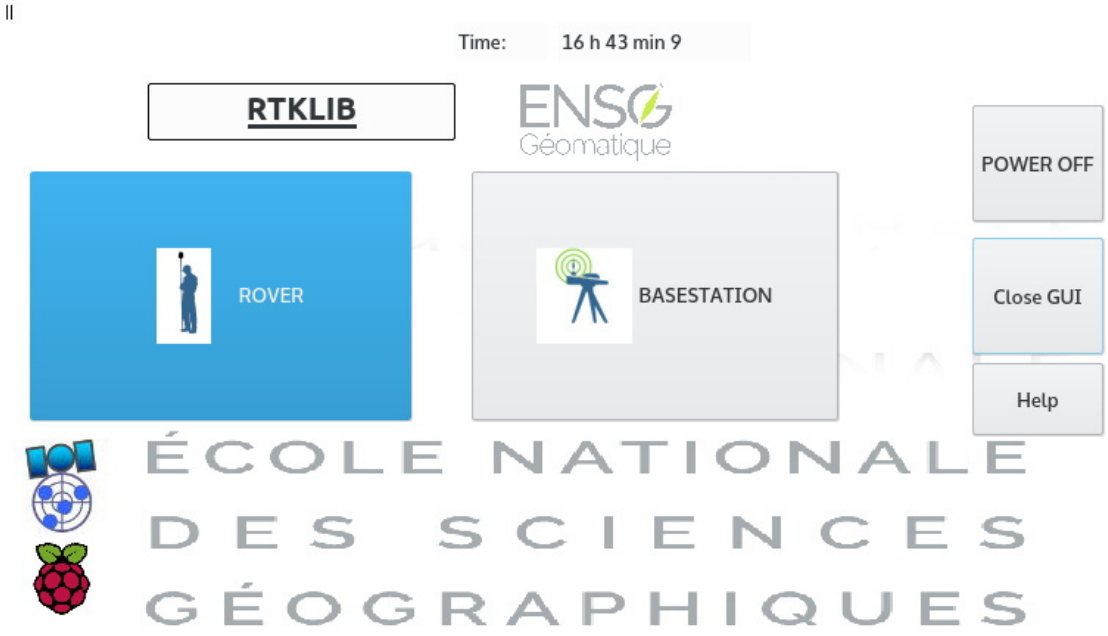
USER Manual

Touchscreen GUI for RTKLIB



SUMMARY:

Updated 22/05/2016

Preliminary information:

This project was requested by a "private" sponsor with the objective of achieving a positioning system in real-time at low cost. The system is based on RTKLIB. It is expected beforewhile for UNIX systems and formatted to best suit a Raspberry Pi2 equipped with a touch screen. All calculation results are from RTKLIB functions and thus their accuracy is directly related. This GUI program is intended only to make them easyly accessible for a user using a UNIX OS, for a Base/Rover System.The software is built around Rtkrcv and Str2str two applications "CUI" of RTKLIB.This software is initially built to run under Rapsberry with a touchscreen, without a keyboard or mouse. You have to edit the UBX files to suit you configuration (RF link, Ntrip user and GNSS stream .

Note 1:
At this stage the needs of the sponsor have yet to be evaluated through testing "in charge"rover/base that it will perform. Returns will adapt better to the GUI "Proven" needs. The changes will focus on the data to display the data to save in the point file, and on the basis of the method configuration options menu.

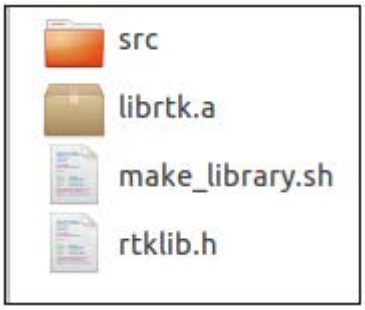
Note 2:
It remains to operate the Base mode beyond the only radio connection (functional), and understand the intricacies of str2str (Rtklib). These subtleties are on the command line allowing the transfer of the position of the base to the rover via radio.

Note 3:
The version used here is RTKLIB RTKLIB 2.4.2.p11, it can be updated to the latest version, just place the latest sources files of RTKlib in the lib folder before recompiling in Qtcreator

I. INSTALLATION

1.) Create the static library:

From a terminal (in the lib folder) start ./make-library.sh order.
The file librtk.aappear if the construction of the library was carried out optimally.
The file must rtklib.hremain at the same level as librtk.a.



2.) .pro files and project

Launch the .pro file in QT. Make a "clean all" then "run qmake" then "Build All" then "run". The RTKBASE interface must embark. Otherwise, go to 3.);

3.) File access Rights

Think about putting rights into "execution" of the .pro well as executable file.
Warning: Raspberry does not maintain an updated clock! Copying new filescompile may result in error because the Raspberry notes file change schedulesin the future ...
Check the time, adjust, via GPS or internet (automatic)!

Conf files:

Some configuration files "type" are included in the source code folder. They are at used to launch the "Rover" mode.

Note that:

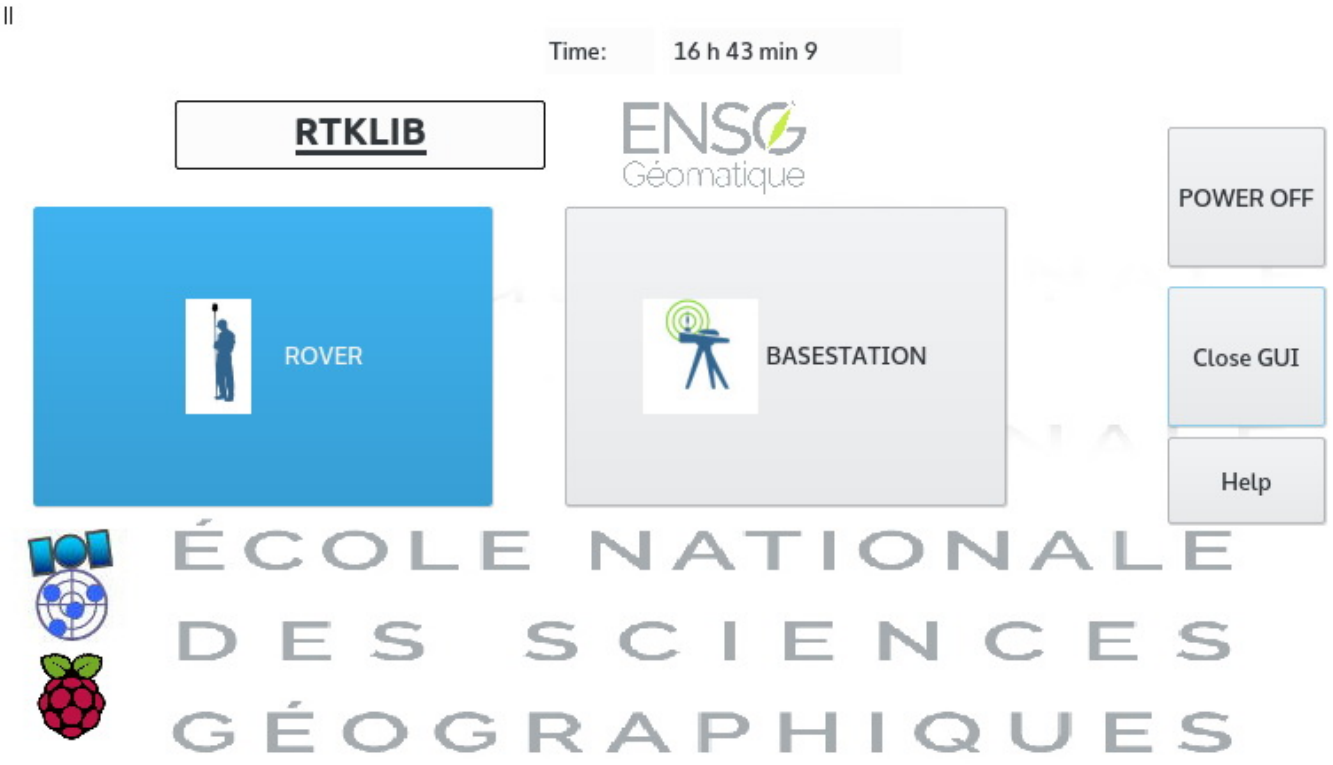
- To perform the "NTRIP caster" must use "static";
- For the calculation on phase L1 must be used "kinematic";
- For differential on the code use the "dgps" mode.

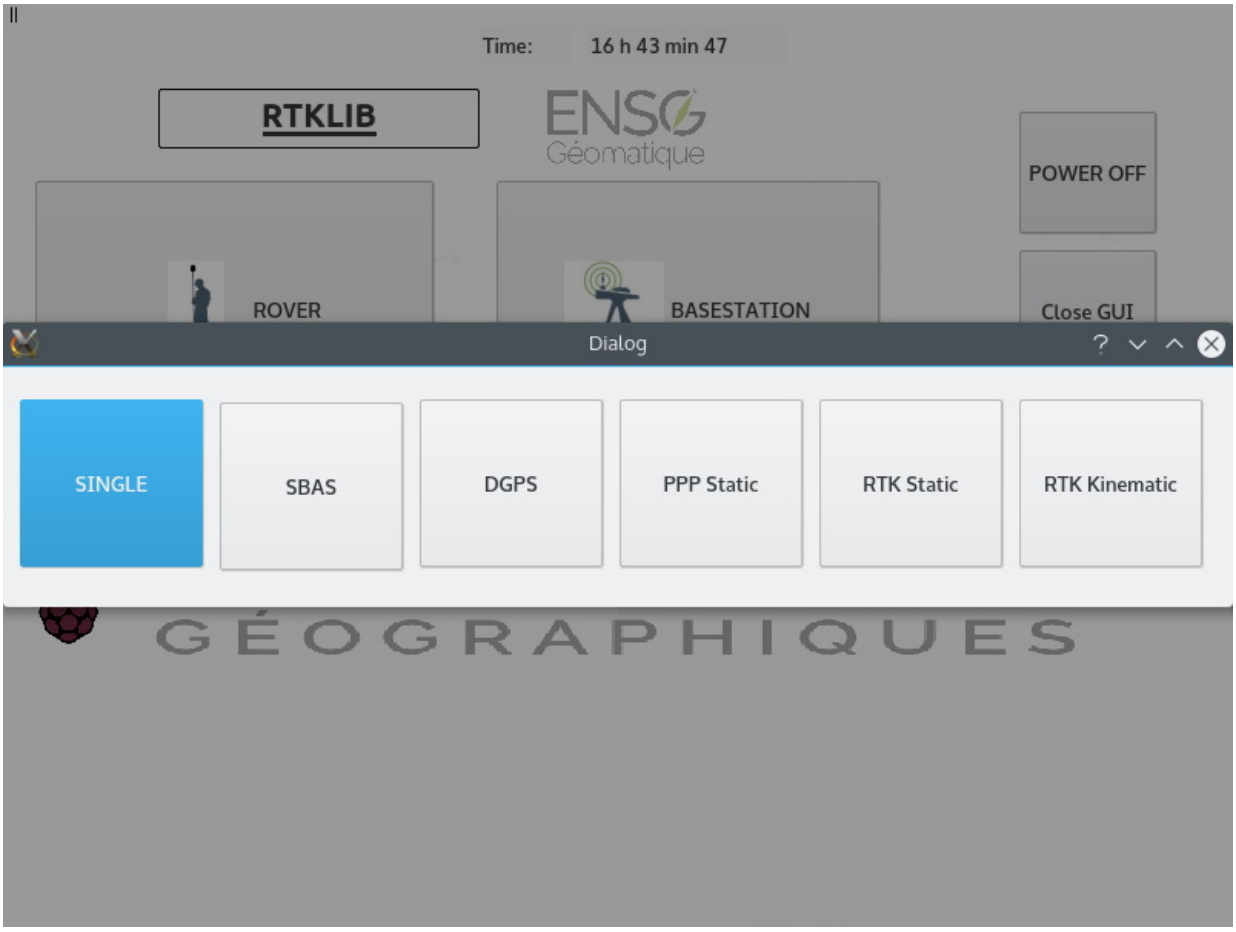
II. USE OF THE GUI

1.) Rover mode:

o Open the Rover mode;

o A window offering you different position calculation modes appears, choose one of the modes to start the position calculation, the main RTKlib calculation methods are available, to change these configurations you must manually edit * .ubx files in the folder /RTKBASE/conffiles. In the statement of position it is advisable to choose the PPP-Static for better precision mode(If possible use a corrections via NTRIP)





6 modes are preset in the UBX files for Rover or calculating base position before using it as basestation:

- Single: RTKlib only calculates its position standalone without any correction

- SBAS: RTKlib uses the correction provided by the EGNOS satellites in Europe and the WAAS satellites un USA. the correction is provided by a ground stations and returned to the SBAS satellites that return them to GNSS receiver.

- DGPS: corrections RTKlib uses a ground station transmitted by RF link, GSM, or internet access, the proximity of correction stations provides a more locally adapted corrections than SBAS

- PPP-Static: RTKlib applies a smoothing on the path created by the raised positions to reduce positions errors (a kind of averaged) we can apply some DGPS corrections (to set corrections you must configure a Ntrip account access in the configuration files * .ubx

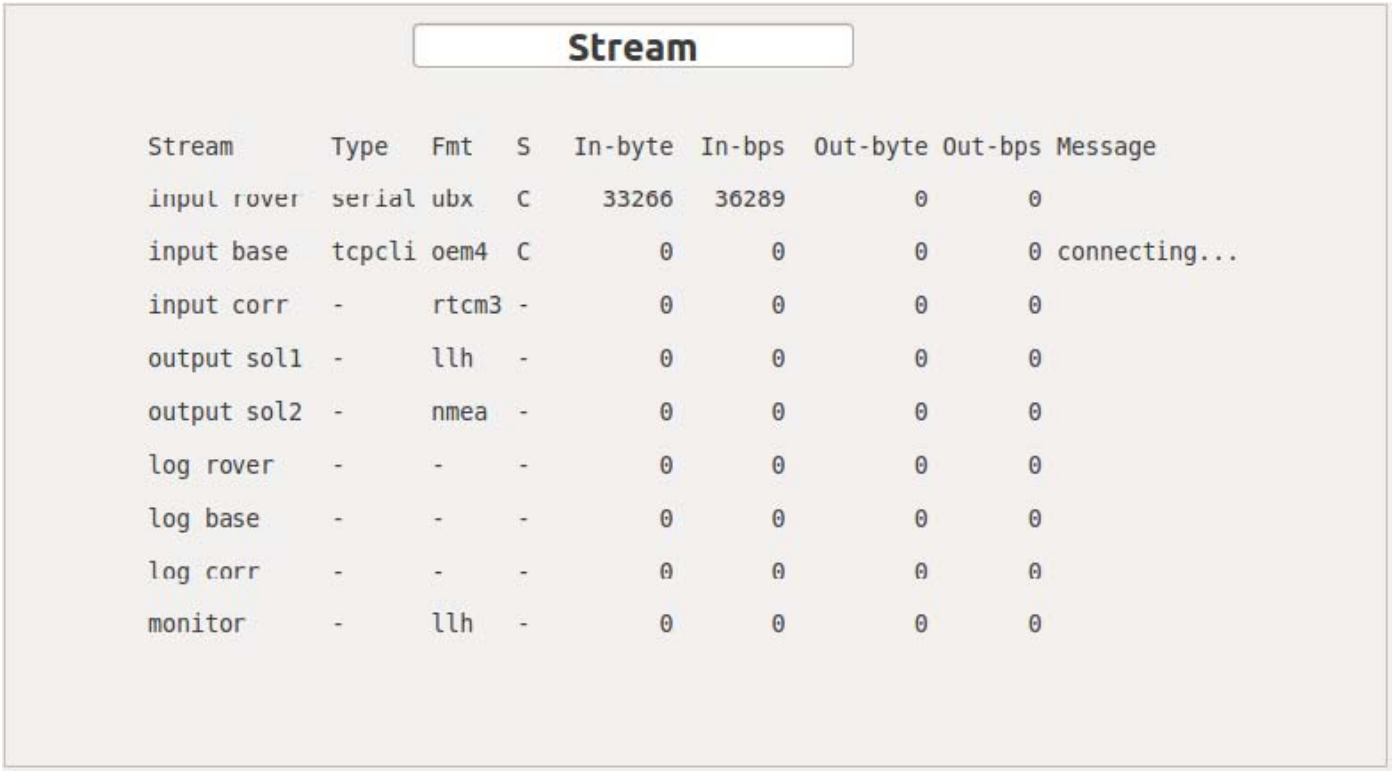
- RTK static: RTKlib performs a differential calculation between the base ideally located idealy in less than 70Km of the rover (the closer is the better).
the distance and bearing between the rover and the base is taken into account (baseline).
the calculation method knows that the rover is static.

- RTK kinematic: same calculation method as the RTK static but we know that the rover will move for the calculation. The resulting path is smoothed as for the PPP

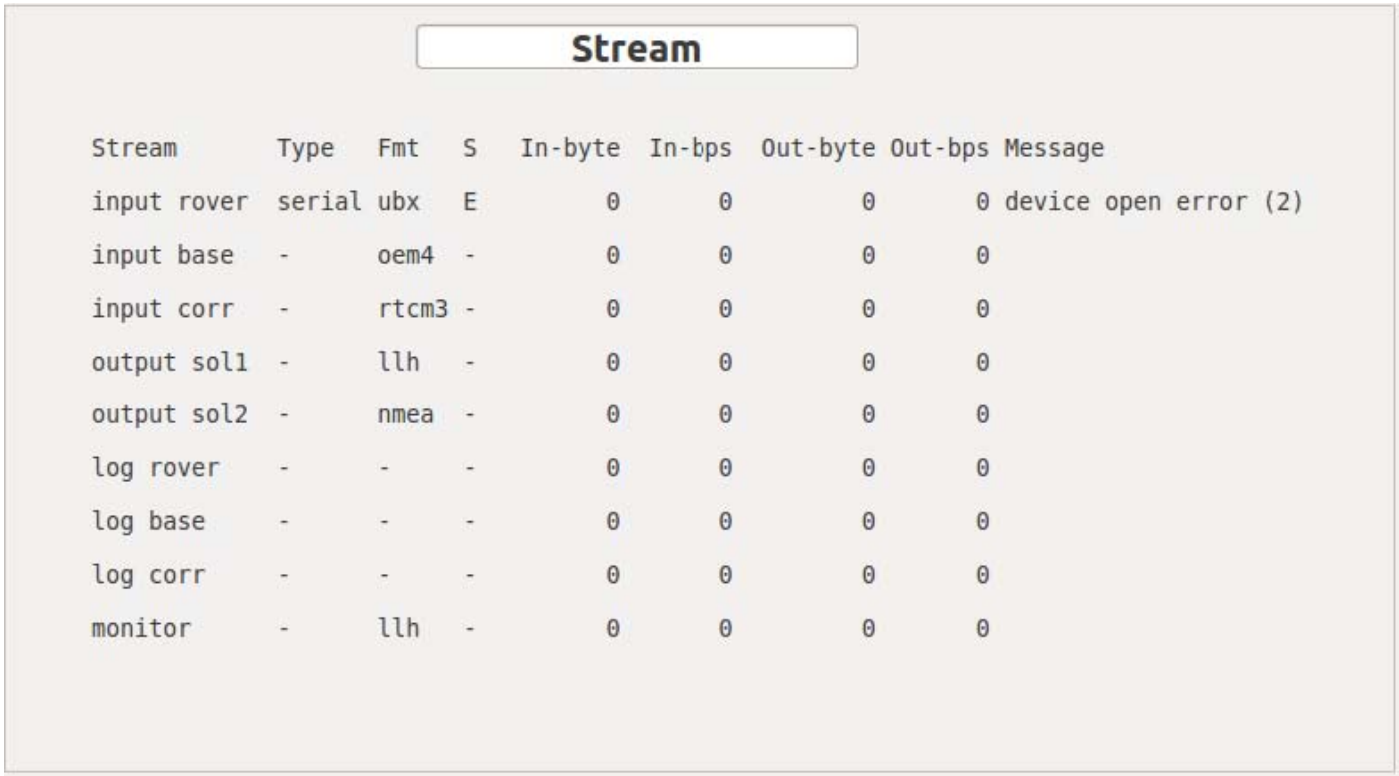
If you want a USB key position log for post processing, configure log option in configuration files * .ubx
The default configuration files are provided for Ublox, if you use a different GNSS you have to change the parameter input stream to the protocol of your constructor (NVS, Skytraq, etc ....)

o The window "Stream" opens. You will see activity at the Rover line.
Otherwise there may be:
GPS is not connected, or that your GPS is not communicating the right protocol (UBX, RTCM ...), or connection with the GPS is wrong.(USB/serial)
If the problem is still there you can watch the log file to try to find the cause of the error, ...

Moreover, in RTK mode, information will also be posted on the received streamby the Rover from the base, or in correction mode, which is received from theNtrip (Caster).

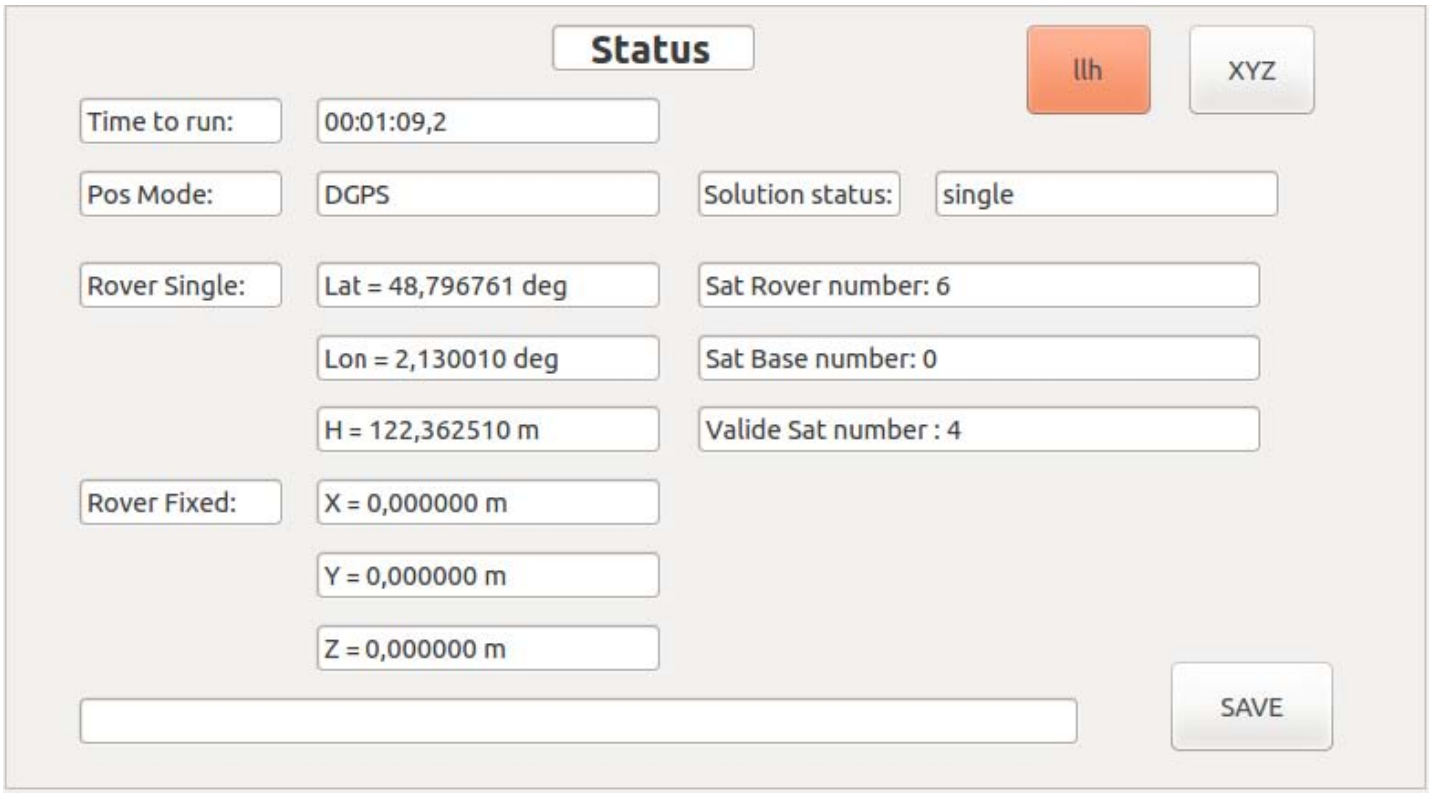


Example with a connexion error of the GNSS

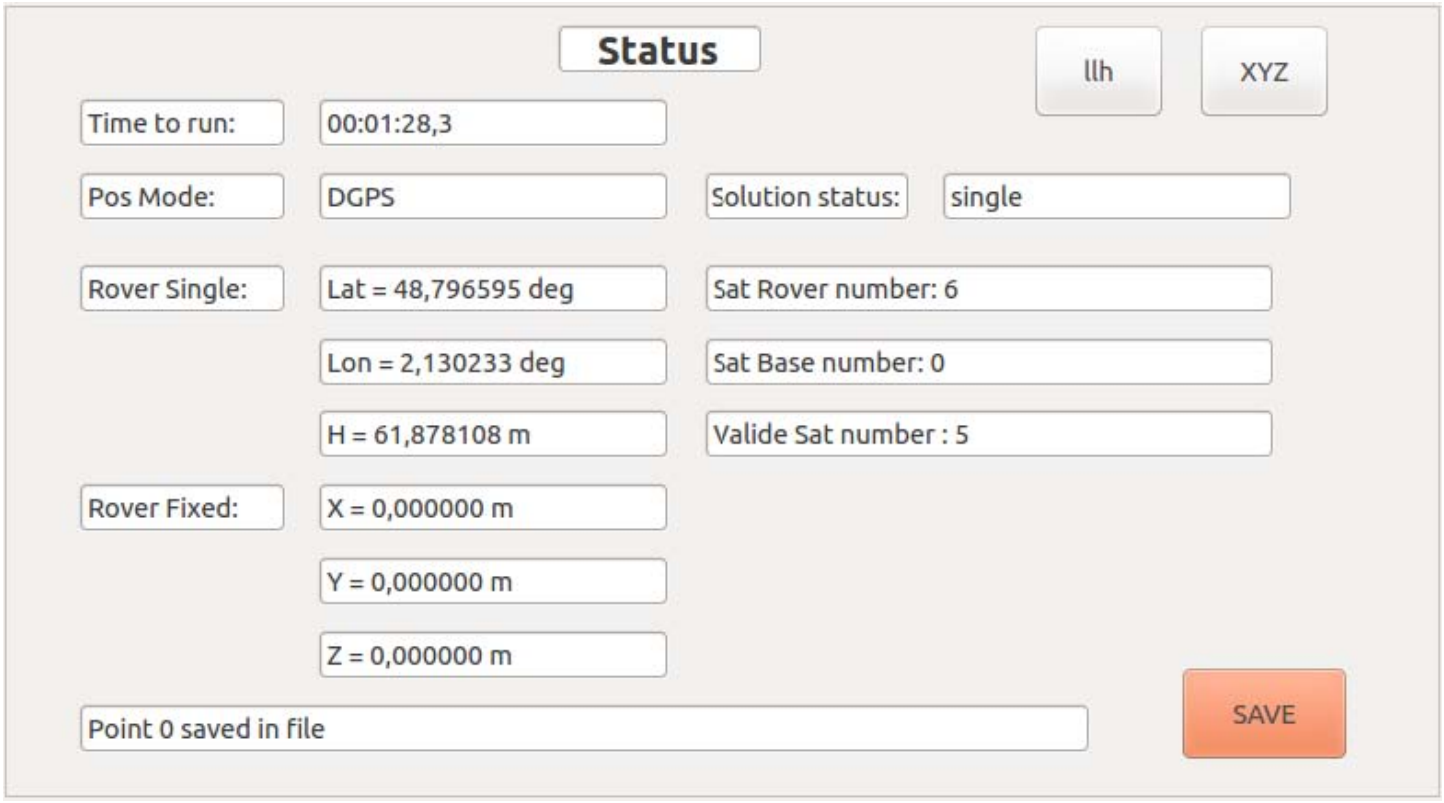


To Choose the view you want, click on the window (anywhere except on buttons) and a new window will open. To access the options again later, just click anywhere on the window.

o Window "Status": Choose the type of units (llh or XYZ) for your solutions. The type of calculation mode selected (here DGPS) is displayed. The restitution level of the solution is shown in the field "status solution" means that the single solution is not the expected level.

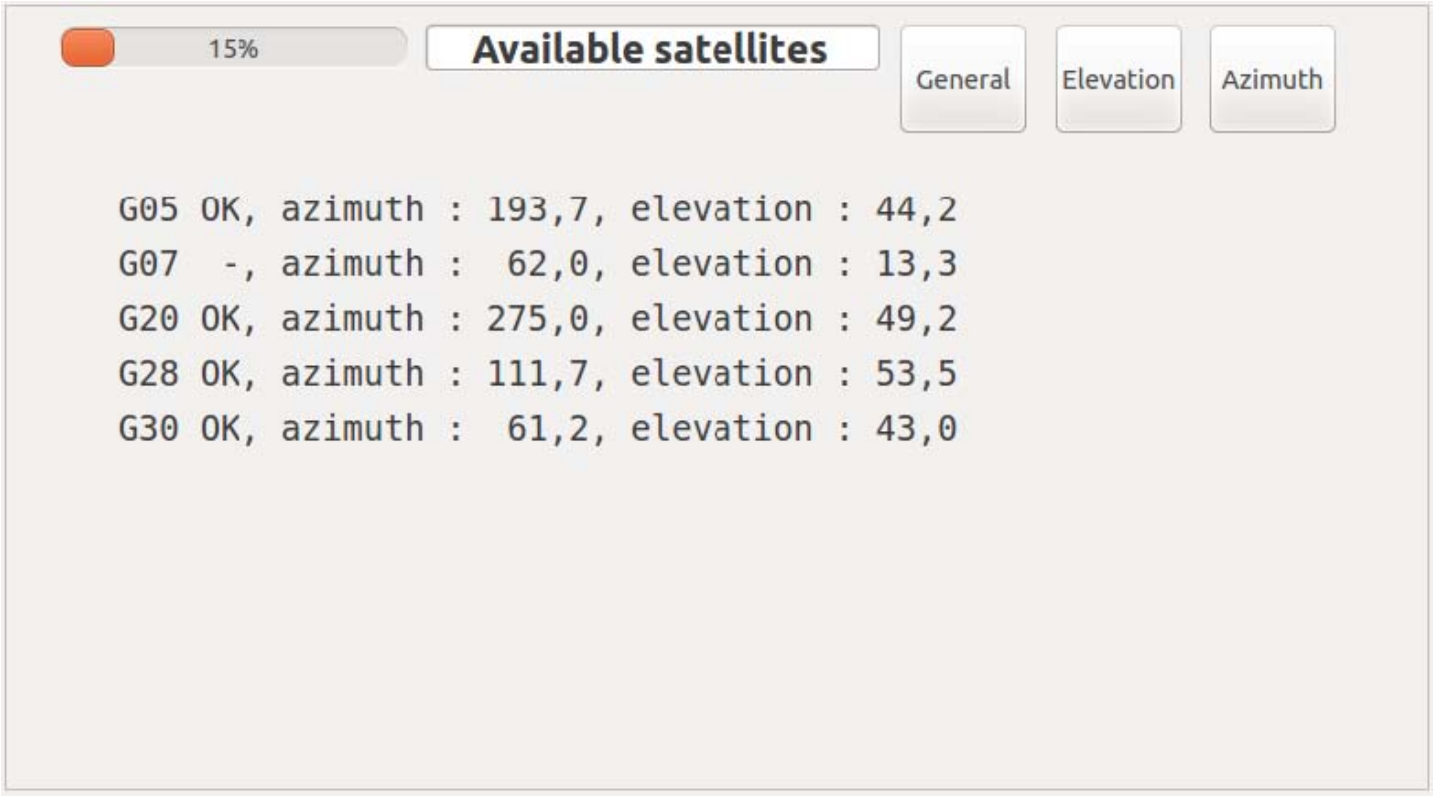


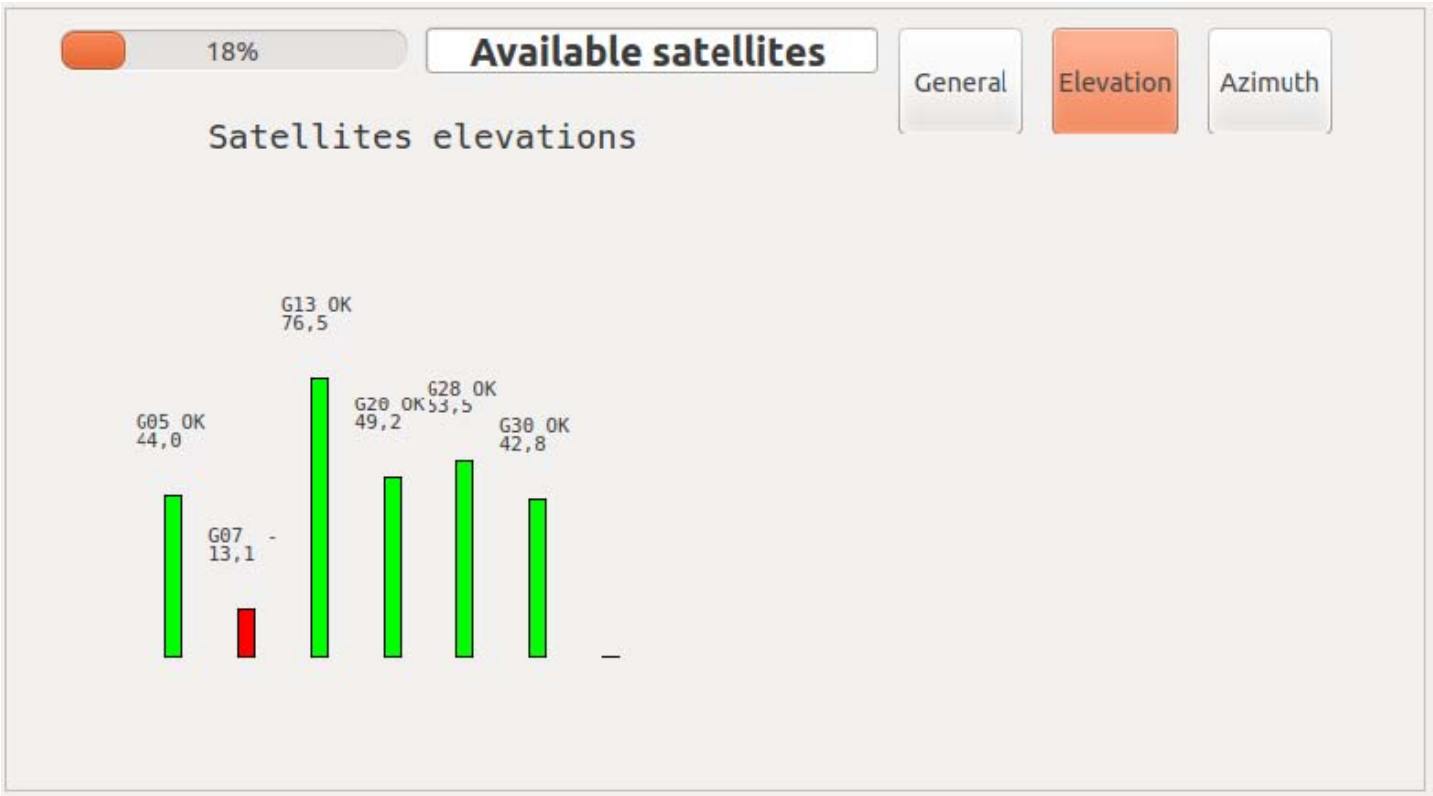
To save the parked position, click "SAVE". The coordinates of the point (the point here) is saved in a file whose name format will be the type YYYYMMDD_HHMMSS.txt (eg 20141215_150322.txt). Files are stored in a folder "PointFiles" in the folder that runs the program. Date information and time correspond to the elements Rover. Hence the importance of putting in the time the Raspberry,failing to check the current time. The following items for the same session will also saved in the same file as a different number. If the rover mode is closed and opened again, a new file will be created.



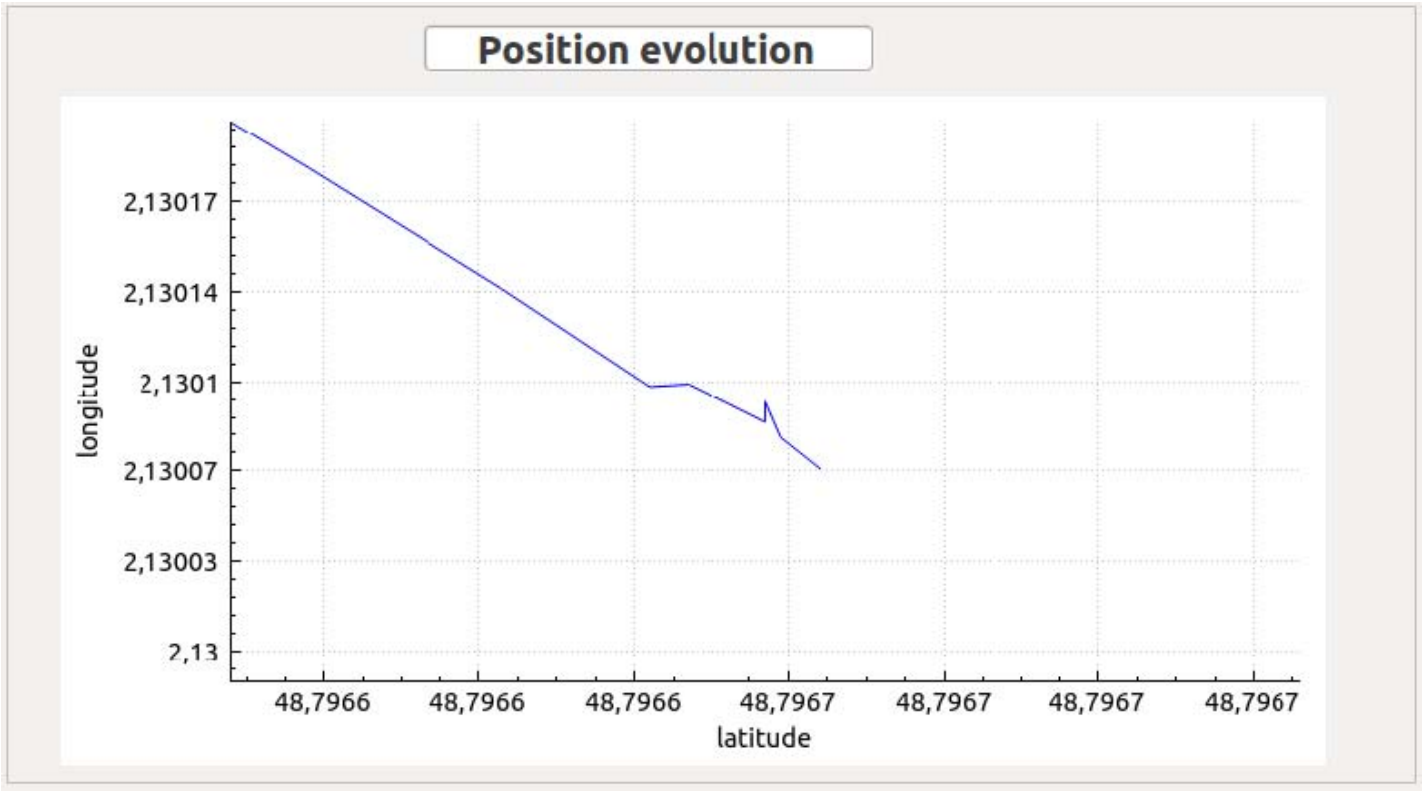
o Window "Sat":

this view allows you to check the number and status of satellites observed.You can click on the "General" buttons, "elevation", "azimuth" in order to see the other view.





o Evolution Position 'window to see how the position changes over time.To date only the first 100 positions are stored by the Rover. We must improve thisoption by adapting the scale and duration of the monitoring points. This system is based on QCustomPlot, whose source file is integrated into the project.



o To close the mode, simply press the screen and in the options Press the button "CLOSE".
You will return to the home page.

2.) In Base mode:

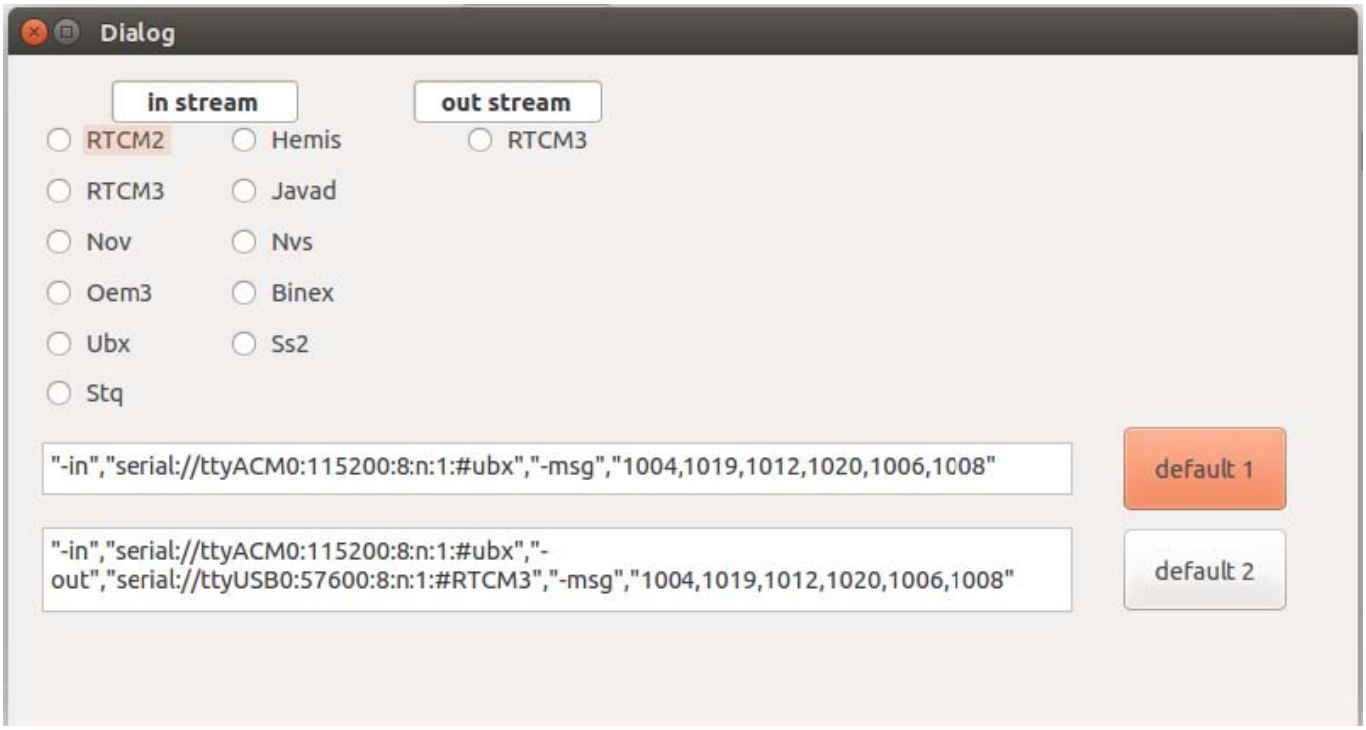
o Open the "ROVER" mode. Let the unit until the position returned acceptable to you based on your need.

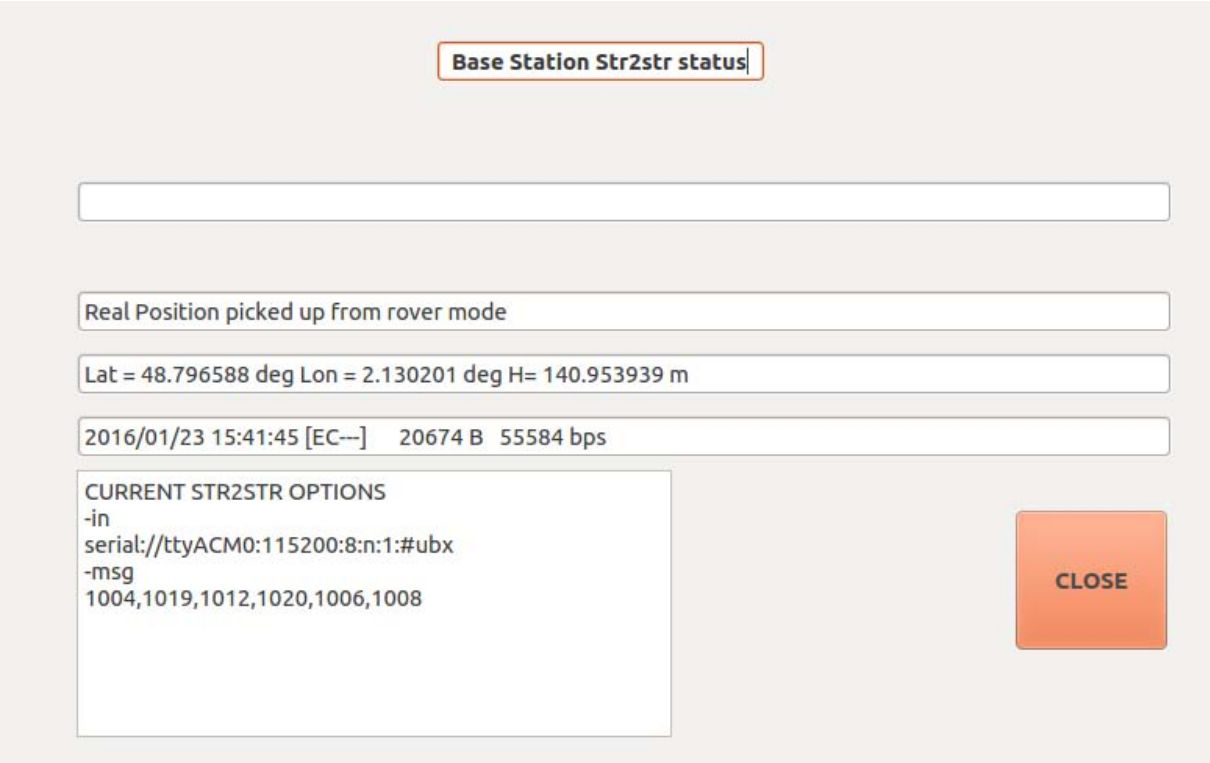
o Close the "ROVER" mode (the last position will be recorded) and then return to the main screen.

o Now select the "BASE" mode. Your radio-communication module must plugged and setup before.
The following screen will then appear:

o Check the display of streams.
If an error exists it will be reported to you.

o Start the Base mode: the last position previously recorded will be recovered,
the serverwill launch: check the stream display now.





3.) Configuration files:

Some *.UBX configuration files are included in the /ConfFiles folder. They are used to launch the "Rover" mode. They can be edited manual in texedit to suit you configurations.

For more detail about setting the conf files you can look the RTKLIB 2.42 manual

Note that :

- To perform the "NTRIP caster" must use "static";

- For the calculation on phase L1 must be used "kinematic";

- For differential on the code to "dgps".