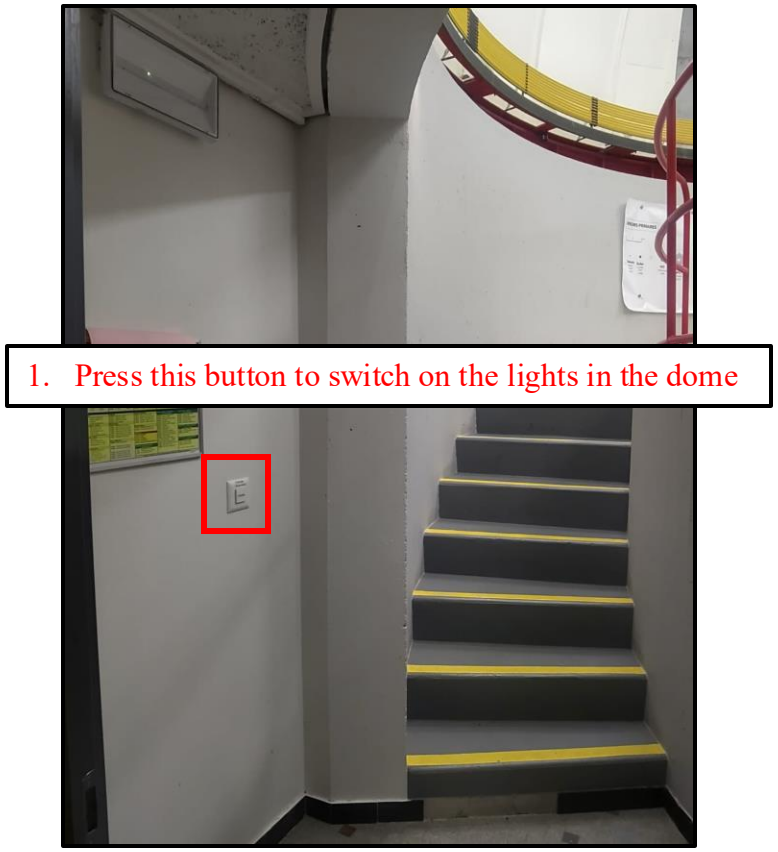
TELESTO

USER MANUAL – N.I.N.A.

STARTUP

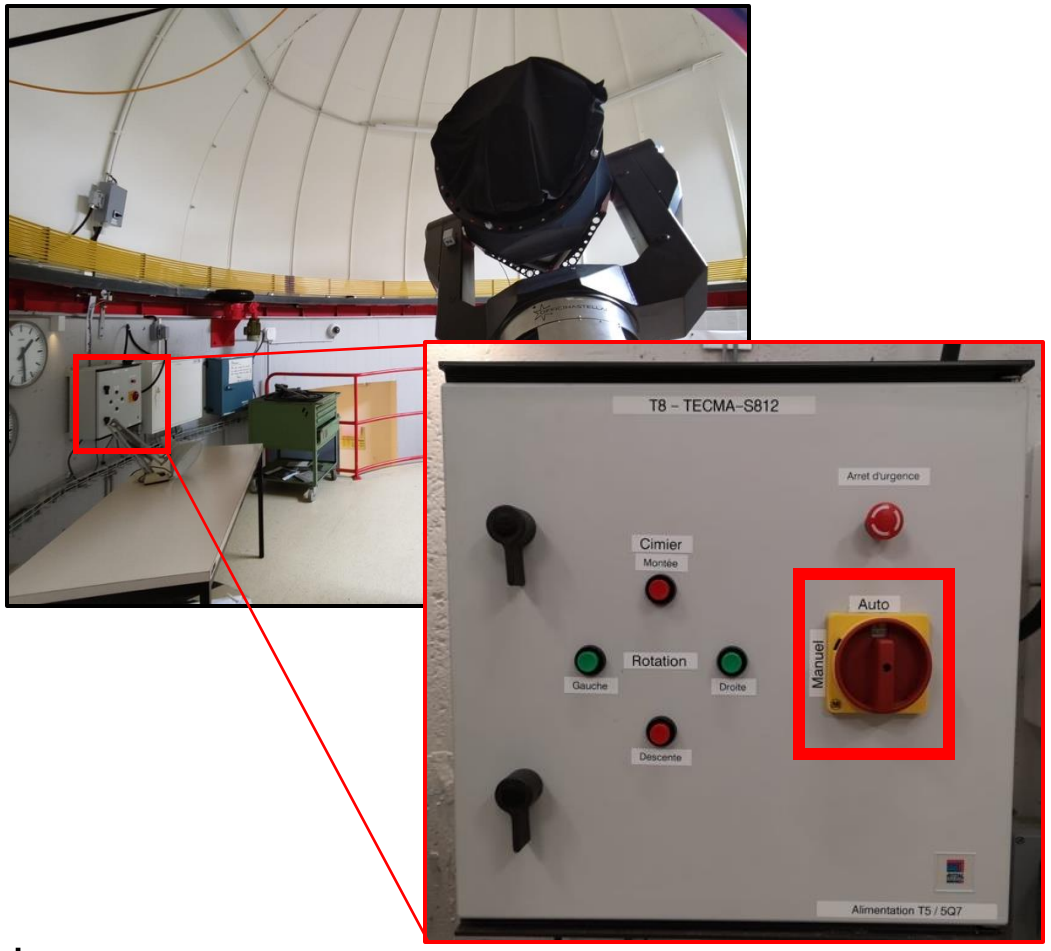
IN THE DOME

0. If it’s too dark, switch on the lights in the dome (at the left of the dome entrance)



1. Press this button to switch on the lights in the dome

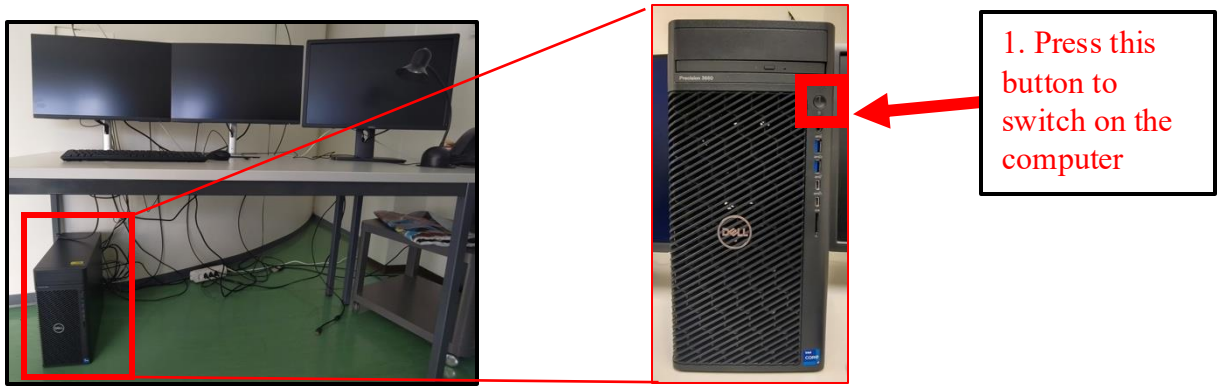
2. Make sure that the dome is on ‘Auto’ and not “Manual”. This allows to move the dome directly from the software in the control room.



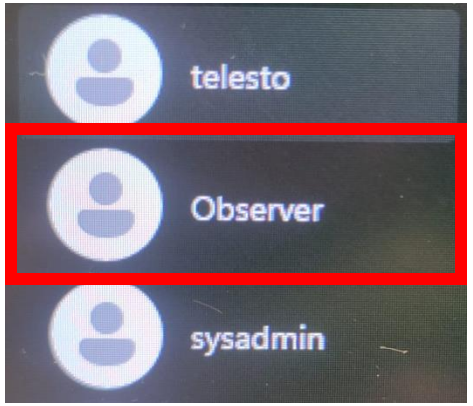
3. Switch off the dome lights and close the door of the dome

IN THE CONTROL ROOM

4. As the computer should be always ON, if you move the mouse, the monitor should automatically switch on and you can go to step 5. If the computer is off, you can switch it on like this:



5. Select the **Observer** account and log in, the password is **observer1290**



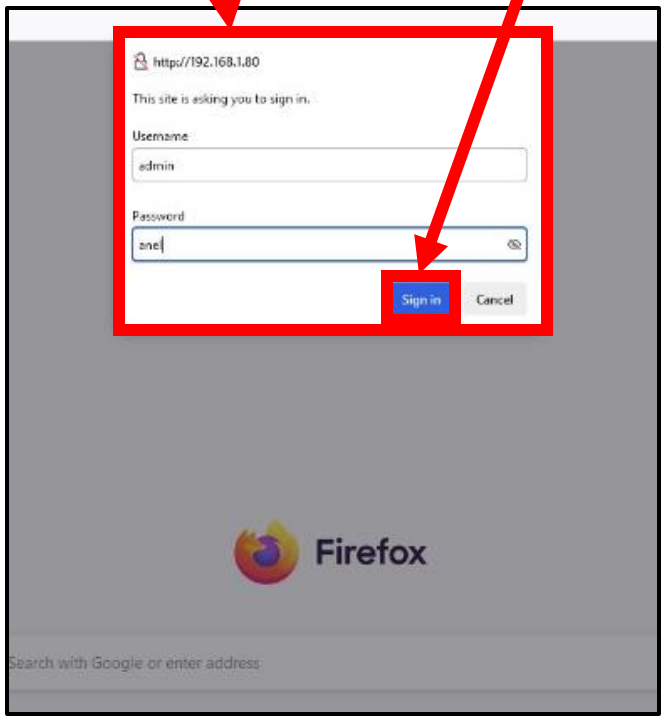
With this account you can not install any software on the computer, so do not try It ☺

6. Switch on the telescope power

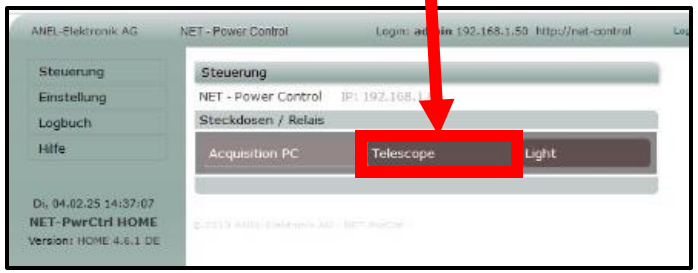
1. Open the Power control (on the top right of the Desktop)

2. A Firefox page will open. The username (edmin) and password (anel) should alreadybe inserted

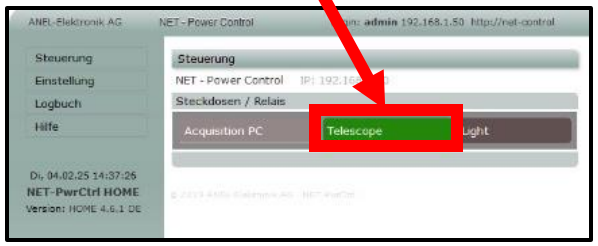
3. Click on ‘Sign in’



4. Click on ‘Telescope’



5. All good !



7. Launch the OSBus Controller software and connect it

If 'COM4' is not in the list, close and reopen the program a few times or reboot the computer

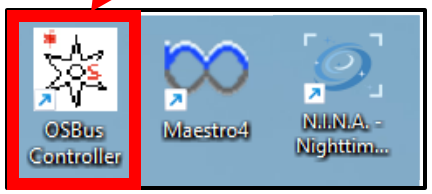
1. Open OSBus Controller program (on the top right of the Desktop)

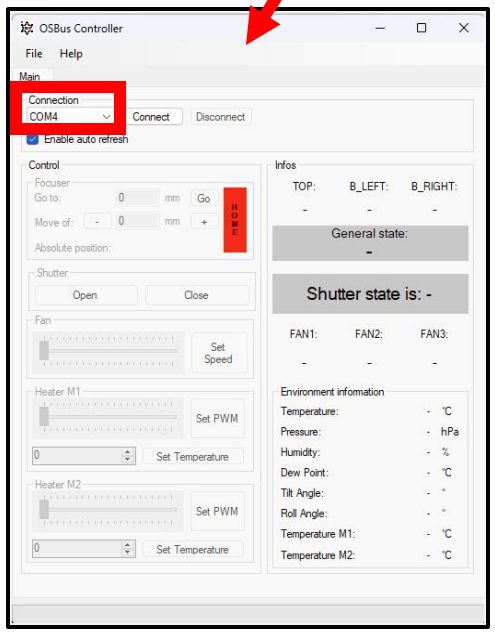
2. Check that the connection is 'COM4'

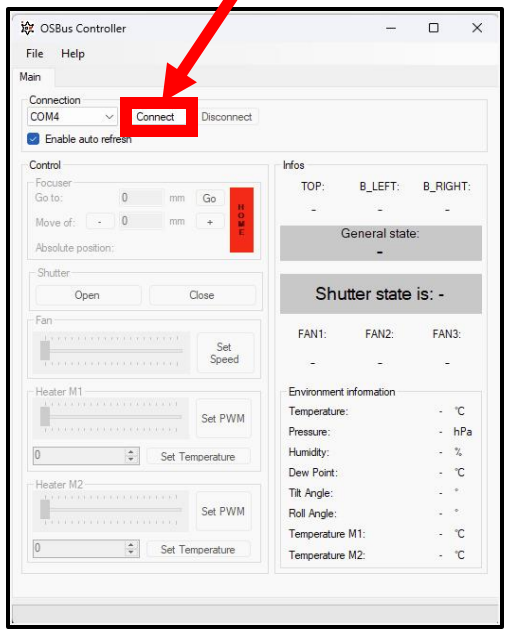
3. Click 'Connect'

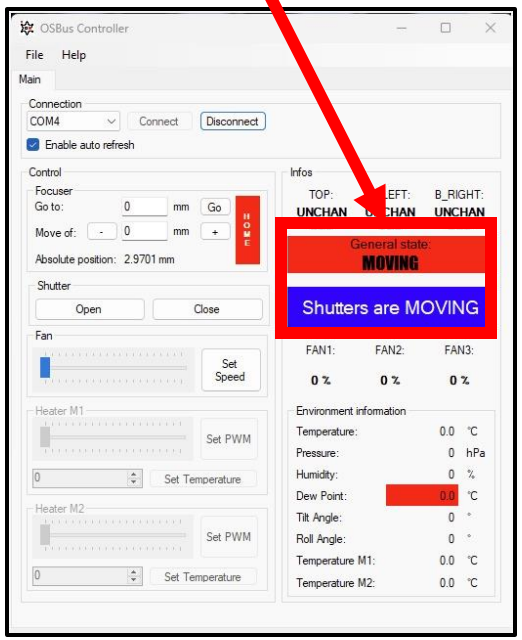
4. Wait

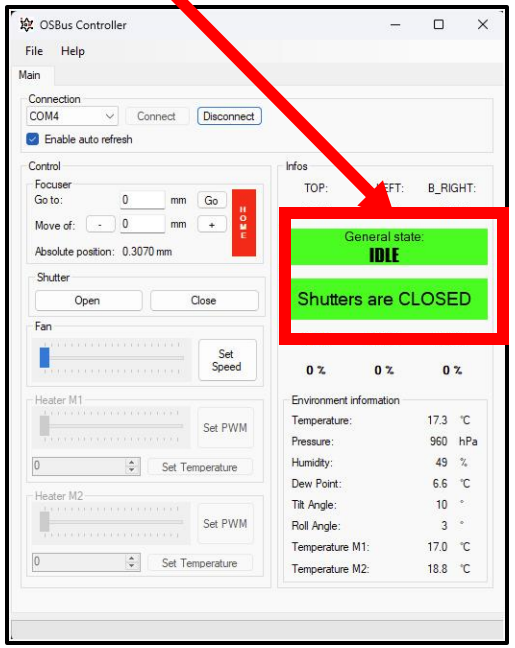
5. All good



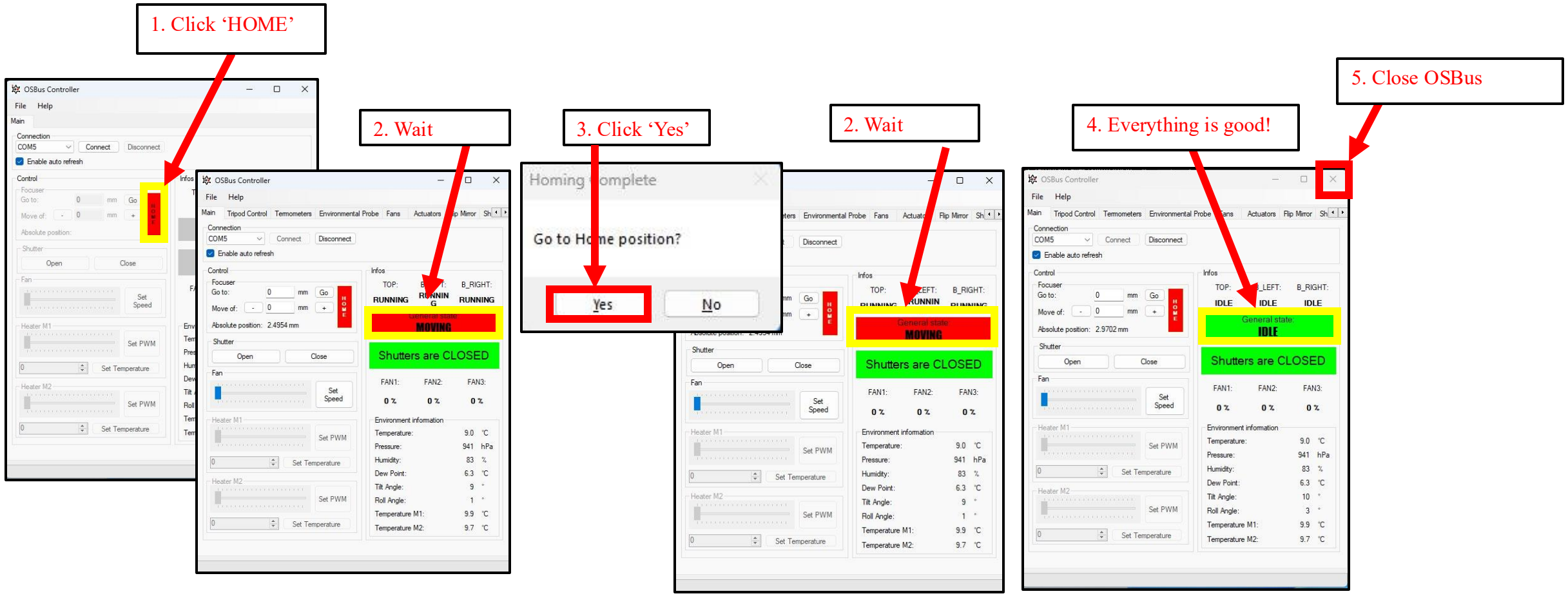




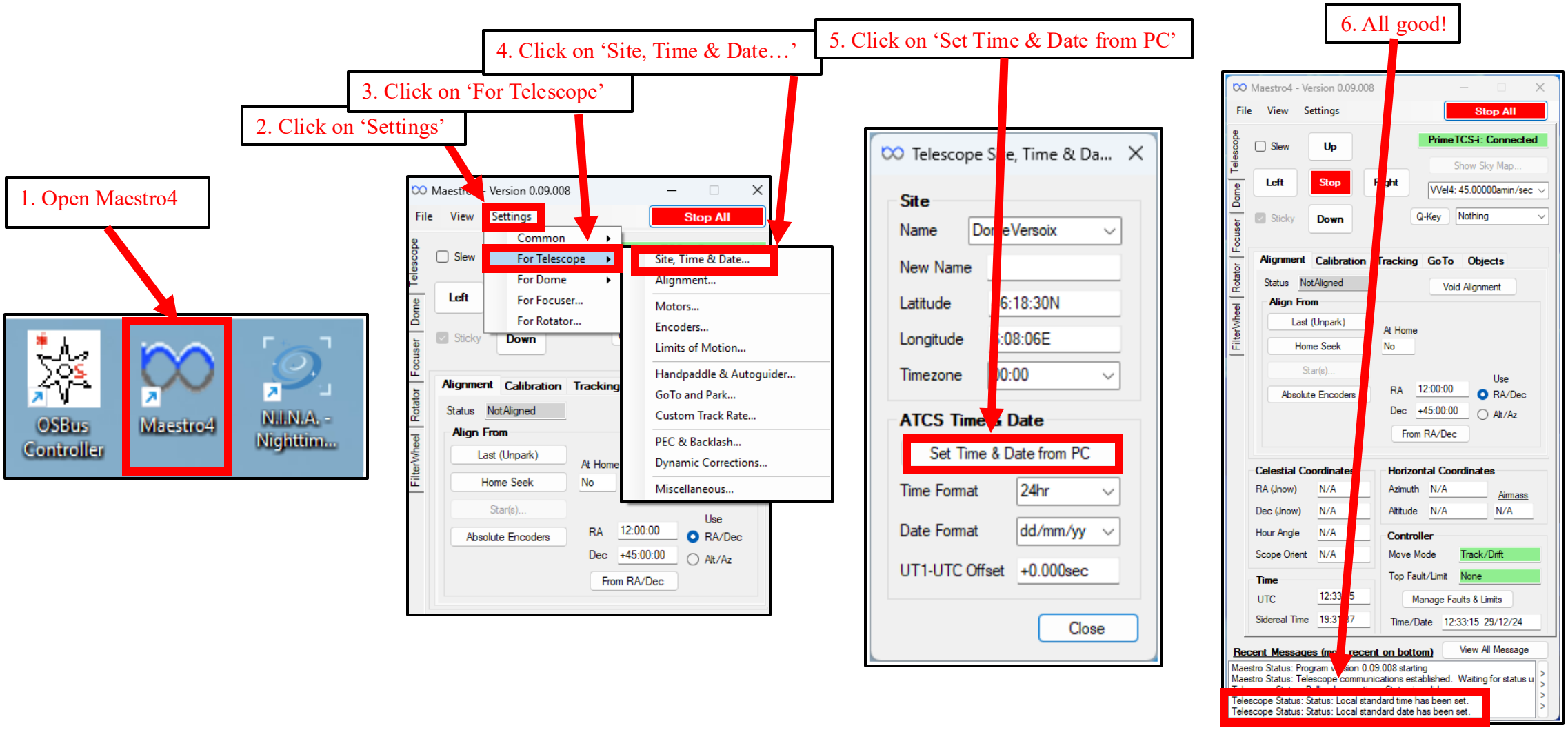




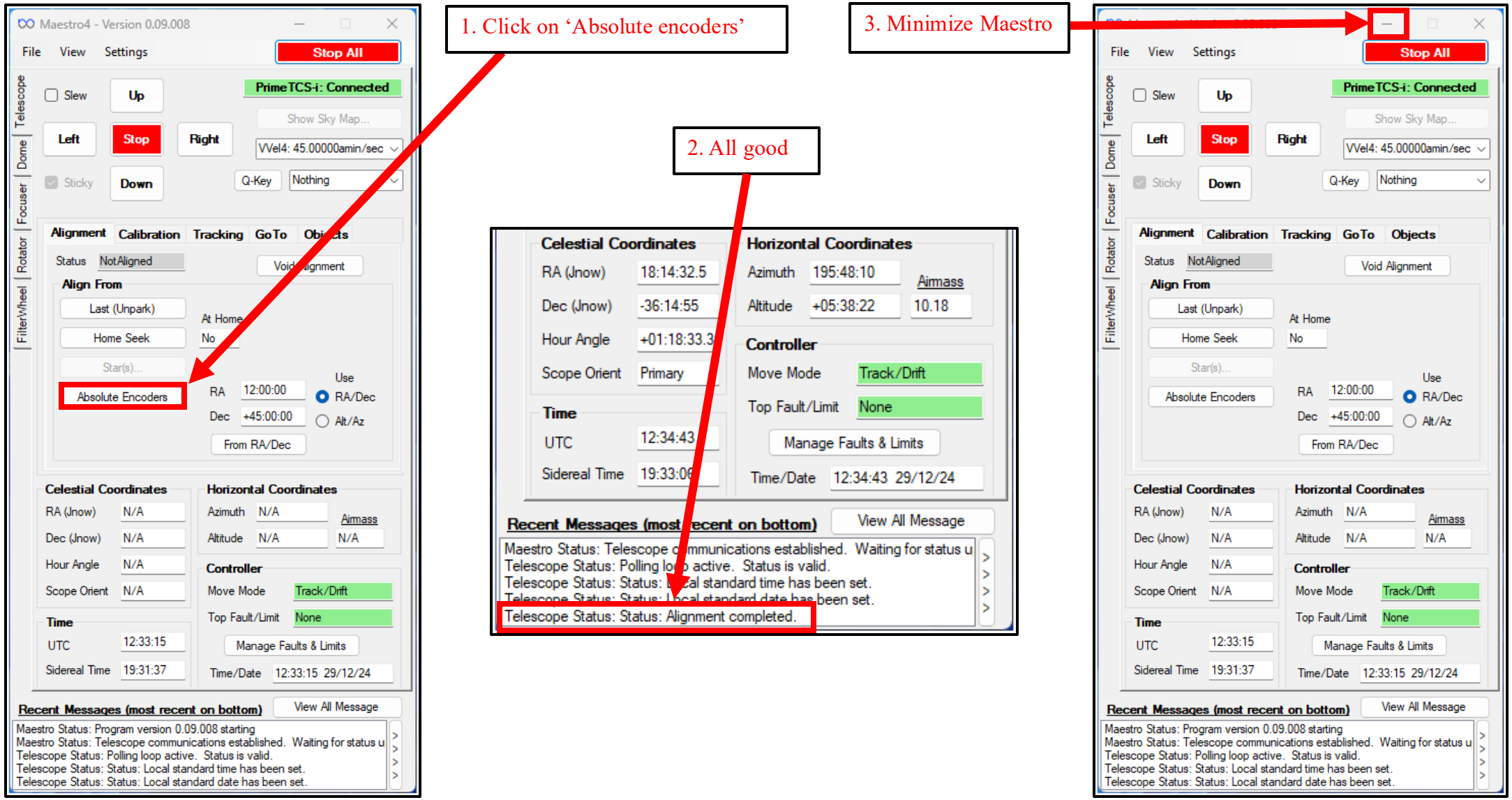
8. Home the focuser and close OSBus



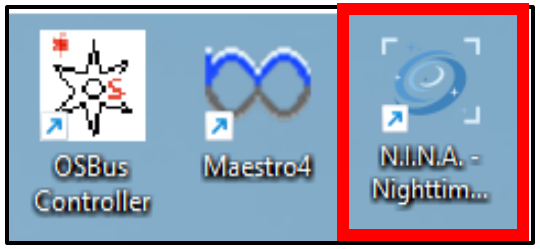
9. Open Maestro4 and set date and time



10. Click on “Absolute encoders” and minimize Maestro (do not close it)

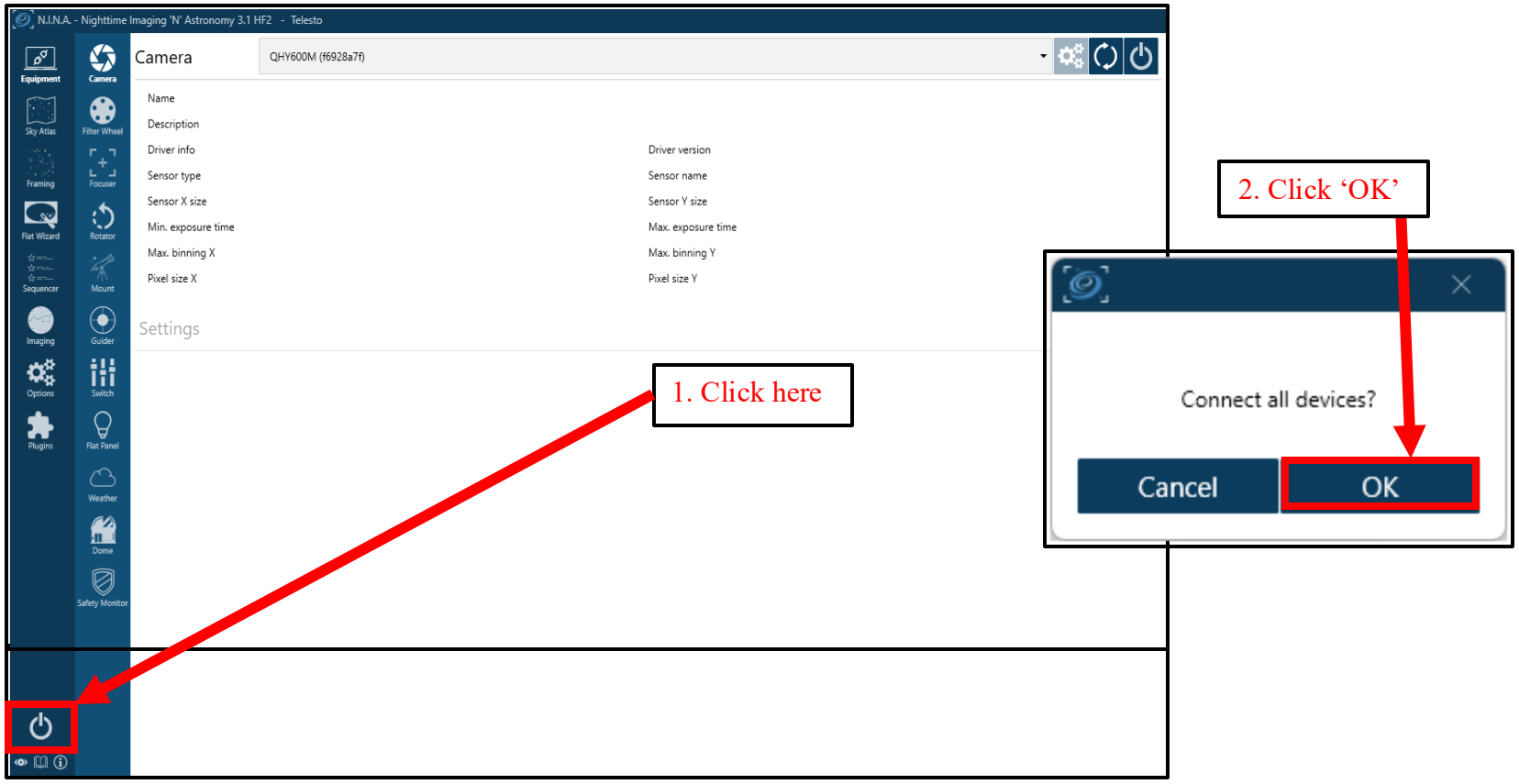


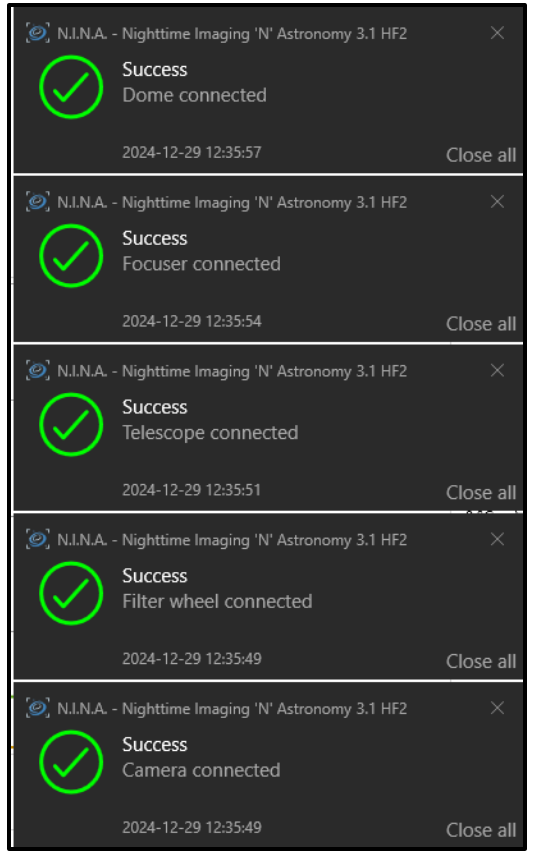
11. Open NINA



12. Connect all devices

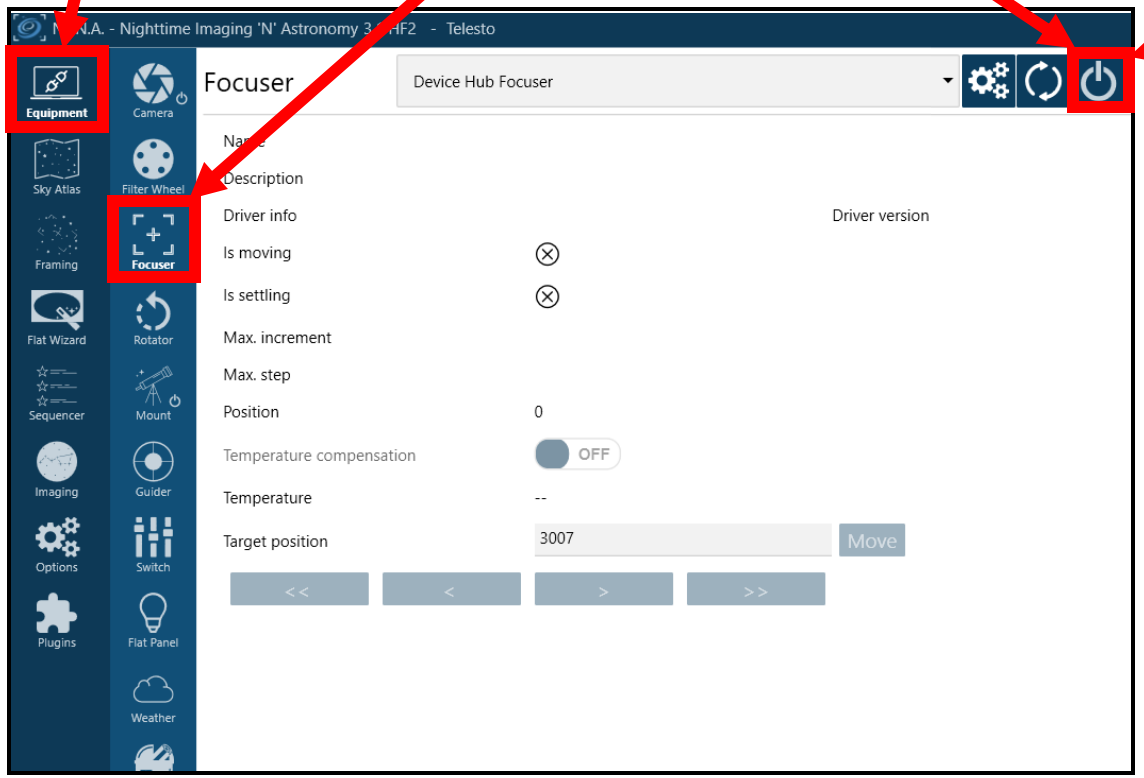
3. Wait until all the tabs appear…All good!

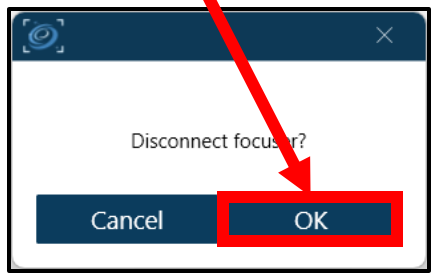


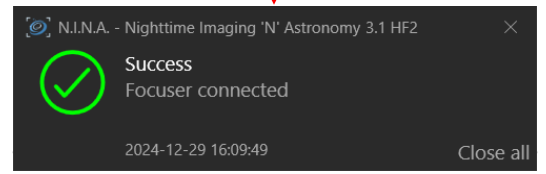


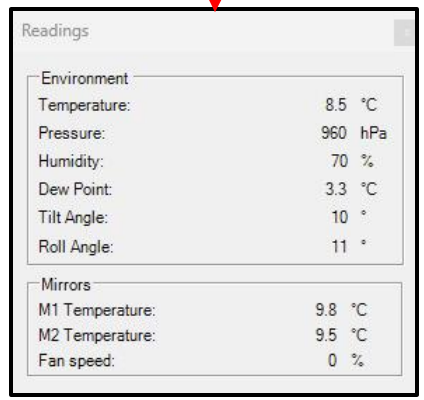
13. Disconnect and reconnect the focuser

1. Click on ‘Equipment’
2. Click on ‘Focuser’
3. Click here to disconnect
4. Click ’OK’
5. Click again to connect
6. All good!
7. This window appears. These are the physical values of the CCD.









14. Find home position and open the dome

If the dome does not move, disconnect the Safety Monitor (the same as you disconnected the focuser), do NOT connect it again and go on with the manual

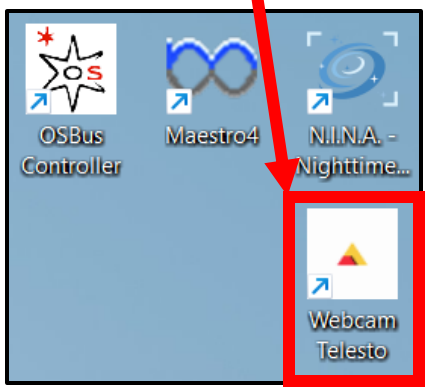
4. When you click on 'Find Home', the Dome will make one full turn to calibrate the spatial coordinates

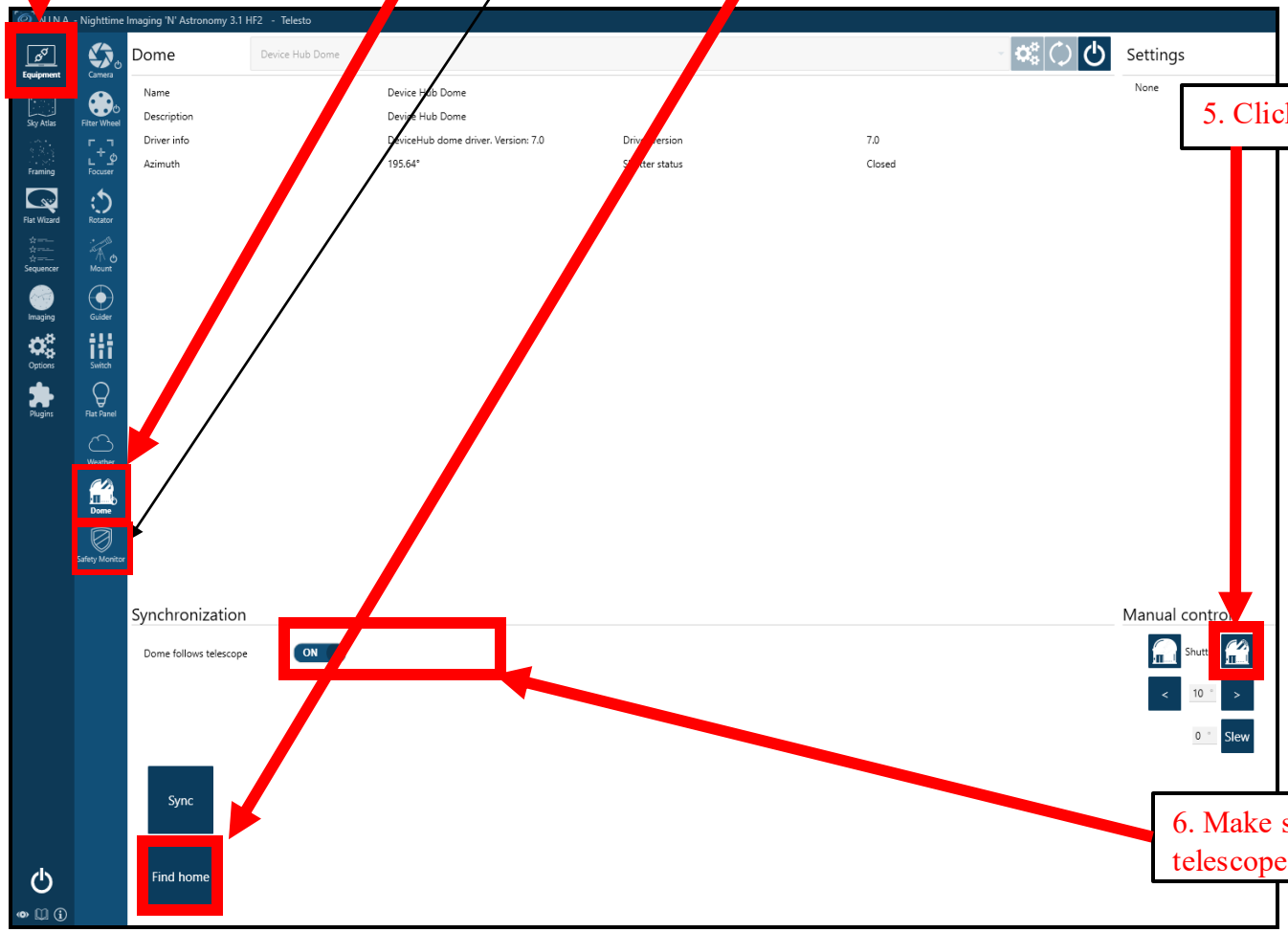
1. You can check that the dome and the telescope positions by clicking here to open the live camera inside the dome

2. Click on 'Equipment'

2. Click on 'Dome'

3. Click on 'Find Home'





5. Click here to open the dome

6. Make sure that 'Dome follows telescope' is ON

END STARTUP

OBSERVATIONS

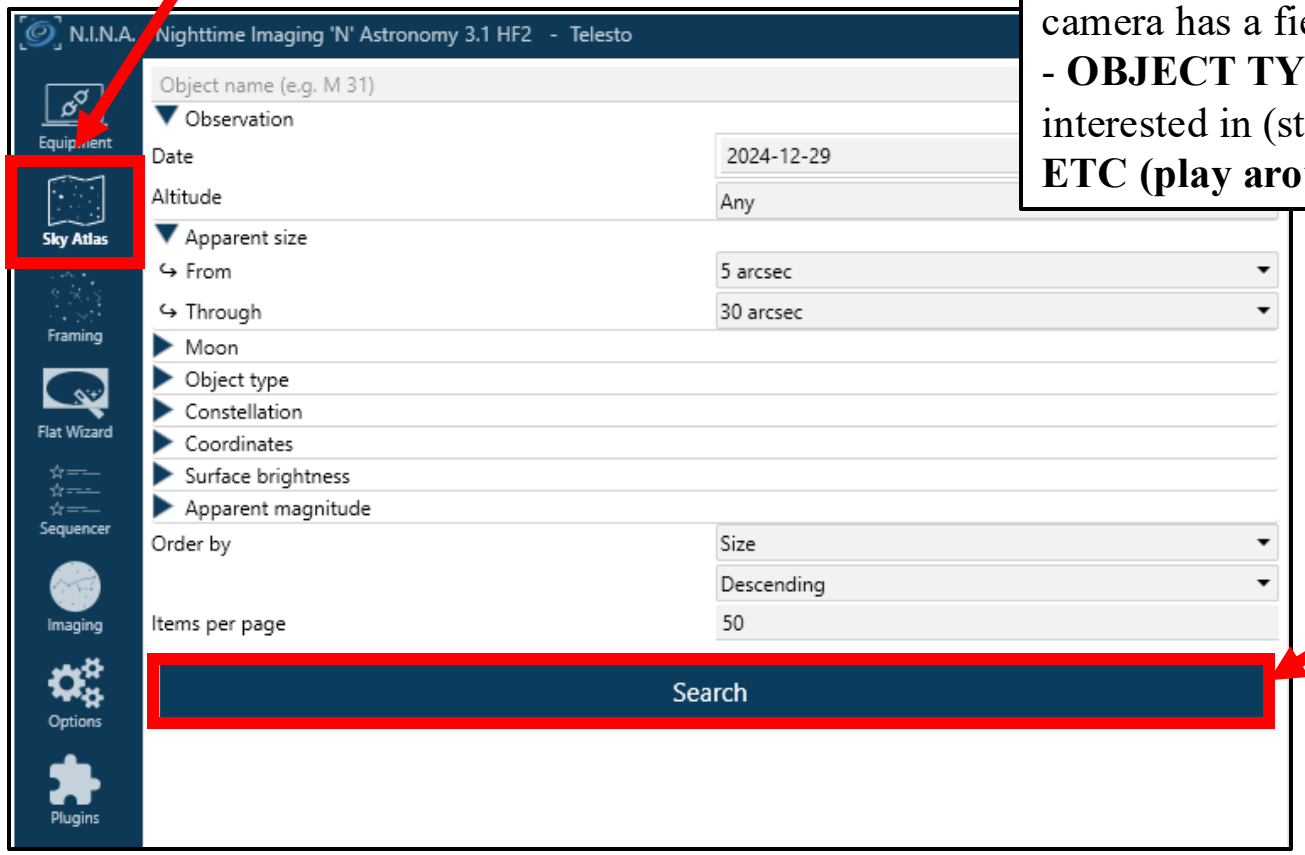
For more information on how to use N.I.N.A., please refer to this documentation

CHOOSING A TARGET

1. Select the the Sky Atlas tab

2. Choose all the parameters of the targets you might be interested in
- **ALTITUDE**: minimum altitude in a given time range (we suggest minimum of 20°, which is the tree level)
- **APPARENT SIZE:** apparent size of the object. Our camera has a field of view of about 30 arcmin
- **OBJECT TYPE:** select the type of objects you are interested in (stars, clusters, galaxies etc.)

ETC (play around)

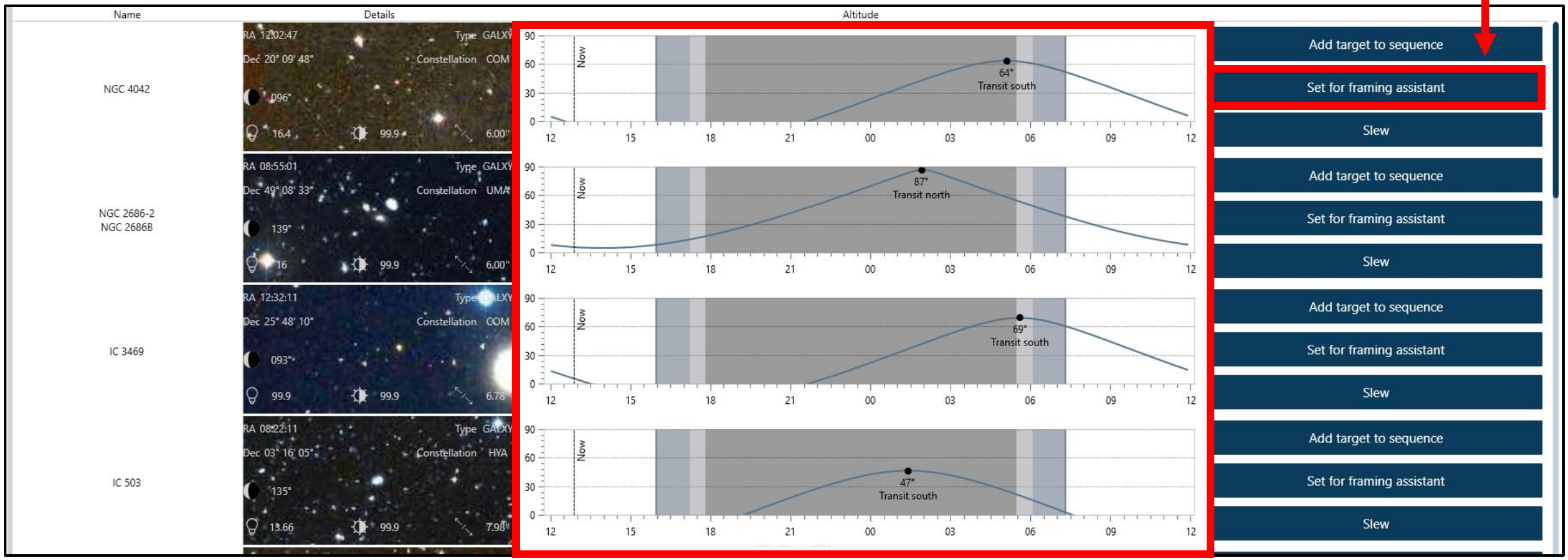


3. Click on 'Search'

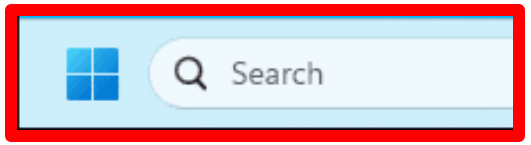
A list of possible targets will appear on the right

1. Here you see the altitude of the objects during the night (we suggest to observe targets when they are above 20°)

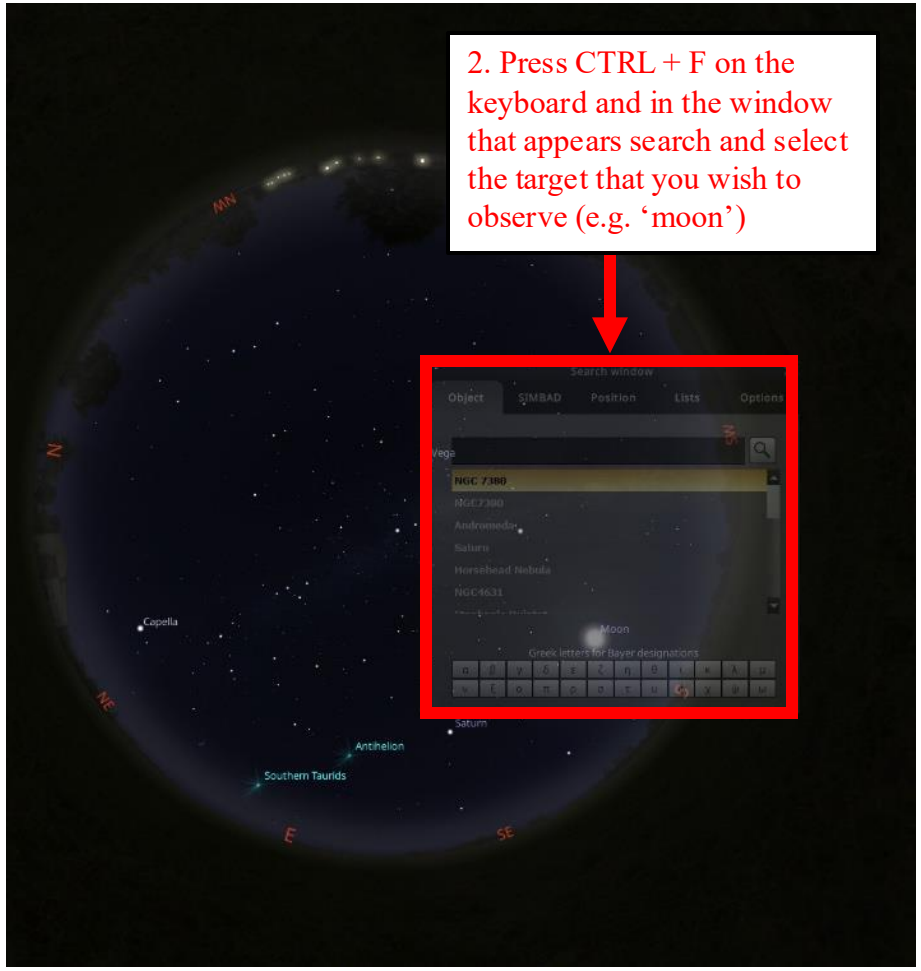
2. Click on 'Set for framing assistant' to have more information about that target and to point it

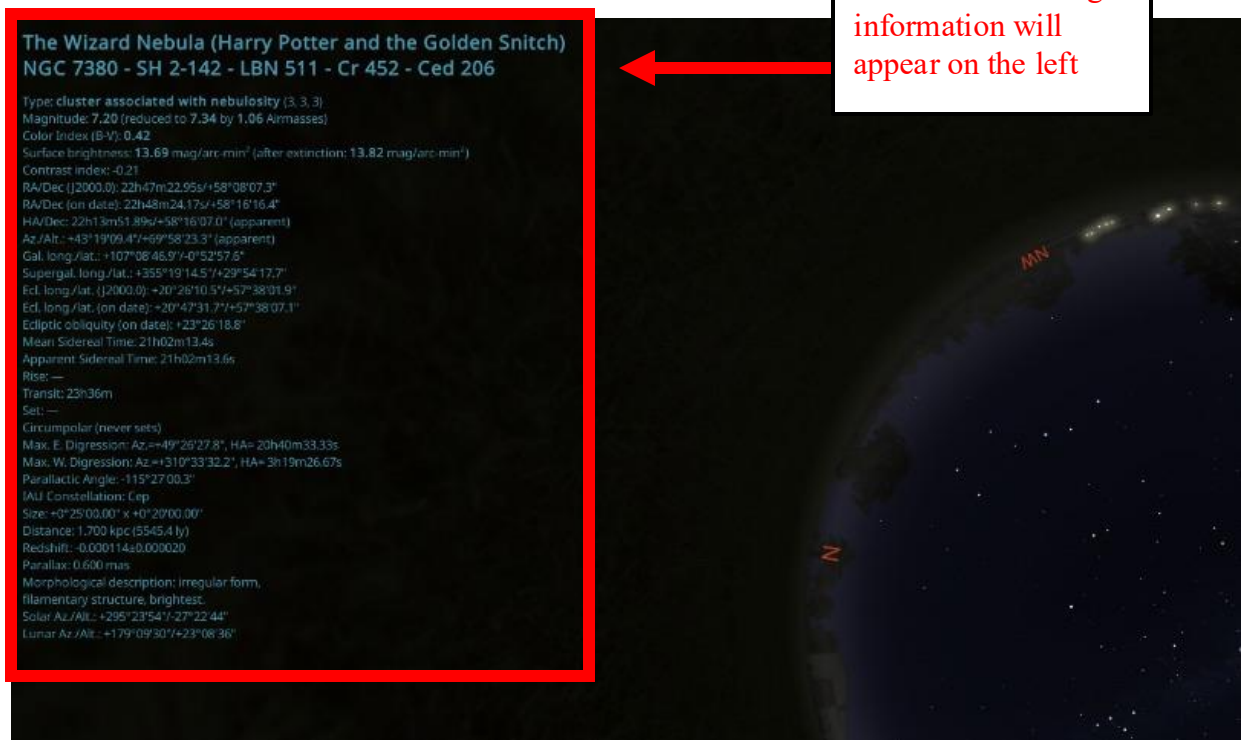


CHOOSING A TARGET ON STELLARIUM (e.g. Moon, Sun, planets)



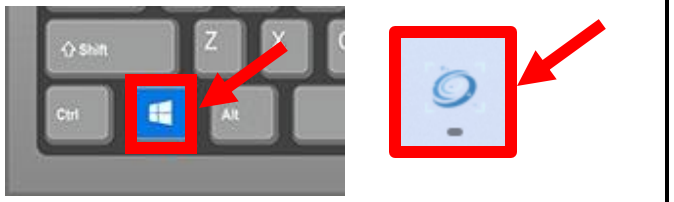
1. In the search tab at the bottom of the screen tap ‘stellarium’ and open the application



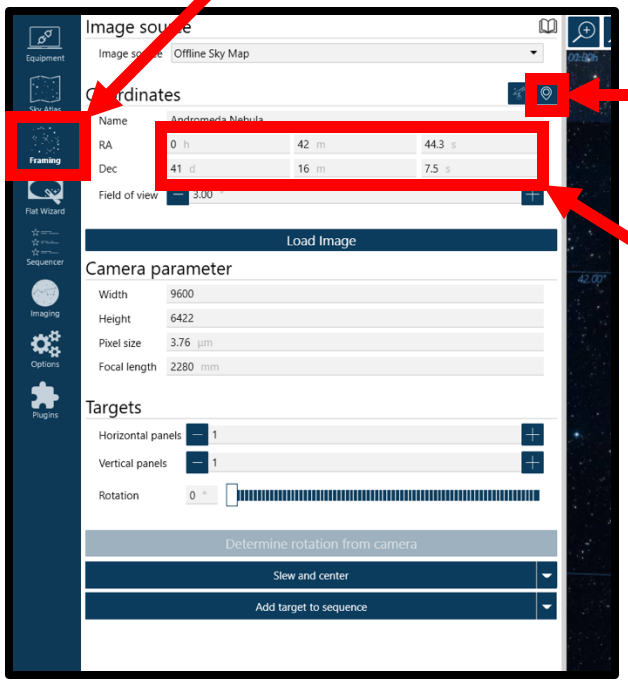


3. Go to NINA window

If you have difficulties switching to the NINA window, press the Windows key on the keyboard and select the NINA icon at the bottom of the screen.



4. Go in the 'Framing' tab

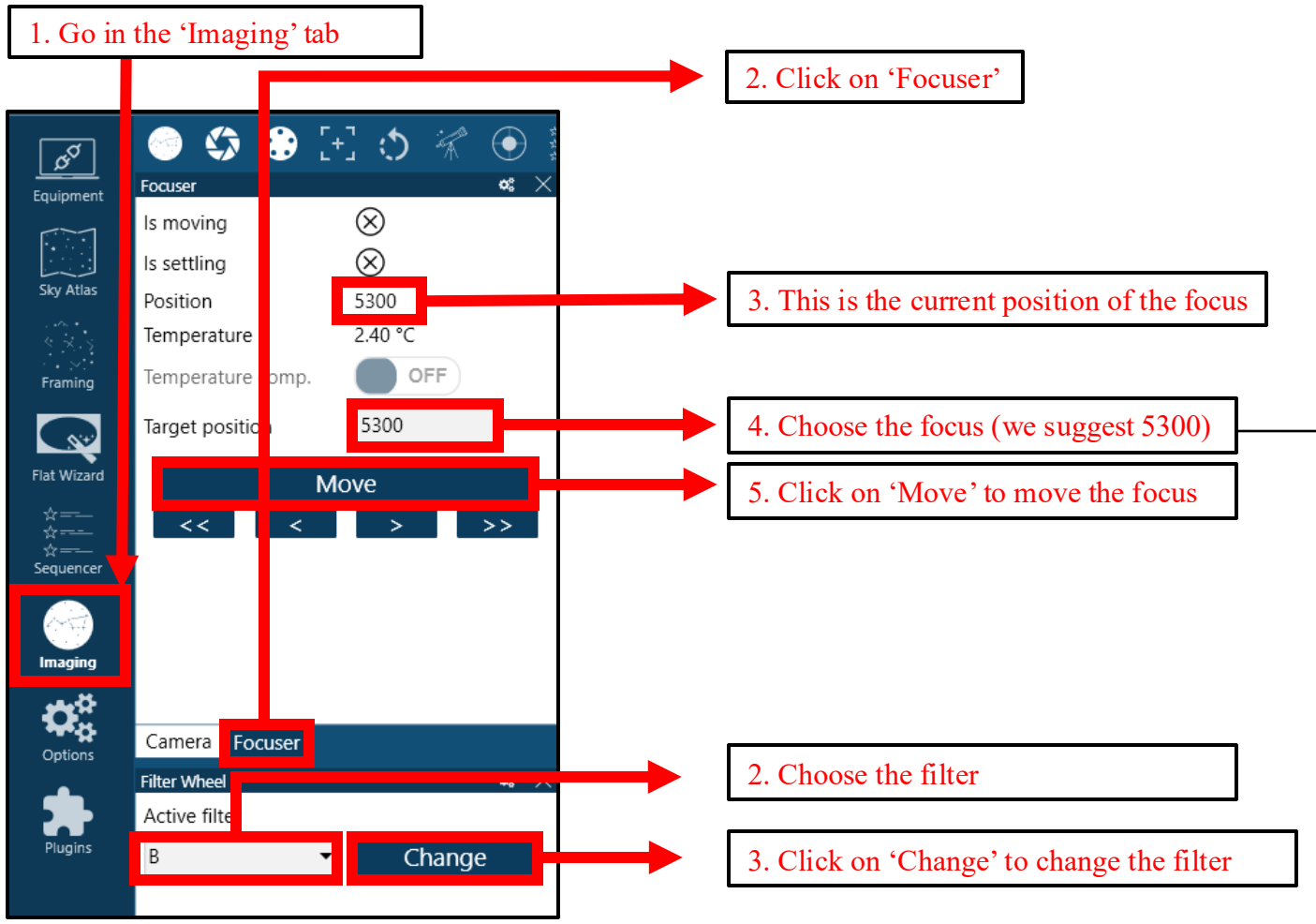


5. Click on this button to import the coordinates of your selected target from Stellarium

6. The new imported coordinates should appear here

When you observe the Sun or the Moon, the picture you take might not be centered in the camera. You can here slightly adjust the object's coordinates manually and retake the picture to see if it is better centered. We suggest to start by changing the Dec by ±5m. Then do not forget to click on 'slew' (in 2 slides) to move the telescope to the new coordinates.

SELECTING FOCUS & FILTER



1. Go in the 'Imaging' tab

2. Click on 'Focuser'

3. This is the current position of the focus

4. Choose the focus (we suggest 5300)

5. Click on 'Move' to move the focus

SET THE FOCUS TO 5300 BEFORE POINTING TO THE FIRST TARGET OR PERFORMING THE FIRST AUTOFOCUS

2. Choose the filter

3. Click on 'Change' to change the filter

POINTING THE TELESCOPE ON YOUR TARGET

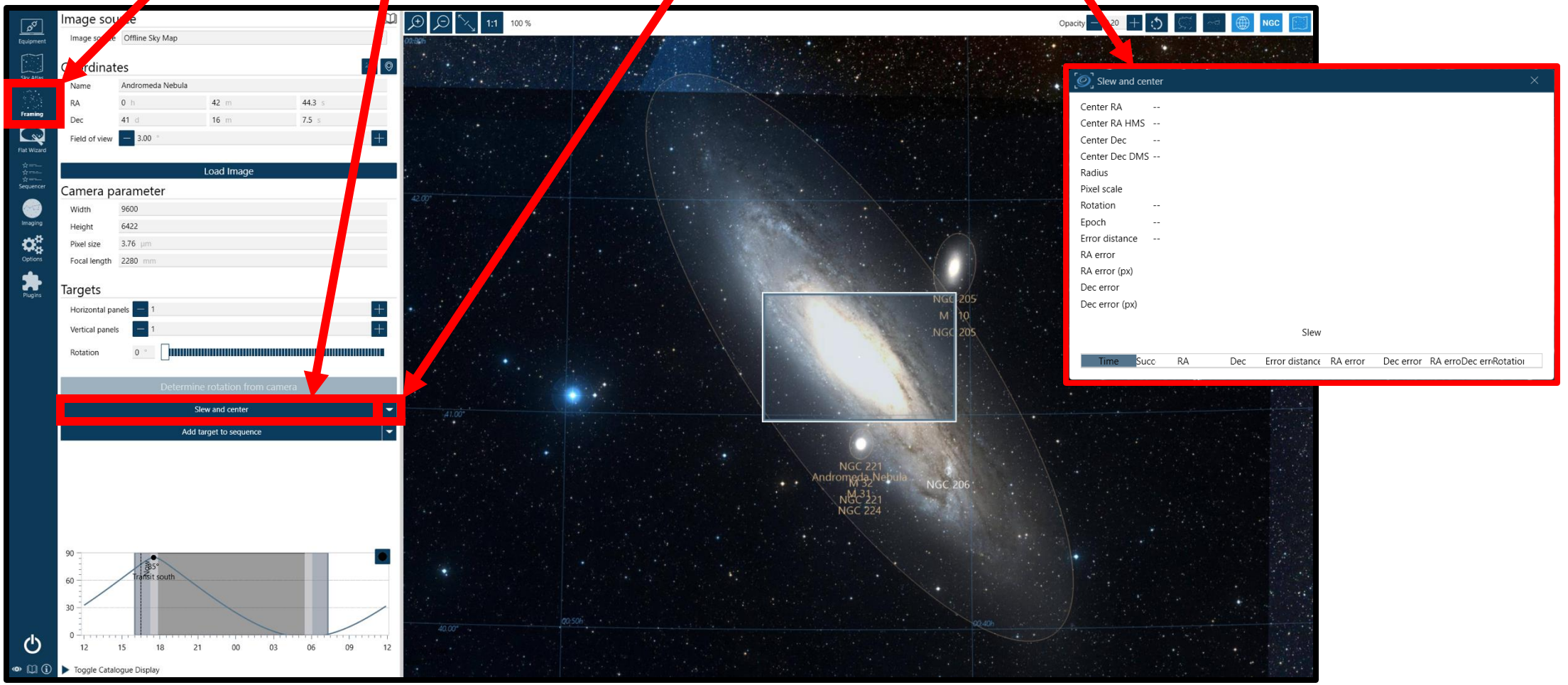
If centering does not work (plate solve failed), you may be out of focus (see previous slide) or weather conditions may be bad. If neither of these is the issue, we suggest using ‘Slew’ instead of ‘Slew and Center’.

If you are observing the Moon or the Sun, just click on ‘Slew’ here instead of ‘Slew and center’

1. Go in the ‘Framing’ tab

2. Click on ‘Slew and center’

3. A window like this will appear. It will take few pictures to center the target



AUTOFOCUS

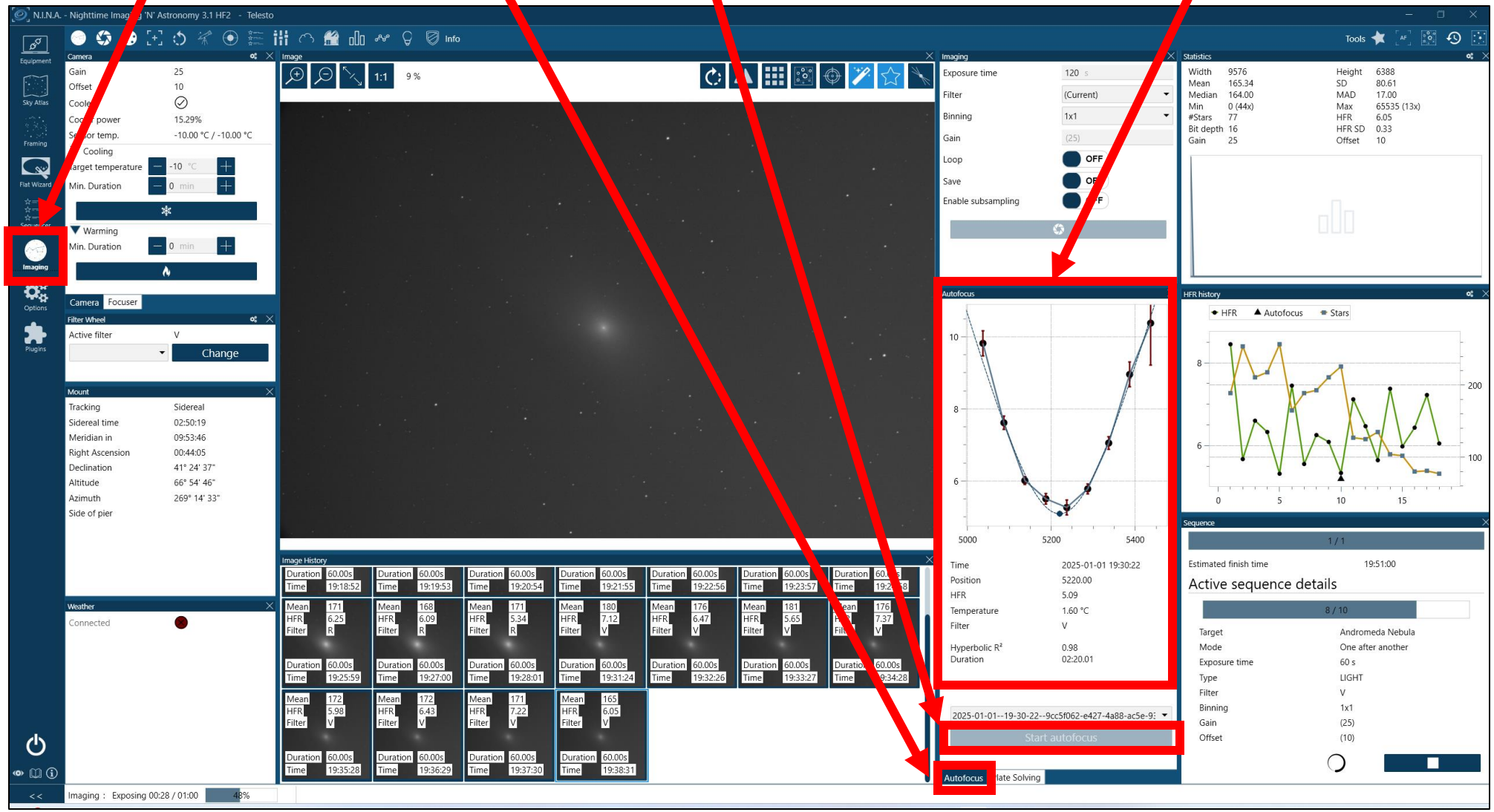
If autofocus fails, you are probably too far from the recommended initial value (5300), or the outside conditions may be poor (e.g., clouds).

1. Go in the ‘Imaging’ tab

2. Click on ‘Autofocus’

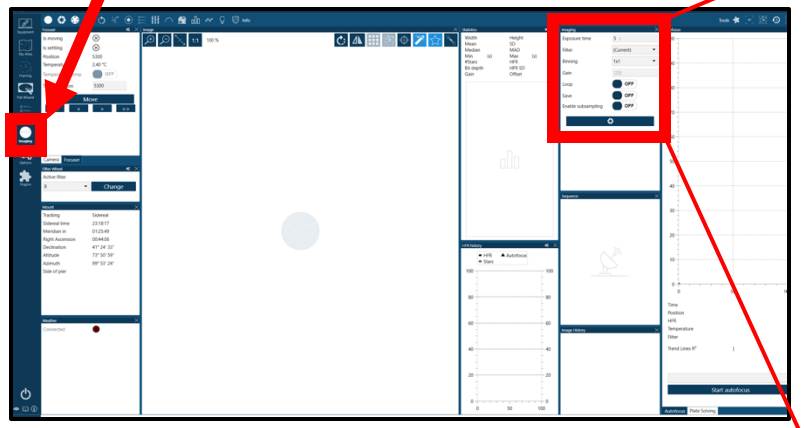
3. Click on ‘Start autofocus’

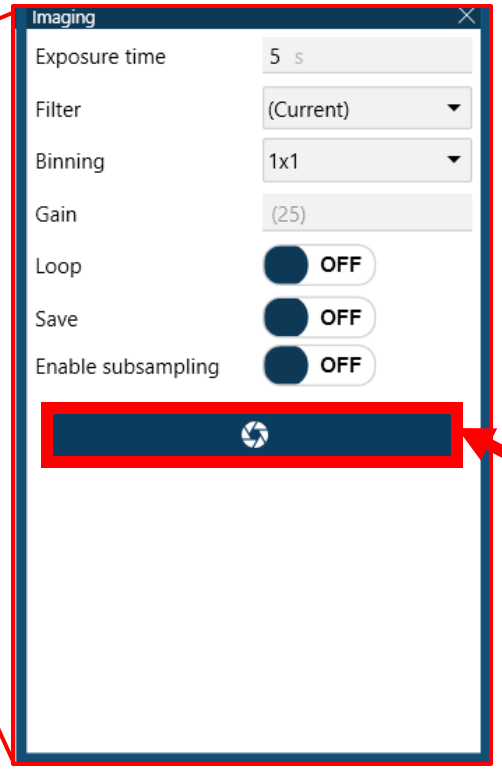
4. It will take few images to adjust the focus



TACKING A PICTURE

1. Go in the ‘Imaging’ tab





2. Choose all the properties that you want:

- **EXPOSURE TIME**: time of the frame exposure in seconds
- **FILTER:** filter to be used for the capture
- **BINNING:** type of binning when pixels are read (lower binning is more precise, but takes longer time).
- **GAIN:** the conversion between the number of electrons ("e-") recorded by the camera and the number of digital units
- **LOOP:** if you want to take images in loop
- **SAVE:** if you want to save the taken images
- **ENABLE SUBSAMPLING:** if you want the camera's image to be downsampled (reduced in resolution). We suggest to leave it OFF

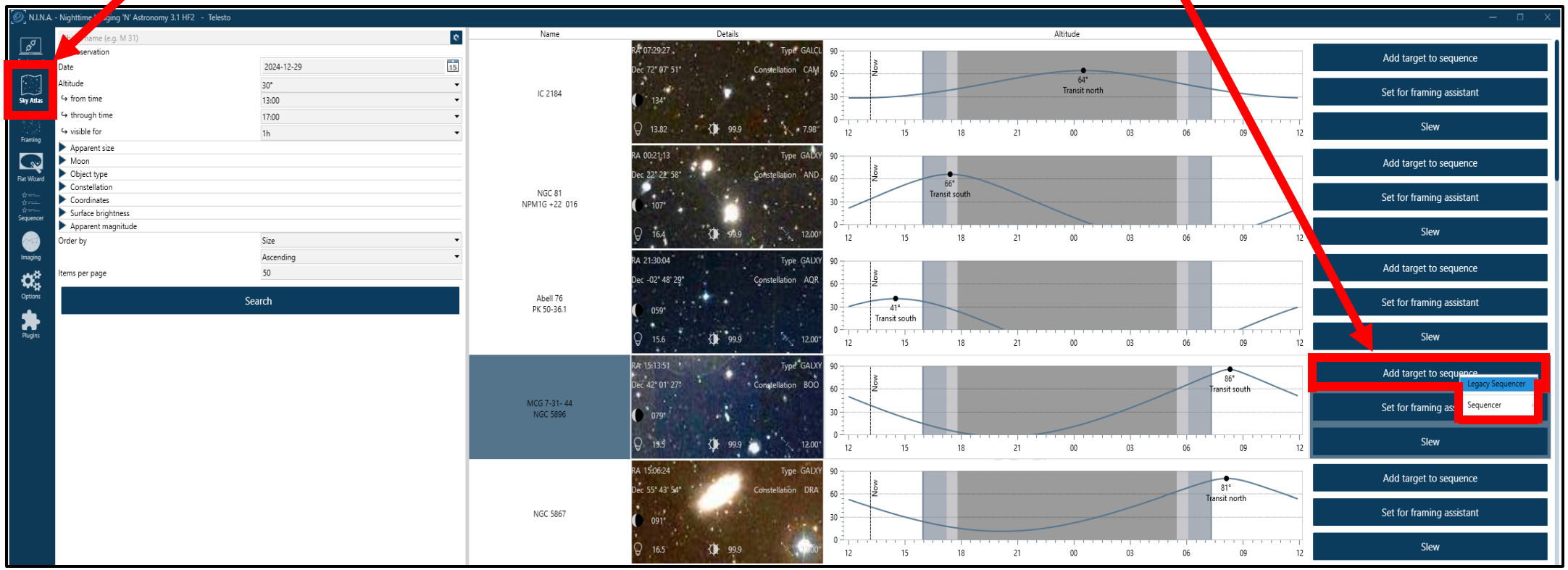
3. Click here to take a picture

TAKING A SEQUENCE OF TARGETS AND PICTURES

There is the option to take multiple consecutive pictures

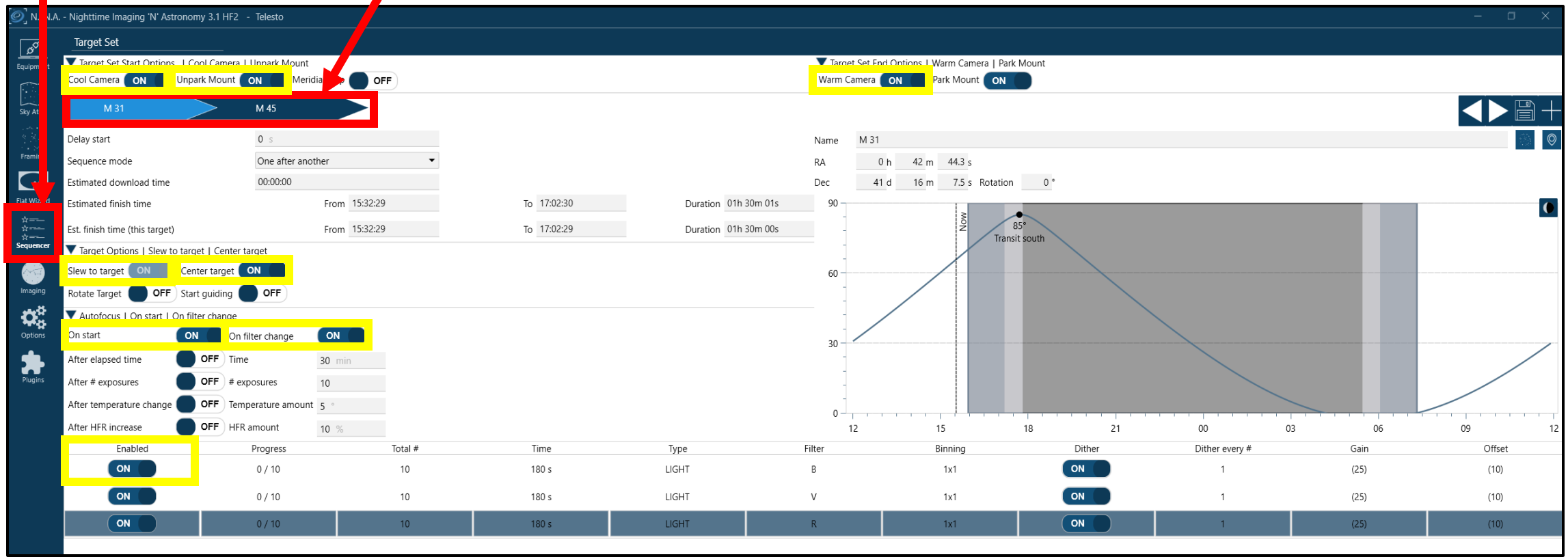
1. In the Sky Atlas tab choose the target you want to observe

2. To add a target in a sequence of observations click on ‘Add target to sequence’ and then ‘Legacy Sequencer’



1. Go in the ‘Sequencer’ tab

2. Here is the list of the targets in your sequence

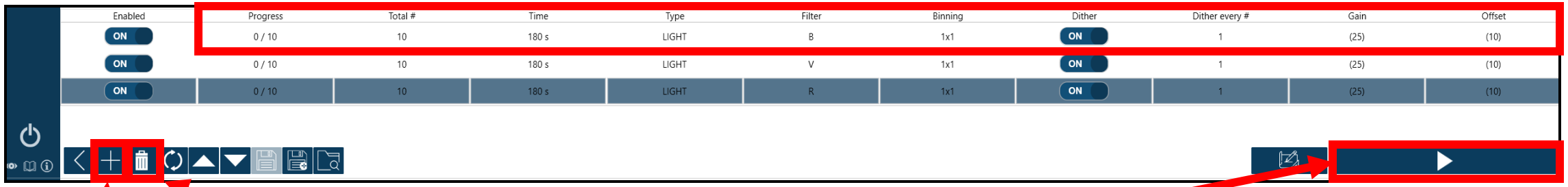


3. We suggest you to set ON all the parameters in the yellow rectangles:

- **Cool camera:** allow the camera to cool down before starting a target
- **Unpark Mount:** unpark the mount before starting a target
- **Warm Camera:** allow the camera to warm up at the end of a target
- **Slew to target:** slew the telescope + dome to the target
- **Center target:** take few pictures to better center the target in the field of view
- **Autofocus on start:** autofocus the camera before starting a target
- **Autofocus on filter change:** autofocus the camera when a filter is changed
- **Enabled:** enable that list of exposures to be taken

List of options for a set of pictures (click two times at a value to change it)

- **Progress:** number of picture that have been taken out of the total #
- **Total #:** number of pictures to be taken with the chosen options
- **Time:** exposure time (we suggest not to go above 180s)
- **Type:** type of picture (BIAS, DARK, FLAT, LIGHT = chosen target)
- **Filter:** filter to use
- **Binning:** binning of the pixels (lower binning is slower, but has higher resolution)
- **Dither:** slightly shift the camera between one picture and another (it helps to remove bad pixels of systematic pattern during postprocessing)
- **Dither every #:** after how many images the camera is slightly shifted
- **Gain:** conversion between electrons and digital units (25 is the unitary value)
- **Offset:** offset to apply to every pixel (useful to avoid negative values of the read-out-noise)

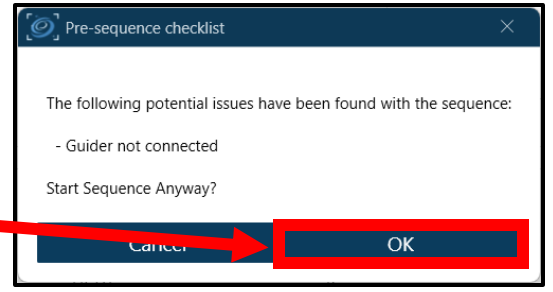


Click here if you want to add a set of pictures for that specific target

Click here to delete that set of pictures

Click here to start the sequence

A window like this will appear, click 'OK'



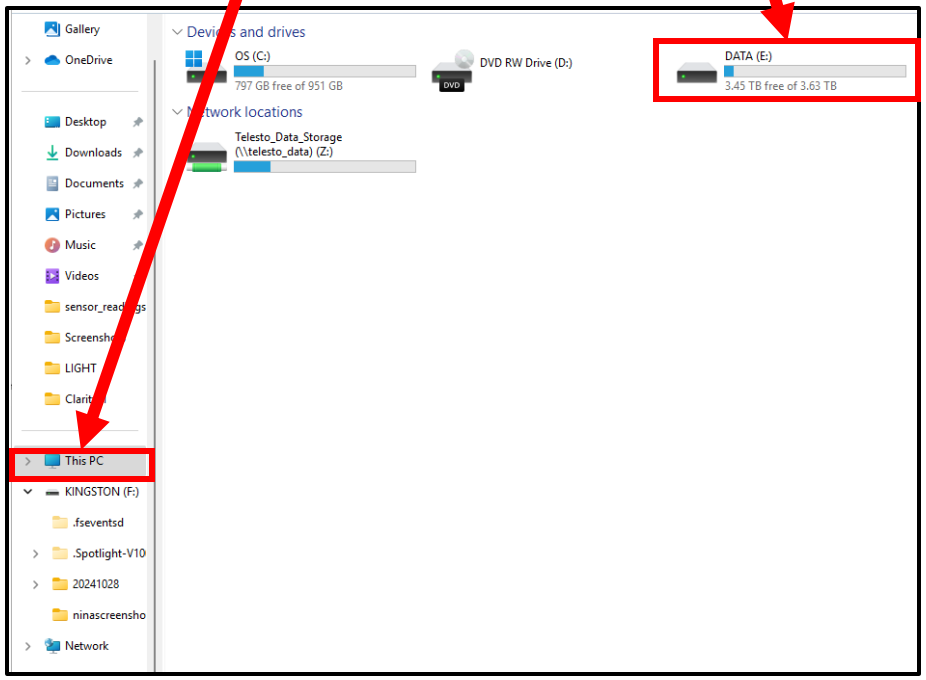
DATA STORAGE

Data (pictures) are automatically saved in as fits files. They are stored in the following path:

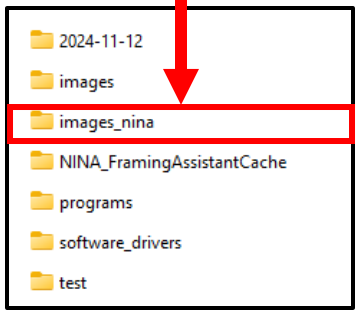
1. Select the folder icon in the bottom bar of the screen

2. Click on ‘This PC’

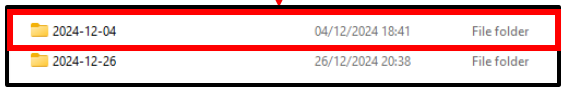
3. Select ‘DATA (E:)’



4. Select ‘images_nina’



3. Your data are stored in the folder of your observing date.
For example, the folder 2024-12-04 will contain images taken on the 4th of December 2024



END OF THE NIGHT

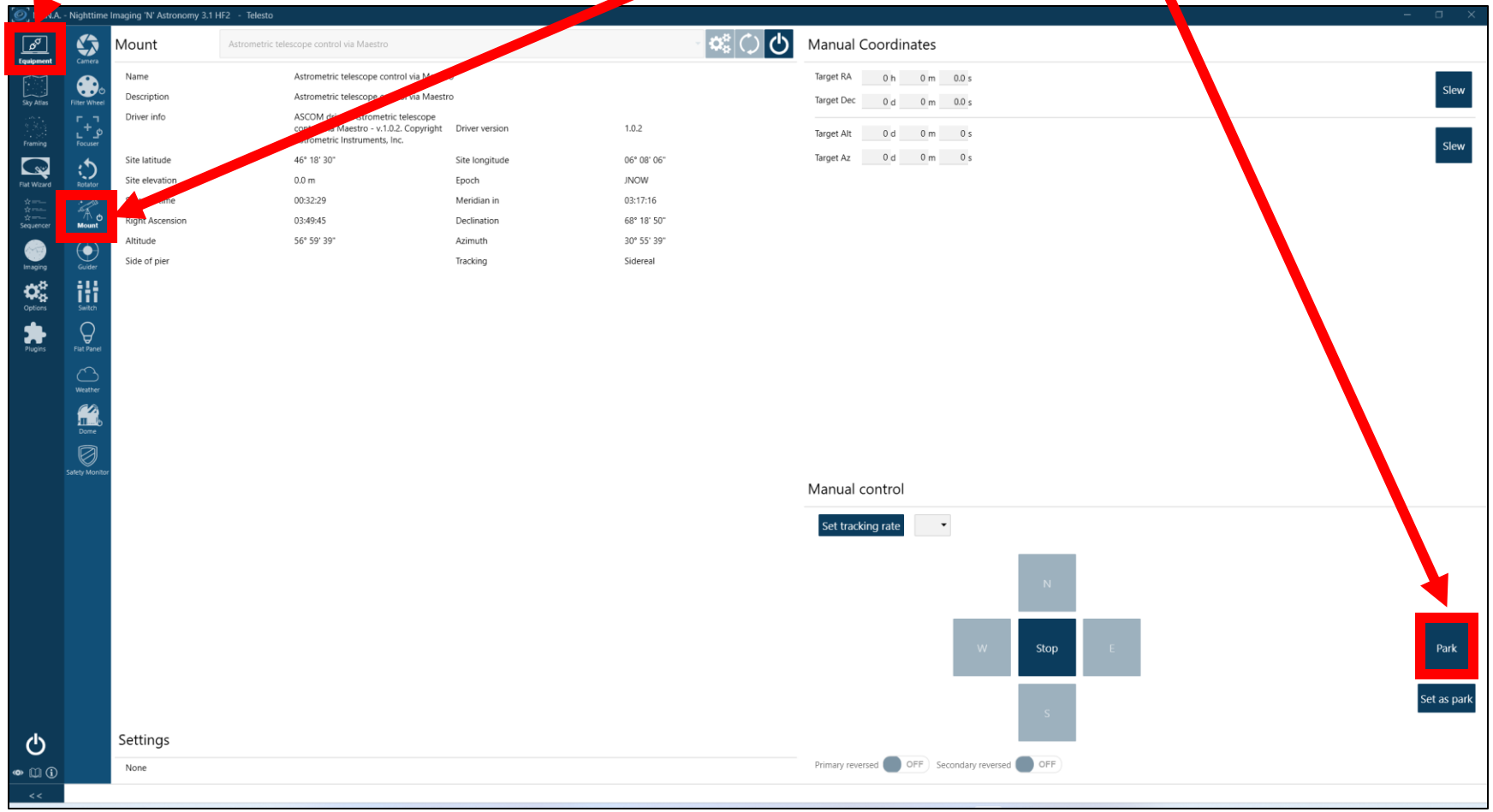
IN THE CONTROL ROOM

1. Park the telescope

1. Go in the ‘Equipment’ tab

2. Click on ‘Mount’

3. Click on ‘Park’

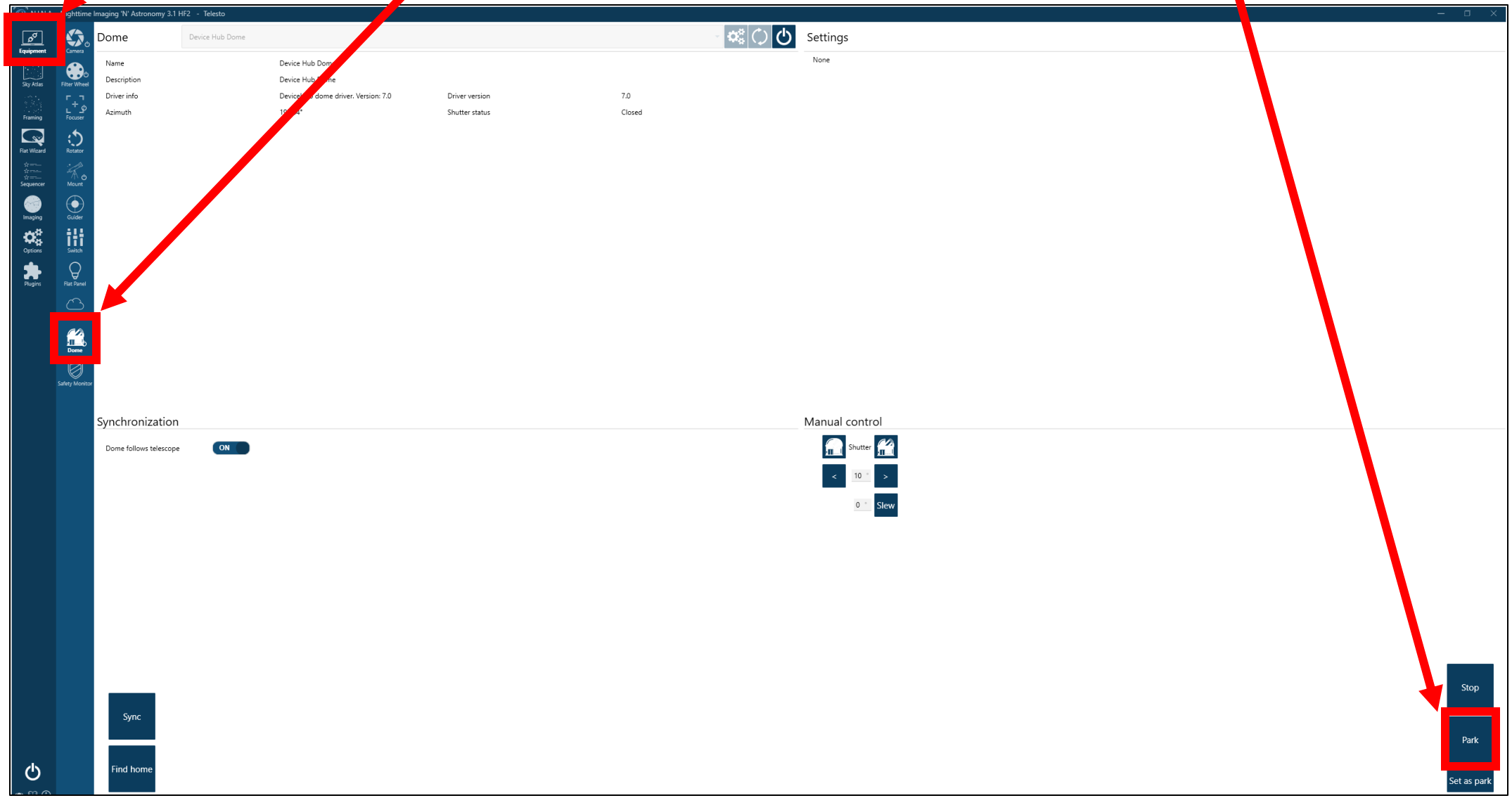


2. Park the dome

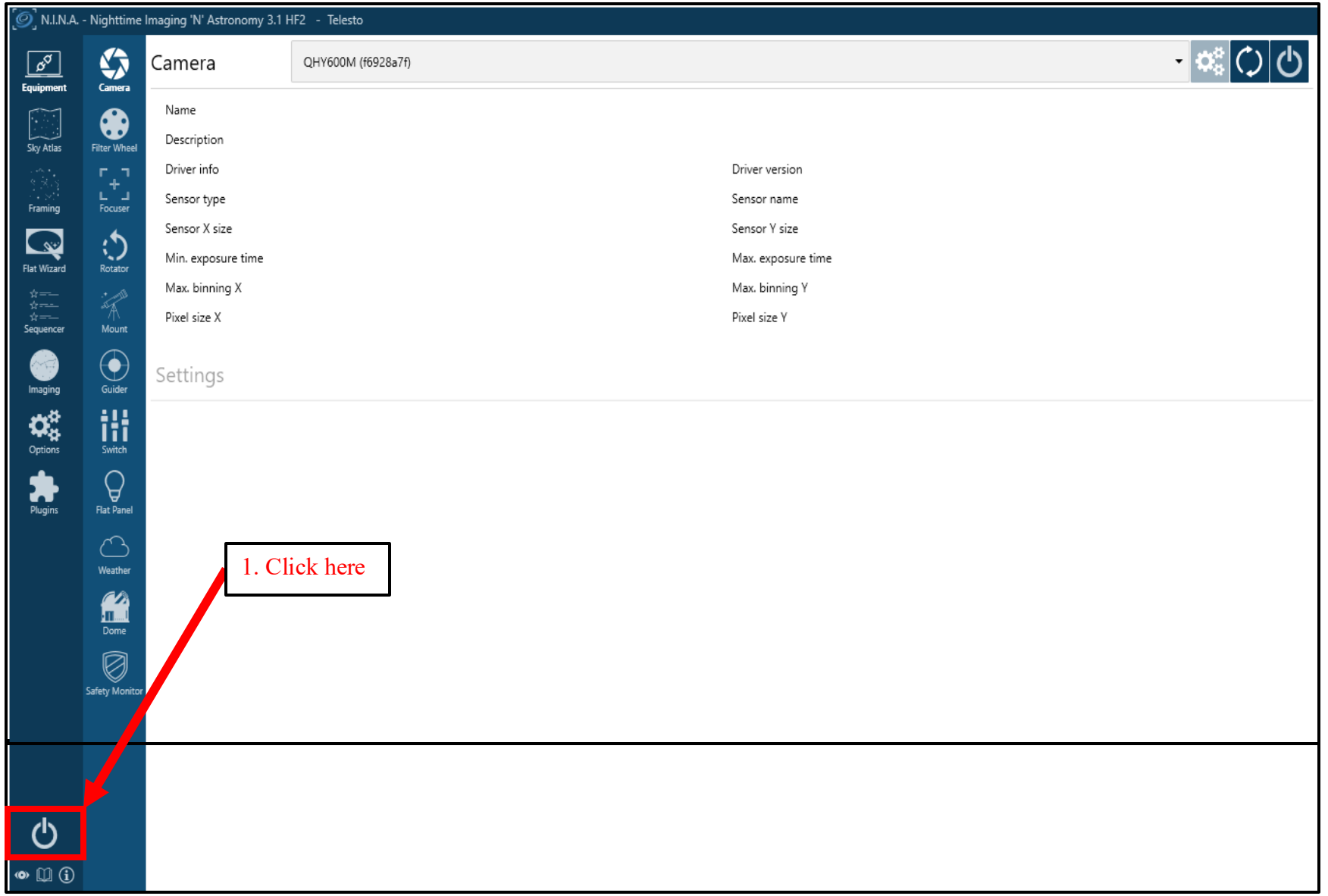
1. Go in the ‘Equipment’ tab

2. Click on ‘Dome’

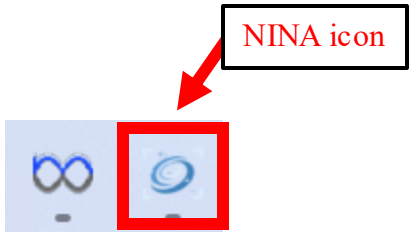
3. Click on ‘Park’ (it will both park and close the dome)

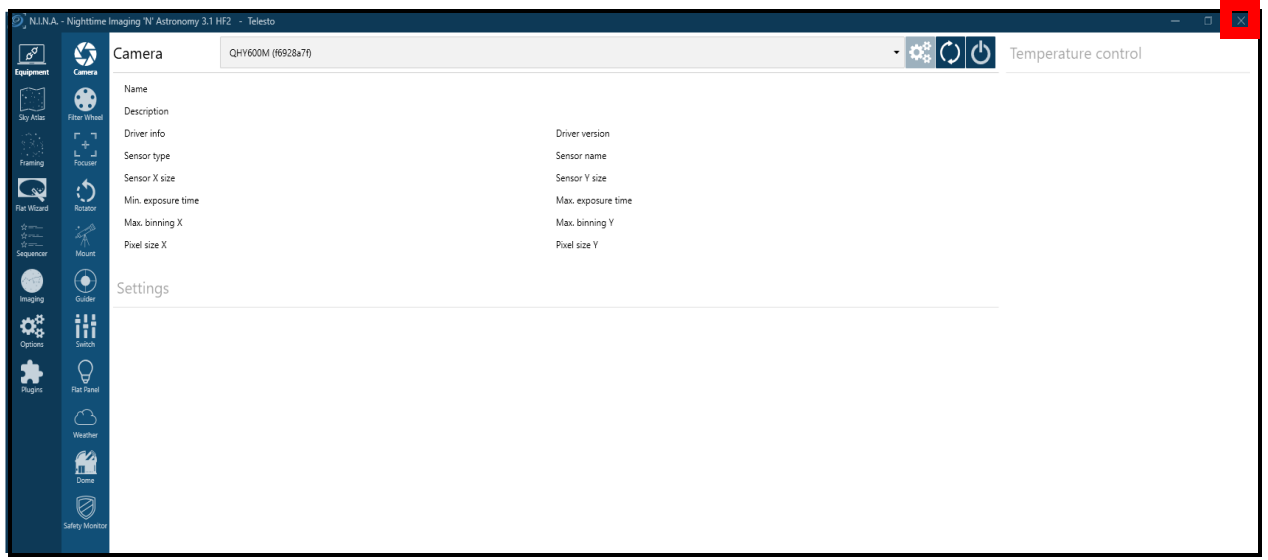


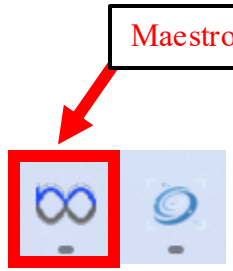
3. Disconnect all devices in NINA

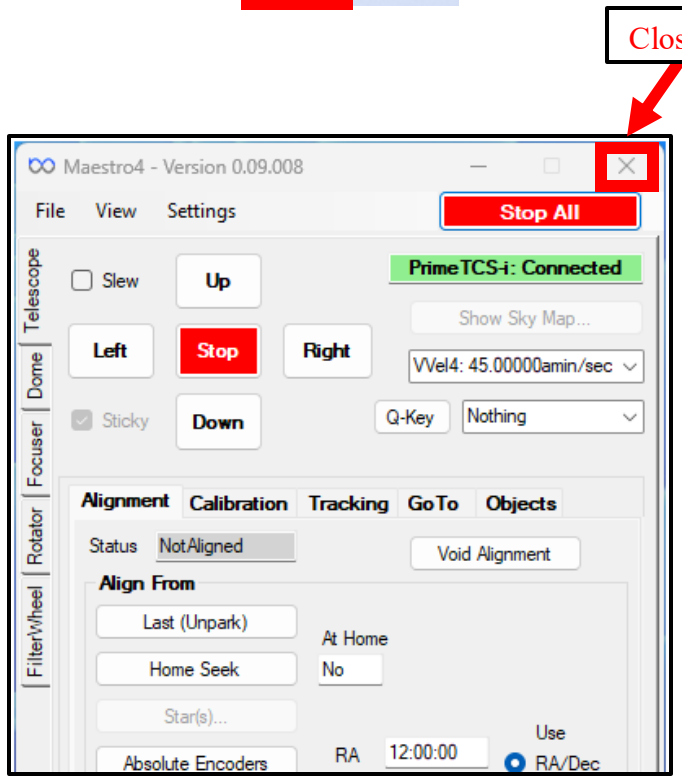


4. Close NINA and Maestro

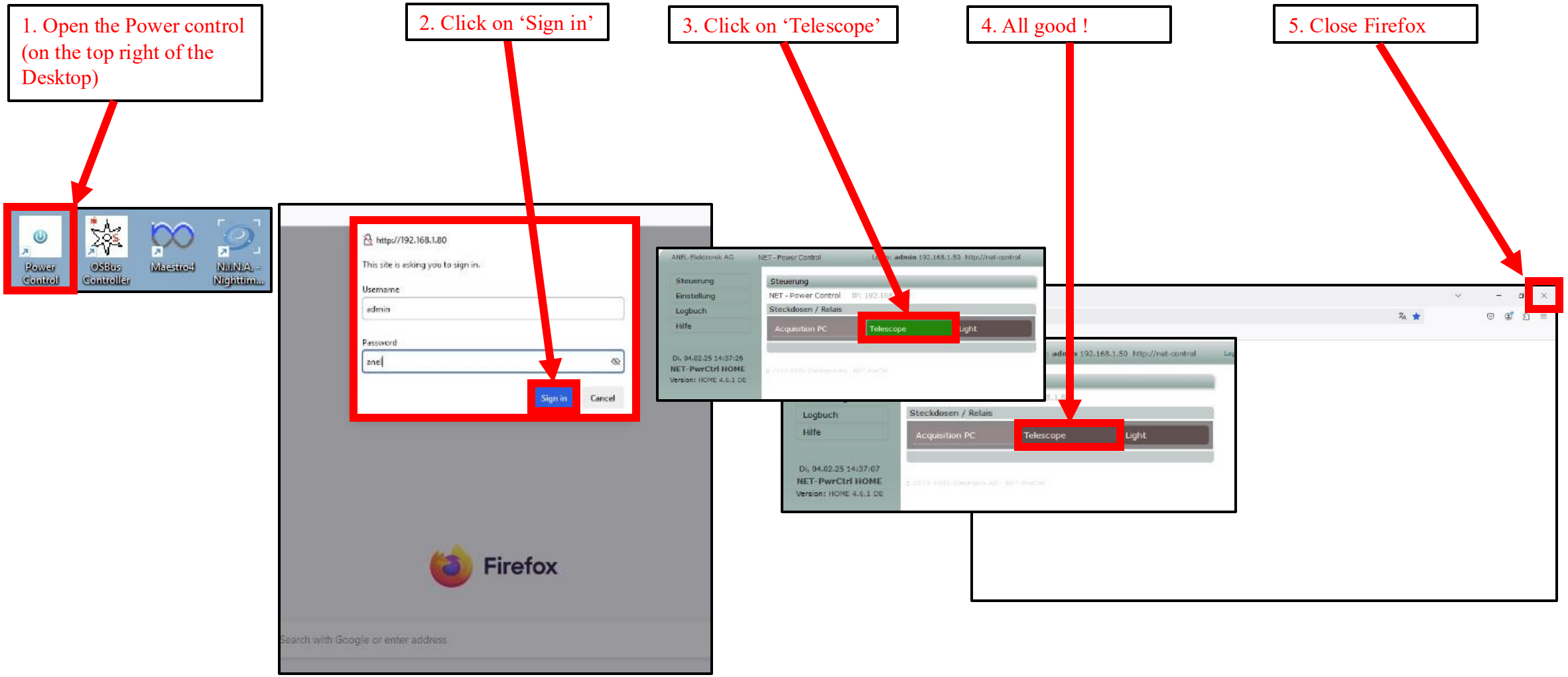








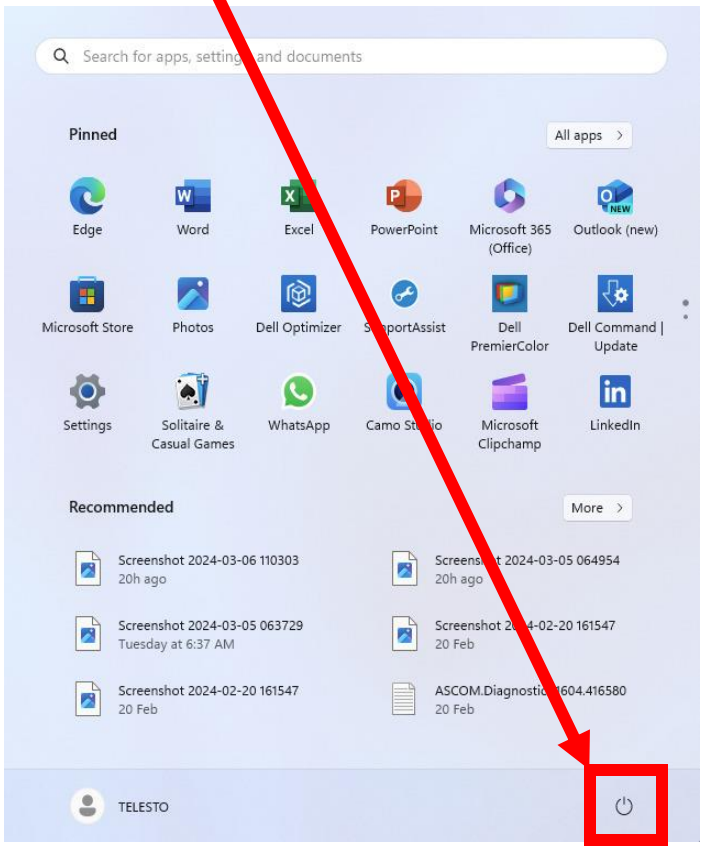
5. Shut down the telescope power



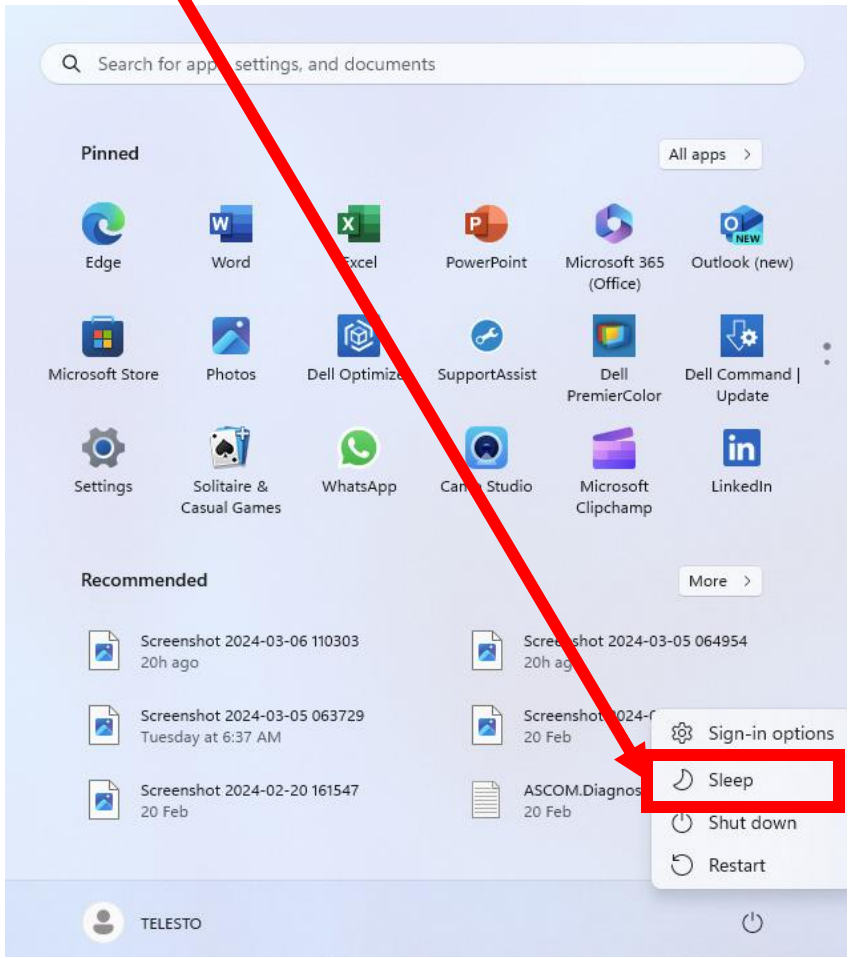
6. Snooze the computer (do not shut down!)

Select the Windows icon in the bottom bar of the screen

Click on the switching off button

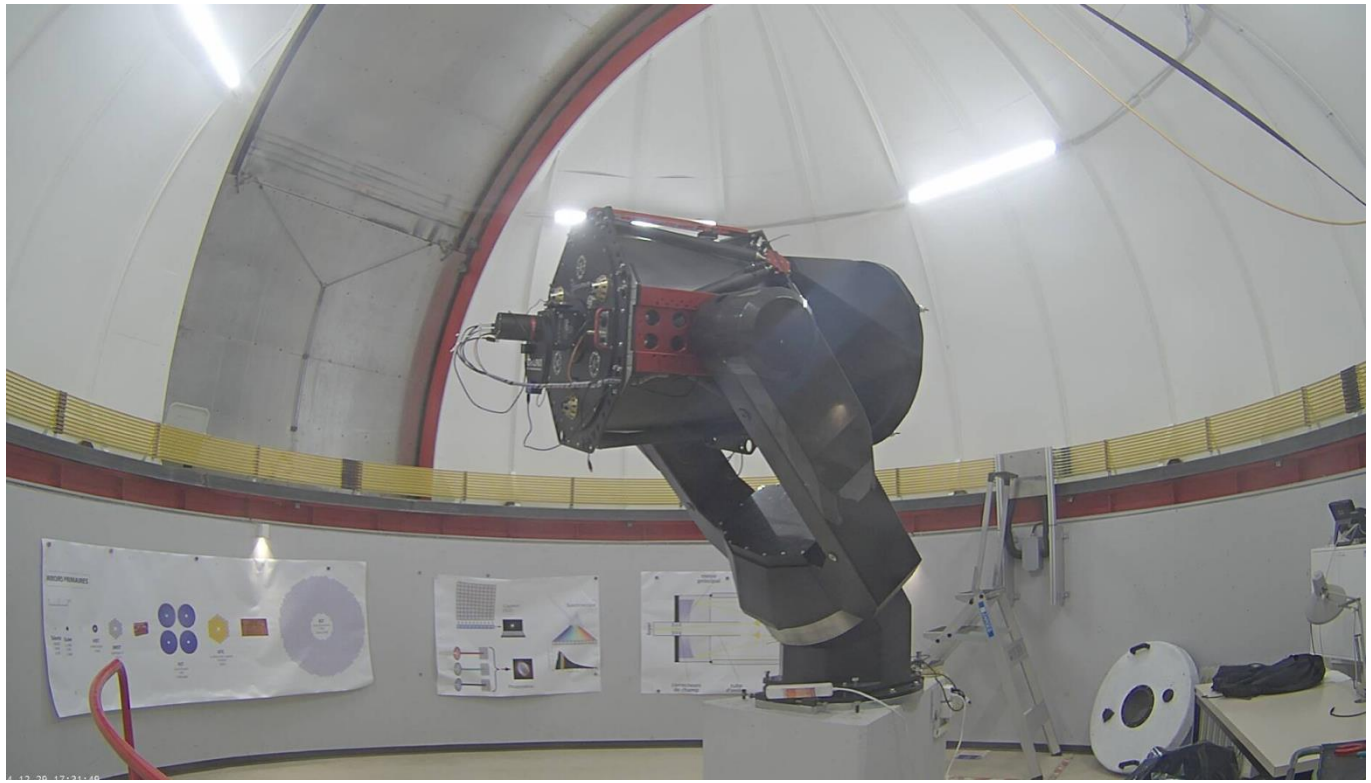


Click on’Sleep’



IN THE DOME

1. Verify by eye that everything is fine:
- Check that the dome is closed
- Check that the telescope and the dome are parked. A corrected parking position is shown in the picture below (from the live camera). The dome aperture is above the ELT poster. The telescope is facing the ladder.



Be sure all lights in the building are switched off (Dome, Telesto control room, and stairs)

HAVE SWEET DREAMS