *.dat, *.txt format

Choose one format to export data.

- Select: support Survey point, Control point, Input point, Stake point, Base, also, you can set the date, name, code of data to specific export

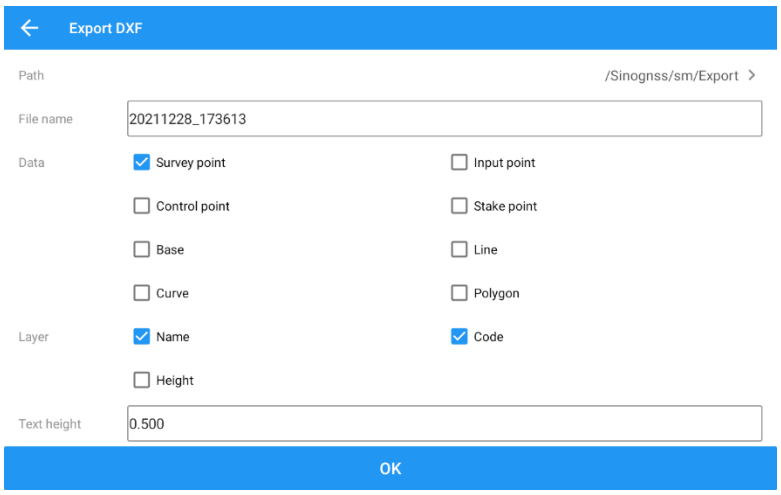
The default export path is …*/Sinognss/sm/export*, and the previous saved file will be shown below, you can also click ***Upper folder*** to change to any other path.





For the points, lines and polygons you surveyed in Topo survey and Feature survey, you can click ***Export DXF*** to export dxf file, then you can edit them in third party CAD software, or import to ***Basemap*** to check, or import to ***Stake CAD*** to stake.

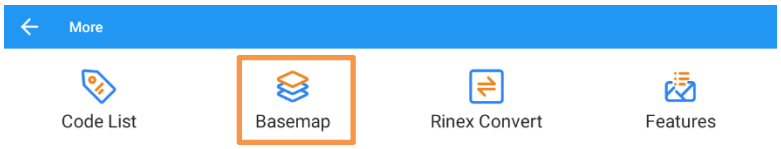
Choose the data that you want to export including survey point, input point, control point, stake point, base, line and polygon, and the layer properties includes name, code and height, the default text height is 0.5.

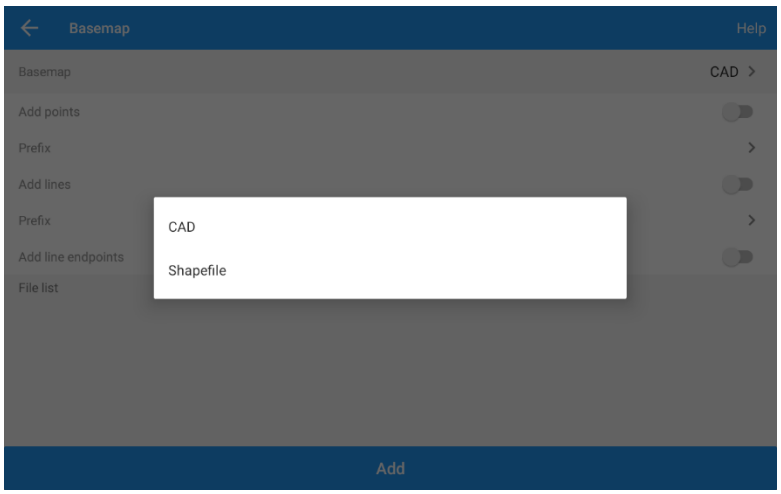


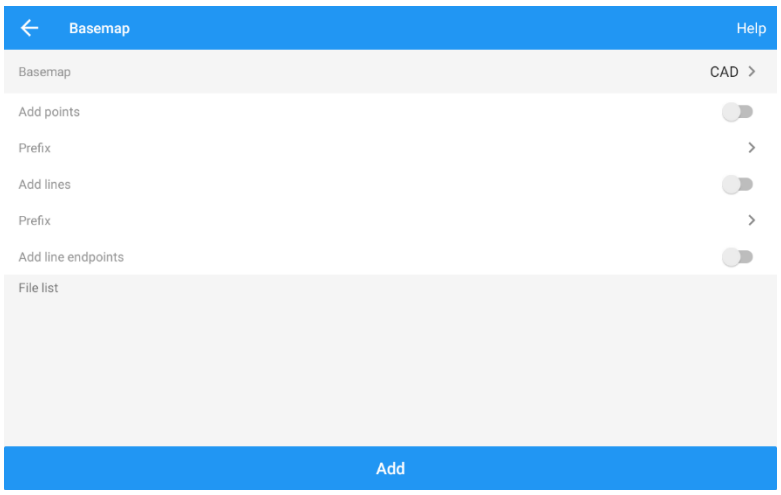
5.3 Import Basemap

Tap ***Basemap*** to import DXF/DWG/SHP file into Survey Master.

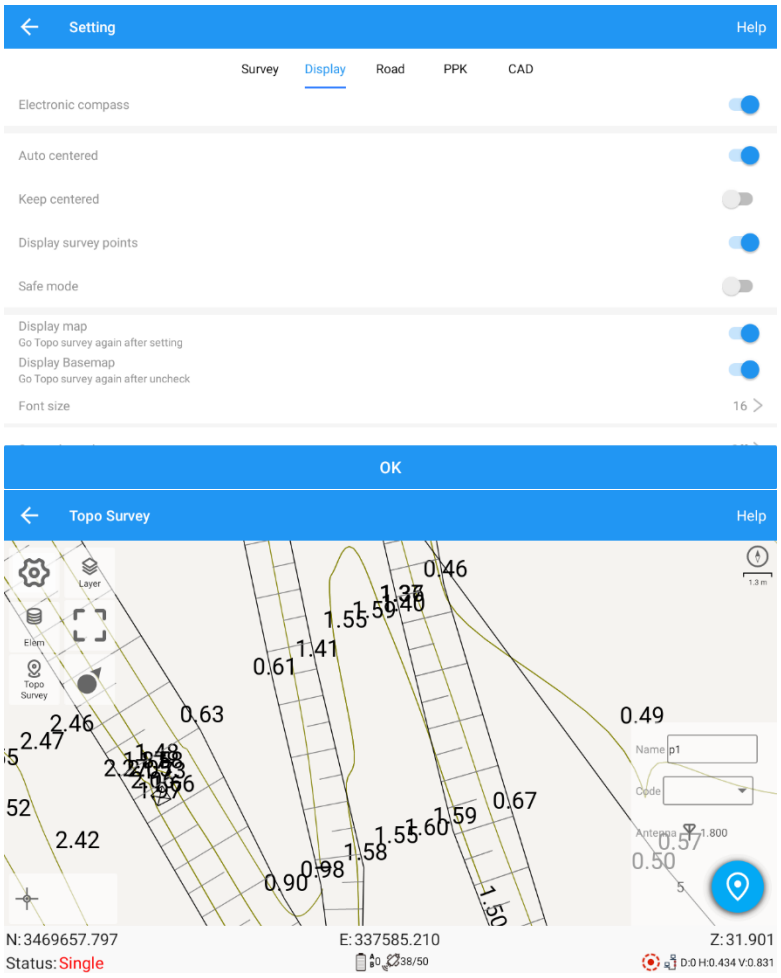
- Add points: Save points from the dxf/dwg/shp file to element.
- Add lines: Save lines from the dxf/dwg/shp file to element.
- Prefix: Support add prefix name for points/lines saved to Elements.
- Add line endpoints: add line endpoints to point element.






Basemap
Help
Basemap
CAD
Add points
Prefix
Add lines
Prefix
Add line endpoints
File list
Add

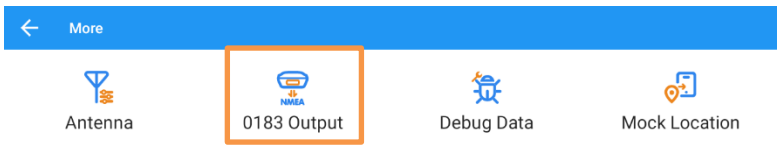
Remember go survey settings to check on display Basemap, click zoom button to auto show Basemap.

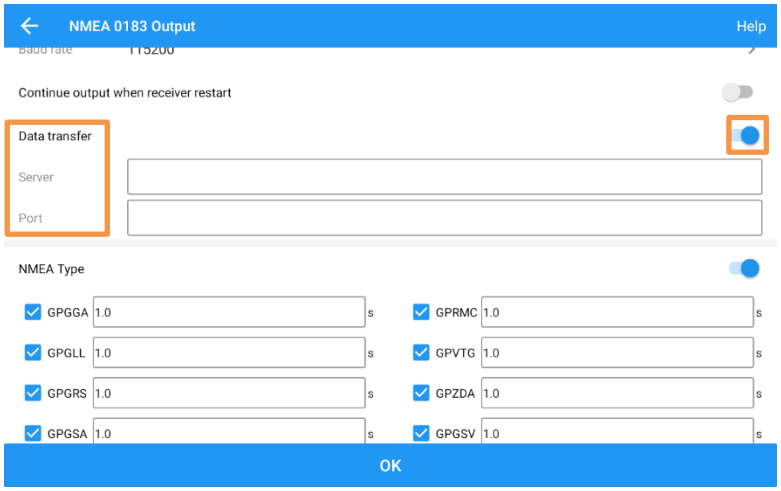


6 Export Result

6.1 NMEA 0183 output

With ***NMEA 0183*** function, you can quickly set to output NMEA data。
Data transfer: Return the NAME message you configured.





6.2 Register P8 Tablet High Precision Version via Survey Master

Normally, the register code is like this:

ID:03401012 $$:49-0B-79-23-00-00-00-95-85

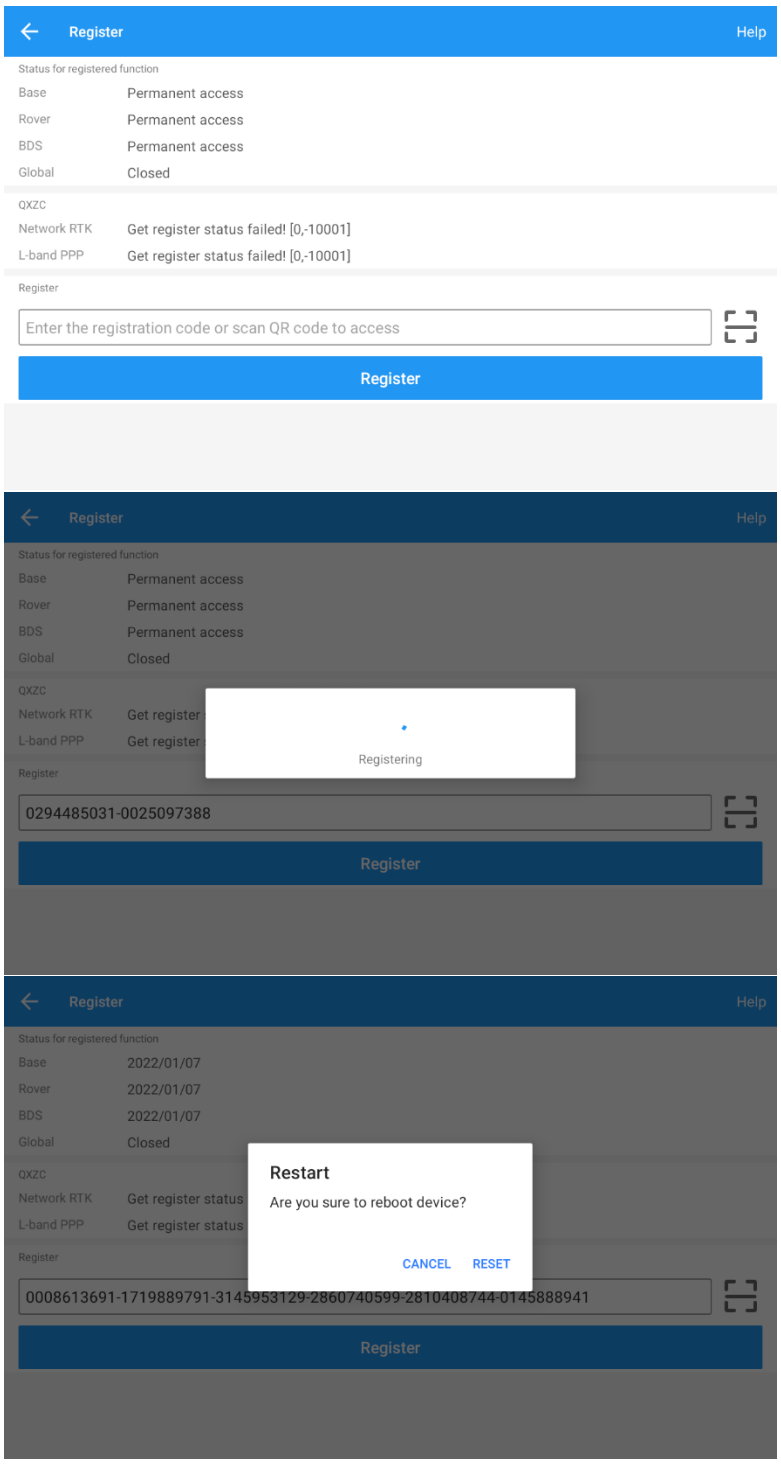
FUNCTIONREG:2207453726-3851620954-0949162572-0697504466-0613618189-0027539229

Note: The length of code may different according to different requirements.

Following shows two methods to register the receiver.

- **Register function**

For Register function, you need only enter the number: *2207453726-3851620954-0949162572-0697504466-0613618189-0027539229*

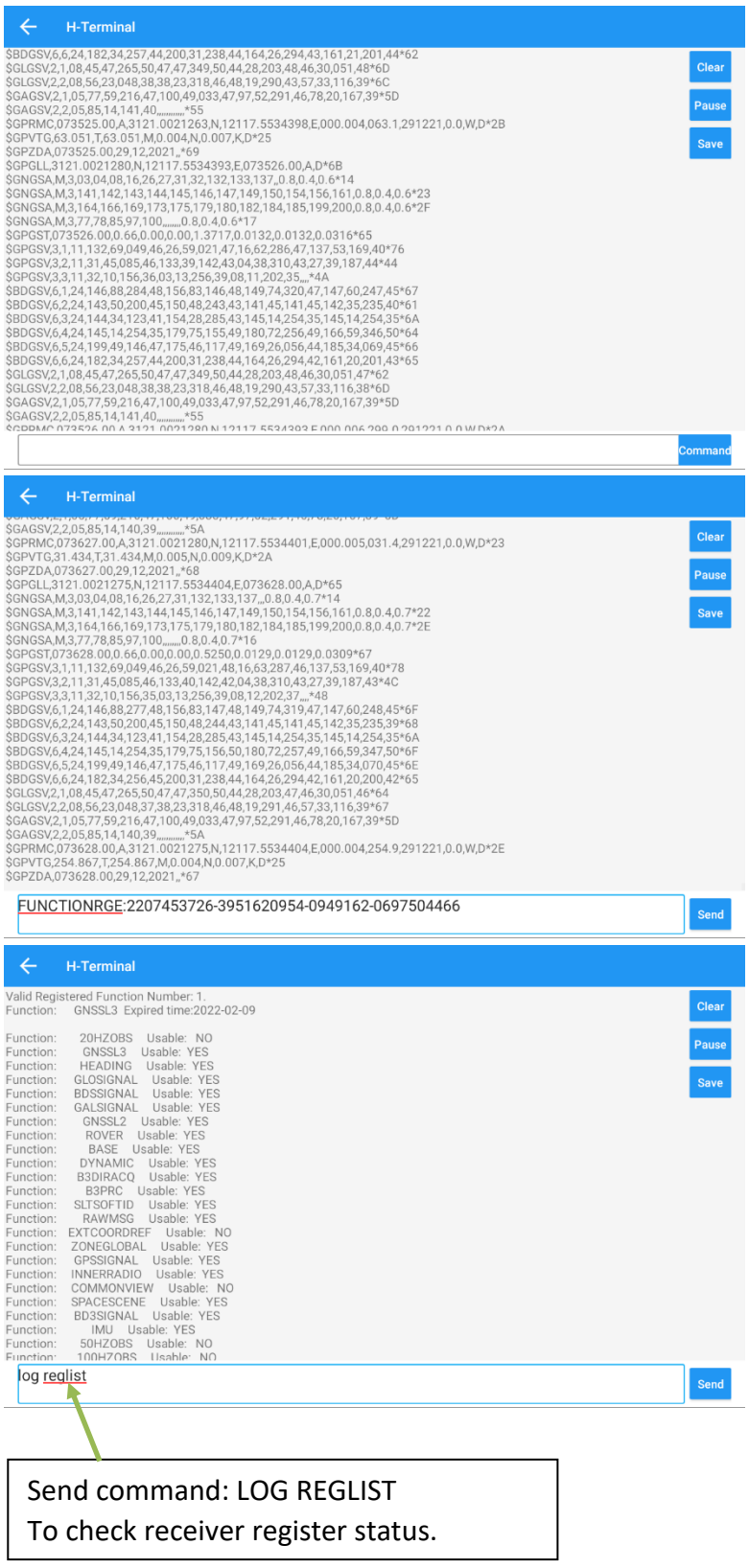


Restart the device after the upgrade is complete.

- **Register via commands**

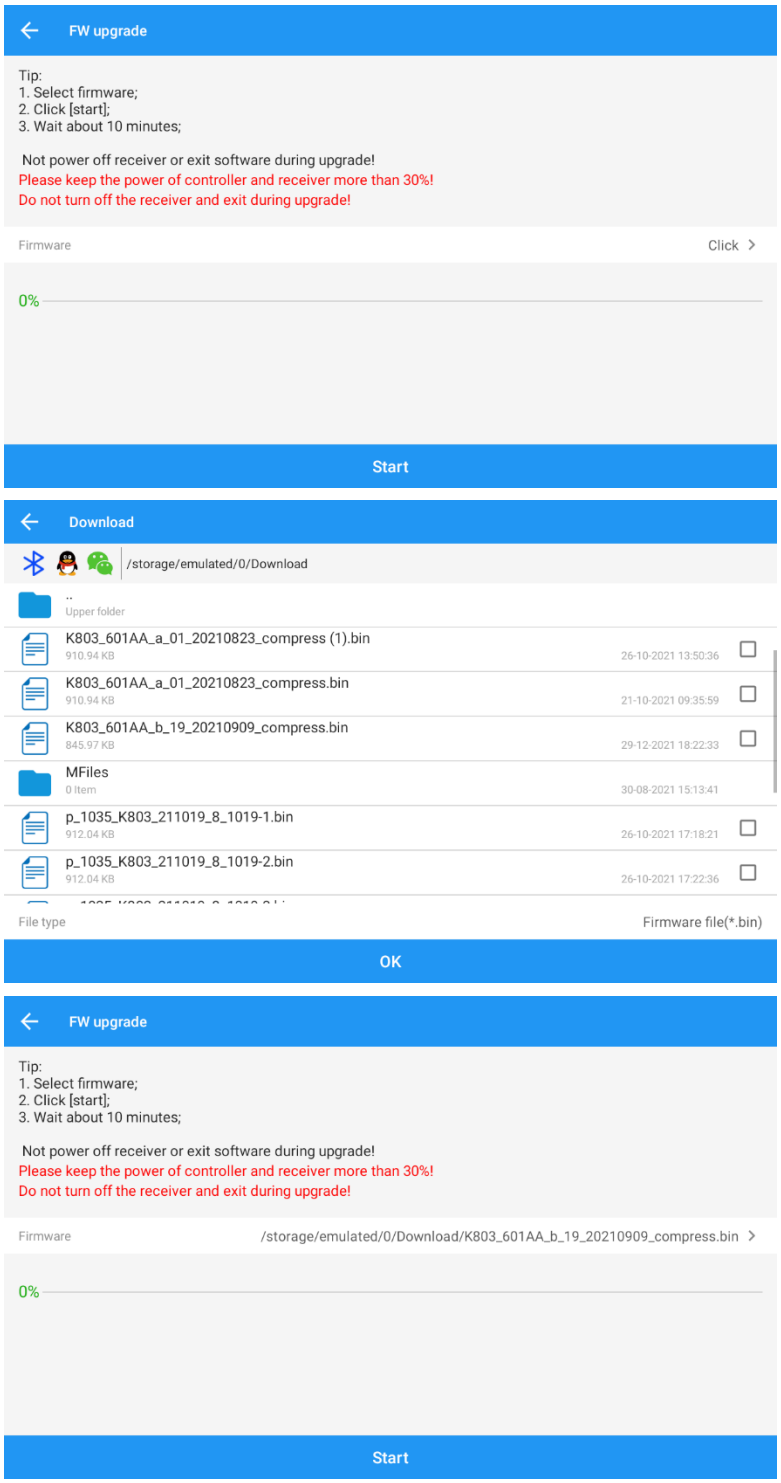
You need copy the whole code, include the word '**FUNCTIONREG**:'

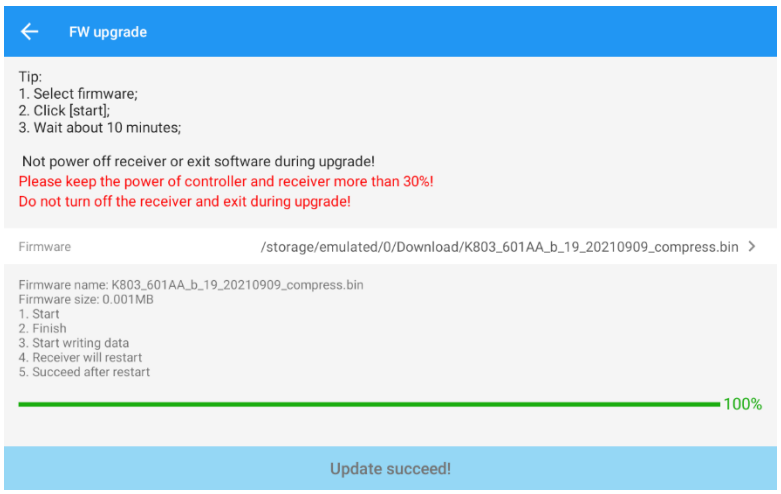
FUNCTIONREG:2207453726-3851620954-0949162572-0697504466-0613618189-0027539229


H-Terminal
Clear
Pause
Save
Command
H-Terminal
Clear
Pause
Save
FUNCTIONRGE:2207453726-3951620954-0949162-0697504466
Send
H-Terminal
Clear
Pause
Save
log reglist
Send
Send command: LOG REGLIST
To check receiver register status.

7 Firmware Upgrade

1. Copy the firmware to the memory of the P8 Tablet High Precision Version.
2. Open the Survey Master software, choose "**FW upgrade**", click "**Click**", select ***the folder where your firmware is placed***, click "**OK**" and then click "**start**".





3.Restart the device after the upgrade is complete.