



# LBT-ADOPT TECHNICAL REPORT

Doc.No :  
Version : B  
Date : 21 Dec 2016



## **Ao Arbitrator commands**

Prepared by

Alfio Puglisi, Luca Fini

Approved by

Released by



Doc.No :  
Version : B  
Date : 21 Dec 2016

## LBT-ADOPT TECHNICAL REPORT

2/10



### **ABSTRACT**

This document describes how the AO Arbitrator commands map to the lower-level AdSec and WFS Arbitrators.



Doc.No :  
Version : B  
Date : 21 Dec 2016

## LBT-ADOPT TECHNICAL REPORT

3/10



### Modification Record

Version	Date	Author	Section/Paragraph affected	Reason/Remarks
A	20 Mar 2012	L. Fini	All	First release of the document
B	21 Dec 2016	A. Puglisi	All	Reformatted into Word document, updated for UAO

### Abbreviations, acronyms and symbols

Symbol	Description
LBT	Large Binocular Telescope
AdSec	Adaptive Secondary Mirror
FLAO	First Light Adaptive Optics system
WFS	Wavefront Sensor



## Contents

<b>1</b>	<b>AcquireRefAO</b>	<b>6</b>
1.1	Automatic mode .....	6
1.2	Intervention mode.....	6
<b>2</b>	<b>CenterPupils</b>	<b>6</b>
<b>3</b>	<b>CenterStar</b>	<b>6</b>
<b>4</b>	<b>CheckFlux</b>	<b>6</b>
<b>5</b>	<b>CheckRefAO</b>	<b>7</b>
<b>6</b>	<b>CorrectModes</b>	<b>7</b>
<b>7</b>	<b>AdjustGain</b>	<b>7</b>
<b>8</b>	<b>ApplyOpticalGain</b>	<b>7</b>
<b>9</b>	<b>OffsetXY</b>	<b>7</b>
9.1	In open/paused loop.....	7
9.2	In closed loop.....	7
<b>10</b>	<b>OffsetZ</b>	<b>7</b>
<b>11</b>	<b>OptimizeGain</b>	<b>7</b>
<b>12</b>	<b>Pause</b>	<b>7</b>
<b>13</b>	<b>Resume</b>	<b>8</b>
<b>14</b>	<b>SetZernikes</b>	<b>8</b>
<b>15</b>	<b>PresetAO</b>	<b>8</b>
<b>16</b>	<b>PresetFlat</b>	<b>8</b>
<b>17</b>	<b>ReCloseLoop</b>	<b>8</b>
<b>18</b>	<b>CloseLoop</b>	<b>8</b>
<b>19</b>	<b>StartAO</b>	<b>8</b>
<b>20</b>	<b>Stop</b>	<b>9</b>
<b>21</b>	<b>MirrorRest</b>	<b>9</b>
<b>22</b>	<b>MirrorSet</b>	<b>9</b>
<b>23</b>	<b>ModifyAO</b>	<b>9</b>
<b>24</b>	<b>RefineAO</b>	<b>9</b>
<b>25</b>	<b>RemoveActuator</b>	<b>9</b>
<b>26</b>	<b>PowerOffAdSec</b>	<b>9</b>
<b>27</b>	<b>PowerOffWfs</b>	<b>9</b>
<b>28</b>	<b>PowerOnAdSec</b>	<b>9</b>
<b>29</b>	<b>PowerOnWfs</b>	<b>9</b>



Doc.No :  
Version : B  
Date : 21 Dec 2016

## LBT-ADOPT TECHNICAL REPORT

5/10





## 1 AcquireRefAO

### 1.1 Automatic mode

1. Check that AdSec is in "AOSet mode"
2. Execute CenterStar command
3. Execute CenterPupils command
4. Execute CheckFlux command
5. Execute CloseLoop command
6. Execute OptimizeGain command
7. Execute ApplyOpticalGain command

### 1.2 Intervention mode

1. Do nothing and wait for the following command

## 2 CenterPupils

Close a temporary loop:

1. WFS: modifyAO
2. AdSec: LoadRecMatTag
3. AdSec: LoadGain
4. AdSec: RunAo
5. WFS: centerPupils
6. WFS: closeLoop

Wait for pupil centering:

7. AdSec: Offloading (enable)
8. WFS: enableRotatorTracking
9. WFS: disableAirDispersionCorrectorTracking
10. WFS: enableCameraLensCentering
11. Wait until WFS reports that camera lens tracking is on target
12. Wait until AdSec reports that tip/tilt offloading is under a threshold
13. Wait a further 15 seconds

Cleanup:

14. AdSec: Offloading (disable)
15. WFS: stopLoop
16. AdSec: stopAo

## 3 CenterStar

1. WFS: centerStar

## 4 CheckFlux

1. WFS: checkFlux



## 5 CheckRefAO

1. WFS: checkRef

## 6 CorrectModes

1. WFS: correctModes

## 7 AdjustGain

Not implemented

## 8 ApplyOpticalGain

1. Read current optical gain from WFS
2. WFS: applyOpticalGain
3. AdSec: applyOpticalGain
4. WFS: enableOpticalGainTracking
5. Not implemented: WFS: enableNCPATracking

## 9 OffsetXY

### 9.1 In open/paused loop

1. WFS: offsetXY

### 9.2 In closed loop

1. AdSec: reduceGain (disabled in UAO)
2. Do in small steps:
  - 2.1. Wait until AdSec reports tip/tilt offloading under a threshold
  - 2.2. WFS: offsetXY (step)
3. AdSec: restoreGain (disabled in UAO)

## 10 OffsetZ

1. WFS: offsetZ

## 11 OptimizeGain

1. WFS: disableCameraLensTracking
2. WFS: optimizeGain
3. WFS: enableCameraLensTracking

## 12 Pause

1. AdSec: Offloading (disable)
2. AdSec: PauseAo



3. WFS: pauseLoop

### 13 Resume

- 1 AdSec: ResumeAo
- 2 WFS: resumeLoop
- 3 AdSec: Offloading (enable)

### 14 SetZernikes

- 1 AdSec: setZernikes

### 15 PresetAO

1. setActiveWFS (wfsSpec)
2. WFS: presetAO
3. AdSec: selectFocalStation()

### 16 PresetFlat

1. AdSec: loadShape

### 17 ReCloseLoop

1. Load disturbance for optical gain:
  - 1.1. WFS: disturbance (get filename)
  - 1.2. AdSec: LoadDisturbTag
  - 1.3. WFS: enableDisturbance
2. AdSec: RunAo
3. AdSec: LoadGain (10 modes)
4. WFS: closeLoop
5. AdSec: Offloading (enable)

### 18 CloseLoop

1. Load disturbance for optical gain:
  - 1.1. WFS: disturbance (get filename)
  - 1.2. AdSec: LoadDisturbTag
  - 1.3. WFS: enableDisturbance
2. WFS: applySettings()
3. AdSec: LoadRecMatTag
4. AdSec: RunAo
5. AdSec: LoadGain
6. WFS: closeLoop
7. AdSec: Offloading (enable)
8. Wait until WFS reports that camera lens tracking is on target
9. Wait until AdSec reports that tip/tilt offloading is under a threshold

### 19 StartAO

1. Sync with AOS state. Does not send commands to either WFS or AdSec.





## 20 Stop

- 2 WFS: stopLoop
- 3 AdSec: StopAo

## 21 MirrorRest

- 1 AdSec: Rest

## 22 MirrorSet

- 1 AdSec: SetFlatAo

## 23 ModifyAO

Not implemented

## 24 RefineAO

Not implemented

## 25 RemoveActuator

- 1 AdSec: RemoveActuator

## 26 PowerOffAdSec

- 2 AdSec: PowerOff

## 27 PowerOffWfs

- 1 WFS: powerOff

## 28 PowerOnAdSec

- 1 AdSec: PowerOn
- 2 AdSec: LoadProgram

## 29 PowerOnWfs

- 1 WFS: powerOn



Doc.No :  
Version : B  
Date : 21 Dec 2016

## LBT-ADOPT TECHNICAL REPORT

10/10



Doc\_info\_start

Title: Ao Arbitrator commands

Document Type: Technical Report

Source: INAF-Osservatorio Astrofisico di Arcetri

Issued by: Alfio Puglisi

Date\_of\_Issue: 21 Dec 2016

Revised by:

Date\_of\_Revision:

Checked by:

Date\_of\_Check:

Accepted by:

Date\_of\_Acceptance:

Released by:

Date\_of\_Release:

File Type:MS-WORD

Local Name:

Category: WRITE THE CAN CATEGORY HERE

Sub-Category: WRITE THE CAN SUB-CATEGORY HERE

Assembly: WRITE THE CAN ASSEMBLY HERE

Sub-Assembly:

Part Name:

CAN designation:

Revision: B

Doc\_info\_end