

I. OPENING UP THE TELESCOPE

- 1) Check control box (the “big blue box”) [downstairs](#):
 - a) *HALT MOTORS* button **in**
 - b) *TRACK/OFF* switch **off**
 - c) *EXT COMPUTER* switch **off**
 - d) *MTR DRIVER CHASSIS* switch **on**
- 2) Go [upstairs](#). Plug in dome slit power. Open top slit; return switch to neutral position. Unplug dome slit power. Re-coil the cord. Open lower slit manually. Turn on the dome azimuth control power switch (left side of black box).
- 3) Remove the yellow cover from the top of the telescope. Remove cover from eyepiece drawtube and insert an eyepiece. Remove covers from keyboard and monitor. Place covers all under desk. Power on the monitor (switch on front).
- 4) When the controller computer is turned on, it automatically assumes that the telescope is pointing to zenith. If it is NOT, see Section V!
- 5) [Back downstairs](#)... Turn on the 2 power strips for the control box and for Lestrade.
- 6) At C:\TCS (DOS) prompt on controller computer, enter "TCS" and hit **return**.
- 7) Power on the Dell Computer (named “LeStrade”) and its monitor. [Do not change any of the settings or install any software on this computer!](#) Log in as **Observer** (you will be given the password when you are “trained”).
- 8) Internet Explorer will appear on the screen with the local documentation page. Read the Announcements and Updates. Then click on the [UT Display to Set TCS Computer](#) link.
- 9) On the TCS computer, under the Initialization (1) menu select "Set Date and Time. **Enter the correct date and time** as given by the NIST web clock. Make sure you use the correct UT time on a 24-hour clock. It is critical that you do this right, so **double check** the time on the TCS display when you are through!! Enter the start time on the log sheet.
- 10) On the control box, set the
 - a) *HALT MOTORS* button **out**
 - b) *TRACK/OFF* switch **track**
- 11) On Lestrade, double click the icon that reads “**Start Observing**”. Macro->Run (or click icon with vertical downpointing arrow). Minimize all windows except TheSky (see Section VI for more help using the SoftwareBisque suite).

II. INITIALIZING THE TELESCOPE

Before you start observing, you ALWAYS have to initialize the pointing on a bright star! If you are unfamiliar with moving the telescope, read Section III first.

To initialize the pointing:

1. Make sure that the *TRACKING* switch is **on**.
2. Use the DFM catalog, "The Sky", or hand-entered coordinates to move the telescope to a bright star, preferably near the zenith. You can't just find the star manually, because the TCS program needs to know the star's coordinates.
3. Use the hand paddle to center the star in the field of view of the main eyepiece.
4. Make sure the star is also centered in the Telrad. If not, you can adjust the Telrad so the star is in the bullseye (but only if you know what you are doing!).
5. Go to the *Initialization* (1) menu on the TCS computer and select (2) "**Set telescope position**".
6. Press Enter at each line. The computer will default to the coordinates listed for NEXT OBJECT at the top of the screen.
7. Confirm that the coordinates for "telescope" and "next object" are now identical. If not, go to step 5.

The telescope should now point accurately no matter what method you use. However, each time you reposition the telescope, you introduce a small error into the position of the telescope known to the computer. The further you move, and the more frequently, the greater the drift. Periodically, it may be necessary to repeat this procedure. It is best to use a bright star near the zenith.

III. MOVING THE TELESCOPE

Moving the Telescope Using TCS:

- 1) The **(2) "Movement"** menu provides 3 ways to tell the telescope where to move.
 - a) *Set slew position....* Use this to enter coordinates manually. You can get coordinates from catalogs, your memory, or the MICA almanac on LeStrade.
 - b) *Select library object....* Enter the number of any object in the DFM catalog. A listing of this catalog is kept in the telescope manual notebook. All Messier objects, most bright stars, and several interesting items can be found in this catalog. Messier object numbers or just their M number (e.g. M51 = 051).
 - c) *Select table entry....* Enter the number of an object you have entered in the "markmove table." You may wish to create table entries for objects you will return to several times during a night's observing. Table entries can be created using the (3) "Set table entries" under the Miscellaneous (4) menu.
- 2) Once you have selected an object, its coordinates will appear as NEXT OBJECT.
- 3) Choose option **(7) "Start slew"** to tell the telescope to move.
- 4) The slew should stop with a beep when the telescope arrives at the object.
- 5) To stop the slew prematurely or if it gets stuck in a loop (at the object but taking forever to center it), choose option **(8) "Stop"**.

Moving The Telescope Using TheSky:

- 1) A rather detailed chart shows you what is up in the sky at the moment. The crosshairs indicate the telescope's position.
- 2) To move the telescope to an object, click on the object. A data box will appear on the screen. (To find an object, press **F**.)
- 3) Select "**Slew to**" icon (it looks like a little telescope). This step sends the coordinates of the object to the NEXT OBJECT line in TCS.
- 4) TheSky asks whether to go ahead with the slew. If you choose to go ahead, TheSky will move the telescope and center the dome slit.
- 5) The slew should stop with a beep when the telescope arrives at the object.
- 6) To stop the slew prematurely or if it gets stuck in a loop (at the object but taking forever to center it), choose option **(8) "Stop"** on the TCS computer.

IV. CLOSING DOWN THE TELESCOPE

- 1) Minimize (don't exit) TheSky. Double-click the "Stop Observing Icon". Macro->Run (or click icon with downpointing arrow). If you are prompted to save any changes, enter "NO".
- 2) On the control box, set the *TRACK/OFF* switch to **off**.
- 3) Under the **(2) Movements** menu on the TCS computer, select **(5) "Set Zenith"** and enter "N". Choose **(7) to slew the telescope**. The telescope should stop at the zenith.
- 4) Go [upstairs](#). Is the telescope pointing to zenith? If it is not, use the hand paddle to move the telescope to the zenith position.
- 5) Replace any covers that you removed from the telescope and return the eyepiece to where you found it. Make sure the **TELRAD** finder is turned **OFF** !!!!
- 6) The dome shutter should be pointing north. If not, use the azimuth control buttons to "park" the dome. Turn off the dome azimuth power switch (left side of black box).
- 7) Close the lower slit completely and then close the top part of the slit. Double check that it closed properly, with the top slit overlapping the lower slit. **Unplug** the slit motor when you are finished, and **re-coil** the power cord.
- 8) Hang the handpaddle properly, push chairs, ladders, and any cables out of the way. Turn off upstairs lights.
- 9) Back [downstairs](#)... Press the *HALT MOTORS* button on the control box **in** .
- 10) Turn off the power strip next to the blue box.
- 11) Shut Down LeStrade (use START button and the SHUT DOWN menu). When the shutdown completes, turn off the power strip for LeStrade.
- 12) Complete your entry in the log book.
- 13) Turn off all lights and lock the door as you leave. Set any trash containers in the hallway (janitors do not clean inside the dome). Turn the a/c (and dehumidifier) back on if you turned it off at the beginning of the night.
- 14) Submit a Fault Report or contact **Jim Neff** (office: 953-5325, home: 762-5843; email: neffj@cofc.edu) or **Chris True** (office: 953-2031, home: 573-9366; email: truec@cofc.edu) if you encounter any serious problems

V. TROUBLESHOOTING

- 1) When the controller computer is turned on, it automatically assumes that the telescope is pointing to zenith. If it is NOT
 - a) Make sure the *HALT MOTORS* button on the control box is **out**.
 - b) Use the hand paddle and the bubble levels to point the telescope to zenith.
 - c) Push the *HALT MOTORS* button **in**.
 - d) Power down and restart (or reboot) the TCS computer. At DOS prompt on controller computer, enter "TCS".

- 2) If you can't find anything, or TCS says it's below the horizon (but you know it's not), then you almost certainly entered the wrong time or date. Bring up the UT Display to Set the TCS computer. Compare this with the UT time on the TCS display. If they don't match, repeat the procedure for initializing the time and date.

- 3) Both TCS and TheSky have horizon limits built in. These limits prevent the telescope from being damaged by moving to a nearly horizontal position. If you choose an object in a forbidden region, you should get an "Out Of Range" message and the telescope should not move. **If you receive an "Out of Range" message but the telescope moves anyway, use the HALT MOTORS button to turn off power to the motors immediately.** If you accidentally drive the telescope into its horizon limit, there is a mercury switch that will shut off power to the motors. It is possible to manually push the telescope up away from its horizon limit. If you are not comfortable with this, call for help. Otherwise, shut down the telescope and replace the covers and submit a fault report.

- 4) The telescope has no gears; it's driven by friction between 2 wheels on each axis. It is possible (quite easy, actually) to bump the telescope. If the encoders noted the change, the "Telescope" and "Next Object" fields on the TCS display will differ. You can move back by making these numbers the same (or by starting a slew). If your object is not centered, it will be necessary to repeat the procedure in Section II.

VI. HELP USING THE SOFTWARE BISQUE SUITE

- 1) The STARTUP and SHUTDOWN scripts for orchestrate should be in the FILE menu. If not, you can browse for them in your MyDocuments folder (i.e. c:\Users\Observer); they are called startup.orc and shutdown.orc. DO NOT edit these files!!!
- 2) If you don't use these scripts, or if they've been corrupted, then you need to do the following....
 - a) STARTUP: Start TheSky (double click icon on desktop). Telescope->Link->Establish. Start Automodome (start ->AllPrograms->SoftwareBisque->AutomaDome). In AutomaDome: Dome->Link->Establish then Dome->FindHome. Minimize AutomaDome and return to the Sky. Shift-Cntrl-D. A window similar to AutomaDome comes up. Do another Dome->Link->Establish there. Minimize all windows except TheSky.
 - b) SHUTDOWN: Basically, do everything above in reverse order. Dome->Park, Dome->Link->Terminate in the AutomaDome windows. Telescope->Link->Terminate in TheSky window. Shutdown (File->Exit or hit the X in the upper right corner) each program and answer NO when it asks if you want to save anything.
- 3) We have a default setup for TheSky on the Observer account. DO NOT CHANGE these settings. If you want to customize it, save the settings into a file and then restore your settings from that file next time after you startup the sky.
- 4) Documentation for all of these programs is included in a Notebook near Lestrade. The local documentation web site also has links to PDF files and web sites with further information.