



OpenRTK 330

Low cost high precision GNSS/INS module

Rtklib tools supporting Aceinna Format



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Wuxi, China
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1. Overview

1.1. What is Rtklib

RTKLIB is an open source program package for standard and precise positioning with GNSS (global navigation satellite system). It supports standard and precise positioning algorithms with GPS, GLONASS, Galileo, QZSS, BeiDou and SBAS.

1.2. Rtklib tools supporting Aceinna Format

Rtklib tools supporting Aceinna Format is a special version of Rtklib which supports aceinna data format to display data, decode data, save data, and also plotting and RTK processing.

1.3. Aceinna data format

Aceinna-user and aceinna-raw are two data formats exported from Openrtk330LI; They are output from serial port 1 and serial port 3 of Openrtk330LI; Aceinna-user data include imu raw data, rtk and ins solution; Aceinna-raw includes rover, base RTCM data and imu raw data.

1.3.1. Aceinna-User Format

Data format definition

Start 1	Start 2	Frame type 1	Frame type 2	Data length1	Data content	Check 1	Check 2
---------	---------	--------------	--------------	--------------	--------------	---------	---------

Description

- Start: Each frame of data starts with this, 2 bytes: 0x55 0x55.
- Frame type: 2 bytes, high byte first.

-
- Data length: 1 byte, refers to the byte length of the data content.
 - Data content: maximum 255 bytes.
 - Check: crc16 check, 2 bytes, low byte first, bytes from the beginning of the “Frame type” to the end of the “Data content” are included in the check calculation, and the check algorithm C code is as follows:

```
uint16_t CalculateCRC (uint8_t *buf, uint16_t length)
{
    uint16_t crc = 0x1D0F;
    for (int i=0; i < length; i++) {
        crc ^= buf[i] << 8;
        for (int j=0; j<8; j++) {
            if (crc & 0x8000) {
                crc = (crc << 1) ^ 0x1021;
            }
            else {
                crc = crc << 1;
            }
        }
    }
    return ((crc << 8 ) & 0xFF00) | ((crc >> 8) & 0xFF);
}
```

Frame types

Aceinna-user has five types of data, namely "S1", "G1", "I1", "O1" and "Y1"; For the specific structure of each type of format, please refer to the openrtk documentation:

https://openrtk.readthedocs.io/en/latest/communication_port/User_uart.html#imu-raw-data-packet

1.3.2. Aceinna-raw Format

Aceinna-raw is composed of four format types of \$GPGGA, \$GPIMU, \$GPROV, \$GPREF;

\$GPGGA

\$GPGGA is the standard GGA format.

\$GPIMU

\$ GPIMU is the IMU information in NMEA format.

\$GPIMU	time of week	accel-x	accel-y	accel-z	gyro-x	gyro-y	gyro-z
---------	--------------	---------	---------	---------	--------	--------	--------

\$GPROV

\$ GPROV contains the RTCM package from Rover.

\$ GPROV	time of week	left length	RTCM bin	
----------	--------------	-------------	----------	--

\$GPREF

\$GPREF contains the RTCM package from Base.

\$ GPREF	time of week	left length	RTCM bin	
----------	--------------	-------------	----------	--

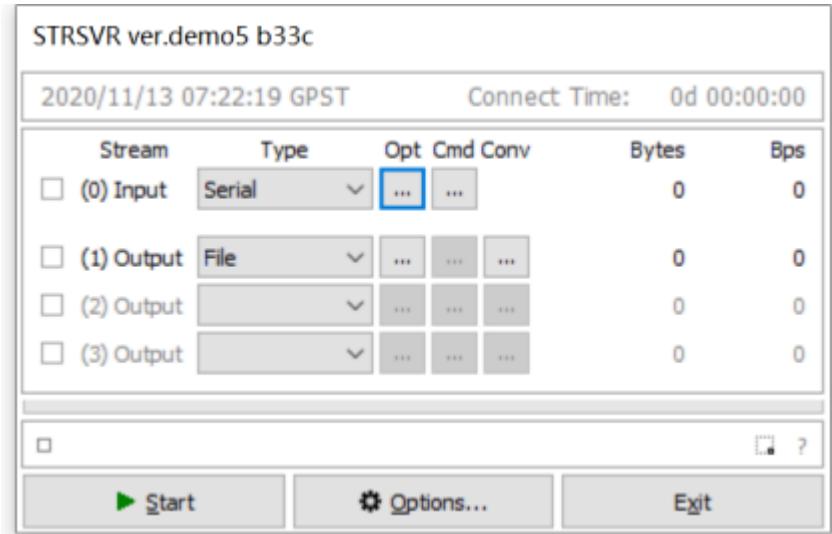
2. Instructions

2.1. Use strsvr to decode aceinna-user data

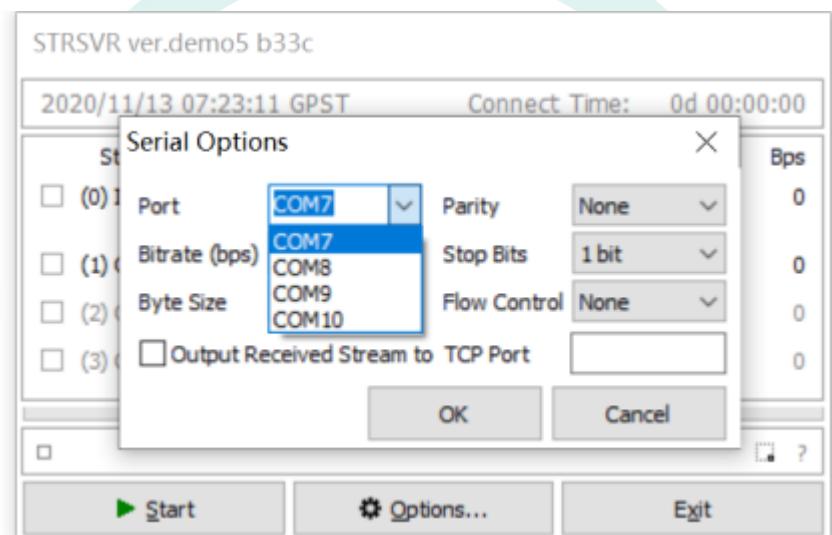
Use strsvr to decode aceinna-user data format. Show the readable format data in monitor dialog and save it in files.

2.1.1. Set input stream parameter

Select serial for (0) input. Click “opt” button open the Serial Options dialog.

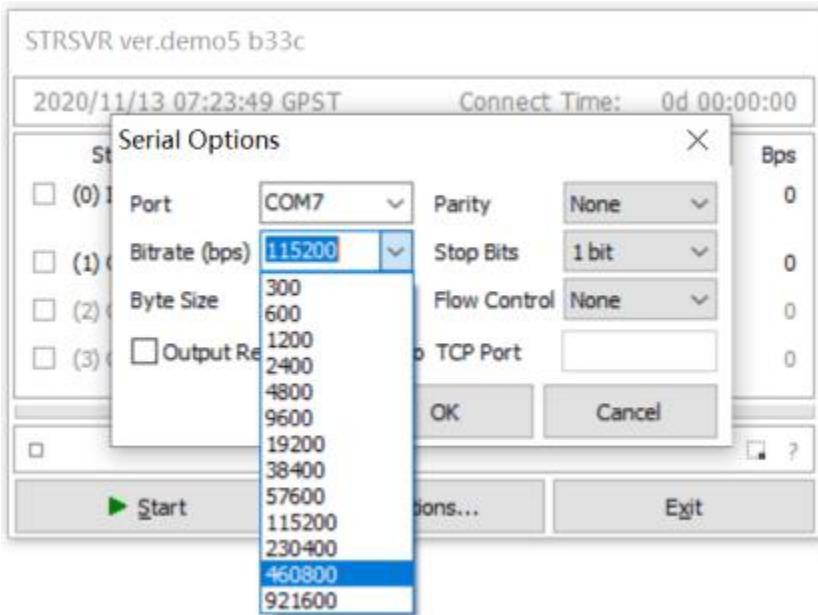


Select the first serial port in the serial Options dialog.



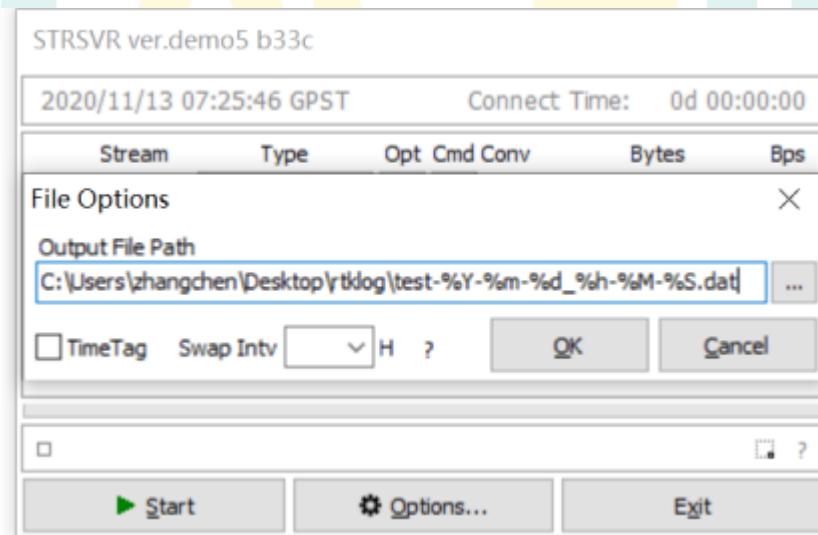
Bitrate select 460800.

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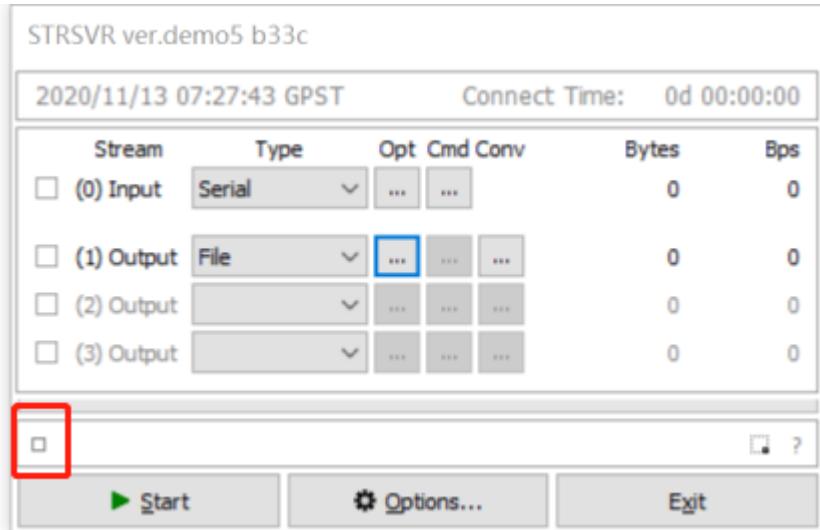
2.1.2. Set output files path

Select the path to save the file. example: C:\Users\zhangchen\Desktop\rtklog\

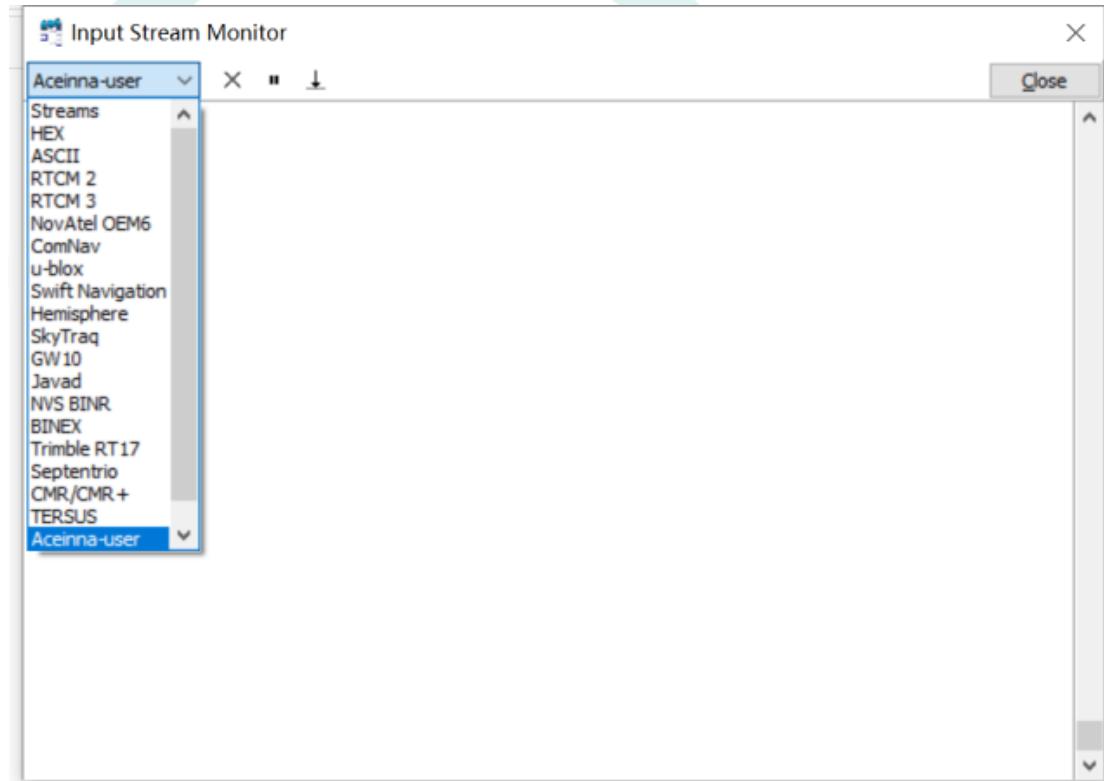


2.1.3. Show the data in monitor dialog and save file

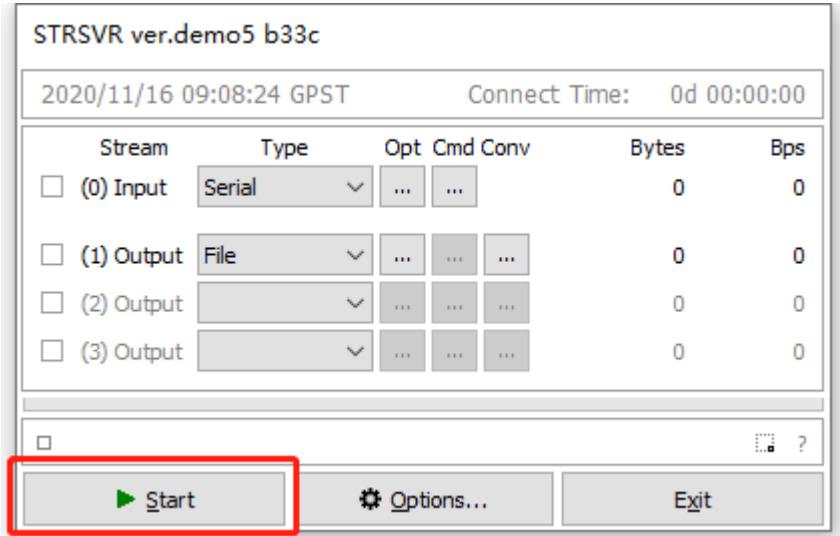
Click the small square button to open Input Stream Monitor dialog.



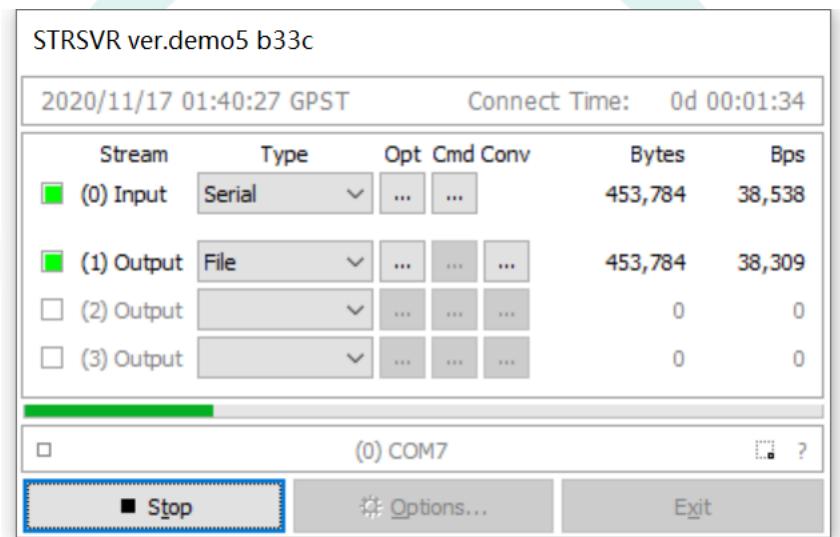
Select the aceinna-user format.



Click start button to start receive data.



Strsvr is running.

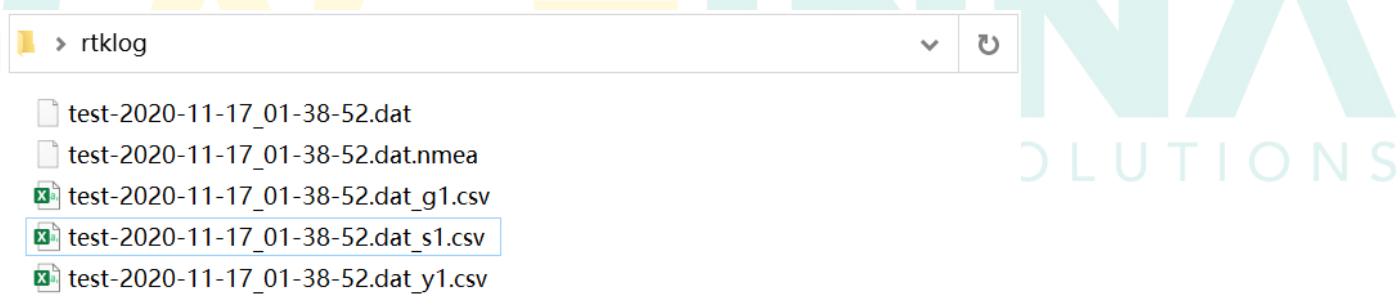


The data is show in monitor dialog.

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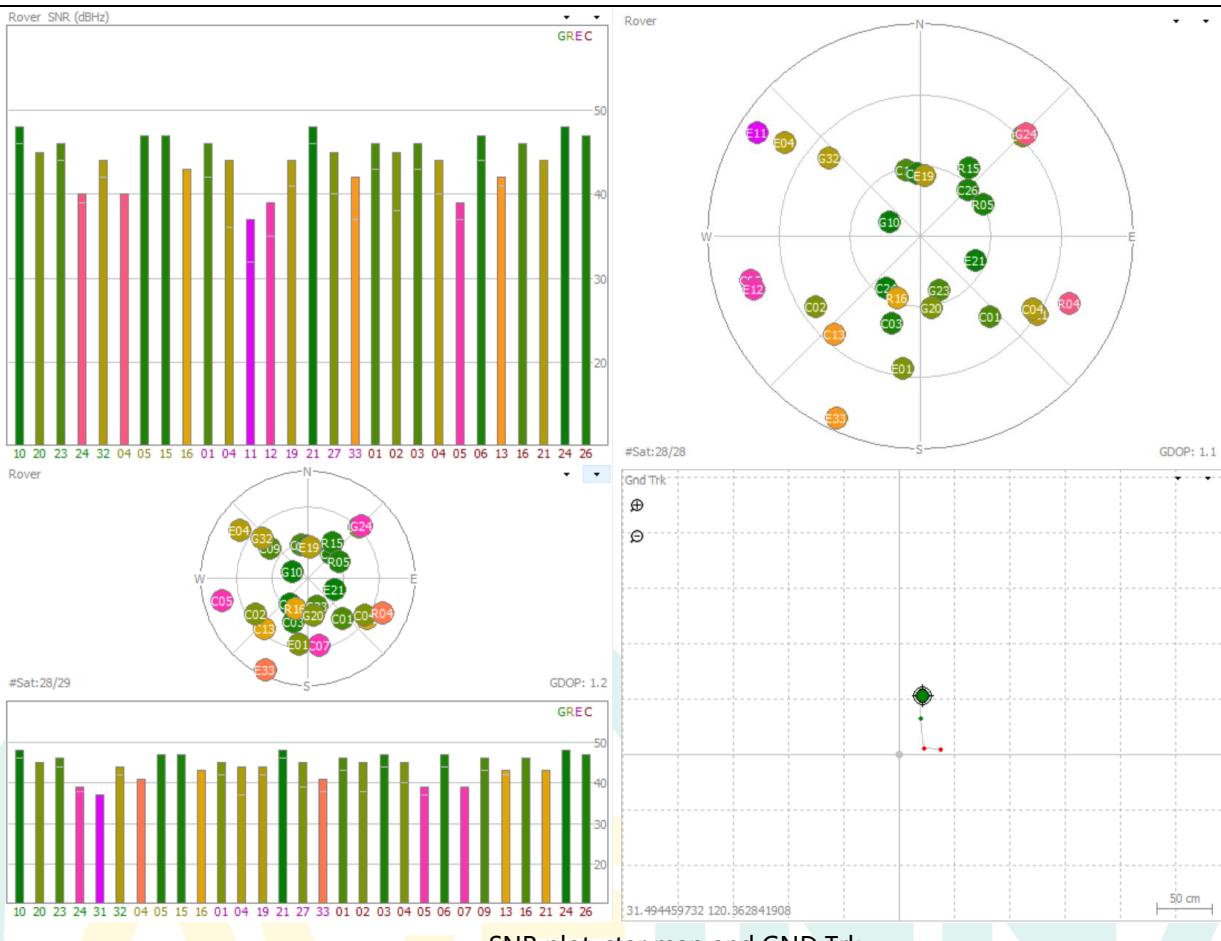
Input Stream Monitor					
Aceinna-user	X	Close			
2132,178872.0000,13, 2, 0, 42, 45, 150.142, 32.720					
2132,178872.0000,18, 2, 0, 35, 41, 0.000, 0.000					
2132,178872.0000,19, 2, 0, 33, 37, 238.515, 11.699					
2132,178872.0000,20, 2, 0, 40, 0, 0.000, 0.000					
2132,178872.0000,26, 2, 0, 47, 48, 232.262, 82.470					
2132,178872.0000,33, 2, 0, 43, 45, 318.318, 36.464					
2132,178872.0000, 3, 4, 0, 43, 0, 198.964, 53.454					
2132,178872.0000, 8, 4, 0, 45, 48, 72.487, 75.628					
2132,178872.0000, 9, 4, 0, 42, 45, 213.656, 40.971					
2132,178872.0000,11, 4, 0, 37, 45, 319.556, 17.569					
2132,178872.0000,12, 4, 0, 46, 49, 272.459, 55.428					
2132,178872.0000,13, 4, 0, 45, 47, 340.000, 68.717					
2132,178872.0000,16, 4, 0, 46, 47, 213.503, 64.847					
2132,178872.0000,19, 4, 0, 37, 0, 64.118, 9.273					
2132,178872.0000,21, 4, 0, 47, 0, 292.690, 49.876					
2132,178872.0000,22, 4, 0, 47, 0, 29.613, 52.473					
2132,178872.0700, -0.0139133977, -1.1731892824, -9.7130279541, 0.0863125622, -0.55671					
\$2132,178872.0800, -0.0139133977, -1.1739838123, -9.7130279541, 0.0802078173, -0.5688					
2132,178872.0900, -0.0131173935, -1.1739838123, -9.7130279541, 0.0800845027, -0.58103					
2132,178872.1000, -0.0131173935, -1.1723911762, -9.7114448547, 0.0740163326, -0.58103					
2132,178872.1100, -0.0139143337, -1.1715966463, -9.7098627090, 0.0680714771, -0.58124					
2132,178872.1200, -0.0147112720, -1.1723946333, -9.7082786560, 0.0741579235, -0.56928					
2132,178872.1300, -0.0147112720, -1.1731927395, -9.7082786560, 0.0802443698, -0.56287					
2132,178872.1400, -0.0139143337, -1.1747856140, -9.7090682983, 0.0742995292, -0.55626					
2132,178872.1500, -0.0131173935, -1.1747856140, -9.7106504440, 0.0683546886, -0.54964					
2132,178872.1600, -0.0123204570, -1.1739875078, -9.7114448547, 0.0683546886, -0.54964					
2132,178872.1700, -0.0115210060, -1.1731892824, -9.7114448547, 0.0683546886, -0.55626					

The file is saved in the previously set output path.



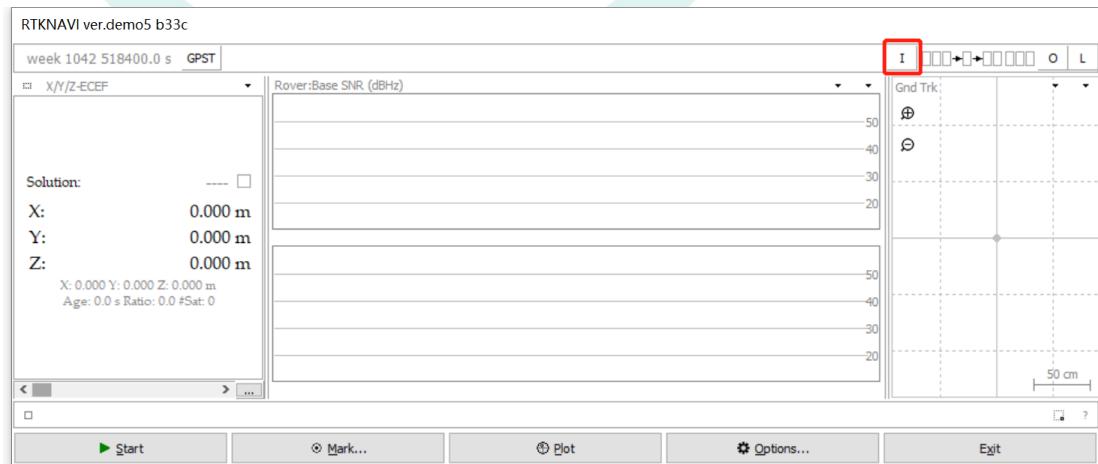
2.2. Use RTKLIBNAVI to decode aceinna-user data

Aceinna-raw data is the result data from openrtk330. Using rtklibnavi to connect the frist serial port of openrtk330 can read the rtk processing result data. These data can be displayed by SNR plot, sky map and GND Trk.

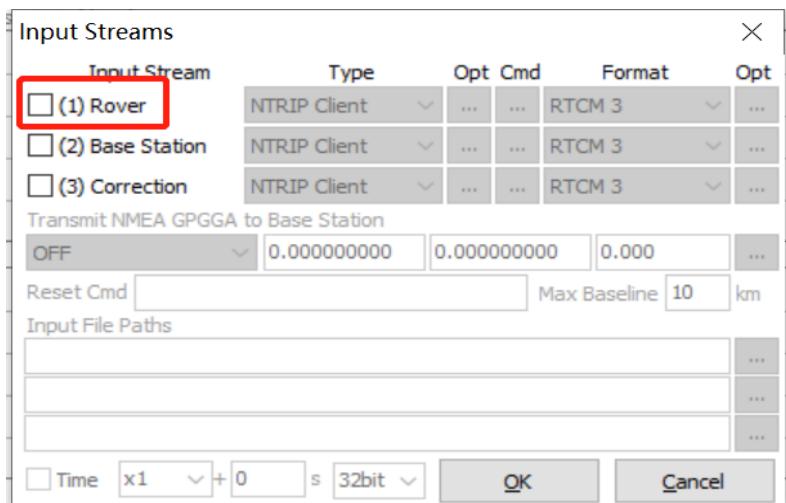


2.2.1. Set input stream parameter

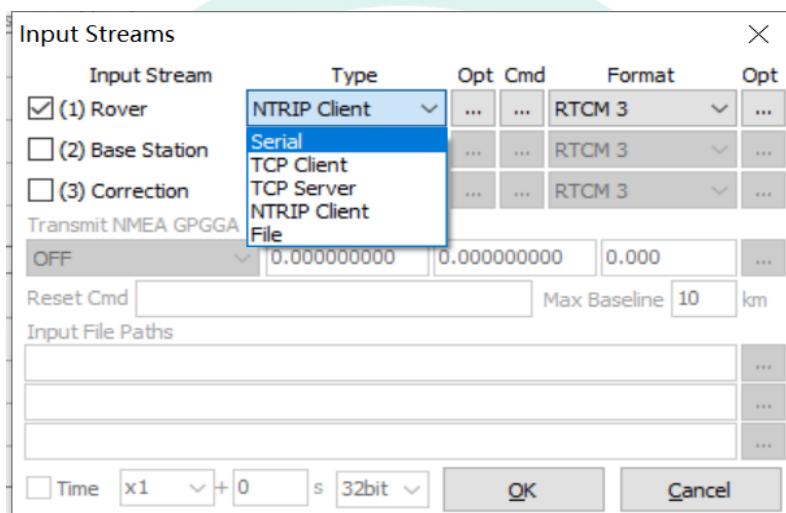
Click the 'I' button to open Input Streams dialog.



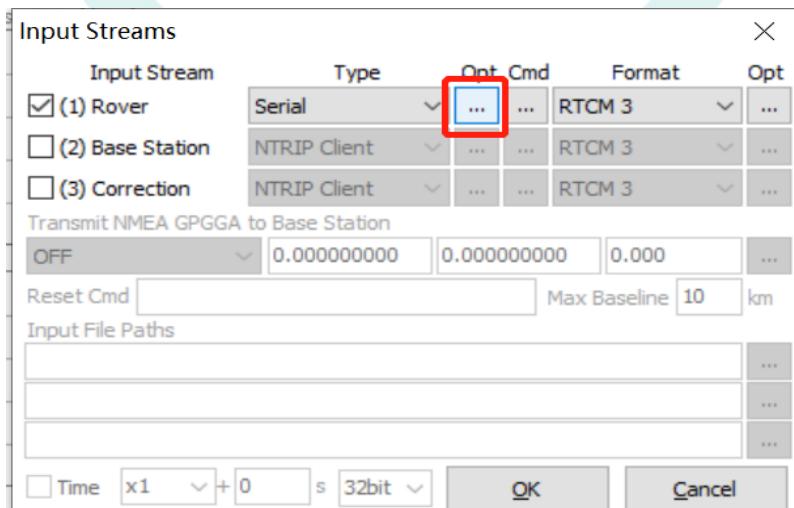
Check (1) Rover in the Input Streams dialog.



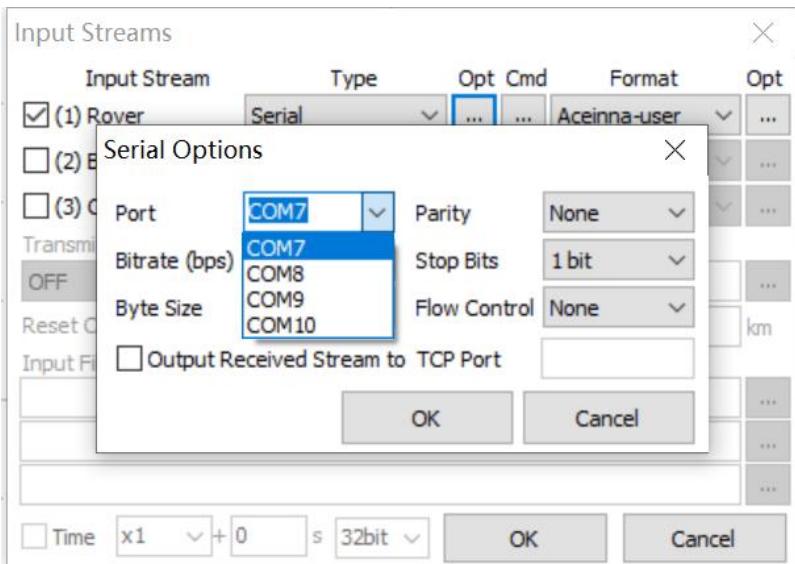
Select serial in the type option.



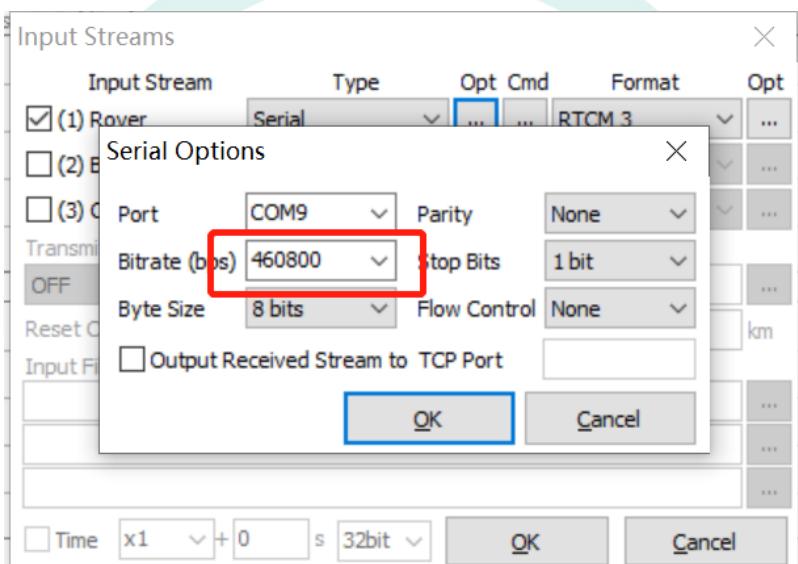
Click the opt button to open the Serial Options dialog.



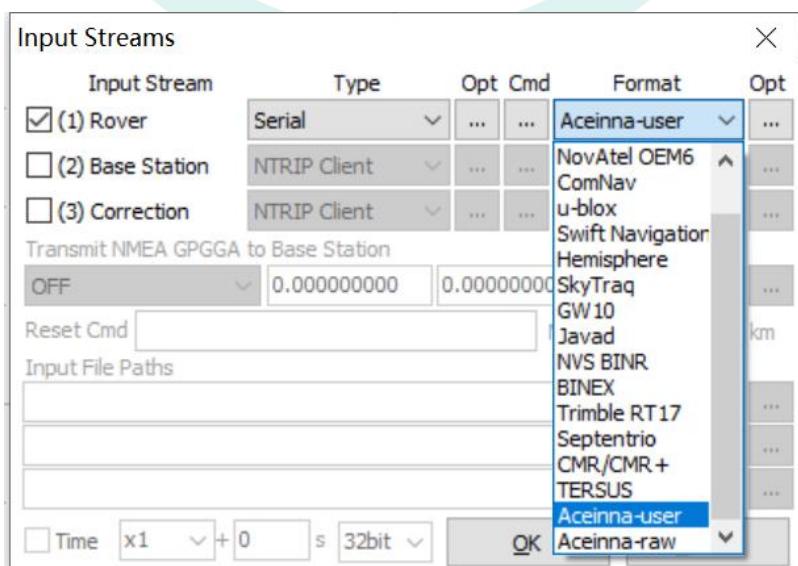
Select the first serial port in the serial Options dialog.



6. Bitrate select 460800;



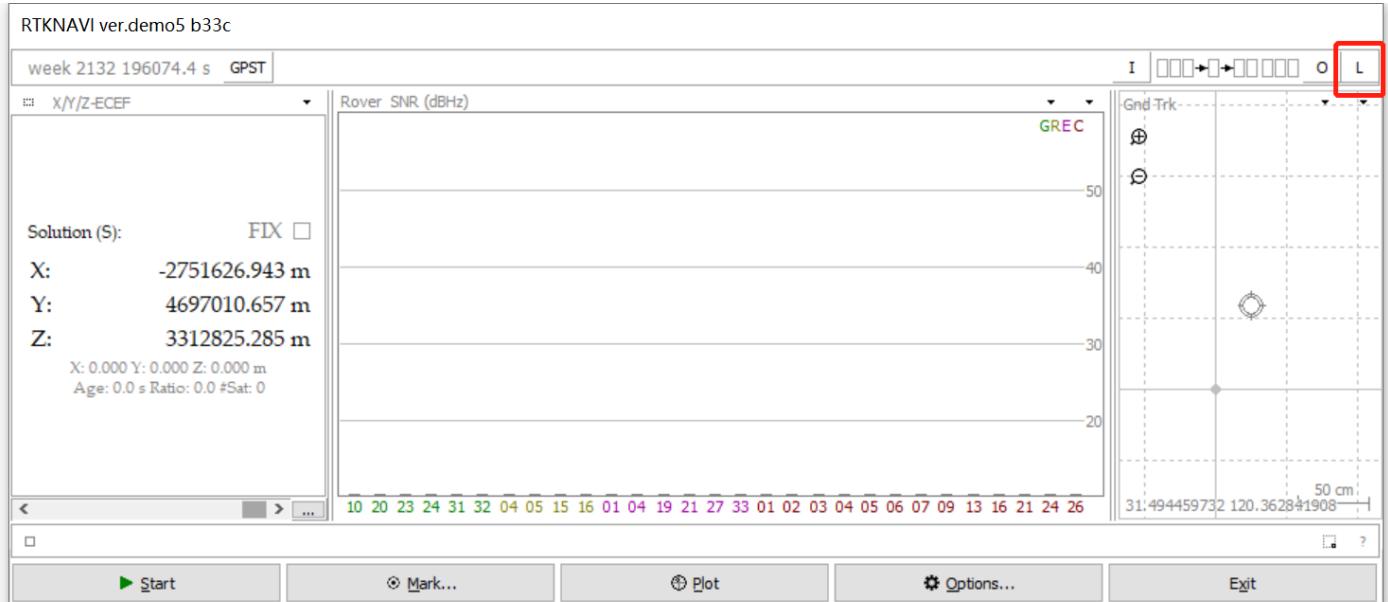
Format select Aceinna-raw.



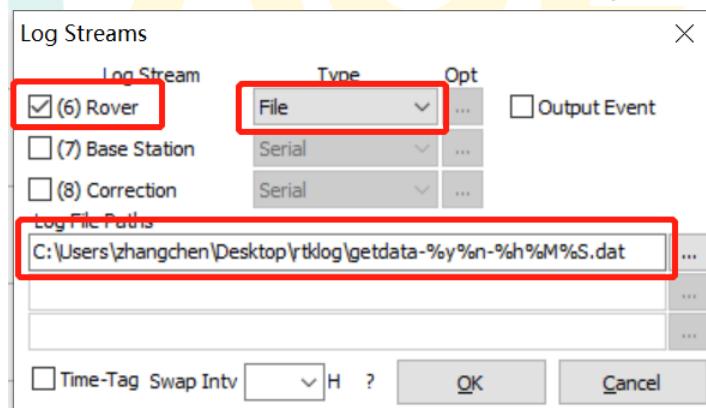
2.2.2. Set output log files path

Select the path to save the file. example: C:\Users\zhangchen\Desktop\rtklog\

Click the 'L' button to open Log Streams dialog.

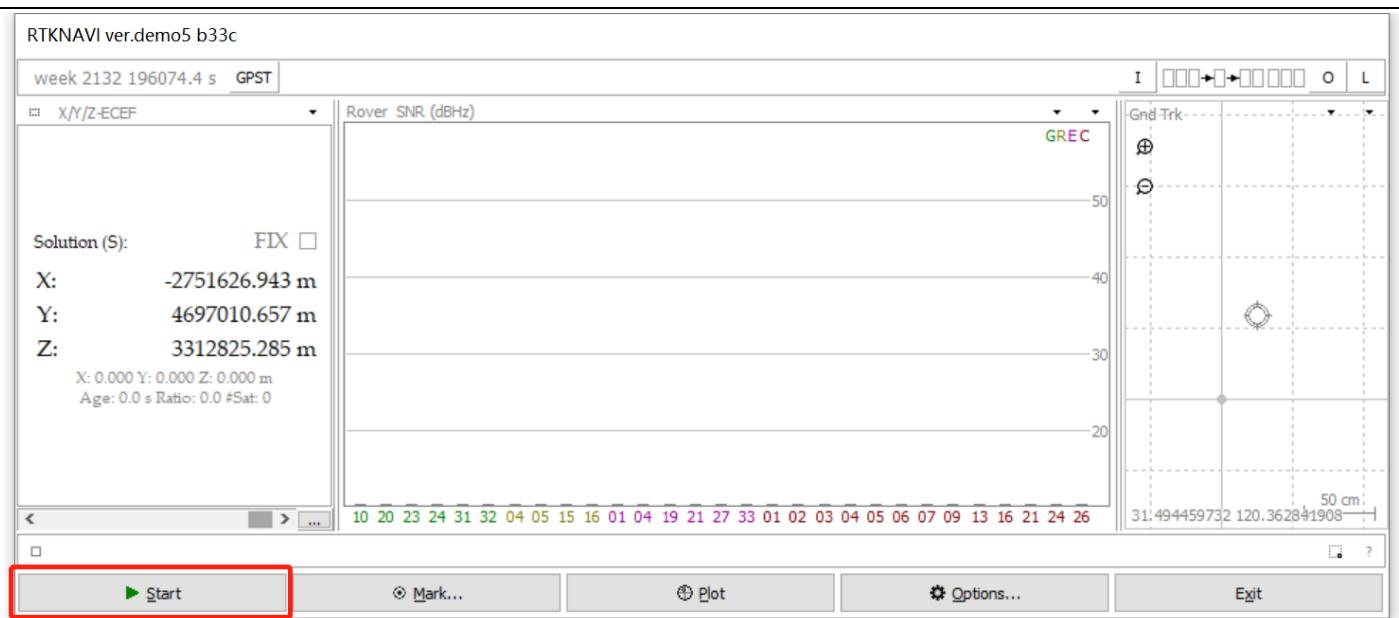


Check (6)Rover ,select File type and input the log file paths. Click OK button.

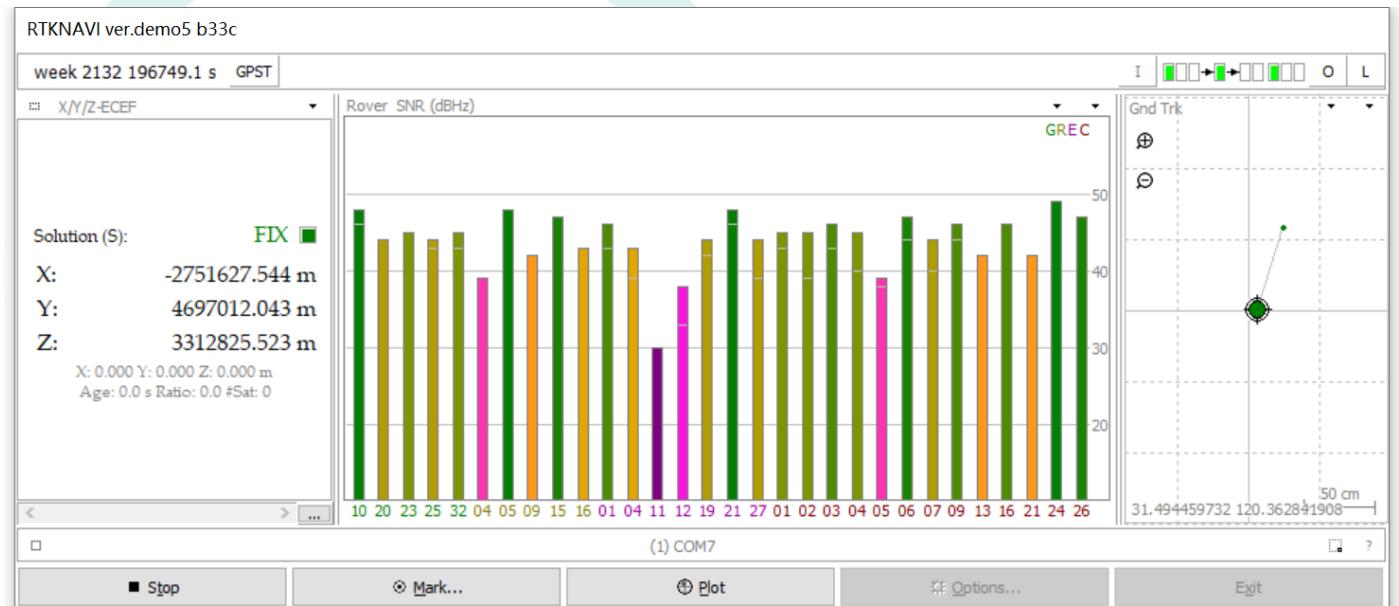


2.2.3. Start to receive data

Click the start button to start receiving the data.



When receiving the data, it will draw the SNR plot.



Click the arrow button to switch view.



The sky map.



Both sky map and SNR plot.



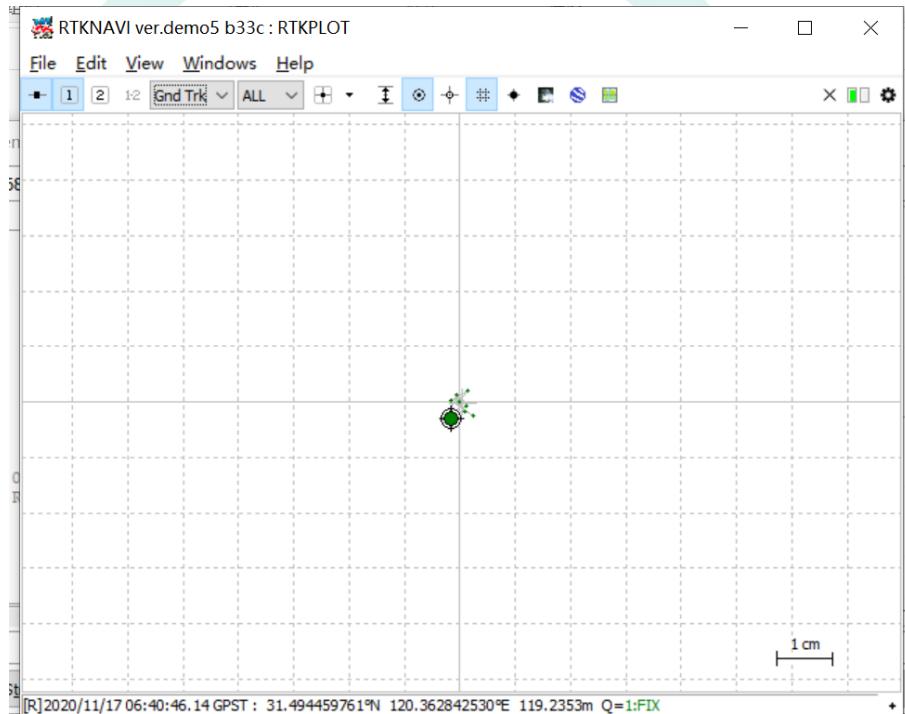
The Gnd Trk.



Click the Plot button to Open RTL PLOT.

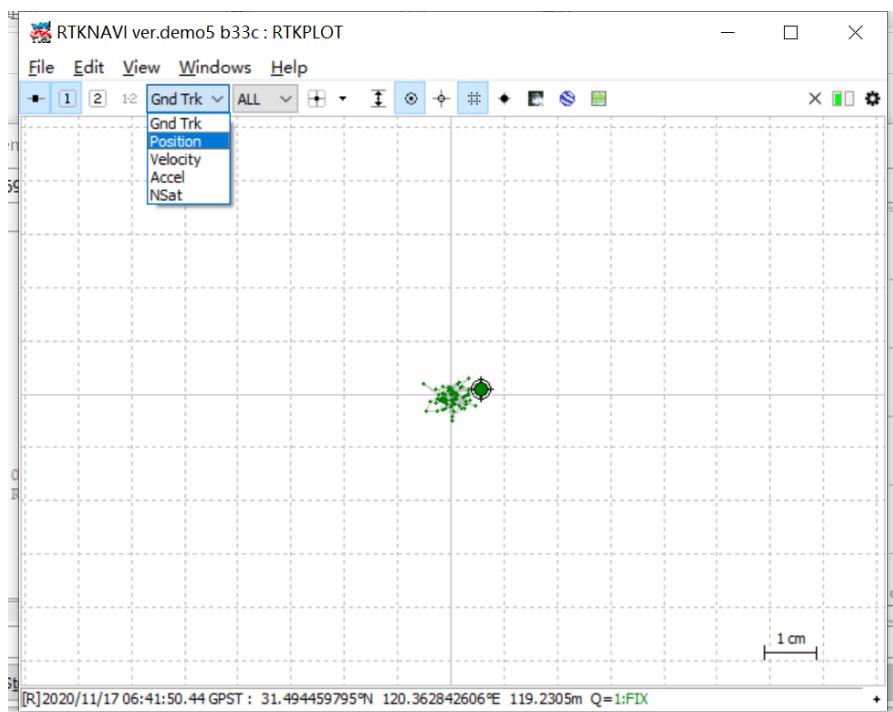


The RTKPLT dialog.

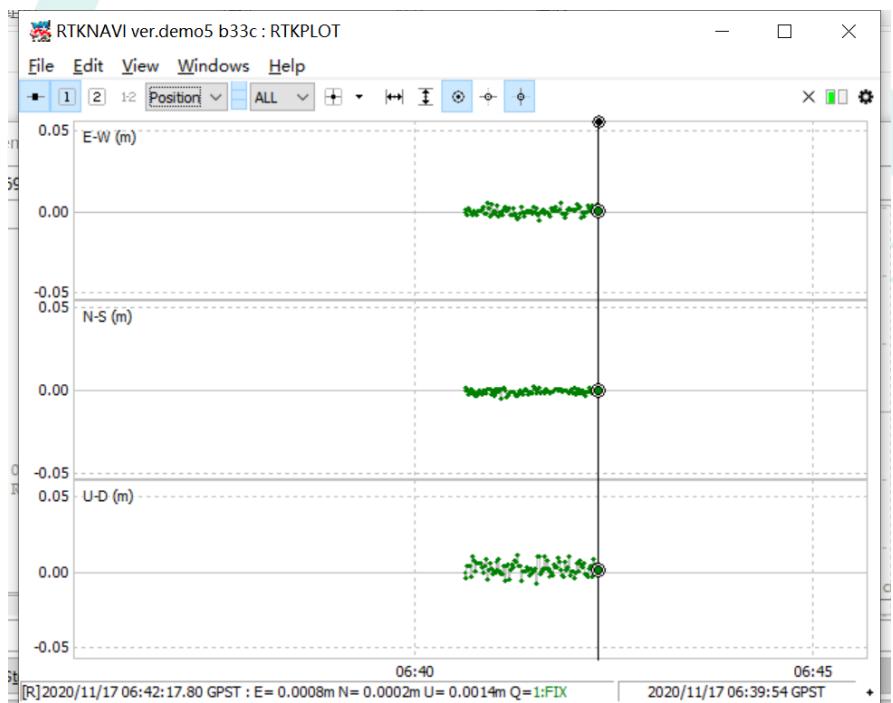


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Select the drop-down list to switch views.

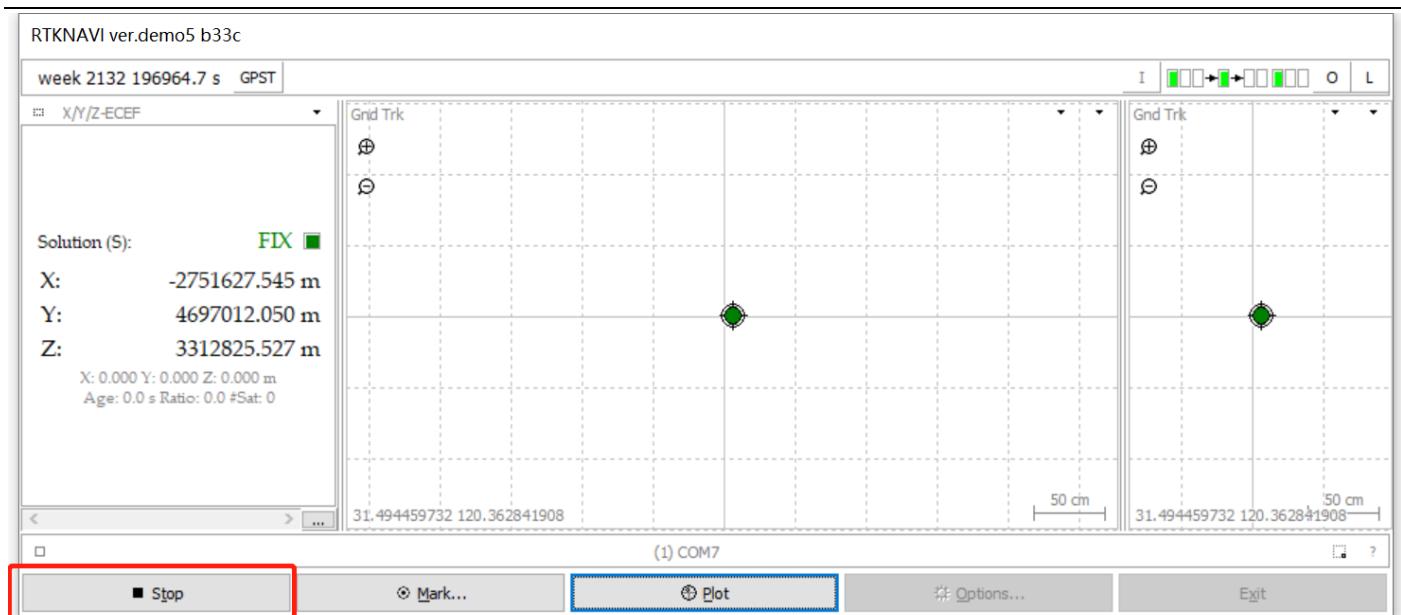


The Position views.



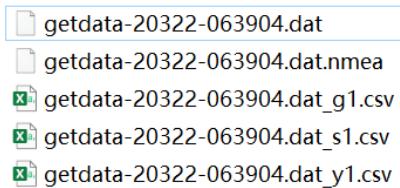
Click Stop button to stop receiving data.

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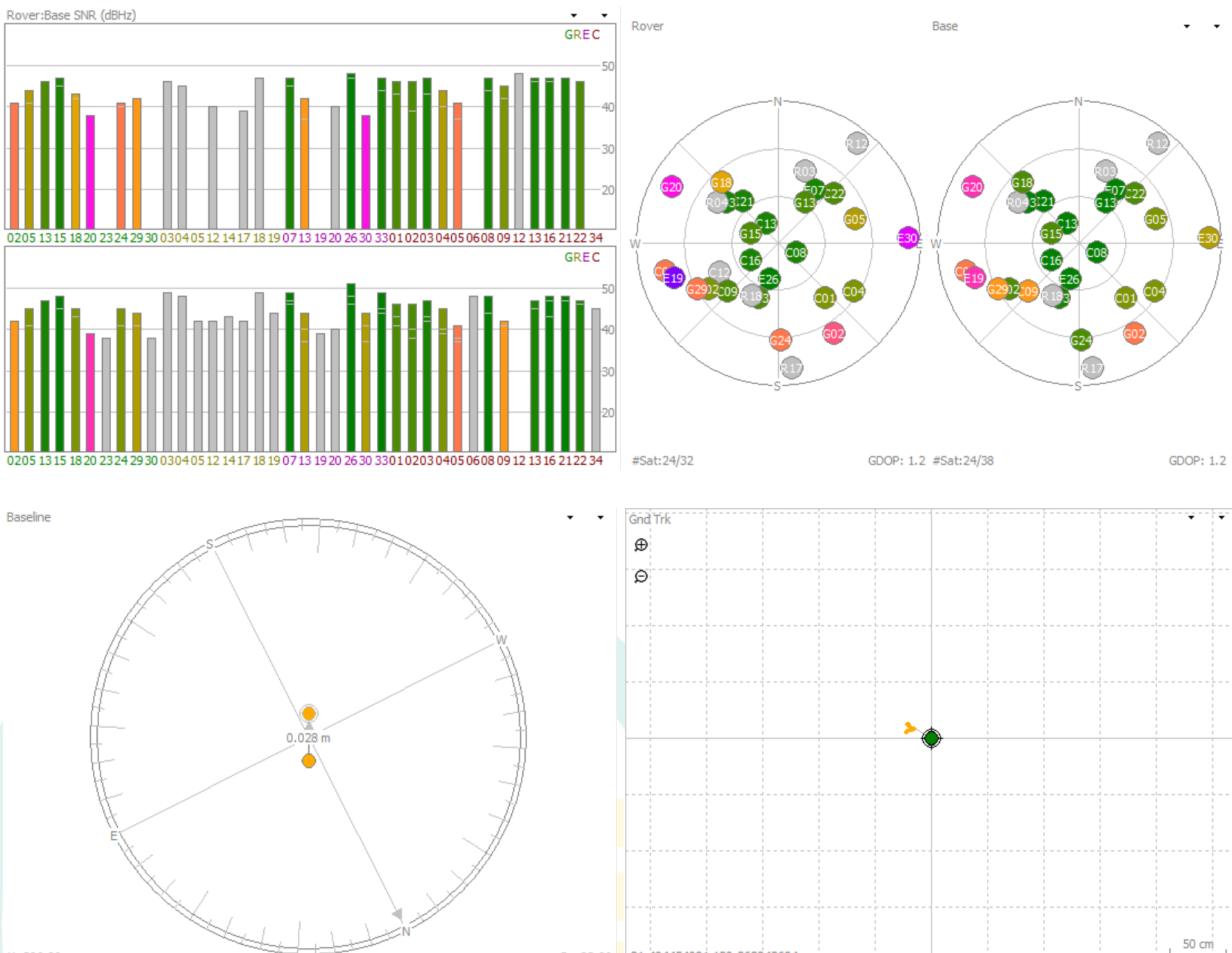
The file is saved in the previously set output path.

> rtklog



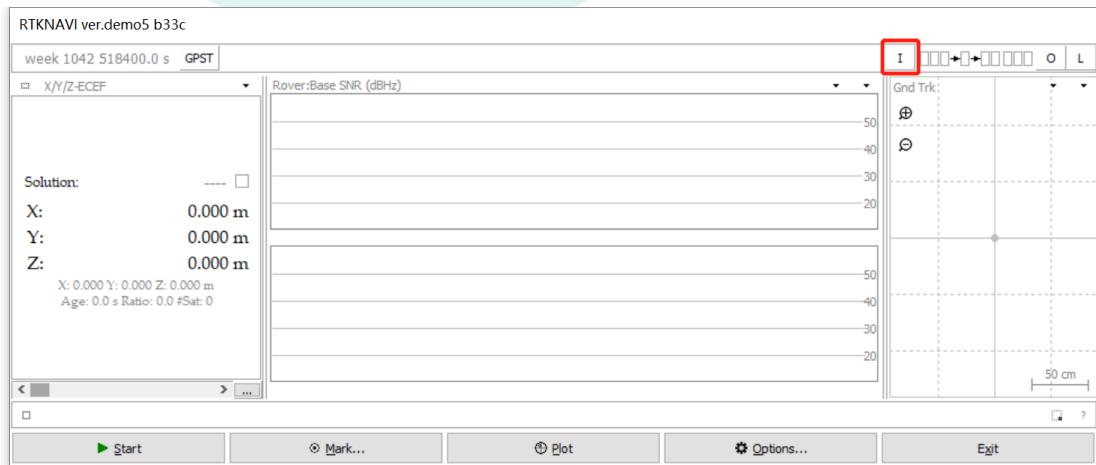
2.3. Use RTKLIBNAVI to decode aceinna-raw data

Aceinna-raw data contains the original data of rover station and base station. Using rtklibnavi to connect the third serial port of openrtk330 can read the rover station and the base station at the same time. These data can be displayed by SNR plot, sky map, baseline and GND Trk. At the same time, these data can also be used for RTK processing.

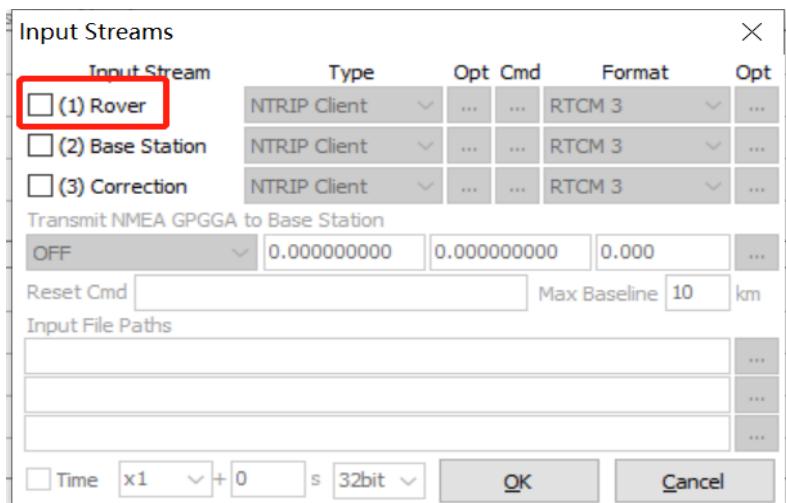


2.3.1. Set input stream parameter

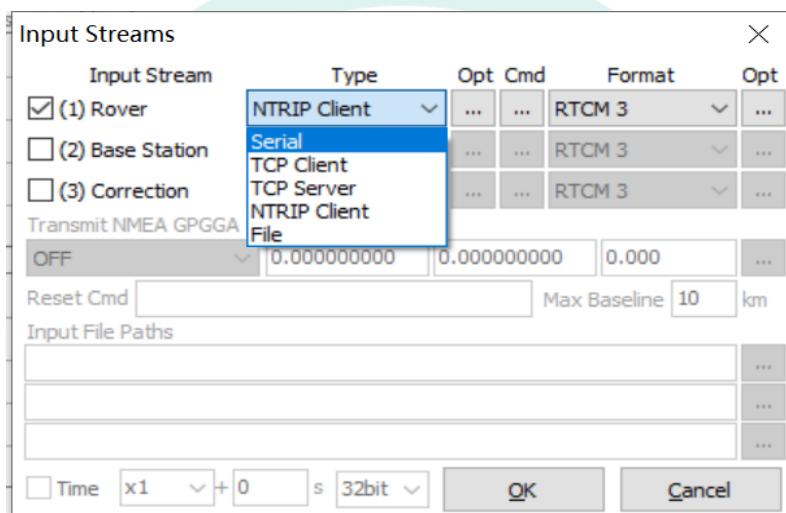
Click the 'I' button to open Input Streams dialog.



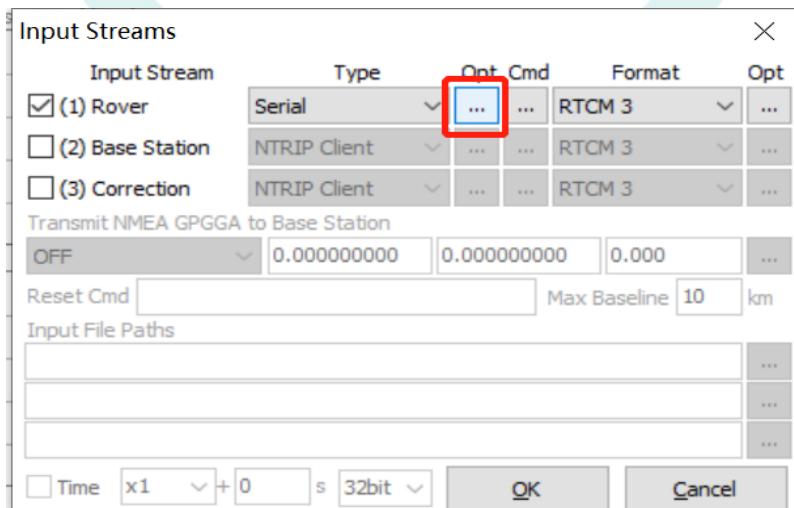
Check (1) Rover in the Input Streams dialog.



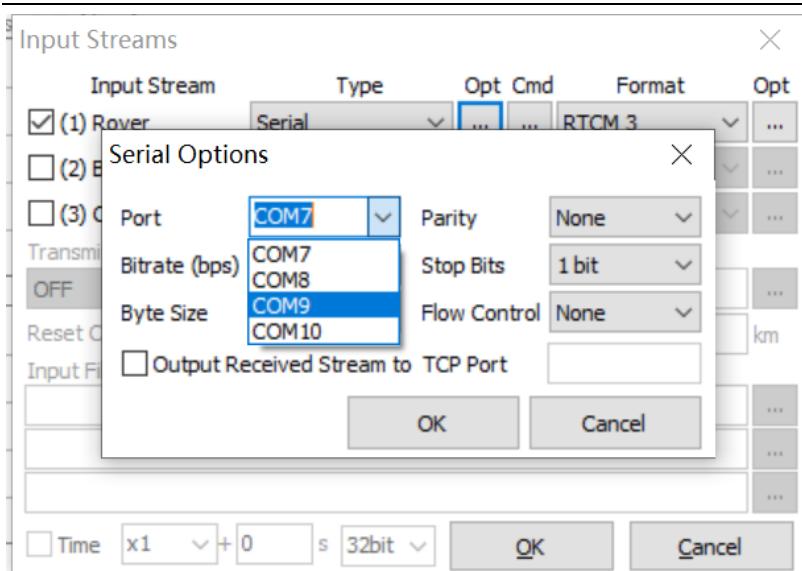
Select serial in the type option.



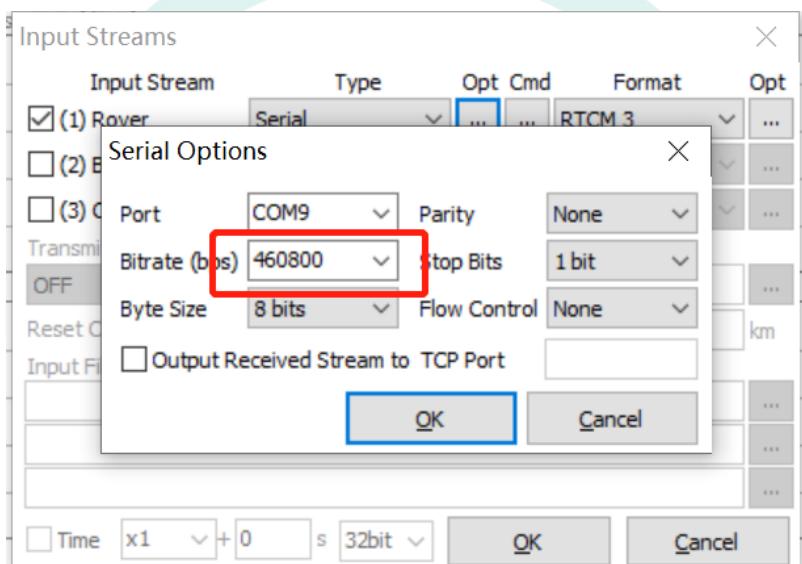
Click the opt button to open the Serial Options dialog.



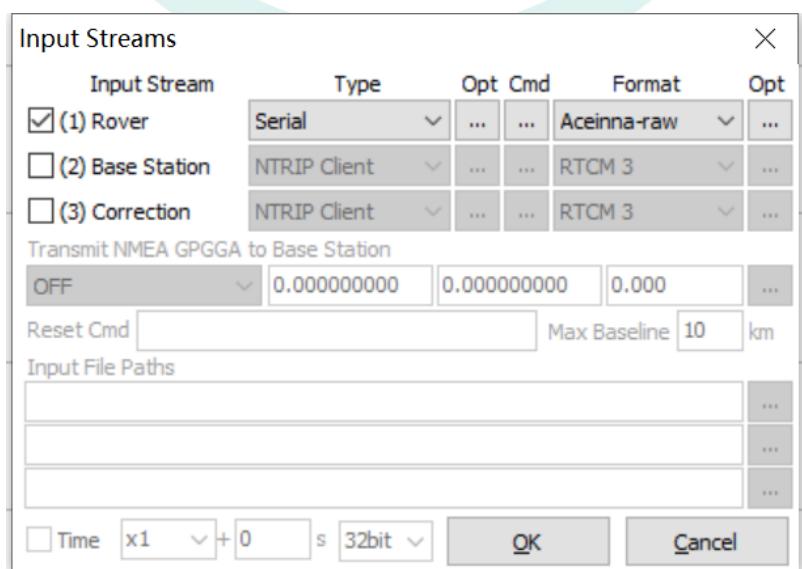
Select the third serial port in the serial Options dialog.



6. Bitrate select 460800;

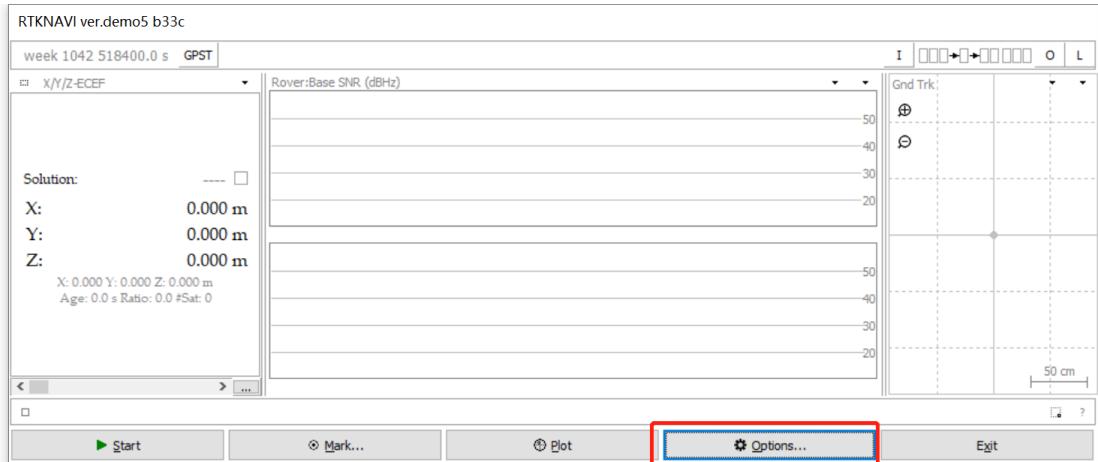


Format select Aceinna-raw.

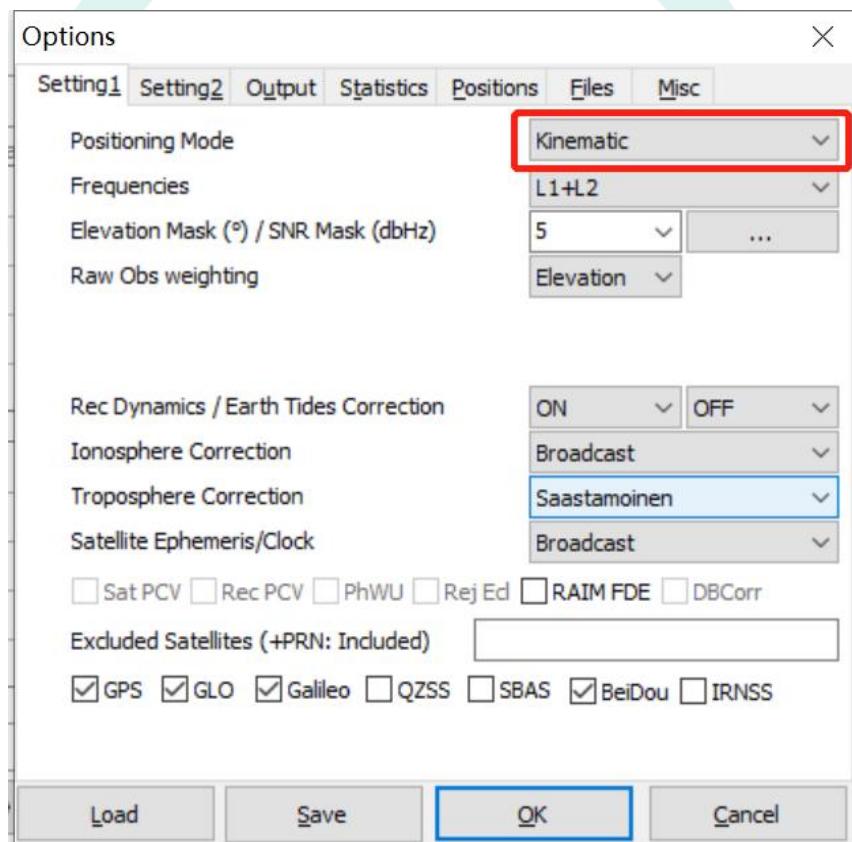


2.3.2. RTK processing config

Close the Input Streams dialog; Click the options button to open the options dialog.

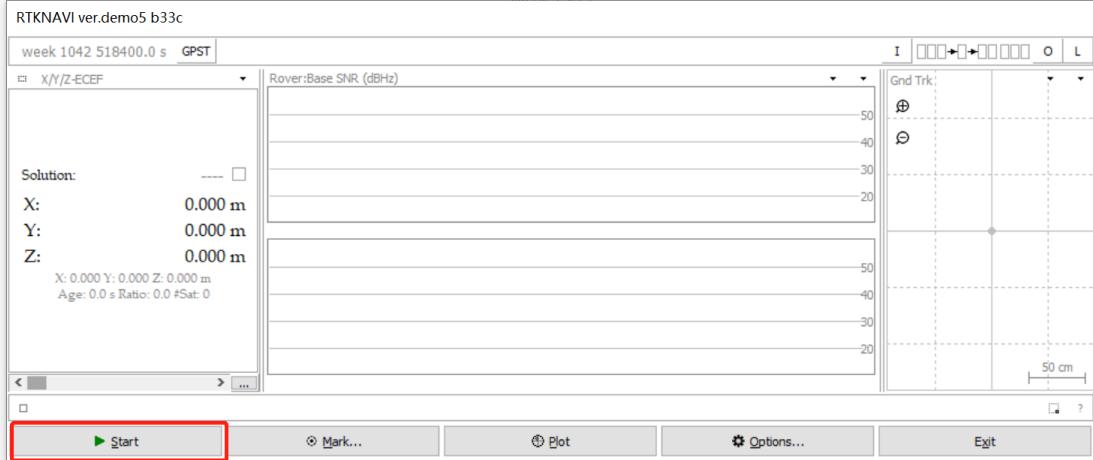


In the options dialog, choose kinetic or static for the posting mode option.

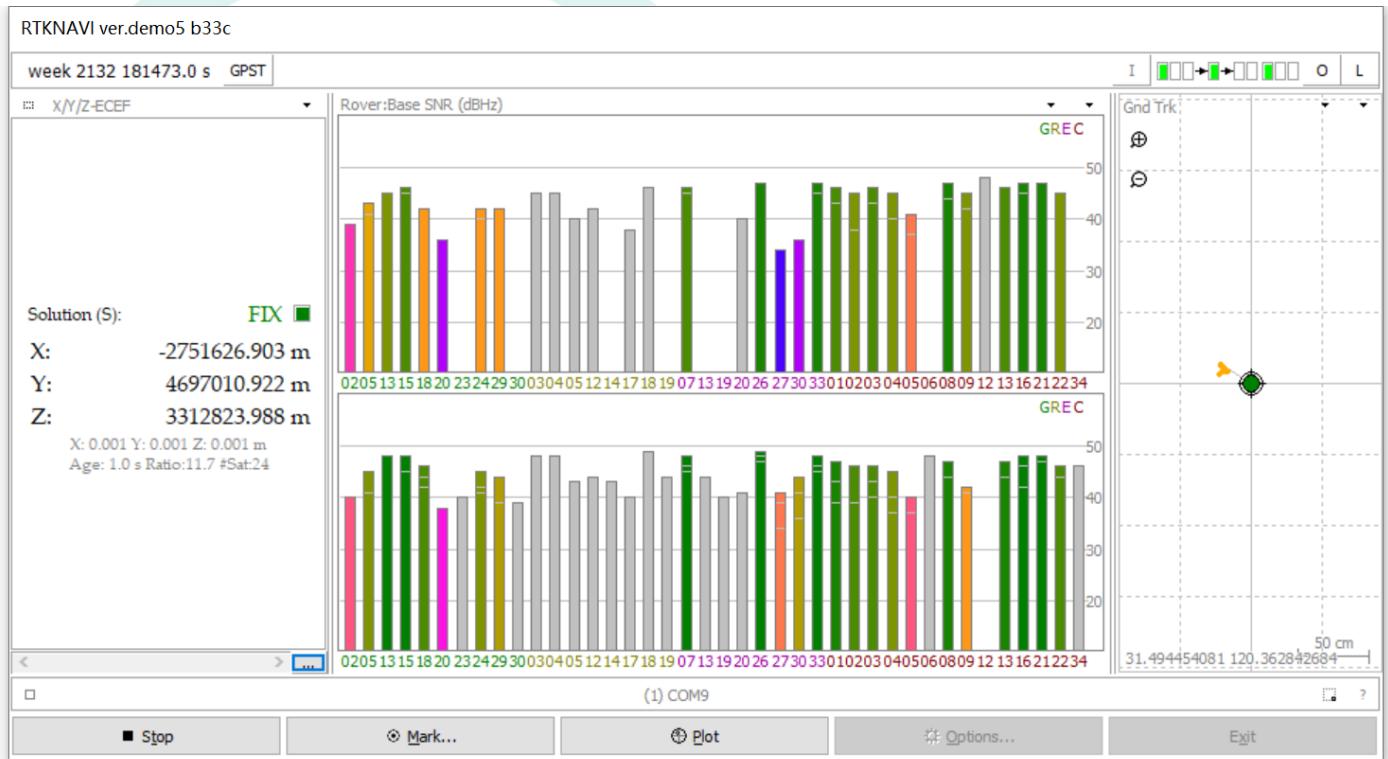


2.3.3. Start to receive data

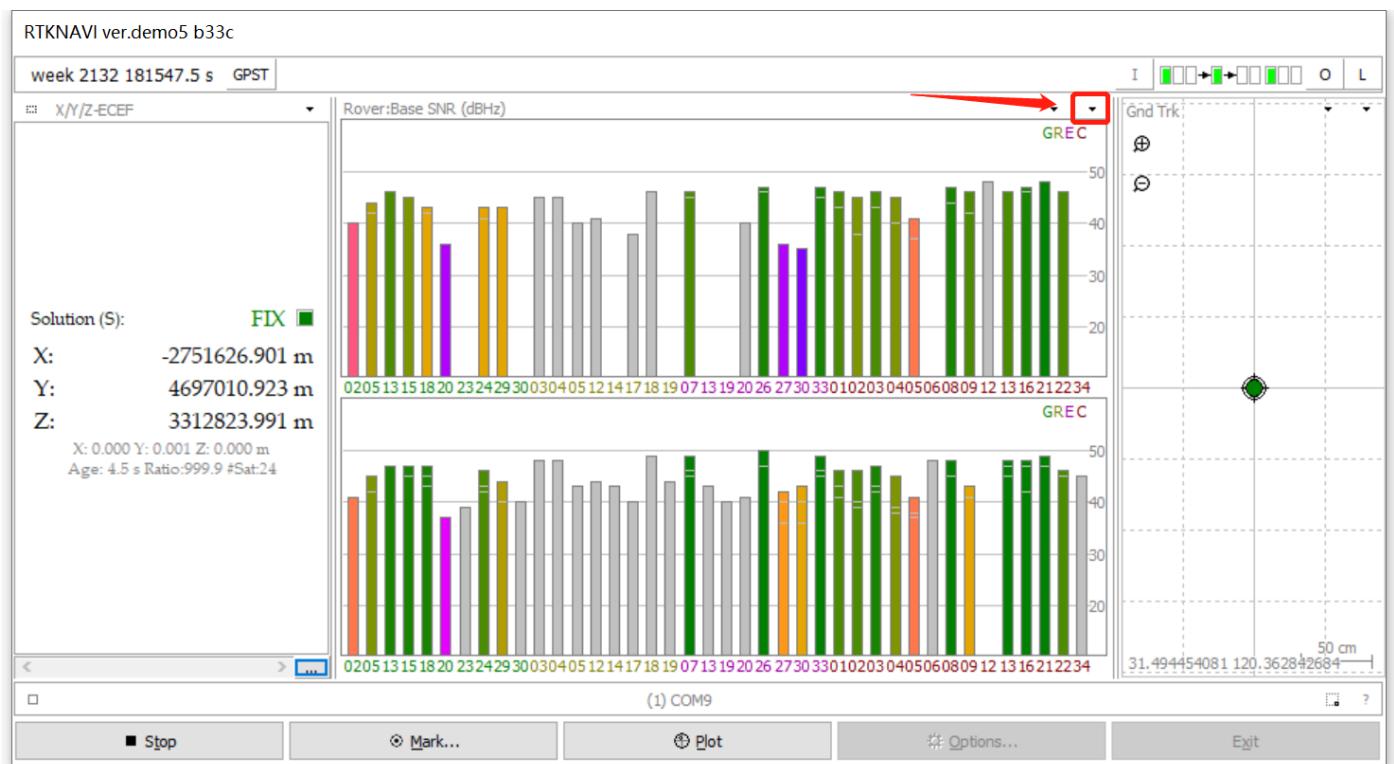
Click the start button to start receiving the data.



When receiving the data, it will draw the SNR map of Rover and base according to the data, and perform RTK operation to display the operation results;



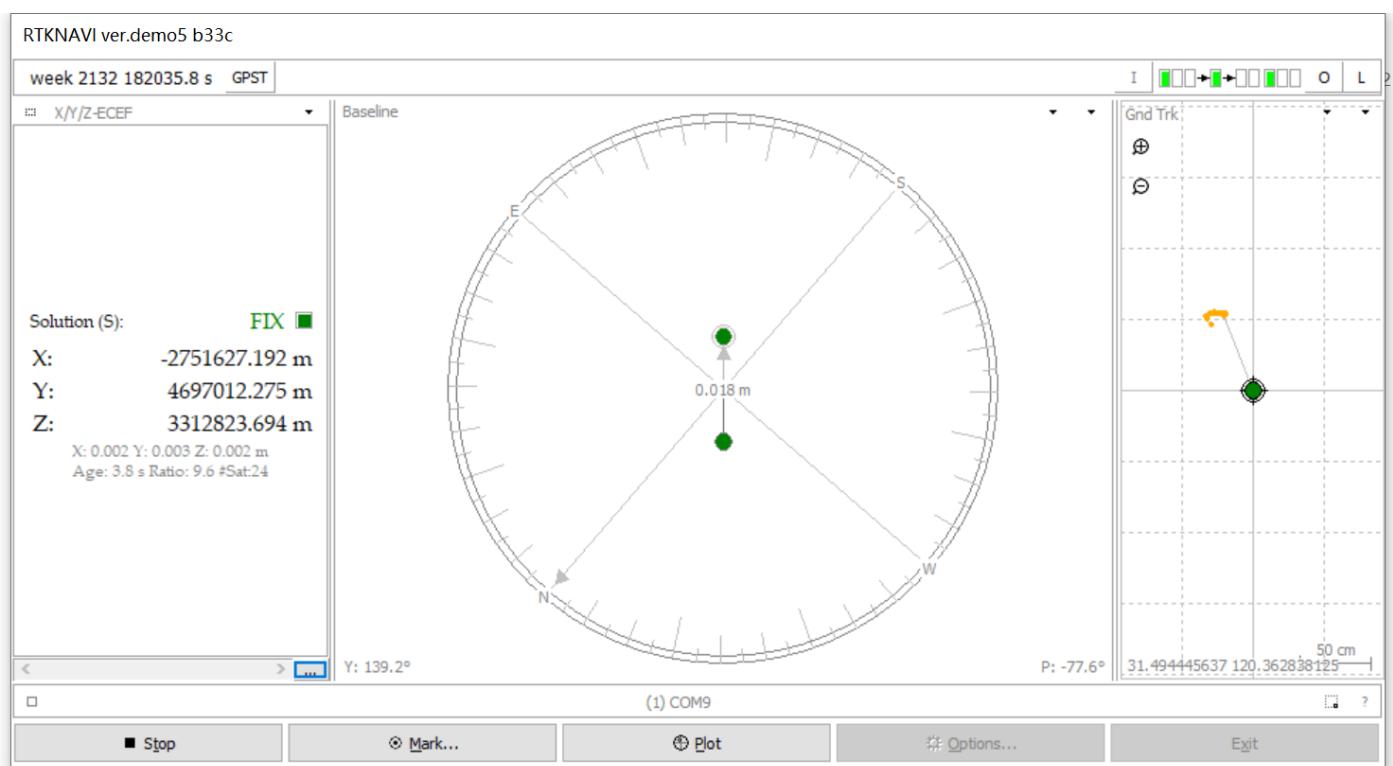
Click the arrow button to switch view.



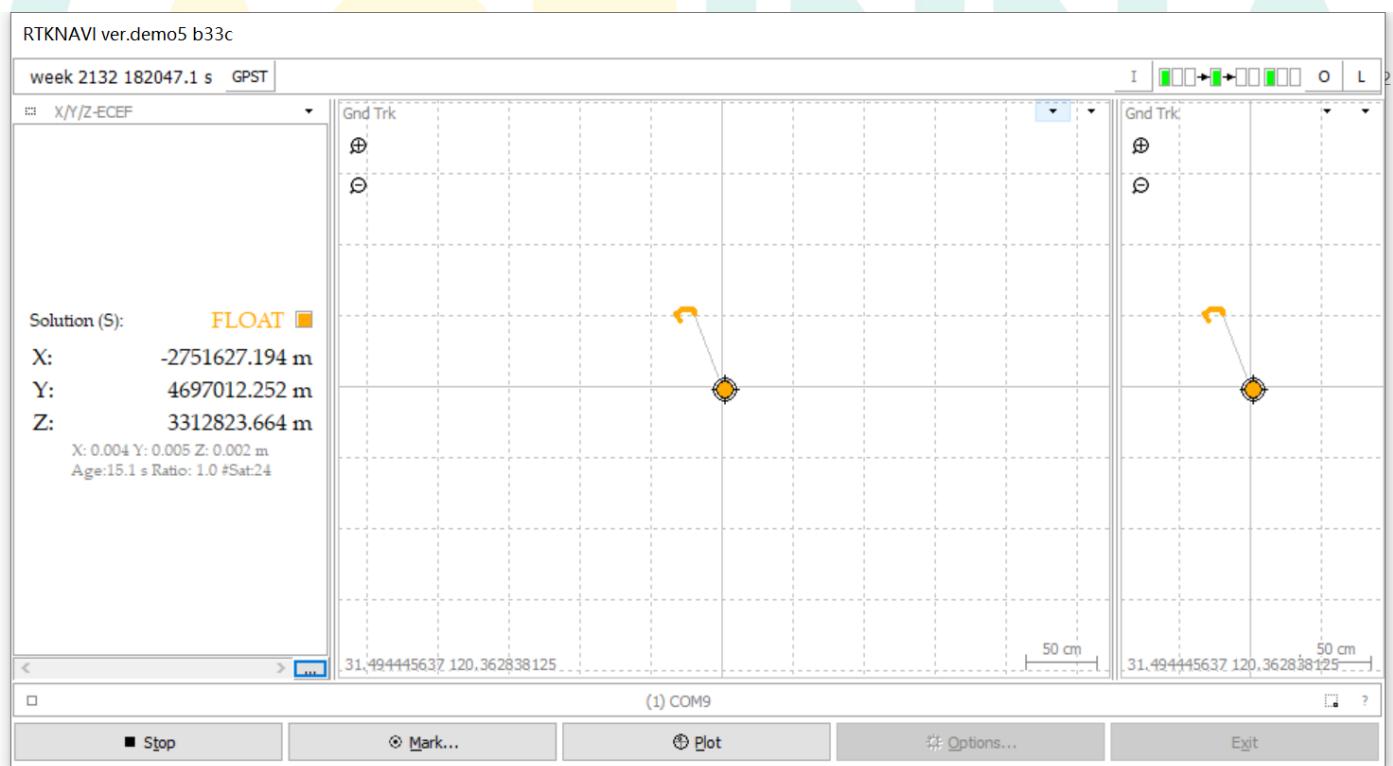
The sky maps.



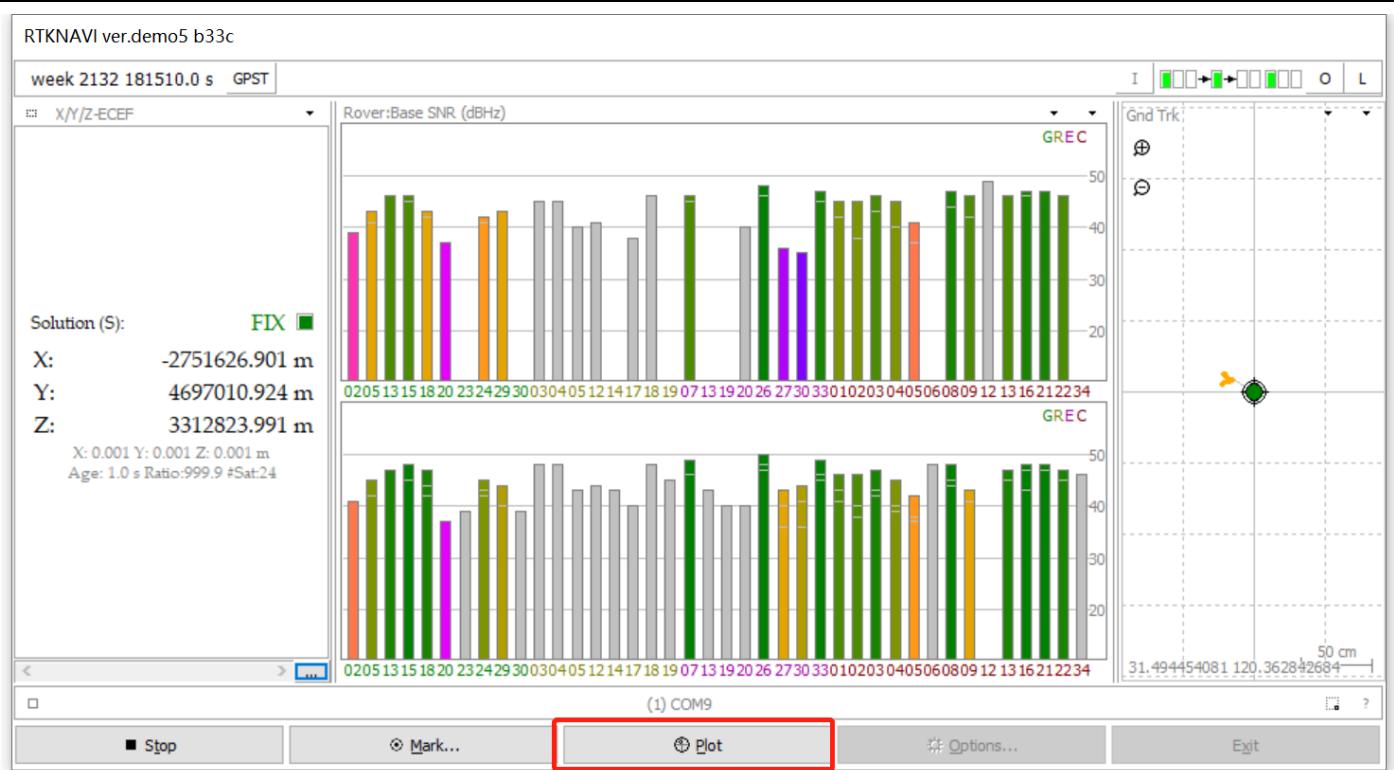
The baseline.



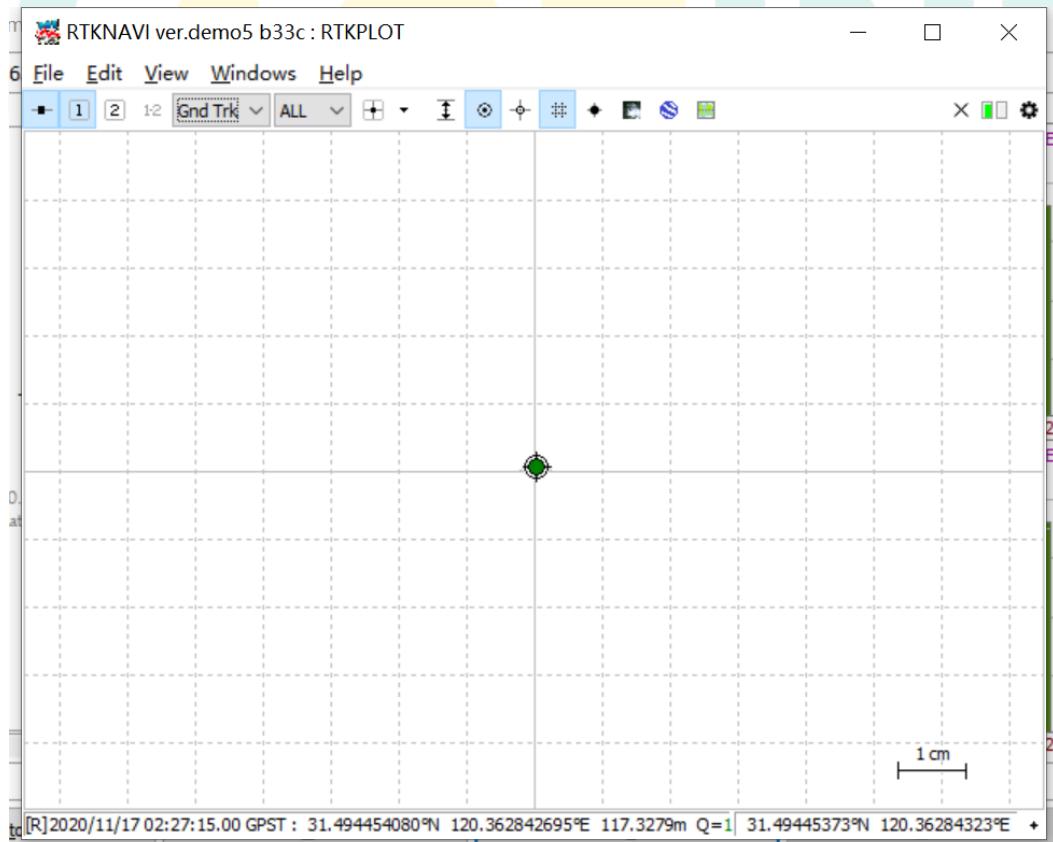
The Gnd Trk.



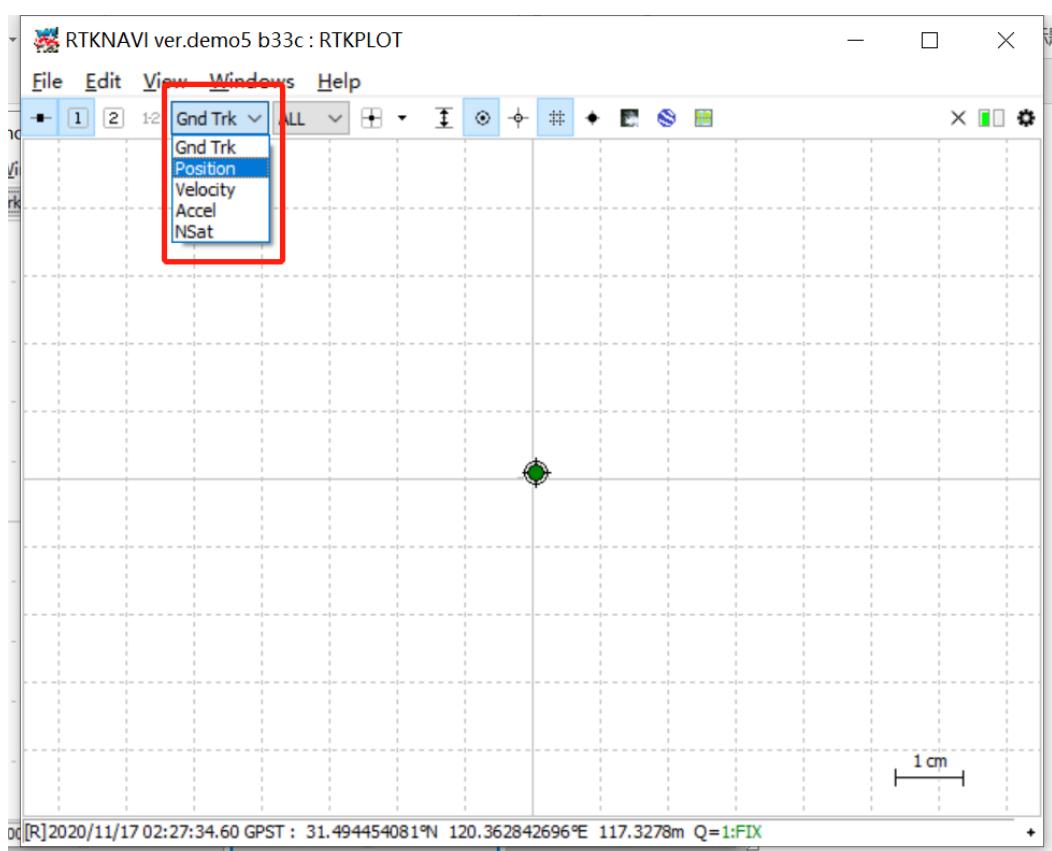
Click the Plot button to Open RTL PLOT.



The RTKPLOT dialog.



Select the drop-down list to switch views.



The Position views.

