

User Manual Basics

Here is a link to the .pdf copy of the [74" https://topswiki.sao.ac.za TCS user manual](https://topswiki.sao.ac.za/TCS%20user%20manual), v. 10.2, updated Nov. 2014.

- Report any problems on [the fault reports page](#).
- Give feedback at the end of your observing run: <http://www.sao.ac.za/science/observing/feedback/>.
- Fill in the [Sutherland Observing Record](#) each night (paper copies in the dome).
- For GIRAFFE, SpUpNIC, or STE3/4: please fill in the triplicate Log Book for each exposure.

Call out list

Telescope software issues: standby **113 (0212015178) or 9118

Electronics Issues: standby **103 (0212015179) or 9117

Mechanical Issues: standby **104 (0212015180)

Introduction

The 1.9m telescope control system (TCS) is written in C, using XFORMS to create the Graphical User Interface (GUI). The software runs on a PC running real-time linux. The TCS allows the control of the telescope; the acquisition and guiding (A/G) camera; and the dome (including opening and closing of the shutters, and control of the windblind and flatfield lamps). Upgrades are currently in progress that require a new TCS PC (tcs74v4) to be used when SpUpNIC is mounted, and the earlier version (tcs74v3) with HiPPo and SHOC.

The telescope can be operated either remotely from Cape Town (remote mode), or locally from the dome (local mode). Users at the dome can slew the telescope either from the TCS or manually from the observing floor. This wiki gives instructions for all options.

Remote observing

In the afternoon, the telescope operations team in Sutherland will switch off the lockout -- allowing remote operation -- and turn off all lights that are not under software control. All the PC addresses, login details, URLs, etc you required to follow the instructions below will be sent to you in advance of your run.

Start-up recipe: remote

1. In the remote observing station, the desk to the left of the entrance is allocated to the 1.9m. It is connected to two 37-inch curved screens. Log in to the PC.
2. There is a webcam pointed at the observing floor. Open the app in one of two ways:
 - Click on the ?74incam? shortcut on the top left-hand side of the desktop. This opens an rdesktop session on appserver.cape. Once logged in, open internet explorer from the menu bar at the bottom. It should open on

the required page - type the username and press

"https://topswiki.sao.ac.zaEnter"https://topswiki.sao.ac.za on the keyboard (it doesn't respond to the login button on the screen).

- Alternatively, the webcam can be viewed from an Android tablet using the Foscam app. Log in as ... and select ...

3. Connect to the TCS: click on the Remmina icon (or open a terminal and type remmina), and connect to either tcs74v3 (for use with HiPPo or SHOC) or tcs74v4 (if using SpUpNIC).

4. Start the software using the icons on the left-hand menu bar:

- TCS (telescope icon)
- observing limits plot (?crash? icon)
- guide star programme (meteor icon)

When you are ready to observe:

5. Check weather on the Sutherland weather website -- **only proceed if windspeed < 60 km/h; humidity <90%; T_{external} - T_{dewpoint} > 1.5.**

6. On the TCS GUI, select the "https://topswiki.sao.ac.zaDOME"https://topswiki.sao.ac.za menu button and select "https://topswiki.sao.ac.zaFluorescent lights"https://topswiki.sao.ac.za from the drop down menu to illuminate the observing floor.

7. You should see the inside of the dome on the webcam. Use the arrow buttons to pan around and check that there are no obstructions on the observing floor. There are two ladders and a skylift which should be parked within their respective zones, demarcated by tape on the floor, up against the walls.

8. Once convinced that the floor is clear, switch off the dome lights the same way you switched them on.

9. On the TCS GUI, take TCS control of the telescope by clicking the grey "https://topswiki.sao.ac.zaFLOOR"https://topswiki.sao.ac.za button. If successful, it will turn cyan and read "https://topswiki.sao.ac.zaTCS"https://topswiki.sao.ac.za (if this does not happen, the lockout has been left on and you need to phone a standby technician).

10. Turn on telescope power: click "https://topswiki.sao.ac.zaTelescope Power is OFF"https://topswiki.sao.ac.za. Button should go from red to green; OFF to ON.

11. Open dome shutters: click "https://topswiki.sao.ac.zaDOME"https://topswiki.sao.ac.za and select "https://topswiki.sao.ac.zaShutter open"https://topswiki.sao.ac.za from the dropdown menu.

12. Open mirror covers: click "https://topswiki.sao.ac.zaDOME"https://topswiki.sao.ac.za and select "https://topswiki.sao.ac.zaMirror open"https://topswiki.sao.ac.za.

13. Currently out of action: Lower windblind: click "https://topswiki.sao.ac.zaDOME"https://topswiki.sao.ac.za and select "https://topswiki.sao.ac.zaBlind lower"https://topswiki.sao.ac.za.

14: Set dome to Auto mode: press the red "https://topswiki.sao.ac.zaMan"https://topswiki.sao.ac.za button in the top right-hand corner, above the shutter OPEN indicator.

15. Ready the autoguider XY slides:

- On tcs74v3: click "<https://topswiki.sao.ac.za/initialize>" in the "[https://topswiki.sao.ac.za/XY Slides Control](https://topswiki.sao.ac.za/xy-slides-control)" panel on the right.
- Or, on tcs74v4, click "<https://topswiki.sao.ac.za/center>" - there is no need to use the "<https://topswiki.sao.ac.za/initialize>" button on tcs74v4 unless it is red (indicating a fault), in which case click "<https://topswiki.sao.ac.za/reset>", wait a moment, then click "<https://topswiki.sao.ac.za/initialize>".

2. Switch OFF all downstairs & observing **floor lights** (having trouble finding the switches?)3. Check weather on the Sutherland weather website -- **only proceed if windspeed < 60 km/h; humidity < 90%; T_{external} - T_{dewpoint} > 1.5.**4. Check **Telescope Power Control** is set to PLC at top of stairs (should be the default).

5. Ensure that the TCS software is running.

6. On the **mimic panel** in the control room:

- Switch "<https://topswiki.sao.ac.za/tcs-lockout>" to the OFF position. **First check that no one is working in the dome.**
- Switch the SMD to the OFF position.

7. On the **floor control panel** ensure that:

- RA and Dec control are in the SLOW positions (should be the default).
- Dome is on AUTO (should be the default).
- Dome lights switch is in the OFF position. (should be the default).

8. Turn on **Telescope Power**:

- *TCS*: take TCS control (press FLOOR/TCS button) and turn on power (press "[https://topswiki.sao.ac.za/telescope power](https://topswiki.sao.ac.za/telescope-power)"). Button should go from red to green.
- *Manual*: Press and hold the green button for 3 sec. under "<https://topswiki.sao.ac.za/power>" on the control mimic panel in the control room.

Note: it takes 1-2 minutes for complete power up.

9. Open **dome shutters**:

- *TCS*: Press DOME for drop down menu and select "[https://topswiki.sao.ac.za/shutter open](https://topswiki.sao.ac.za/shutter-open)".
- *Manual* On the dome control panel, press "<https://topswiki.sao.ac.za/local>" to get control and then press "[https://topswiki.sao.ac.za/shutters open](https://topswiki.sao.ac.za/shutters-open)".

10. Open **mirror covers**:

- *TCS*: Press DOME for drop down menu and select "https://topswiki.sao.ac.zaMirror open"https://topswiki.sao.ac.za
- *Manual* On the dome control panel, press "https://topswiki.sao.ac.zalocal"https://topswiki.sao.ac.za to get control. Use the ladder to press the "https://topswiki.sao.ac.zaOPEN"https://topswiki.sao.ac.za on the north side of the telescope.

11. Lower **windblind**

- *TCS*: Press DOME for drop down menu and select "https://topswiki.sao.ac.zaBlind lower"https://topswiki.sao.ac.za
- *Manual* On the dome control panel, press "https://topswiki.sao.ac.zalocal"https://topswiki.sao.ac.za to get control and then press "https://topswiki.sao.ac.zaWINDBLIND LOWER"https://topswiki.sao.ac.za

12. Set dome to Auto: press red "https://topswiki.sao.ac.zaMan"https://topswiki.sao.ac.za button above shutter OPEN indicator on TCS.

13. Center the **XY-slides** (TCS).

Local observing

Start-up Recipe

1. Switch ON **lighting circuits** at entrance to dome.
2. Switch OFF all downstairs & observing **floor lights** (having trouble finding the switches?)
3. Check weather on the Sutherland weather website -- **only proceed if windspeed < 60 km/h; humidity <90%; T_{external} - T_{dewpoint} > 1.5 and no thick cloud.**
4. Check **Telescope Power Control** is set to PLC at top of stairs (should be the default).
5. Turn on **Telescope Power**. *Manual*: Press and hold the green button for 3 sec. under "https://topswiki.sao.ac.zaPower"https://topswiki.sao.ac.za on the control panel in the warm room. *TCS*: take control and press box labeled "https://topswiki.sao.ac.zaTelescope Power"https://topswiki.sao.ac.za.
6. Open **dome shutters**. (TCS/ grey panel on N. pier)
7. Open **mirror covers** (TCS/buttons on telescope base)
8. Switch **dome rotation** to Auto (blue console N. pier)
9. Lower **windblind** (if appropriate; TCS/grey panel N. pier)
10. Switch on **slow motion drive/tracking**. ("https://topswiki.sao.ac.zaSMD"https://topswiki.sao.ac.za switch on control panel/TCS "https://topswiki.sao.ac.zaTracking"https://topswiki.sao.ac.za button).

11. Initialise **XY-slides** (TCS).

Shutdown checklist

*** NOTE: in bad weather, perform step 6 first, then 7, then 1 onwards.**

1. **Stop instrument and autoguider exposures.**

2. Initialise **XY-slides** (TCS)

3. Switch OFF the **slow motion drive/tracking** ("https://topswiki.sao.ac.zaSMD"https://topswiki.sao.ac.za switch on control panel/TCS "https://topswiki.sao.ac.zaTracking"https://topswiki.sao.ac.za button).

4. **Park telescope** at HA = 0h, Dec = -32° in SLOW mode.

5. Switch **dome rotation** to Manual (blue console N. pier)

6. Close **mirror covers** (TCS/buttons on telescope base). If windspeed > 50km/h, rotate dome 180° from wind direction before closing.

7. Close **dome shutters**. (TCS/ grey panel on N. pier)

8. **Rotate dome** to 90° azimuth (to keep rain off telescope).

9. Lower **windblind** (if appropriate; TCS/grey panel N. pier).

10. Switch OFF telescope power (push and hold for 3 sec.

"https://topswiki.sao.ac.zaPower"https://topswiki.sao.ac.za button on control panel/TCS

"https://topswiki.sao.ac.zaTelescope Power"https://topswiki.sao.ac.za button)

11. Switch OFF **lighting circuits** at exit.

12. **End of run:** copy data; report faults; complete [<http://www.sao.ac.za/science/observing/feedback/> feedback form], put Sutherland Observing Record in tray in warm room; for SpUpNIC or GIRAFFE, tear out 1st and 2nd copy of each completed page in triplicate log book -- keep 1st copy and put 2nd copy in end of run tray.

Instrument Focus settings

Approximate focus values for each of the instruments are listed here. Make further adjustments on target.

GIRAFFE: ~2090

HIPPO: ~2120

SHOC"https://topswiki.sao.ac.za ~1900 (~1940 with focal reducer)

SpUpNIC: ~2200

STE3/4: ~2090 (~ 2120 with focal reducer)

Telescope

Telescope power control

The original telescope isolator switch at the top of the stairs has been replaced by a three position switch (see figure below) that should be in the "https://topswiki.sao.ac.zaPLC" position and left that way for normal operations, day and night. Observers should not use this switch unless authorised to do so by a technician. If the switch is not found in the "https://topswiki.sao.ac.zaPLC" position, contact the electronics technician for guidance. Telescope power is now switched on/off at a new multifunctional control panel in the warm room, described in the following section.

- Example.jpg

The new power switch at the top of the stairs. Ordinarily, it should be in the "https://topswiki.sao.ac.zaPLC" position, day and night. Observers should not use this switch unless authorised by a technician.

Warm room control panel

In April 2013, a new panel was installed in the warm room to control power to the telescope, slow motion drive and automatic dome rotation, and to indicate the status of a number of telescope subsystems (see figure below). Its functionality is described below.

- Example.jpg

The new control panel installed in the warm room in April 2013. Power to the slow motion drive is controlled by turning the switch in the "https://topswiki.sao.ac.zaSMD" section. When the drive power is on, the green light illuminates.

Telescope power

Large green "https://topswiki.sao.ac.zaOn" and "https://topswiki.sao.ac.zaOff" buttons are located in the top left section of the panel, with corresponding indicators that illuminate to show the current status. To operate, push and hold in for ~ 3 seconds. These buttons replace the power switch previously located at the top of the stairs.

There is a safety interlock preventing telescope power from being switched off unless:

- Dome shutter is CLOSED (both "https://topswiki.sao.ac.zaSHUTTER" indicators are off)
- Mirror shutter is CLOSED (both "https://topswiki.sao.ac.zaMIRROR" indicators are off)
- RA and Dec are set to SLOW (both "https://topswiki.sao.ac.zaFM" indicators are off)

The power OFF indicator will flash if an attempt is made to power down the telescope while the above subsystems are not in a safe state.

Dome Information

Light switches

As you enter the 1.9m building, on the wall to your right are four switches. The two close together (labelled "<https://topswiki.sao.ac.za>Light Switch Main L.T. board"<https://topswiki.sao.ac.za> and "<https://topswiki.sao.ac.za>Light Switch D.B.5"<https://topswiki.sao.ac.za>) should be switched on -- these give you mains power (switching them off kills the lights, but not the power to certain vital components such as PCs). The other two switches give you incandescent and fluorescent lights in the entrance area and should be switched off if you are going to observe/take flats/do focus tests with the spectrograph.

There is a light switch at the bottom and also at the top of the steps -- again, you need the stairwell lights off (and all observing floor lights off) if you are going to do tests on the spectrograph.

There are three other lighting systems on the observing floor which might need to be switched off:

- Dome incandescent lights -- the switch for these is on the dome wall, to the west side of the north pier (just to the right of the ``grating room *door*).
- Dome fluorescent lights just below catwalk level -- these are switched on/off at the new white switches beside the electrical panel (the metal doors on the south west wall of the dome near the stair railing)
- Dome fluorescent lights high up on the inside of the dome itself -- these can be operated from three different places:
 1. The control room, using the DOME dropdown menu on the TCS
 2. The observing floor, using the panel on the North pier. If the switch does not work the first time, press the "<https://topswiki.sao.ac.za>Request Control"<https://topswiki.sao.ac.za> button at the top of the panel and try again.
 3. The catwalk, using the button on the orange control cabinet by the dome shutters.

Current known issues (last updated Nov 2013)

Telescope pointing problems/time server error

If you encounter telescope pointing problems, check the time and date displayed on the TCS, as the cause could be the time server. If the date/time is wrong, please call the electronics technician for assistance.