

A step by step guide to place GCP's in RTK mode

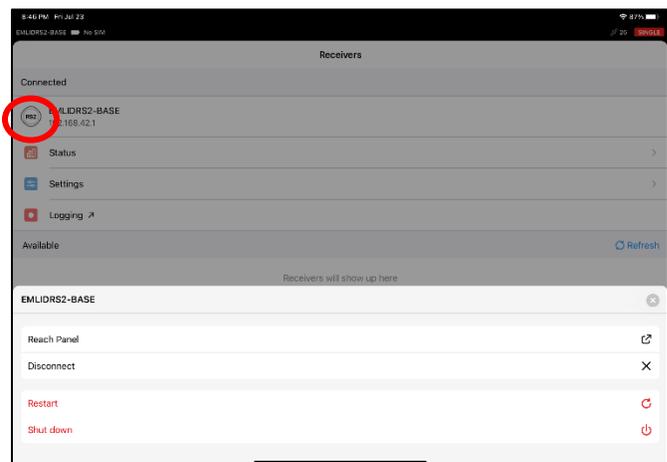
Real Time Kinematic technique

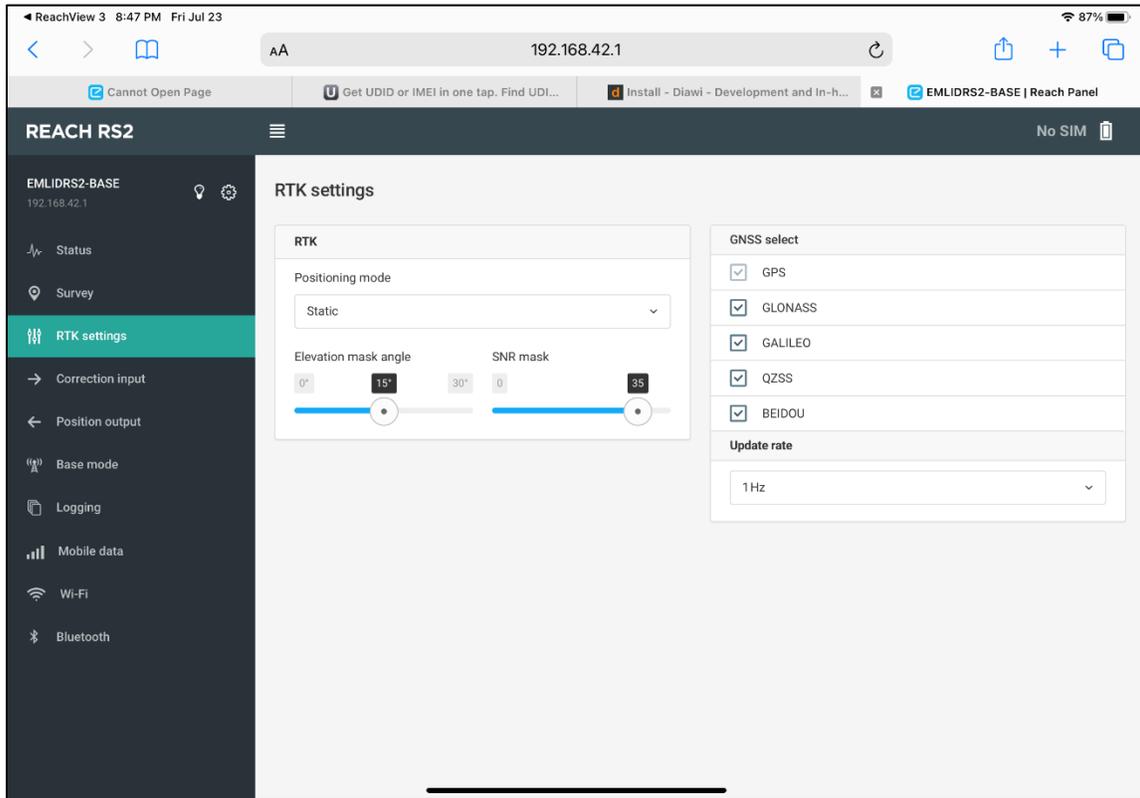
Real Time Kinematic (RTK) is a technique used to increase the accuracy of GNSS positions using a fixed base station that sends corrections to a moving receiver. The base station is a coordinate known position, therefore, the base receiver calculates the error that this the difference between the known coordinates and the calculated coordinates at each time, based on the available satellite constellation, and sends it to the rover to correct its position. There are several ways to send the corrections. For instance, a local fixed base station or network of service: NTRP (Networked Transport of RTCM via Internet Protocol).

More details: <https://docs.emlid.com/reachrs/tutorials/basics/rtk-introduction>

Configuring Base receiver (EMLID RS2 receiver)

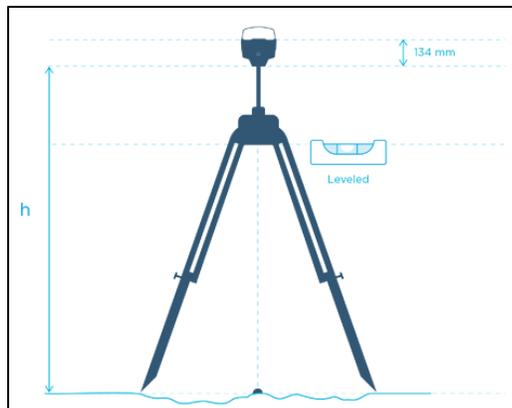
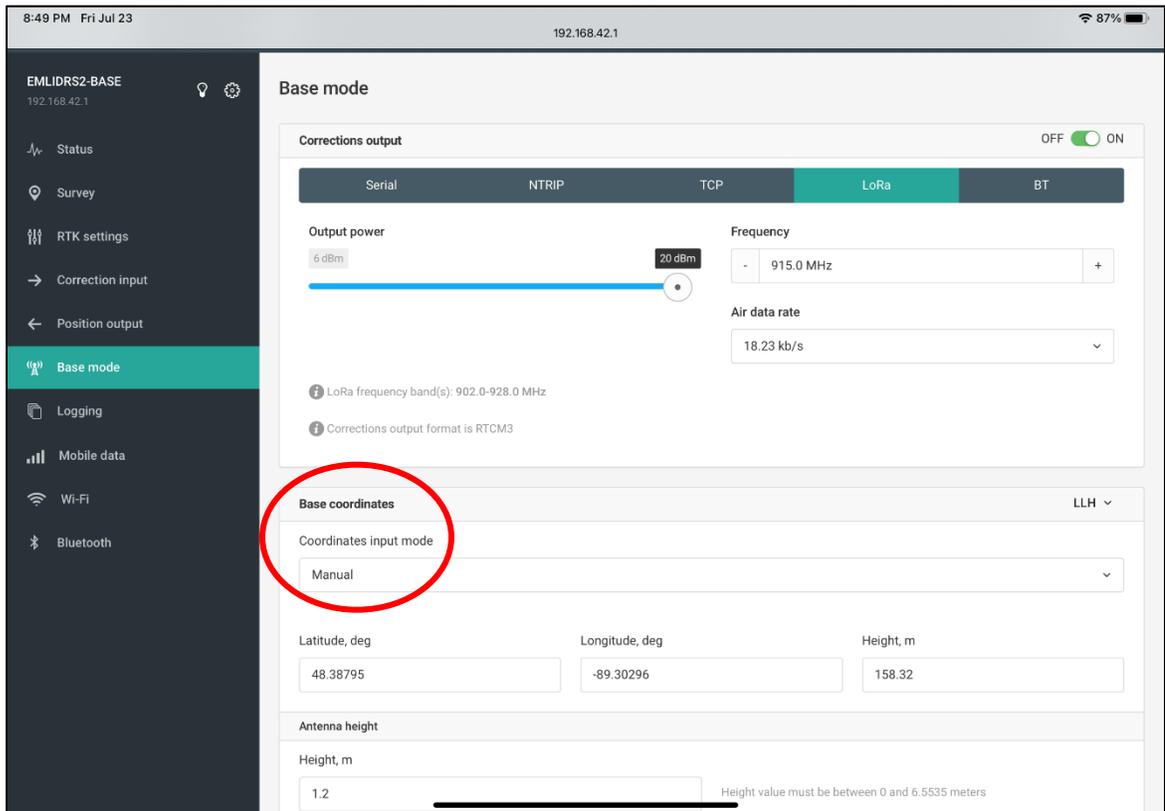
1. Set up the RS2 receiver at the known point as a base, attach the LoRa antenna, we will use LoRa (local radio) for the communication
2. Switch on RS2 receiver and let it find its position, in the iPad, connect to the available wifi network (password = emlidreach)
3. Open Reachview 3, you will see the base receiver under the “Receivers” tab, if not “Refresh” once
4. Once connected, click on the RS2, it will open a new panel as below and select the Reach panel
5. Go to RTK settings tab; check available systems (remember to enable the same systems in the rover unit); set the update rate = 1Hz; APPLY





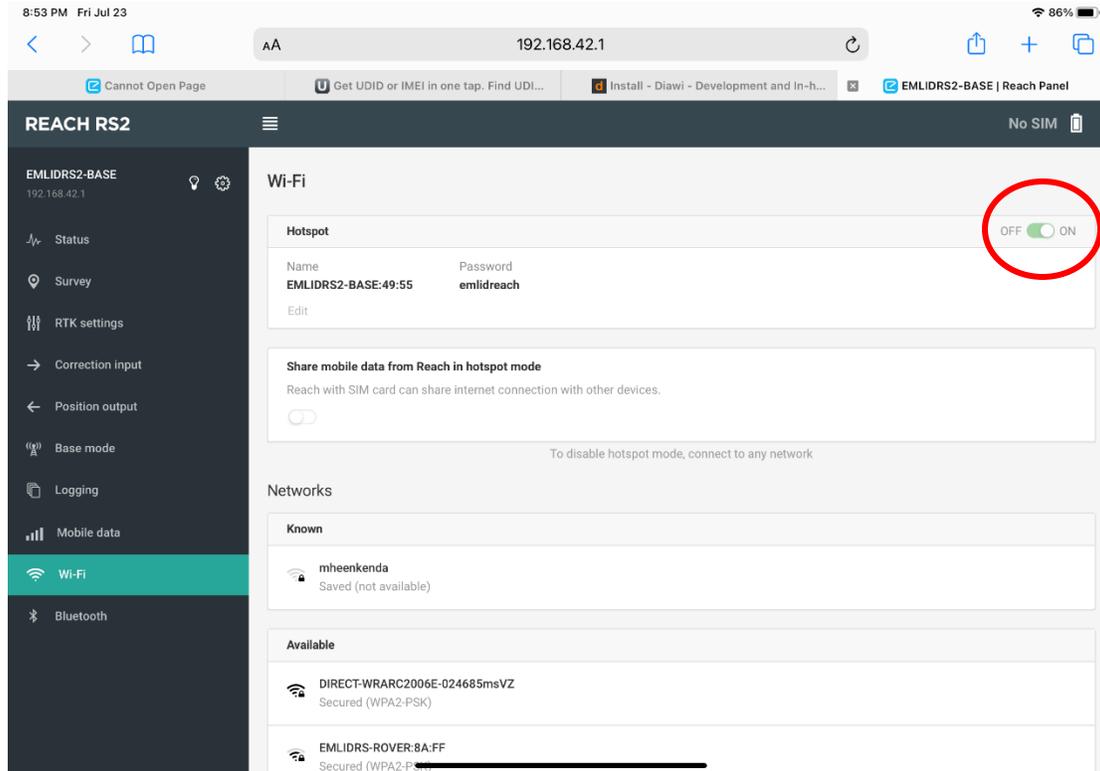
6. Now we set up LoRa to broadcast RTK correctly. Go to the Base Mode tab → Corrections output → LoRa
7. Set the Output power = 20 dbm; Frequency = 905.0Hz; Air data rate = 9.11* kb/s (rememebr to set the same in the rover unit) (*if this value is enactive select the available lowest value)

- In the “Base Coordinates” section → Coordinates Input Mode → Manual; enter the base station coordinates you measured earlier (**WGS 84 and decimal degree**). Set the Antenna height and press Apply. It will take some time to calculate the position



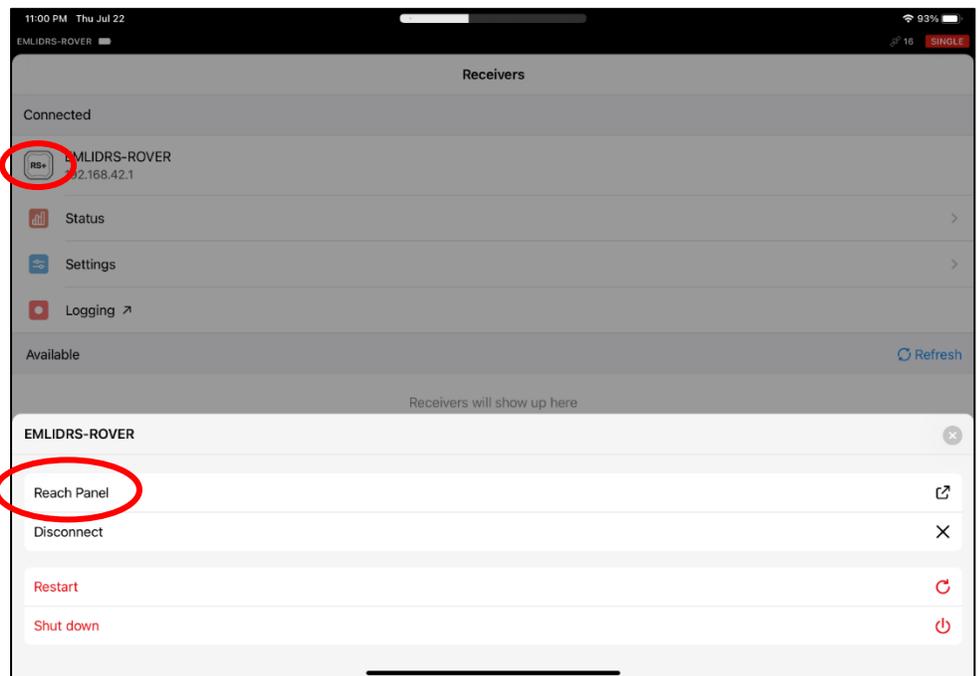
- Select RTCM message GPS MSM4 = 1 Hz; ARP Station coordinates= 0.1 Hz; GLONASS L1 = 0.5 Hz; GALILEO = 0.5Hz → Apply

10. Go to wifi tab and enable Hotspot mode.

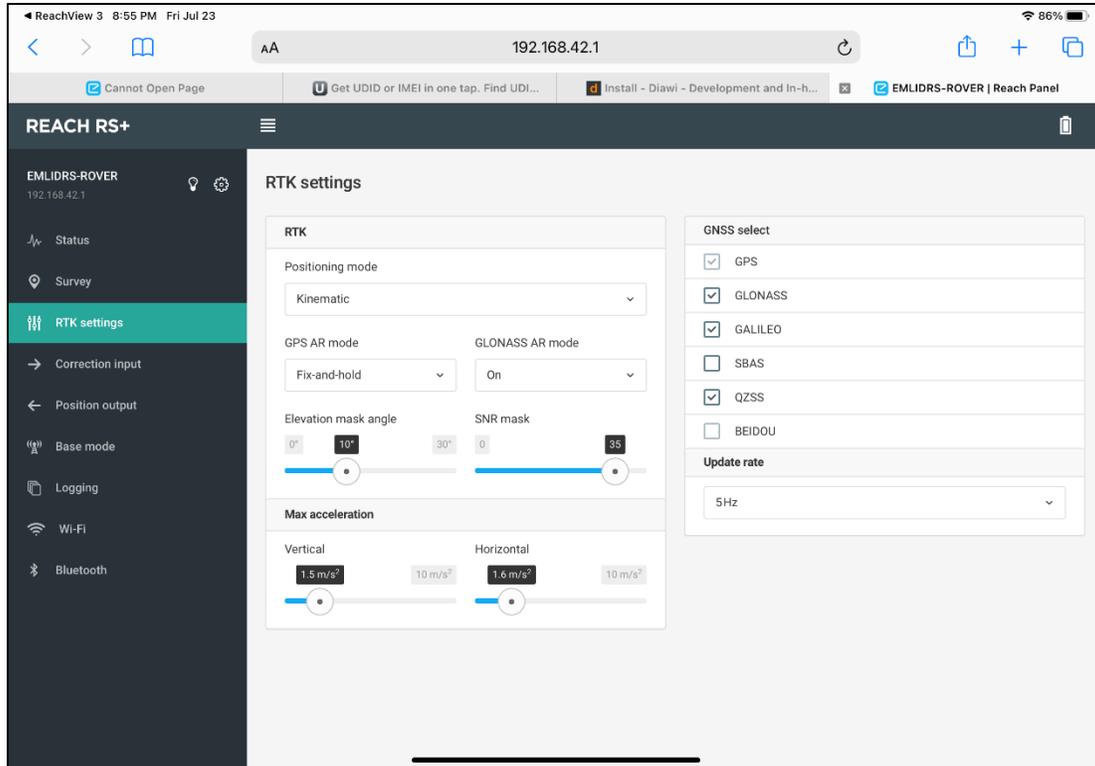


Configuring the rover (EMLID RS+ receiver)

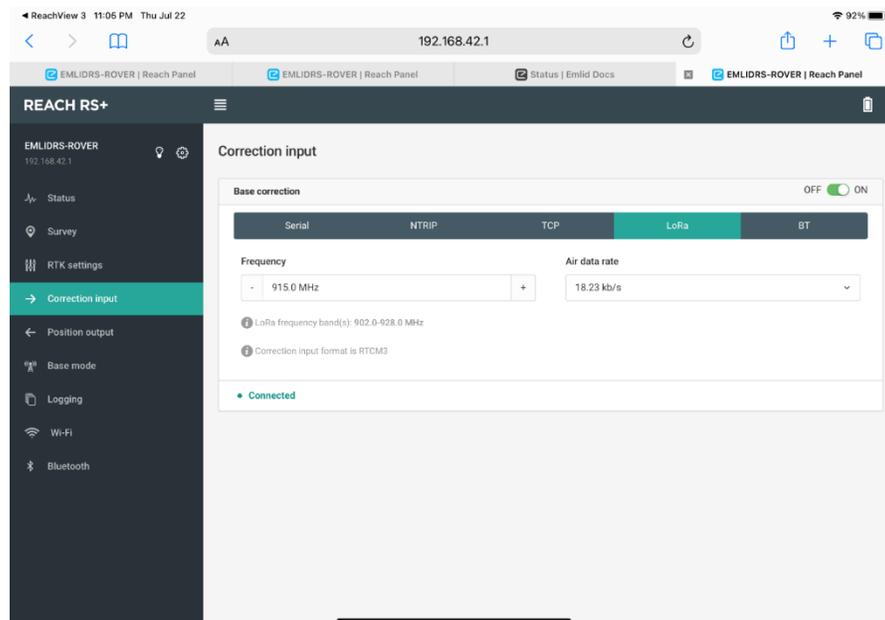
1. Once connected, click on the RS+ button, then a new panel will appear like below. Select Reach Panel.



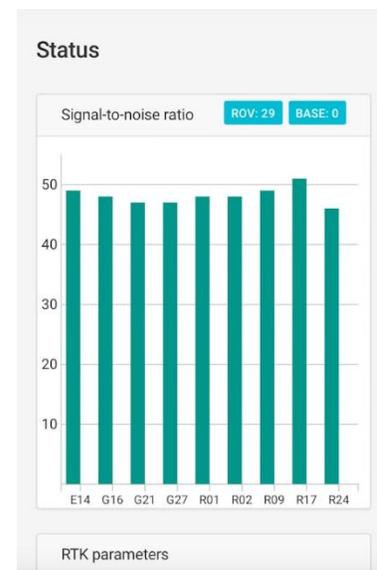
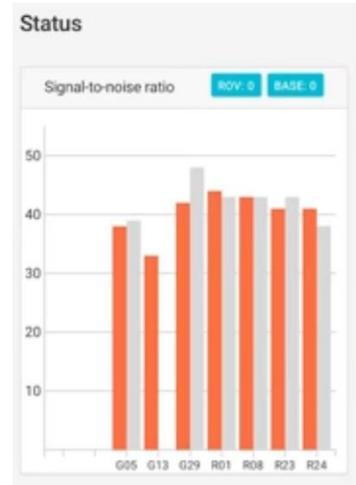
- Go to RTK Settings; Positioning mode = Kinematic; GPS AR mode = Fix and Hold; GLONASS AR mode = ON; Elevation mask = 15 degrees, SNR=35; select the same GNSS as base unit with update rate = 5Hz



- Go to the “Correction Input” tab; set the radio frequencies as the same as the base.



4. Go to the wifi panel, switch on Hotspot.
5. Now when you go to the Status tab, if you set up both the base and the rover correctly, you should see orange bars and grey bars. Gray bars mean the receiver is getting corrections from the base.
6. Now you are ready to go to the field. Go to the field, set the base station over the point you have measured earlier or the geodetic monument
7. Open the Reachview 3 app and connect to the base. In the Reach Panel got to the Status tab and assure that there are plenty of green satellites.
8. Now you can prepare the rover
9. Attach the rover unit to the survey pole (there is an adaptor in the box), fix the antenna to the rover, turn on it (set the pole slightly higher than you to avoid any obstacles).



10. Connect to the rover and check the Status tab. If everything is set correctly, you will see lots of green satellites accompanied by grey bars
11. Solution status (**single** means there is no corrections yet, meter level accuracy; **float** means corrections are receiving but still submeter level accuracy; **fix** means all ambiguities are resolved and positions are at centimetre level accuracy). After few minutes, the rover gets fix solution and AR ratio will increase. Now you are ready for data collection.

Create a project

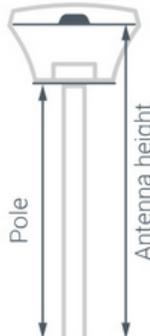
1. Open Reachview 3, connect to the receiver, create a project in the Survey tab. You will see the R and B icons showing receivers on the map; before taking measurements adjust the pole height (click on pole icon and fill in the information); save

Pole height x

I use thread adapter

m

Antenna height is 2.065 m



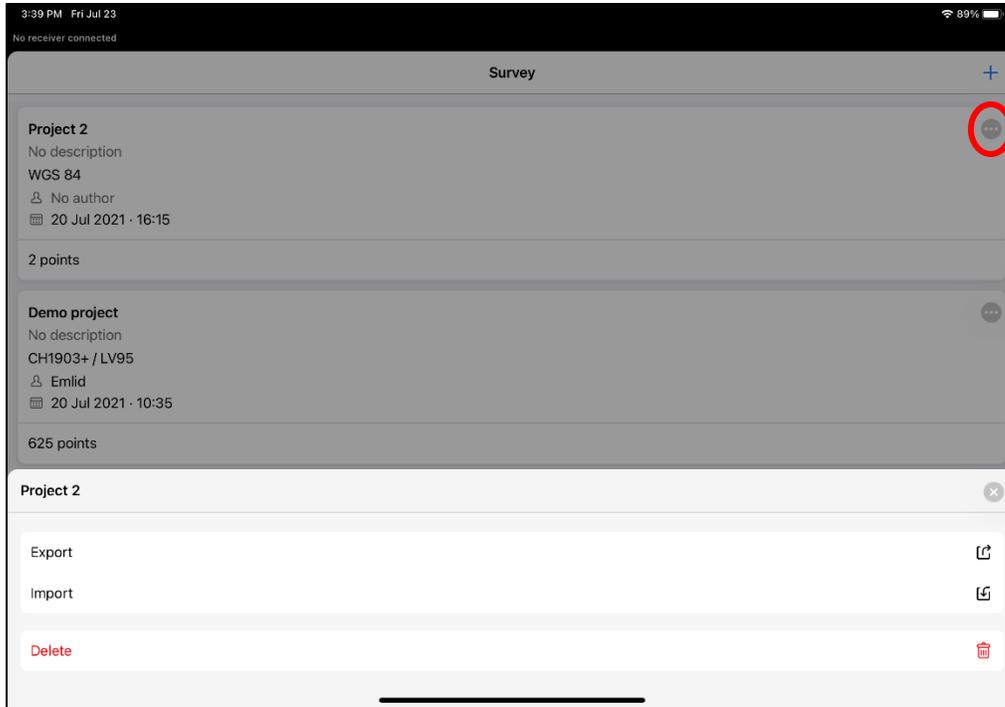
2. Put your pole in the center of the target, click on the plus icon; fill in details; if Fix only enables the app used only fix solutions. In the status bar, you will see the status and no. of observed satellites.



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3. When everything is ready, click the “Mesure” button, it will save your point.

4. Exporting data
5. Open Reachview app → Survey tab → your project → click on three dash button next to the project name and select Export



6. Select CSV format and share using any file sharing option available