# Quick updates on ADFOSC (2020C2)

Based on preliminary analyses of the instrument verification data taken in December 2020, a quick update is released for immediate use of the science users:

## Date: 24-12-2020 (ver 2)

## 1. Interface with TCS:

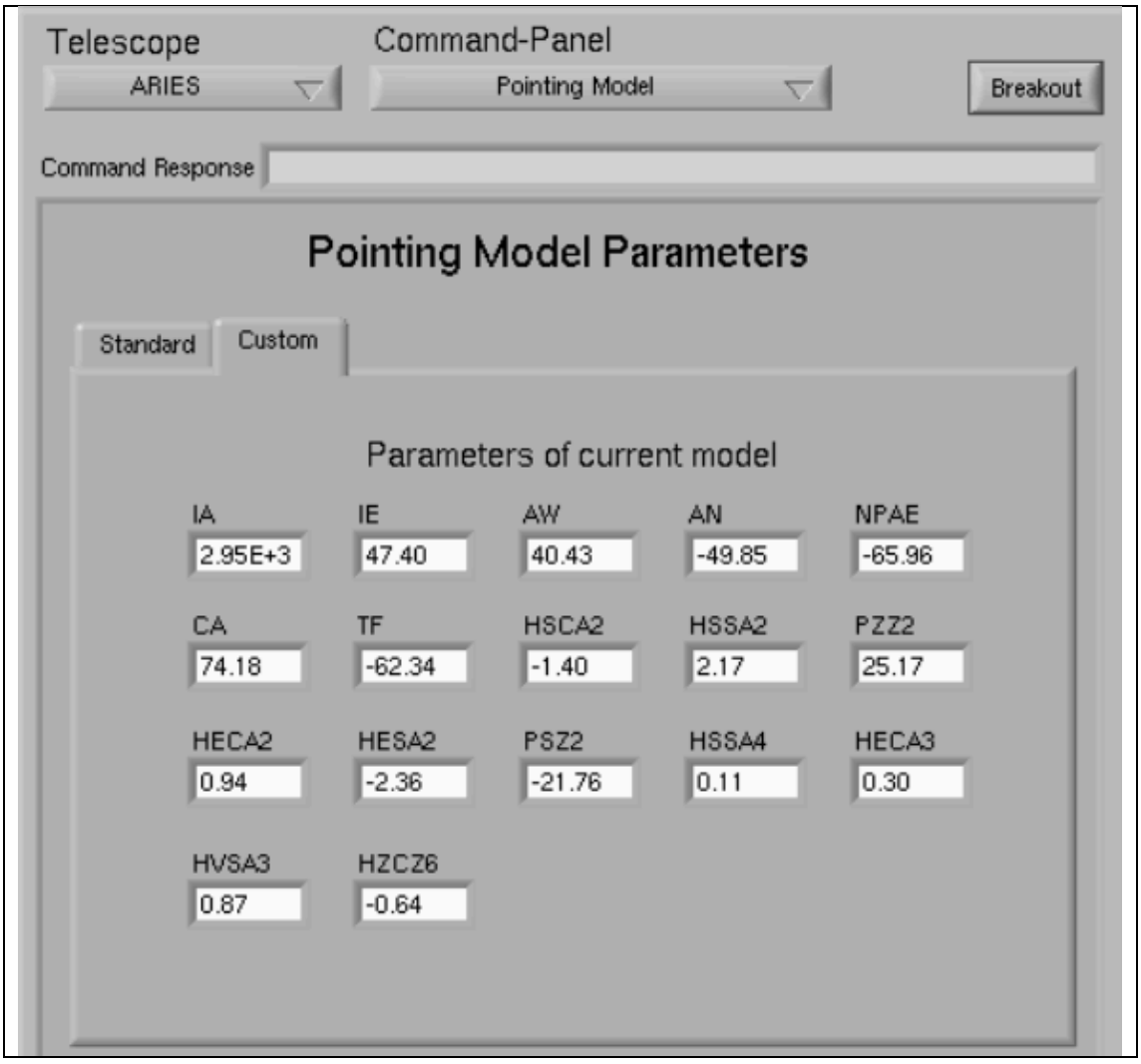
A pointing model has been made and therefore, ADFOSC setup with TCS has changed now. The new setup is described below and a sticky note was left to the operator's screen.

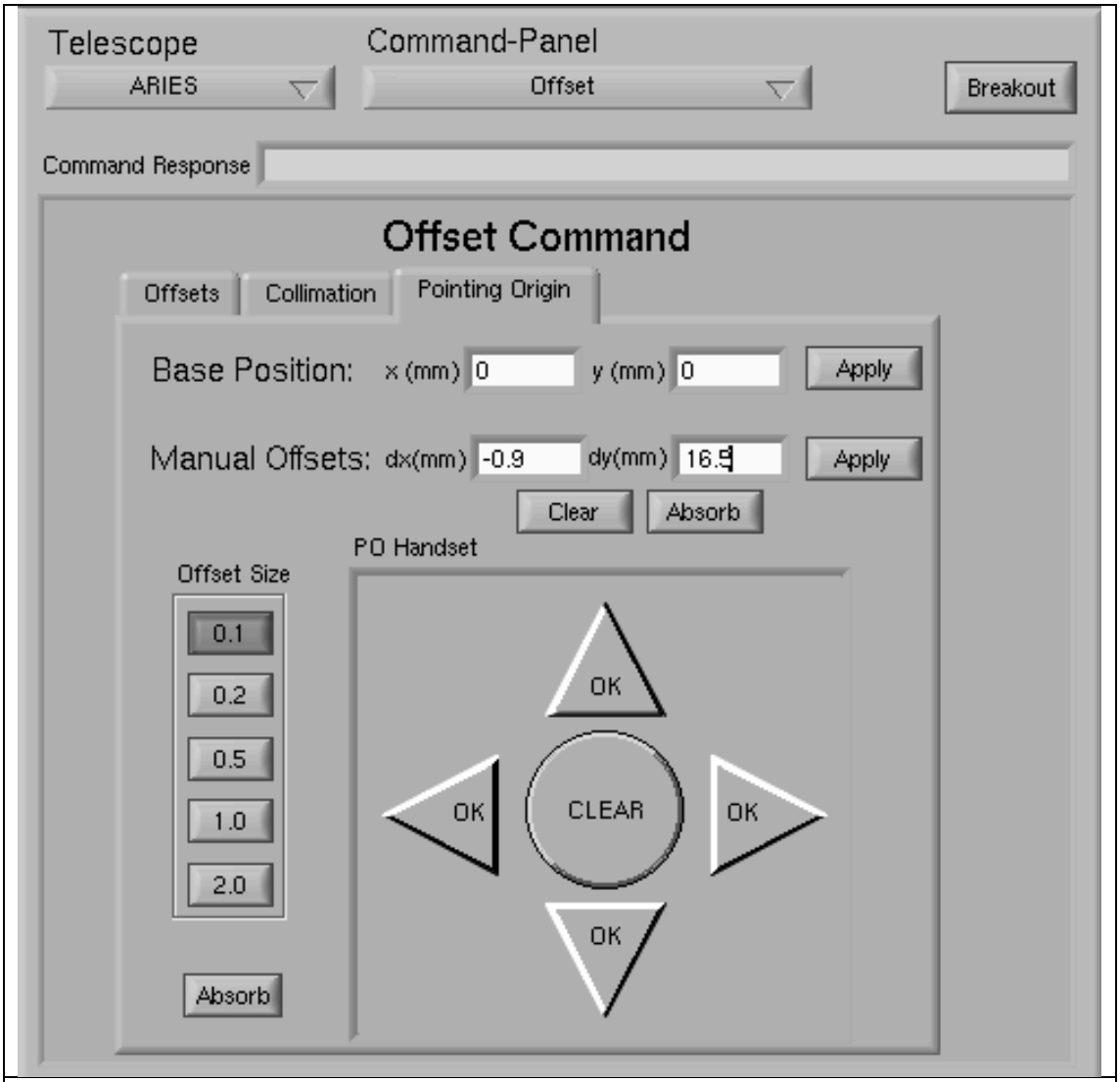
**SELECT PORT → MAIN PORT**

**LOAD POINTING PARAMETER → adfosc-23dec2020.mod**

**GO TO OFFSET (OFFSET COMMAND) → POINTING ORIGIN → ENTER VALUE dx =-0.9 and dy=16.5 (mm) → APPLY**

**(Above are nominal values and may need slight adjustments)**





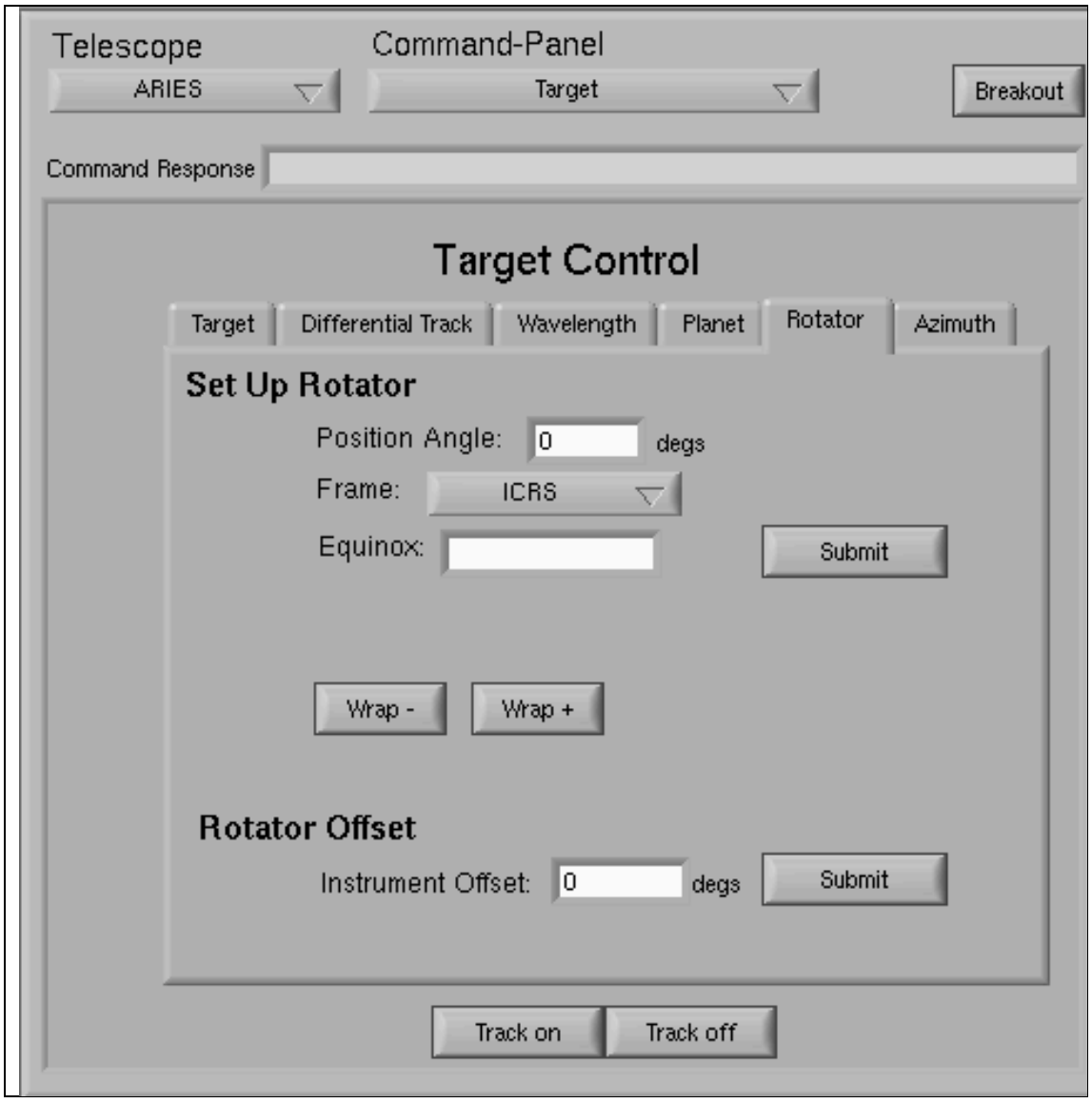

**Note: Use Pointing Origin instead of RA/Dec offsets.**

## 2. Slit Position Angle alignment

To position and align an extended source along the slit direction, find out the object's P.A. (measured w.r.t. to North-up). Find out angle (90 - P.A.), which will be the required rotation. To apply clockwise rotation, use positive values and for anti-clockwise rotation use negative values in the ROTATOR OFFSET. Any residual translation to bring the desired region of the target in the slit can be applied by using the POINTING ORIGIN Offset Command (enter dx and dy values in mm; Use scale ~6.4" as 1 mm). Directions of POINTING ORIGIN Offsets are –

dx+ = moves the target UPWARDS on the CCD frame (raw)
dx- = moves the target DOWNWARDS on the CCD frame (raw)
dy+ = moves the target towards LEFT on the CCD frame (raw)
dy- = moves the target towards RIGHT on the CCD frame (raw)

The above method works only if Pointing origin is used to make offsets. The source coordinates should be entered to TCS with a high accuracy (better than 1").

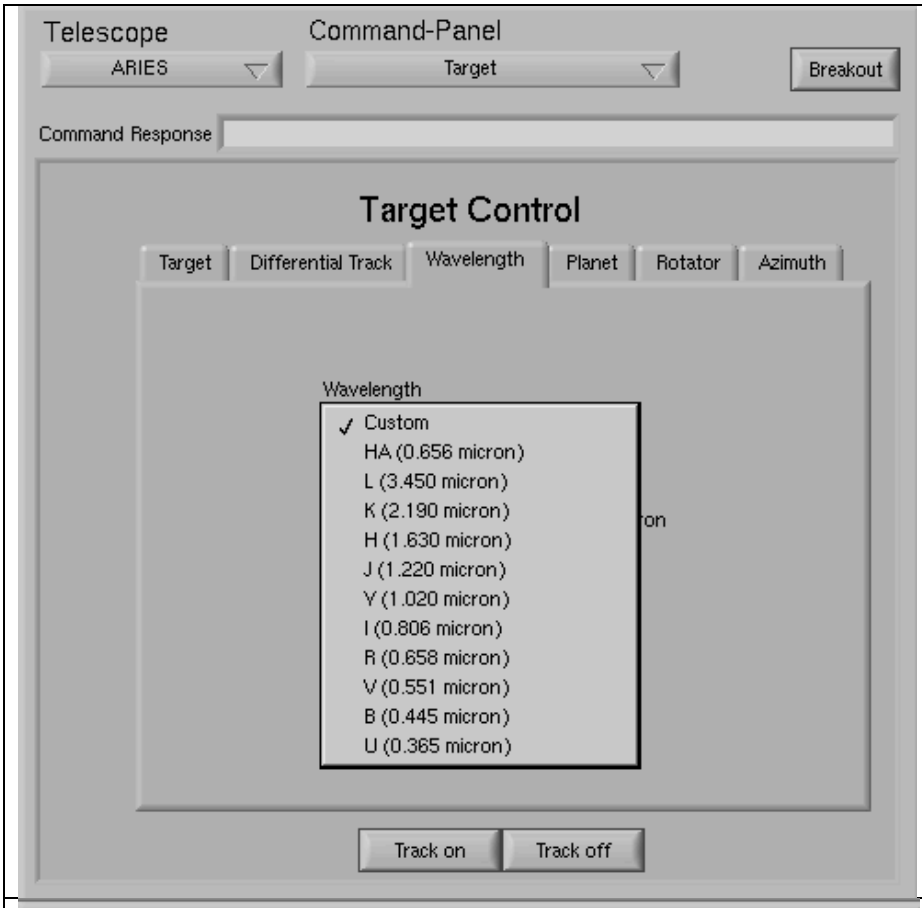


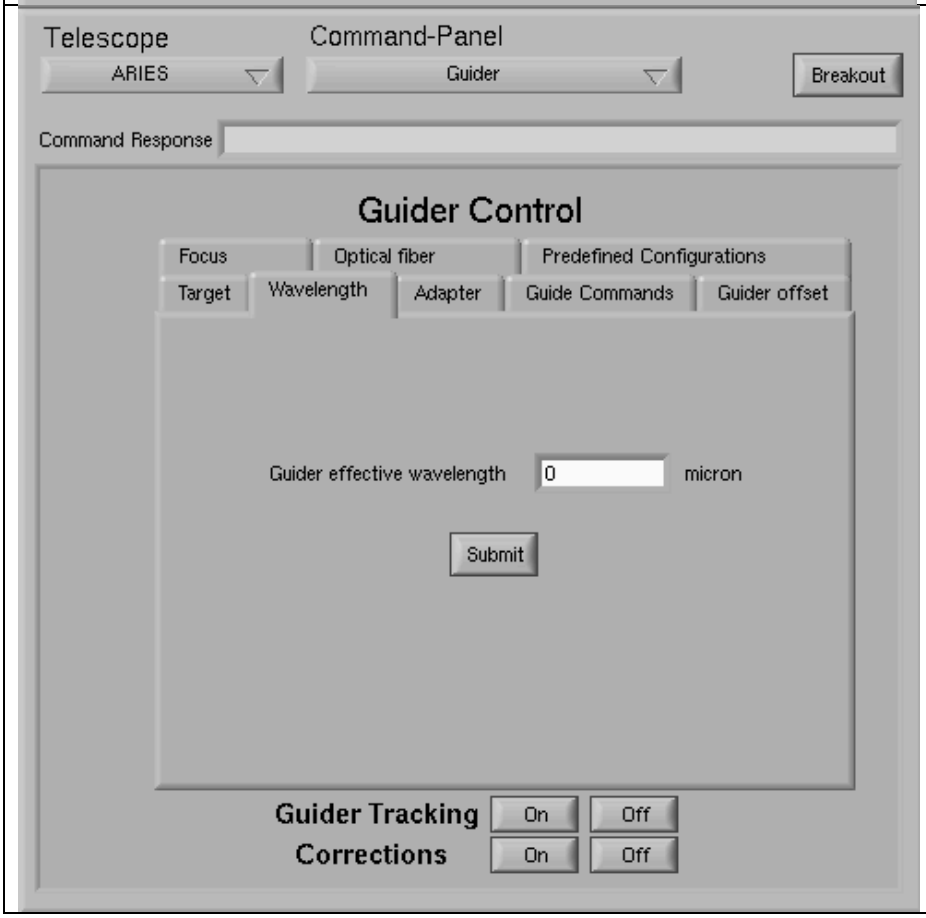

## 3. Tracking Accuracy & use of telescope guider:

Our measurements on a few sources at both positive and negative declinations indicate that telescope+ADFOSC system is fairly rigid and well modeled now, and for most of the practical single exposure times, it will not require setting up a telescope auto-guider for elevations above 30 degrees. At lower elevations also, we tested exposure times of 600 seconds down to 20-degree elevations and no image trailing was noticed. Longer exposures at lower elevations are not tested. However, a small one-time shift of 2”-3” is noticed just after the transit and it remains stable afterwards. This shift is not fully understood as of now.

**In case telescope auto-guider is setup, the guide star should be between 31’ and 35’ from the target. The vignetting (dark patch on the corners/edges of CCD frame) may be seen at FoV beyond 10’ diameter when the telescope guider is used.**

It is advised to specify observing filter (target control) or wavelength (in guider) particularly when observing at low elevations or in blue bands.


Telescope
ARIES
Command-Panel
Target
Breakout
Command Response
Target Control
Target
Differential Track
Wavelength
Planet
Rotator
Azimuth
Wavelength
Custom
HA (0.656 micron)
L (3.450 micron)
K (2.190 micron)
H (1.630 micron)
J (1.220 micron)
Y (1.020 micron)
I (0.806 micron)
R (0.658 micron)
V (0.551 micron)
B (0.445 micron)
U (0.365 micron)
Track on
Track off


Telescope
ARIES
Command-Panel
Guider
Breakout
Command Response
Guider Control
Focus
Optical fiber
Predefined Configurations
Target
Wavelength
Adapter
Guide Commands
Guider offset
Guider effective wavelength
0
micron
Submit
Guider Tracking
On
Off
Corrections
On
Off

## 4. Other changes in ADFOSC control GUI:

In Narrowband filter wheel control, two clear apertures are defined as below –

Clear-Imaging = Use for broad-band imaging
Clear-Spectroscopy = Use for slit spectroscopy

## 5. CCD related instructions:

If anytime an issue is noticed such as fixed counts in the image or no response or a garbled image, CCD should be soft-reset using OWL CCD software window (Run controller setup, set desired binning and set subarray to 0).

## Date: 17-12-2020 (ver 1)

1. **CCD linearity:** The sky-measured CCD response is seen linear (measurement accuracy ~0.6 – 1.0 %) over the full range of 16-bit register, after the controller update. Gain is near 1.

2. **Slit-widths:** The slit width measurements were completed with a phase-shifting interferometer setup in ARIES. The effective slit-widths are given below and also updated in the ICS (instrument control software) panel.

| **Label in ICS** | | **width** |
|---|---|---|
| Slit 1 | = | 1-arcsec |
| Slit 2 | = | 1.5-arcsec |
| Slit 3 | = | 2-arcsec |
| Slit 4 | = | 0.4-arcsec |
| Slit 5 | = | 3.2-arcsec |

3. **Spectral calibration lamps:** The calibration lamp's intensities were dimmed, and a new Tungsten-LED combination lamp was added for continuum calibration. The lamps switch off automatically after 15 minutes but it is always advised to switch off lamps after use. The lamps are labeled as follows:

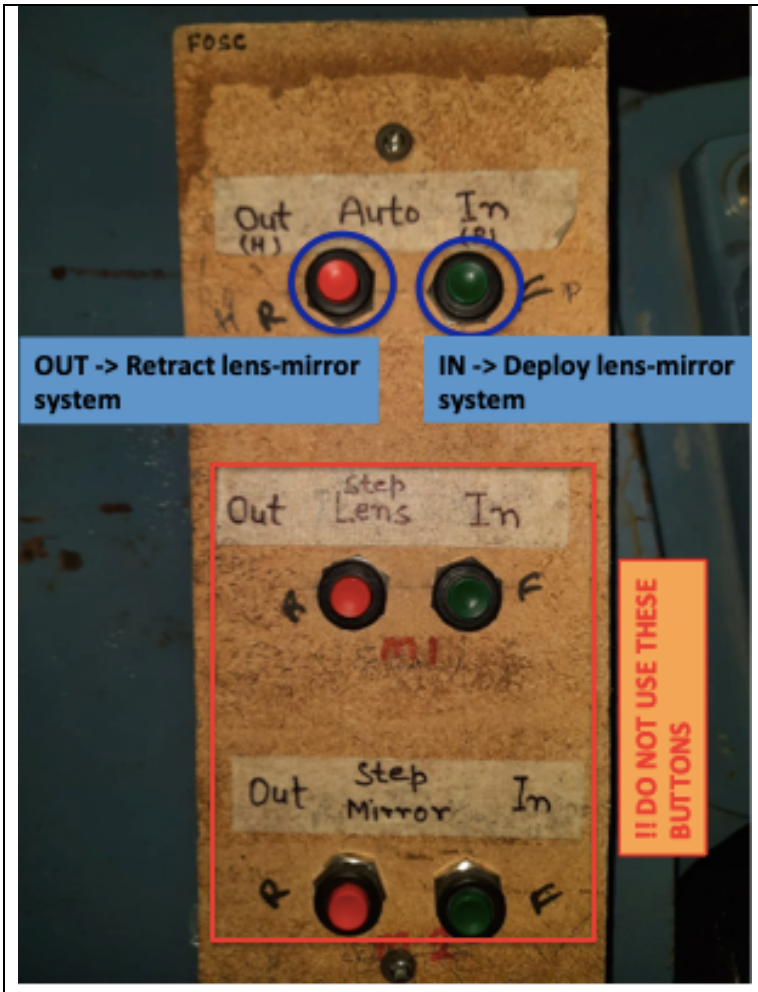
   **Lamp 1: Hg-Ar (Take a few frames around 0.01sec integration)**

   **Lamp 2: Ne (Take a few frames around 0.01-sec integration)**

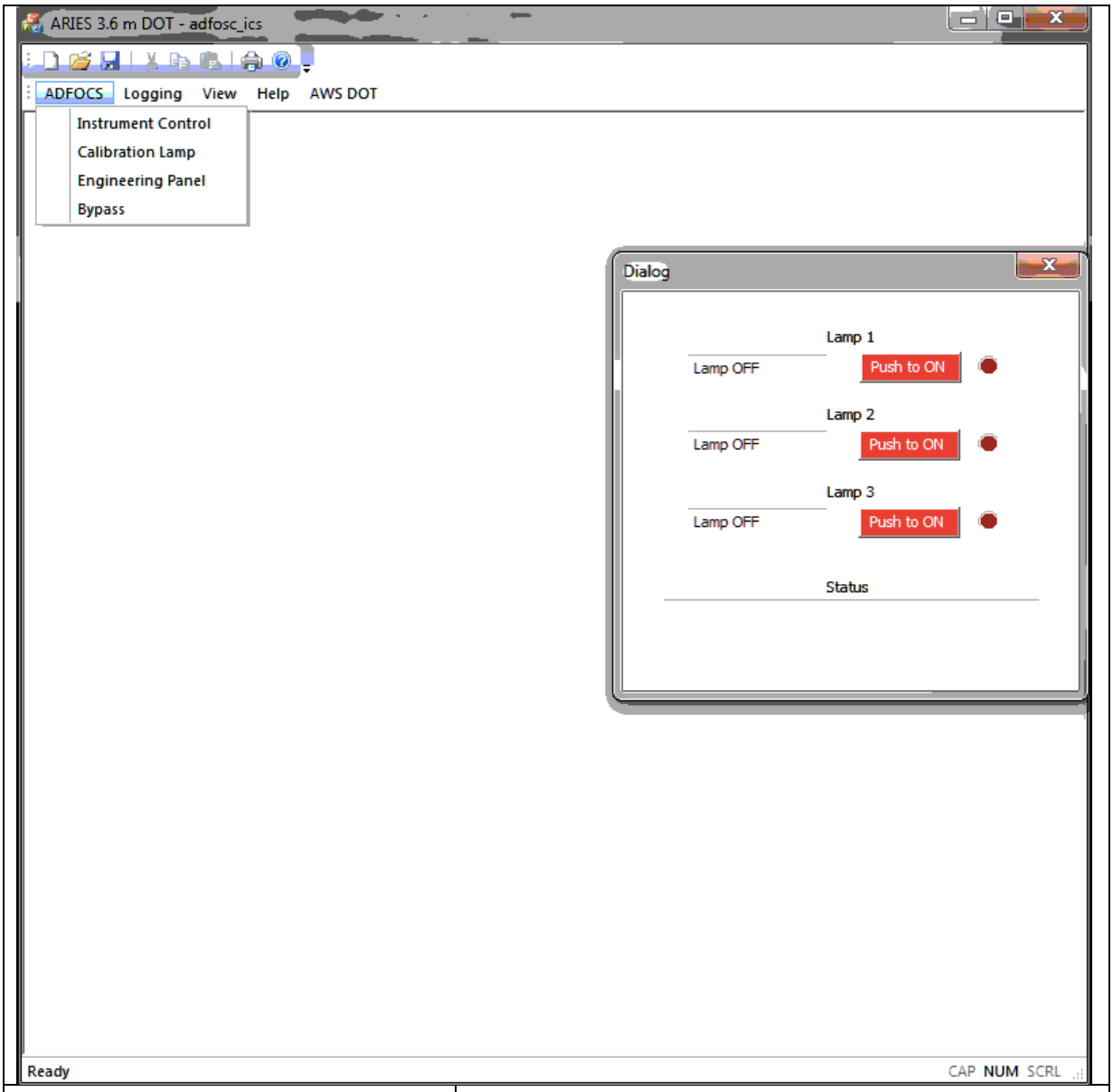
   **Lamp 3: Tungsten-LED: (Take a few frames around ~1-sec integration)**

   **How to take spectral calibration frames:** To use lamps, first deploy the lens-mirror system of the calibration unit in the field. The sequence is as follows

**Lens-Mirror system deployment**
Use the hand-panel provided on the ADFOSC dummy weight (on telescope). Press **Auto IN (green button - topmost)** for ~2 sec and release.
Important: Press **Auto OUT (red button - topmost)** for ~2 sec to take the lens-mirror out of the field before resuming sky observations, after calibration observations are completed.
It takes about one minute for the movements to complete.




**Lamp operation:**
Switch ON the lamp from Main ICS panel and click ADFOCS -> Calibration lamp. It opens up one window showing Lamp control. Press ‘Push to ON’ – the button turns green. Do not forget to switch off the lamps after use.


ARIES 3.6 m DOT - adfosc_ics
ADFOCS
Logging
View
Help
AWS DOT
Instrument Control
Calibration Lamp
Engineering Panel
Bypass
Dialog
Lamp 1
Lamp OFF
Push to ON
Lamp 2
Lamp OFF
Push to ON
Lamp 3
Lamp OFF
Push to ON
Status
Ready
CAP NUM SCRL

# Known Issues

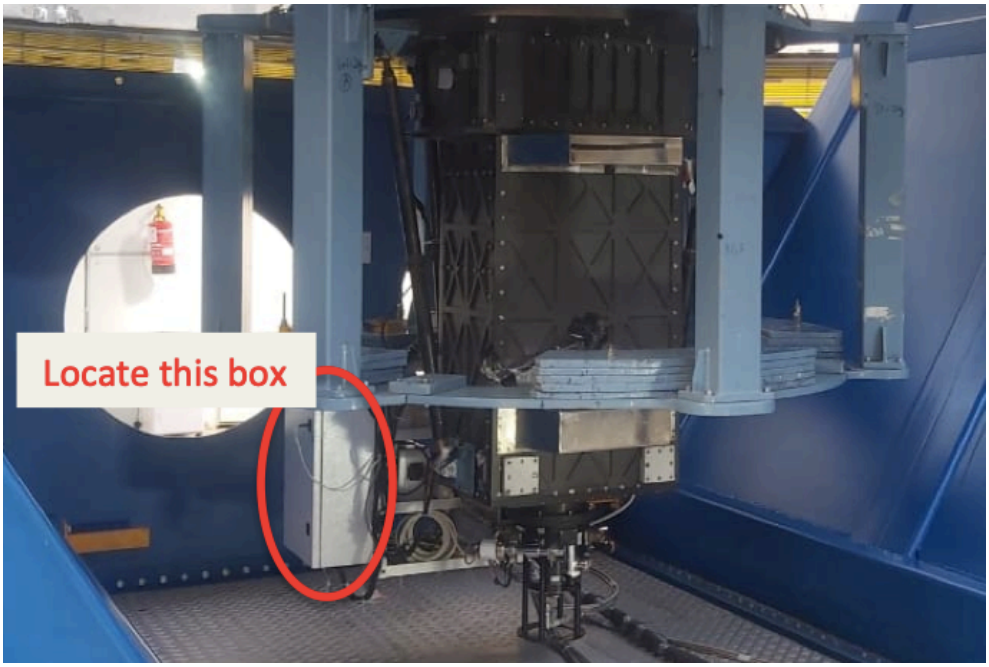
The following technical issues are noticed and are listed below along with their solutions, if any.

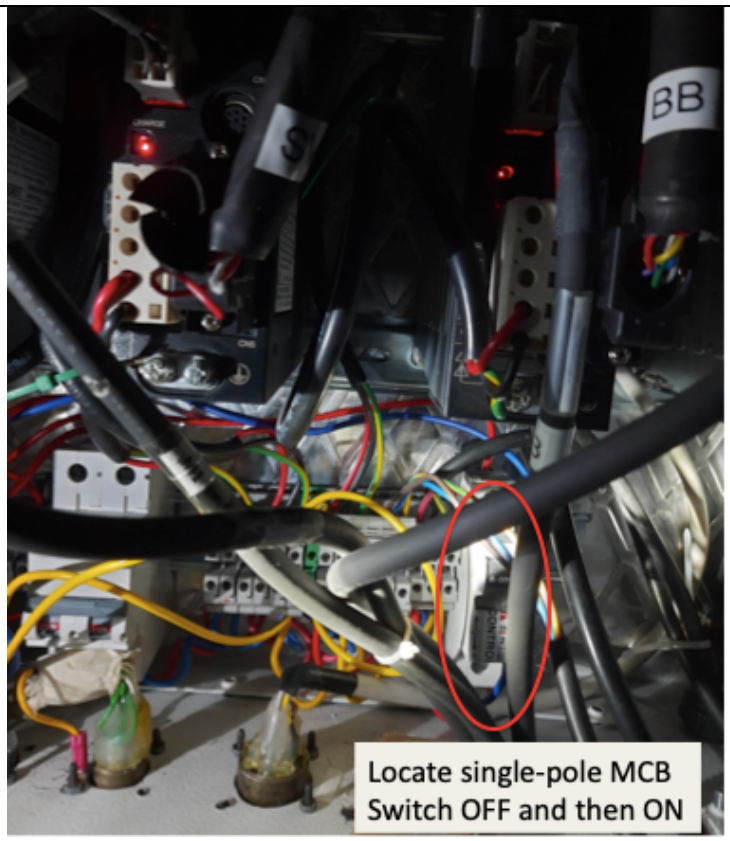
## 1. ADFOSC wheel control becomes un-responsive

**[Occurrence: occasional; Reason: Devasthal Network]:**

The system intermittently hangs or gets reset due to some ongoing local network issues at Devasthal. If it happens, the filter movements will not take place as that can be seen from the log (it does not get updated and stops responding) in the ICS control panel. The only solution is to reset the network power of ADFOSC cabinet. The method is given below:

**THIS PROCEDURE TO BE PERFORMED BY AN AUTHORIZED PERSON WHO CAN SAFELY HANDLE ELECTRICAL PROCEDURE:** Go to telescope floor and locate ADFOSC wheel control box (gray color covered box mounted sideways on dummy weight structure). Use the key provided there to open this box. The single-pole MCB switch as shown below should be switched OFF – wait 10 sec – switch ON.






## 2. Shifts in Grism position

**[Occurrence: Always; Reason: Unknown]:**

It is noticed that grism positions do not exactly repeat and gets a small angular offset that can be seen as a small tilt in the spectrum (horizontal x-axis of CCD frame). We advise that to overcome this situation – each time a grism needs to be positioned follow this sequence –

**'Home' grism wheel and then move to the desired grism position from the ICS GUI panel.**

## 3. Dirt on the slits

**[Occurrence: Always; Reason: Natural]:**

Some of the positions on the slits may receive and trap dust particles from open atmosphere, which cast a shadow (reduced response) in the spectrum at that location.

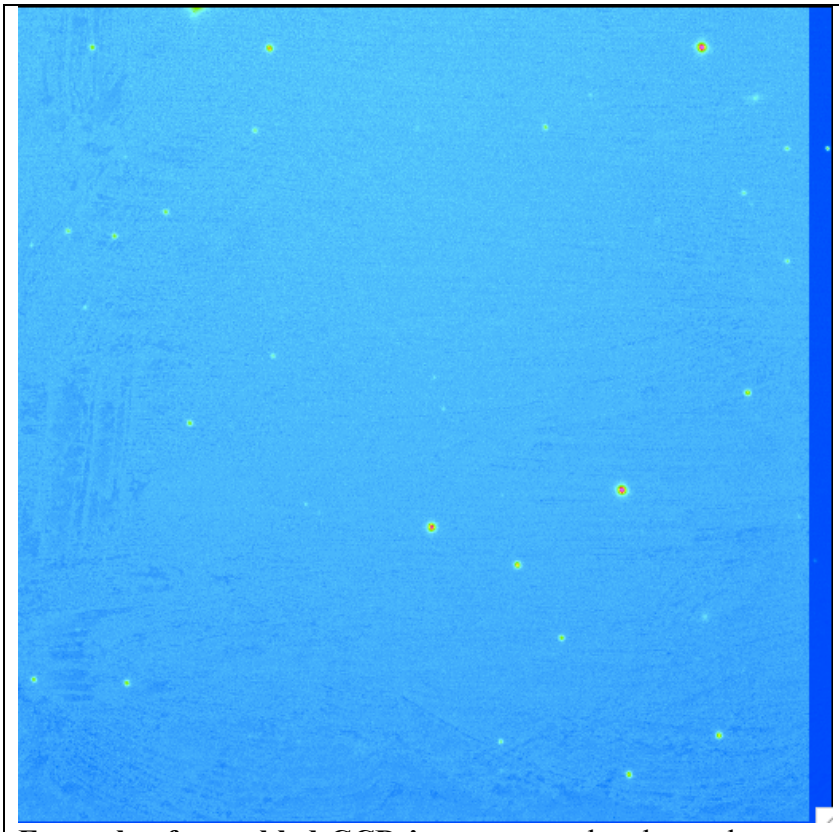
**Avoid placing objects on the slit locations, which have dust particles.**

## 4. Garbled CCD image

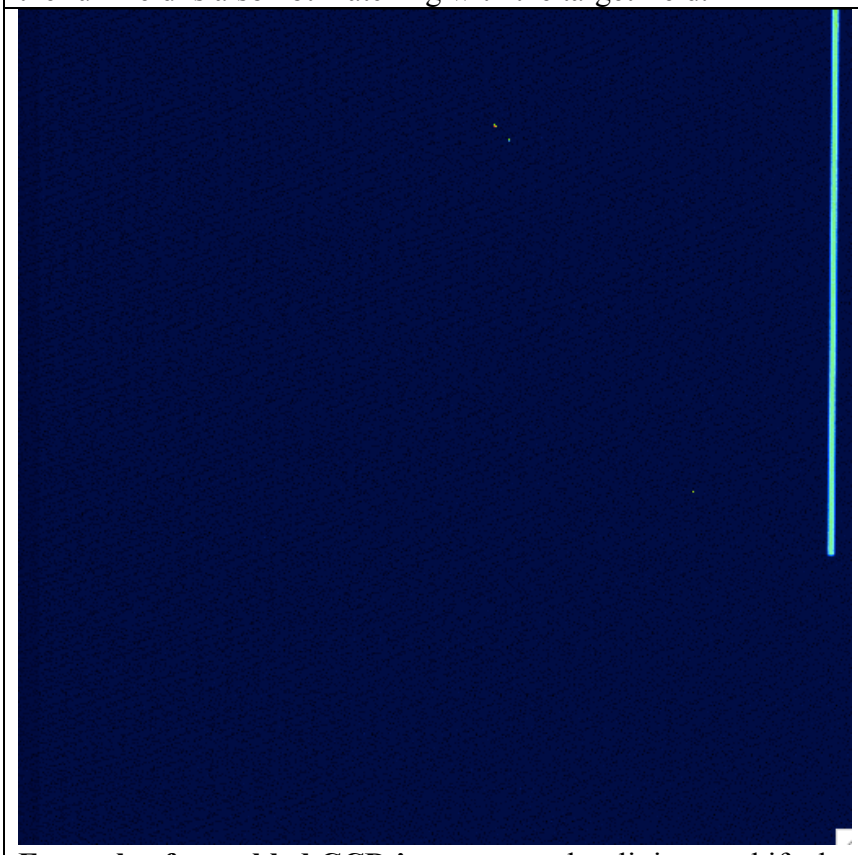
**[Occurrence: rare; Reason: controller glitch]:**

For some reasons, the CCD controller sometimes stiches pixel images with misplaced geometry. This effect is seen as some columns of the center section of image appearing at right edge with different contrast or if a slit is placed, the slit appears at the right edge. If you see images as shown below, reset the CCD software, which solves the problem.

**Reset CCD by running CCD controller 'setup' sequence from OWL GUI.**



**Example of a garbled CCD image** – see the changed contrast on the right side strip. Part of the full field is also not matching with the target field.



**Example of a garbled CCD image** – see the slit image shifted to right edge.