Introduction

This is a quick guide for basic maintenance/calibration/operation procedures for the 2.7m (107") telescope at McDonald Observatory. First, a few points...

- I compiled these notes during observing runs using the Mitchell Spectrograph (aka VIRUS-P). Not all of these notes will translate to other instruments.
- This is just a “quick” guide. Consult the real manuals as necessary http://www.as.utexas.edu/mcdonald/facilities/2.7m/2.7.html
- These notes are best used as reminders of what you should have learned in a training session.
- This guide is current as of the date above, but procedures may have changed since then.

From this point on, steps that need to be performed in the control-room will be preceded by “(control room)” and steps that need to be performed in the dome will be preceded by “(dome)”. I took these notes in the order I was taught them (roughly).
Filling the Dewar with Liquid Nitrogen

1. (dome) Using the yellow remote, raise platform E until the liquid nitrogen reservoir can reach the instrument
   (a) Push lower left button (“function”) to get platform E
   (b) Push joystick up to raise platform

2. (dome) Insert the probe from the reservoir into the VIRUS-P dewar and secure it by screwing it down

3. (dome) Open “liquid” valve half-way for a few minutes, hold the rubber tube in the air using the provided gloves until tube is frozen stiff

4. (dome) Open “liquid” valve entirely until dewar is filled, you will know it’s filled when the gas-relief tube spits liquid nitrogen

5. Wait until the tube is thawed and then remove the probe and replace the probe in the wooden block

6. (dome) Lower platform E

7. Note the time the dewar was filled, it will be put into the night report

Unlocking the Telescope

1. (dome) In the back room (“server” room) push 3 buttons
   (a) Hydraulic Bearings - push START
   (b) Declination breaks - push ON
   (c) Hour Angle breaks - push ON
   (d) Ensure that the following switches are in these positions
      i. Tube Fans - toggle ON
      ii. Maintenance - toggle OFF
      iii. Normal/Balance - Normal
      iv. Autoslew - Enable

2. (dome) In TCS window click the inactive button (it should now say active)

3. (dome) Push “RESET” on the control pedestal

4. (dome) In TCS window on computer next to pedestal click:
   TOOLS → ENABLE DOME AUTOMATION
Starting ICE/IRAF Terminal

1. (control room) At bottom of screen should be a quick-launch (GMS-ICE)
2. (control room) Type “cl” command to begin the IRAF session
3. (control room) Type “icex” command to access VIRUS scripts
4. (control room) Execute in ICE-term (don’t skip any)
   (a) mytasks — Prints available scripts
   (b) status — Checks status of instrument
   (c) unload — Unloads available scripts
   (d) status — Checks status of instrument
   (e) flush 5 — Clears any old stuff
5. (control room) Type “tonight” in ICE-term to create a directory for data
6. (control room) Type “obspars” to set header parameters like observer name (save and exit with “:g”)
7. (control room) Open ds9 (quick launch at bottom of screen)
8. (control room) Open TCS (if it says inactive, click on that button to activate it.)

Biases (and Arc Lamps Setup)

1. (dome) Turn off all the lights
2. (dome) Choose the proper arc lamps and screw them carefully into the fixture using the provided gloves
3. (dome) Turn on arc lamps to warm them up (jiggle switches if necessary)
4. (dome) At the TCS select NEXT → MANUAL ENTRY → AZ/EL to enter the coordinates for biases/arcs...
   Azimuth = 180 deg
   Altitude = 20 deg
5. (dome) Click “GO NEXT” and slew with AUTO button on subremote *** DO NOT CRASH THE TELESCOPE ***
6. (dome) On the control pedestal push “Close Cover” for the mirror
7. (control room) Take bias frames...
   (a) Type ”bias” in ICE-IRAF to run a test
   (b) Type ”zero” and specify # of bias frames (suggestion: 11 frames)

Arc Lamps

1. (dome) With yellow remote, raise the lower windscreen (~75% of the way)
   (a) On yellow remote push lower left button (“function”) to get windscreen and lower right button (“options”) to get lower-windscreen
   (b) Push joystick up to raise screen
2. (dome) At control pedestal push “Open Cover” for the mirror

3. (control room) Take arc frames...
   (a) Type “test” to take a test exposure (of type comp)
   (b) Type “comp” command in ICE-term to specify # and exptime
       (suggestion: 11 exposures of 30 seconds)

4. (dome) Turn off arc lamps when done

**Screen Flats**

1. (dome) Turn off all the arc lamps

2. (dome) Using the small black remote press the # 2 on button to turn on
   the white light

3. (control room) Take screen flat frames...
   (a) Type “test” to take a test exposure (of type flat)
   (b) Type “flat” command in ICE-term to specify # and exptime
       (suggestion: 11 exposures of 10 seconds)

4. (dome) Turn off lamp when done by pressing the #2 off button on the
   remote

**Night Report**

1. (control room) Type “xreport &” in a regular terminal to open window
   (a) Observers names
   (b) Time you opened the dome
   (c) Instrument name (VIRUS-P or MITCHELL)
   (d) Detector name (vp detector)
   (e) Guider name (vagdr+alta)
   (f) Software name (ICEX, tcsgui)
   (g) Comment the time you refilled the dewar
   (h) At 3 points during the night, go outside to check weather

**Twilight Flats**

1. (dome) Open doors+vents for ventilation

2. (dome) At control pedestal...
   (a) close the mirror cover
   (b) open the dome shutter
   (c) open the mirror cover
   (d) make sure that both windscreens are out of the way

3. (dome) At the TCS select NEXT → MANUAL ENTRY → AZ/EL to
   enter the coordinates for twiflats...
   Azimuth = 270 deg
   Altitude = 80 deg

4. (dome) Click “GO NEXT” and slew with AUTO button on subremote
   *** DO NOT CRASH THE TELESCOPE ***

5. (control room) Take twilight flats by typing “autotwi” in ICE-term
Finding Charts and Coordinate Files

1. (control room) At the Atlas computer (not the TCS computer), follow the install instructions at http://www.as.utexas.edu/mcdonald/facilities/2.7m/virus-p.astrometry.html

Then run the following in a terminal window

```
cd ~/finder_code_delta/scripts
find_gen.csh [hh:mm:ss.s] [dd:mm:ss.s] [object_name]
```

- `hh:mm:ss.s` — This is the RA of your target (include “:”)
- `dd:mm:ss.s` — This is the Dec of your target (include “:”)
- `object` — This is the object name of your choosing

2. (control room) This generates three images in the folder “../images/”

3. (control room) There are also coordinate files in “../coord/”

Pointing Calibration

1. (control room) In the TCS, select NEXT → BCS STARS NEAR ZENITH

2. (control room) Two windows will open (coordinates list and a skyplot)

3. (control room) Click on a star in the skyplot

4. (dome) Click “GO NEXT” and slew with AUTO button on subremote *** DO NOT CRASH THE TELESCOPE ***

5. (control room) Open a terminal window on Atlas to start autoguider

   (a) Type “vagdr” to start VIRUS autoguider window
   (b) Select “Start Imaging” in lower-left to animate the autoguider
   (c) Select MARKER → LOAD MARKERS... the red circle is the centroid of the VIRUS IFU

6. (control room) In TCS window, click OFFSET and set 540° South (this puts VIRUS-P into the FoV). You should see a darn-bright star in the autoguider.

7. (control room) In autoguider perform POINTING ADJUSTMENT (next section) to get the star in the red circle

8. (control room) Click OFFSET 540° North

9. (control room) Click ZERO → NEW HA/DEC CONSTANT ZEROPOINTS

Pointing Adjustment

1. (control room) In the autoguider window...

2. (control room) Menu: MARKER → CREATE → OBJFROM

3. (control room) Click the object

4. (control room) Menu: MARKER → CREATE → OBJTO

5. (control room) Click where you want it to go

6. (control room) Click “Move Scope”
Auto-Guiding for Targets

1. (control room) In Autoguider window, select File → Window Controller to easily access all window options
2. (control room) In imaging window, draw a box around the target of interest and the [x,y] coordinates where it should be
3. (control room) Select “Specify Fiducial” in window controller
4. (control room) Enter the exact pixel coordinates of the guide star in the box that appears
5. (control room) Click “Go” to move the crosshairs to the x & y coordinates specified above
6. (control room) Perform POINTING ADJUSTMENT (previous section)
7. (control room) Click on the “Auto Guide” button.

Focusing the telescope

1. (control room) Using the yellow remote, switch to the focus function
2. (control room) Autoguide on a star, and while viewing the Guider History, adjust the focus and look for a minimum in the FWHM of the observed star

Observing a Target

1. (control room) At TCS computer, click NEXT → WORKLISTS to load your worklist and select a target
2. (dome) Click “GO NEXT” and slew with AUTO button on subremote 
   *** DO NOT CRASH THE TELESCOPE ***
3. (control room) Adjust auto-guiding (previous section)
4. (control room) Take your exposure(s) in ICE-term...
   (a) (control room) Type “object” for a single exposure
      ...or...
   (b) (control room) Type “vp2_dither” for a 3-point dither sequence
      (almost 100% coverage)
      ...or...
   (c) (control room) Type “vp2_subdither” for a 6-point dither sequence
      (100% coverage)

Shutting Down

1. (control room) Unselect ”Auto Guide” and ”Start Imaging” in the Autoguider program
2. (dome) Lower the lower windscreen, and raise the upper windscreen so that it covers the top of the dome
3. (dome) In TCS select: Next → STOP TRACKING
4. (dome) In TCS select: NEXT → STOW
5. (dome) In TCS select: TOOLS → PARK DOME

6. (dome) Close mirror cover on the control pedestal half-way (for ventilation)

7. (dome) Close the dome shutter on control pedestal (if not already)

8. (dome) Click “GO NEXT” and slew with AUTO button on subremote *** DO NOT CRASH THE TELESCOPE ***

9. (dome) Click “ACTIVE” to “INACTIVE” in TCS window

10. (dome) Push EMERGENCY STOP on pedestal (despite not being an emergency)

Download Data

1. (anywhere) ssh into “<username>@oberon.as.utexas.edu” with your password

2. (anywhere) Your data should be in a folder in “/data1/oberon/<username>/”
THE END