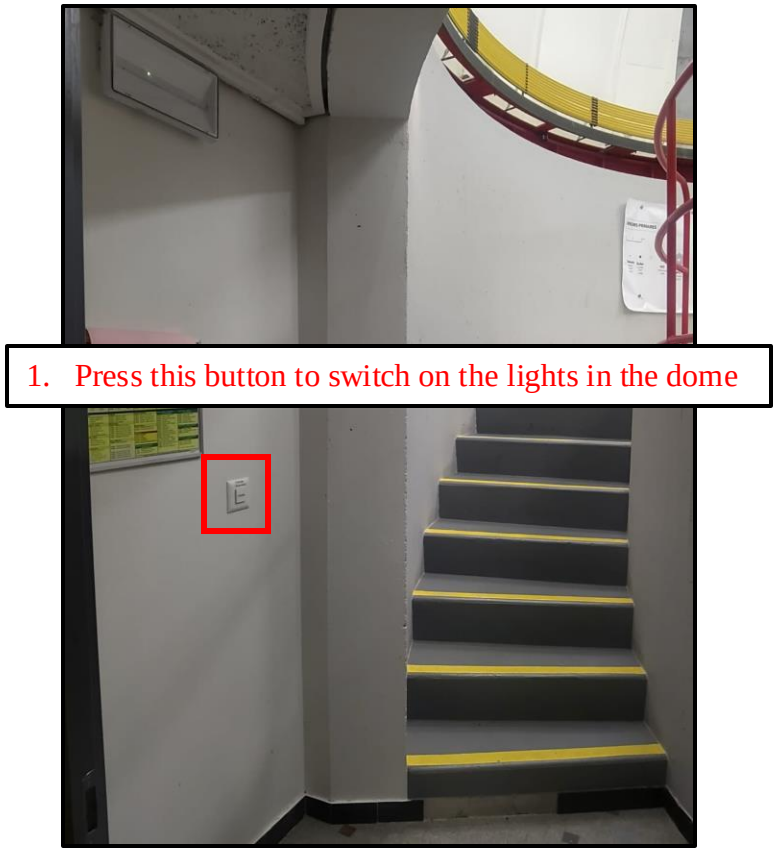
TELESTO

USER MANUAL – N.I.N.A.

STARTUP

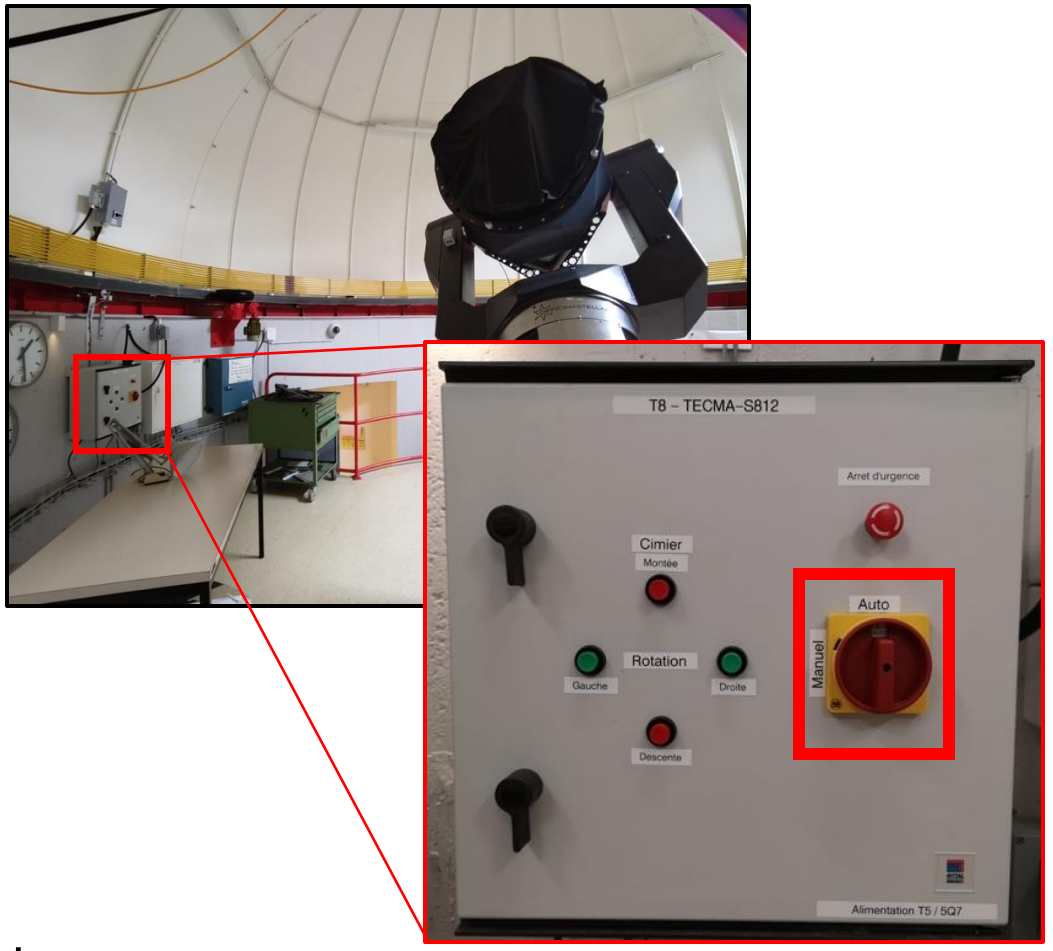
IN THE DOME

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

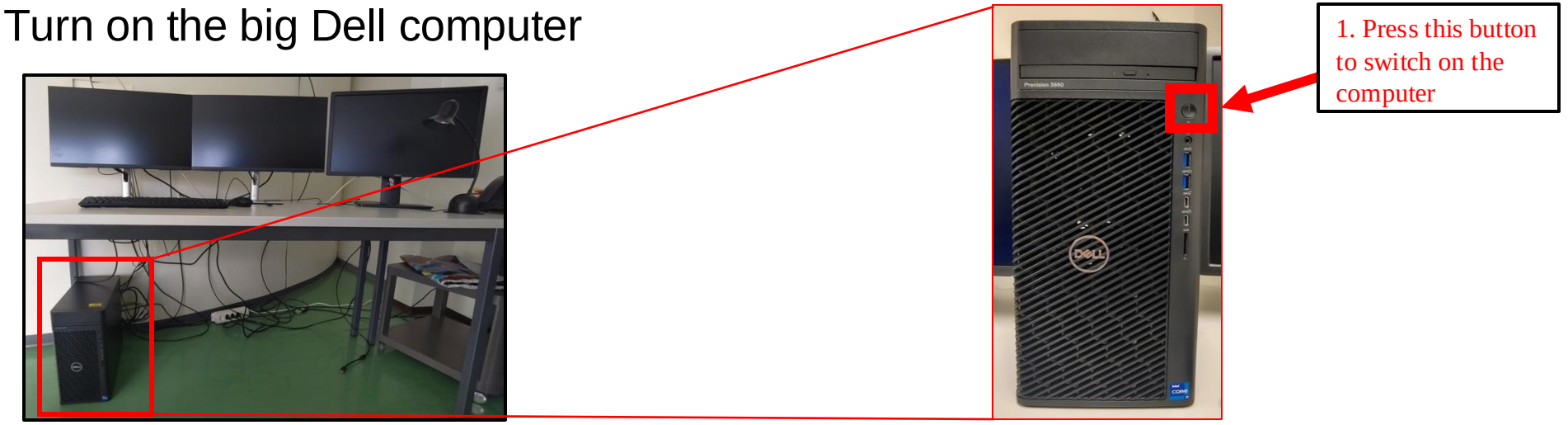
2. Make sure that the dome is on ‘Auto’ and not “Manual”. This allows to move the dome directly from the software in the control room.



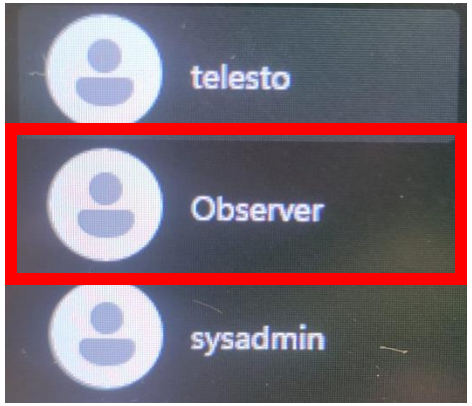
3. Switch off the dome lights and close the door of the dome

IN THE CONTROL ROOM

4. Turn on the big Dell computer



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



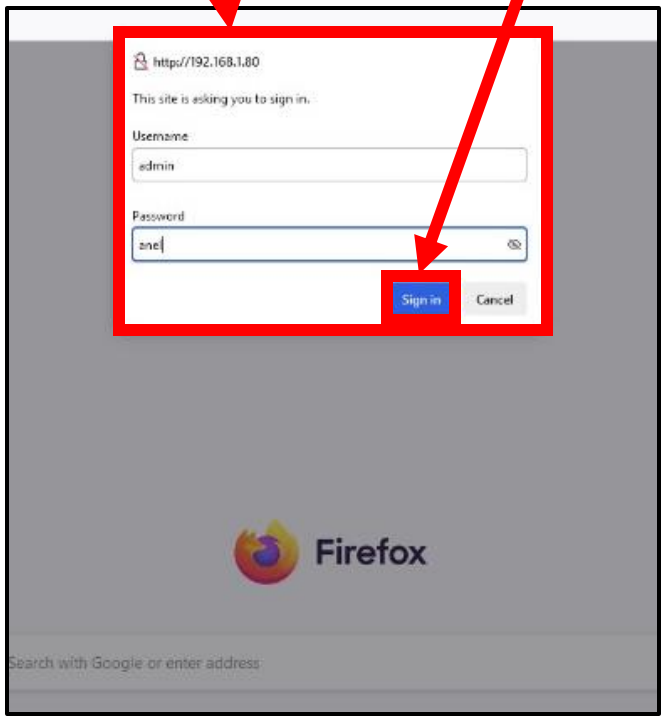
With this account you can not install any software on the computer, so do not try It ☺

6. Switch on the telescope power

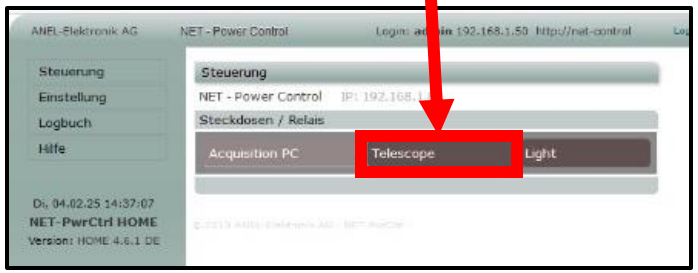
1. Open the Power control (on the top right of the Desktop)

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

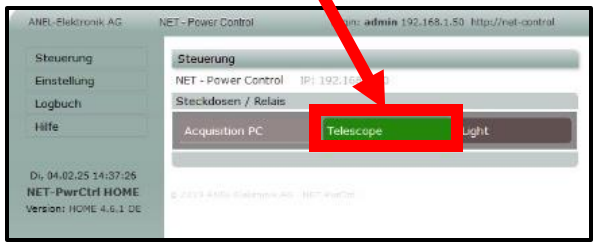
3. Click on ‘Sign in’



4. Click on ‘Telescope’



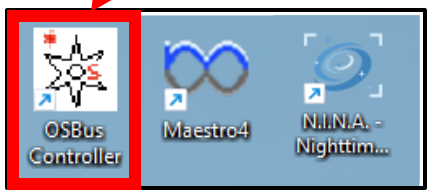
5. All good !



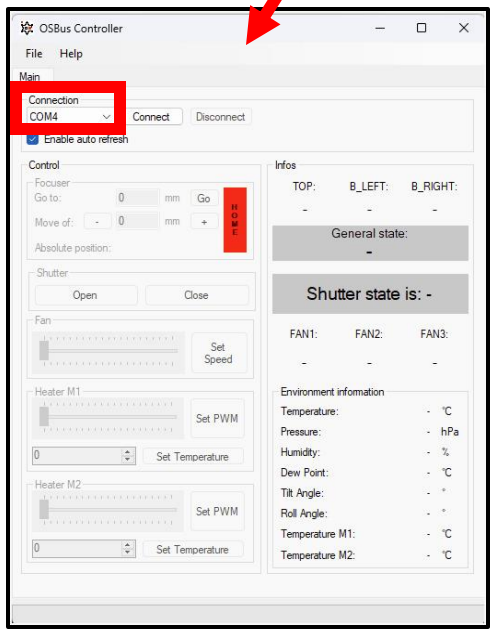
7. Launch the OSBus Controller software and connect it

If 'COM4' is not in the list, just reboot the Computer

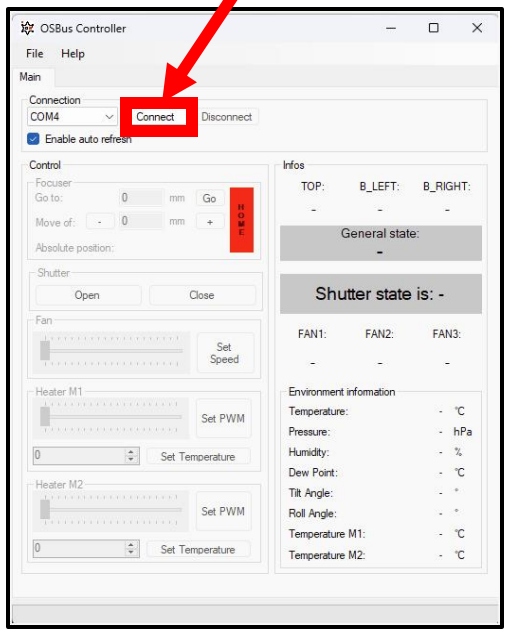
1. Open OSBus Controller program (on the top right of the Desktop)



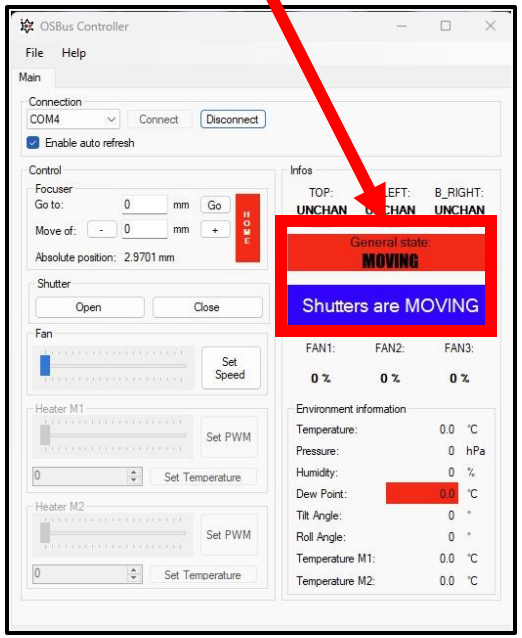
2. Check that the connection is 'COM4'



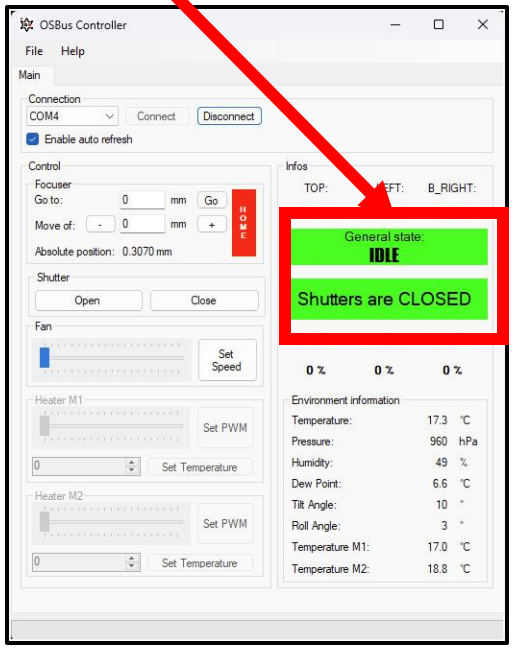
3. Click 'Connect'



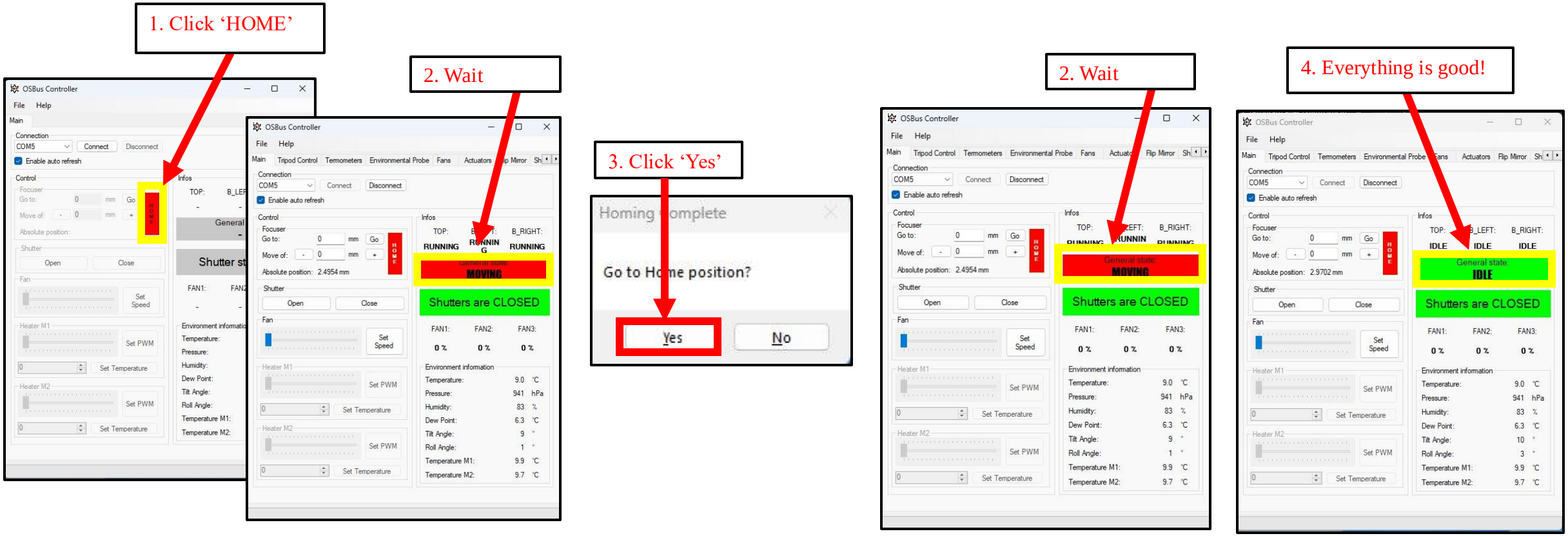
4. Wait



5. All good

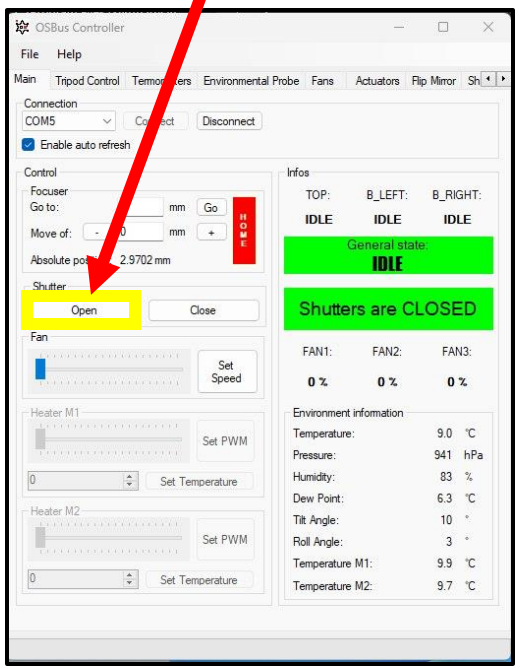


8. Home the focuser

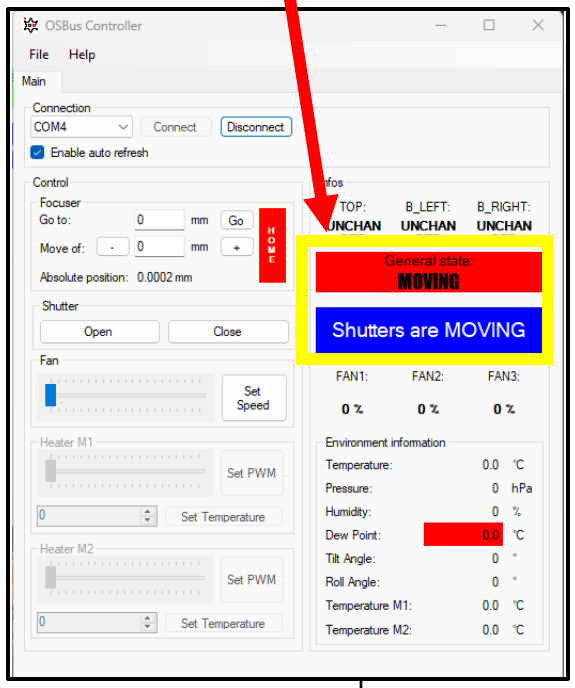


9. Open the shutters and close OSBus

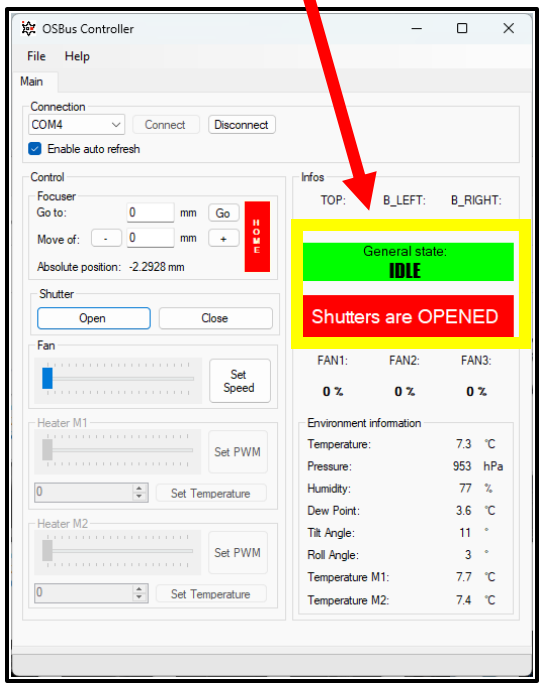
1. Click ‘Open’



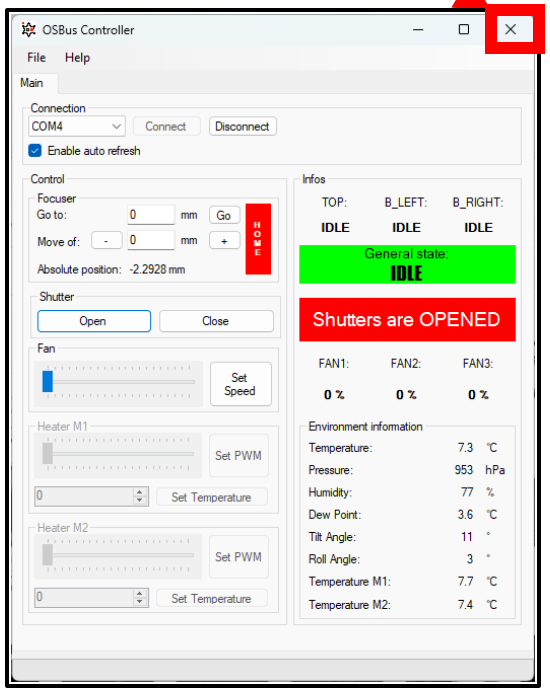
2. Wait



3. Everything is good!

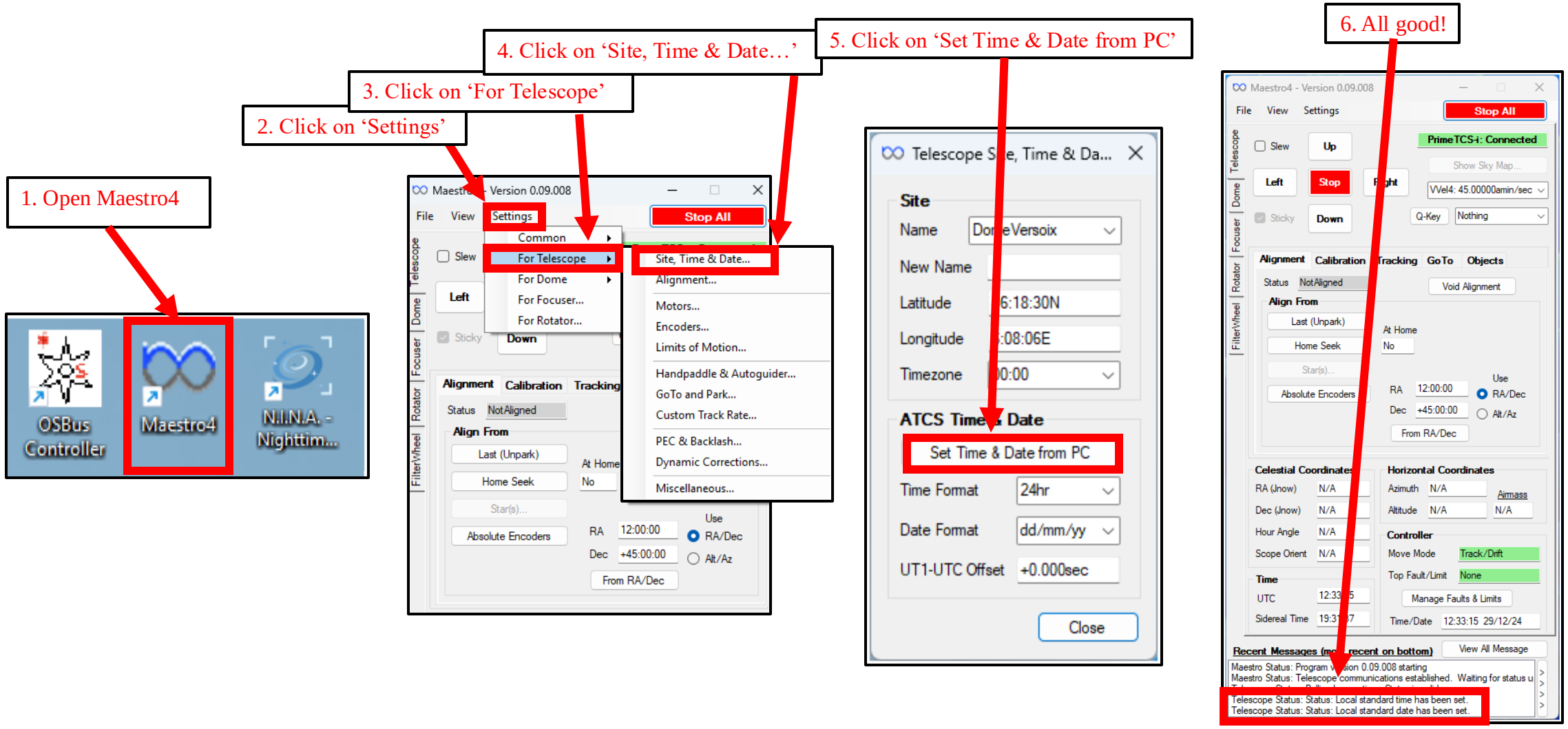


5. Close OSBus

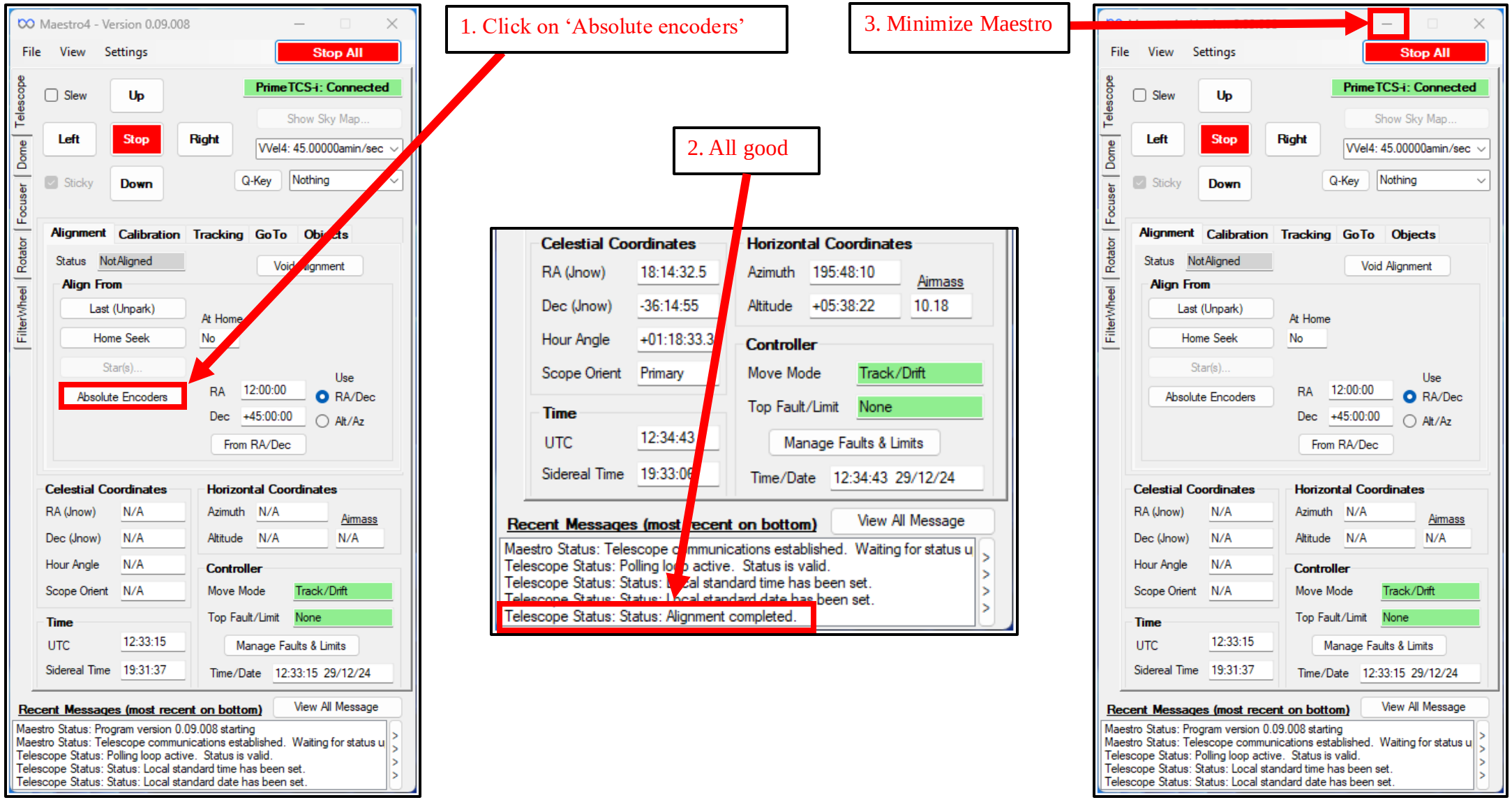


If you get the message ‘shutters are MOVING’ for too long (more than 2 minutes), it means that they are probably stuck. Open them one by one following the instruction on the troubleshooting page (https://plone.unige.ch/astrodome/observations/content/troubleshooting)

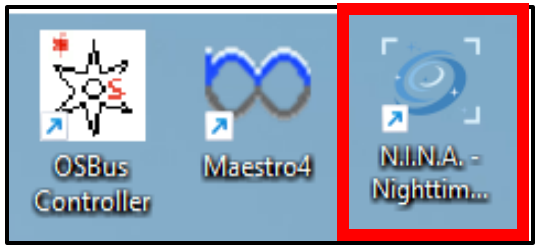
10. Open Maestro4 and set date and time



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

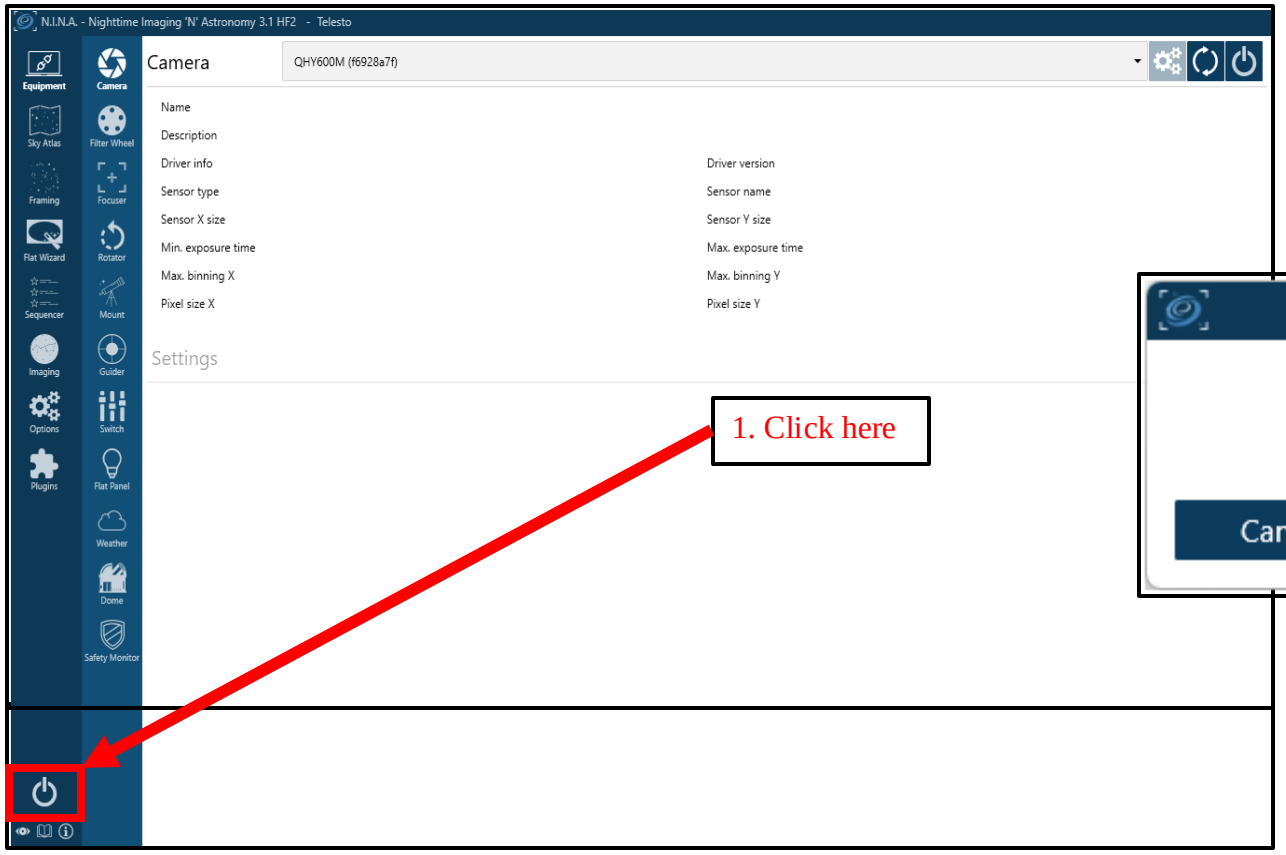


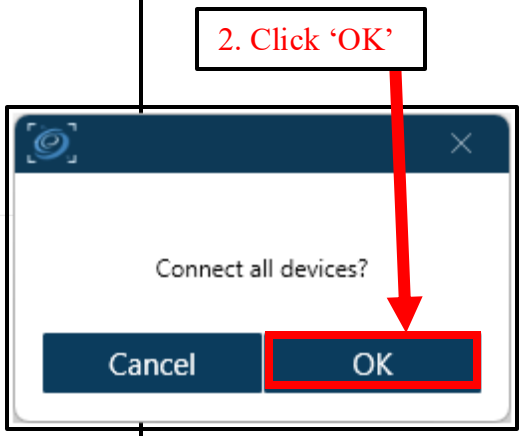
12. Open NINA

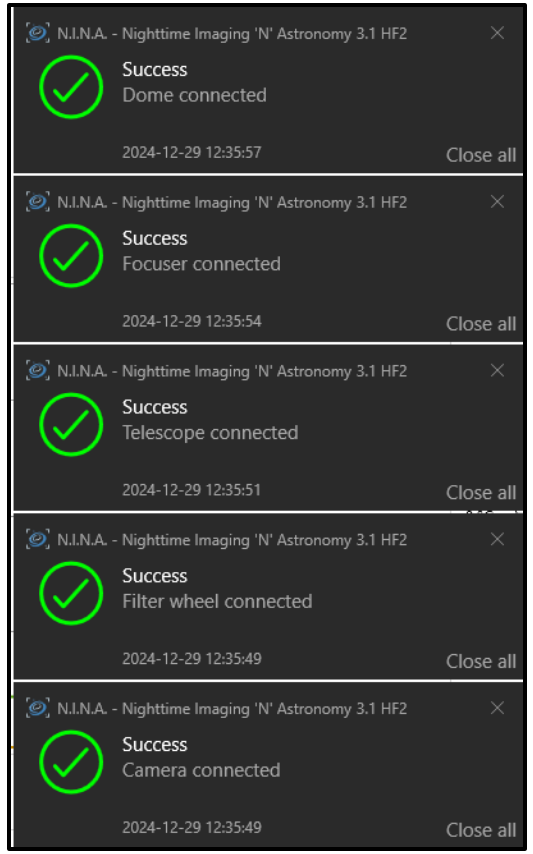


13. Connect all devices

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







13. Disconnect and reconnect the focuser

1. Click on ‘Equipment’

2. Click on ‘Focuser’

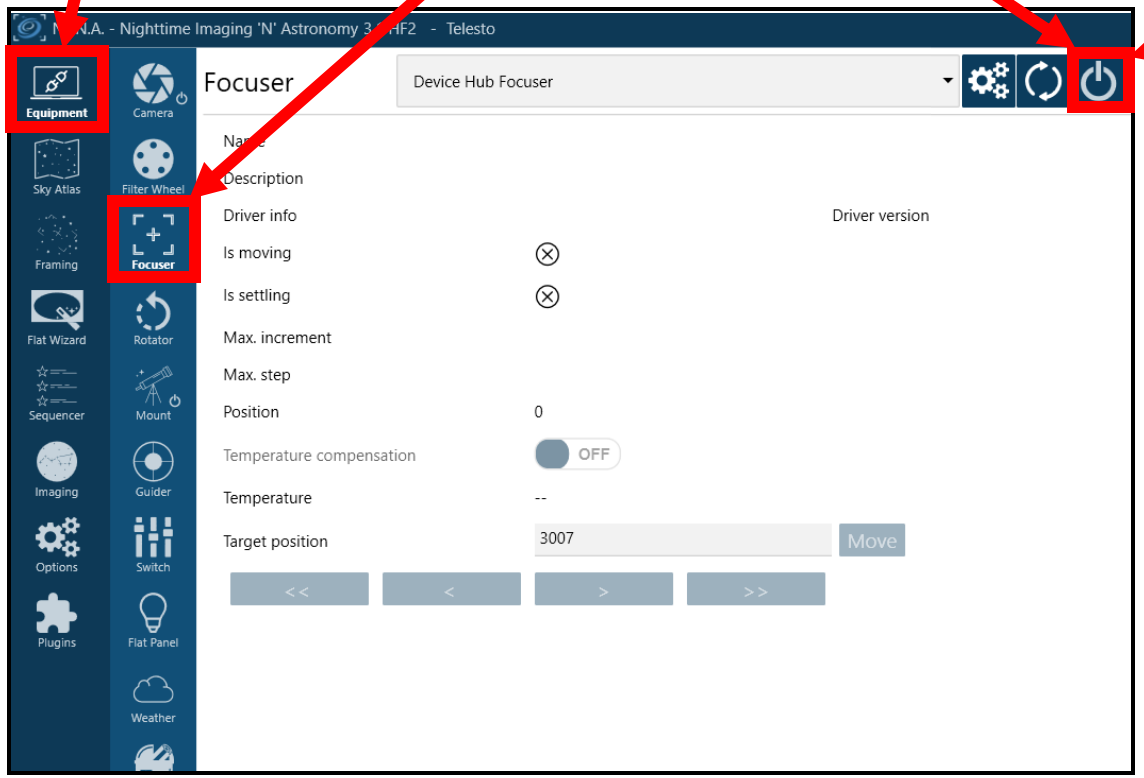
3. Click here to disconnect

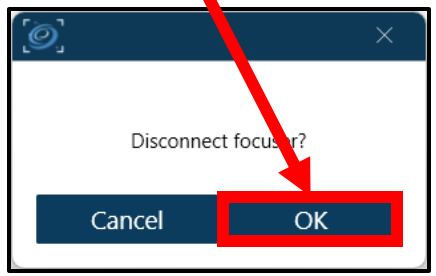
4. Click ’OK’

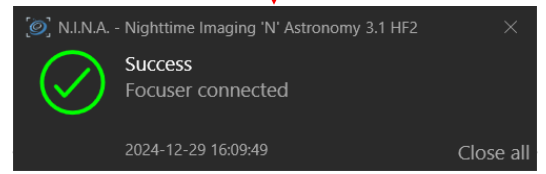
5. Click again to connect

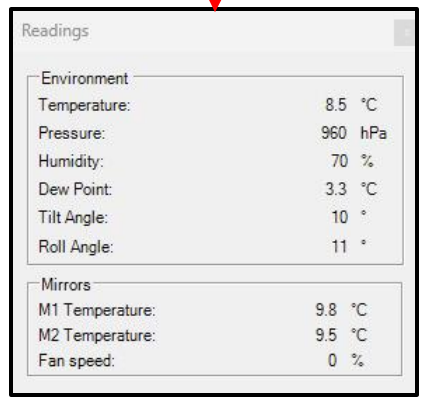
6. All good!

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

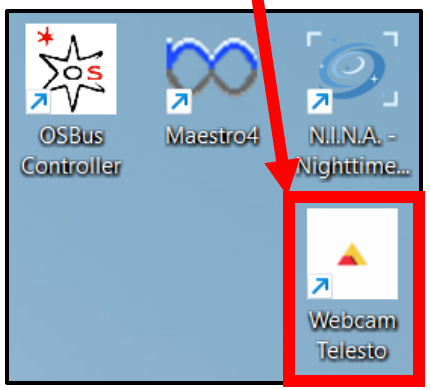
4. When you click on 'Find Home', the Dome will make one full turn to calibrate the spatial coordinates

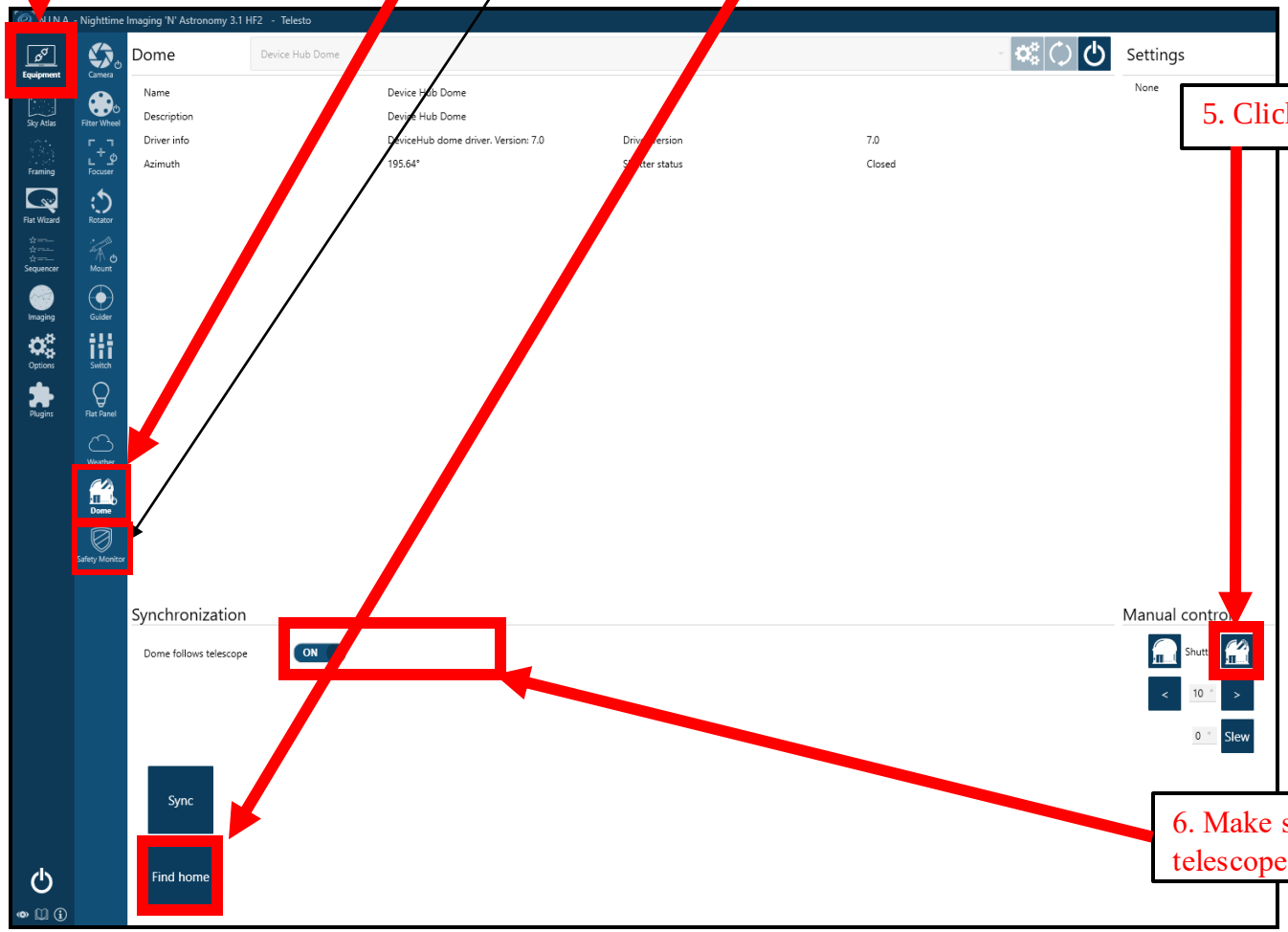
1. You can check that the dome and the telescope positions by clicking here to open the live camera inside the dome

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

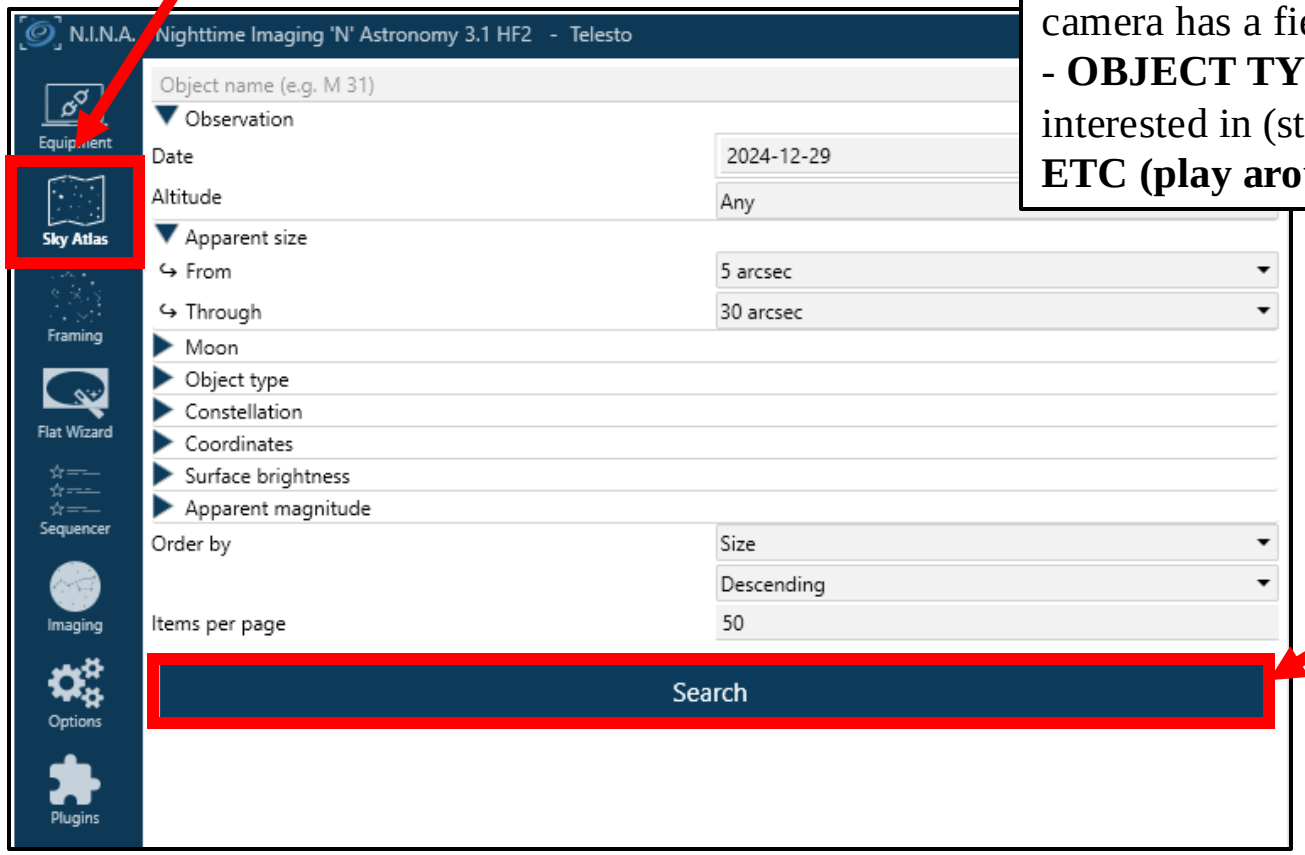
CHOOSING A TARGET

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)

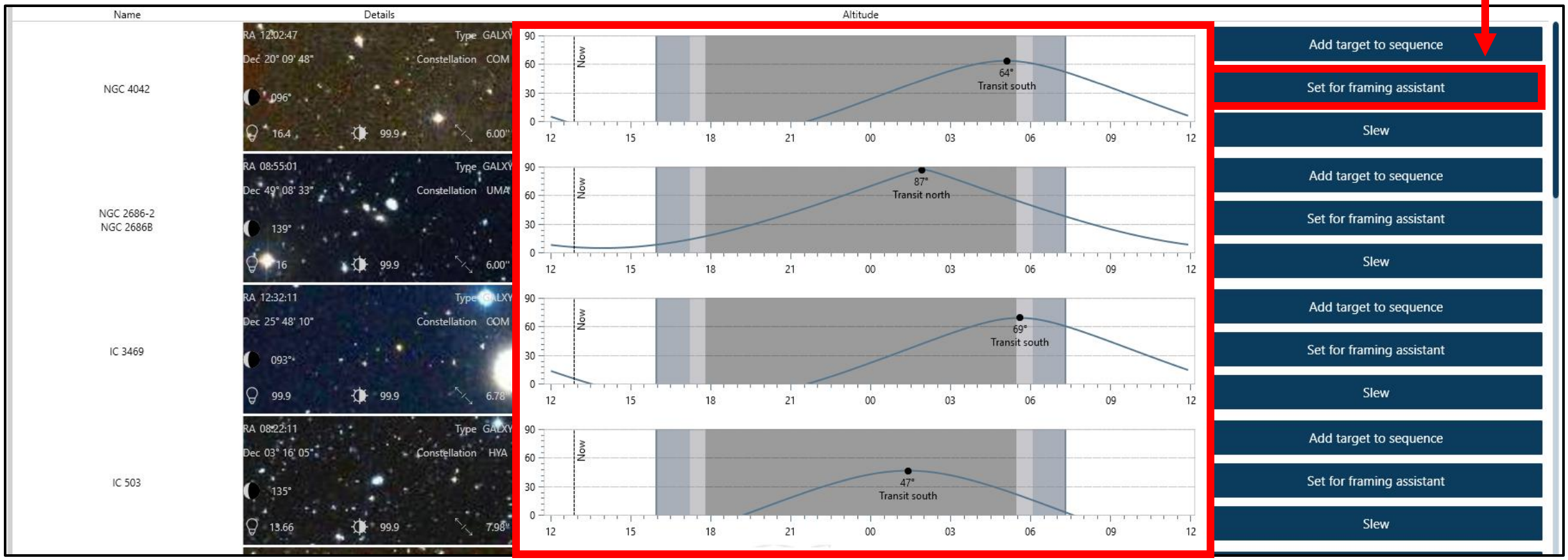


3. Click on 'Search'

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



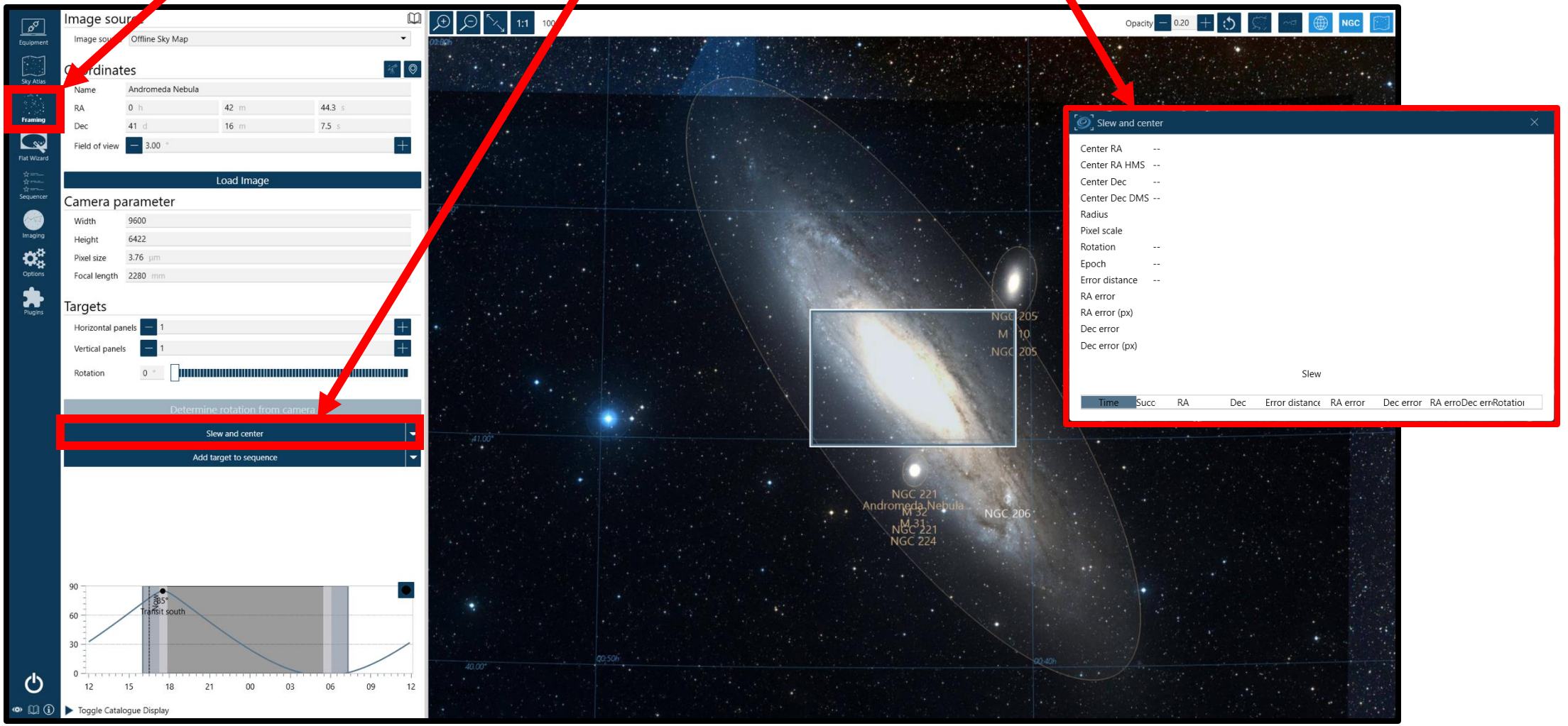
POINTING THE TELESCOPE ON YOUR TARGET

If the centering (plate solve) does not work, probably you are out of focus. Firstly, do an autofocus (next 2 slides) and then slew and center to the object

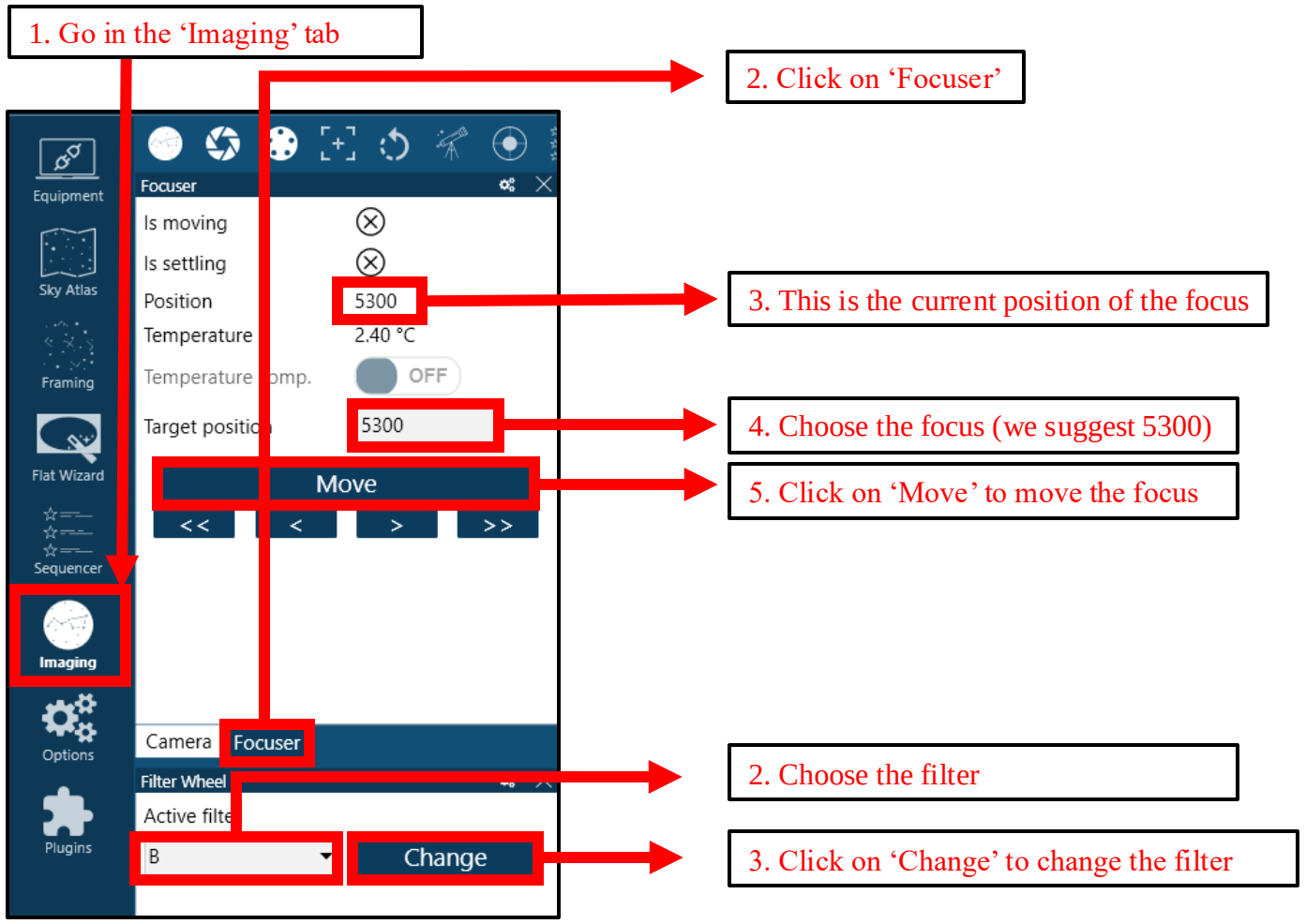
1. Go in the ‘Framing’ tab

2. Click on ‘Slew and center’

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



SELECTING FOCUS & FILTER



AUTOFOCUS

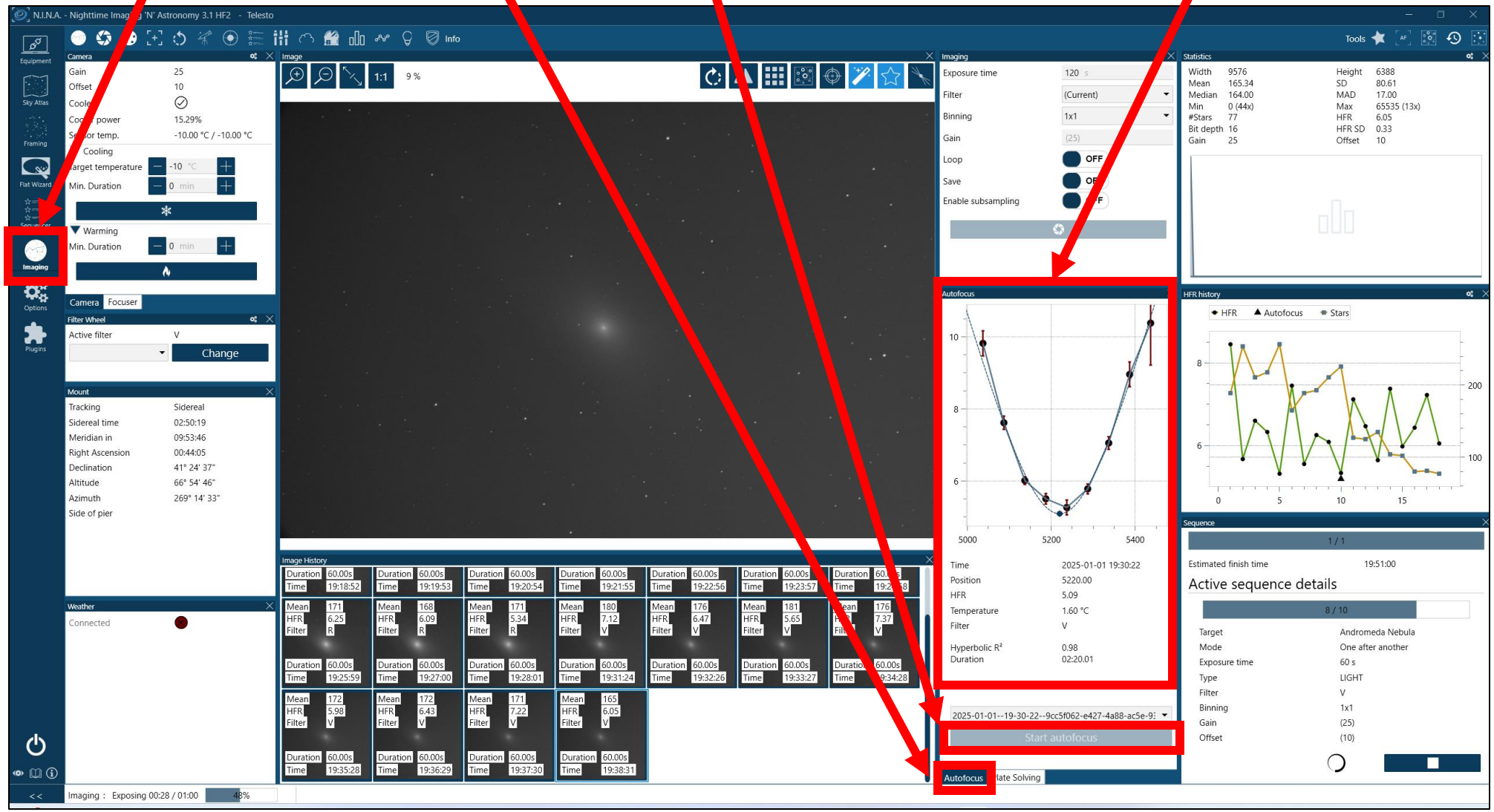
If the autofocus fails, you are probably too far from the good value. Set the focus to 5300 (previous slide), and then redo the autofocus

1. Go in the ‘Imaging’ tab

2. Click on ‘Autofocus’

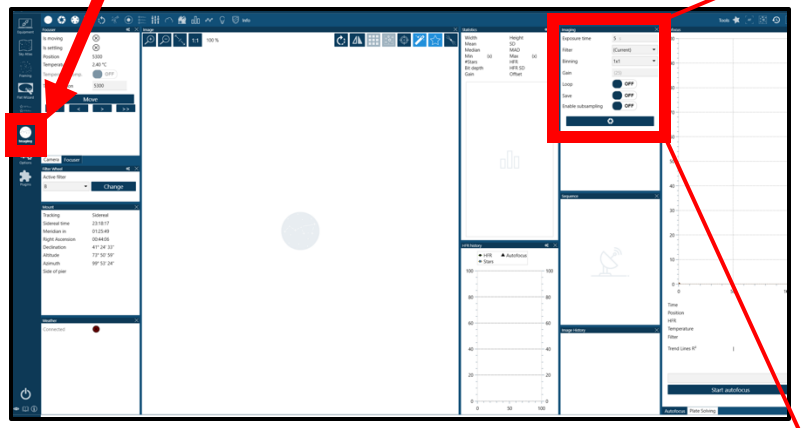
3. Click on ‘Start autofocus’

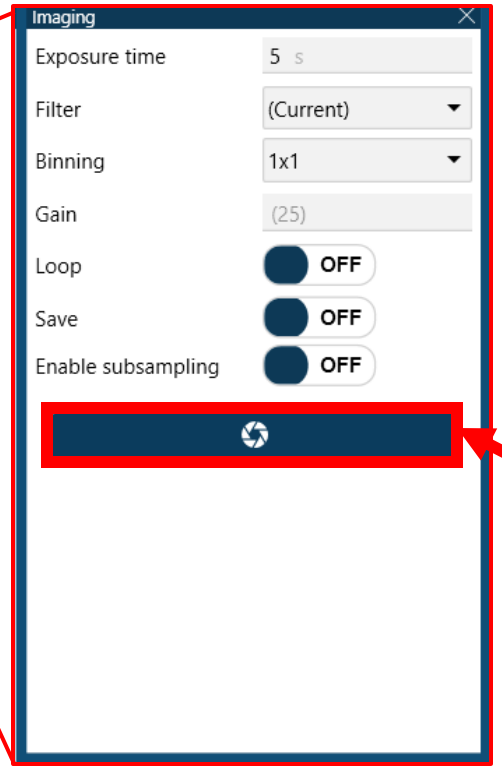
4. It will take few images to adjust the focus



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

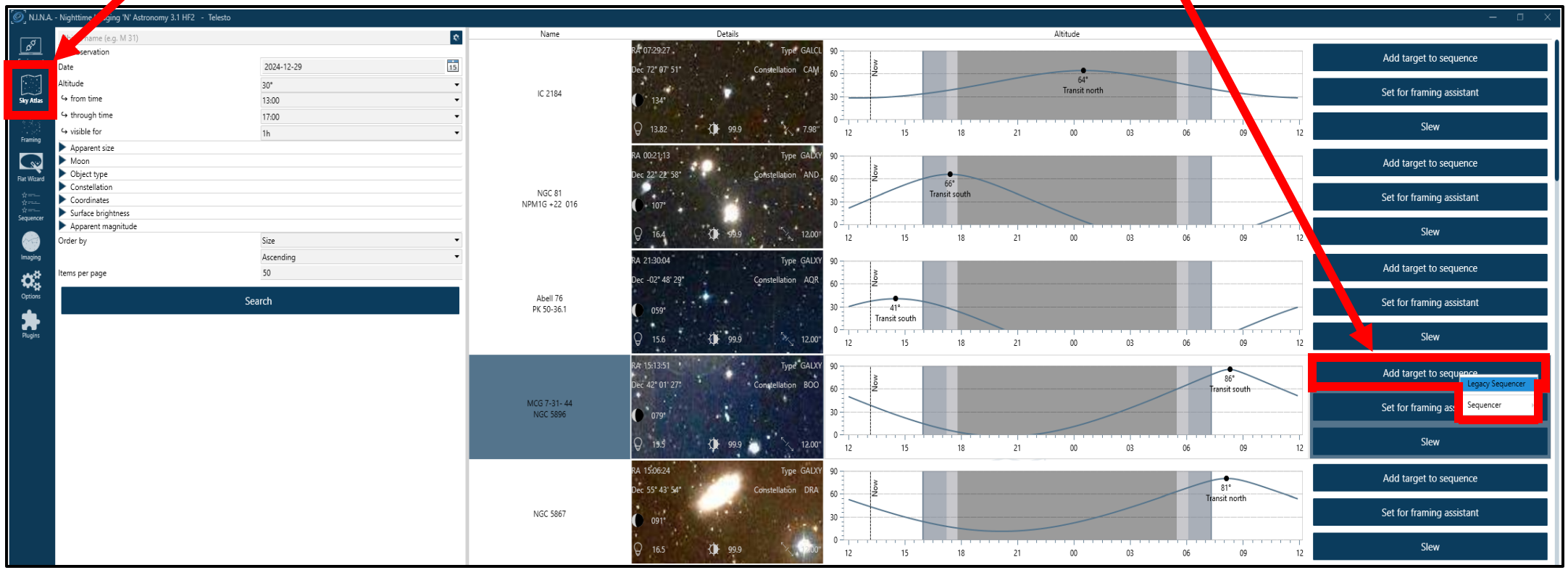
3. Click here to take a picture

TAKING A SEQUENCE OF TARGETS AND PICTURES

There is the option to take multiple consecutive pictures

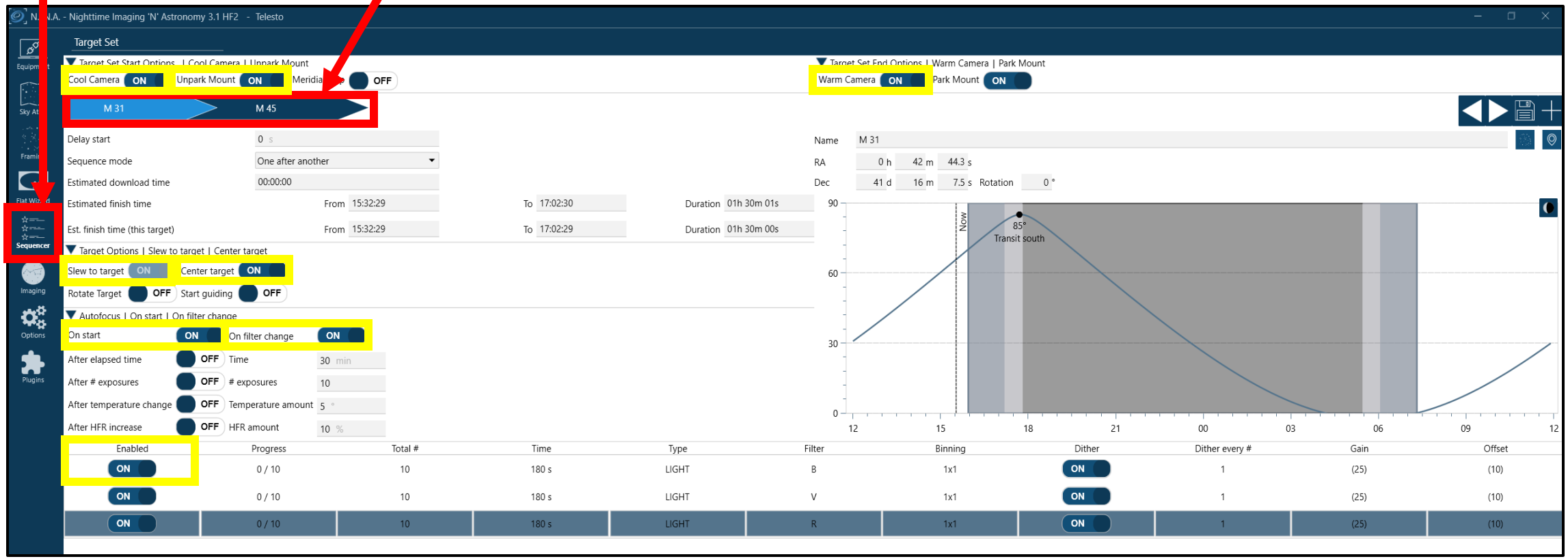
1. In the Sky Atlas tab choose the target you want to observe

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

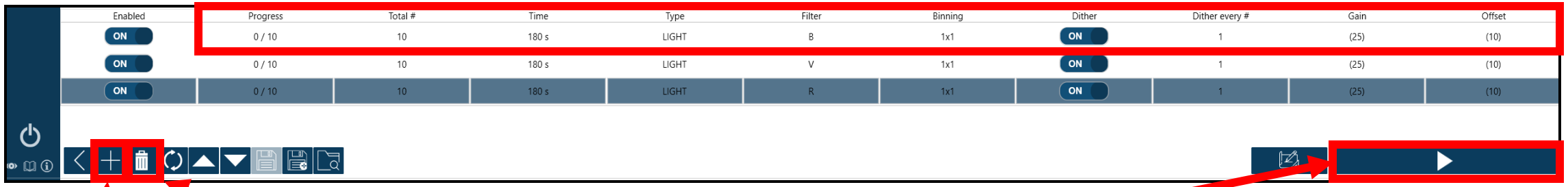


3. We suggest you to set ON all the parameters in the yellow rectangles:

- **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)

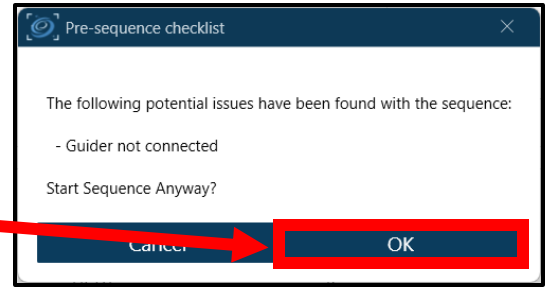


Click here if you want to add a set of pictures for that specific target

Click here to delete that set of pictures

Click here to start the sequence

A window like this will appear, click 'OK'



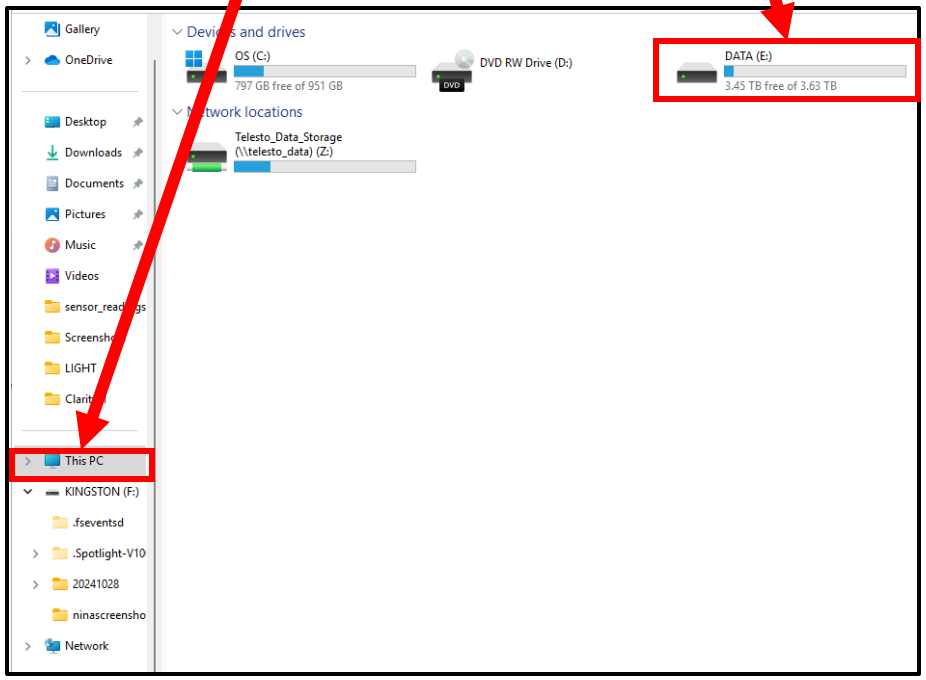
DATA STORAGE

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

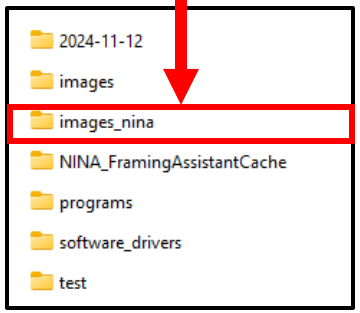
1. Select the folder icon in the bottom bar of the screen

2. Click on ‘This PC’

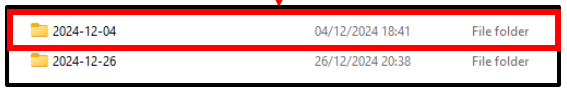
3. Select ‘DATA (E:)’



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



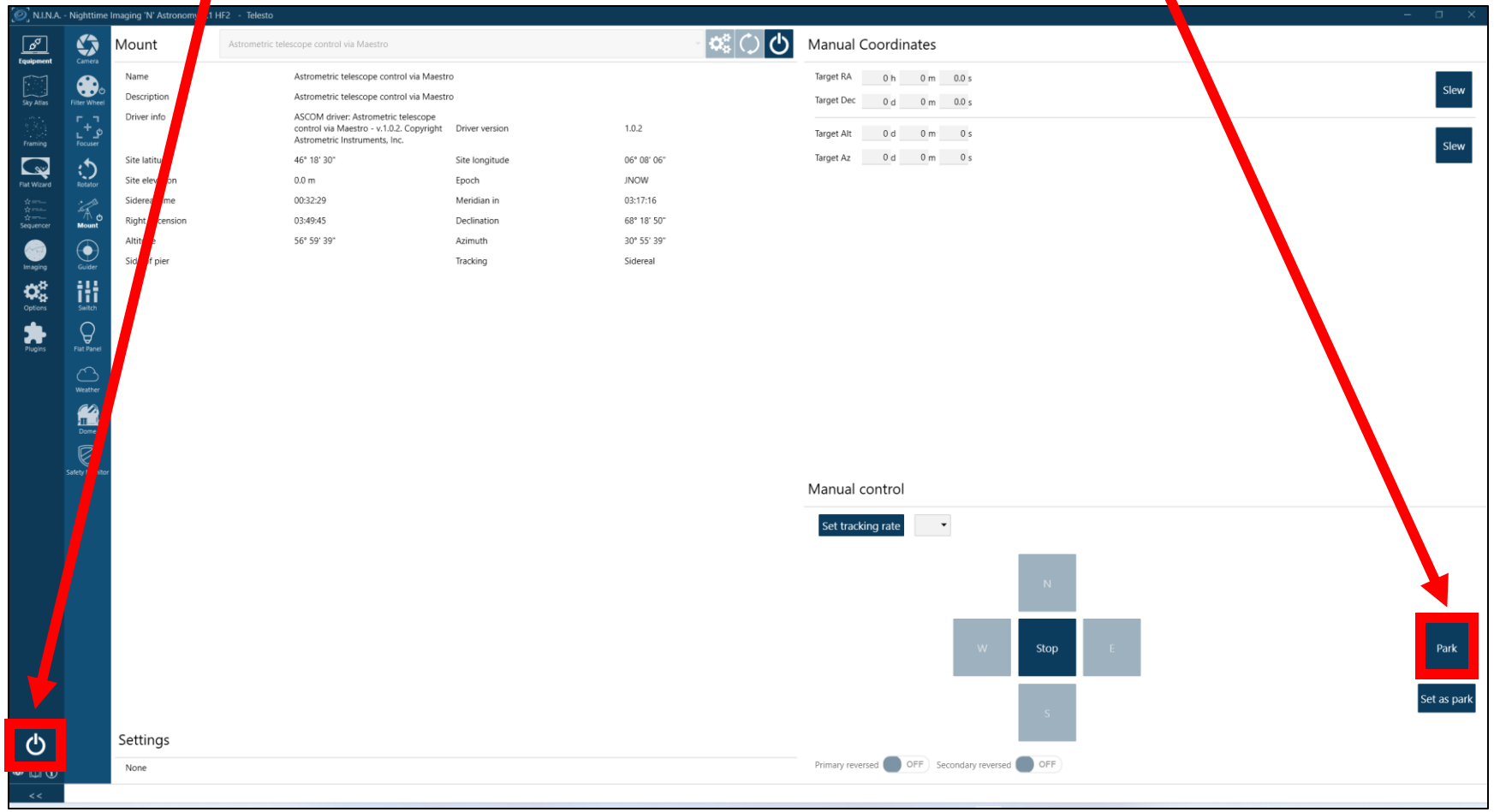
END OF THE NIGHT

IN THE CONTROL ROOM

1. Park the telescope

1. Go in the ‘Equipment’ tab

2. Click on ‘Park’

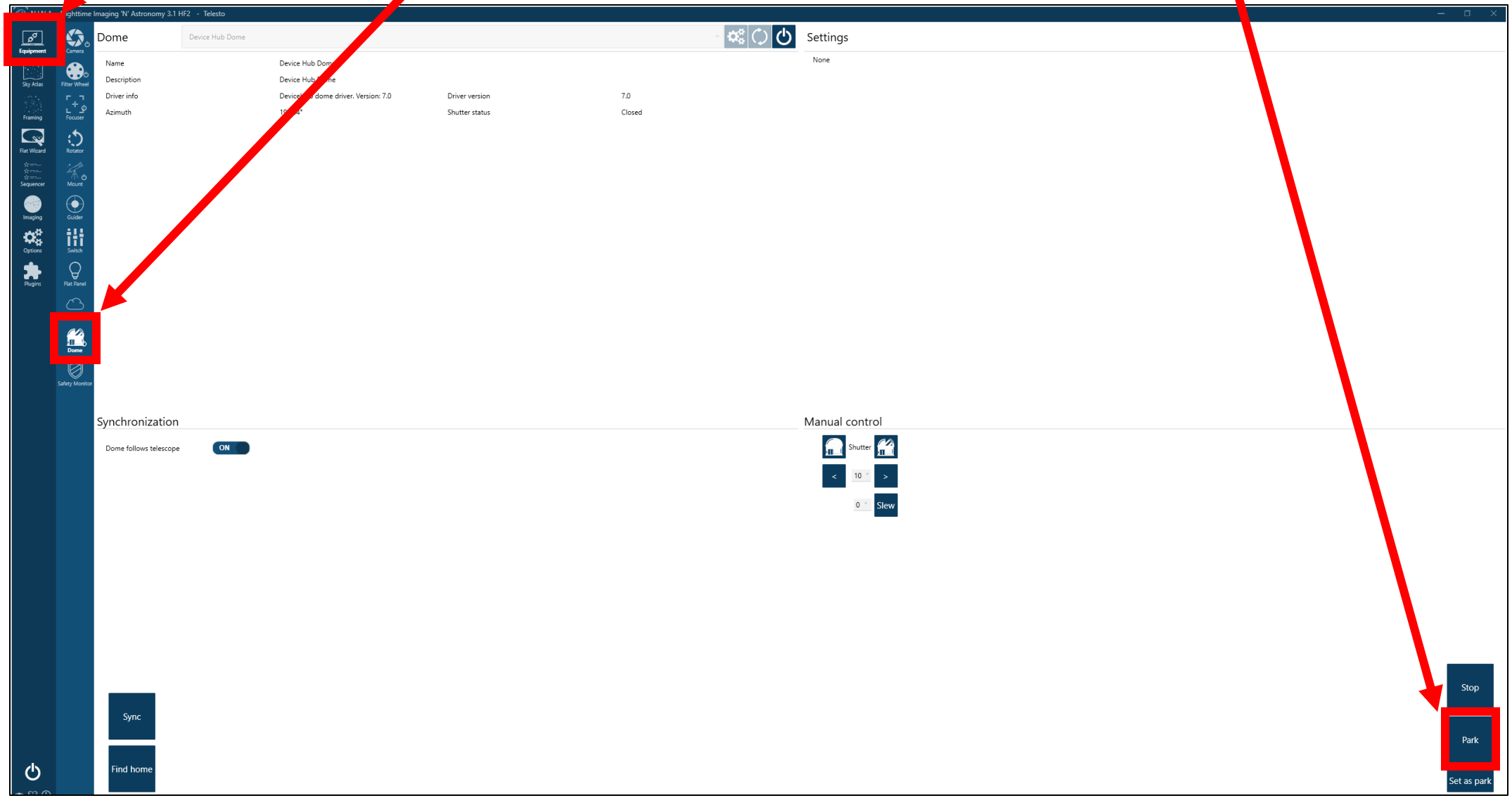


2. Park the dome

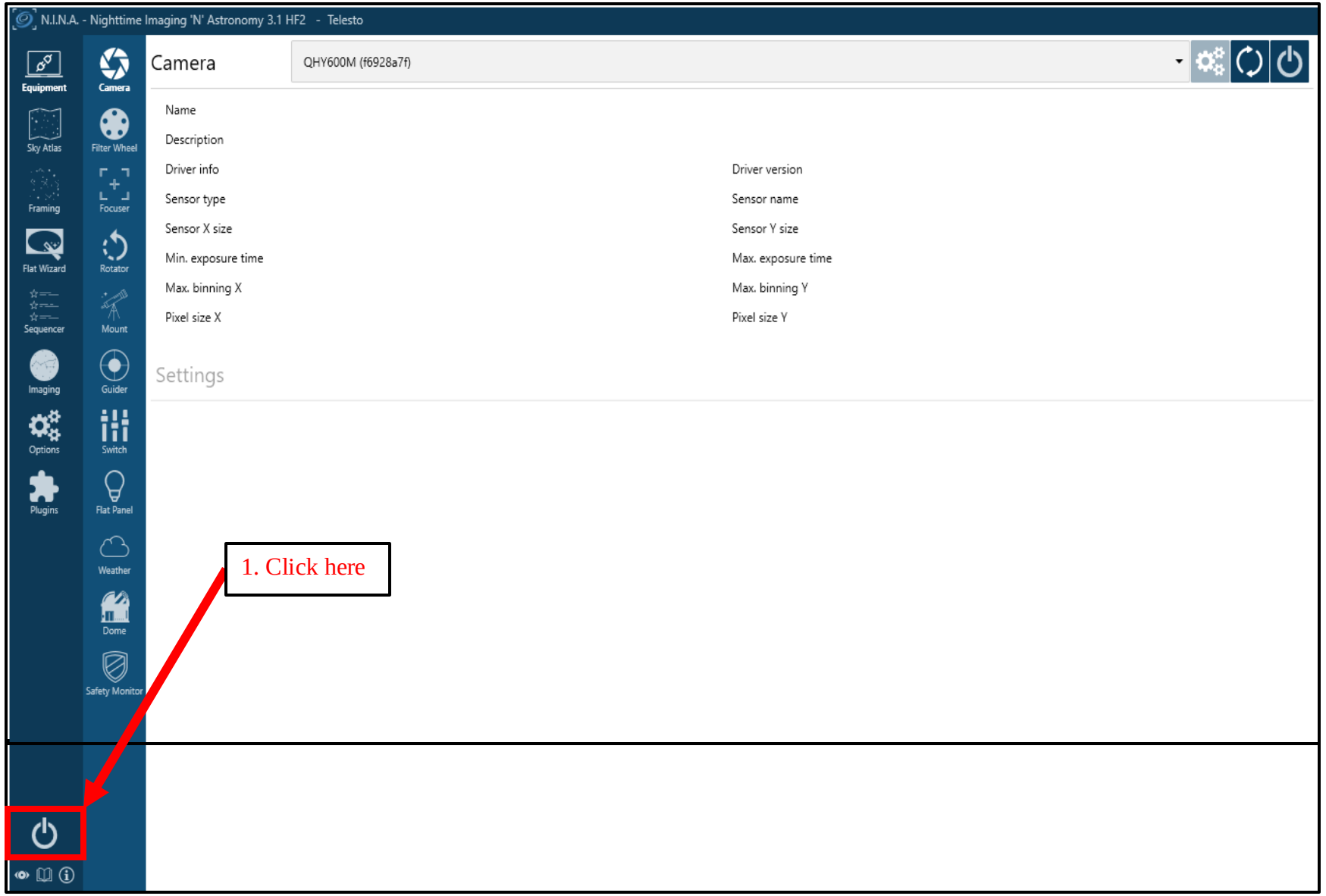
1. Go in the ‘Equipment’ tab

2. Click on ‘Dome’

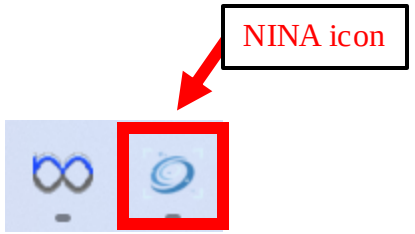
3. Click on ‘Park’ (it will both park and close the dome)

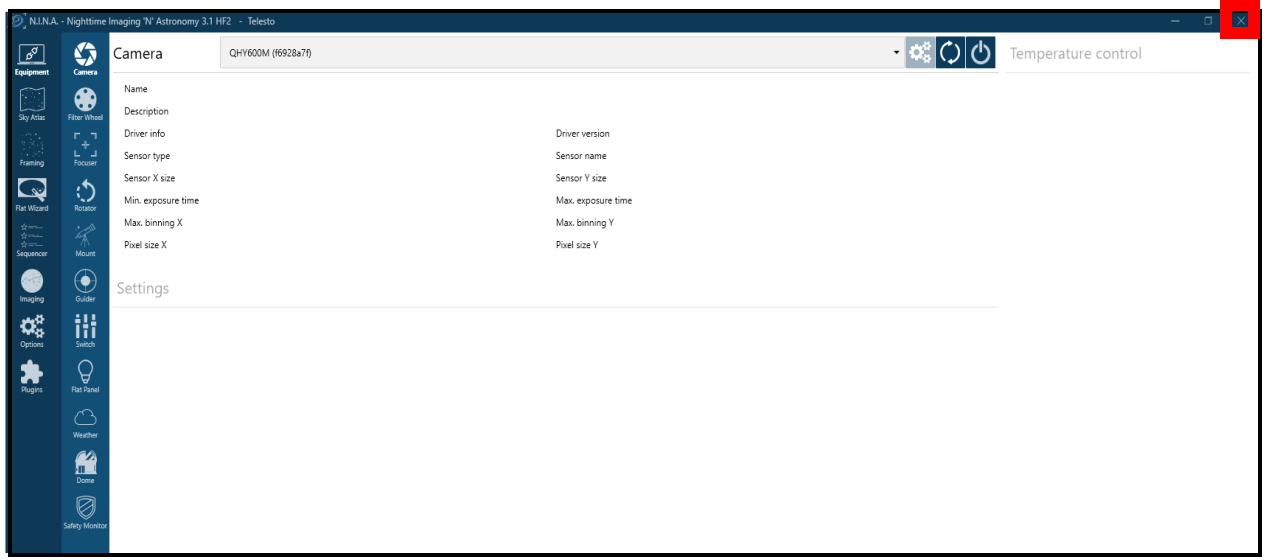


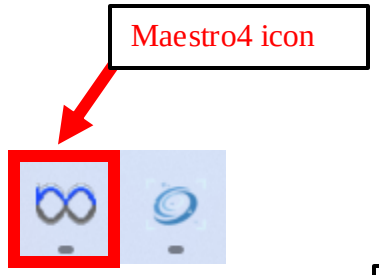
3. Disconnect all devices in NINA

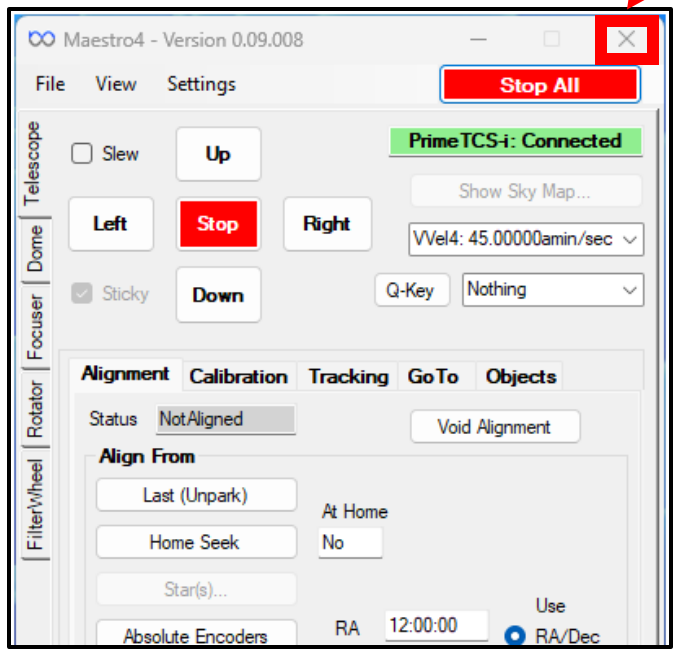


4. Close NINA and Maestro

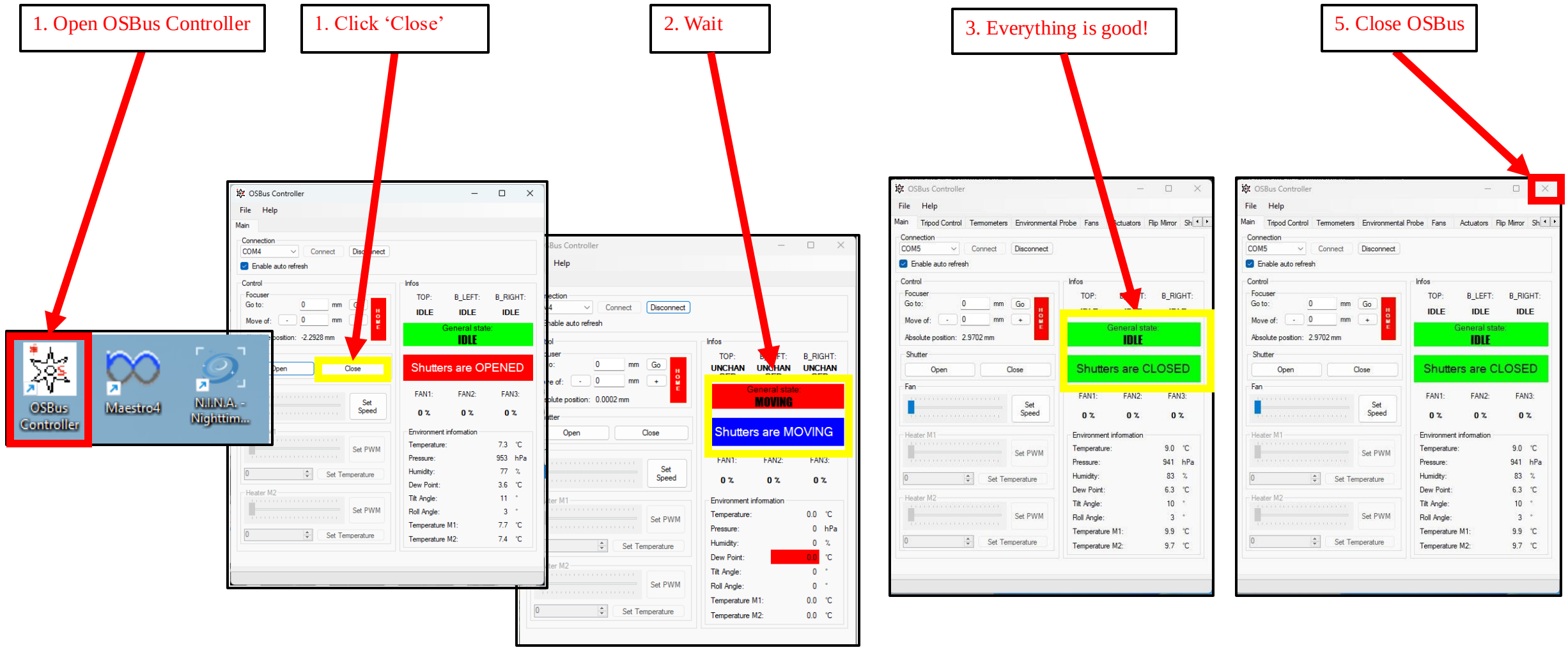








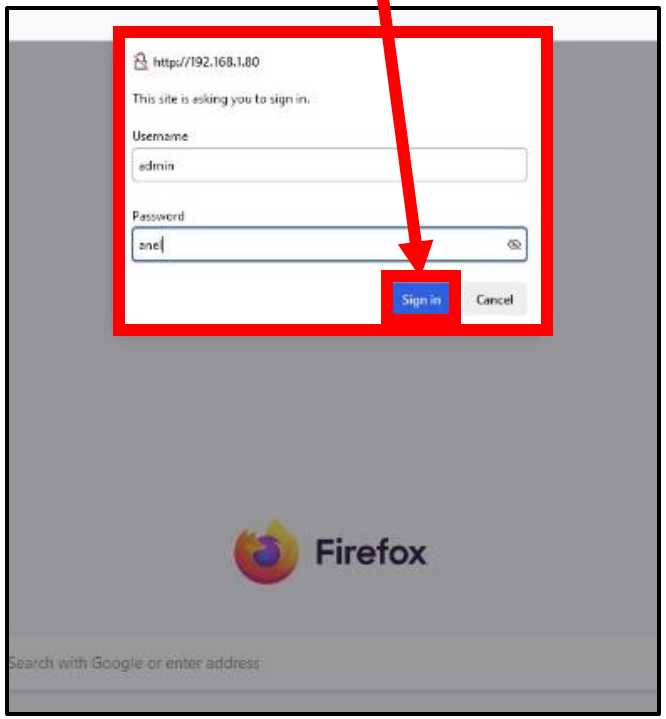
5. Close the Shutters in the OSBus Controller



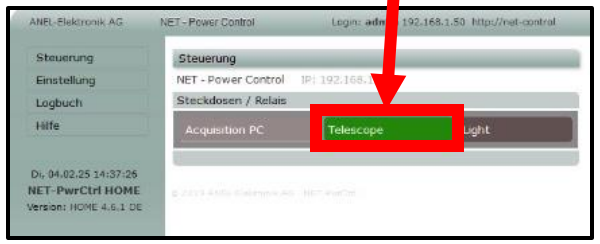
6. Shut down the telescope power

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

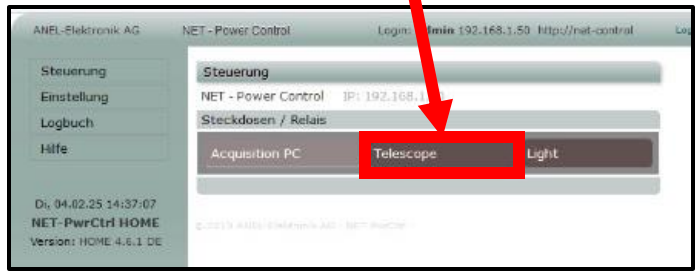
2. Click on ‘Sign in’



3. Click on ‘Telescope’



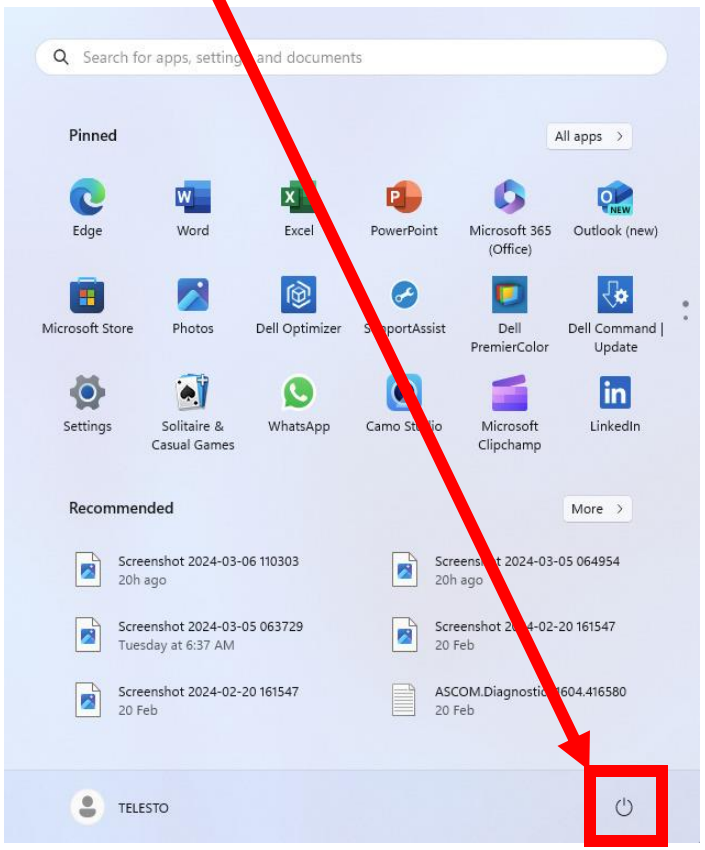
4. All good !



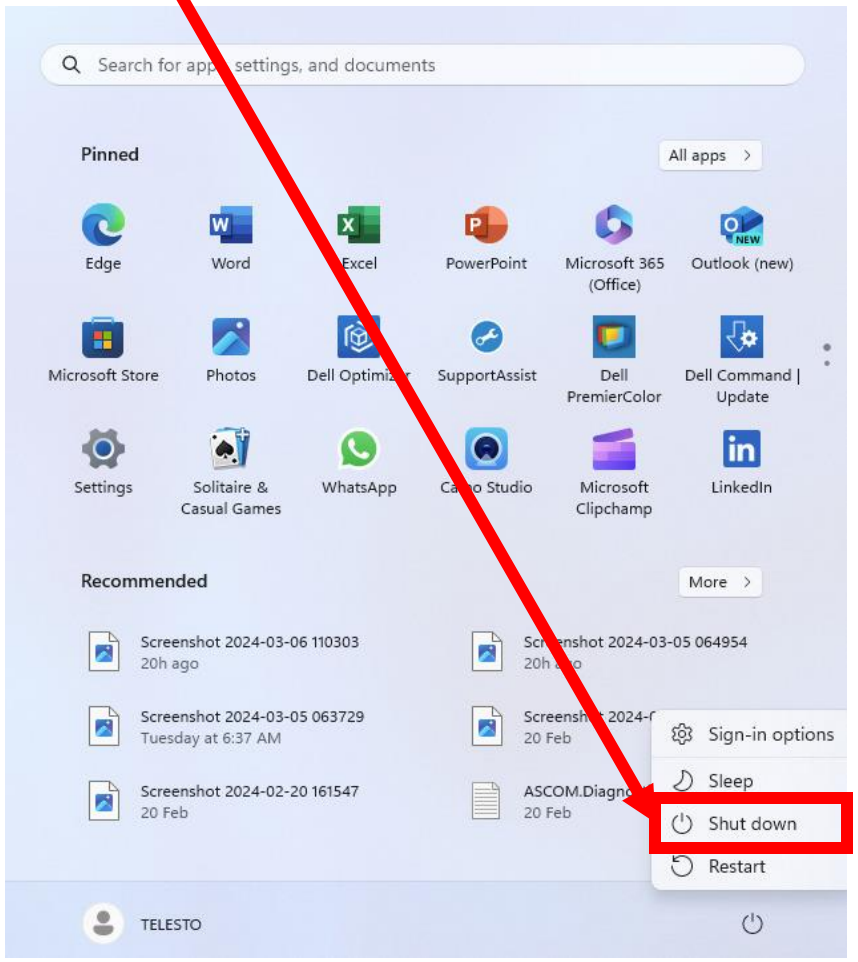
7. Shut down the computer

Select the Windows icon in the bottom bar of the screen

Click on the switching off button

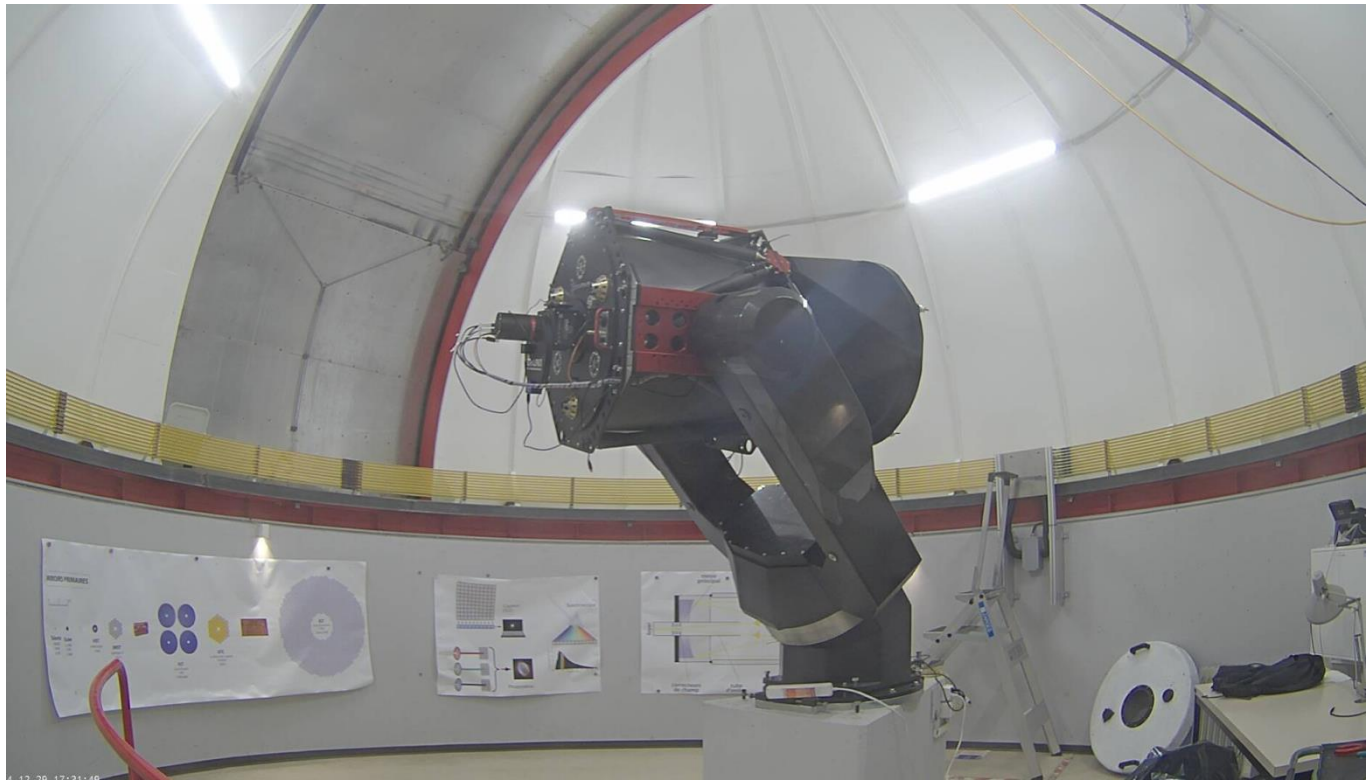


Click on’Shut down’



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