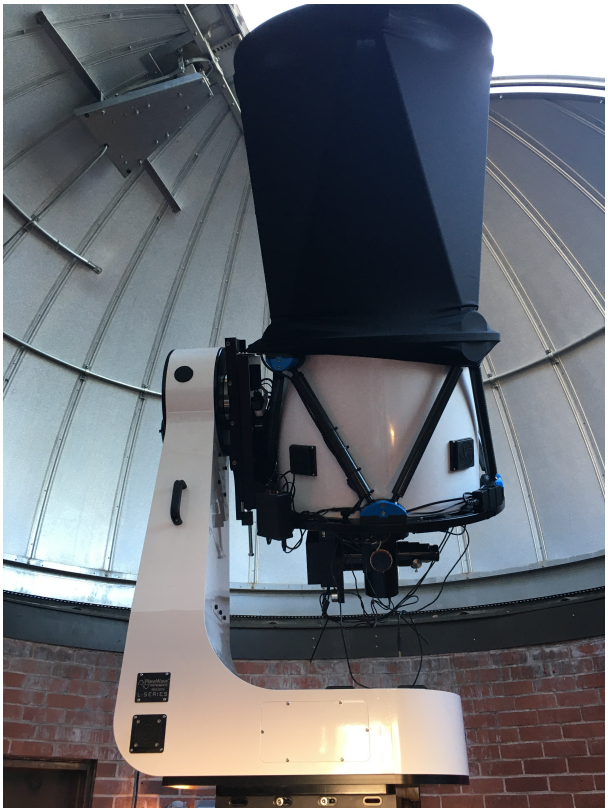
Wesleyan University
24” PlaneWave CDK
Operating Reference Manual

Department of Astronomy
Ed Moran, Chair
Roy Kilgard, Telescope wrangler
Middletown, Connecticut



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1. Power and Lighting

Power

Power for all components of the system is managed by the Digital Loggers Ethernet Power Controller in the closet, henceforth called the Power Distribution Unit, or PDU.

Figure 1: Power Distribution Unit

The PDU can be controlled by the buttons on its front and via a web interface. The PDU has 8 banks of outlets that can be controlled separately:

1. Empty
2. White Lights
3. Red Lights
4. Empty
5. Pier Outlet (currently telescope and all cameras and accessories)
6. Empty
7. Empty
8. Dome CPU (do not turn off!)

The URL for power control is http://129.133.58.90 Username: admin, Password: Ch7.trK

Lighting

The dome interior has both red and white lights. They can be controlled by the toggle switches near the door or through the PDU. IMPORTANT NOTE: Turning on either the red or white lights with the toggle switches overrides the ability to control them by computer. Never leave the dome with the switches in the ON position.

2. Dome Operation

The dome is controlled by an Astrometric DomePro2-d control system. The dome can be opened/closed and rotated either via the buttons on the DomePro2-d unit mounted on the brick wall or via the software interface, Maestro (see Section 12). The buttons are momentary switches, so they will only move the dome/slit while the button is pressed.

When operated by hand, the upper slit opens first, then the lower slit opens only when the upper is fully open. The reverse is true when closing. The components can be controlled individually in Maestro. Right rotation corresponds to increasing azimuth, and left is decreasing azimuth.

3. Computer and software overview

The control computer is named vvo24inch.astro.wesleyan.edu. It can be accessed using Microsoft Remote Desktop. Student users will need to first connect to the Wesleyan VPN, even if they are in the observatory. Remote Desktop username/password: observer/ VVO24Inch!

There are many pieces of software associated with the system. This section will provide a short overview. Details on each can be found in subsequent sections. There are shortcuts to each of these pieces of software on the Windows desktop.

1. PWI3 – PlaneWave Interface 3. PWI3 controls all systems of the telescope except for the mount (i.e., pointing). This includes the focuser/rotator and temperature/fan control.

2. PWI4 – PlaneWave Interface 4. PWI4 controls the mount. This includes enabling drive motors, pointing, tracking, and GoTo functions.

3. Perseus Commander – Perseus Commander controls the Perseus instrument selector. Currently, the FLI ProLine CCD and filter wheel are mounted on port 1, the eyepiece is in port 2, a counterweight to offset the weight of the camera is in port 3, and the high-speed camera is in port 4.

4. MaxIm DL – MaximDL is used for controlling the ProLine CCD camera.

5. Clarity II – Clarity II provides access to the weather station.

6. AllSkEye – AllSkEye is the control software for the all-sky camera.

7. Maestro – Maestro is the dome control software.

8. FireCapture – Software used for controlling the PointGrey Blackfly high-speed camera.

4. Startup Procedure

Here is the startup procedure.

1. Connect to the PC through Remote Desktop.
2. Turn on the lights through the PMU.
3. Turn on outlet 5 through the PMU. This will power on the pier outlet and the power strip for opening and closing the dome slit.
4. Open MaximDL first and start the camera cooling to the desired temperature.
5. Start PWI3 and PWI4. Click Connect in PWI4. Enable Alt and Az axes.
6. Start Perseus Commander.
7. In PWI4, select “Home Mount” from the Commands menu. This is necessary for the telescope to know where it is, and is not too far from a good location for taking sky flats.

5. Observing Quick Start

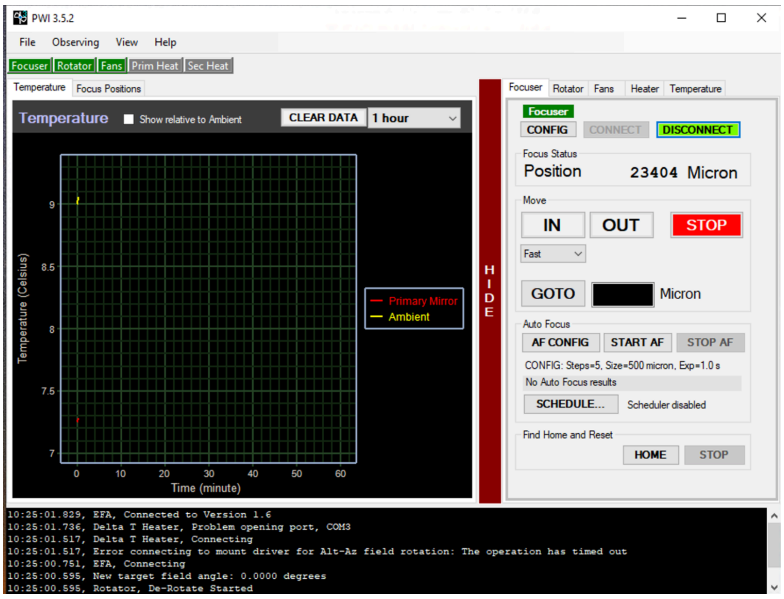
Blah blah blah observing.

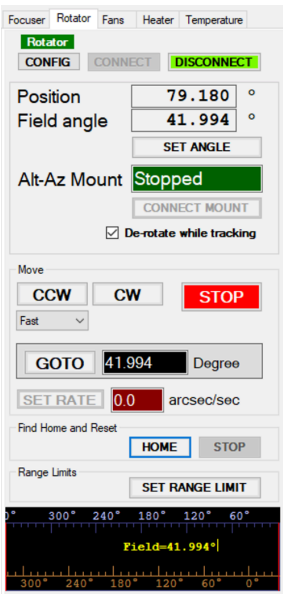
6. PlaneWave Interface 3 (PWI3)

PWI3 controls the IFR90 integrated focuser and rotator and the temperature monitoring and control systems (fans and heaters). Although PWI3 mostly sits in the background, observers will use it to run the autofocus routine.

PWI3 has controls for the focuser, rotator, fans, and heaters. In the left view below, the current focuser position can be seen. Typical focus is in the range from 23000-24000 microns.

An autofocus routine can be run by clicking “START AF”. As can be seen in the setting window, it is configured to take 5 images in 500 micron steps with exposure times of 1s. Users may wish to change the exposure time. The other settings are probably fine. The routine assumes you are close to the correct focus and takes N images spaced around current focus. It automatically finds all the stars in the images and measures the FWHM. It then minimizes the value and sets focus to the minimum of the function.



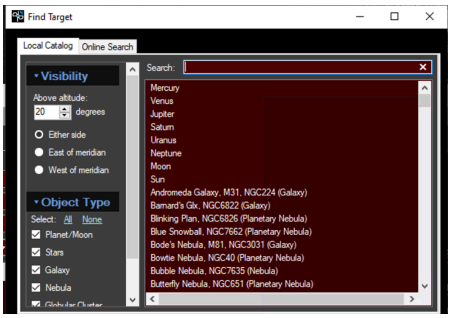


The Rotator tab displays the rotator position, speed, and limits. When tracking is enabled (in PWI4), the Rotator tab will turn yellow. Users should generally not touch anything here unless you wish to rotate the field. By default, the rotator will set its position so that North is up.

7. PlaneWave Interface 4 (PWI4)

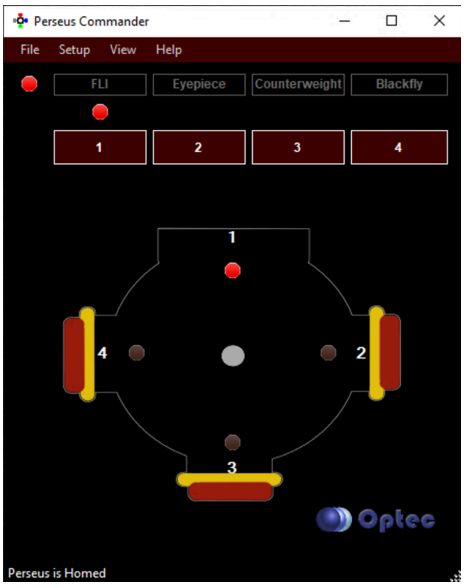
PWI4 controls the L-600 mount and is responsible for all pointing of the telescope, including GoTo functionality. The default view after connecting and enabling the Az and Alt axes is shown below. In normal observing, there are only a few commands needed:

1. Home mount. Located under “Commands”, observers should home the mount at the beginning of an observing session. The home command causes the mount to slew past the home sensors on both axes, so it will its precise Alt/Az position.
2. Go to park position. Located under “Commands”, parking the telescope moves the telescope to an Az of 180º, and Alt of 5º, and disables tracking.
3. Find targets… Located under “View” in the top left, this opens the Find Target menu seen below. It displays a list of bright objects and is useful for casual/ public observing. Moving the telescope to any celestial object enables tracking.
4. Goto. The Goto tab allows the user to enter celestial coordinates for a target. Alt/Az coordinates can also be entered. For now, this will be the preferred method of taking sky flats.

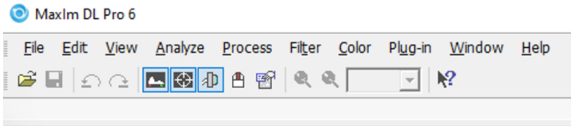


8. Perseus Commander

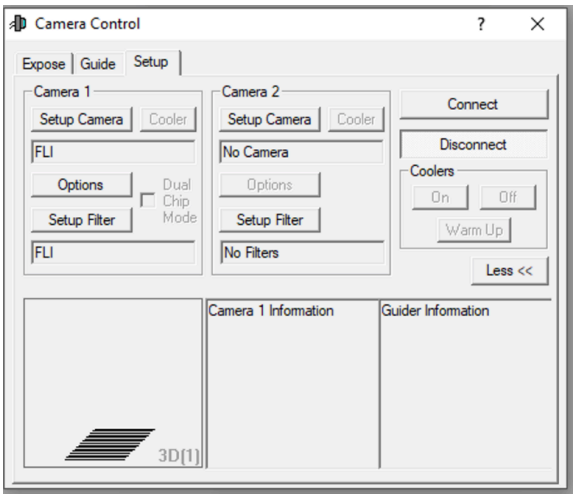
Perseus Commander controls the Perseus 4-port instrument selector. After startup, select “Connect”. Currently, the FLI ProLine CCD and filter wheel are mounted on port 1, the Feathertouch focuser for eyepiece observing is in port 2, a counterweight is in port 3, and the PointGrey Blackfly high-speed camera is in port 4. The Perseus can be controlled by the software interface or by the button on the bottom center of the Perseus.



9. MaximDL



MaximDL handles CCD camera control. The Camera Control window likes to hide. It can be activated by clicking the rightmost of the three selected icons in this image, by selecting "Camera Control" from the "View" menu, or by hitting ctrl-w.

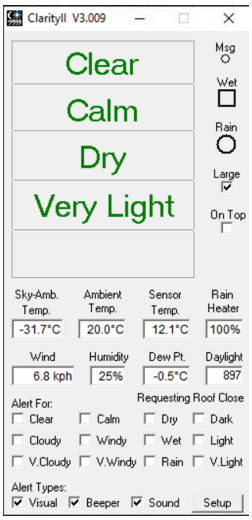


Connect to the camera by selecting the "Setup" tab and clicking connect. The temperature for the cooler can be set by clicking "Cooler". The cooling limit is TBD but it can probably handle -40ºC below ambient.

Imaging controls are in the "Expose" tab. MaximDL creates a nightly folder and saves all images automatically. The folder rolls over at 12:00pm (noon). Observers will need to experiment to familiarize themselves with all the menu options.

10. Clarity II

Clarity II interfaces with the Boltwood II weather station. It displays current weather conditions. Its basis for clear/cloudy is based on the difference between sky ambient temperature and ground ambient temperature, so is not always correct, especially when it's clear but very humid. The weather station will eventually communicate with the dome control system.



11. AllSkEye

The AllSkEye software interfaces with the Starlight Xpress all sky camera. It will eventually take images automatically and stitch them together to make nightly movies. Observers should generally not mess with it; it will run quietly in the background.

12. Maestro

Maestro interfaces with the dome control system. Screenshots coming soon.

13. FireCapture

FireCapture interfaces with the PointGrey Blackly high-speed camera. The camera does not yet have an adapter for the Perseus, so anyone wishing to use it should contact Roy Kilgard for instructions.

14. Dome Cams

The dome cams are accessed through VLC by their IP addresses. DomeCam1 is the horizontal interior view. Its address is 129.133.58.184:554. Appending /s0 is the high-resolution stream and /s1 is the low-resolution stream. There are shortcuts to open both streams on the desktop.

15. Public Astronomy

General
When Wesleyan Astronomy personnel or ASGH hold a public or private session, these basic guidelines must be followed. There may only be 10 people on the floor with the telescope at any given time. An ASGH member is expected to be with the telescope AND with the public in the hall waiting to observe at all times. Solo operation of the telescope is not permitted under any circumstances.

Access and privacy
Classrooms are off limits to the public and ASGH members during public astronomy nights, unless a specific classroom program is taking place. It is the responsibility of the observer to minimize traffic though the rest of the building. Please keep the public away from the students who are there to study and do research, and away from all of the other telescopes.

Keep the public contained to the main hallway. Post signs to direct the public toward the telescope(s).

Parking
Parking for ASGH members, friends, and the public is offsite. Parking at the observatory is only for faculty/staff, permitted students, and those who require accessibility assistance. Public parking is available either on Vine Street in the large parking lot or on Wyllys Avenue near the Admissions Office.

16. Security

Security procedures will be handled during your training sessions.

Campus security can be reached at 860-685-2345. Campus emergency number is 860-685-3333.

While it is certainly not expected that there will ever be a problem with an unruly guest or student, observers are not expected to be the police. Never place yourself in a confrontational situation–contact security. Your roles are education, crowd control, and the proper use and protection of the equipment and Wesleyan University's resources.

17. Troubleshooting

1. Help!