Info

This manual is still a work in progress. Report any parts you believe to be in error to Observing Support.

1 Preparations

For a better overview, the images are listed in section 8.

1.1 Observer account

To log into the telescope's control computers, you need to have an account. If you do not have an account yet or are not allowed to use another person's account, write an e-mail to the technical team (McDonald Observatory Observing Support Group) at mcd-os@utlists.utexas.edu.

1.2 Plug-in VIRUS-W and its compressor

Info

Usually the observatory staff will have done this before you arrive

Warning!

The system needs time to relax after you have activated the cooling. You should activate it a day before the first exposures. **At least** 2 h are necessary to bring the system in a stable state.

- Check if the black glue stripes, that prevent light from entering VIRUS-W, are in a good shape. If they are not, fix them by using some of the tape that can be found in the aluminium box near the instrument/compressor (see figure 4).
- Plug-in the VIRUS-W compressor and turn it on (VIRUS-W is physically located at the telescope's control room).
- Plug-in the 110 V to 230 V converter ⇒ There should appear numbers on the digital display, which is located at the side of VIRUS-W. If not, you have to turn on VIRUS-W which can be done by using the switch right next to the digital display.

1.3 Turn on and prepare computers

Info

Usually the the computers should be running by the time you arrive at the observatory

- Turn on the two VIRUS-W computers that are also located in the control room. You will find the computers on the backside of the monitors. You will recognize the VIRUS-W machines by the typical MPE stickers (**ex-ws12 exgal 74.212**, **ex-ws04 exgal 74.204**).
- One of the computers is a Windows machine, the second computer runs Kubuntu (Linux based). There monitors are the ones at left end

of the large workdesk, The top one should be connected to the windows machine, the lower one to the linux machine.

- Login to the Linux machine. The login requires a username and a password that can be obtained at mcd-os@utlists.utexas.edu.
- On the Windows machine click on the **SI Image SGL** icon and click SI Image SGL » Operate » Initialize via the prompt.
- You need to upload new firmware to the camera to turn of a internal LED. Unfortunately this has to be done whenever VIRUS-W is being started. To do so, go to SI Image SGL » Operate » DSP Utilities » Download DSP Code and click OK which will upload and install the new firmware
- You should check the status of the CCD temperature, which should be around $-120\,^{\circ}\mathrm{C}$ (see figure 9).

  Warning!

  Do not start to operate if the temperature is above this value. The CCD noise is too high in this case. Wait until the instrument has been cooled down properly. If the camera fails to reach a stable temperature of $-120\,^{\circ}\mathrm{C}$, it might be necessary to pump the cryostat. In this case please ask the observatory staff.

- You might want to take a test image with exposure time 0 to check if everything works as expected. In the windows machine set the exposure time to 0. and click Acquire Image 1 to take a picture.
- Make sure that both, the Linux as well as the Linux machine, show the same time (UT).

  Info

  Something needs to be fixed in the above line - Linux and windows?

- It might be easier to control the everything from the big screen on the atlas machine, if you want to do that, open one ore more connections to the linux machine with:

```
ssh -Y virus-w@virus-w
```

and start the control script there. To open a remote desktop to the windows machine, you can run:

```
rdesktop -g 1024x768 192.168.20.41
```

from the virus-w linux machine.

- Start the control script via a new **terminal** on the Linux machine

```
> vw
```

This will open an **IPython** instance that provides commands to control VIRUS-W as well as a **ds9** instance that is connected to the **IPython** instance

Info

If you ever close the **ds9** instance you can reopen it by calling `ds9 -title vwcontrol` in a new terminal.

- Next bring the grism in the correct position and calibrate the zeropoint of the focus inside the spectrograph camera

```
>>> grismDriveCal() # will lead to HR mode
>>> focusDriveCal()
```

Both commands should return 0 in the end. If not, you should make sure that the instrument has power and you followed all of the previous steps correctly.

- If you want to use the low resolution mode, you have to call

```
>>> grismDrive(GRISM_LOWRES)
```

since the default setting points to the high resolution mode.

Warning!

These commands must be repeated whenever the instrument loses power since VIRUS-W needs to take track of the exact positions!

Help

You can always look up function definitions in **IPython** by appending a question mark to the function name (like `command?`). This tells you which parameters you might pass to the function and provides a short help text. Also you can call `vwhelp()` to get a brief overview over possible commands.

Info

The low resolution mode requires more than just calling the different `grismDrive` command mentioned above. It requires the SDSS-g filter to be removed among to different other steps. If you do not know how to switch to low resolution mode call somebody to assist you!

Info

There might be cases in which you want to abort an observation or any script that runs via the **IPython** command line. To do so press ctrl + C and ↵ to interrupt. Depending if the script is waiting for an exposure, you have to reestablish the connection between the Windows and the Linux machine. Go to SI Image SGL and click on the **TCP/IP - Acitve** icon above the image area. The connection should be closed and the icon should disappear. To reconnect the machines go to SI Image SGL » Operate » TCP/IP Server. Now the icon should appear again telling, **waiting** for commands to execute. See also figure 8.

- Start another terminal on the Linux machine, that runs the `VIRUS-W` control software, and copy an old logfile. Have a look at the logfile and follow its structure in your own logs.

```
> govwdata
> cd new
> cp ../vwXXXXX/201XXXXX/log.txt .
```

(replace the varibales with your own values)

1.4 Prepare dome flats

- In the following steps you want to move the telescope into the 5° soft limit. The telescope has a limit that prohibits positions that allow to damage the telescope

  Warning!

  If you move the telescope into the 5° soft limit, you may damage the telescope. Be careful whenever you move the telescope.

- To unlock the hydraulic bearings go to the small control room near the platform and press the buttons **Start** (right to **Pump 1**), **Declination** (on) and **Hour angle** (on) (see figure 2, buttons 1, 2 and 3)

- Go back to the platform and press the **Reset** button (see figure 1, button 2). You should hear a sound as the hydraulic bearings are unlocked.

  Info

  Remember the steps. Whenever you have put the telescope into **emergency stop mode** and you want to bring it back to life again, you have to repeat the steps above.

- You can now control the telescope, dome, windshields, etc. with the handpaddle

- There are 4 lamps attached to the telescope that can be powered via a plug that is fixed on the telescope. To attach the cable you might have to raise the platform via the telescope handpaddle. Select **Platform East** in the **Slew** mode on the handpaddle to move the platform.

  Warning!

  Take care of the fibers when moving the platform. The platform might rip the fibers!

  (See figures 5 and 6 to locate the needed cable and sockets.)

- Bring up the lower windscreen (control on the handpaddle: **Windscreen: lower**) so that the telescope sees only the white surface that is illuminated by the flat-lamps, that have been previously powered on
- Extend the light shield by pressing **Shield extended** on the control panel on the platform until it lights up, which indicates that the shield is extended compeletely (see figure 1, buttons 3)
- Make sure to open the mirror shield by pressing mirror cover open on the platform terminal (see figure 1, buttons 6)
- Turn off all other lights in the dome using the **passage lights** switch on the platform (see figure 1, buttons 5)

> Attention!
>
> While taking flats, you should put the instrument in the emergency stop mode to prevent that other people move and damage the telescope (see figure 1, button 1). Remember that you are operating in the soft 5° limit. In the case that you want to move the telesope again you have to press the three buttons in the control room next to the telescope (see figure 2, buttons 1, 2 and 3) and the reset button (see figure 1, button 2).

1.5 Taking dome flats

- To start doing the dome flats you have to focus the camera first. Do this by running

```
>>> autoFocus()
```

  This takes about 3 min and should return a parabola in a popup window. Accept it by simply closing the popup window. If the fit does not show a parabola, check your setup and run the `autoFocus` command again.

- Denote the focus value in your logfile

Attention!

You should always record a logfile, which you should use to describe what you have done. You may want to have a look into older logs which can be found at `▸mnt▸data▸virus-w▸vwMonthYear▸log.txt` where month and year should be replaced by a recently done observation. Some information in the logs are redundant since they are also mentioned in the FITS headers. Nevertheless you should write them down, in case something goes wrong with the headers and they are needed to be confirmed after the observation.

- Now you can start to take the domeflats

```
>>> domeflats(5, n=11)
```

  which will take approximately 15 min to 20 min.

1.6 Preparing arcs

- To prepare the arcs you have to bring the telescope in a position, in which it can see the reflected lights of the calibration lamps. You find the lights at the upper ramp near the dome which can be placed in a rack that you also find up there. You should use a combination of **Hg** and **Ne** lamps. You can use the aluminium box as a stool on which you can place the lamps (see figure 7).

Warning!

The calibration lamps are rarely and a replacement may be impossible. Pay attention when carrying them. Do not touch them with your fingers. Use the gloves to carry them.

- You should bring the telescope in a position, so that the lower part of the covering is at the same height as the upper part of the shield of the calibration lamps (see also figure 7).

Warning!

Do not forget to turn off every light source, except the calibration lamps, when taking arcs!

1.7 Taking arcs

Info

Calibration lamps do need some time to warm up. After turning them on you should wait about 5 min until you take your exposures. If one of the lamps fails to ignite, it might help, to let the power supply to run for a few minutes to let it warm up before trying again, or it might be needed, to change the power supplies between the two lamps (switch the connectors), but ask the support staff first.

- To take arcs use the command

```
>>> arcs('NeHg', n=11, exptime=120)
```

  which will take 11 frames with an exposure time of 120 s each

1.8 Biases

- To take the bias images use the following command

```
>>> biases(n=11)
```

  which takes 11 images with zero exposure time. This will take approximately 15 min.

Warning!

Especially for the bias images you should pay attention that no external light can enter the telescope. So make sure that you have turned off all lights in the dome before starting the bias images.

1.9 Skyflats

- Point the telescope near stow position which can be done either manually or using **TCS-GUI** by clicking TCS-GUI › Next › Stow and then Go next (you can use the computer next to the control terminal on the platform which mirrors the screen in the control room). Or you can use a position with an altitude of 80° and an azimuth of 90° in the evening and 270° in the morning. You can enter these in the **TCS-GUI** by clicking TCS-GUI › Next › Manual Entry › Az/El.. If the telescope needs to move more than 5° on sky you need to watch the telescope manually by using the dead man controller (see figure 1, button 7).

- To acquire the skyflats (evening) run

```
>>> autotwi("dusk", 5, n=11)
```

> **Info**
>
> Do not worry if the sky is still too bright/dark. The script checks if the conditions are okay and complains if the do not fit. In the latter case you have to wait and run the program again a little later.

- For the morning calibrations the command is slighty different:

```
>>> autotwi("dawn", 5, n=11)
```

1.10 Guider setup

- You can start the guider software from the main observing computer.
- Start a terminal via Right mouseclick on Desktop › Open in Terminal... and create a new directory to save the guider's FITS files

```
> mkdir vwMonthYear
> cd vwMonthYear
```

- Start the guiding software using the button for the GCMS autoguider on the top left tool bar on atlas
- In the **View** dialog set **scale: Log** and **Scale: 99**

- In the **Settings** dialog window, go to the Saving tab, click the tick box to enable image saving, and set it to save images after 10 cycles. Use the **Chdir** button to select the save directory you created.
- To start the autoguider click on **Image** at the bottom of the main window, clicking Guide starts the actual guide process.

Figure 8 shows the Guider main window together with all its subwindows.

Warning!

The guider software remembers the positions of the markers, but after a restart, you have to re-enable the image saving, and reset the path for the guider images.

1.11 Dome

- To observe the dome slit has to be opened. The terminal on the platform has two buttons (see figure 1, buttons 4) that allows to open and close the slit of the dome.

Info

In both directions you should press the buttons until you hear the locking sound of the dome.

Warning!

The slit of the dome should only be opened, when the mirror of the instrument is protected by the mirror shield. To activate the shield you have to **retract** the **light shield** and protect the mirror by **closing** the **mirror shield**, both can be done via the control terminal on the platform. Do never open the dome without securing the instrument, due to stuff that could fall down from the dome shutter and damage the instrument.

Warning!

When opening the dome all lights have to be shut down since you should not disturb the other observers at the McDonald Observatory.

- If the dome should follow the movements of the telescope, click TCS GUI › Tools › Enable Dome Automation
- After opening the dome the **light shield** has to be **extended** and the **mirror shield** has to be **opened** again

Info

Whenever you open or close the dome, you should denote that in the telescope report. You find the program on the machine that runs the guider. If it wasn't opened already by the night assistants, open a shell and start it using the command: **¿ dr &**

- To stabilize the seeing you should open the doors that are leading to the catwalk. You should also open the lower louvers using the air controller (see figure 3).

1.12 Centering a star on the IFU

The following steps describe how to find the central IFU position relative to the guider. This procedure usually does not have to be done every time since it is possible to save and load the relative position of the guider and the IFU (see also the box at the end of this subsection). But if you want do a new measurement these are the steps that you should follow.

- Find a bright star via TCS GUI › Next › BSC Stars Near Zenith ... or TCS GUI › Next › Nearby BSC Stars ... and choose one of the bright objects
- In the **TCS GUI** main window click on Offset. A digital version of the telescope handpaddle should appear. Make sure, that the RA/Dec Step size is set to 540

- Now bring the bright star into the guider's field of view by pressing TCS Telescope Handpaddle » Down (Symbol) / South

- Use the real physical handpaddle to move the star near the center of the finder window. The setting on the hardware handpaddle should be **Scope rate: SET**. By using up/down and left/right you can change the position of the star.

- Move the guide star back again into the IFU by using the pressing TCS Telescope Handpaddle » Up (Symbol) / North

- Now use the Windows machine's **SI Image SGL** window to take a short exposure and see where the star hits the fiber. To save set the CCD readout mode to a faster one: SI Image SGL » CCD settings » Mode 7 (dropdown) » ok. Then set SI Image SGL » Exposure Time to 30 s.

- Take an exposure via SI Image SGL » Aquire Image and see where the star is located on the IFU.

- If you only see noise and no obvious star signal, the IFU is not pointing to the star at this moment. Then repeat the above procedure with slighty variations in the final position of the star. Repeat the exposure and see if the star is now hitting the IFU.

- As soon as the star illuminates the IFU try to modify the position on the IFU by moving the telescope until the star illuminates the center of the IFU. This may need some time and is not particularly easy. **up/down** on the handware handpaddle moves the star between different rows in the IFU which results in large jumps on the CCD, whereas **left/right** moves the star in the same row between different fibers. The latter only leads to small variations on the CCD.

Help

For an easier way, take a test image in the control software with: `testImage(5)` and once it is saved, run: `quicklook()`. This opens a plot window with a representation of the IFU image. In this it should be clear where the star is on the IFU, use the scaling to estimate the needed offset, and use the Telescope Handpaddle window to offset the star accordingly. If you want, you can take another test image.

- When you have positioned the star, so that the central fiber(s) is/are illuminated, you should mark another visible star in the FOV of the guider by using the left mouse button to drag a rectangle around the star. This is your backup position in case the following step will go wrong which might happen.
- Now move the star in the FOV of the guider by pressing TCS Telescope Handpaddle › Down (Symbol) / South, and revert again by pressing TCS Telescope Handpaddle › Up (Symbol) / North. If the star you have marked before (from now on secondary star) is still in its box, everything is fine and you should mark the position of the star itself as this marks also where the center of the IFU is located at. Bring the guide star back in the guider's FOV and mark it. To do so go to Guider Main Window › Markers › Create › Target1 and click on the star. This should place a large circle on the screen where the star sits. Eventually move the guide star back again on the IFU. If the secondary star does not coindence with its box after bringing it back, you should manually correct the position of the star and then repeat the procedure. Repeat this until the offset vanishes.

2 Telescope alignment

For science observations the telescope has to be aligned to the object of interest. This can be done on two ways: either by entering the coordinates by hand or using a prepared list (so called worklist).

In both cases you surely want to activate the tracking mechanism of the telescope. Do that by clicking TCS GUI › Next › Start Tracking. Start also the dome automation by clicking TCS GUI › enable dome automation.

2.1 Setting the telescope's zero point

The telescope has a mathematical model for the movement of the stars on the sky. The software translates movements on the sky into movements of the mechanics of the telescope. There is a degree of freedom called that zero point of the telescope. The following steps should be done to align the zero point of the object:

- Choose a bright object with a magnitude of around 7 mag to 8 mag by clicking TCS GUI › Next › FK5 Stars near Zenith and filtering objects in the respective range.
- Move to the object by double clicking the object in the list and clicking TCS GUI › Go Next
- Bring the object into the FOV of the guider by pressing **South** on the software handpaddle

  Info

  You should be able to distinguish the bright star from other stars since it is very bright. If you do not see it, try using the hardware handpaddle to move around the current position (use the mode **Scope rate: SET**). If you are not sure which of the stars the correct one is, you might still not see it. A star with a magnitude 7 mag to 8 mag is so bright, that you will not miss it, for sure!

- Center the object onto the position of the IFU by clicking Guider main window › Markers › Create › Objind TO and clicking the Primary marker (large red cross) on the guider image and then clicking Guider main window › Markers › Create › Objdes From and clicking on the center of the bright object to mark the position. Afterwards click on Guider main window › Move Scope (in the lower right corner of the main window) to match the **from-marker** and the **to-marker** you have just created.
- Bring the object back into the IFU by pressing **North** on the software handpaddle again
- Set the zero point by pressing TCS-GUI › Zero › New HA/Dec Constant Zero Points.

Warning!

Make sure that you put the star into the IFU before setting the new zero point. Otherwise the zero point is shifted by the distance between the guider and the IFU (540 arcsec).

- Repeat the **South** and **North** nodding to make sure that the star still hits the IFU after you have set the zero point

Info

When repeating the nodding, the star should always fall onto the same position you have placed it before. If this is not case you might consider to lower the speed at which the telescope is moving when nodding. To do so go to TCS-GUI › Tools › Handpaddle Rates ... and make sure that the **Digital Handpaddle - Step size** is set to 540 arcsec and lower the **Reference Position rate** to 60 arcsec s^{-1}. Remember that the nodding then takes 9 s, so be patient.

2.2 Entering coordinates manually

To enter the coordinates by hand you should use TCS GUI › Next › Manual Entry and give the RA and Dec coordinates. After that you have to tell the telescope to move to the object by clicking TCS GUI › Go Next. If the object is more than 5° distant from whereever the telescope is pointing you have to use the dead man button to check the telescope's movement.

2.3 Entering coordinates via worklist

To use objects from a worklist you have to first load the worklist via TCS GUI › File › Open/Transfer Work List ... › Add/Delete. Then you can display the list by clicking TCS GUI › Next › Work Lists › Listname. Select the object of interest and click TCS GUI Worklist › Apply. Then you click TCS GUI › Go Next. Again you have to use the dead man button if necessary.

3 Science observations

There are multiple ways of doing sky observations. As a quick reminder: VIRUS-W consists of fibers that are arranged in a way that they cover 1/3 of the field of view. Thus it needs three dithered images to cover the compelete field of view. Depending on what you are insterested in, there exists modes for doing single exposures, dithered and subdithered exposures.

3.1 Setting up the guider using fiducial coordinates

Since there is an offset between the guider and the IFU, fiducial coordinates of a guide star are used to fix the object on the same position on the IFU.

Part of the preparation of the observation is to create finder charts. These charts include the fiducial coordinates of the stars in the finder field of view. Choose a star that is bright enough to allow short exposure times for the guider and enter its ficudial coordinates into the **Fiducial, Guider, Non-sidereal Offset** fields in the **Settings** window of the guider. Press **Set** which creates a guiding box in the guider image area. You can then put the guiding star into that box by positioning the mouse cursor above the guide star and pressing ctrl+Right mouse button. After you have done that and the guide star is in its box you can turn on the auto guiding by pressing **Guide** below the main guider window. The telescope is now following the guide star and makes small adjustments of its position if necessary.

Attention!

Make sure to take notes of the guider star and the fiducial coordinates that you have chosen since these information are not saved by any software. Write them into your logfile!

3.2 Dithered observations

To run dithered, or subdithered observations (a subdithered image consists of six images which in principle gives 200 % sky coverage. Nevertheless it increases the spatial resolution because the second three images are shifted slighty relative to the first three images), build an observation program. To create a simple 600s 3 position dither observation, you would call:

```
>>> p = build_dither_program( targetname="M56P1", exptime=600.,
skyexptime=0., dodither=[1,1,1])
```

To create a program for a complete subdithered observation, with intervening skynods and splits two 600s exposures of the object at each dither position, run e.g.:

```
>>> p = build_dither_program( targetname="M56P1", exptime=1200.,
skyexptime=600., dodither=[1,1,1,1,1,1], ncrsplit=2)
```

Then you can inspect program:

```
>>>  vw.pprint(p)
[SkyExp(targetname='M56P1', dithernum=-1, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=0, expnum=0, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=0, expnum=1, exptime=600.0),
 SkyExp(targetname='M56P1', dithernum=0, exptime=600.0),
 Offset(targetname='M56P1', dithernum=1, offset=(-2.8, -1.5)),
 ObjExp(targetname='M56P1', dithernum=1, expnum=0, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=1, expnum=1, exptime=600.0),
 SkyExp(targetname='M56P1', dithernum=1, exptime=600.0),
 Offset(targetname='M56P1', dithernum=2, offset=(2.8, -1.5)),
 ObjExp(targetname='M56P1', dithernum=2, expnum=0, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=2, expnum=1, exptime=600.0),
 SkyExp(targetname='M56P1', dithernum=2, exptime=600.0),
 Offset(targetname='M56P1', dithernum=3, offset=(0.8, 1.5)),
 ObjExp(targetname='M56P1', dithernum=3, expnum=0, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=3, expnum=1, exptime=600.0),
 SkyExp(targetname='M56P1', dithernum=3, exptime=600.0),
 Offset(targetname='M56P1', dithernum=4, offset=(-2.8, 1.5)),
 ObjExp(targetname='M56P1', dithernum=4, expnum=0, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=4, expnum=1, exptime=600.0),
 SkyExp(targetname='M56P1', dithernum=4, exptime=600.0),
 Offset(targetname='M56P1', dithernum=5, offset=(0.0, -3.1)),
 ObjExp(targetname='M56P1', dithernum=5, expnum=0, exptime=600.0),
 ObjExp(targetname='M56P1', dithernum=5, expnum=1, exptime=600.0),
 SkyExp(targetname='M56P1', dithernum=5, exptime=600.0),
 Offset(targetname='M56P1', dithernum=6, offset=(2.0, 3.1))]
```

if you are content with the results, you can start the observation by calling:

```
>>> execute(p)
```

For the astrometry field or a flux standard you can also use the old subdither command:

```
>>> subdither('Feige34', 180, 1) # subdithering for astrometry
```

Of course the parameters, like the name and the exposure time, might differ in your observations.

There might be more commands that you want to use. Choosing the commands should be part of the preparation of the observation.

4 Calibrations after science observations

After you have done the observations, you need to do all the calibration steps again. Typically you do them in reverse, that means

- Twilight flats

```
>>> autotwi("dawn", 5, n=11)
```

> **Info**
>
> A good rule of thumb is to start the twilights as soon as you could read a newspaper without an additional light source.

- Biases
- Domeflats
- Arcs

5 Parking the telescope

After your observations are completed, the telescope has to be parked in a safe position. This requires to reverse most of the previous steps.

- First of all you should disable the telescope tracking by stoping the auto-guider and stop the telescope tracking itself. The first can be done via Autoguider Main Window » Stop imaging whereas the latter can be done via TCS GUI » Next » Stop tracking.

- Stop also the dome automation by TCS GUI » Enable dome automation which disables the automation if it was activated before
- Afterwards you can park the telescope in its parking position which can be reached via TCS GUI » Next » Stow
- Park also the dome via TCS GUI » Tools » Park dome
- Close the mirror shield by **retracting** the lightshield first and then close the mirror covers.
- After the mirror is protected you may close the dome's slit

> Attention!
>
> Be aware that the telescope should be protected all the time. This means that first the mirror has to be covered before the dome's slit can be closed. Otherwise you risk to damage the mirror by stuff that may be falling down from the slit while closing it.

- Protect the telescope from water that may drop through the slit by placing the **upper windshield** above the telescope covering the closed slit
- Do not forget to close the doors and the close the lower louvers via the air controller
- After you have put the telescope into parking position, put everything into **emergency stop mode** and press one more time **reset** to enable the breaks of the dome again
- And finally before going to bed, remember to fill in all fields marked in red in the night report.

6 Links

- Weather information: `http://observatories.hodar.com/mcdonald/`
- McDonald Observatory Skycam: `http://monet-n-sky.as.utexas.edu/view/viewer_index.shtml`

- Camera looking out of the 2.7m slit, mounted on the secondary mirror: `http://198.214.229.22/`

7 A typical observing night

- After the end of the guided tours at 16:00, start by taking a set of biasframes. Starting the calibrations early, might leave enough time to solve possible problems before the start of the night.
- Move the telescope into position for domeflats and arcs, and turn on the domeflat lamps. Run autofocus and take a set of domeflats.
- Turn of the domeflat lamps, turn on the arc lamps, and take a set of arc frames.
- Return the telescope to **Stow** for now.
- At about sunset, open the dome, louvers and doors and take the skyflats.
- Between 6 and 12 degree twilight you can check the telescope offsets.
- When setting up the guider remember to check, that the image saving is turned on.
- In the morning, if you finish observations at about 18 degree twilight, there is just enough time, to close the dome, and take arcs and domeflats, and re-open the dome to get the skyflats done before sunrise. If you finish later, take either domeflats or arcs after the skyflats.
- Then finally close the dome (and doors and louvers) and finish with a final set of bias frames.
- Do not forget to put the telescope into **Stow** position, park the dome, put everything into **emergency stop mode**, and press reset again.

8 Images

Figure 1: Control terminal on the platform.
1: Emergency stop (use whenever you want the telescope not to move)
2: Reset (use whenever you want to reset a previously emergency stop)
3: Controls the position of the lightshield
4: Dome shutter (controls the dome slit)
5: Passage lights/Dome lights
6: Mirror Covers Open/Close
7: Dead man control (has to be used whenever the telescope has to move more than 5° on the sky

Figure 2: Control room near the telescope.
1, 2, 3: Controls for deactivating the hydraulic breaks
4: Switch for activating/deactivating the 5° limit

Figure 3: Control unit for ventilation purposes. The unit is located next to the door that allows you to access the catwalk in eastern direction.

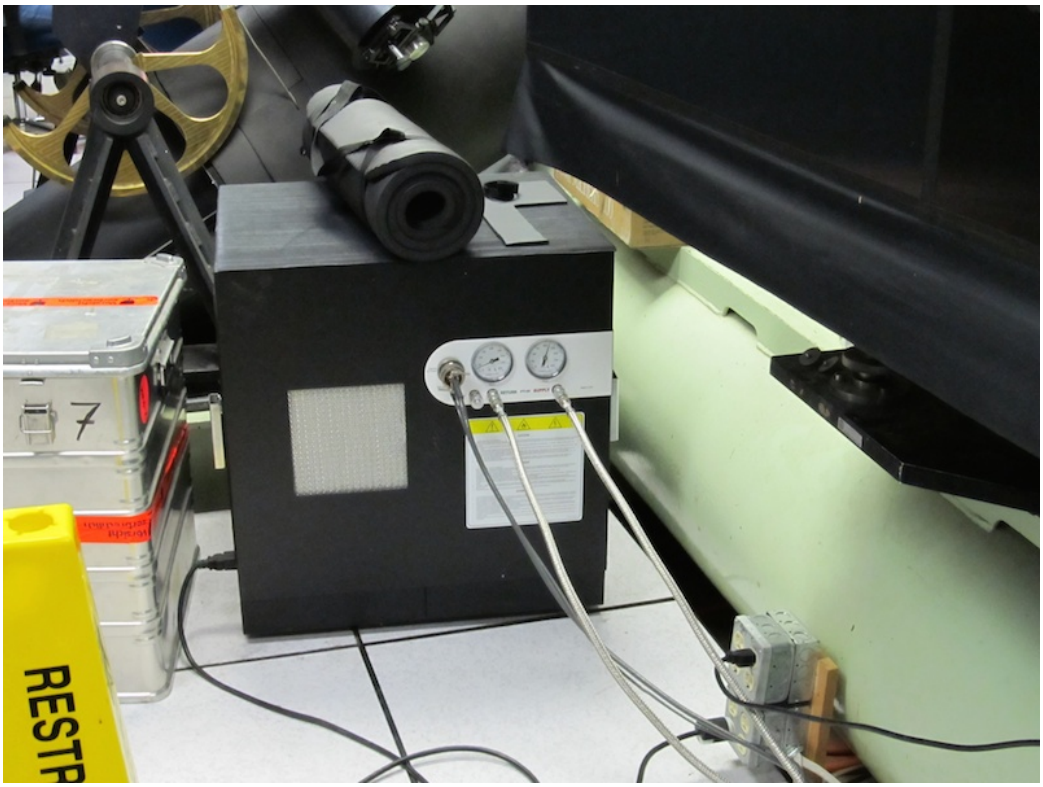

Figure 4: VIRUS-W compressor. The on/off-switch is located at the right side of the box. Additional glue tape can be found in the aluminium box on the left side. P arts of VIRUS-W can be seen at the right side of the image.

Figure 5: Cable (arrow) and power outlet for the dome flat lamps mounted at the top of the telescope.

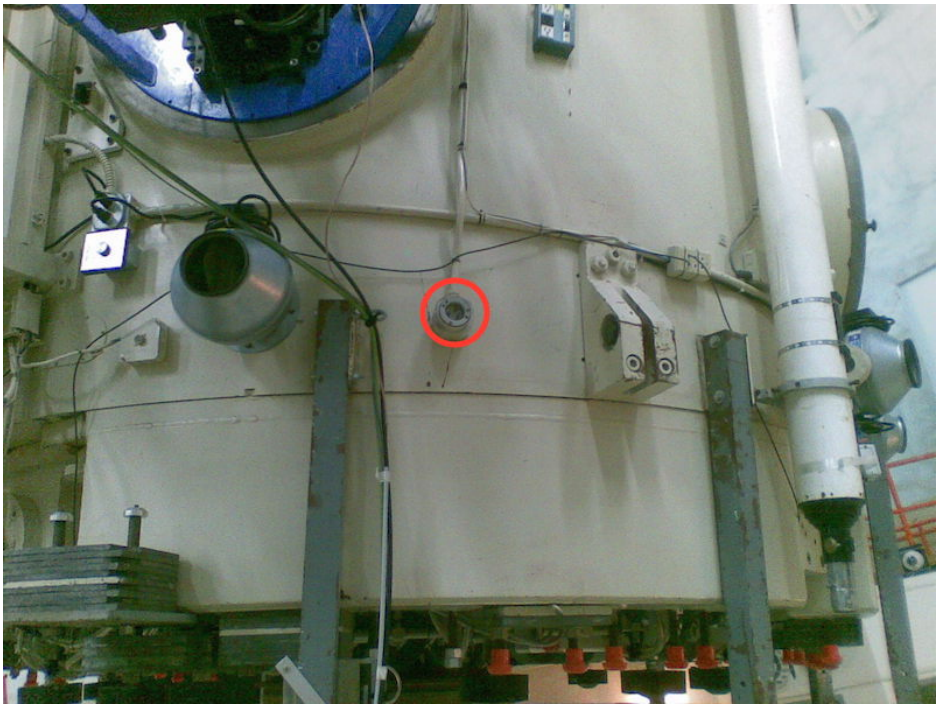

Figure 6: Socket for the power cables for the dome flat lamps. You most likely have to use the raising platform to reach it.

Figure 7: Position of the calibration lamps for the arcs. Please place them in a way that the telescope can not upset the rack at any time during later movements.

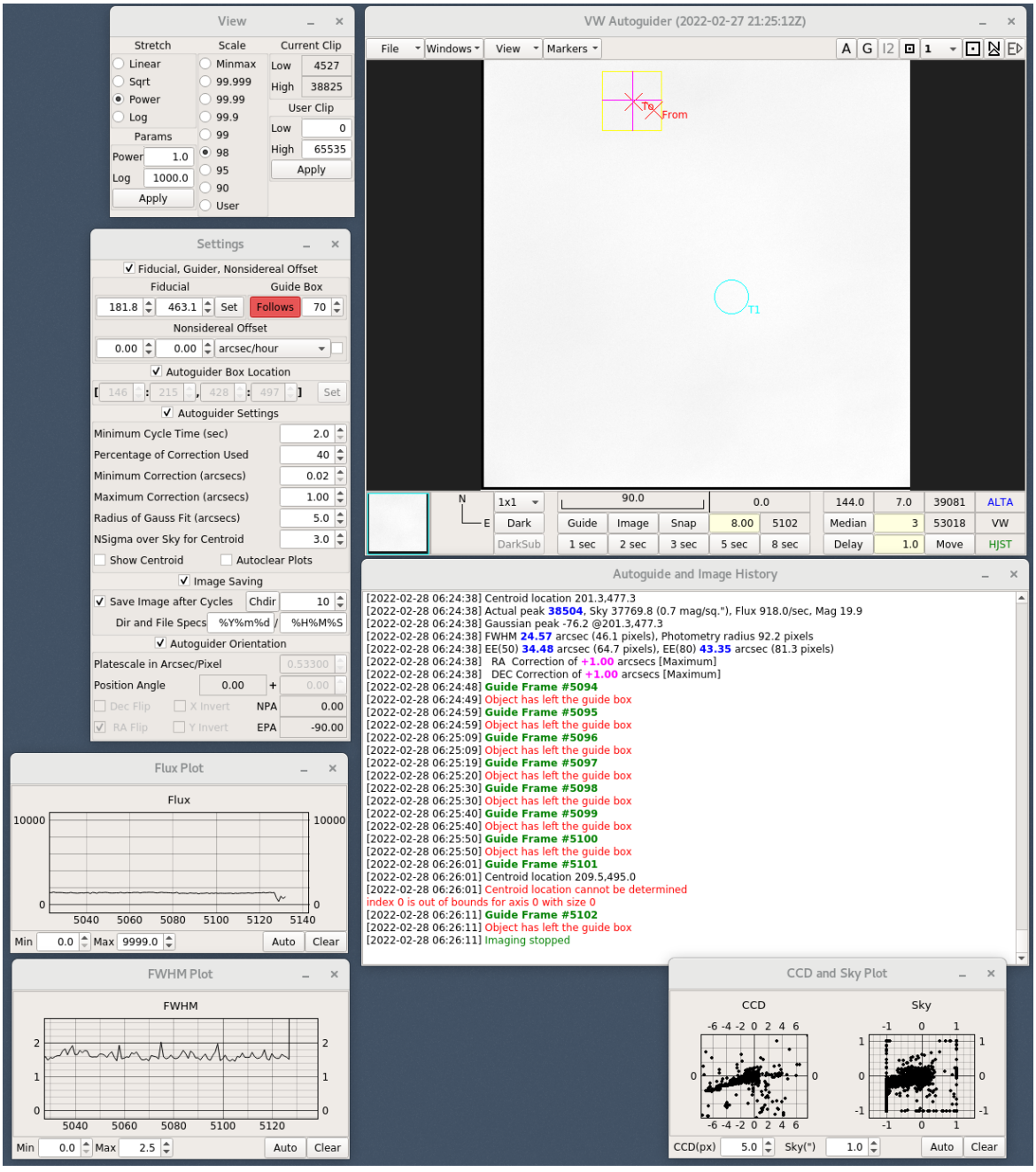

Figure 8: Screenshot of the guider computer. All necessary windows for guiding, entering fiducial coordinates, etc. are opened.

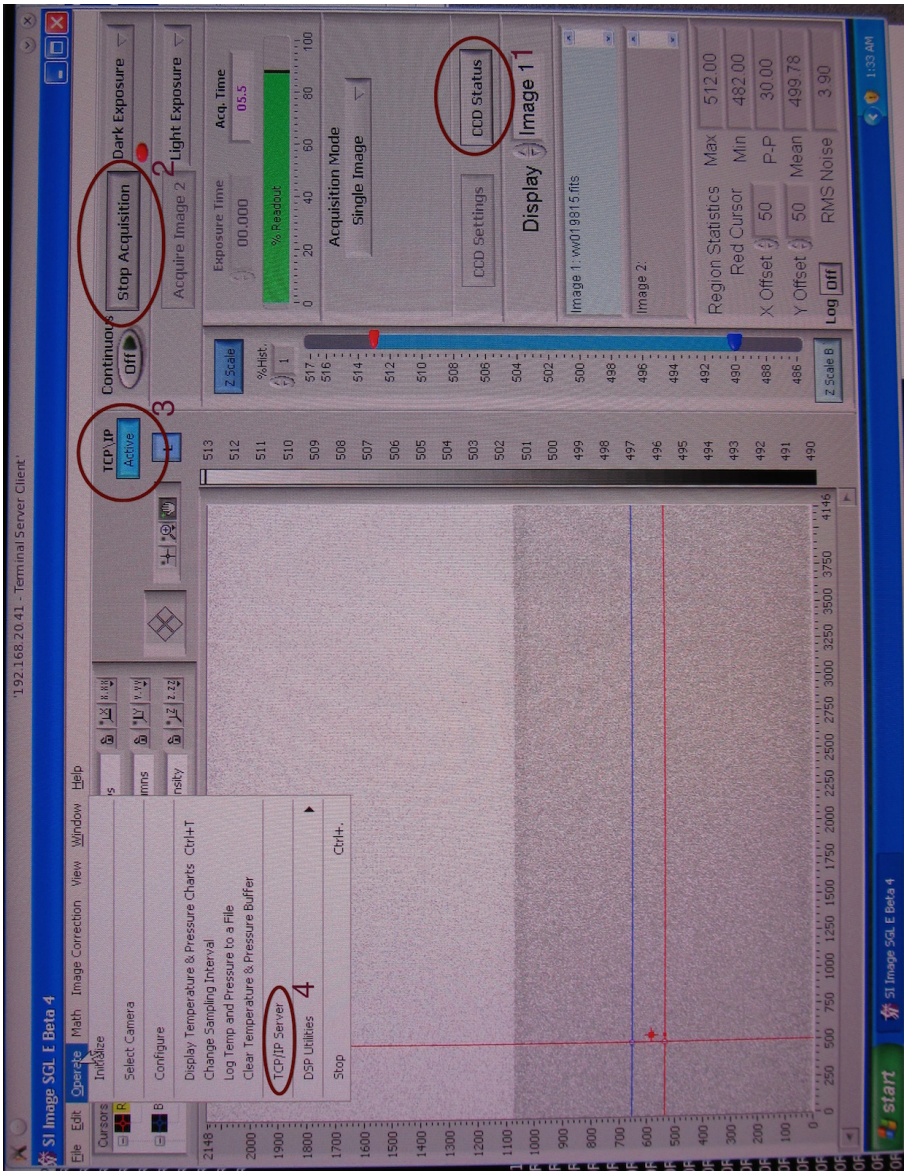

Figure 9: Screenshot of the **SI Image SGL** software.
1: CCD Status to monitor the CCD temperature
2: Stop Acquisition button to interrupt an exposure
3: TCP/IP Icon that signalizes the status of the TCP/IP connection to the Linux machine
4: TCP/IP Server menu entry to restart the TCP/IP connection