Adaptive Secondary Mirror User Manual

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ABSTRACT

Adaptive Secondary User Manual is created to permit to a final user to do all basics operations with the system and some advanced one.

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Modification Record

Version	Date	Author	Section/Paragraph affected	Reason/Remarks
1.00	23-03 2010	Marco Xompero	All	First release of the document
1.10	25-10-2010	Marco Xompero	All	Update with new software release
1.11	11-01-2011	Marco Xompero	Safety Remarks	Added AOS note on TSS behavior

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Abbreviations, acronyms and symbols

Symbol	Description
LBT	Large Binocular Telescope
ASM	Adaptive Secondary Mirror
GUI	Graphic User Interface
TSS	Thin shell safety system
adsecdx	Adaptive Secondary control PC
TCS	Telescope control system
AOS	Adaptive Optics Subsystem

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Contents

1 Prerequisites 6

2 Safety Remarks 6

3 Quick start with AOS GUI (from BP4 built ahead) 7

4 Quick start with Engineering GUI 9

5 Quick recovery from Failure 11

6 Adaptive Secondary software shutdown and startup guidelines 12
6.1 Shutdown 12
6.2 Start 12

7 Adaptive Secondary startup and shutdown 12
7.1 With Engineering GUIs 12

8 More on GUIs 14
8.1 AdSec Mirror GUI 14
8.2 AdSec Housekeeper GUI 14

9 Troubleshooting 15

10 References 17

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1 Prerequisites

The following action has to be previously verified:

- Ethernet connection between control computer (named “adsecdx”) and Adaptive Secondary
- Fiber connection between ASM Cabinet and ASM (6 for crates BCU, 1 for switch BCU)

2 Safety Remarks

The system is particularly sensitive to condensation problems: condensation inside the gap between the Reference Body and the Thin Shell not only does not allow operating the system, but also requires long time to be fixed.

For this reason the system is **maintained fully powered** up also during day and night time. If a switch off of the system is mandatory, the dew-point level has to be taken carefully in account.

Moreover, if the **wind speed** is over 8 [m/s], for thin shell safety reasons, only the system can be powered off **but not the AO software** framework.

In order for the mirror to work for observation the telescope **elevation** has to be **greater than 25 degrees**, the **swing arm** has to be **deployed** and the **wind speed** at secondary level has to be **below 22 m/s**. All these info has to be available from the TCS in order to permit to the Adaptive secondary to properly working.

For safety reasons, if the **wind speed** becomes **unavailable**, the **TSS** safety extra current is **enabled**.

In the same way, if the **elevation** or the **swing arm status** becomes **unavailable**, **the shell is rest** against the reference body and **any operation will be stopped**.

Please take care about the AOS process: since the AOS is routing the information from the TCS to the AOSupervisor , **any shutdown of the AOS will cause the TSS to be enabled and the shell to be rest**.

In the same way a mis-functioning of the TCS processes in charge of collecting the wind speed data, the elevation and the swing arm status will cause an AOSupervisor reaction as described above.

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3 Quick start with AOS GUI (from BP4 built ahead)

Open the AOSGUI. If the GUI is RED, the upper right label is not operating or if the Adaptive Secondary fields marked not looks like the ones here reported please refer to the chapter [5].

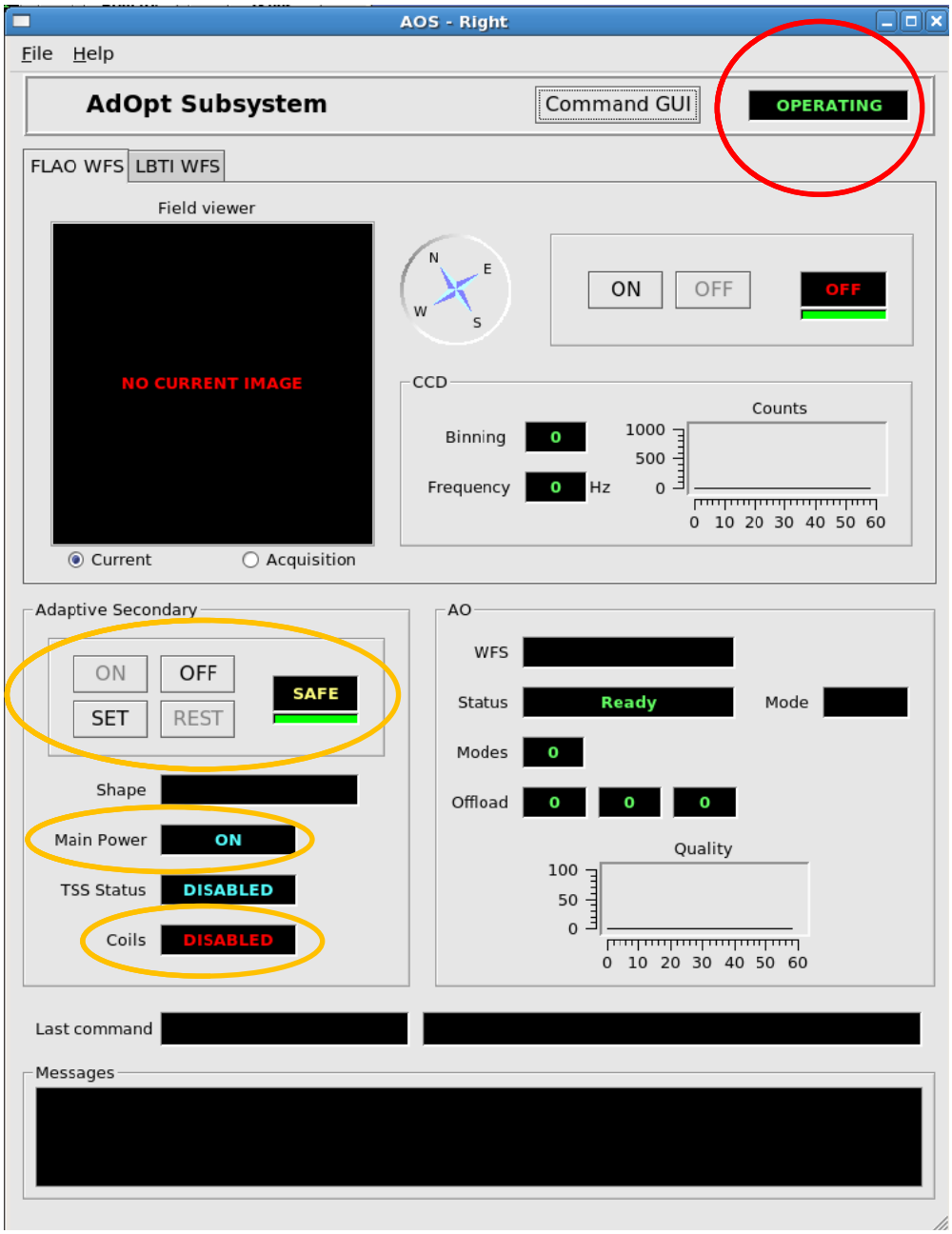

Figure: 3-1 AOS GUI

Press the **SET** button and wait. After a couple of minutes, if everything is ok, in the Adaptive Secondary frame, the label should change between ***SAFE*** to ***SET***.

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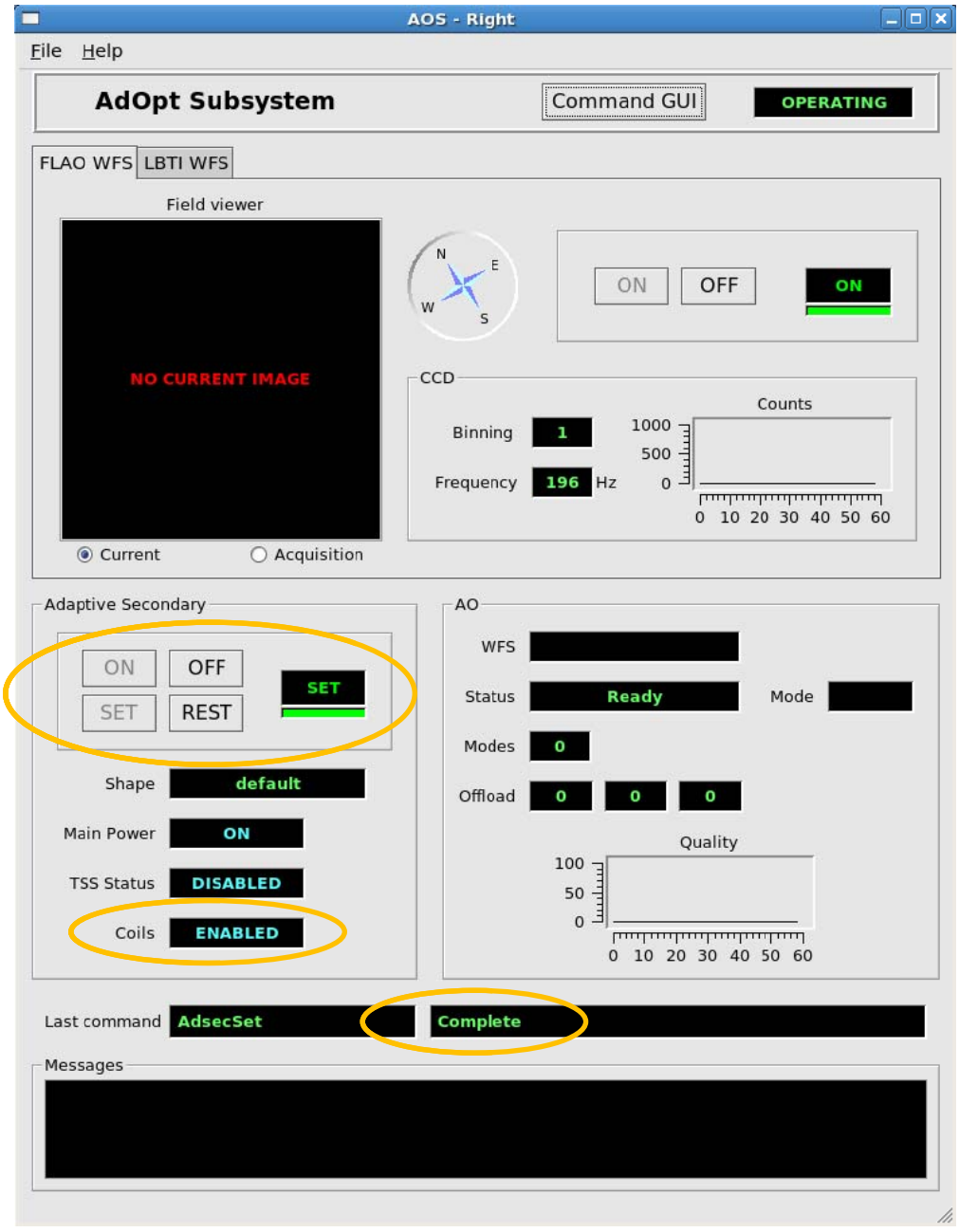

At the end of the observation night, please put the mirror in the SAFE position BEFORE going horizon to close the dome pressing **REST**. If you REALLY want to power the system off you can press, after the REST, the OFF button. (About that read carefully the chapter [2]).

In case of mirror FAILURE please use the engineering GUI as shown below.

4 Quick start with Engineering GUI

Login into “adsecdx” pc (user: AOeng, pwd: m1rr0r) and write the command **adsceng** for startup the main engineering GUI. If some error occurs please refer to the chapter [5].

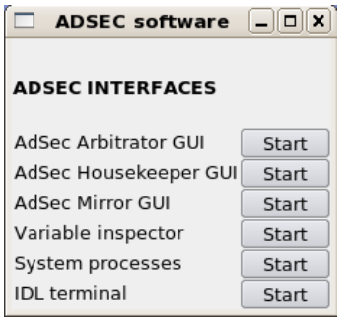

Figure: 4-1 Adsec Engineering GUI panel

Press for starting the **AdSec Arbitrator GUI**. If the fields marked in RED are not showing values OR have a RED background please check that the AOS is up and running. If that values are not correctly updated the Adaptive Secondary cannot be operated. Check the “AdSec Arbitrator Status” label (circled in orange in the following screenshot). It must show a **Ready** state. If not, refer to chapter 7 to set the proper arbitrator status.

To set the shell, press the “**SetFlatAo**” button (on the left column, circled in orange in the following screenshot). The command will take about 2 minutes to execute. At the end, the status will be “**AOSet**”.

At this point, the secondary mirror is flat and ready for seeing limited operation and no further action is necessary.

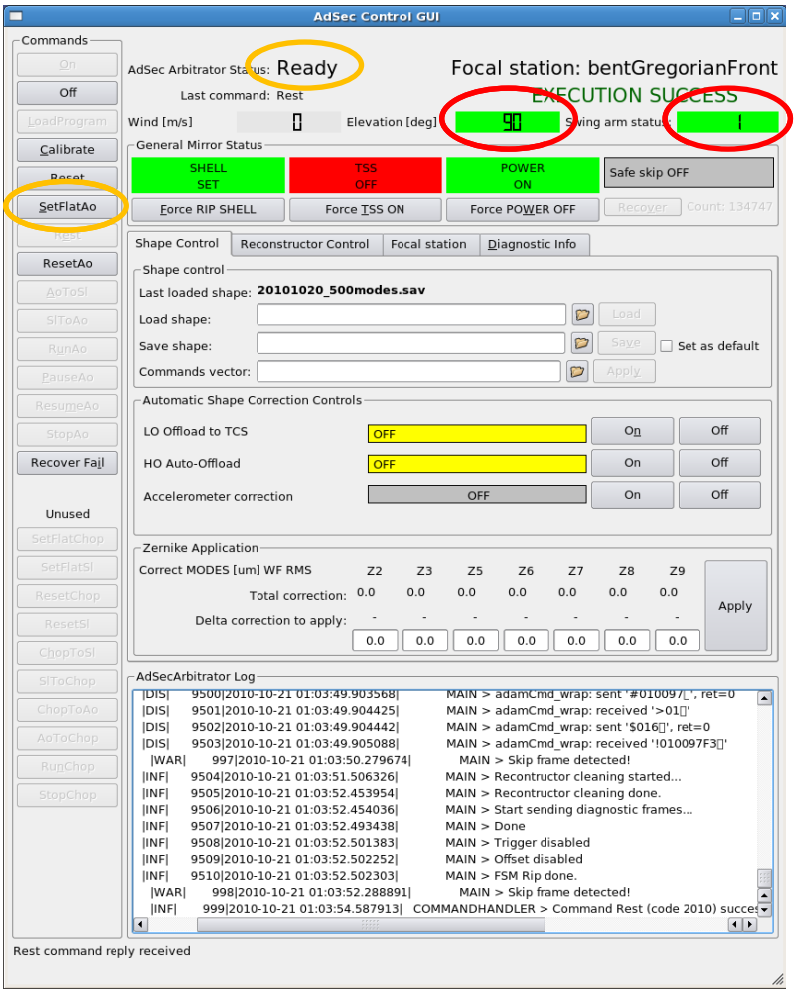

Figure: 4-2 Adsec Arbitrator GUI

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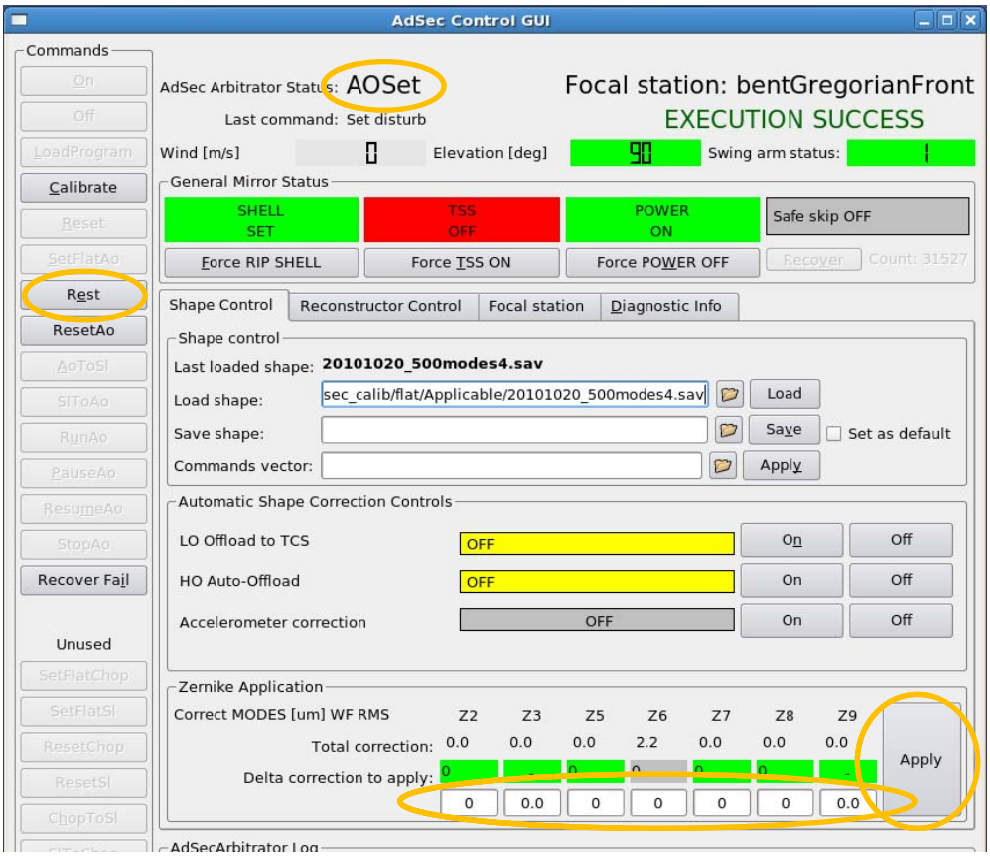

Once the shell is set, you can apply low order Zernike correction. **Write** a value (um wavefront), press **Enter** and once the field is updated press **Apply**.

At the end of the observation, put the thin shell in safe position with pressing the **Rest** button.

The Adsec Arbitrator status will change **from AOSet to Ready.**

5 Quick recovery from Failure

The Adaptive Secondary arbitrator can reach a **Failure** state in case of some hardware or software fault occurred. The software will try to **recover automatically** from the failure and go back to Ready state. In case this is not working, the operator has to press the "**RecoverFail**" button on the AdSec Arbitrator GUI to recover the system.

The fail recovery procedure takes about one minute to complete.

In case the Recover Fail procedure does not work, try first to restart the software from scratch as detailed in chapter 6. If it is still impossible to start the mirror, you will need technical assistance from Arcetri.

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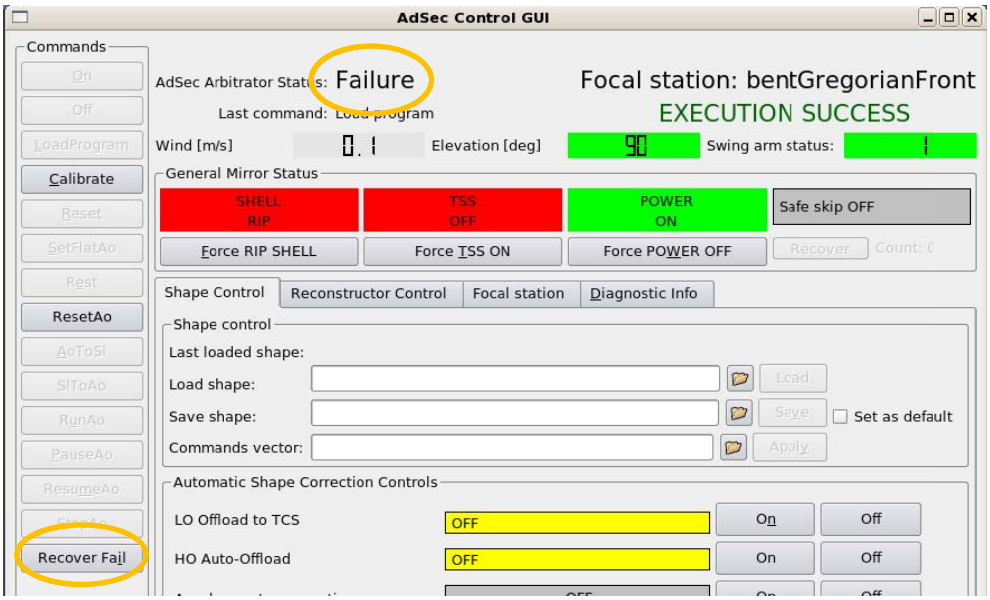

6 Adaptive Secondary software shutdown and startup guidelines

The software should be usually up and running. You can test it after you log in adsecdx (user: AOeng, pwd: m1rr0r) with typing the **adsc_check** command. Please note that after severe network problems is **recommended** to shutdown and startup again the software. If a message “No adopt processes are running” appears, if means that no software is running. A series of “xxx is running” messages means that the software is already running and no action is needed

6.1 Shutdown

Log in into adsecdx (user: AOeng, pwd: m1rr0r) and type the **adsc_stop** command. Note that the Adaptive Secondary and the Hexapod as well will be powered off.

6.2 Start

Log in into adsecdx (user: AOeng, pwd: m1rr0r) and type the **adsc_start** command. If some error occurs, before shutdown the software and after try to start up again.

7 Adaptive Secondary startup and shutdown

7.1 With Engineering GUIs

After checking the software is up and running (see [6]), log in adsecdx pc (user: AOeng, pwd: m1rr0r) and start the engineering GUI panel and the Adsec Arbitrator GUI (see [4]). The top of AdSec arbitrator GUI should look like the following one. In particular the Adsec Arbitrator Status should be **PowerOFF** and the **On** command button should be enabled.

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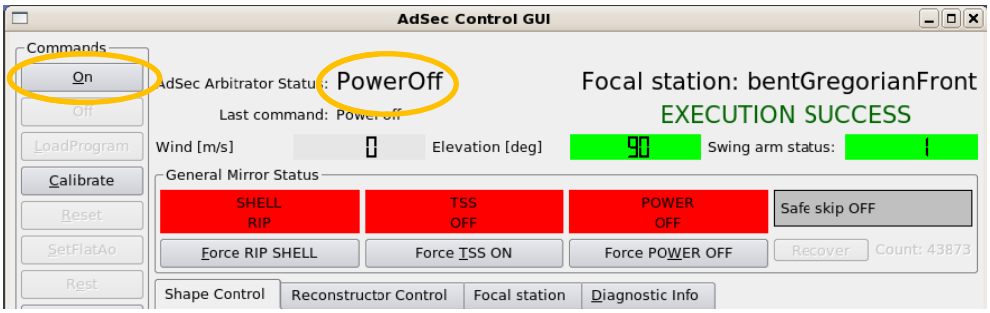
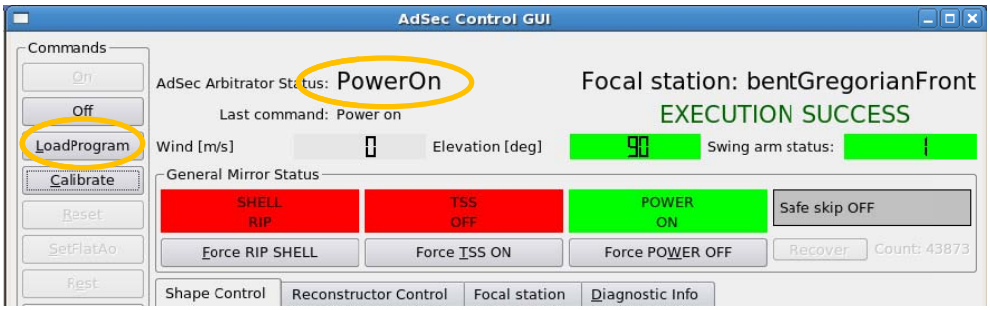


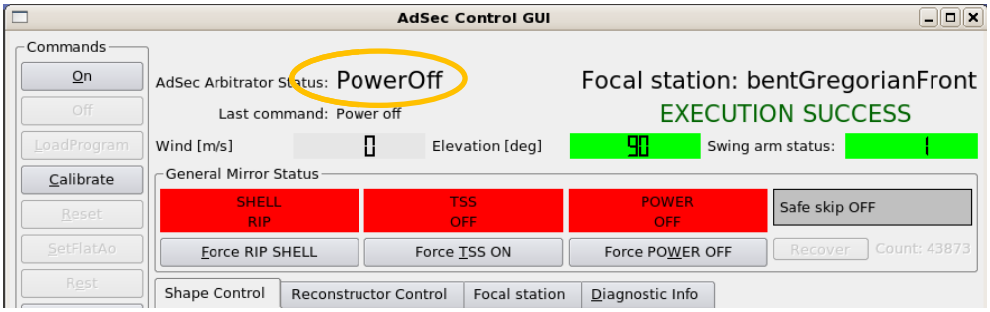
Now press the **On** button and wait until the system is switched on and the Adsec Arbitrator Status changes **from PowerOff to PowerOn**. After that proceed pushing the **LoadProgram** button.



At this point the Adsec Arbitrator Status should change **from PowerOn to Ready**. Now the mirror is ready to operate as shown in [3,4]. When you end the observation **this is the right status** in which put the Adaptive Secondary.

If you need to PowerOff the Adaptive Secondary, please check the Safety Remarks [2]. After that, you can simply power off the system pushing the **PowerOff** button.

When the Adsec Arbitrator Status changes to PowerOff, you can shutdown also the AO software framework as described in [6.1].

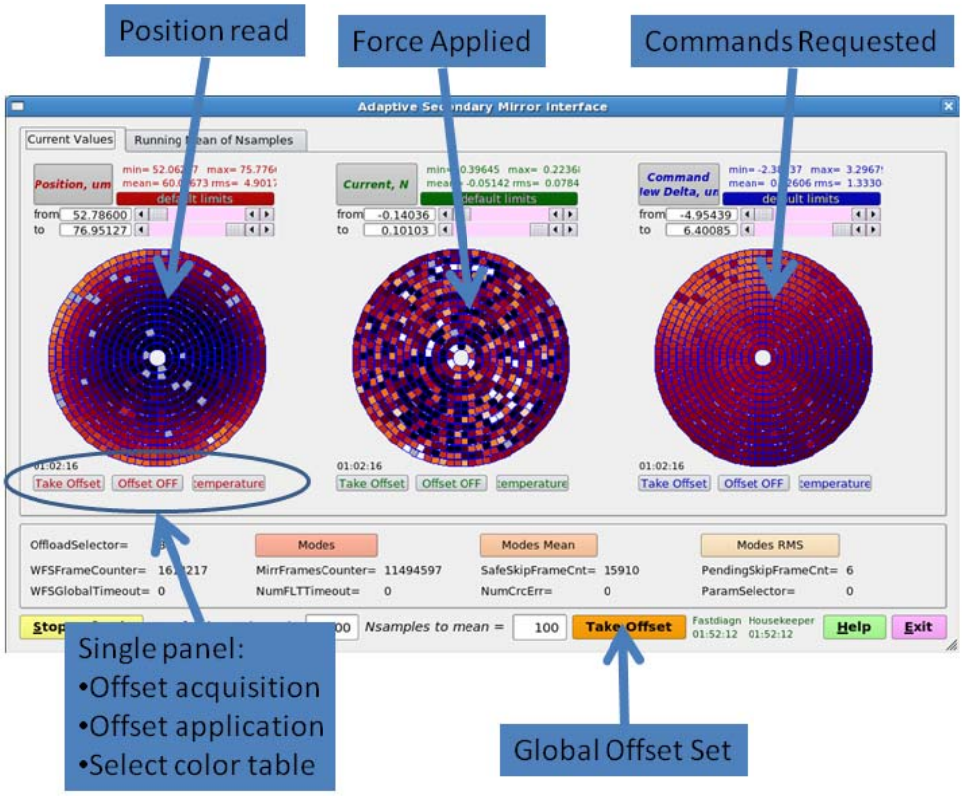


8 More on GUIs

In the Adsec engineering GUI panel [Figure: 4-1] you can select two more useful GUIs that allow to you to have a more detailed look to the Adaptive Secondary mirror status.

8.1 AdSec Mirror GUI

This GUI can be used if the Adsec Arbitrator status is **Ready**, **AOSet** or **AORunning**. It shows in a quick look the capacitive sensors readings, the force applied from each voice coil and the command sent by the Slope Computer.



8.2 AdSec Housekeeper GUI

This GUI shows all slow diagnostic data of the adaptive secondary, essentially temperatures of various component of the Adaptive Secondary.

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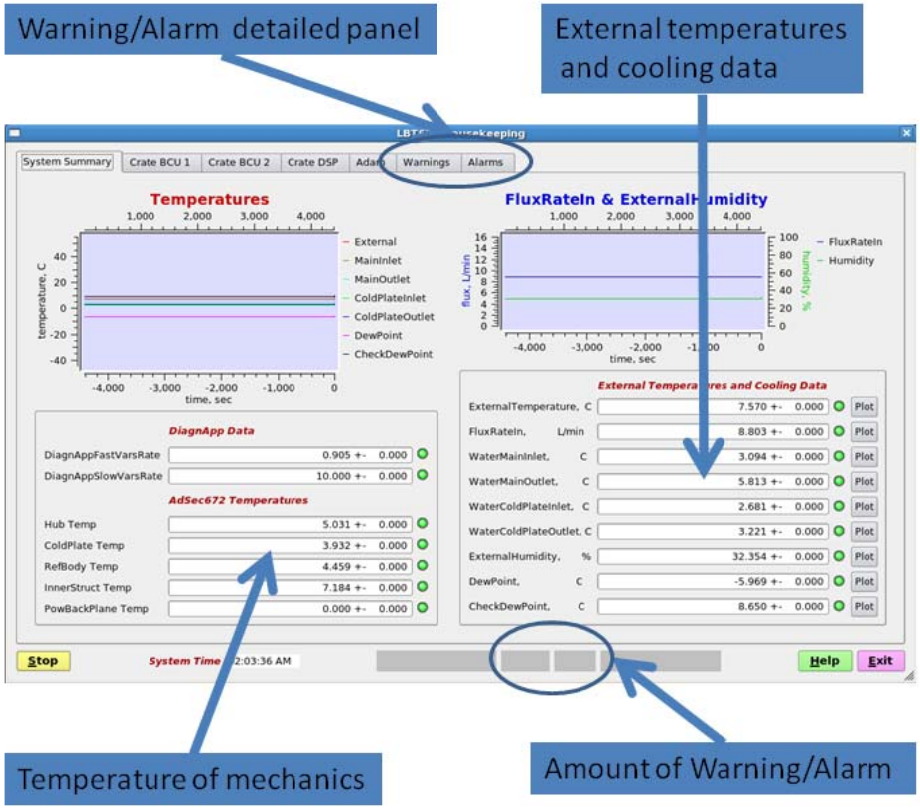
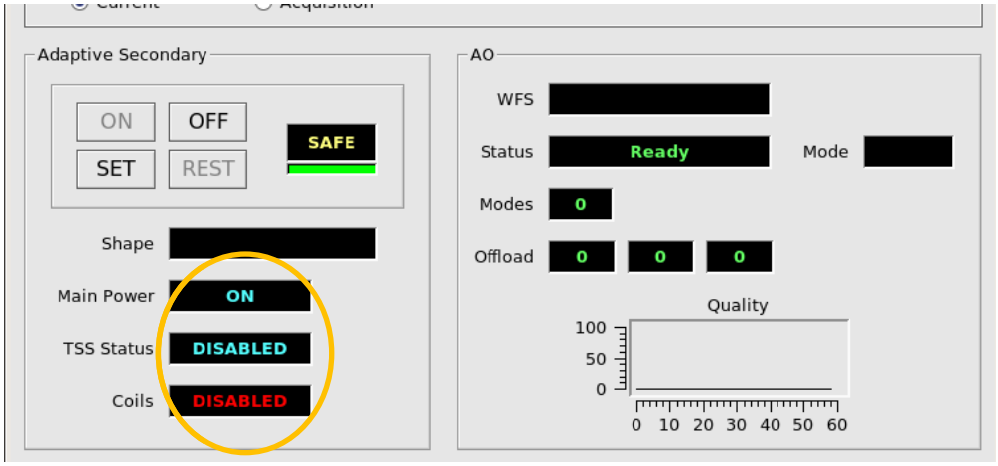


9 Troubleshooting

9.1 Adaptive Secondary labels go crazy in AOS GUI or Adsec Arbitrator GUI

May happen for an hardware problems that the labels in the AOS GUIs (and in the Adsec Arbitrator GUI) become not synchronized with the system real status.



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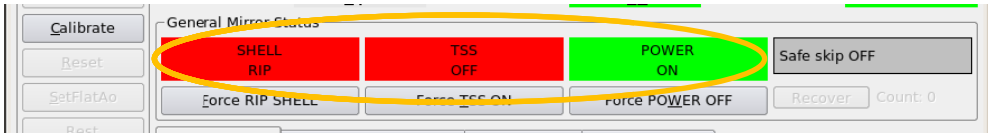

For correcting this bad behavior: **wait 2 minutes**. If the problem is still there, open the Adsec engineering GUI panel with the **adsceng** command in a terminal connected to adsecdx, select the **System Processes** interface, **stop and start the adamHousekeeper** process.

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