Base and Rover Communication

via NetHub Software

Version 1.0

Last revised March 13, 2013

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Base and Rover Communication Configuration via NetHub

1. Introduction

NetHub software offers several ways of interaction between bases and rovers.

The receivers can communicate directly, and alternatively through NetHub, using NTRIP-Caster, and without it. If the connection is established through NetHub, rover can receive all available corrections from any base connected to NetHub.

If the rover is also connected to NetHub, you can control and monitor the status of satellites simultaneously with the receipt of the corrections. The correction exchange through NetHub without NTRIP-Caster is available for receivers manufactured by JAVAD GNSS.

NetHub supports various connection modes, including GPRS connection without public IP.

Regardless of the connection and interaction between base and rover receivers, make the following settings before operation:

- Configure the connection of the receivers and NetHub;
- Configure base(s);
- Configure rover(s);
- Configure NetHub.

2. Connecting the receiver to NetHub

The following connecting modes are available:

- Local connection via Serial (Bluetooth), USB, CAN, local TCP;
- Remote TCP connection;
- RAW TCP connection.

2.1. Local connection via Serial (Bluetooth), USB, CAN, local TCP

The receiver is connected to the PC with running NetHub, or to the PC which is a part of a local network, if local TCP connection is used.

Open the *Hub Connections* tab, and set the following: connection type, port the receiver is connected to:

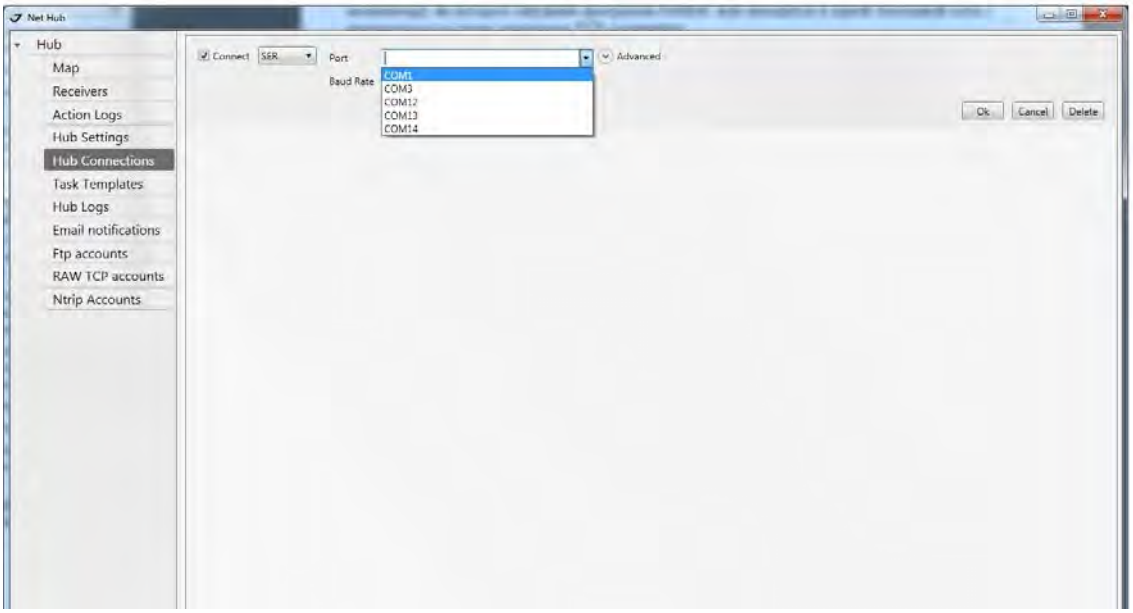

Figure 1. Local connection setup

2.2. Remote TCP connection (NetHub connects to receiver)

For this connection mode the receiver should be connected to the Internes and have the public IP address.

Open the *Hub Connections* tab, and set the following: connection type, address, port, password:

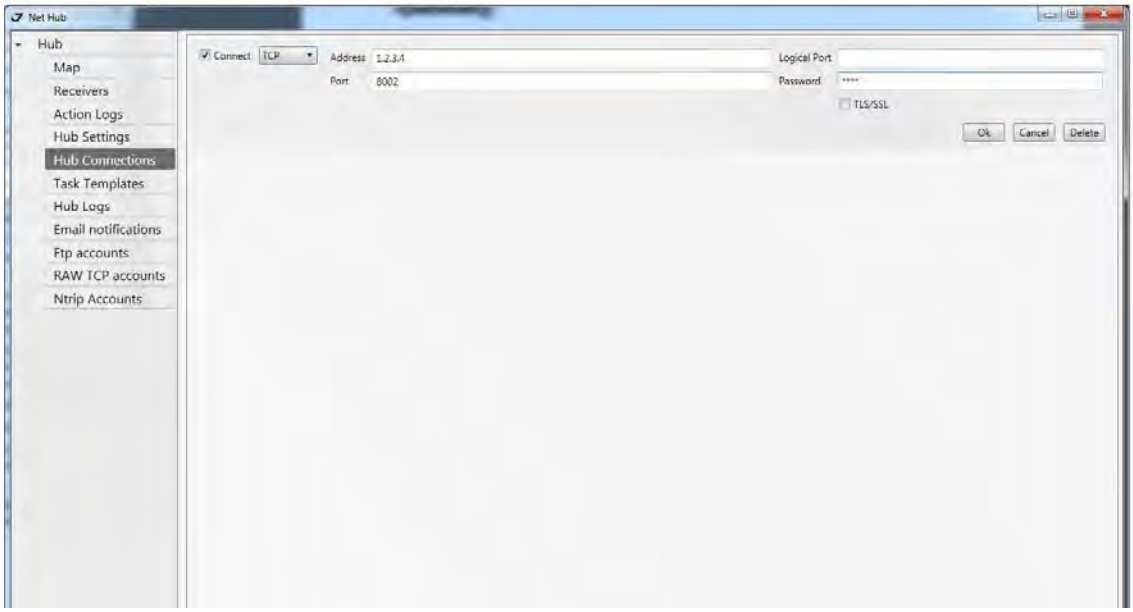

Figure 2. Remote TCP connection

2.3. RAW TCP connection (receiver connects to NetHub)

If the receiver is connected to Internet, but does not have public IP address, it can be configured to be able to connect to the NetHub. In this case the PC should have public IP address.

For Raw TCP connection the following is needed:

- Configure RAW TCP server in NetHub;
- Configure RAW TCP client on the receiver.

NetHub RAW TCP server configuration

In the *Hub Settings* enable *RAW TCP server*, and change the port if needed:

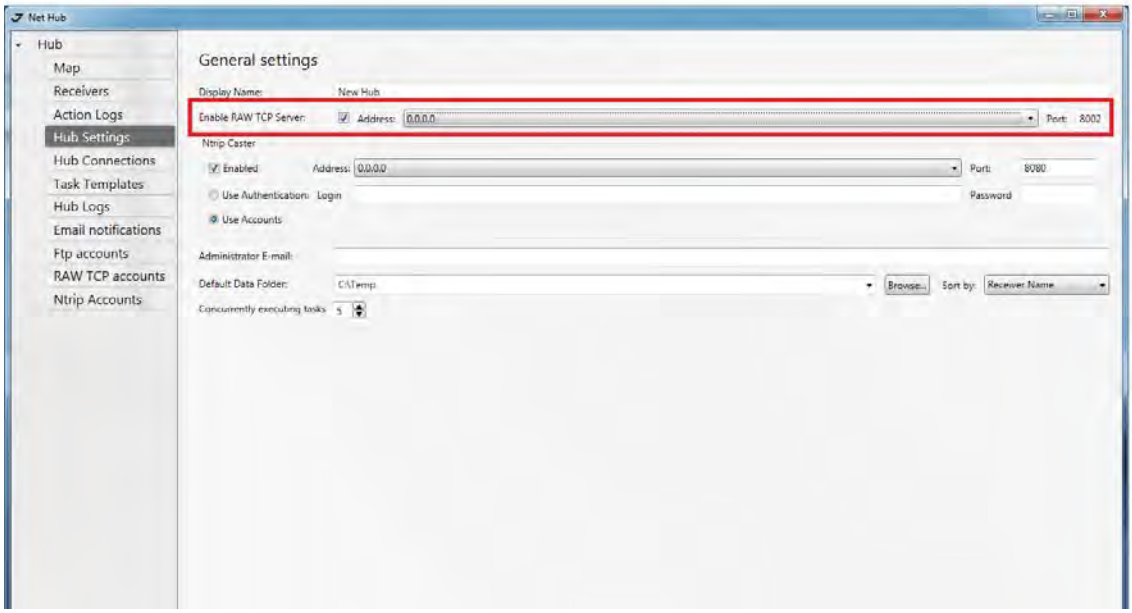

Figure 3. Enabling RAW TCP-server in NetHub

Click *Save* button and restart the software to apply the settings.

Open *RAW TCP accounts* and add the account (password):

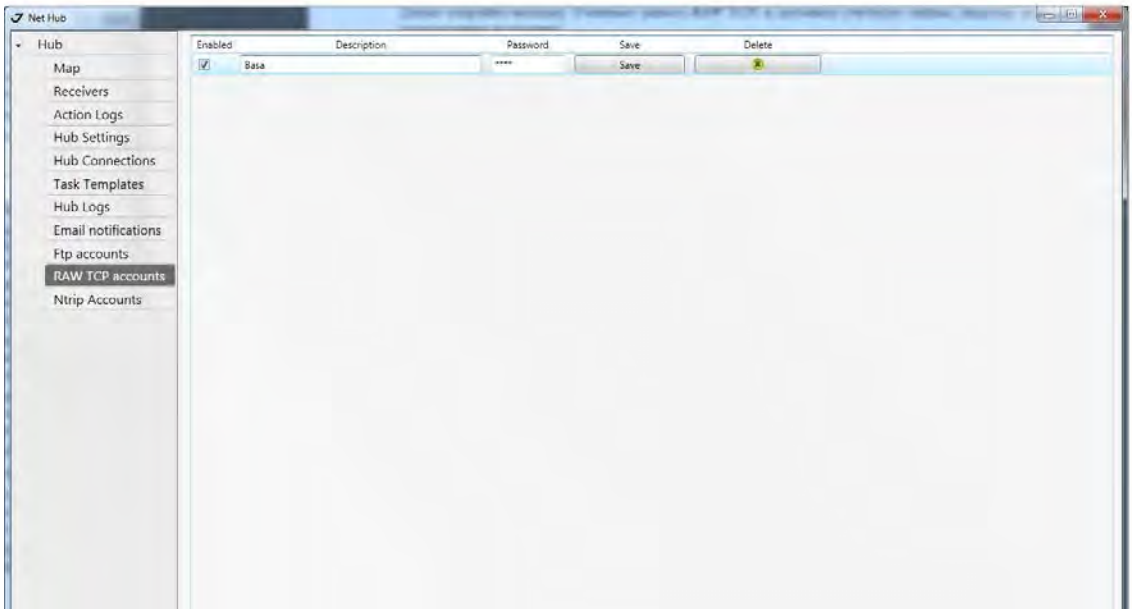

Figure 4. Adding the accounts to RAW TCP connection

RAW TCP client configuration

To configure RAW TCP client, use NetView, NetHub or Tracy software. Follow the screen instruction if Tracy is used.

To configure RAW TCP client using NetView (NetHub) follow the steps below:

- Connect the receiver and receiver;
- Configure the Internet connection (GPRS, Ethernet, or Wifi);
- Configure the client port mode;
- Enter the parameters of the RAW TCP client.

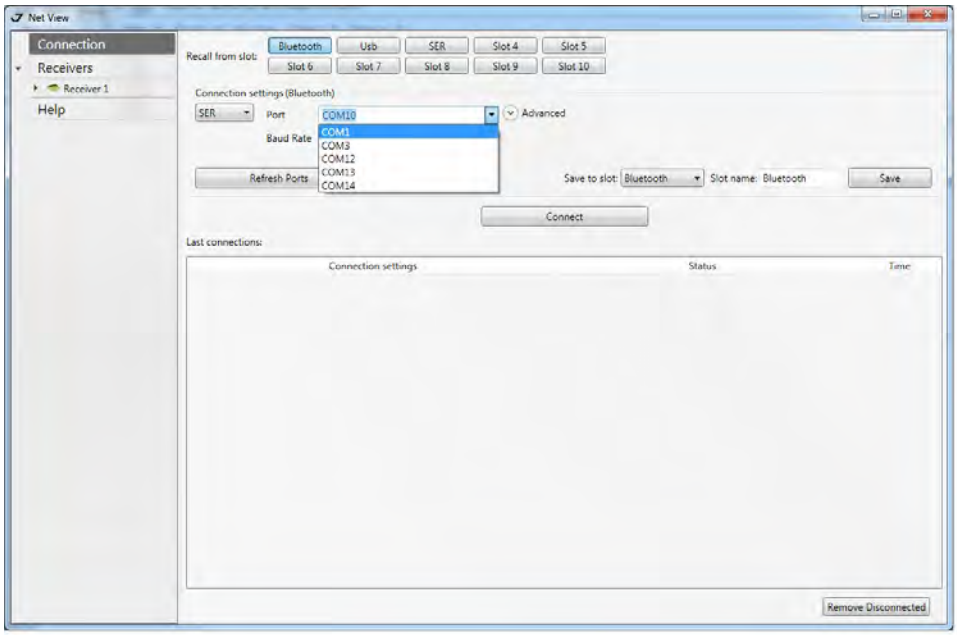

Figure 5. Connection via Serial (Bluetooth) port

If the receiver will be connected to Internet via GPRS, configure the connection parameters: click *Parameters* ▸ *Networking* ▸ *GSM*, set *Modem mode* to `gprs`.

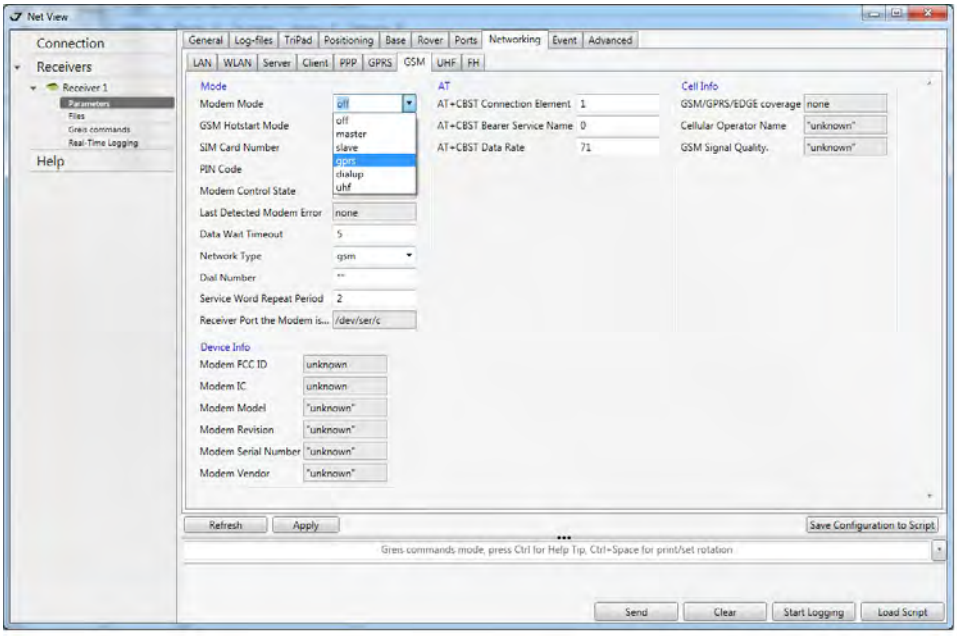

Figure 6. GPRS parameters configuration

Click *Parameters* ▸ *Ports* ▸ *TCP* and set the *Input Mode* for *TCP Client a* to `cmd`. Click *Apply.*

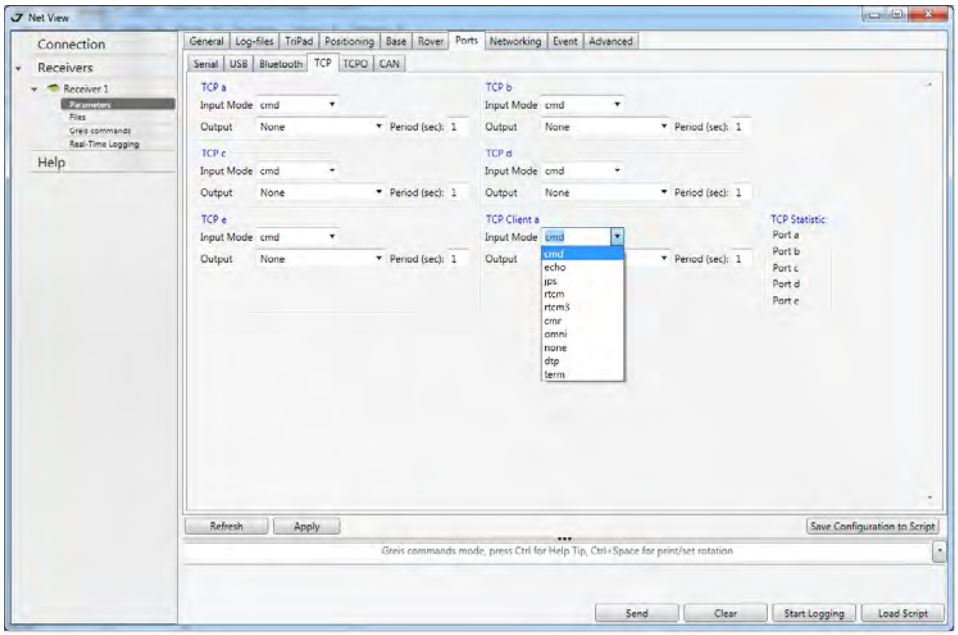

Figure 7. TCP client settings

Click *Parameters* ▸ *Networking* ▸ *Client* and enter address, port and password for *Raw TCP Server.*

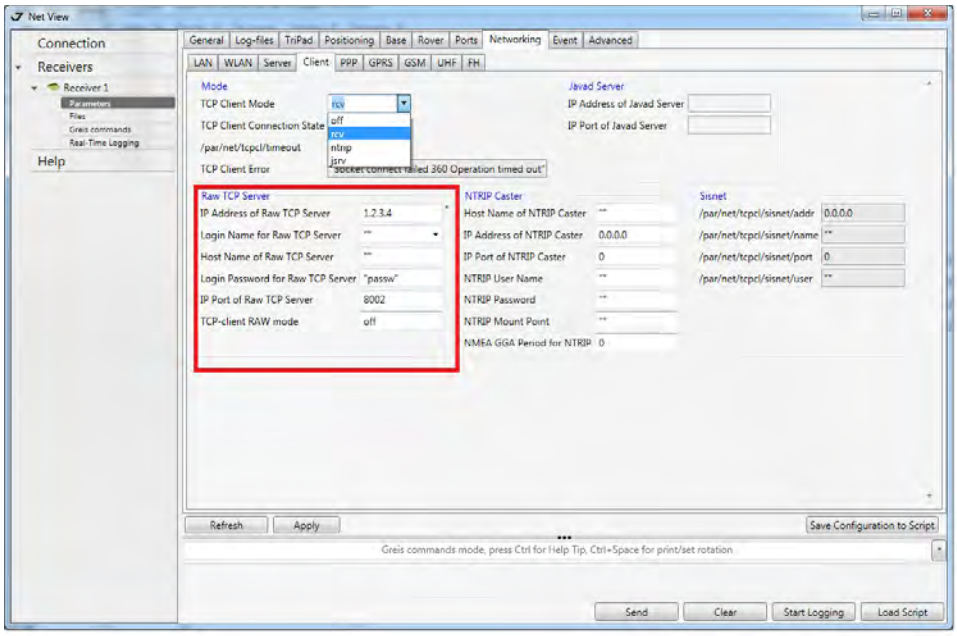

Figure 8. TCP client configuration

Set *TCP Client Mode* to `rcv` and click *Apply.*

As result, the receiver will be connected to NetHub, and will be visible in it.

3. Base configuration

In order the base will be able to transmit the corrections, the correct parameters of the antenna, the exact coordinates of base and set the corrections type should be entered. The base can be configured using NetView, NetHub or Tracy software.

Below is described how to configure the base using NetView (NetHub).

3.1. Antenna parameters and coordinates

Click *Receiver* ▸ *Parameters* ▸ *Base* and enter the *Reference Antenna parameters* ? *Reference position*.

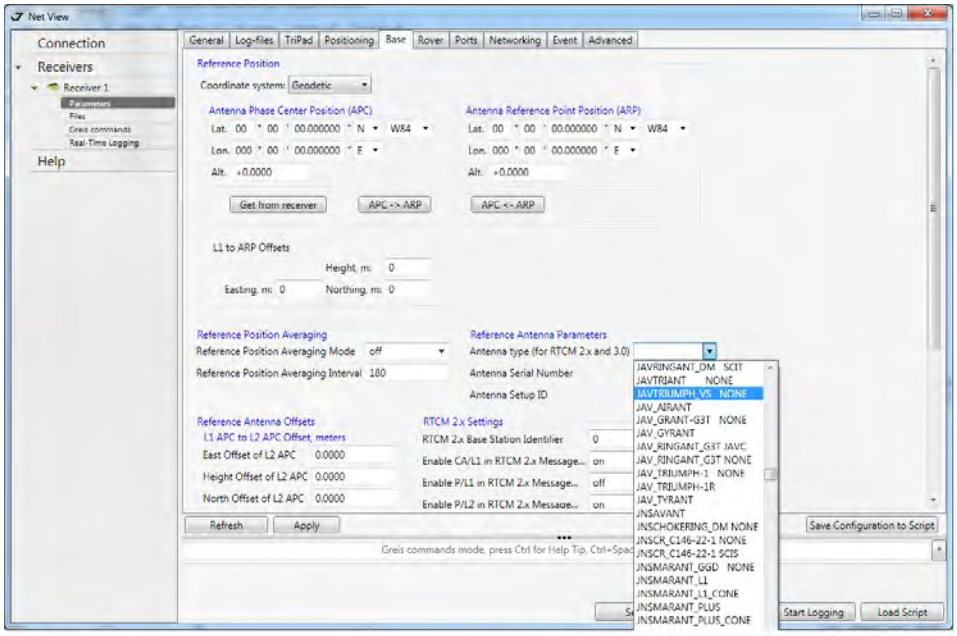

Figure 9. Antenna parameters and base station configuration

Antenna

Select the antenna type in the *Reference Antenna parameters* group.

Coordinates

Enter the exact coordinates of antenna phase center to the fields of *Reference Position* group in the geodetic or Cartesian system.

Geodetic:

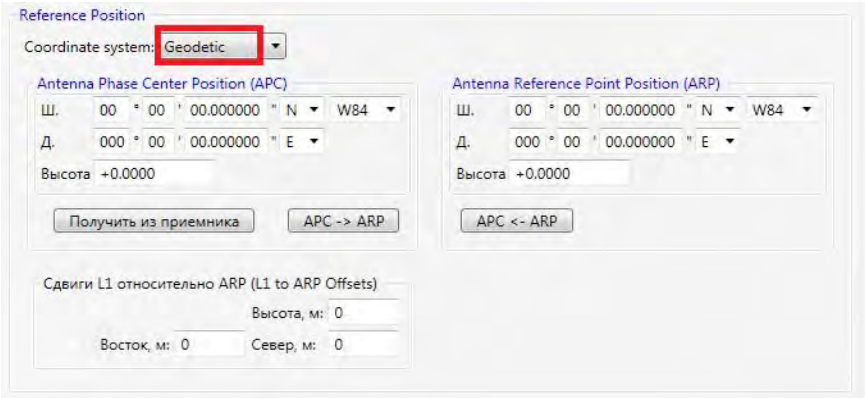

Figure 10. Base station geodetic coordinates

- Lat - latitude in degrees, minutes, and seconds with a letter indicating the hemisphere (N or S).
- Lon - longitude in degrees, minutes, and seconds with a letter indicating the hemisphere (E or W).
- Alt - height above the ellipsoid in meters.

Cartesian:

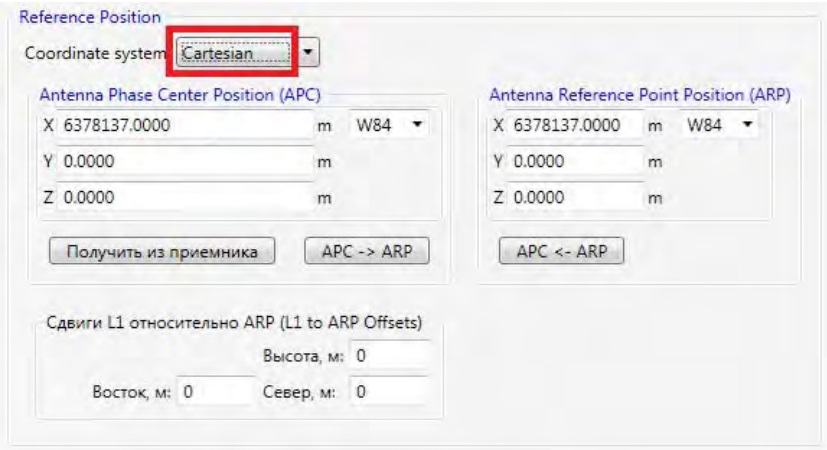

Figure 11. Base station cartesian coordinates

- X, Y, Z, in meters.

Note: If you enter the coordinates in datum other than WGS 84, make sure that the correct ID datum is selected.

You can set the coordinates using one of the following ways:

- Manually enter the coordinates of the reference station obtained with a high accuracy during the earlier surveying.
- Use current absolute position by clicking on the *Get from the receiver.*
- Use as reference coordinates the coordinates obtained from averaging of the absolute coordinates. To customize the averaging mode, click *Reference Position Averaging*.

- Get the coordinates of the phase center of reference point (button *APC-> ARP*) or vice versa (the button *ARP-> APC*). In this case, the offsets between these points should be set in the *L1 to ARP Offsets* edit fields.

If any antenna is selected (*Antenna Type* ...), the fields show the values ?of this antenna from the receiver database. The manually changed parameters affect only the calculation of the coordinates and will be not stored in the receiver.

3.2. Corrections

Open the *Base/Rover* tab.

Enable *Use receiver as reference station.*

Enter the unique base name, which will be displayed in the NTRIP points list if NTRIP-Caster will be enabled.

Enter the additional information about base and specify the correction type.

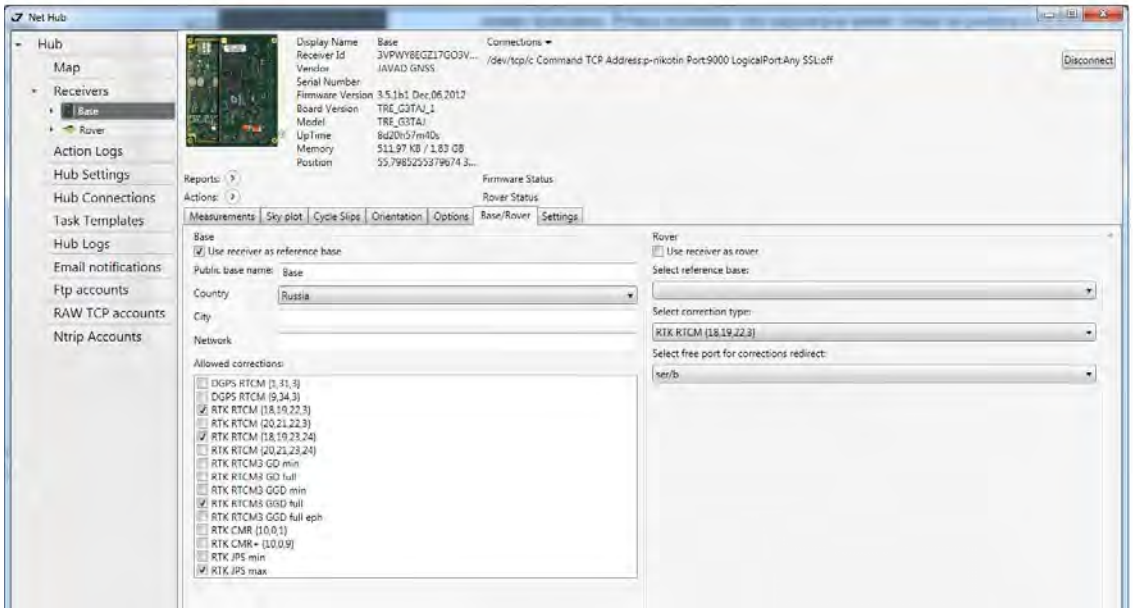

Figure 12. Base parameters

If the base won't transmit the data via NTRIP-Caster, the base configuration is complete.

3.3. Enabling NTRIP-Caster

To enable NTRIP-Caster, open the *Hub Settings* tab, and enable *NTRIP Caster*. Enter the password to the server. Restart the program to apply the changes.

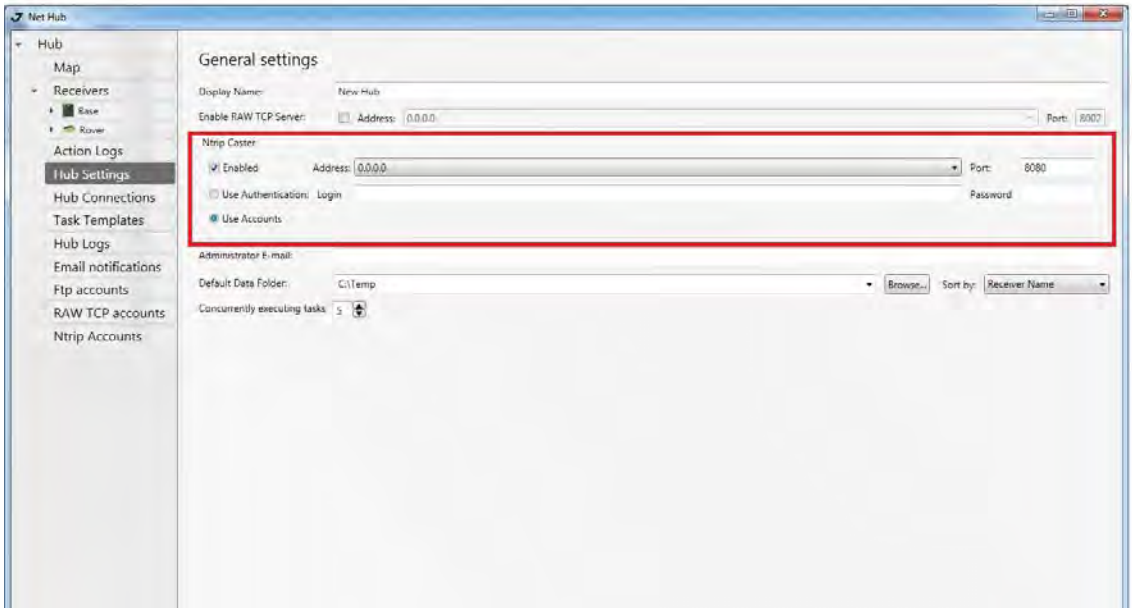

Figure 13. NTRIP-Caster settings

To check the NTRIP points list, use any browser entering NTRIP-Caster address, e.g., `http://localhost:8080`.

4. Rover configuration

The rovers can receive the corrections directly from the base or from NetHub. In the second case there are two schemes:

- Rover is connected to NetHub and receives the corrections directly from NetHub;
- Rover is configured as NTRIP-client and receives the corrections from NTRIP-Caster NetHub.

The first scheme is available for the JAVAD GNSS receivers and allows remote monitoring receiver status and configuring the rover.

The direct connection to the rover is useful for solving the problems of data collecting during the monitoring of the structure deformation, or by the construction of buildings and structures, the base and rovers are usually connected to the local network based on TCP or CAN connection.

If the rover is connected via the Internet, the connection RAW TCP is preferable.

4.1. Configuring the rover to receive corrections from NetHub

After connecting he rover to NetHub in any way, including RAW TCP, open the *Base/Rover* tab on the rover.

Enable *Use receiver as rover*, select a base from the list, correction type rover will receive, and the port that will be used for redirect of the corrections.The redirection is necessary because the current port, the rover is connected to can not be simultaneously used for the corrections processing. Select one of unused receiver's port. The program will automatically apply the decoder type, depending on the type of corrections.

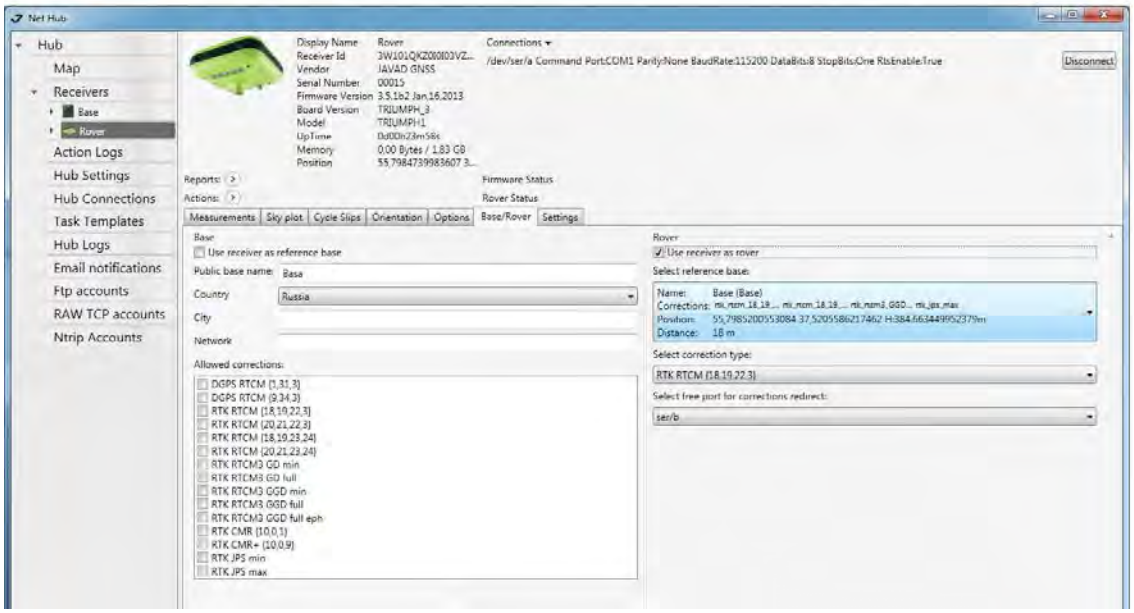

Figure 14. Rover configuration to receive the corrections from NetHub

Click *Save*. The program will configure automatically the ports for redirection.

The rover status starts changing. You can check it in the *Measurements* tab.

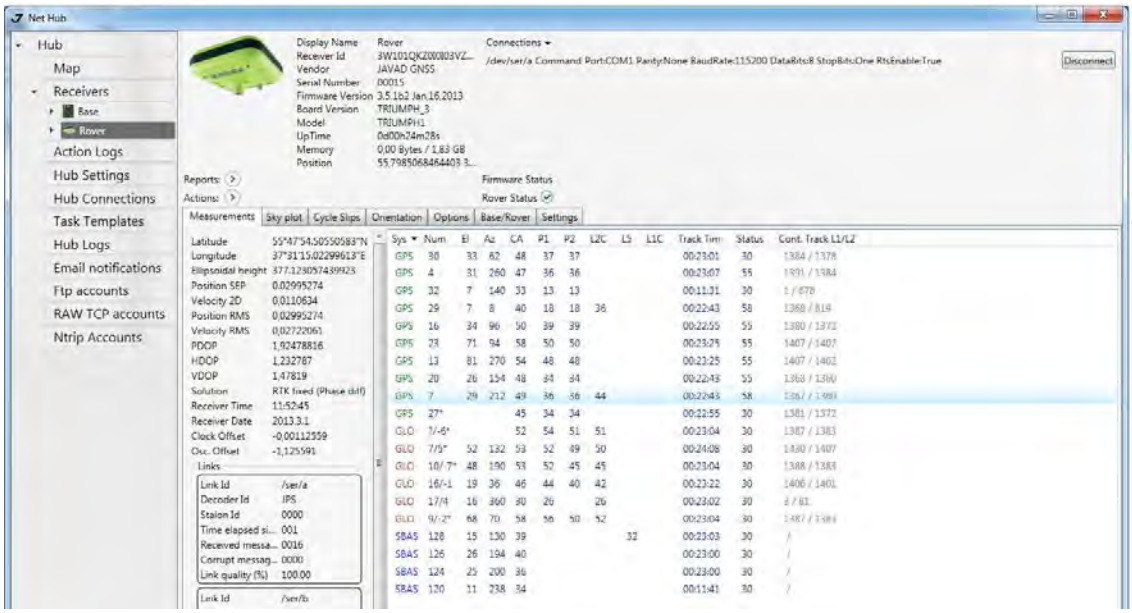

Figure 15. Rover and corrections status

4.2. Rover as NTRIP client

To configure NTRIIP client, use NetView, NetHub or Tracy software. Follow the screen instruction if Tracy is used.

- Connect the receiver and receiver;
- Configure the Internet connection (GPRS, Ethernet, or Wifi);
- Configure the client port mode.

To configure NTRIP client using NetView (NetHub) follow the steps below:

1. Connect the receiver to the PC using Serial (Bluetooth), USB, CAN, or TCP.
2. Click *Parameters* ▸ *Networking* ▸ *Client*.

3. Enter the NTRIP Caster parameters.

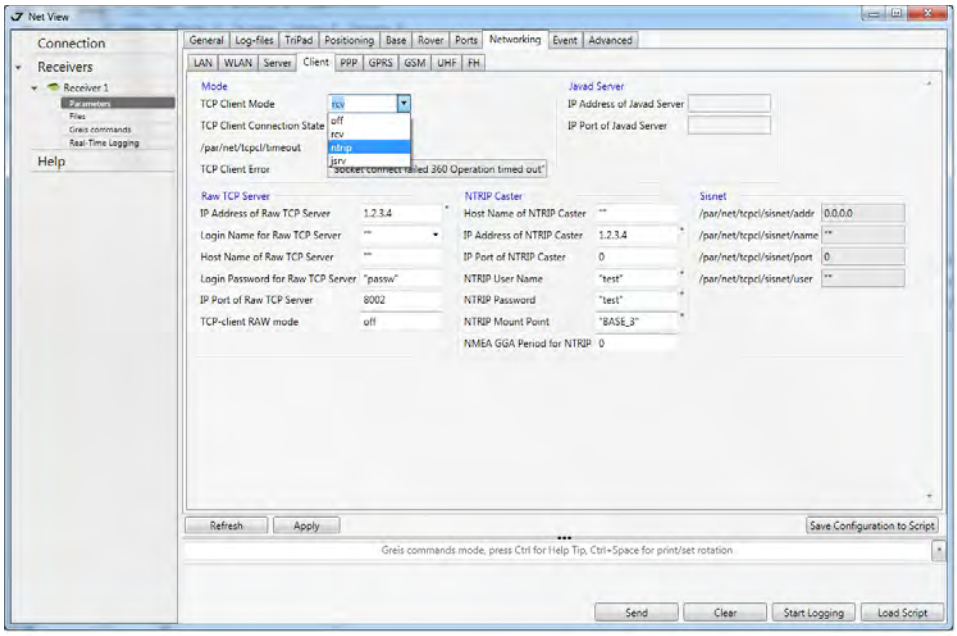

Figure 16. Rover NTRIP-client configuration

4. Set the *TCP Client Mode* to `ntrip`. Click *Apply.*
5. Click *Parameters* ▸ *Port* ▸ *TCP* and set the *Input Mode* for *TCP Client a* to `rtcm`, `rtcm3`, `cmr`, or `jps` depending on NTRIP point type. Click *Apply.*

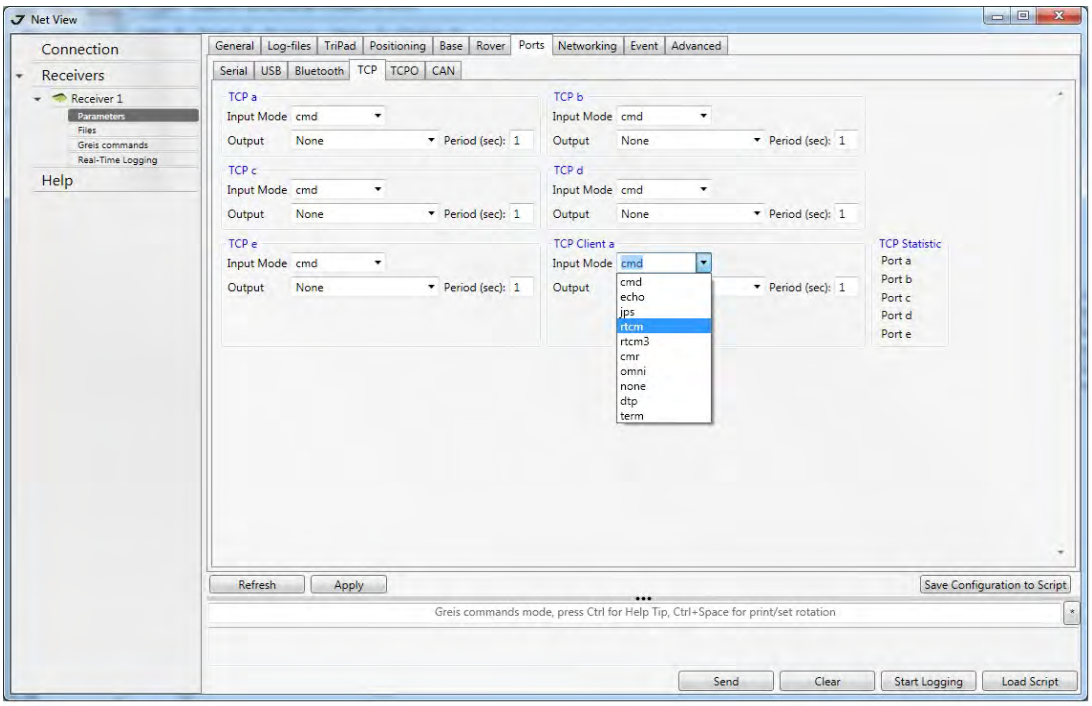

Figure 17. NTRIP-client port settings

The receiver will be connected to the NTRIP-caster via NetHub, and starts to receive the corrections.

The solution type can be set by clicking *Parameters* ▸ *Positioning*.

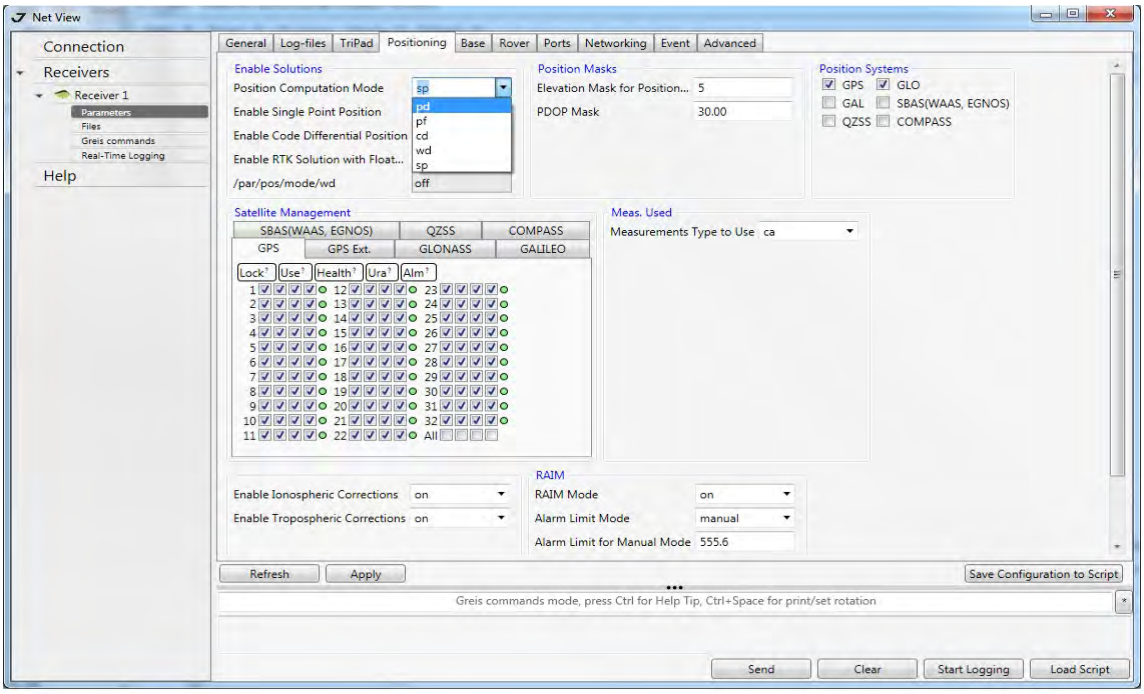

Figure 18. Rover solution type selection

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