

ICOM IC-PCR100 Remote by F4BPP

**Remote software for the ICOM IC-PCR100 receiver
under Linux environment**



User manual

Version 1.0

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1. Presentation of the software.

Icom IC-PCR100 Remote is a program designed for the Linux environment.

It has been developed to optimise the reception of SSTV images sent from the ISS by astronauts. It therefore has two buttons to launch Gpredict and QSSTV respectively from the program.

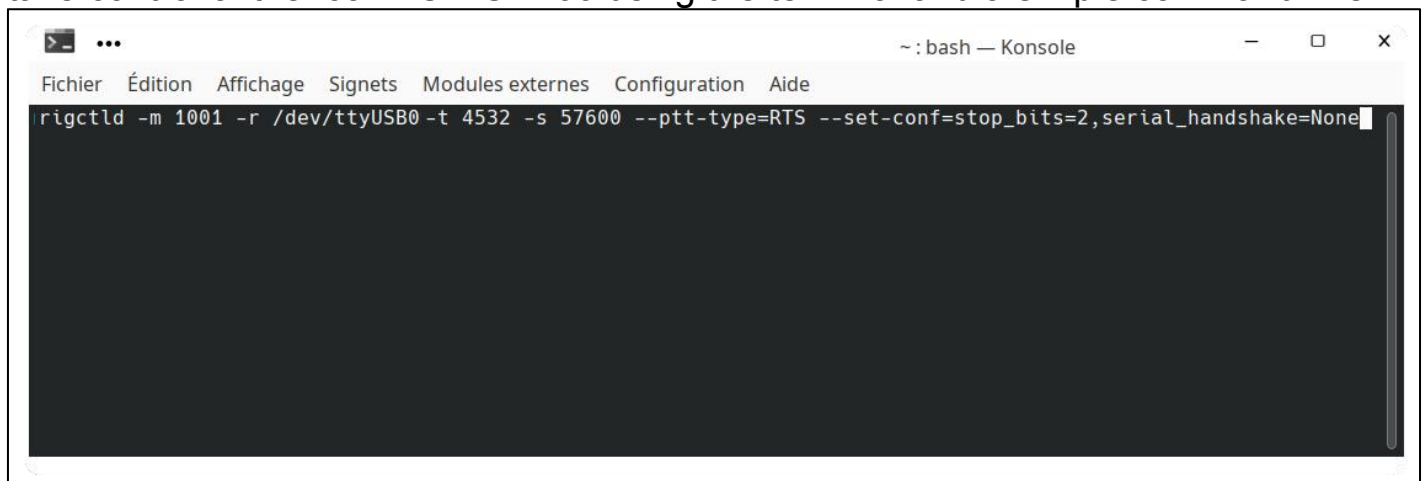
- Gpredict is a software package for tracking and predicting satellite orbits in real time.
- QSSTV is software for decoding SSTV (Slow Scan Television) images.

Thanks to the interconnection between the Icom IC-PCR100 and Gpredict, the receiver's reception frequency is adjusted in real time to correct the Doppler effect inherent in satellite communications: higher frequency when the satellite is approaching and lower frequency when it is moving away.

2. Prerequisites for running the software.

To run, this programme requires the following packages to be installed: **libhamlib-utils**.

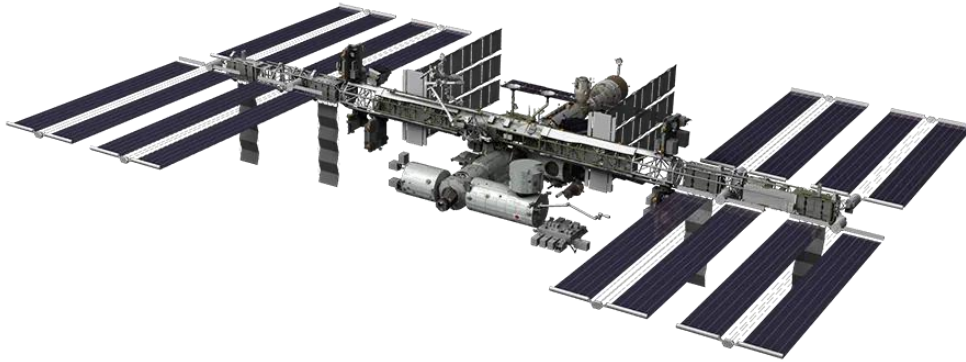
With the **libhamlib-utils** package, which includes the **rigctld** software, Gpredict can take control of the Icom IC-PCR100 using the terminal and a simple command line:

A screenshot of a terminal window titled '~ : bash — Konsole'. The window has a menu bar with 'Fichier', 'Édition', 'Affichage', 'Signets', 'Modules externes', 'Configuration', and 'Aide'. The terminal displays the command: `rigctld -m 1001 -r /dev/ttyUSB0 -t 4532 -s 57600 --ptt-type=RTS --set-conf=stop_bits=2,serial_handshake=None` followed by a cursor. The terminal background is dark, and the text is light gray.

However, the user has no control over settings such as volume, squelch and reception mode (FM, WFM and AM). Moreover, there is no indication to the user that the receiver frequency is correctly adjusted by Gpredict.

The Icom IC-PCR100 remote software allows the user to take control of the receiver via a graphical interface without using the terminal. It also allows the user to control the volume, squelch and receive mode while Gpredict takes control of the VFO to adjust the frequency.

The **Gpredict** software is therefore also necessary if you want to use the receiver to receive satellites or the International Space Station.



If you wish to receive SSTV images sent from space via the ISS, you will also need to install the **QSSTV** software.

You can install all this software simply by entering the following command line in a terminal:

```
sudo apt install libhamlib-utils gpredict qsstv
```

3. Software installation.

To install the Icom IC-PCR100 remote software, simply double-click on the package and let the package installer of your Linux distribution guide you.

You can also open a terminal at the location where you downloaded the software and enter the following command for the desktop version:

```
sudo dpkg -i PCR100_Remote_jammy_amd64.deb
```

For the Raspberry PI version, enter the following command:

```
sudo dpkg -i PCR100_Remote_jammy_arm64.deb
```

4. Connecting the receiver to the computer.

The Icom IC-PCR100 is a receiver that was launched in 1998. At the time, it was supplied with a DB9 connection cable, also known as an RS-232 COM port. This type of port is no longer found on computers.

Instead, you need a USB/RS232 converter cable, which is often fitted with an FTDI-232RL chip. This adapter enables the computer to communicate with the receiver via a USB port.



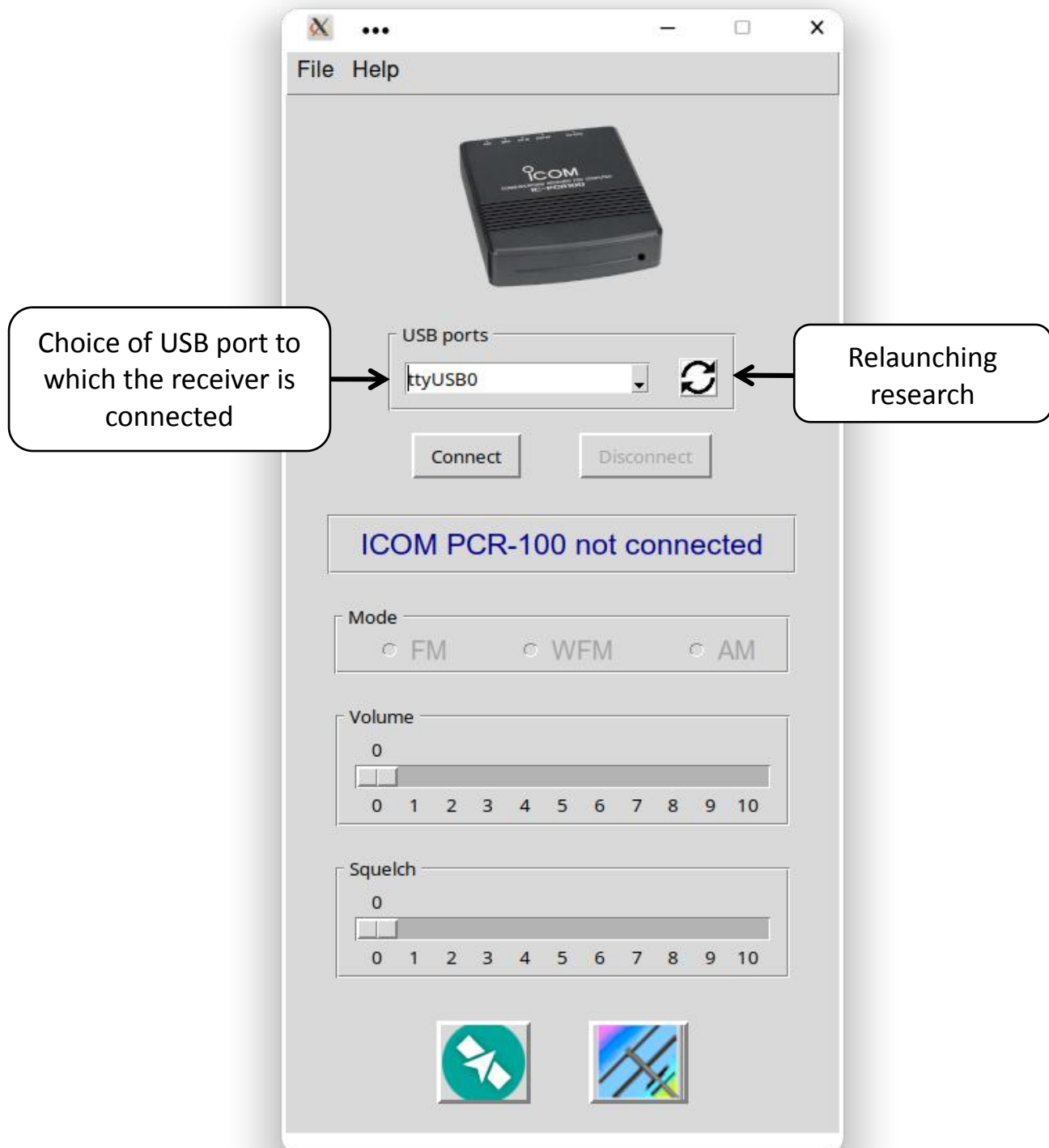
The ICOM IC-PCR100 Remote software can control the receiver via your computer's USB ports, but will be unable to detect it if you are using an RS-232 port.



5. Getting started with the software.

To begin, select the USB port to which the receiver is connected via the program's drop-down list.

The software will scan the USB ports on start-up. If you connect the receiver after launching the software, you will need to run a new search for the receiver using the icon provided.

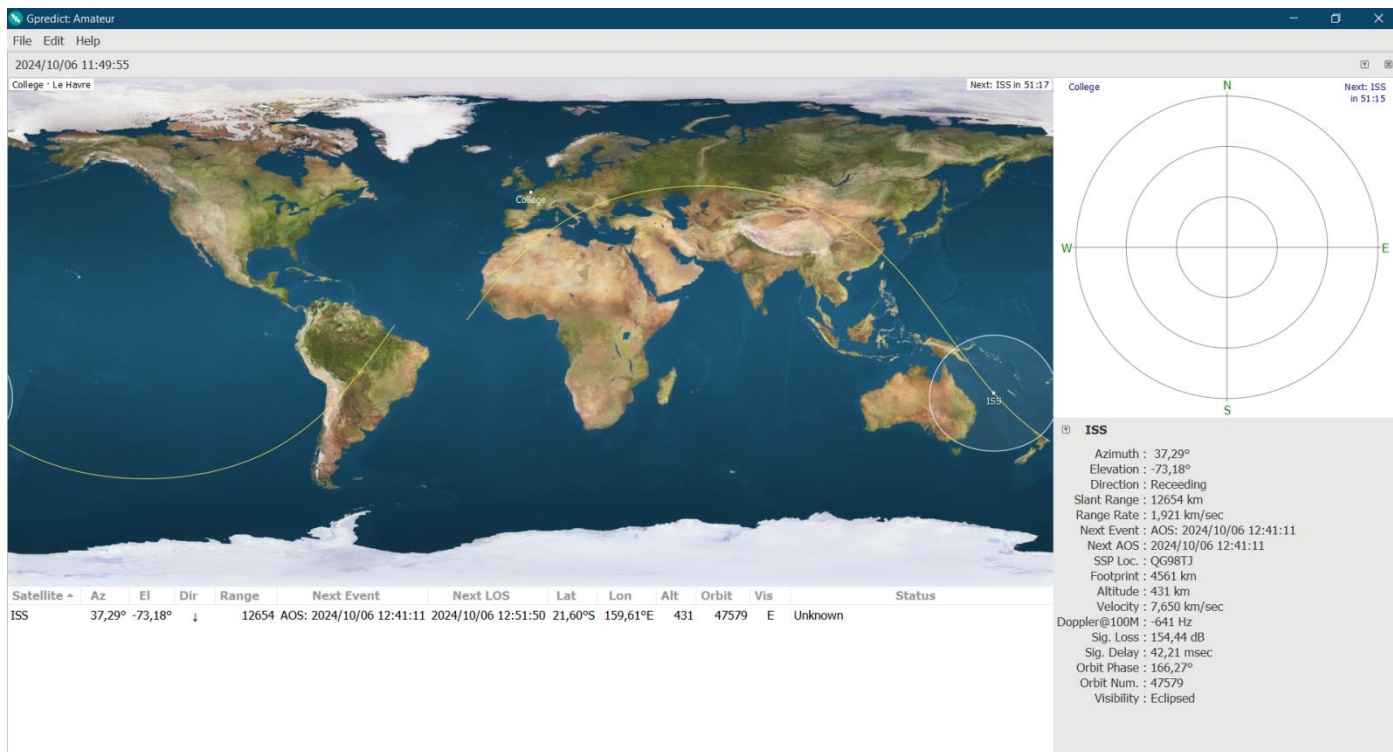


Click on the 'Connect' button to activate the receiver. If the cable is properly connected and the receiver is correctly powered, the frequency will be displayed. If not, an alert message will prompt you to carry out the necessary checks.

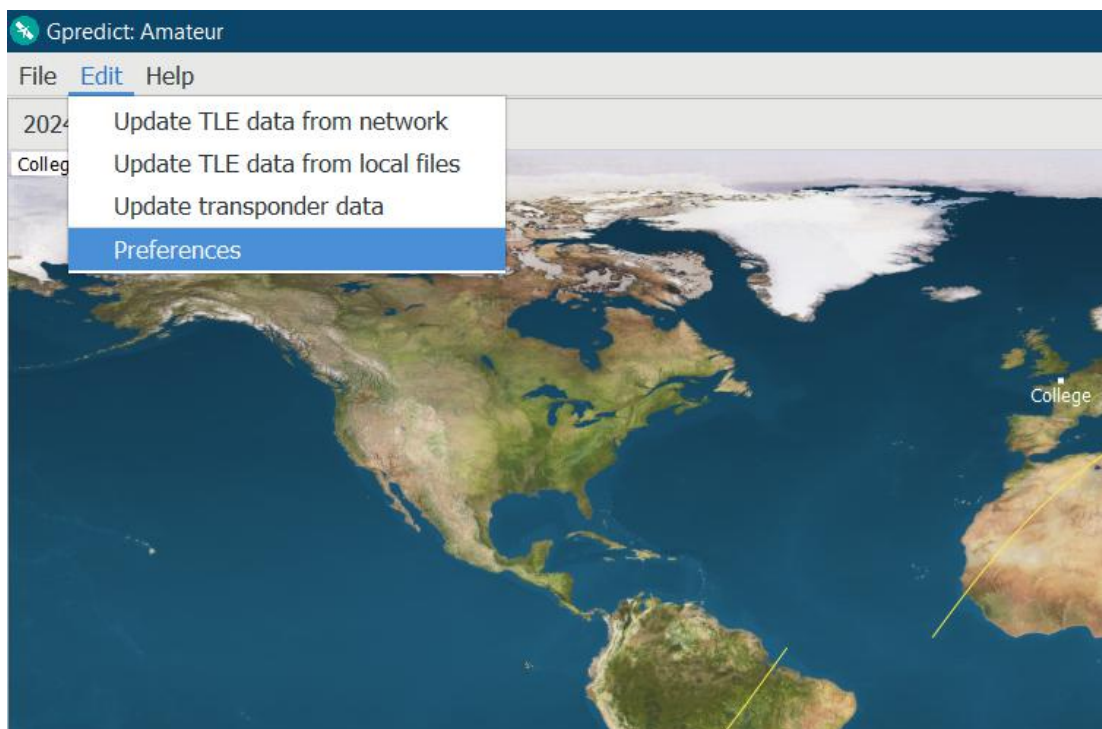


6. Connecting to Gpredict.

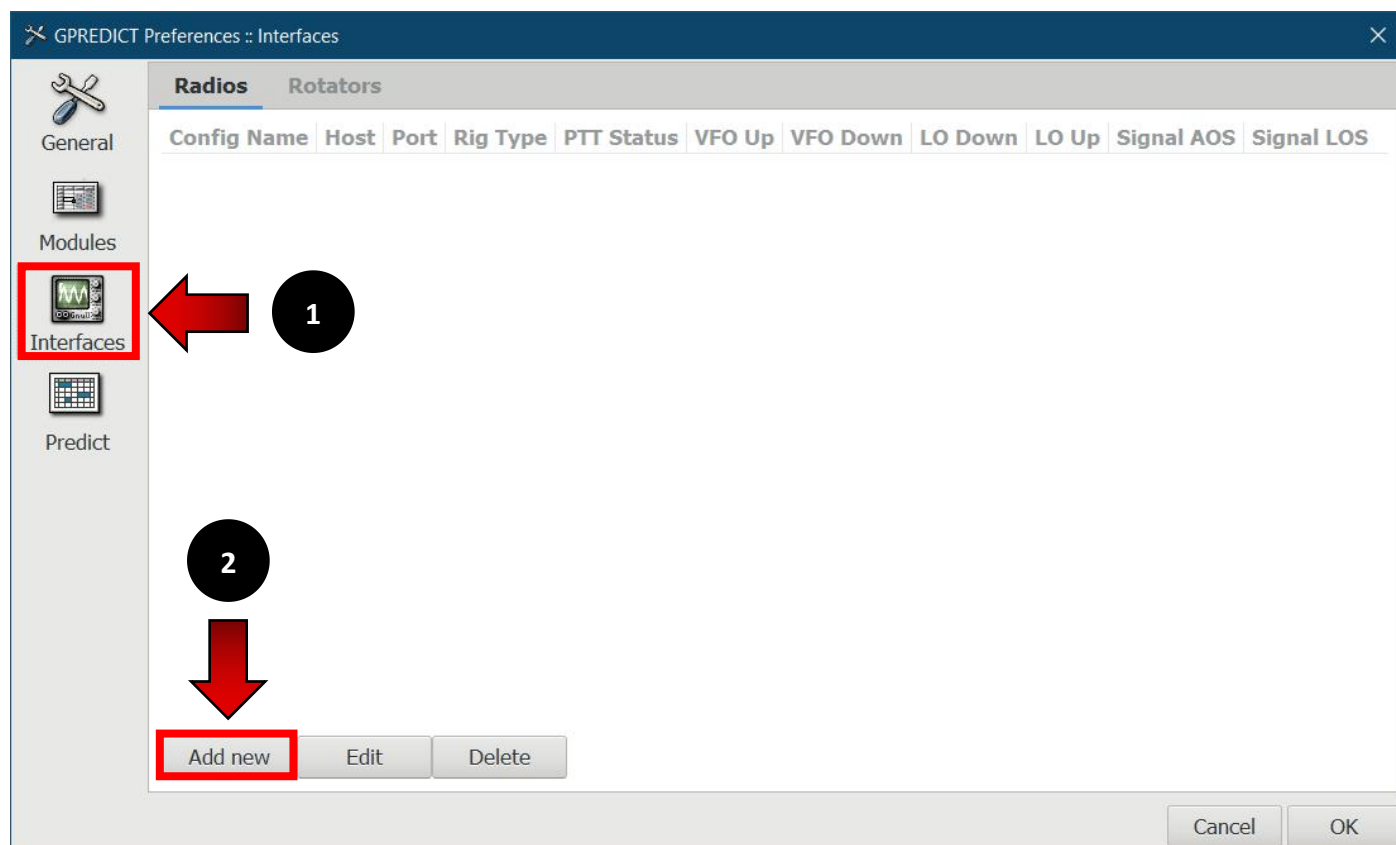
Launch the Gpredict software using the button provided in the software :



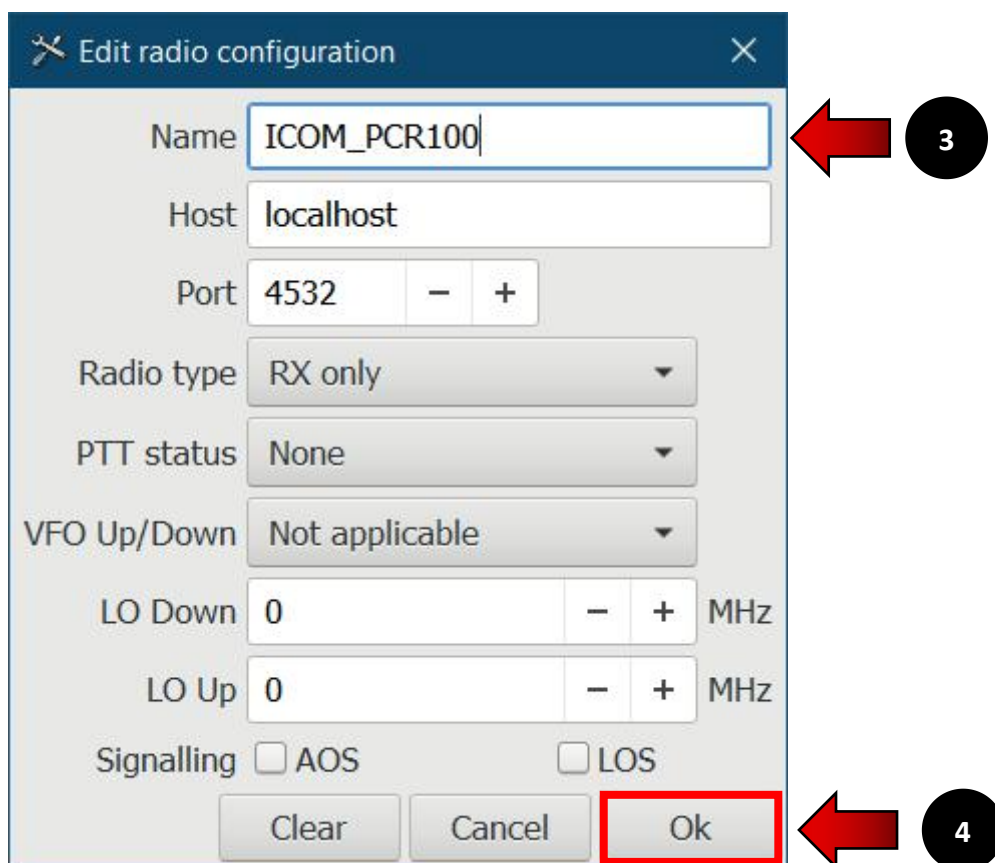
Then open the «Edit» menu then click on «Preferences» :



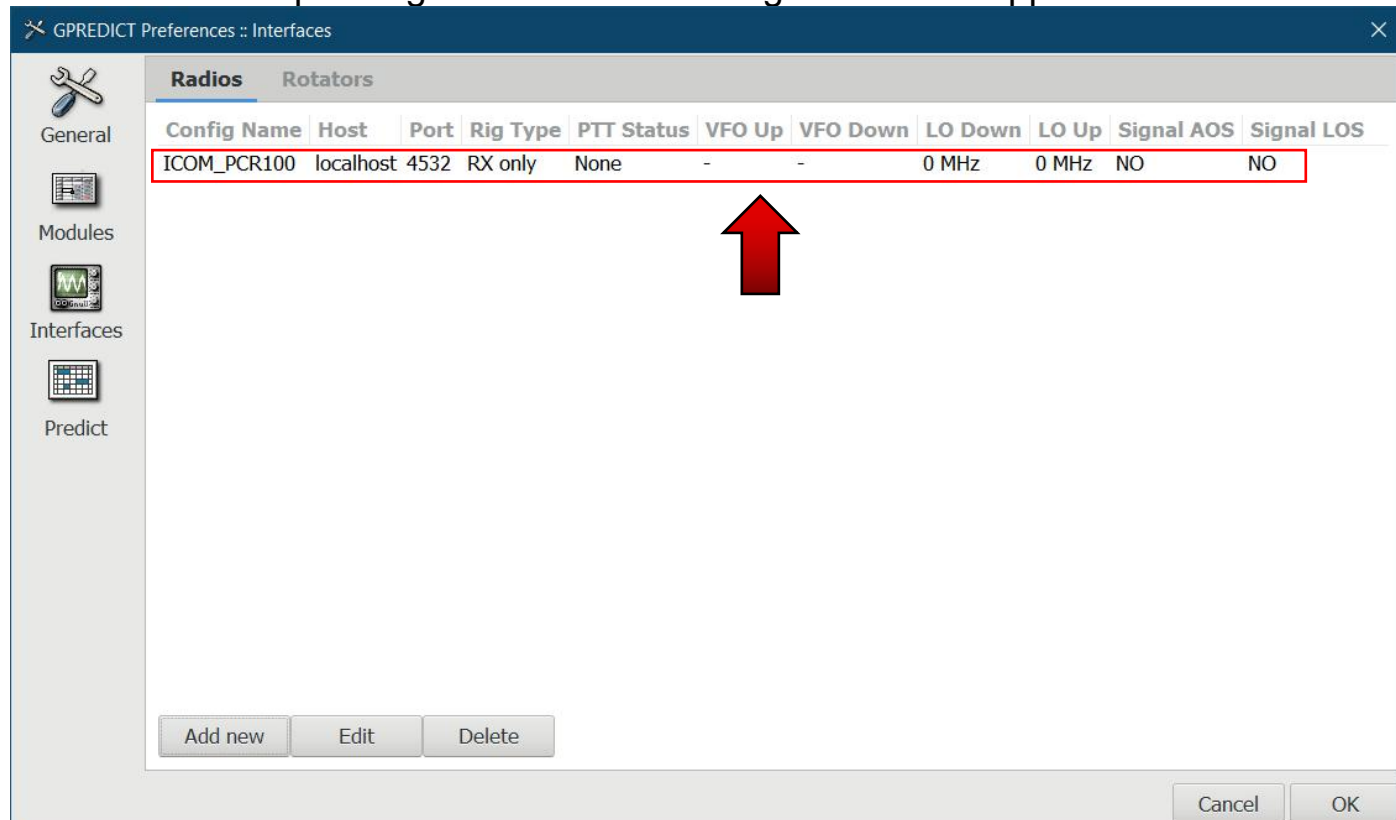
Then click on the «Interfaces» icon then the «Add New» button :



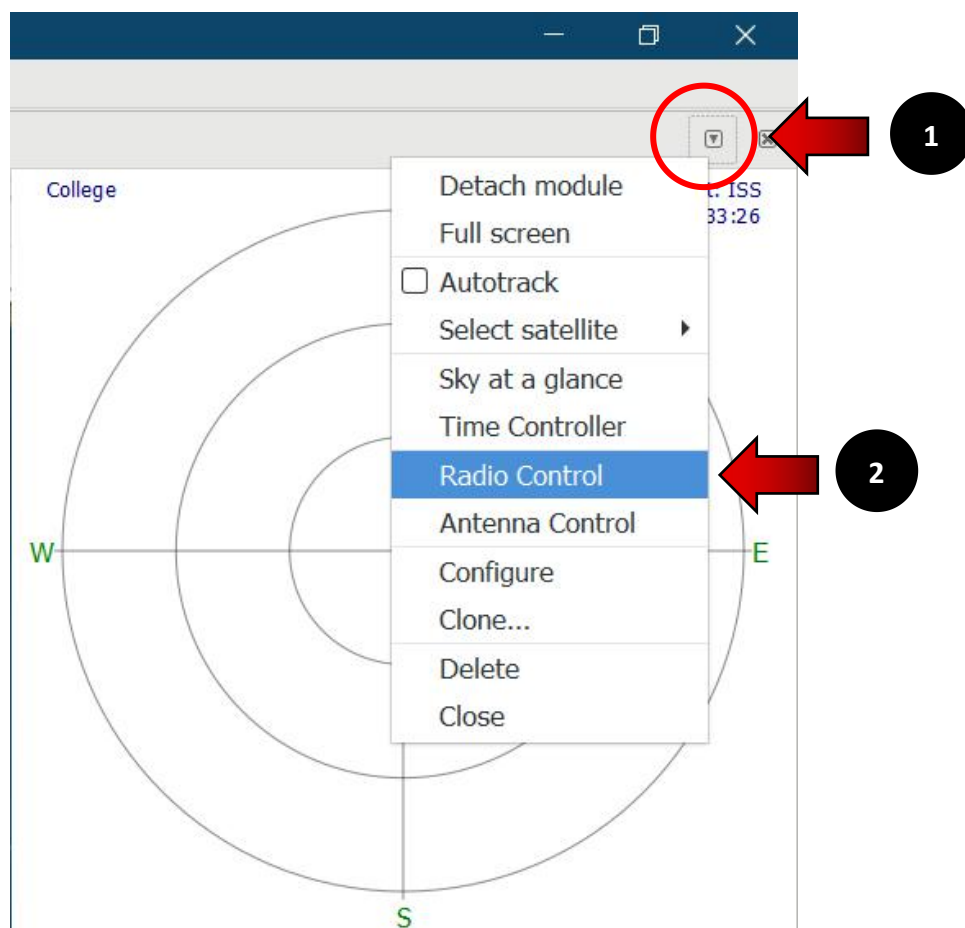
Enter the name «ICOM_PCR100» then confirm with the «OK» button :



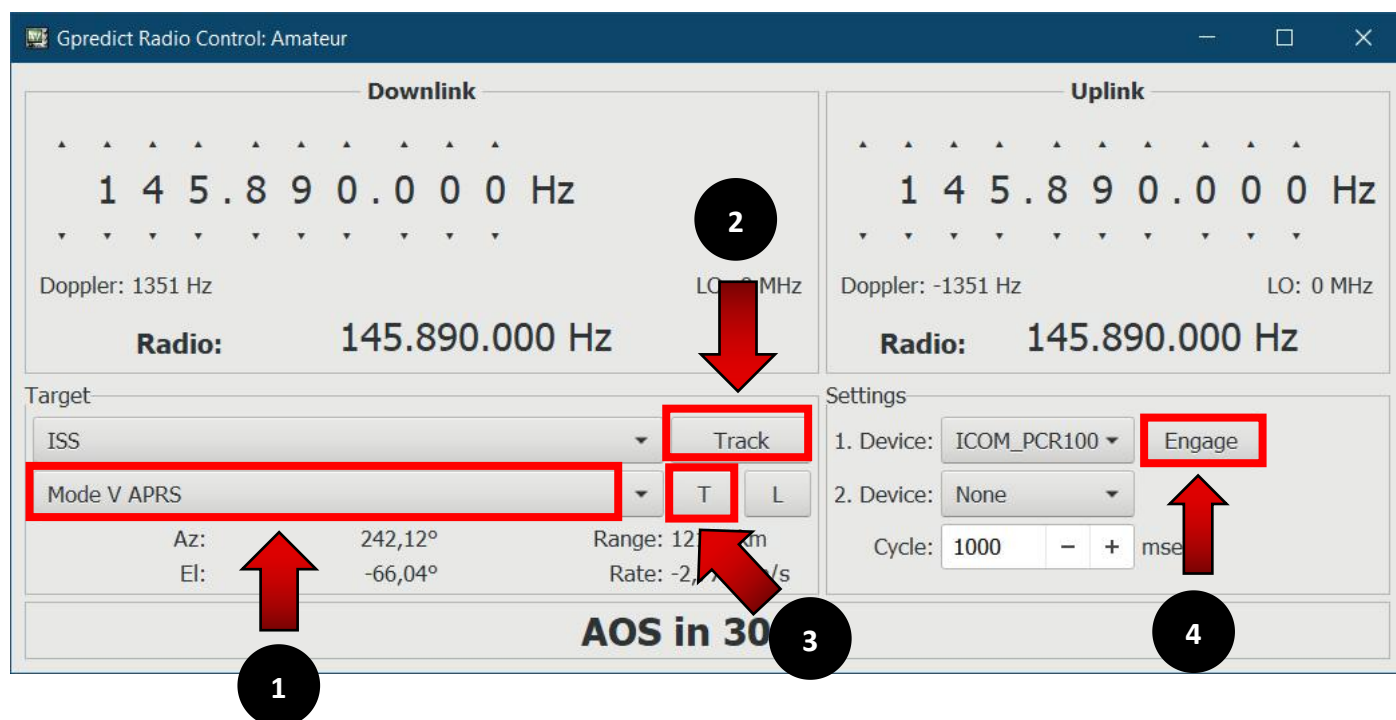
A new line corresponding to the receiver configuration now appears in the form :



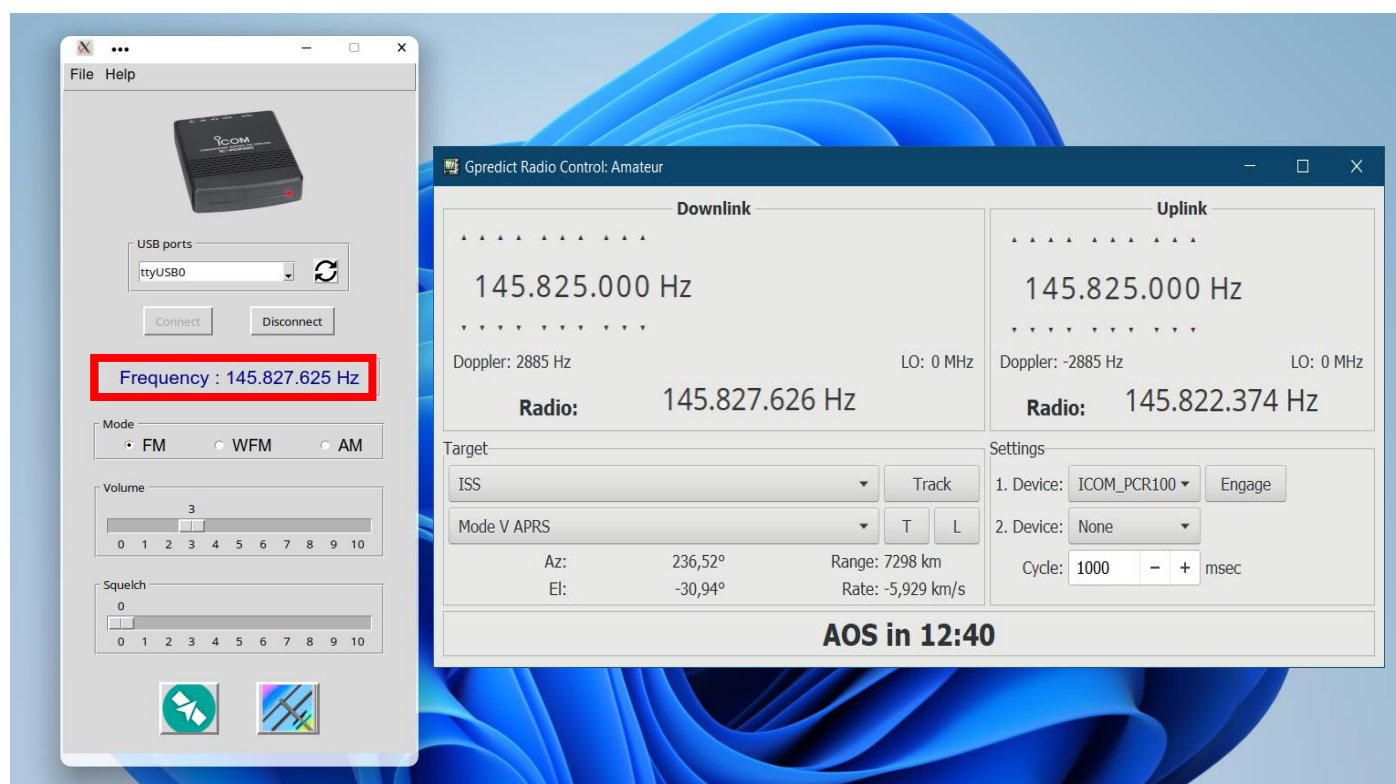
Close the window and click on the icon with the three dots or the triangle in the top right-hand corner of the window, then select «Radio Control» from the menu :



Select the frequency from the drop-down list provided, then click on the «Track» button. Then click on the «T» button then the «Engage» button :



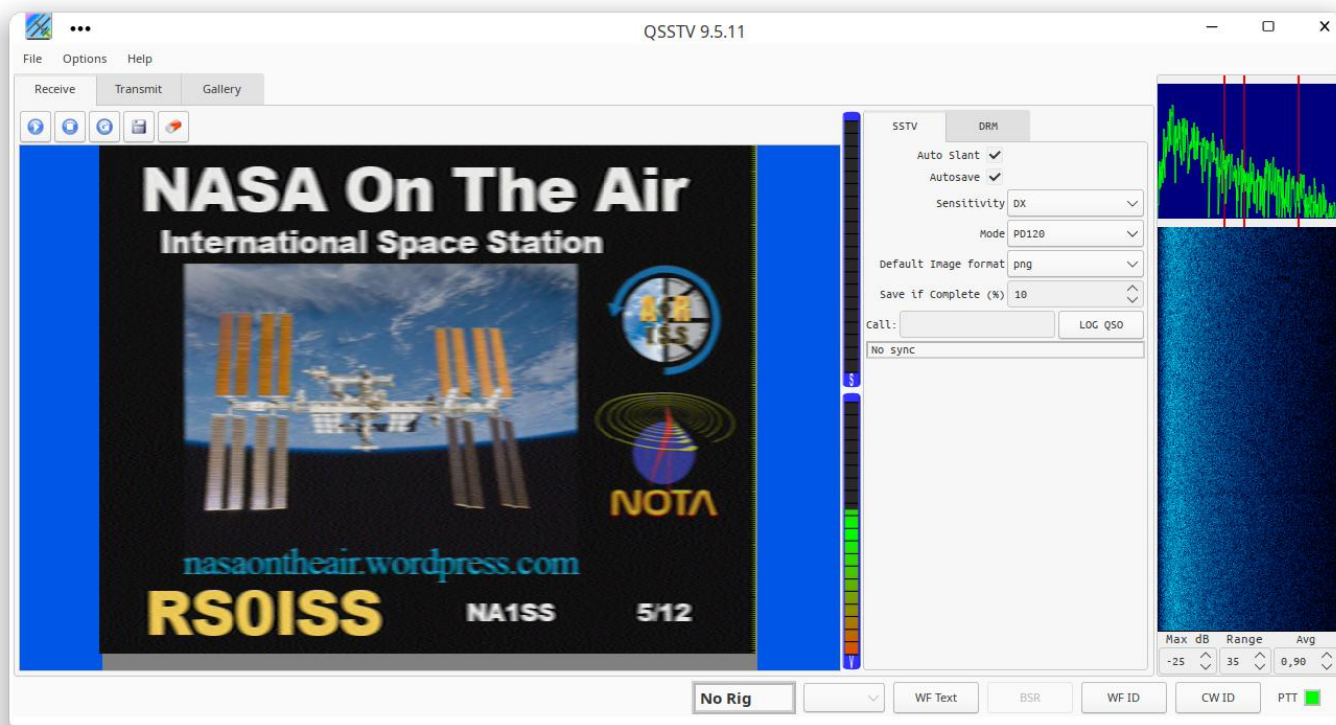
Gpredict now controls the frequency of the Icom IC-PCR100 :



Click on the QSSTV icon to launch the SSTV image decoding software :



You can now receive images sent from the ISS with the reception frequency adjusted in real time to correct for the Doppler effect :



7. Quit the software.

The 'Disconnect' button allows you to cleanly interrupt the link between Gpredict and the receiver. However, if you click on the icon to close the window or use the «Quit» option in the «File» menu without first clicking on the «Disconnect» button, the software will terminate the connection before quitting.

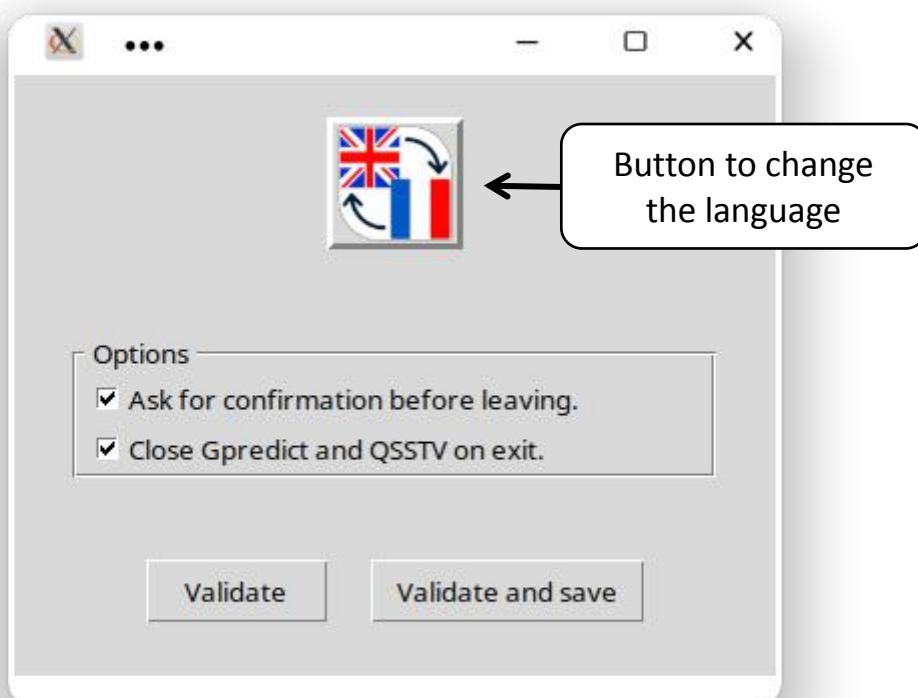


8. Software options.

To access the program options, click on the «File» menu and select «Options...» :



In the dialogue box that appears, you can change the interface language by clicking on the icon with the two flags :

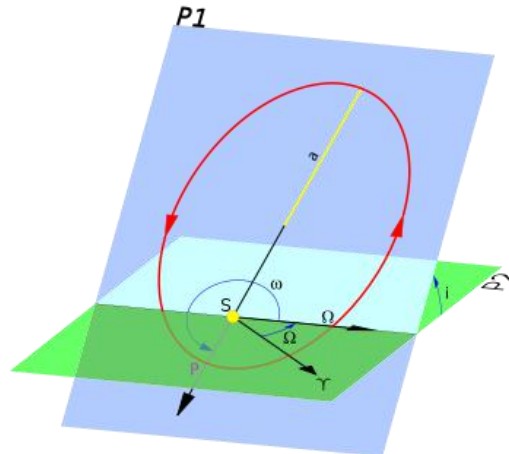


You can also activate the display of a dialog box when you exit the program to ask for confirmation before quitting. You can also choose to close Gpredict and QSSTV when you exit the program. Use the mouse to tick the desired options to activate them.

You can validate your choices only for the current session by clicking on the «Validate» button, or for all the sessions in the programme by clicking on the «Validate and save» button.

9. Tips for improving tracking accuracy.

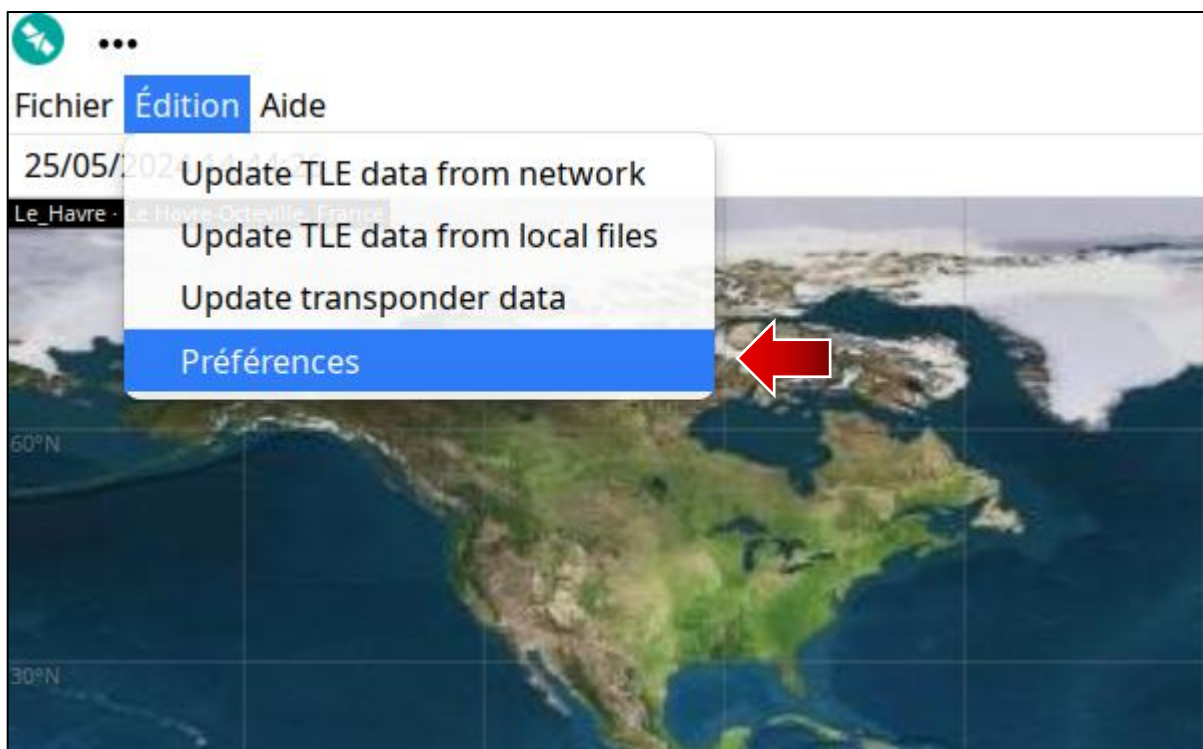
Gpredict uses orbital data supplied by NASA to calculate satellite trajectories and correct for the Doppler effect.



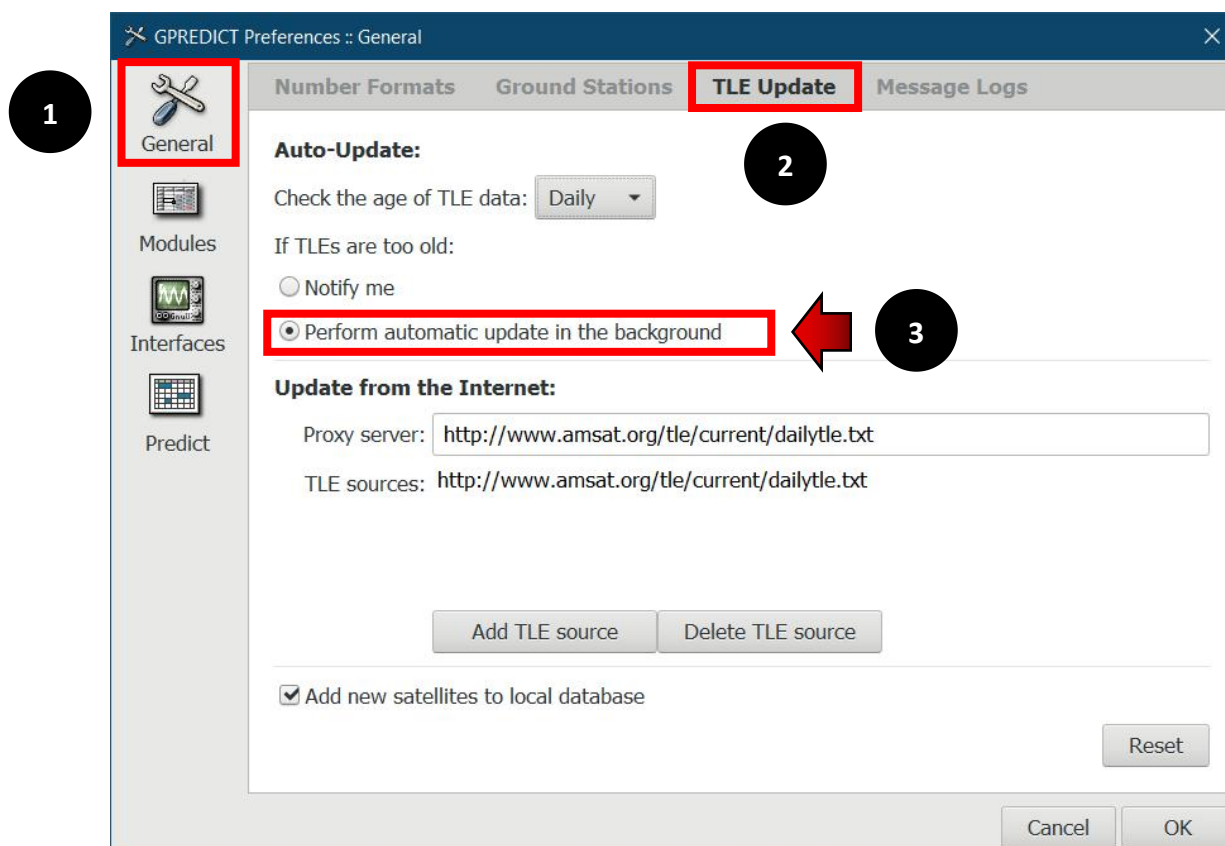
The accuracy of satellite orbit calculation and the Doppler effect can only be correct if your orbital data is up to date. There are several sources for updating this data, some of which are updated more frequently than others.

The first thing to do to ensure accurate calculations is to set the software to use the most recent orbital data, and the second is to update this database as well as the list of frequencies used by the satellites and the International Space Station.

In the Gpredict software, pull down the «Edit» menu then click on «Preferences»:

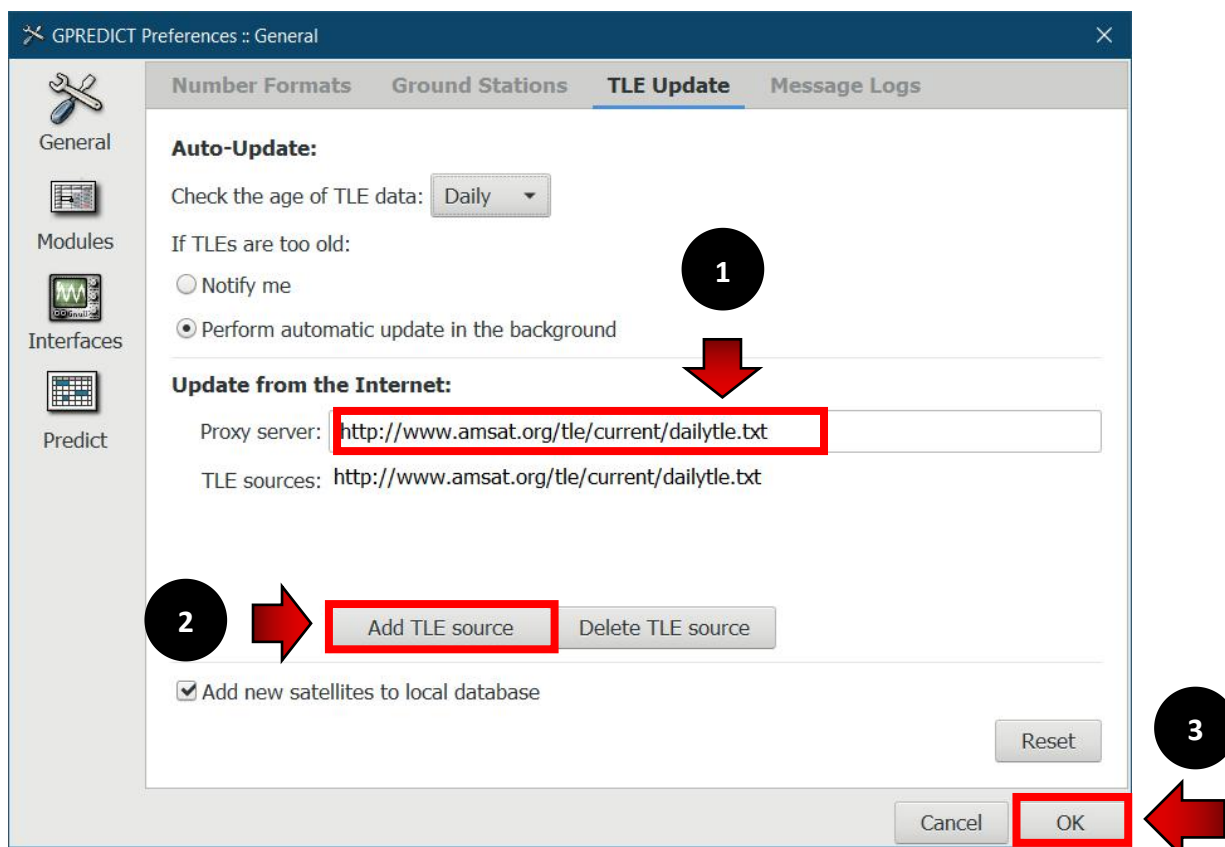


In the «General» section, click on the «TLE Update» tab and tick the option that activates the automatic update of orbital data :

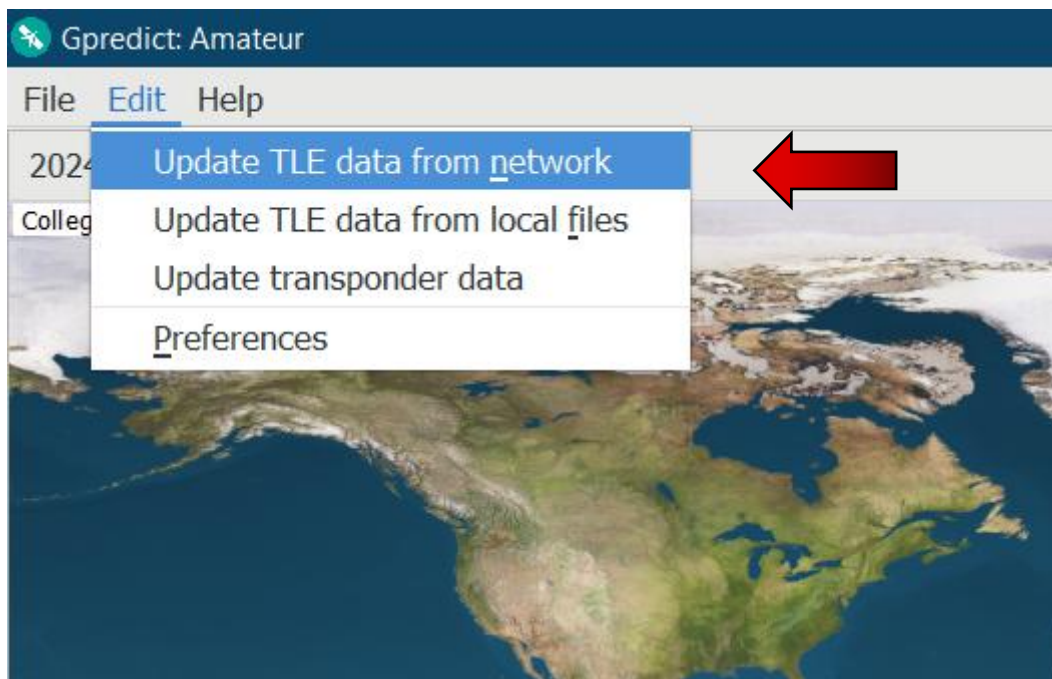


Enter the following line in the «TLE sources» field and press «OK» to confirm :

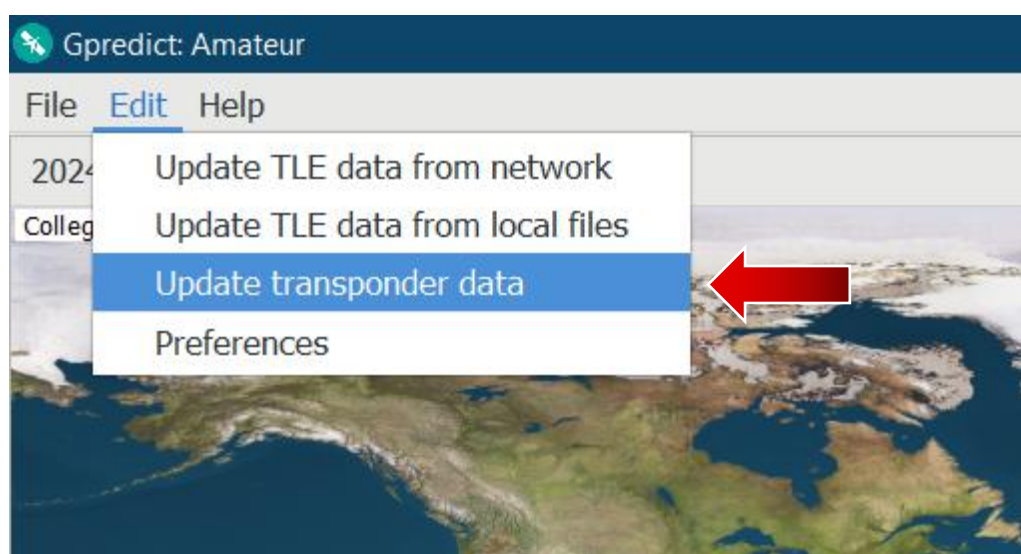
<http://www.amsat.org/tle/current/dailyle.txt>



Then go to the «Edit» menu and click on «Update TLE data from network» to update the TLE file containing the orbital data :



Finally, pull down the «Edit» menu one last time and click on the «Update transponder data» option to update the list of frequencies used by the satellites and the International Space Station :



10. ICOM IC-PCR100 Remote and Raspberry PI.



There are two versions of the software: a desktop version (architecture X86/X64) and a Raspberry PI version (architecture ARM64). The ICOM IC-PCR100 / Raspberry PI duo makes it possible to set up a reception station that is both silent and energy-efficient for decoding images sent from the ISS during SSTV sessions at night.