



OBSERVATORY MANUAL

The Sculptor observatory is setup for fully automated operation, and can run multiple object sequences from dusk to dawn.

This includes:

- Opening of the observatory
- Opening of mirror covers
- Turning on telescope fans
- Camera cooldown
- Acquisition of flatfields
- Acquisition of light frames
- Autofocus every 40 min.
- Complete shutdown after the session

The observatory automation is controlled by ASA Sequence and will be described later in this manual.

It is still possible to do manual imaging by using Maxim DL and the SKY X as planetarium software.

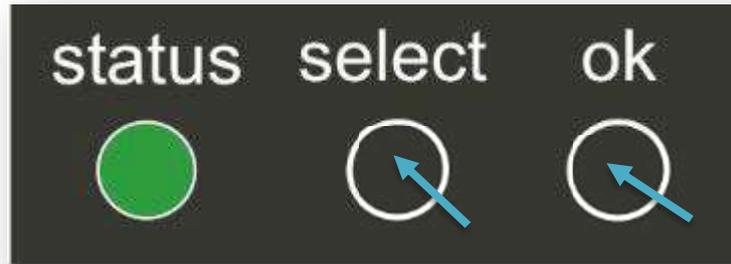
The system is currently setup for unguided operation, the low read noise of the C3 camera keeps the necessary exposure time in the range of 60 to 180 sec. for LRGB and a maximum of 420 sec. for Narrowband.

Technical Data:

- ASA DDM200 Direct drive mount
- ASA 600 RC with reducer f4.5
- Moravian C3 Pro Camera with IMX455 Cmos sensor
- Image scale 0.289"/pixel
- Fov 44'x30'
- Camera orientation North is up
- FLI LRGB and Baader 7nm Ha, OIII and SII

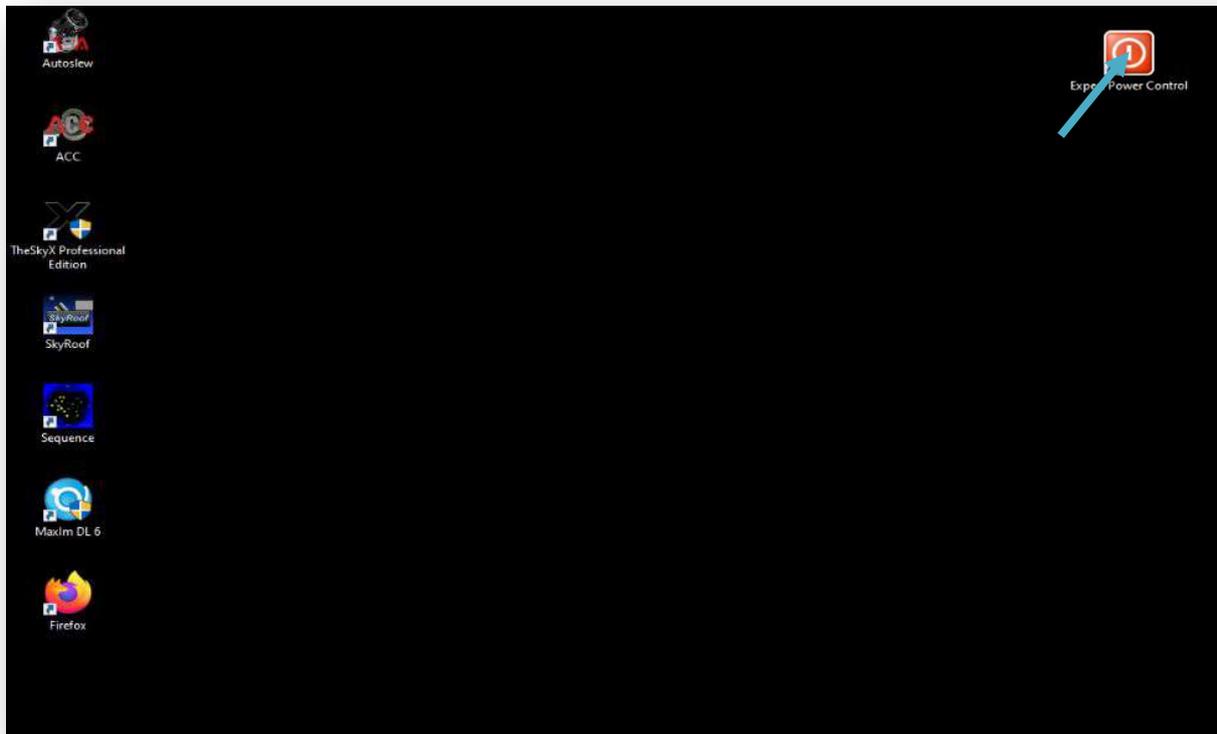
Getting Started

The main control computer is always on, the monitor is switched off on the EPC remote power switch. You need to manually switch on channel 6 on the EPC.



Choose channel 6 with "Select" until the respective status led blinks, and confirm with "OK"

You will then have access to all other functions on the desktop of the computer.



On the upper right side of the desktop is the EPC web interface.

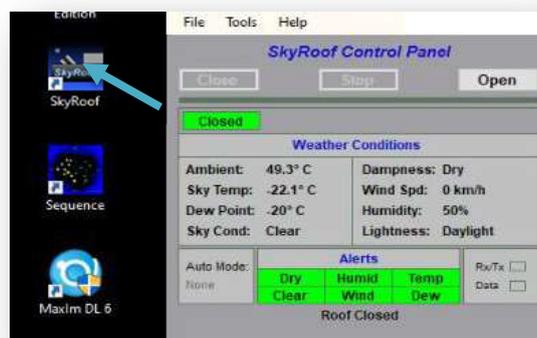
Switch on the DDM200 the RC600 Camera and USB.



The observatory is now fully powered and you can open the roof and connect the mount, focuser and camera.

Roof Control

The roof is controlled by Interactive Astronomy's SkyRoof.



Use the “Open” and “Close” buttons to control the roof, please use Skyroof and not the remote control on the observatory key. Also do not open the roof during daylight, the software will detect daylight and automatically close after a period of 10 min.

The roof will also close in case of unsafe weather conditions.

Mount Control



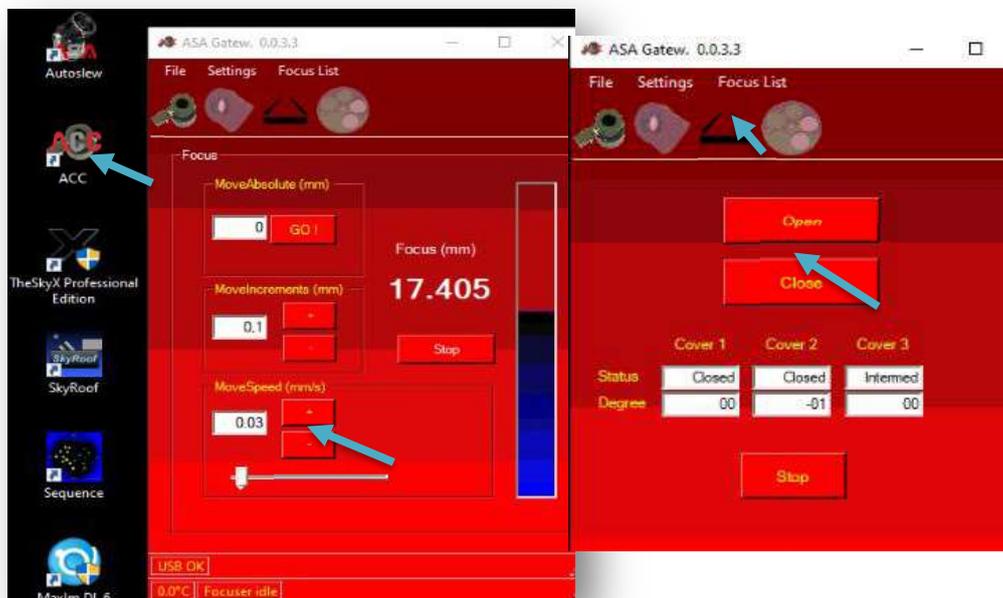
Start “Autoslew”, it will connect to the mount automatically, the motors are on by default.

The DDM200 is equipped with absolute encoders so there is no homing or sync necessary

You can move the mount manually by using the arrow keys on the right side of the Autoslew user interface, choose the manual speed with the slider on the right side of the arrow keys.

The telescope fans are also controlled by Autoslew use the “Fans” slider to turn them on. The fan control has a ramp so it will take a minute until they are up to the chosen speed.

Focuser and Mirror Covers

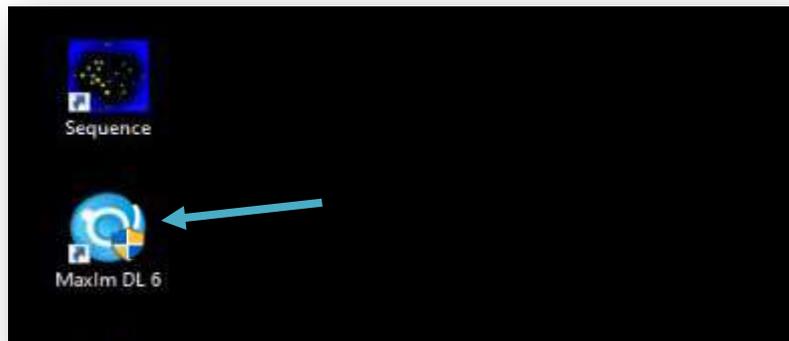


ACC is used for focuser and mirror cover control, the secondary mirror focusing unit has an absolute encoder, so again no homing needed. The correct focus position of the system is around 17.4mm, depending on ambient temperature.

If you intend to manually focus, use the “Move Speed” +/- buttons, and set the slider to a speed between 0.01 and 0.03.

To operate the mirror covers go to ACC’s cover tab and open or close.

Camera Control



The camera is controlled by Maxim DL, so basically you just need to connect, turn on the cooling and you are ready to go.

The camera is set to a gain of 2750, this is the highest useful gain. At this setting the read noise is 1.4 electrons, and the full well capacity is 16900 electrons resulting in a dynamic range of 11,57.

If you intend to use other settings please revert to the original values when leaving the observatory.

The cooler setpoint is at -10 degrees, please don't change the setpoint to lower temperatures, the IMX455 sensor has very low dark current so lowering the temperature will only put strain on the system with no real benefit.

The 7 position filterwheel is fitted with 50x50mm FLI LRGB Filters, and a Baader Narrowband set.

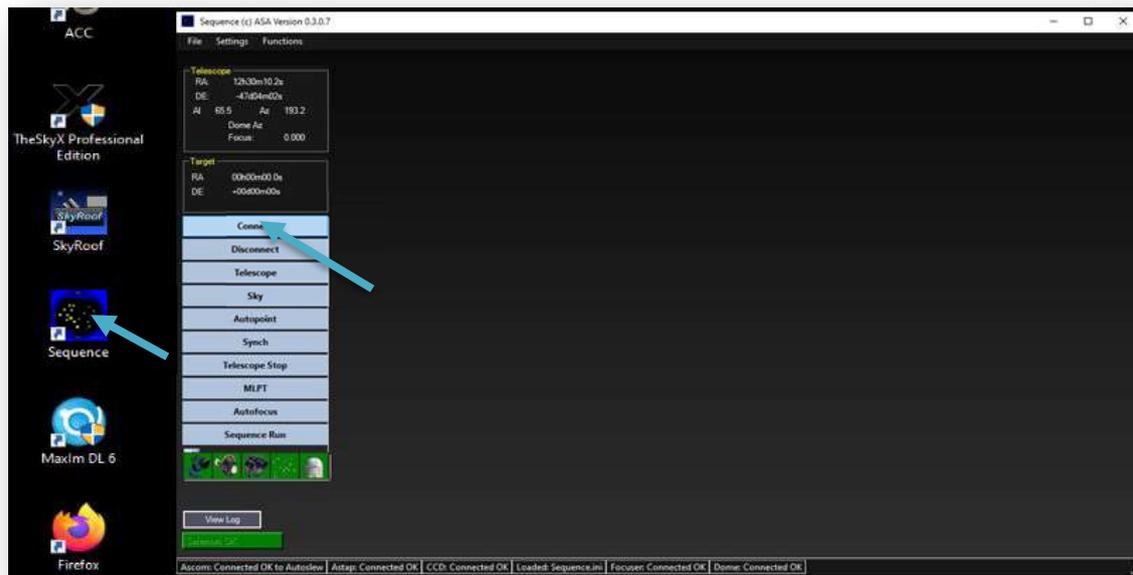
Useful exposure times for subframes are 60 to 180sec. for LRGB, and about 420sec. for NB filters.

The system has no guide camera as it is capable of doing sub exposure times up to 600sec. unguided.

This also saves lots of overhead time for acquisition and recentering of guide stars.

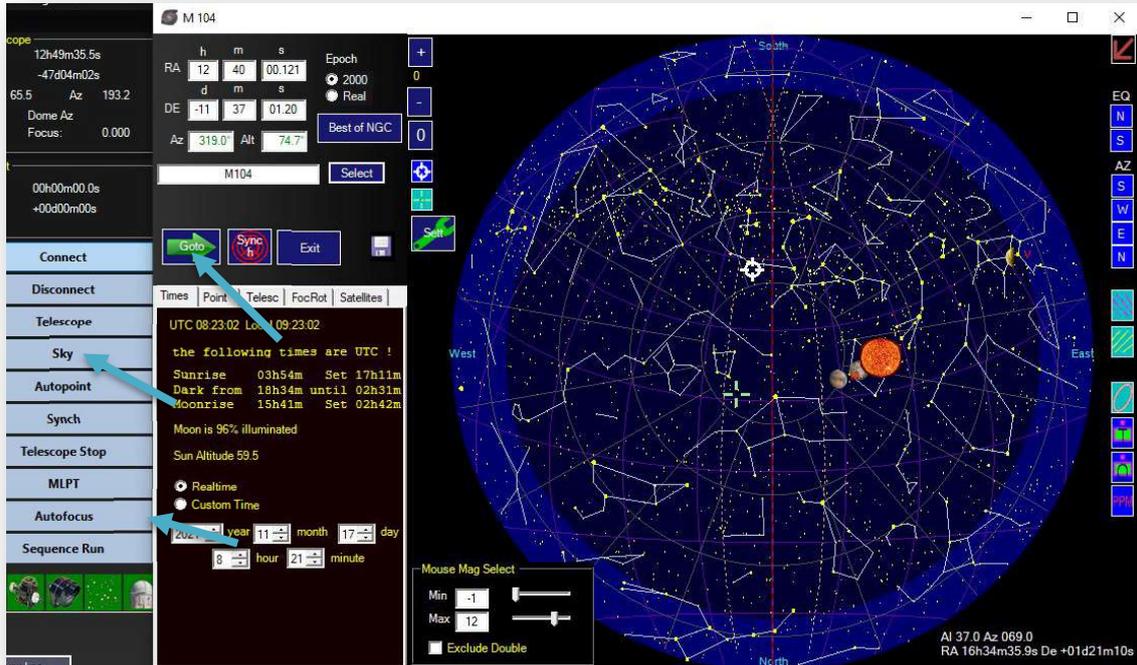
SEQUENCE OBSERVATORY CONTROL

SEQUENCE is used to automate the observing session, it controls the mount, focuser, mirror covers, telescope fans and the camera.



Open SEQUENCE and click connect, it will connect to all devices.

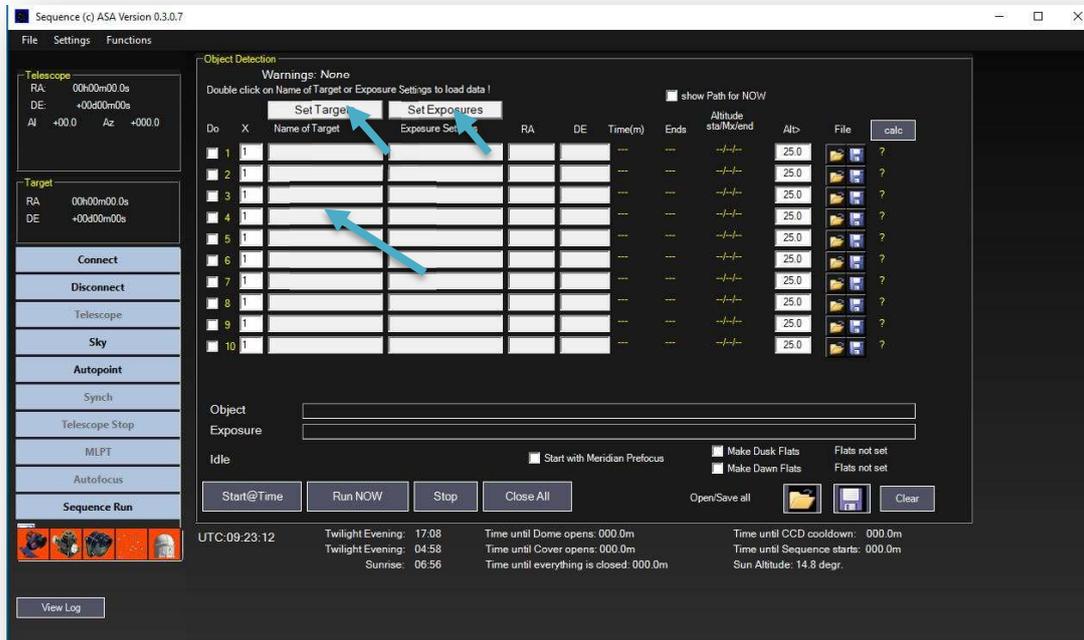
The two relevant functions in the left side menu are "Sky" which is a planetarium window where you can choose objects and position the telescope, and "Sequence Run" to automate observing sessions.



In the "SKY" you can either click a position on the map and then slew the mount with clicking on the "GOTO" arrow.

You can also input coordinates, or choose the object in the "SELECT" window, this works for "M, NGC, and IC" objects.

SEQUENCE RUN

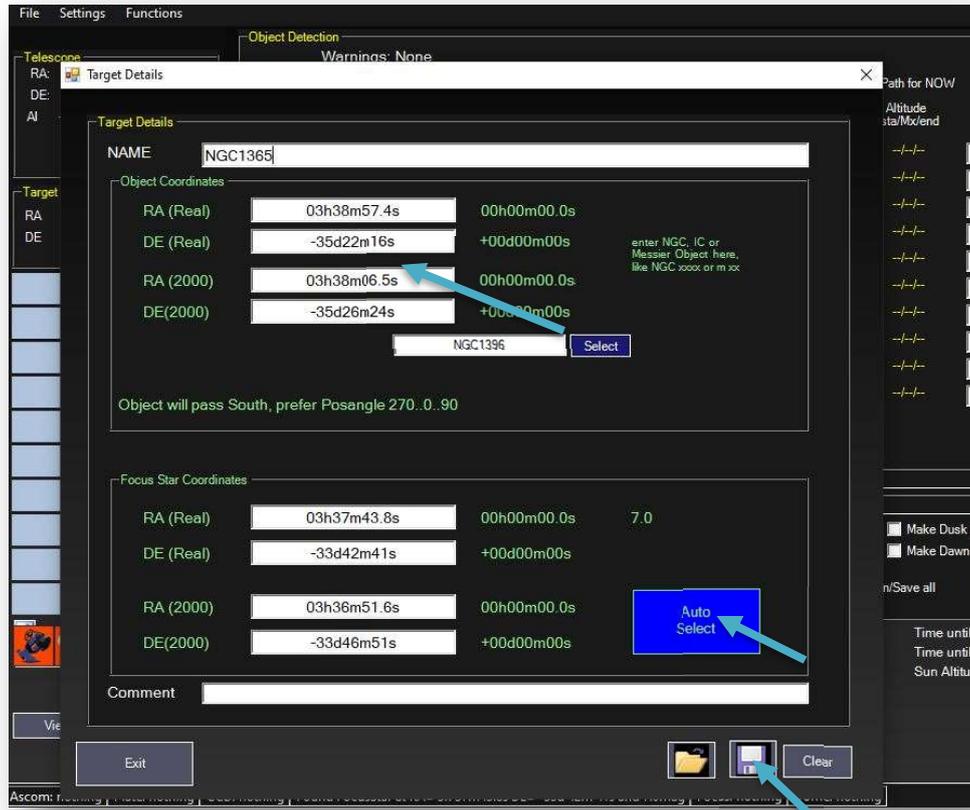


Under “Sequence Run” you can set your target and exposure templates, and input them into the observing list by double clicking.

The target and exposure templates are saved under C:/Program Data/ASA/Sequence/Target Files, and /Exposure Settings.

By double clicking on the target or exposure fields the correct folder will open, and you can choose your objects and exposures.

SET TARGETS

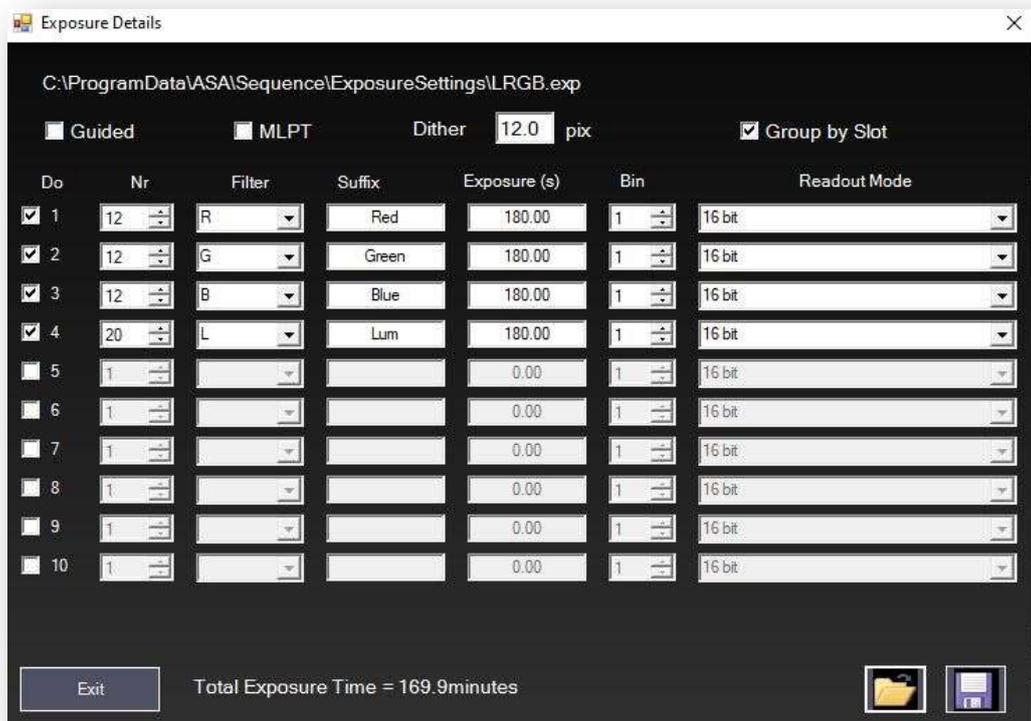


To create a target, you can either input a “M, NGC, or IC” number and click select, or manually input coordinates in Jnow, or 2000 epochs.

Choose a focus star by clicking “Auto Select”, this chooses a focus star with the right magnitude not far from the object.

Give your target a specific name and save it.

SET EXPOSURES



Next step is to create your “Exposure Template”, input your desired sequence for filters, subframe count and Bin mode.

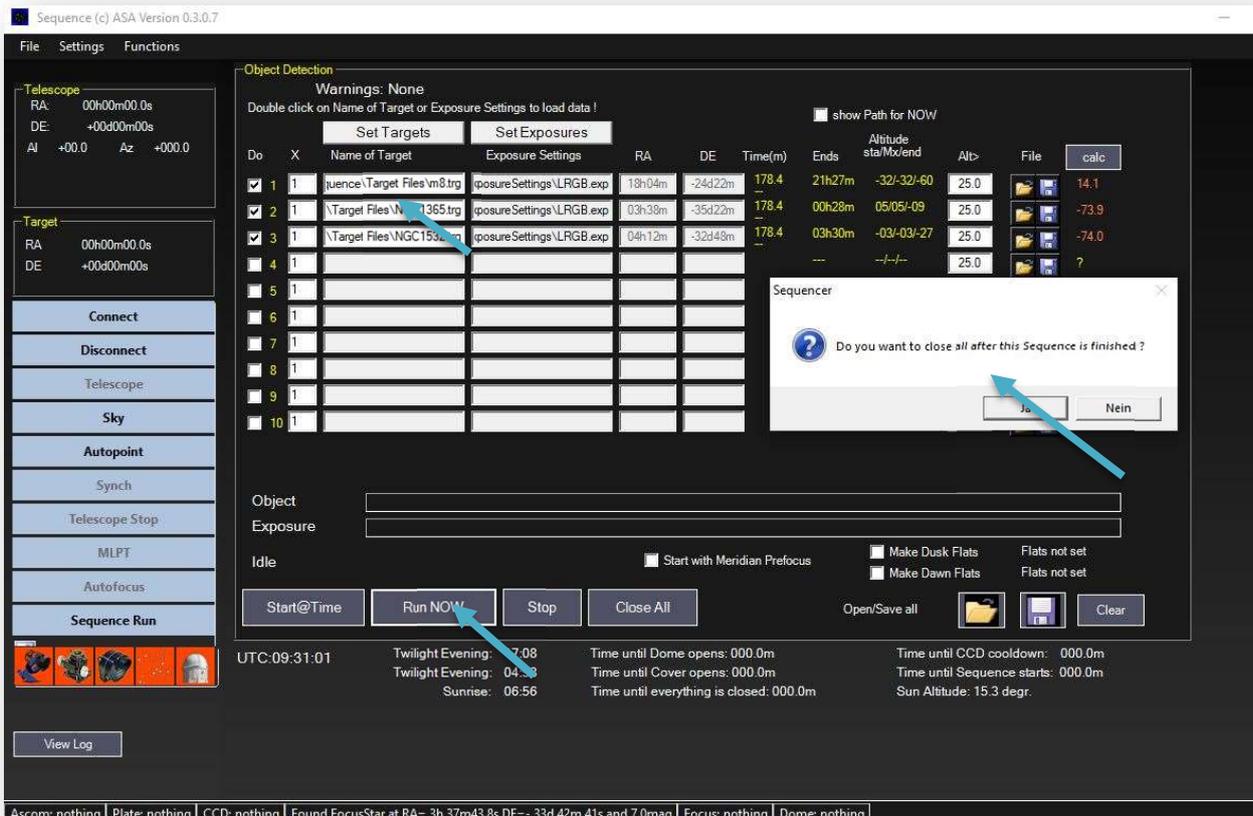
You can choose between grouped by slot, or consecutive change of filters.

For sub exposures longer that 180 sec. I would recommend to use the “MLPT” function, this performs an automated local pointing correction on the imaging path before the object sequence.

Exposure templates are not object specific, so you can create templates that you can use on multiple objects.

Once you are finished, save the template.

RUNNING THE SEQUENCE



By double clicking on the target and exposure columns you can input your templates.

I would recommend to use the "Run Now" command to start the session. Sequence will ask if you want to close all after the sequence.

If you confirm "SEQUENCE" will initiate a complete shut down once the run is finished, the camera will warm up, the fans will be turned off, the mirror covers close, and finally the roof closes.

If you click no the system will stay operational.

Your Fits files are saved under D:\Images

On the front of the left PC in the rack there are free USB/A and USB/C connectors to retrieve your data.



Additional Notes

Please do not open the observatory during daylight, the ambient condition sensor is connected to the roof control and will automatically close after 10 min.

For safety reasons be careful not to stand or sit in the swing radius of the telescope during an imaging session.

Please do not shut down the computer, the system is set up for remote operation and runs 24/7.

If you have any additional questions, you can contact me under wolfgang@astro-pics.com

I wish you successful observing

Wolfgang Promper