Manual
PICTOR Observatory

Welcome to Pictor Observatory!

The Pictor Observatory is set up for fully automatic operation and can run multiple object sequences from dusk to dawn.

This includes:

- Opening the observatory roof
- Opening the mirror covers
- Switching on the telescope fans
- Cooling down the camera
- Creation of flatfields
- Making the lightsframes
- Autofocusing every 30 min.
- Complete shutdown after object sequences

The automation of the observatory is controlled by ASA Sequence and will be described later in this manual. It is still possible to take manual images using MaximDL and SKY X as the planetarium program.

The system is set up for "unguided" operation. The low readout noise of the CMOS camera keeps the necessary exposure times for LRGB in the range of 60 to 180 seconds. An off-axis guider is installed for narrowband exposures from 420 to 900 seconds.

Technical data:

- ASA DDM100 direct drive mount.
- ASA 400 RC f/8
- ZWO ASI 6200MM Pro camera with IMX455 CMOS sensor
- Resolution 0.24"/pixel
- Field of view 38,7'x 25,8'
- Camera orientation north is up
- Baader LRGB filter set (CMOS optimized), Astrodon 5nm Ha, OIII and a dark filter

1. Turn on the monitor

By default, the monitor in the observatory is de-energized and turned off. To switch it on, open the server rack front door (press the cylinder lock and unlock using the lever mechanism with a ¼ turn counterclockwise).

In the rack you will find a Gude Expert Power Control (EPC) unit. To power the monitor, press the "Select" button (red arrow) until you reach position 12. The following modes are switched through one after the other:

• First button press: All on (PALL in the display): All LEDs flash green.
• Second button press: All off (PALL in the display): All LEDs flash red.
• If you press the "Select" button again, the LED for the first output starts to flash, i.e. the output is selected. Press „Select" again to select the next output, and so on.

When you have reached output 12, hold down the "OK" button (green arrow) for approx. 1 second until you hear the relay switch and the display changes to "on".

Illustration.1: Gude Expert Power Control (EPC)

The monitor is now supplied with power and you can switch it on or off directly on the screen as usual with the monitor power button. The PC password is: **Pi-tor**

2. EPC interface

All other power connections (mount, CMOS camera) are made via the web interface of the EPC, which you can call up via the yellow lightning icon.
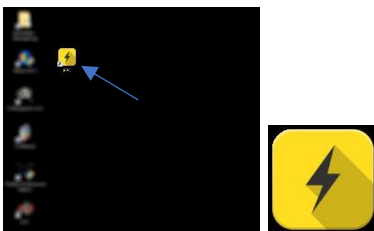

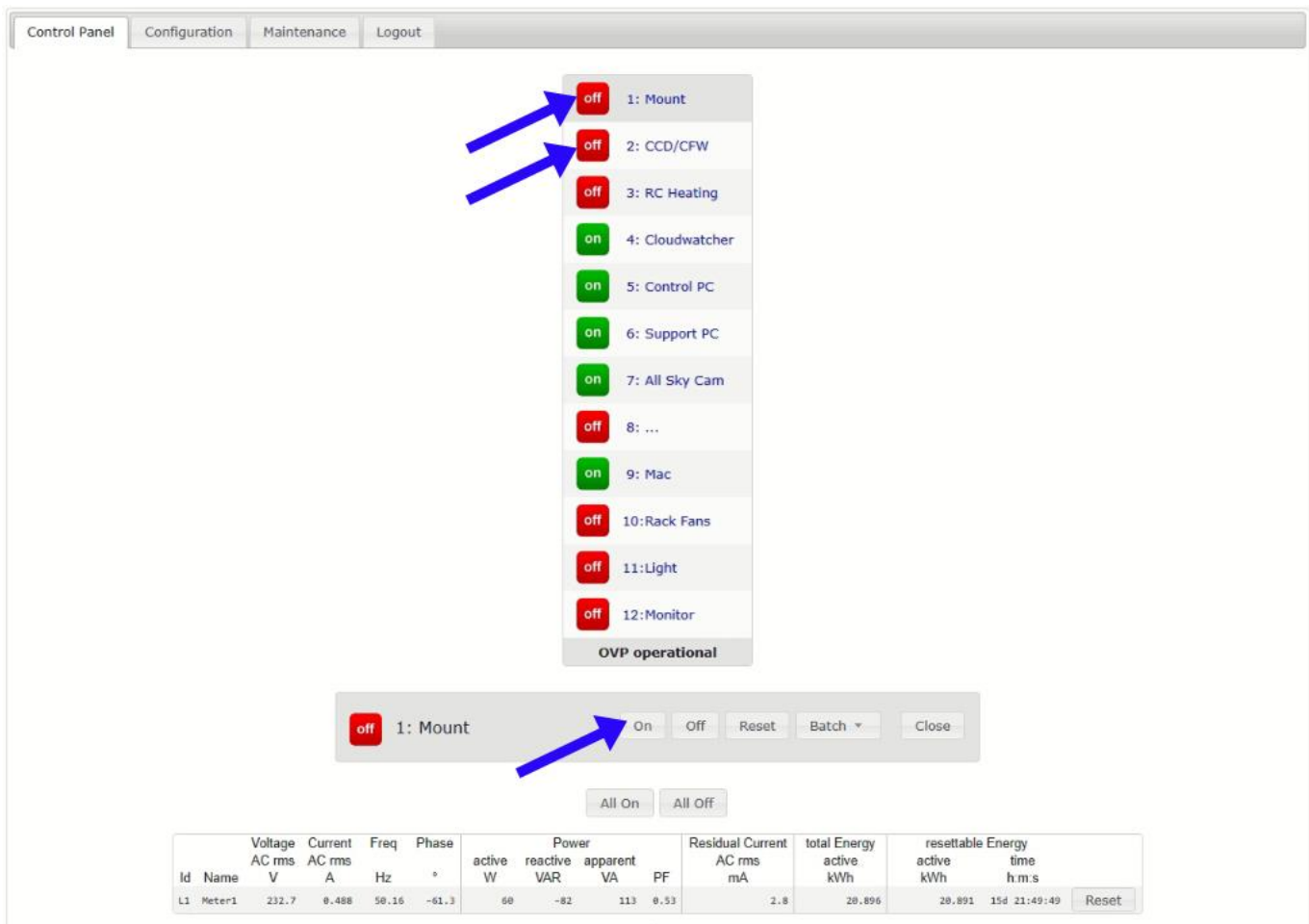*Illustration.2: PC screen and EPC- Icon*

Illustration.3: EPC interface

In nights with high humidity the telescope heating (3: RC heating) may also be required. This is configured in such a way that it only has to be switched on - the other parameters are already set on the Kendrick DigiFire FX-Pro.

> ⚠️ **All other connections (4-11) are not necessary for use and are switched/used exclusively by the owner!**

3. Roof control

The roof is controlled by Interactive Astronomy's SkyRoof. Please use only the "Open" and "Close" function in SkyRoof to open the roof and **NOT** the remote control on the observatory key!
Likewise, the roof should not be opened during the day, this is detected by SkyRoof and the roof is automatically closed. The roof also closes in uncertain weather conditions.
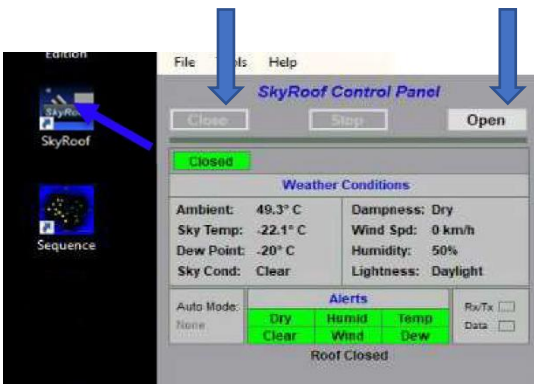
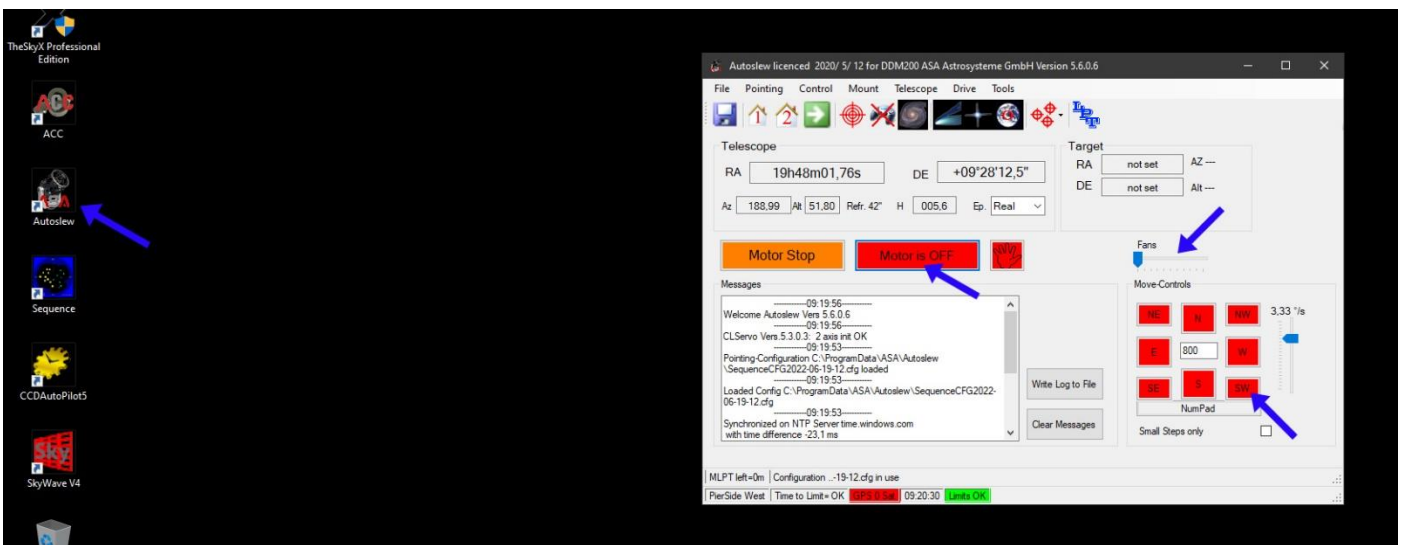*Illustration.4: SkyRoof*

4. Mount control

Illustration.5: Autoslew Icon und Autoslew interface

When you start Autoslew, the motors are off by default. Click the "Motor is OFF" button to turn it on. The DDM100 mount is equipped with absolute encoders, so no "Homefind" or "Synch" is necessary. You can move the mount manually in the desired direction using the arrow keys (the speed can also be selected manually).

The telescope fans are also controlled in Autoslew ("Fans" slider). These have a startup and deceleration ramp, so it takes a bit until the desired fan speed is reached.

5. Focuser and mirror covers

Illustration.6: ACC Icon und interface

ACC is used to control the focuser (secondary mirror focuser with absolute encoders) and the mirror covers. No "homing" is necessary here either - the correct focus position is around 22mm, depending on the respective ambient temperature.

If you want to focus manually, you can use the "MoveSpeed" +/- buttons (ideal speed 0.01 and 0.03 - set with the slider below).

Clicking on the covers icon will take you to the Mirror Covers tab. The covers can be opened and closed with "Open" and "Close".

6. Camera control

The camera and filter wheel are controlled using MaximDL. When you call up the program, select "Connect" and turn on the cooling (target temperature is -10⁰ Celsius) and everything is set up. Please do not change the setpoint to lower temperatures, the IMX455 sensor has a very low dark current, so lowering the temperature will only load the system without any gain.
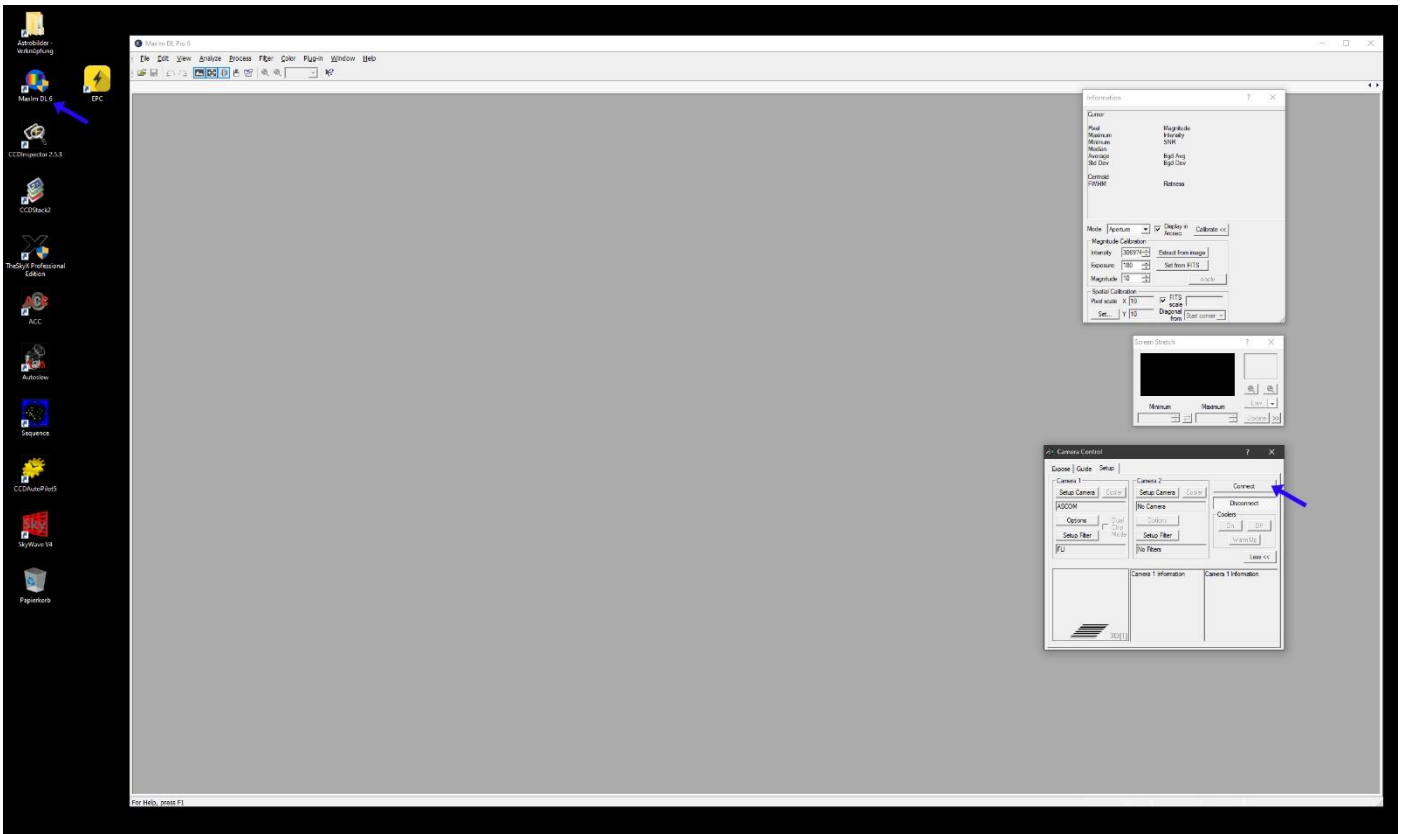

Illustration.7: Icon MaximDL und interface

The 7-position filter wheel includes the following 50x50mm filters:
- • Position 1-4: Baader CMOS optimized LRGB filterset
- • Position 5-6: Astrodon Ha & OIII 5nm filters
- • Position 7: Dark filter

Typical exposure times for LRGB range from 60 to 240 seconds, for narrowband imaging from 420 to 900 seconds. PI masterdarks with 180, 240, 420 and 900 seconds, PI masterbias and PI masterflats are available.

7. Sequence observatory control

Sequence fully automatically controls the entire photo session (mount, focuser, mirror covers, fans, camera and roof). Open Sequence and click "Connect" - all devices are now connected (indicated by the toolbar turning green).
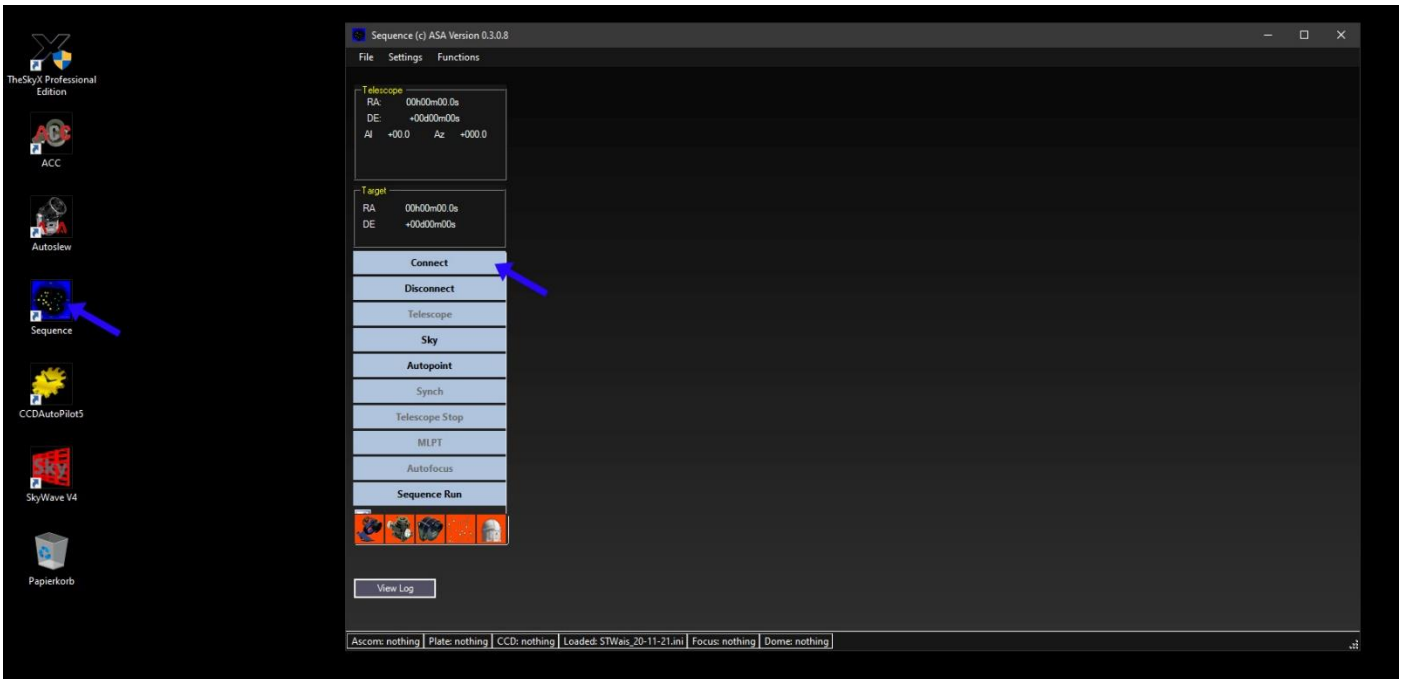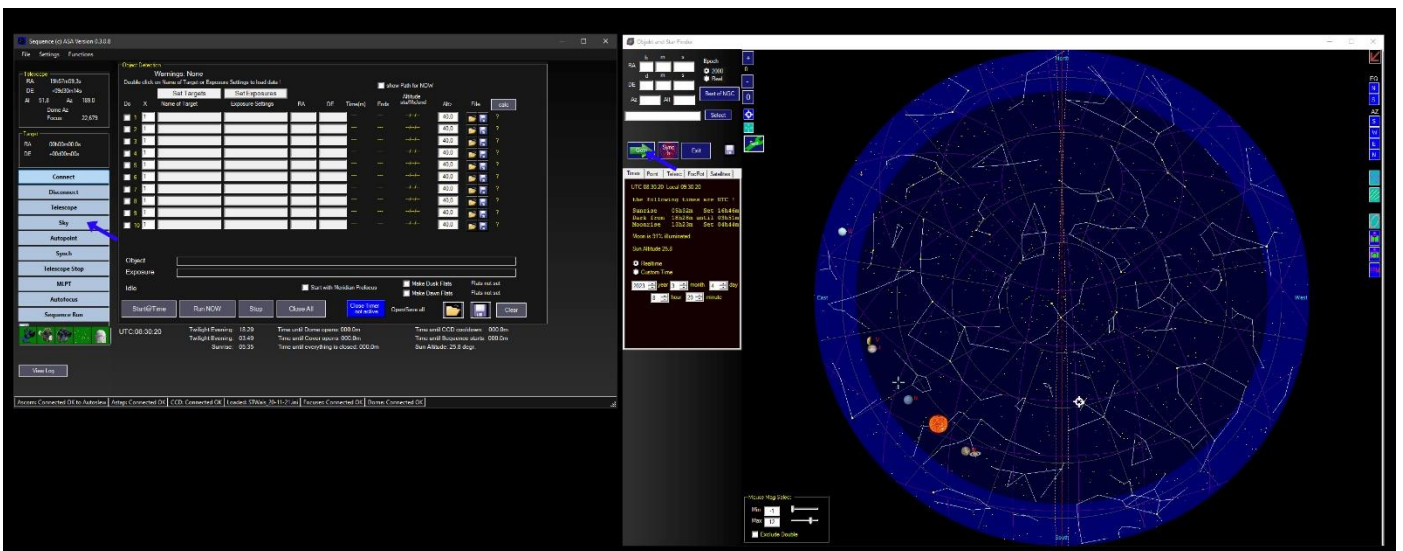

Illustration.8: Icon Sequence und interface

Illustration.9: Sky Planetarium app und interafce

The integrated planetarium software „Sky" makes it possible to go to any object or star directly. To do this, click on "Sky", enter the desired destination in the search window and then click on "Goto". You can close this planetarium window at any time with the "X" in the upper right corner and open it again later.
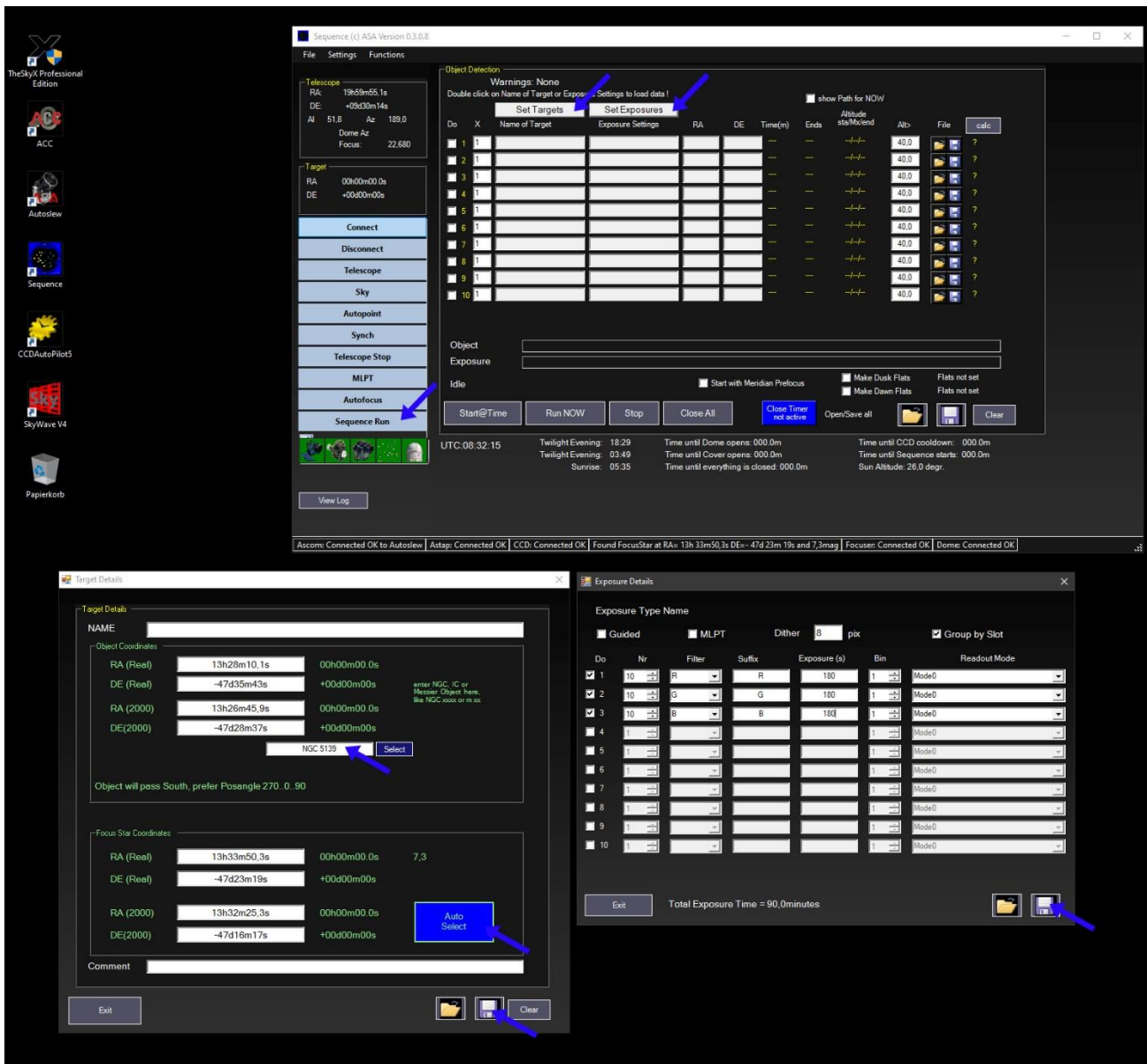
Illustration.10: Sequence Run, Set Target and Set Exposures windows

To create a session, click on "Sequence Run". You can create one object per line, which will then be photographed in sequence. To set an object or the exposure sequence, click on "Set Target" or "Set Exposures". Select an object in the target window or enter the coordinates (RA & DE (2000)) directly. Then let Sequence automatically determine a suitable focus star and save the object.

To create the exposure sequence, proceed as follows: select the number of exposures per line, the desired filter including the appropriate suffix, the desired exposure time and the binning. For exposure times over 180 seconds, it makes sense to tick „MLPT" to improve tracking performance. You can also choose whether you want to expose the respective filters one after the other or whether you want a continuous filter change. Then save the exposure sequence (this sequence can be used independently for any object).
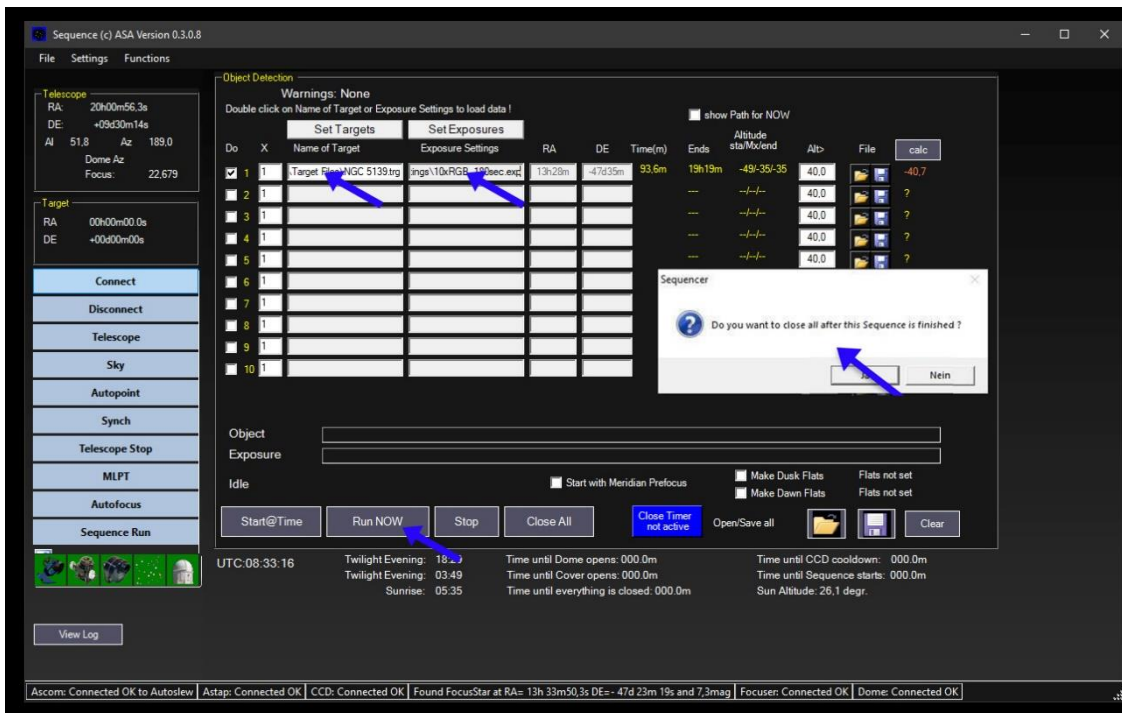
Illustration.11: Sequence Run – Session start

In order to photograph the desired objects, double-click in the Target and Exposures lines and select the target file and exposure sequence file you created before. As already mentioned, several objects can be created, which are then photographed one after the other. Finally, to start the session, click "Run NOW" and confirm that Sequence should close everything when the sequence is finished.

If you select "No", the entire observatory remains operational after the sequence has been completed (note: the roof also remains open until sunrise).

After completion, you can retrieve the data of your photo session in the folder "Astroimages - link" with the respective date subfolder. You will find a USB3 port directly on the monitor, where you can plug in your mobile hard drive or USB stick.
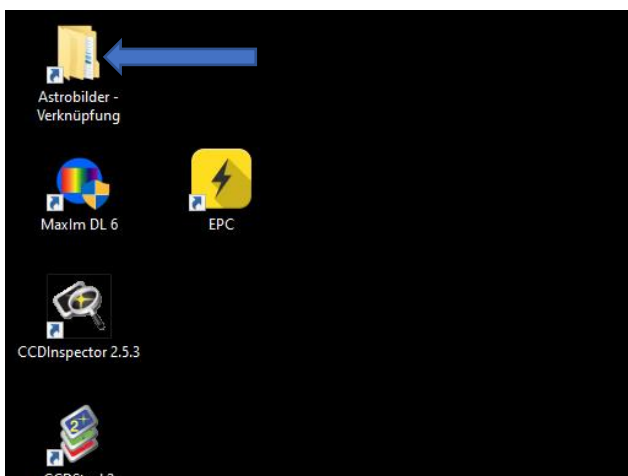

Illustration.12: File folder

8. Additional notes

Be careful not to stand too close to the telescope at night during an ongoing session (slewing range of the mount/telescope).

DO NOT open the observatory roof during the day.

All computers run 24/7 - so please NEVER DO A SHUT DOWN!

In addition, the programs "AAG Cloudwatcher", "AnyDesk" or "Radmin" and "FlingFileUploader" ALWAYS run on the control computer. Please do not close them!

If you have any further questions, please do not hesitate to contact me at
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