

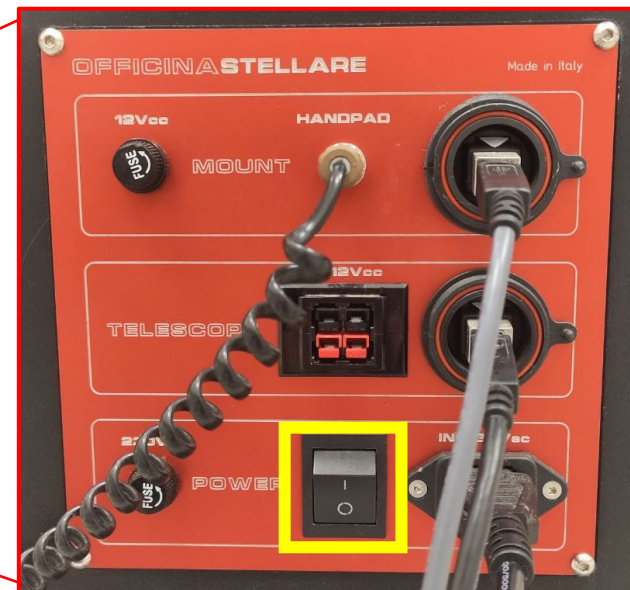
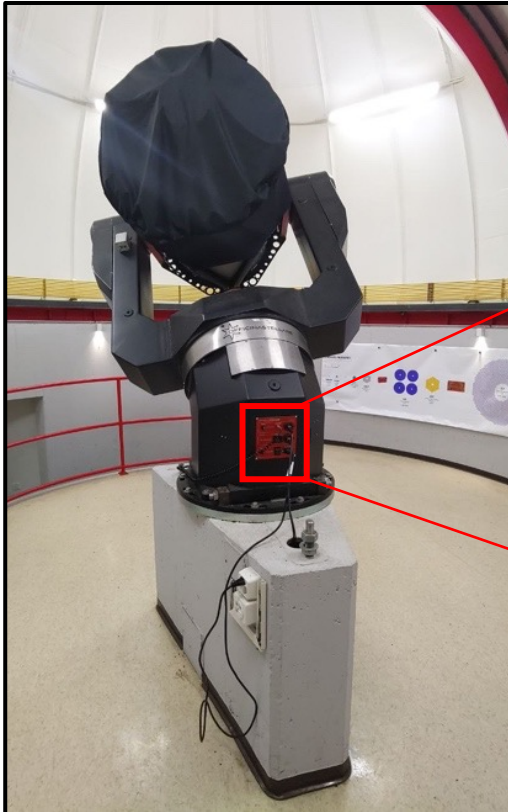
TELESTO

USER MANUAL

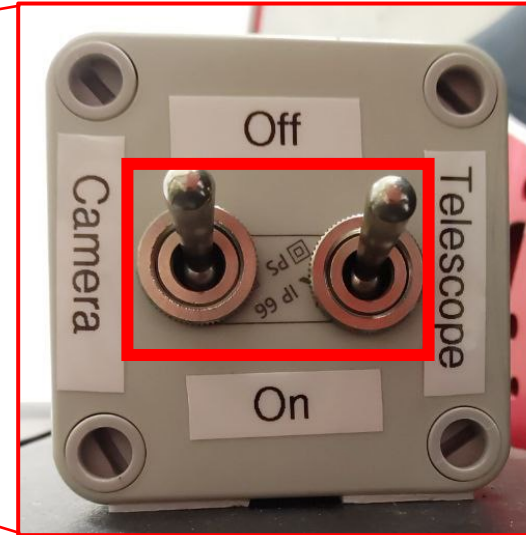
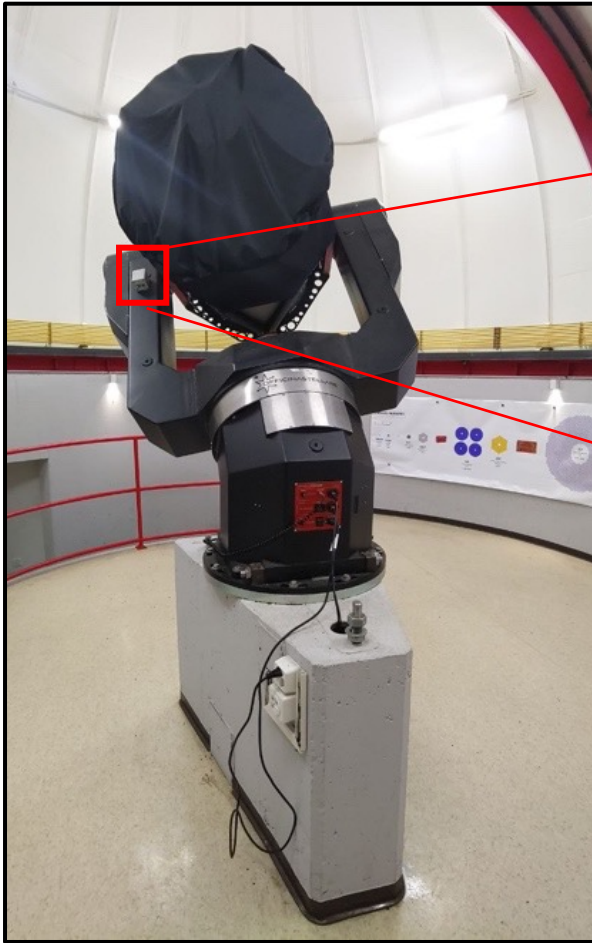
STARTUP

IN THE DOME

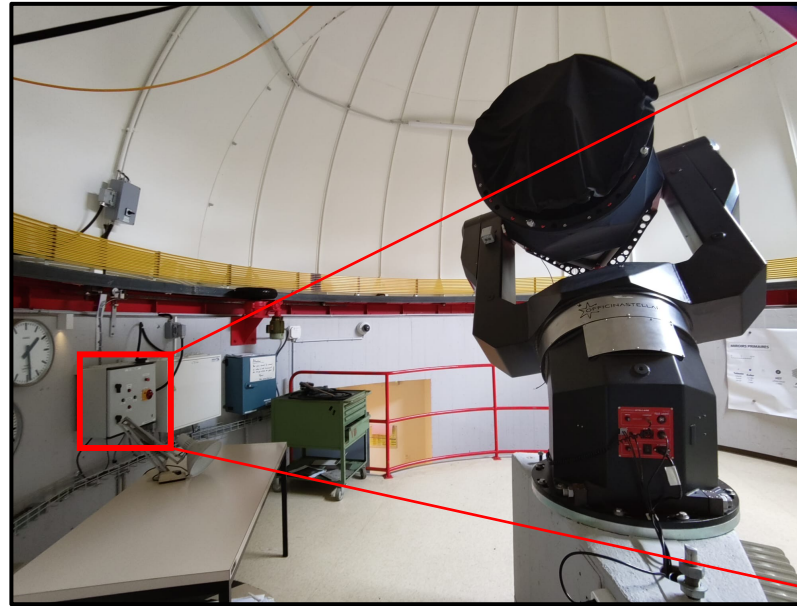
1. Switch **ON** the telescope electricity by using the designated switch (1=ON, 0=OFF).



2. Turn on the Camera and the Telescope: pull down the two switches



3. 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.

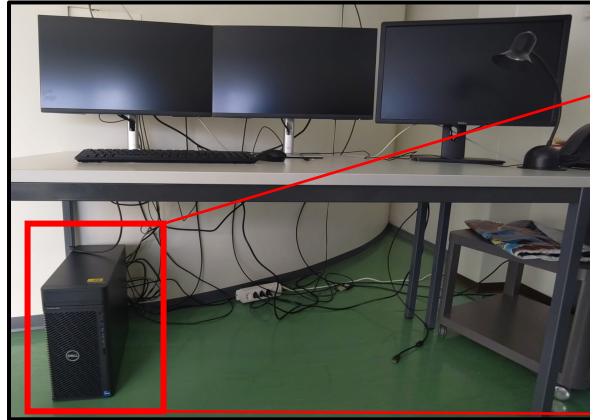


4. Remove the cover from the telescope



IN THE CONTROL ROOM

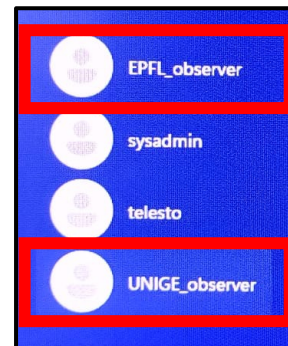
5. Turn on the big Dell computer



1. Press this button to switch on the computer

6. Select an observer account (either UNIGE or EPFL, depending on you) and log in. The password is:

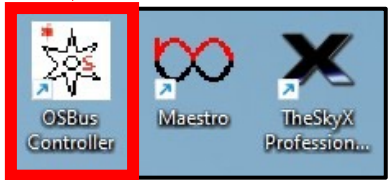
- **unige1559** for UNIGE_observer
- **1969epfl** for EPFL_observer



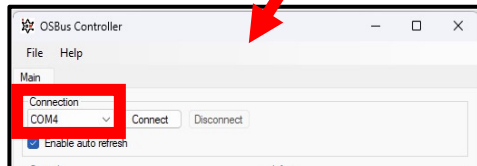
With this account you can not install any software on the computer, so do not try It 😊

7. Launch the OSBUs Controller software and connect it

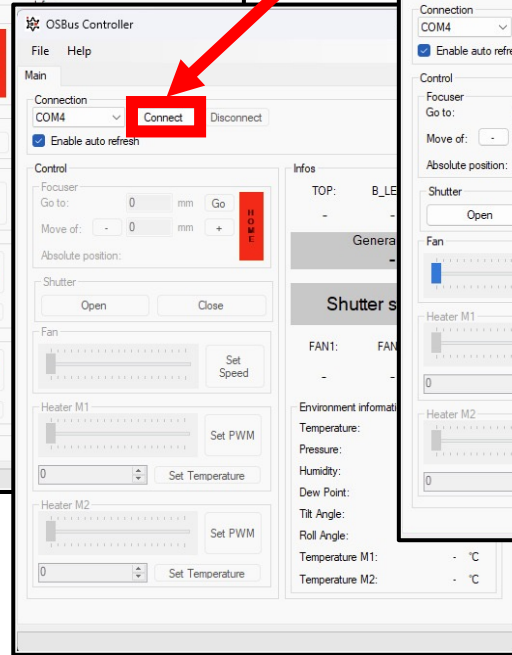
1. Open OSBus Controller program (on the top right of the Desktop)



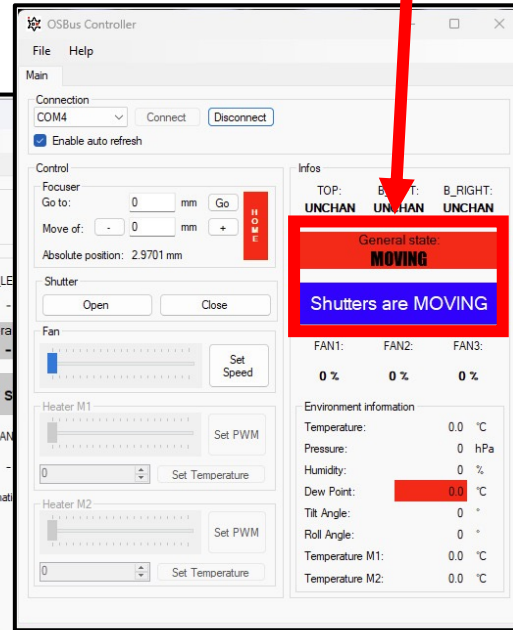
2. Check that the connection is 'COM4'



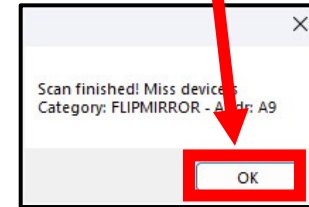
3. Click 'Connect'



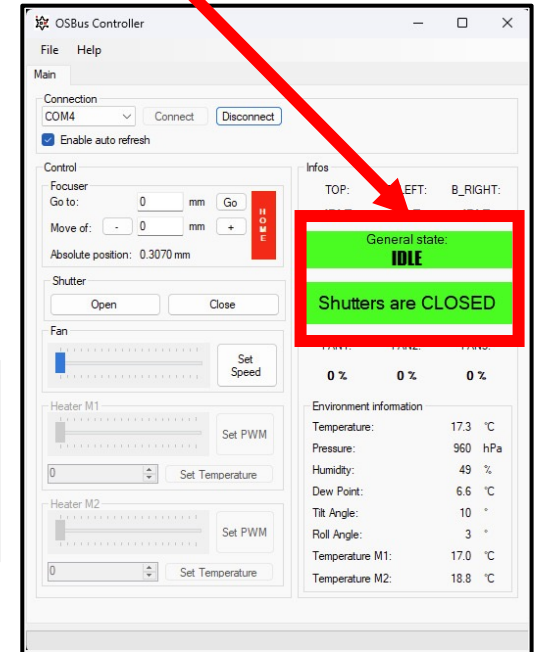
4. Wait



5. Click 'OK'



6. All good



8. Click on "Home" to home the focuser and close OSBus

1. Click 'HOME'

2. Wait

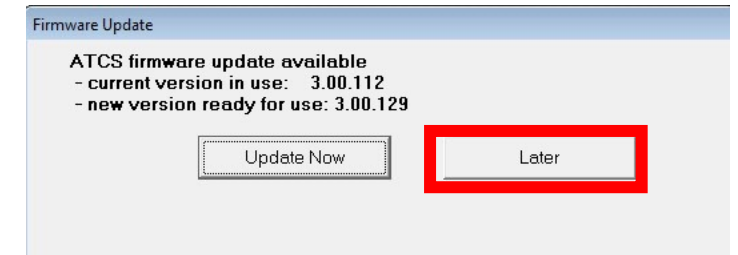
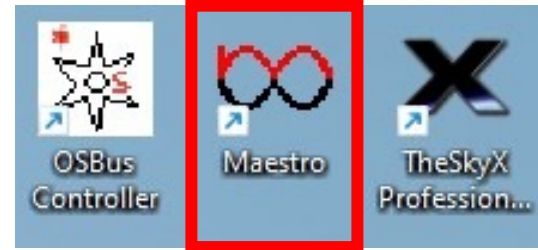
3. Click 'Yes'

4. Everything is good!

5. Close OSBus

The screenshots show the OSBus Controller software interface. The main window has a menu bar (File, Help) and a toolbar (Main, Tripod Control, Temometers, Environmental Probe, Fans, Actuators, Flip Mirror, Sh...). The 'Control' section includes fields for 'Go to:' (0 mm), 'Move of:' (0 mm), and 'Absolute position:' (2.4954 mm). The 'Infos' section shows 'General state: MOVING' and 'Shutters are CLOSED'. A dialog box titled 'Homing Complete' asks 'Go to Home position?' with 'Yes' and 'No' buttons. The final screenshot shows the 'General state: IDLE' and 'Shutters are CLOSED'.

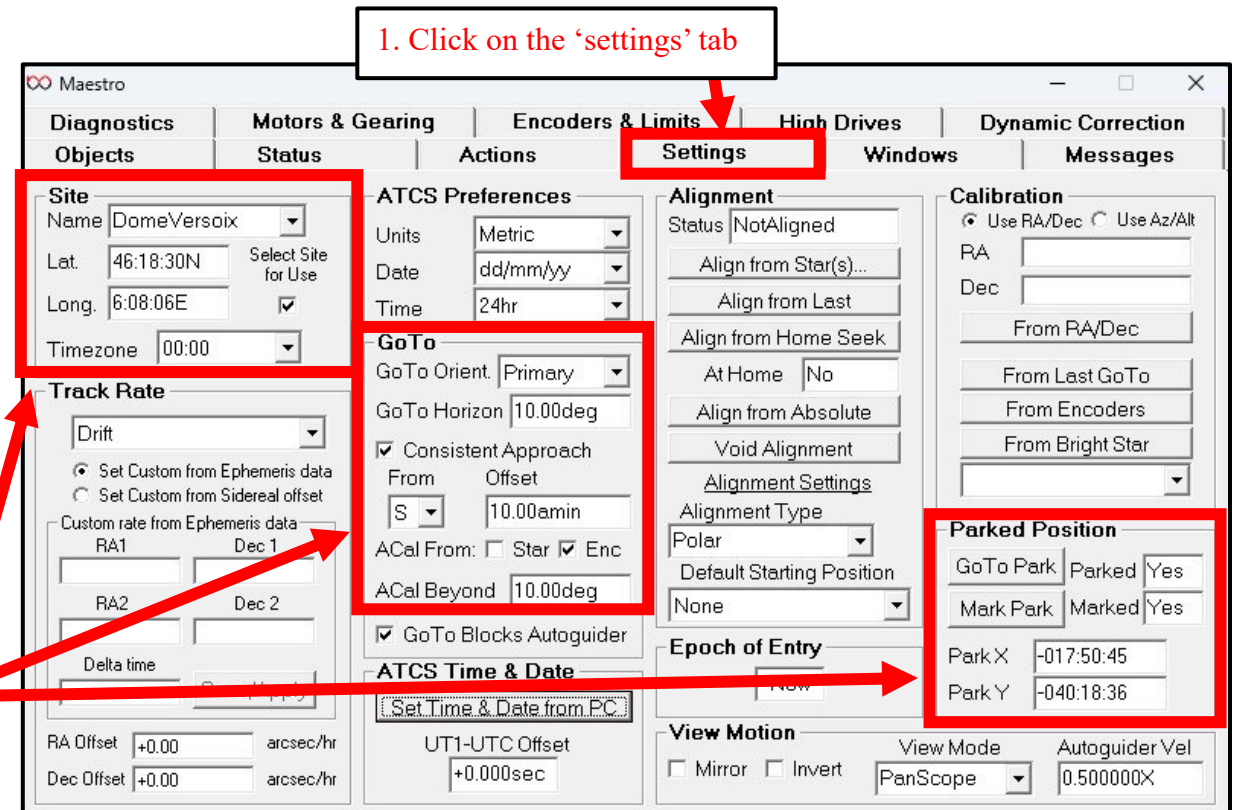
9. Open Maestro3. If a pop-up window appears and asks if you want to do an update of Maestro, simply click on "Later".



10. Go in the 'settings' tab and wait one/two minutes so that the window shows all the values like in the picture (if they are slightly different it's fine!)

IF THE PROGRAM IS STUCK,
REOPEN IT

2. Verify that there are number values



10. Click on "Set Time & Data form PC"

1. Click 'Set Time & Date form PC'

2. Click 'Yes'

3. All good

The screenshot displays the Maestro software interface with several panels. The 'ATCS Time & Date' section is highlighted, showing the 'Set Time & Date from PC' button. A 'Time Sync' dialog box is open, asking to update ATCS's time. The 'Yes' button in the dialog is highlighted. The background interface shows various settings for site, alignment, and tracking. A status bar at the bottom shows logs, with the message 'Status: Local standard time has been set.' highlighted in red.

09/02/24 08:21:34 : Maestro: version 3.00.111 initialization complete
09/02/24 08:21:49 : Maestro: ATCS Firmware Update Postponed until Later
09/02/24 08:21:57 : Maestro: sky object error: Can't Read Sky Object Database (.def file): file not found
09/02/24 08:23:01 : Status: Local standard date has been set.
09/02/24 08:23:02 : Status: Local standard time has been set.

11. Click on "Align from absolute" (NEVER CLICK ON 'Void Alignment') and minimize Maestro (do not close it)

1. Click on 'Align from Absolute' (NOT 'Void Alignment')

2. All good

3. Minimize Maestro

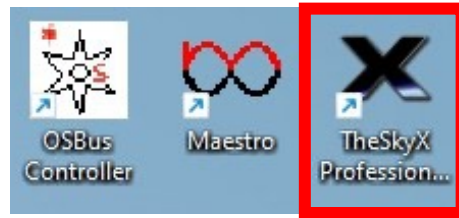
NO! NEVER!

09/02/24 08:21:49 : Maestro: ATCS Firmware Update Postponed until Later
09/02/24 08:21:57 : Maestro: sky object error: Can't Read Sky Object Database [def file]: file not found
09/02/24 08:23:01 : Status: Local standard date has been set.
09/02/24 08:23:02 : Status: Local standard time has been set.

09/02/24 08:21:49 : Maestro: ATCS Firmware Update Postponed until Later
09/02/24 08:21:57 : Maestro: sky object error: Can't Read Sky Object Database
09/02/24 08:23:01 : Status: Local standard date has been set.
09/02/24 08:23:02 : Status: Local standard time has been set.
09/02/24 08:23:30 : Status: Alignment completed.

09/02/24 08:21:49 : Maestro: ATCS Firmware Update Postponed until Later
09/02/24 08:21:57 : Maestro: sky object error: Can't Read Sky Object Database [def file]: file not found
09/02/24 08:23:01 : Status: Local standard date has been set.
09/02/24 08:23:02 : Status: Local standard time has been set.
09/02/24 08:23:30 : Status: Alignment completed.

12. Open SkyX



13. Connect the camera (connect + disconnect + connect)

1. Click on 'Camera'

2. Click on 'Connect'

3. A window like this should appear

4. Click on 'Disconnect'

5. Click again on 'Connect'

6. This new window appears. These are the physical values of the CCD.

The screenshots show the following steps:

- The 'Camera' button in the left sidebar is highlighted with a red box.
- The 'Connect' button in the main window is highlighted with a red box.
- A 'Readings' window is shown with the following data:

Environment	
Temperature:	0.0 °C
Pressure:	0 hPa
Humidity:	0 %
Dew Point:	0.0 °C
Tilt Angle:	0 °
Roll Angle:	0 °
Mirrors	
M1 Temperature:	0.0 °C
M2 Temperature:	0.0 °C
Fan speed:	0 %
- The 'Disconnect' button in the main window is highlighted with a red box.
- The 'Connect' button in the main window is highlighted with a red box.
- A 'Readings' window is shown with updated data:

Environment	
Temperature:	8.5 °C
Pressure:	960 hPa
Humidity:	70 %
Dew Point:	3.3 °C
Tilt Angle:	10 °
Roll Angle:	11 °
Mirrors	
M1 Temperature:	9.8 °C
M2 Temperature:	9.5 °C
Fan speed:	0 %

PLEASE, NEVER CHANGE THE DEVICE OR AUTO-SAVE CONFIGURATION IN SkyX!

14. Enter your name as observer

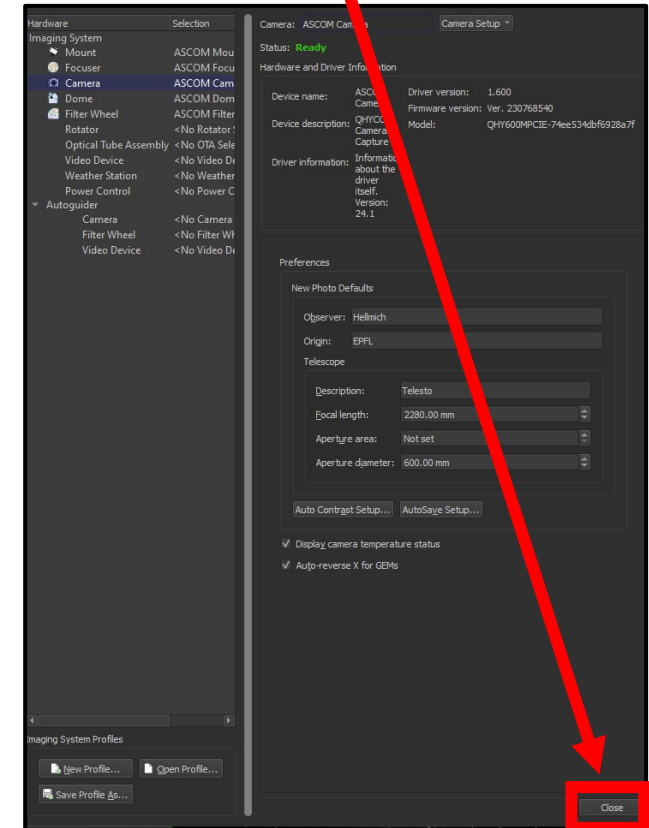
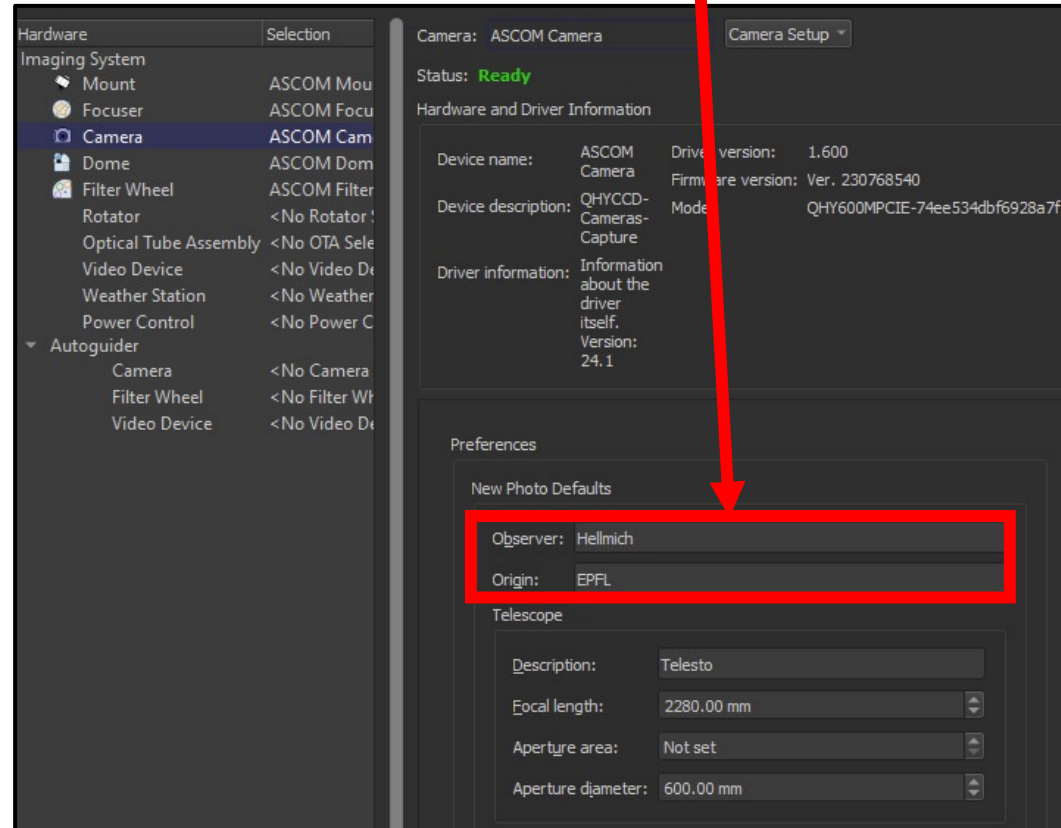
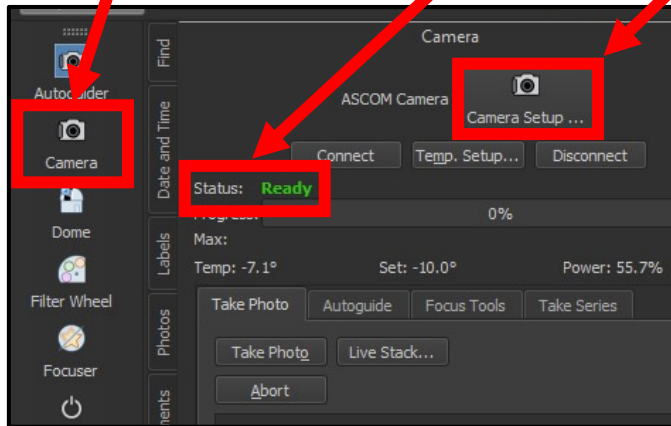
1. You should already be in the 'Camera' section

2. Check the Status is 'Ready'

3. Click on 'Camera Setup ...'

4. In the windows that pop ups, as observer insert your family name and as origin UNIGE or EPFL

5. Click on 'close'



15. Check that the Filter wheel and Focuser are connected

1. Click on 'Filter wheel'

2. Check that its status is 'Ready'

The screenshot shows the 'Filter Wheel' control panel. The left sidebar contains a vertical list of icons for various components: Autoguider, Camera, Dome, Filter Wheel (highlighted with a red box), Focuser, Power Control, Rotator, Telescope, Video, Video (Guider), and Weather Station. The main panel displays 'Finger Lakes Instrumentation Filter Wheel Plugin 2.0' with a 'Filter Wheel Setup ...' button. Below this are 'Connect' and 'Disconnect' buttons. The status is shown as 'Status: Ready' in green text, which is also highlighted with a red box. A dropdown menu shows 'Filter: R' and a 'Move Now' button. At the bottom, it says 'Filter wheel presently at filter:'.

3. Click on 'Focuser'

4. Check that its status is 'Ready'

The screenshot shows the 'Focuser' control panel. The left sidebar is identical to the previous screenshot, with the 'Focuser' icon highlighted by a red box. The main panel displays 'ASCOM Focuser' with a 'Focuser Setup ...' button. Below this are 'Connect' and 'Disconnect' buttons. The status is shown as 'Status: Ready' in green text, highlighted with a red box. The panel includes fields for 'Position: 3007', 'Temperature: 8.50° C', and a slider for 'Amount: 0.01% - 1' with 'In' and 'Out' buttons. A 'Move To' field contains '2999995' and an 'Abort' button. A 'Show Log' button is at the bottom. The 'Temperature Compensation' section has an 'Activate' checkbox, an 'Adjust' slider set to '0 steps /° C', and radio buttons for 'Temperature' (selected) and 'Time'. An 'Every:' field is set to '1.00° C' and an 'Adjust during exposures' checkbox is present. The 'Focuser Training' section shows a 'Current filter:' list with values $2.4 \cdot 10^8$, $2 \cdot 10^8$, and $1.6 \cdot 10^8$. A 'Name' dropdown menu is open, showing options 'clear', 'clear', and 'Halpha'.

16. Connect the telescope

1. Click on 'Telescope'

2. Click on 'Start Up'

3. Select 'Connect Telescope'

4. All good!

The image displays two screenshots of a telescope control software interface, illustrating the steps to connect the telescope.

Left Screenshot (Initial State):

- The sidebar on the left contains various control buttons. The **Telescope** button is highlighted with a red box.
- The main panel shows the **Telescope** section with the status **Not Connected**.
- The **Start Up** dropdown menu is open, and the **Connect Telescope** option is highlighted with a red box.

Right Screenshot (Final State):

- The status in the **Telescope** section is now **Connected**, highlighted with a red box.
- The **Start Up** dropdown menu is closed.

17. Connect the dome and find home position

1. Click on 'Dome'

2. Click on 'Connect'

3. The Dome is moving (you can hear it!)

4. Wait until you see the Status: 'Ready'

5. Click on 'Find Home'

The image displays three sequential screenshots of the ASCOM Dome control software interface, illustrating the steps to connect the dome and find its home position. Each screenshot shows a sidebar with various telescope control options and a main panel with dome-specific controls and status information.

- First Screenshot:** The 'Dome' button in the sidebar is highlighted with a red box. In the main panel, the 'Connect' button is highlighted with a red box. The status is 'Not Connected'.
- Second Screenshot:** The 'Connect' button in the main panel is highlighted with a red box. The status has changed to 'Slewing to target' in green text. The azimuth is 345.37.
- Third Screenshot:** The 'Find Home' button in the main panel is highlighted with a red box. The status is now 'Ready' in green text. The azimuth is 192.66. The result area shows: 'Result: 'Slewing to target' complete. No error. Error = 0.'

6. When you click on 'Find Home', the Dome will make one full turn to calibrate the spatial coordinates and then it will go in front of the telescope aperture. Be patient and wait.

18. Open the dome

1. You should already be in the 'Dome' section

2. Click on 'Open Dome'

3. The dome is opening

4. All good!

The image displays three sequential screenshots of the ASCOM Dome control software interface, illustrating the steps to open the dome. Each screenshot features a sidebar on the left with icons for various telescope components: Autoguider, Camera, Dome, Filter Wheel, Camera, Find, Focuser, Power Control, and Rotator. The main panel shows the dome's status and control buttons.

- First Screenshot:** The 'Dome' icon in the sidebar is highlighted with a red box. The main panel shows 'Status: Ready' and 'Slit state: Unknown'. The 'Open Dome' button is highlighted with a red box.
- Second Screenshot:** The 'Open Dome' button has been clicked. The status is now 'Status: Opening slit' (highlighted with a red box) and 'Slit state: Unknown'. The 'Open Dome' button is no longer visible.
- Third Screenshot:** The dome opening is complete. The status is 'Status: Ready' and 'Slit state: Last Open succeeded' (highlighted with a red box). The 'Open Dome' button is now visible again.

END STARTUP

OBSERVATIONS

GENERAL INFORMATION

The screenshot displays a telescope control software interface. On the left, a vertical sidebar contains various control buttons such as 'Center', 'Frame', 'Show Photo+', 'Slew', 'Copy Text', 'Add to List', 'Lock On', and 'Abort'. Below these is a 'Details' section with 'Advanced' and 'Log' tabs. The main area shows a circular star chart of the Moon with a blue trapezoid representing the dome's field of view. A yellow circle marks the telescope's current pointing direction, and a red circle marks a clicked point on the sky. The information panel on the left is highlighted with a red border and contains the following data:

Object Name: Moon
RA (Topocentric): 18h 24m 10.1s
Dec (Topocentric): -29° 23' 36"
RA (2000.0): 18h 22m 38.5s
Dec (2000.0): -29° 24' 18"
Azimuth: 171° 33' 30"
Altitude: +13° 55' 16"
Phase (%): 33.05% (waning)
Rise Time: 03:16
Transit Time: 07:06
Set Time: 10:58
Air Mass: 4.13
RA Rate (arcsecs/sec): 0.453507
Dec Rate (arcsecs/sec): 0.001476
Date: 05/03/2024
Time: 06:27 STD
Constellation: Sagittarius
Constellation (Abbrev.): Sgr
Moon Ecliptic Longitude: 275° 12' 27"
Moon Ecliptic Latitude: -05° 07' 45"
Moon Parallax: 0.9699
Moon Angular Diameter: 0° 31' 43"
Moon Distance (km): 376,794.34
Moon True RA: 18.3935
Moon True Dec: -28.4644
Moon Topocentric Ang. ...: 0.5308
Moon Alt w/Refraction: 14.4459
Moon Total Libration l: -7.7171
Moon Total Libration b: 6.6408
Moon Optical Libration l: -7.6836
Moon Optical Libration b: 6.6364
Moon Physical Libration l: -0.0336
Moon Physical Libration b: 0.0044
Moon Position Angle: -2.6968
Phase Angle: 109.8104
Moon Pos. Angle of Bright Limb: 85.7794
Moon's Age (Days Past New): 24.42
Sidereal Time: 17:46
Julian Date: 2460374.76936206
Click Distance: 0.0000
Frame Size (arcmins): 31.8479

The yellow circle indicates where the telescope is pointing at (telescope direction)

The trapezoid shape indicates where the Dome is (it should be always on top or in front of the yellow point)

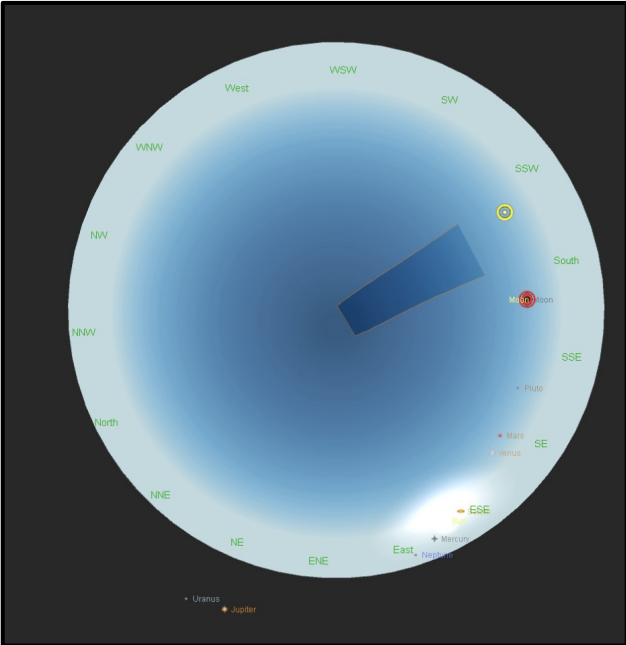
The red circle indicates where you clicked

When you click on a point on the sky (red circle), all the information of the target will appear here on the left

SELECTING A TARGET

You can select a target in two ways: by clicking on the sky map or by specifying the target name

1. Click the target on Sky map (e.g. Moon)

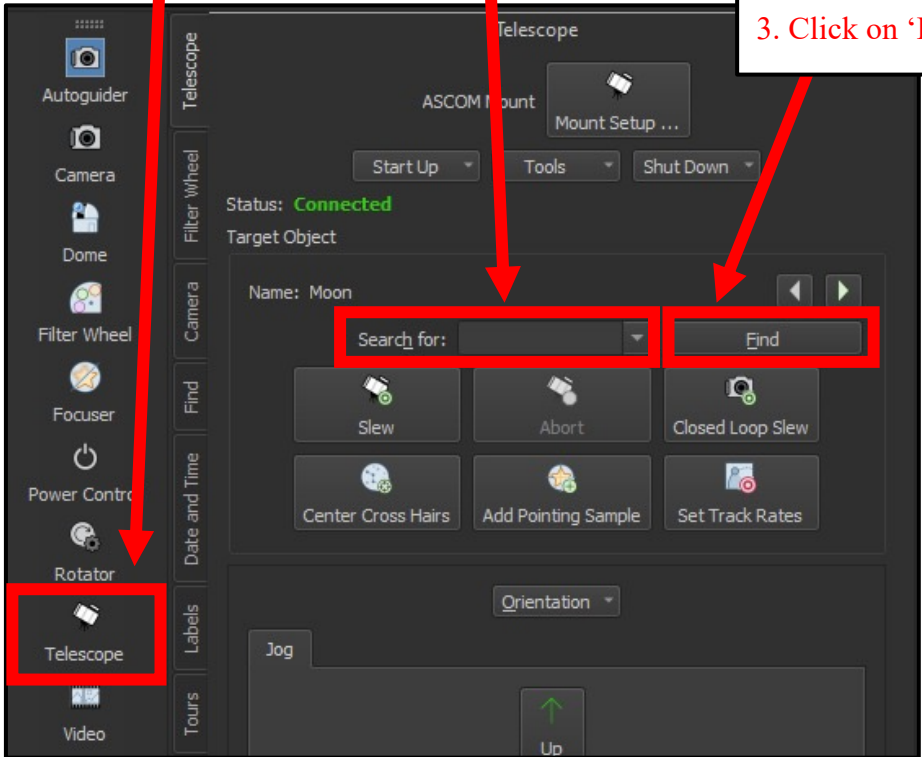


OR

1. Click on 'Telescope'

2. Write the name of the target you are looking for

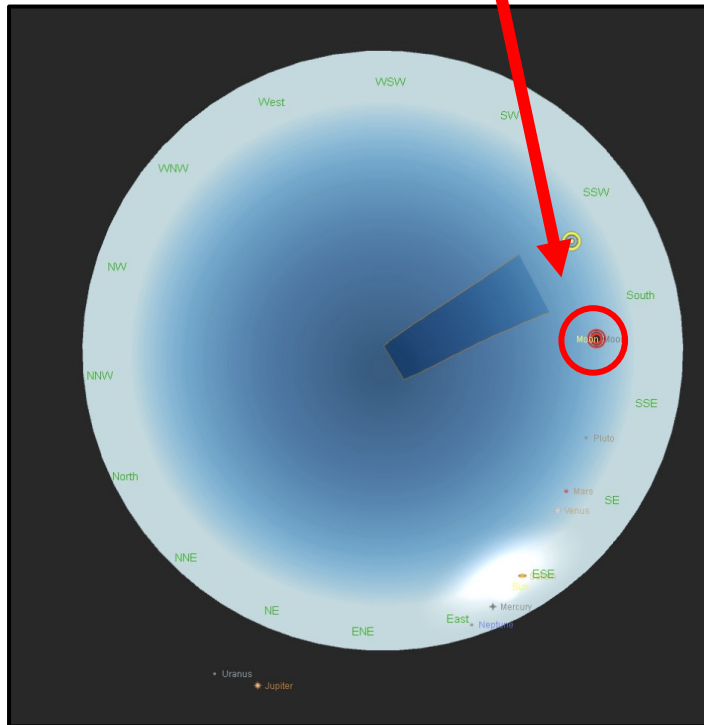
3. Click on 'Find'



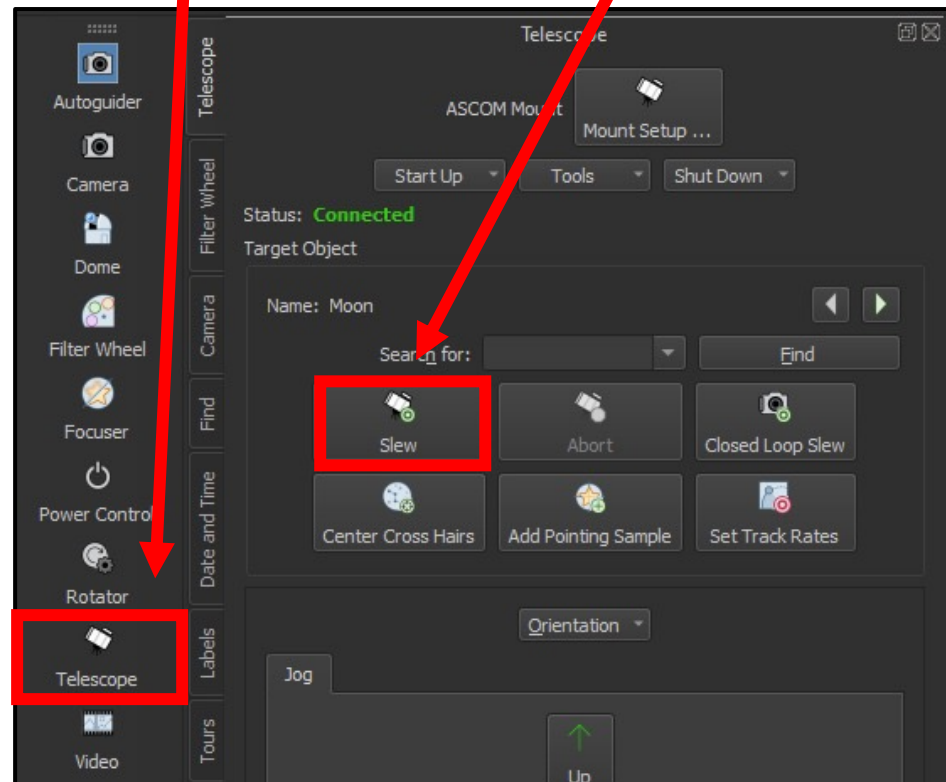
POINTING THE TELESCOPE ON YOUR TARGET

Once you found the target you want to observe (the red circle is on the target). Click on 'Slew' to move the telescope and Dome towards the target.

1. Check that the red circle is on top of the target you want to observe

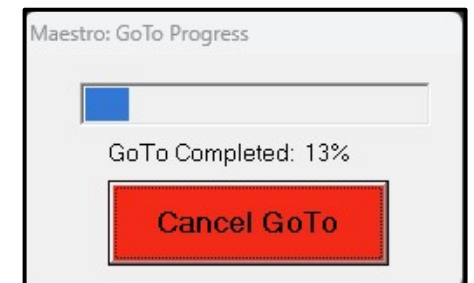


2. Go in the 'Telescope' tab



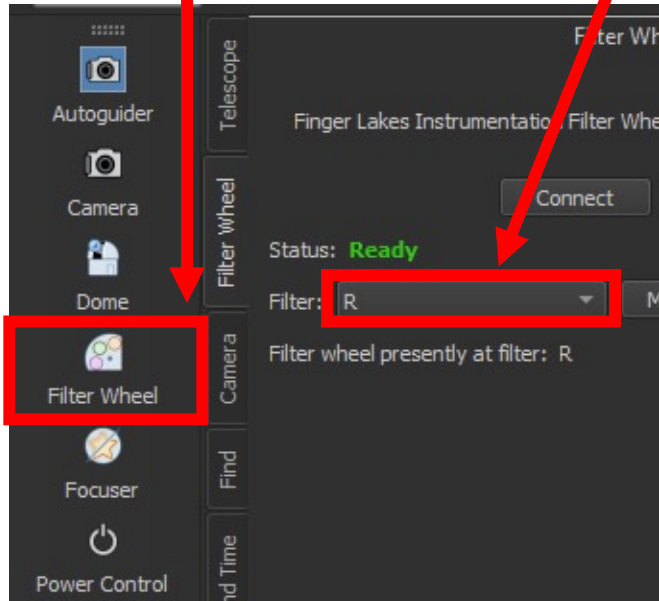
2. Click on 'Slew'

3. A window like this should appear. When both the telescope and the Dome are pointing the target, the window will disappear.

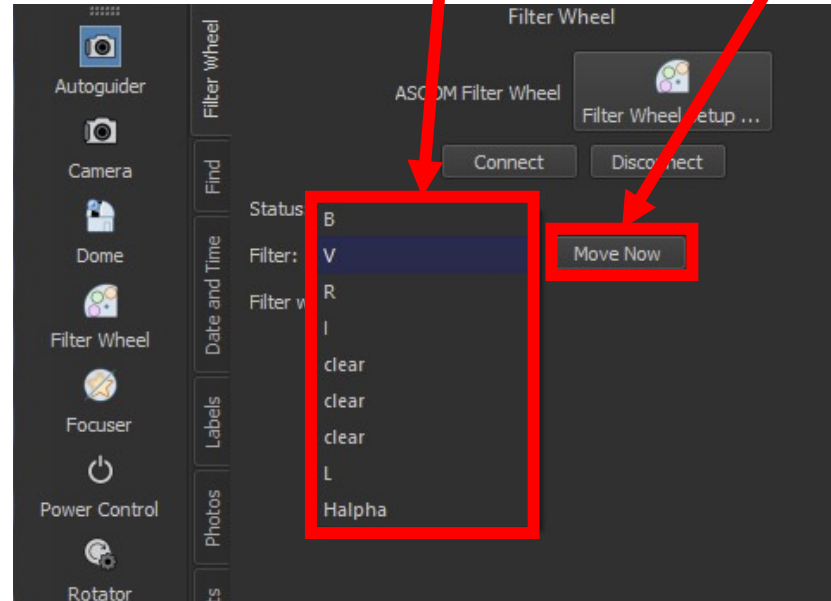


SELECTING THE FILTER

1. Go in the 'Filter Wheel' tab



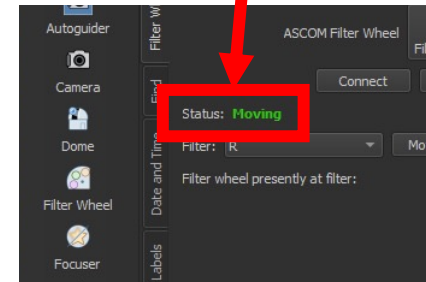
2. Click on the Filter window



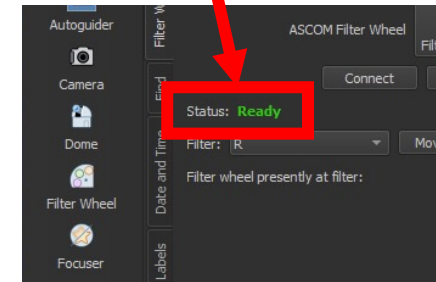
3. Select the filter you want to use from the list

4. Click on 'Move Now'

5. Wait



6. All good



SELECTING THE FOCUSER (WE SUGGEST 5300)

1. Go in the 'Focuser' tab

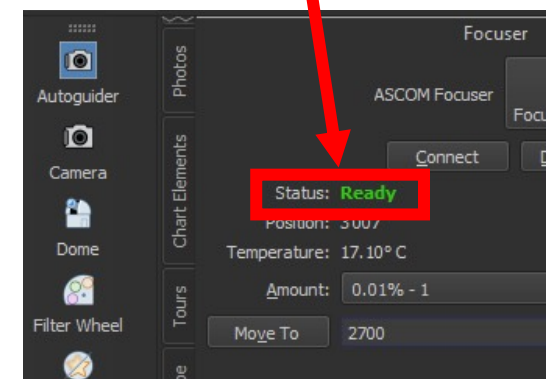
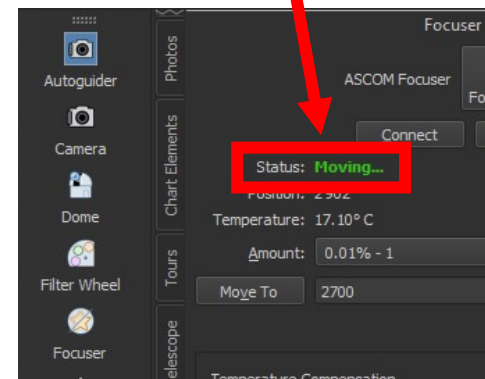
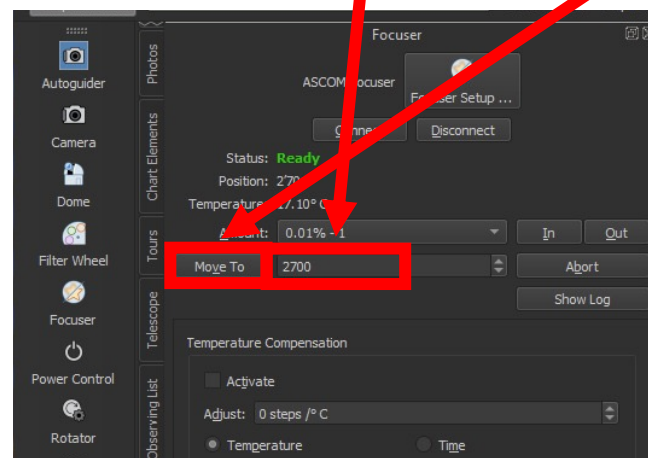
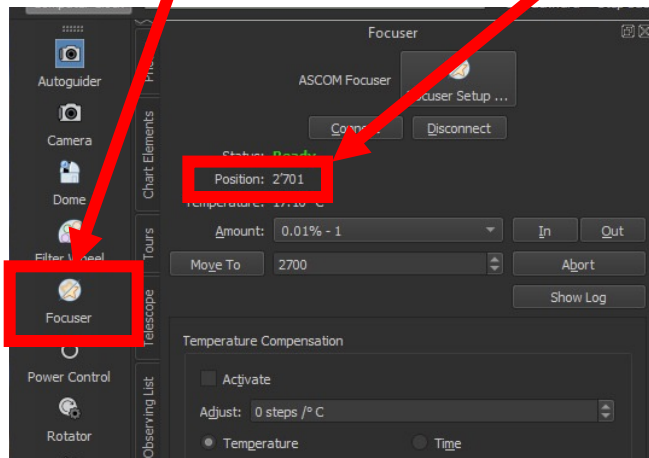
2. This is the current position of your focuser

3. Insert here the number you want (5300 is good)

4. Click on 'Move To'

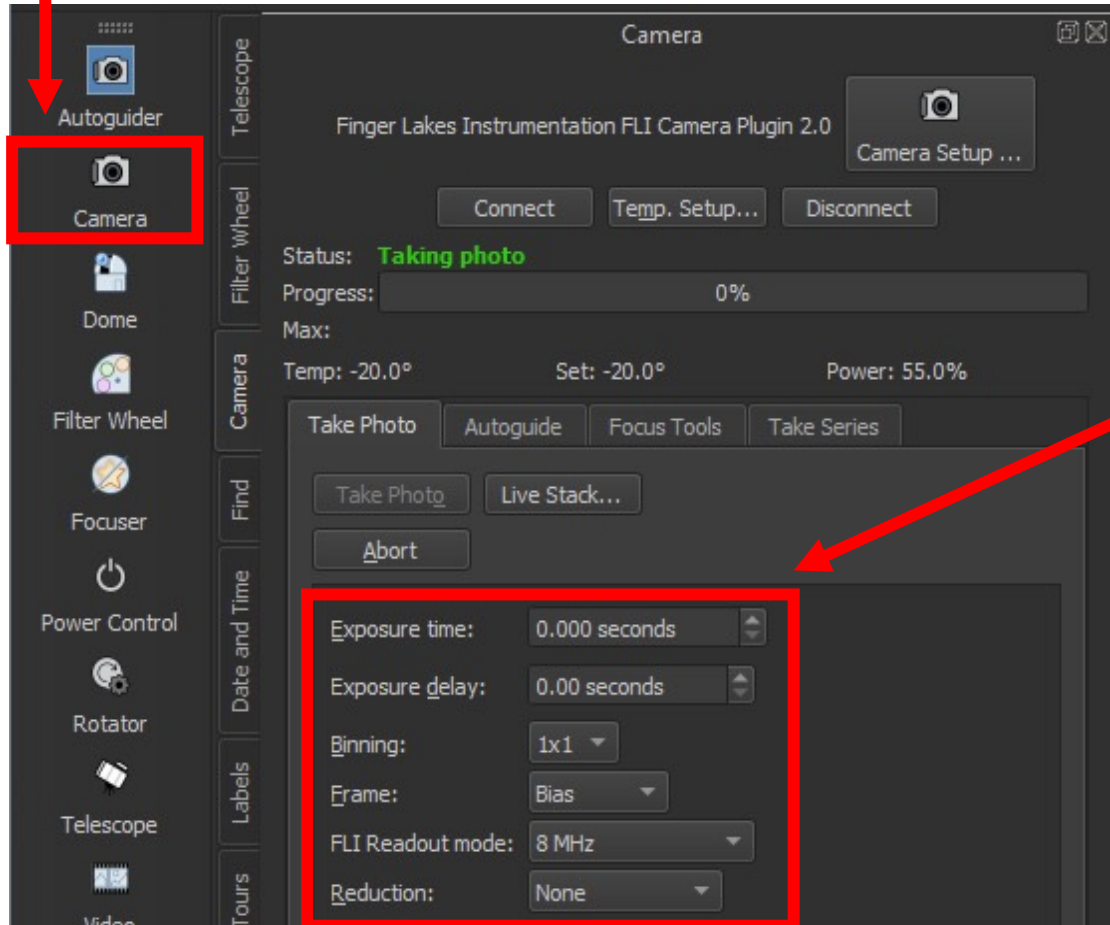
5. Wait

6. All good



SELECTING PICTURE PROPERTIES

1. Go in the 'Camera' tab

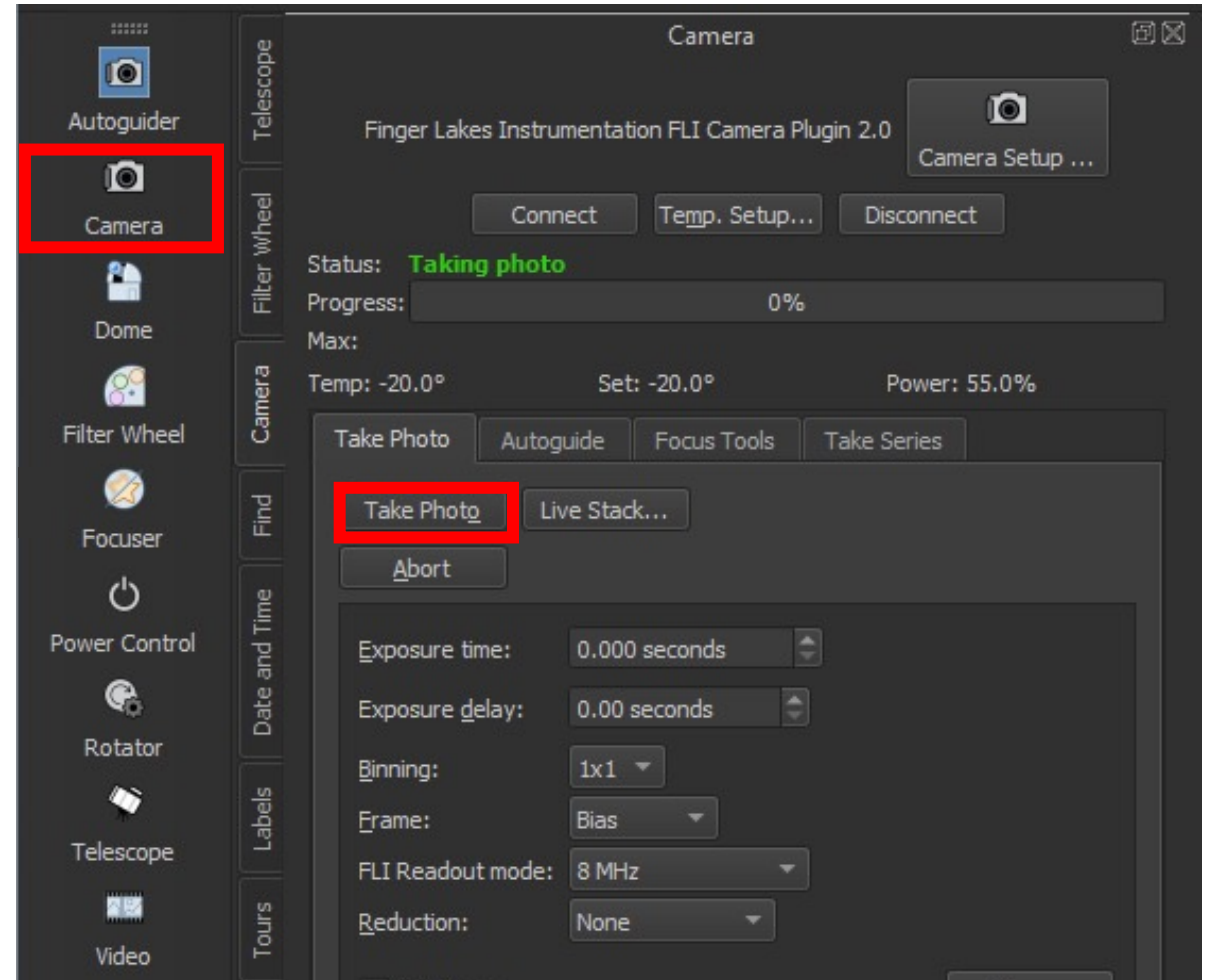


2. Choose all the properties that you want:

- **EXPOSURE TIME:** time of the frame exposure
- **EXPOSURE DELAY:** time of delay between one picture and the following one
- **BINNING:** type of binning when pixels are read (lower binning is more precise, but takes longer time). We suggest either 2x2 or 3x3 binning
- **FRAME:** select the frame you want to take. There is **BIAS**, **DARK**, **FLAT FIELD**, and **LIGHT**. **LIGHT** is the scientific image (your star, planet, galaxy etc.)
- **FLI READOUT MODE:** it's the speed to read the CCD. For higher modes (8 MHz), the measurement is less precise, but the reading is faster
- **REDUCTION:** you can select if you want the program to perform the frame correction for you. We strongly suggest to do it yourself and just leave **NONE**

TAKING A SINGLE PICTURE

Once you chose all the picture properties (previous slide) and you point at the target you want to observe, you can take a picture by simply clicking on 'Take Photo'. When the picture is done it will open automatically in front of you.



TAKING A SERIES OF PICTURES

There is the option to take multiple consecutive pictures

1. Go in the 'Camera' tab

2. Click on 'Take Series'

3. Choose your settings (same settings as for the single picture)

4. Choose how many pictures you want to take

The screenshot shows the 'Camera' tab selected in the left sidebar. The 'Take Series' button is highlighted in the main panel. Below it, the 'Repeat Executes' section shows 'Per series' selected. A table for 'Series 1' is visible with the following settings:

Series 1	
Exposure Time:	0
Binning:	3x3
Frame:	Bias
Filter:	R
Repeat:	10
Mode:	8 MHz

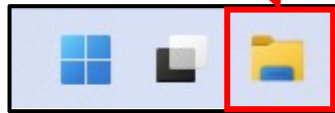
5. Start to take the serie

The screenshot shows the 'Take Series' button highlighted in the main panel, indicating the start of the series capture process.

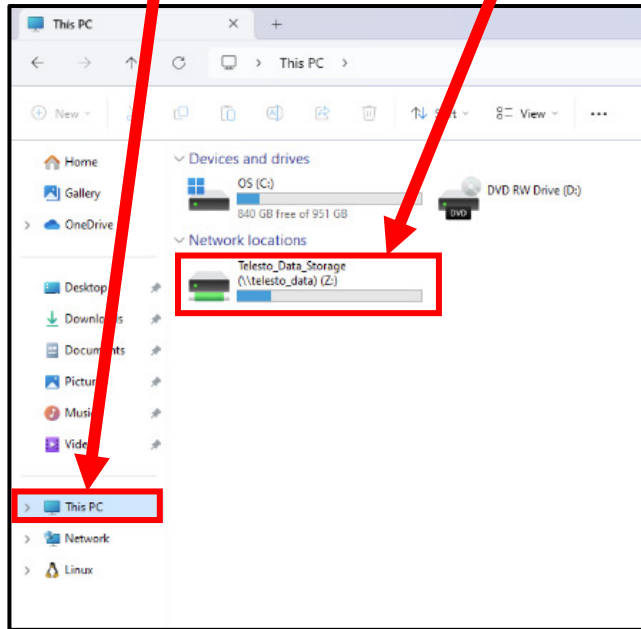
DATA STORAGE

Data (pictures) are automatically saved in a folder as fits files. To find them follow these procedures:

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

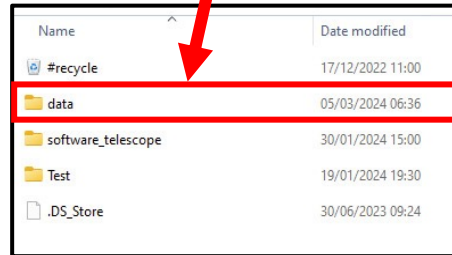


2. Click on 'This PC'



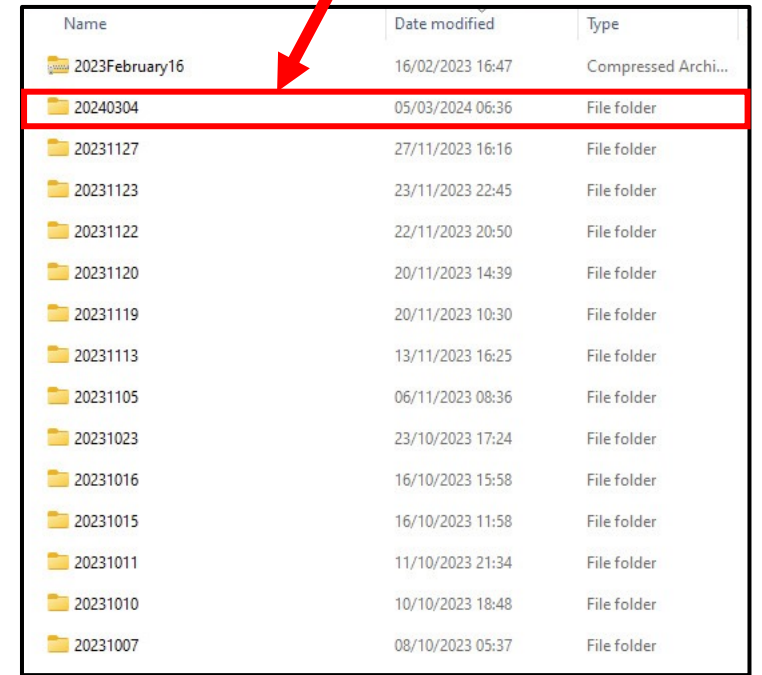
3. Select 'Telesto_Data_Storage'

2. Select the 'data' folder



Name	Date modified
#recycle	17/12/2022 11:00
data	05/03/2024 06:36
software_telescope	30/01/2024 15:00
Test	19/01/2024 19:30
.DS_Store	30/06/2023 09:24

3. Your data are stored in the folder of your observing date. For example, the folder 20240304 will contain images taken on the 4th of March 2024



Name	Date modified	Type
2023February16	16/02/2023 16:47	Compressed Archi...
20240304	05/03/2024 06:36	File folder
20231127	27/11/2023 16:16	File folder
20231123	23/11/2023 22:45	File folder
20231122	22/11/2023 20:50	File folder
20231120	20/11/2023 14:39	File folder
20231119	20/11/2023 10:30	File folder
20231113	13/11/2023 16:25	File folder
20231105	06/11/2023 08:36	File folder
20231023	23/10/2023 17:24	File folder
20231016	16/10/2023 15:58	File folder
20231015	16/10/2023 11:58	File folder
20231011	11/10/2023 21:34	File folder
20231010	10/10/2023 18:48	File folder
20231007	08/10/2023 05:37	File folder

END OF THE NIGHT

IN THE CONTROL ROOM

1. Park the telescope

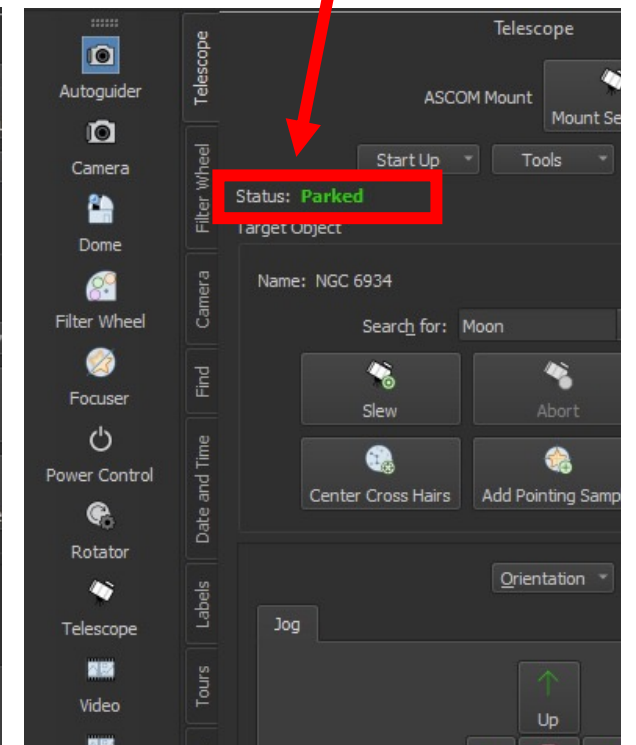
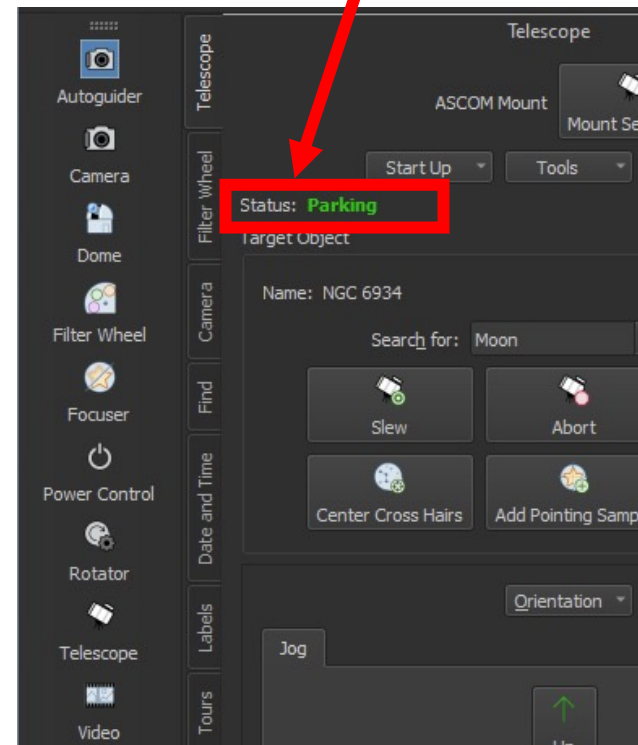
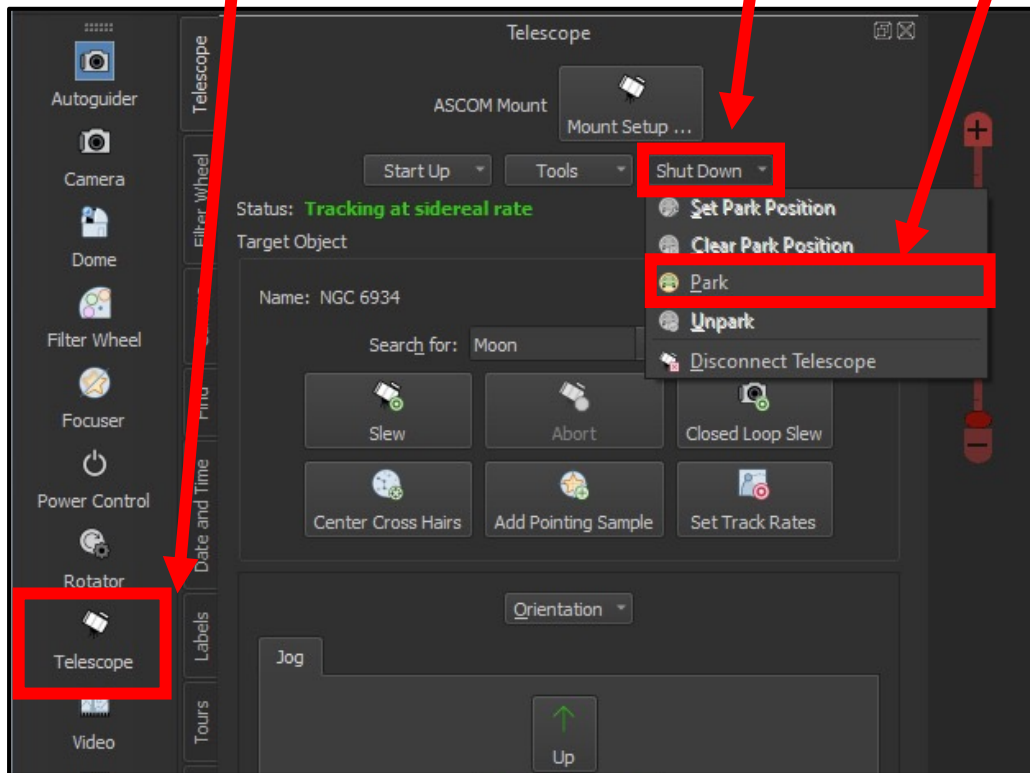
1. Click on 'Telescope'

2. Click on 'Shut Down'

3. Choose 'Park'

4. The telescope is parking

5. The telescope is parked

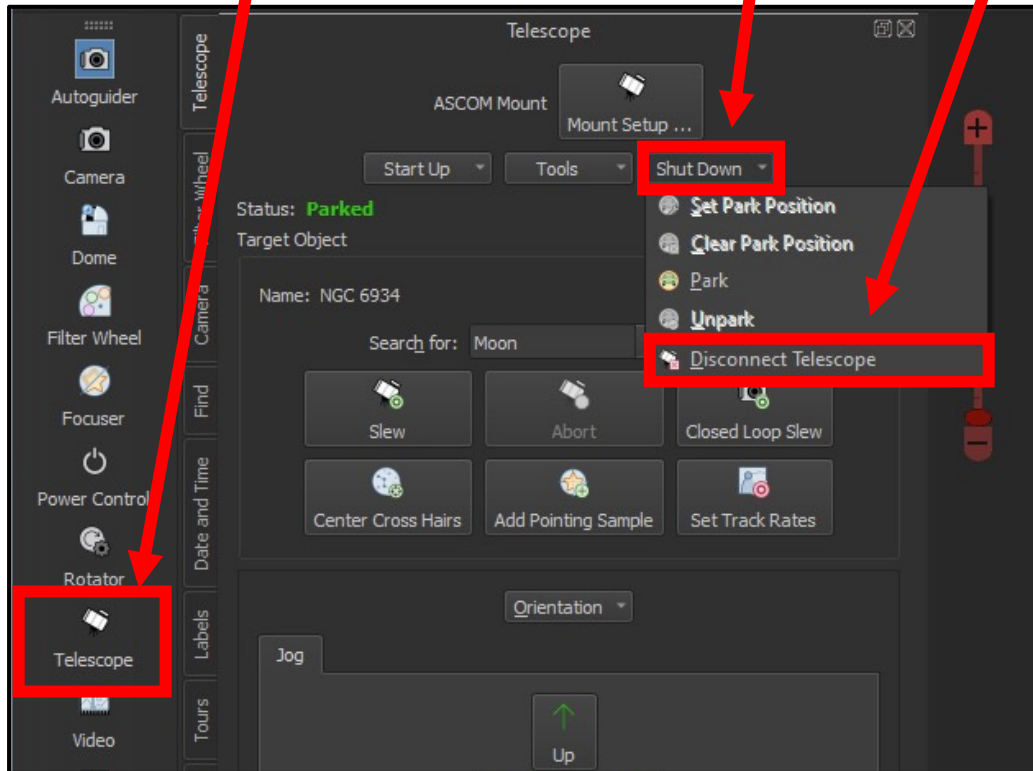


2. Disconnect the telescope

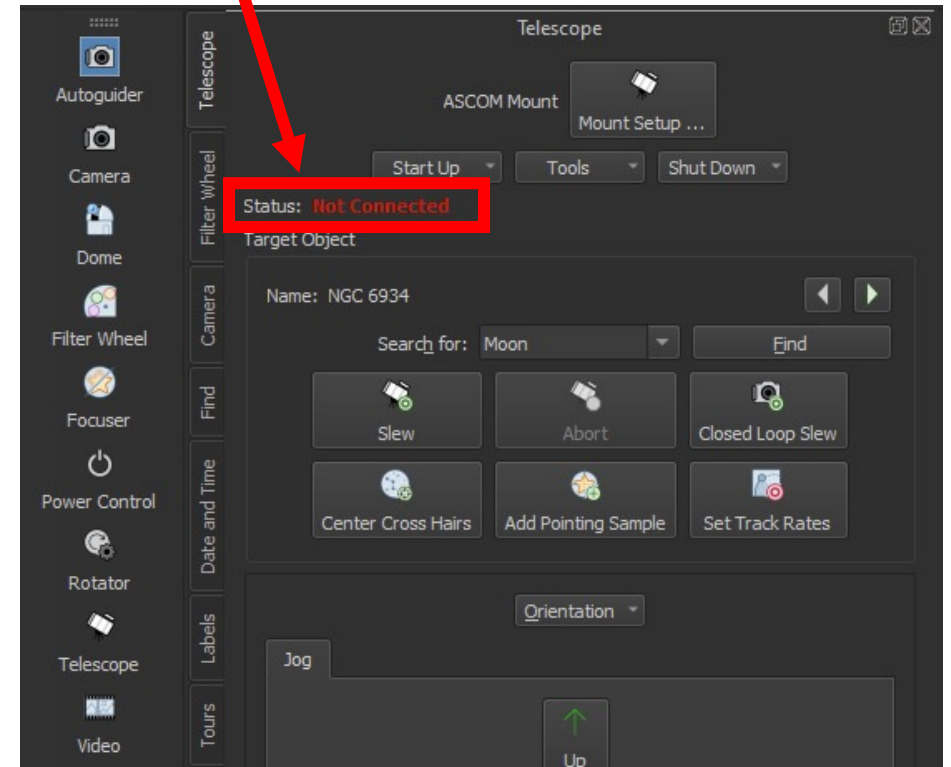
1. You should already be in the 'Telescope' tab

2. Click on 'Shut Down'

3. Choose 'Disconnect Telescope'



4. All good!



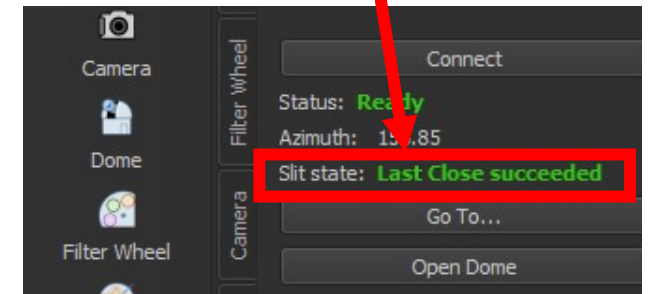
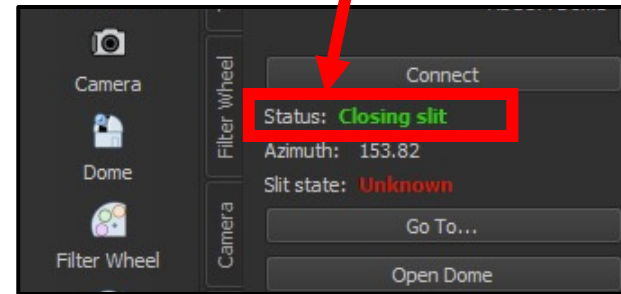
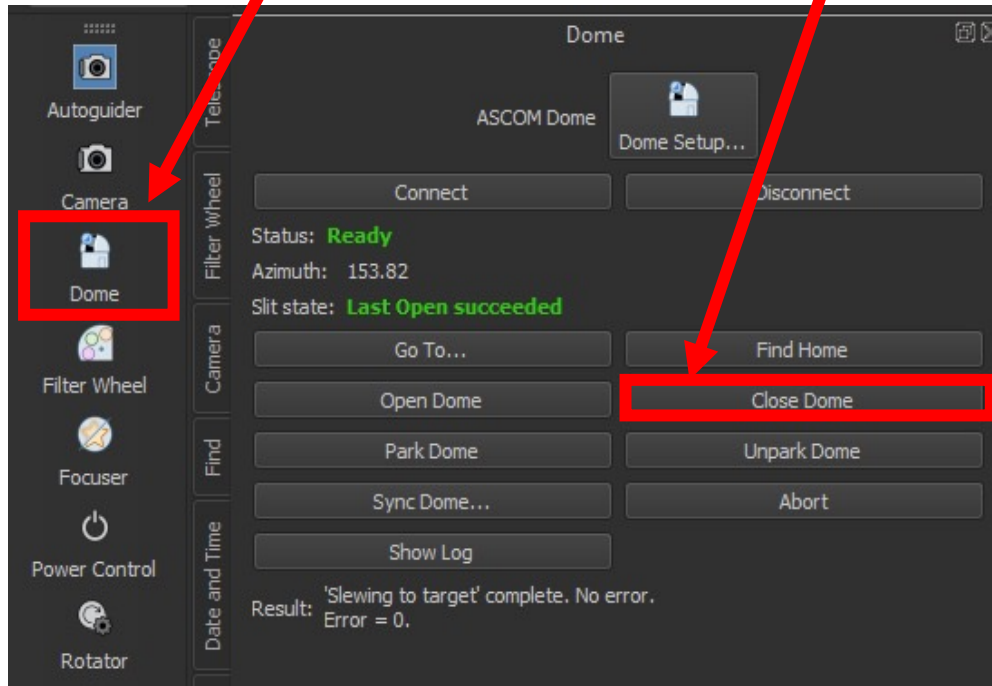
3. Close the dome

1. Go in the 'Dome' section

2. Click on 'Close Dome'

3. The dome is closing

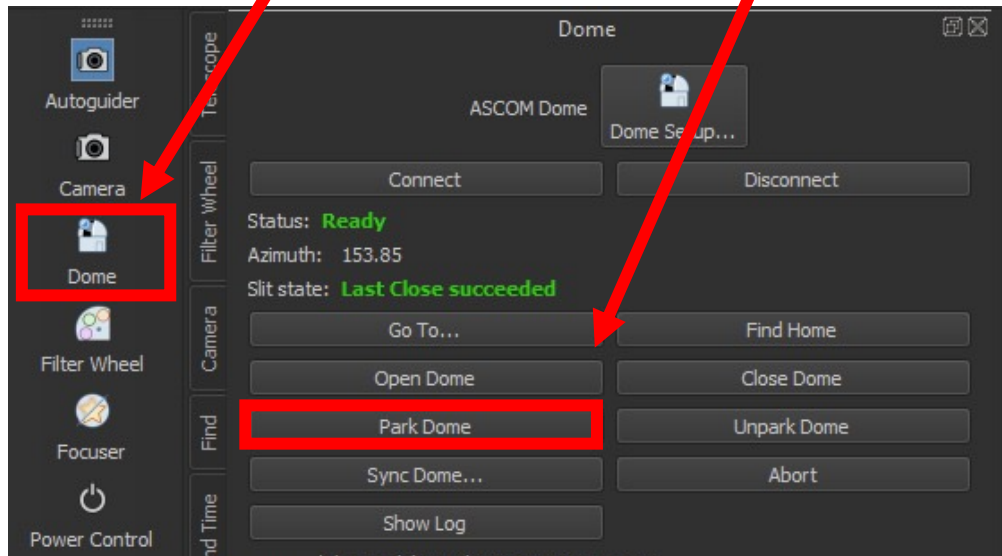
4. All good!



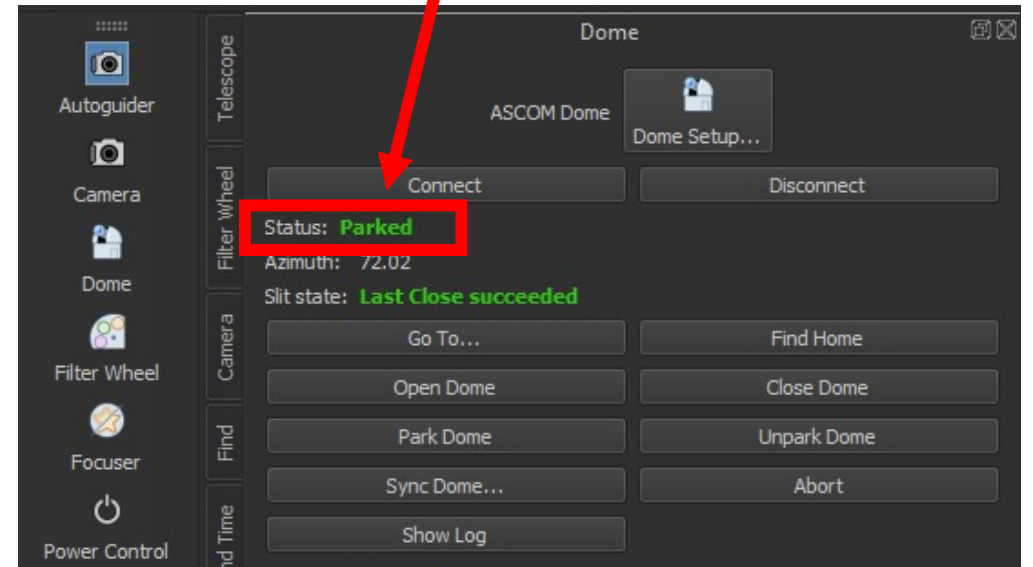
4. Park the dome

1. You should already be in the 'Dome' section

2. Click on 'Park Dome'



3. All good!

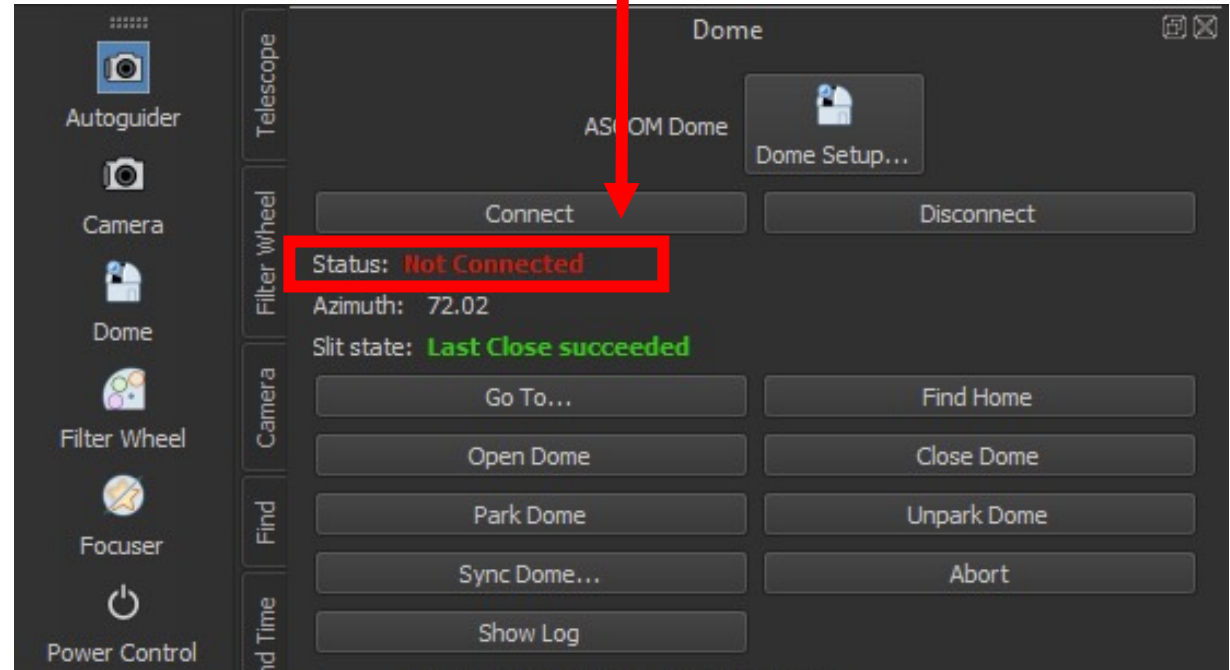
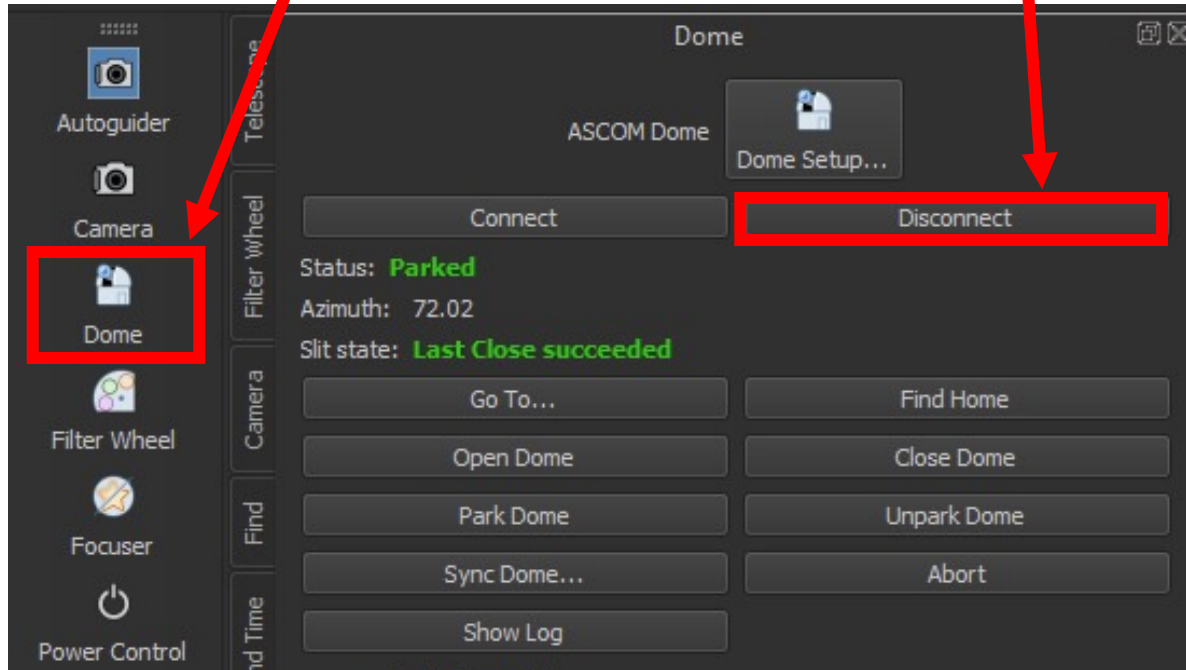


5. Disconnect the dome

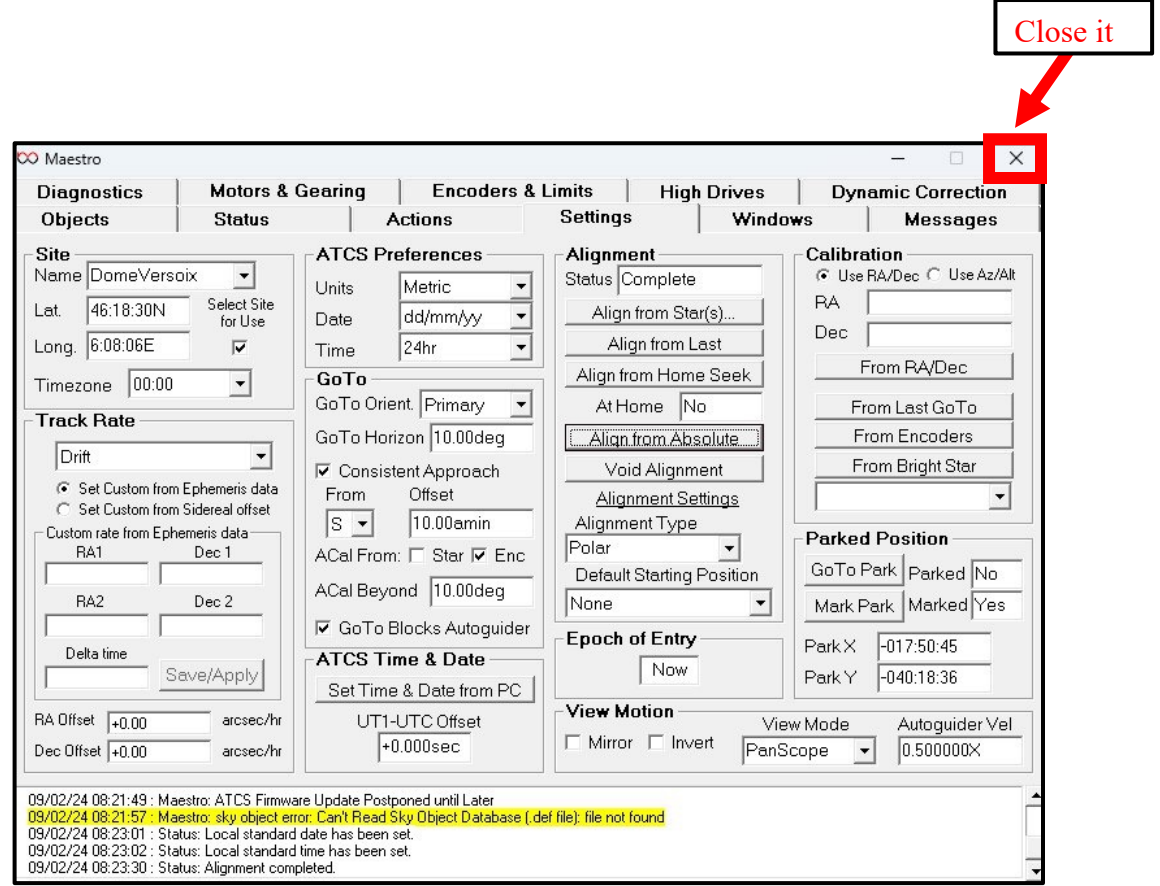
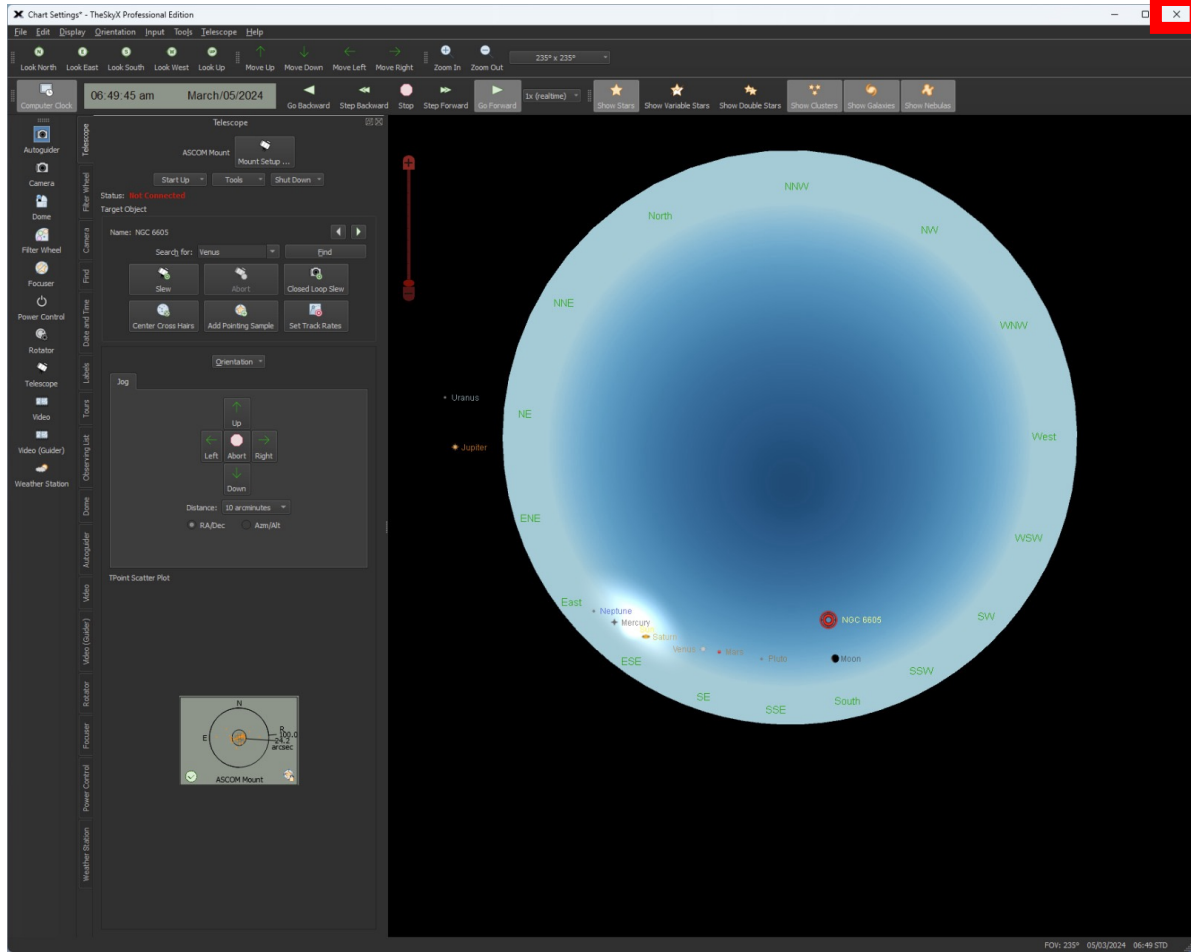
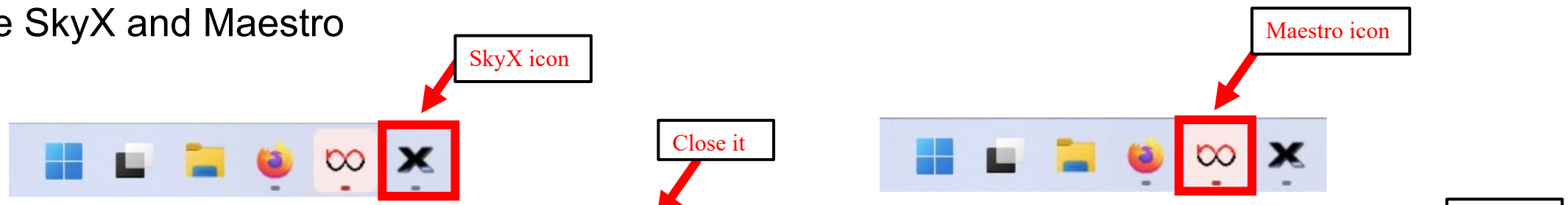
1. You should already be in the 'Dome' section

2. Click on 'Disconnect'

3. All good!

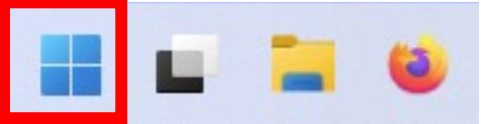


6. Close SkyX and Maestro

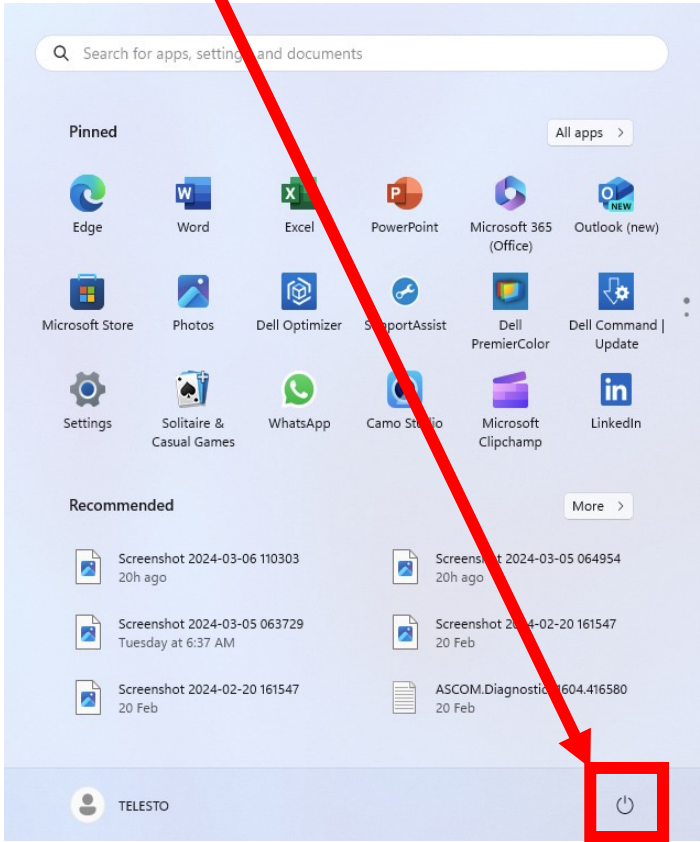


7. Shut down the computer

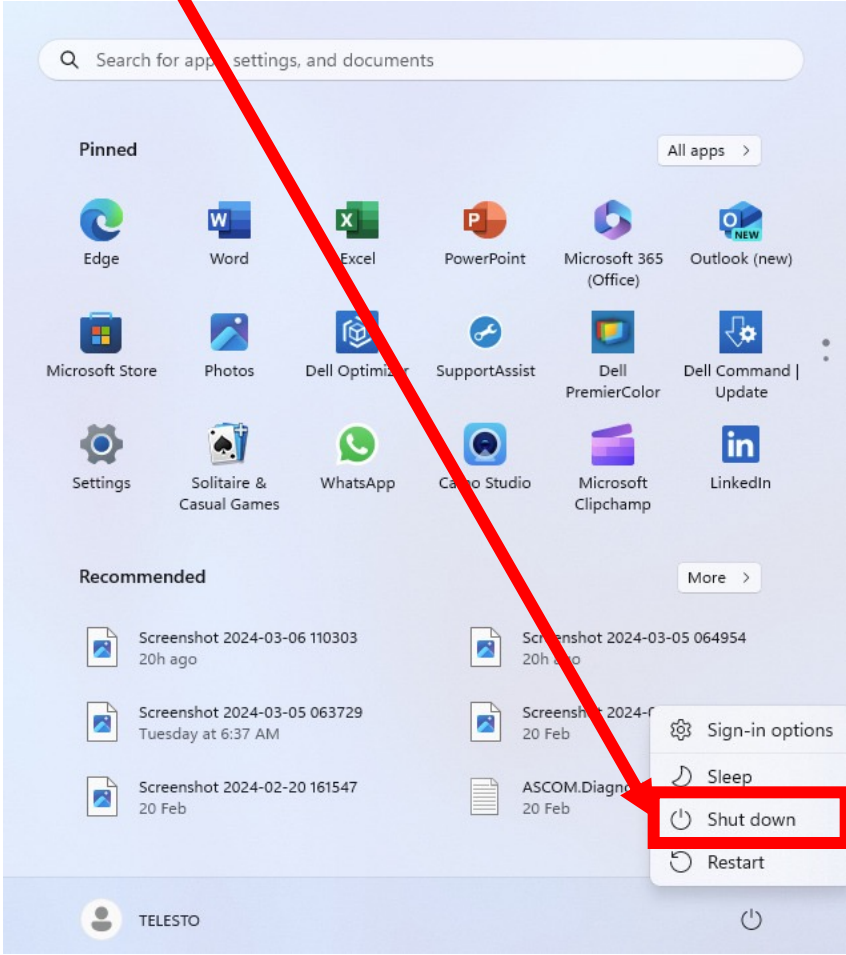
Select the Windows icon in the bottom bar of the screen



Click on the switching off button



Click on 'Shut down'



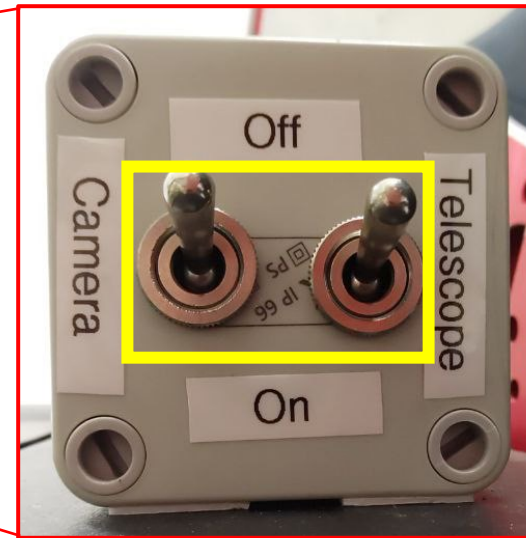
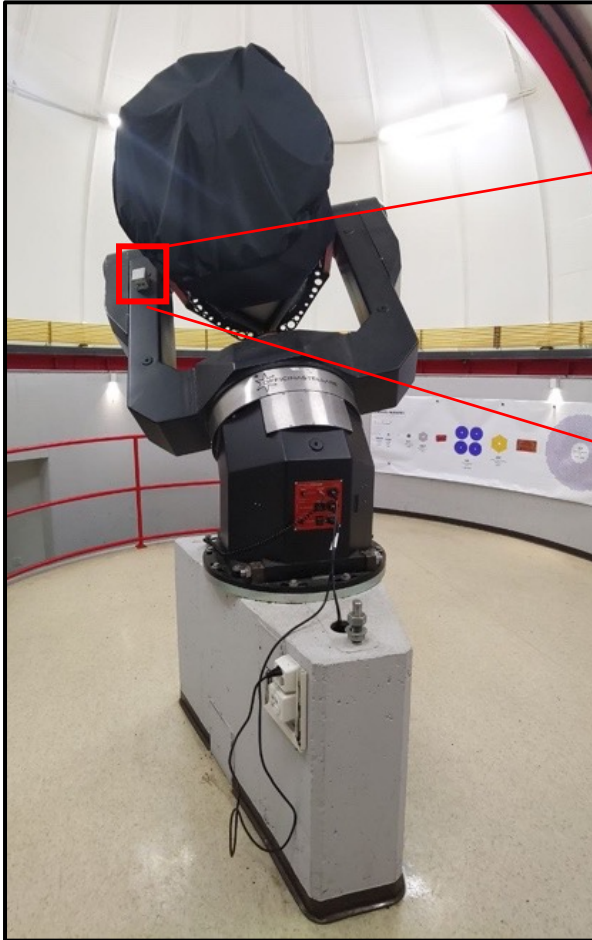
IN THE DOME

1. Verify by eye that everything is fine:

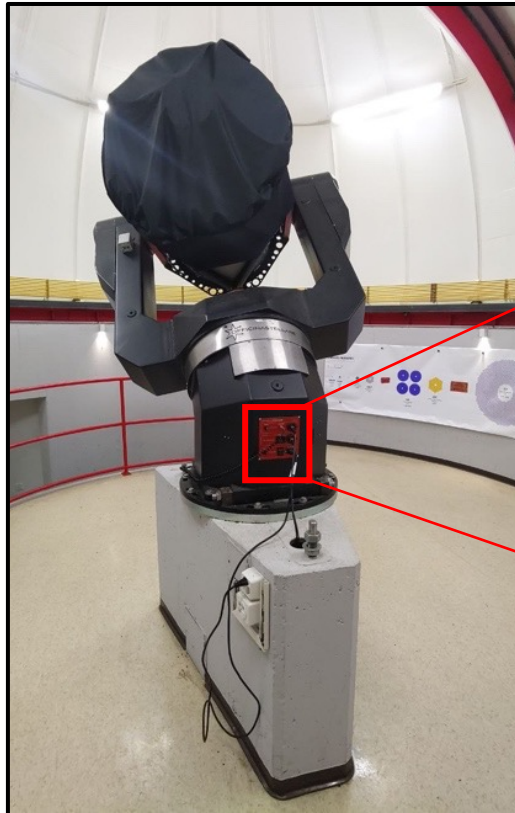
- Check that the dome is closed
- Check that the telescope and the dome are parked. A corrected parking position is shown in the pictures below. The dome aperture is above the ELT poster. The telescope is facing the ladder.



2. Turn off the Camera and the telescope: push up the two switches



3. Switch **OFF** the telescope electricity by using the designated switch (1=ON, 0=OFF).



4. Put back the cover on top of the telescope aperture



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

**HAVE SWEET
DREAMS**