OSCO Summary

Handover
- Prepare WFS + AdSec
- Prepare LUCI software + scripts

Sunset
- Open Chamber

Sunset + 10m
- Point

Sunset + 20m
- Collimate, execute script

BEFORE 12° Twilight
- Hand telescope to observers ready for their science

Before Opening
(at handover or as soon as practical)

Ready WFS(s)

Login to WFS machines:

  ssh -Y AOeng@soul-sxwfs

and/or

  ssh -Y AOeng@soul-dxwfs

Check processes
They should be running and connected. It's good practise to stop and restart them anyway, and check they all came back up:

  w_check
w_stop
w_start
w_check  -> if this shows problems, stop/start again. Often the Housekeeper WFS process fails to come up.

Open GUlS:

wfseng &

Brings up this window:

![WFS Interfaces Window]

Go ahead and open the **WFS Arbitrator GUI**. You might also want to open the **WFS HW GUI** for troubleshooting if things don’t come up cleanly. **Telescope should be at zenith, and rotators in park pos. prior to pressing “Operate”.** PRESS OPERATE on WFS Arbitrator GUI. It will take a few minutes for all the WFS components to power up.
If the power up went smoothly you will see “Execution Success” in green:

If it failed, try again. If it fails again, call AO support.

Ready OCAM

Hit [WFS Camera] to bring up the OCAM viewer. There are two issues that often come up: The viewer is “Not Live” (the green bar in the image below will be red) or the image has a distinctive chevron like noise pattern like this:
If you have either of these problems, go to the WFS HW GUI and under “General”, select “Power Controller”. If the viewer is not live, power cycle the BCU2K. If the noise pattern is present, power cycle OCAM2K. If this doesn’t resolve this issue, try again. If you still have problems, try powering off the WFS, running a `w_stop`, then `w_start`, and powering up again.

Once the OCAM is live and happy, you can start cooling it by hitting the button that says “AMBIENT” (or “STRANGE!”) on the WFS Arbitrator GUI. It will take 8-10 minutes to reach operating temperature (-45C). **NOTE: The OCAM must be at AMBIENT and the temperature display background orange (not yellow) to be able to power off the WFS.**

Sometimes the noise mentioned above doesn’t show up until cooling is underway, keep an eye on it and warm it up to power cycle if necessary.
Ready AdSec(s)

Login to AdSec machines

    ssh -Y AOeng@sxadsec and/or ssh -Y AOeng@dxadsec

Processes should be up and running and AdSecs powered on. Open the GUIs with

    adsceng &

The adsec itself doesn’t require any different preparation from normal operations. Open the FLAO GUI. It should be in AUTO mode. If it is in Intervention mode, hit the Set AUTO button in the top right. If things run smoothly, you won’t need to interact with this GUI, but it’s useful to follow along as the script goes through each stage: Center Star, Center Pupils, Check Flux, Close Loop, Optimize Gain.
Prepare Script

Open an OT in a fresh terminal:

```
ot
```

On the OT startup screen, hit “Import XML” and navigate to `/home/lbto/OSCO/` to open the latest version of OSCO_OT.xml.

Pick a star suitable for the LST at the time you'll be running OSCO. If you’re running monocularly, pick from the folder of the correct instrument, and make sure “mono” is selected when generating the script. If running bino, it doesn’t matter which folder you use, but make sure “Twin Identical” is selected when generating the script. The magnitudes in the observation titles are the guide star magnitudes. OSCO is intended to be run in twilight, and anything fainter than ~11.5 is likely to be too faint for guiding in twilight. The options with fainter guide stars are included for more coverage when OSCO is running during the night for whatever reason.
You can check the elevation plot for any target by highlighting it and hitting the “Plot” button in the top toolbar.
If you’re happy with your star choice, generate the script and save it in /home/lbto/osco/scripts. You can probably use the same script throughout your shift so this step can be skipped after the first night.

**Ready LUCI(s)**

The observers may already have the LUCI software running from daytime calibrations. If they do, run

```
ssh telescope@obs2
open_observer luci observer
```

OR

On desktop, choose Application -> Activities Overview -> “Show Application” icon in left menu (3x3 point grid) -> “LUCI” icon

This will open just the LUCI observer panel on your workstation without killing GIERS on the observers’. If the LUCI software has not been started up at all (ie GIERS is not running), run
open observer luci all

where luci could also be luci1 or luci2 when running monocularly. Be patient while waiting for GIERS to come up. Watch for the popups and hit “OK”.

The LUCI Observation Execution Panel will appear:

If not already done, or you don’t know if it was already done, open the LUCI instrument panel(s) by hitting the “LUCI 1” and/or “LUCI 2” buttons (right under all the green status boxes).
Before doing anything on the Instrument GUI, it's good practice to always hit “Refresh” to make sure you’re getting the most up to date information. Then click on “Initialize” and **INIT ALL UNITS**. This only needs to be done once per night. If the MOS unit is locked out for some reason but LUCl is otherwise usable, hit **INIT ALL UNITS EXCEPT MOS** instead.
To prevent accidental overexposure of the LUCI detectors while filters are moving, set filter wheel 2 to ND2, leave filter wheel 1 set to blind for now.

To save a few minutes, assuming there are no current MOS issues, put the N30 Field Stop into the FPU. If at this or any other point you get a LUCI MOS error, DO NOT take any further action. Call Dave T, Jenny, or Barry. do not attempt any troubleshooting yourself and especially do not “init all units” again.

Once LUCI is ready, you can load the script. Hit the “Load” button on the Observation Execution Panel and navigate to the script you generated.

Post Opening

- Open the chamber as soon as possible.
- Pick the brightest pointing star in the vague direction of the OSCO star (hopefully toward the east). It should be possible to get pointed around 10 minutes after sunset. If you still can’t see your star, pick a brighter one.
- Wait for background counts on the WFS to dim, then collimate as soon as possible, around 20 minutes after sunset.
- Once the telescope is collimated, hit “GO” on the LUCI Observation Execution Panel to start the script. If everything goes well, your job is done and you can wait for the script to complete before handing back to the observers.

When you start the LUCI script, the telescope will slew, and the AO system should acquire the AORef star on CCD47, center it on the pyramid (OCAM), close the loops and start taking the LUCI images. You should see the star in the top left quadrant of LUCI for 10 images, then the bottom left for 10. When the LUCI script is completed, OSCO is completed.

If both LUCIs are planned for science use but on, point and collimate both sides even if only one is being used for OSCO. Just be sure to de-authorize the side you’re not using for OSCO before running a monocular LUCI script.

Once the script is completed, if there are no plans to use AO during the night, warm up the OCAM by hitting the same button you hit to cool it (it should say “CHILLED”). It takes about the same time to warm up (8-10 minutes) as it did to cool. The background of the temperature status will turn orange when it has reached ambient temperature. At this point you can turn the wavefront sensor off. Sometimes, the temperature reaches ambient but then fluctuates back below the limit after you hit Power Off and causes the power off command to throw an error. Just hit OK and try again.
Once the wavefront sensor is off, you’re all done with OSCO and can resume your regularly scheduled science programming.

TL;DR Checklist

- ssh -Y AOeng@soul-sxwfs
- w_stop, w_start,w_check -> Repeat if necessary
- wfseng &
- Open WFS Arbitrator GUI, WFS HW GUI
- “Operate” and wait for completion
- “WFS Camera” and check it’s live and noise free
  - If not live, power cycle BCU2K in HW GUI
  - If chevron noise present, power cycle OCAM2K in HW GUI
- Cool OCAM
- Open FLAO GUI from adsceng&, check it’s in AUTO mode
- Open LUCI software
- Open LUCI instrument panels, click “Refresh”, and “Init All Units”
- Set filter wheel 1 to blind, filter wheel 2 to ND2, Camera to N30, and N30 Field Stop to FPU.
  - If you get a MOS error, stop everything with LUCI and call Dave or Jenny
- Open OT, import /home/lbto/OSCO/OSCO_OT.xml
- Pick a star in the position you want for the relevant instrument (doesn’t matter which for bino) and generate script. Load it into the LUCI software.
- Open dome, point and collimate as soon as humanly possible.
- Once collimated, execute script by hitting “Go” on LUCI observer panel. Everything should be automatic. If something fails, you likely won’t have time to fix it before handing back to observers.
- **Make sure everything is ready and handed back to observers by 12 deg twilight.**
- If AO isn’t being used for the rest of the night, warm up OCAM. When at ambient, power off WFS. Leave processes running.