

Palomar Adaptive Optics Test Plan

Title	LGS Acquisition and characterization
Date	12/06/06
Lead	A. Bouchez, M. Troy
Time requested	1 hr
Required conditions	Clear.

Purpose

Acquire LGS, focus LLT, determine LGS magnitude and spot size,

Test procedure

1. Setup
 - 1.1. Configure AO to look at sky
 - 1.2. Telescope at zenith, at best NGS focus.
 - 1.3. Acquisition camera V filter not installed.
 - 1.4. Move LLT mirror to its default position (determined during LLT alignment) [-11,53]
 - 1.5. Load best available flatmap
 - 1.6. Acq focused at 90 km altitude (NGS focus-2450)
move acq_z 12300 (for NGS use 14740)
 - 1.7. LLT focused to 90 km altitude (NGS focus - 300).
bto_control "move llt_focus 11564"
 - 1.8. check/set laser focus to correct value
bto_control "move laser_focus 9500"
 - 1.9. Setup acquisition camera:
 - 1.9.1. Start up IDL program *acqview*
 - 1.9.2. Set integration time to 2s
 - 1.9.3. In an appropriate experiment directory: IDL> *ao_plot_vid_image*
2. Perform final safety checks and fire laser
3. Acquire LGS on Acq
 - 3.1. If LGS is not in the Acq. FOV, use ellipticity of dichroic spots (apex points to LGS) and Raleigh gradient (brighter towards LGS) to steer it in:
offset llt_a +X=down; offset llt_b +X=left
4. Calibrate UTT mirror throw (one-time calibration)
 - 4.1. Center LGS in acquisition camera field.
 - 4.2. Record image with ACQVIEW and note time tag in log in Results section.
 - 4.3. Record images dithering laser in a cross pattern (see log).
 - 4.4. Manually center laser behind reflective spot.
5. Focus on Na layer
 - 5.1. Move LGS to clear region of ACQ. field: *offset llt_b +30*
 - 5.2. Rough focus laser spot:
bto_control "offset llt_focus ..." in steps of 100
move acq_z ... in steps of 300
 - 5.3. Detune laser, take and save a 5s background image.
 - 5.4. Focus Acq
 - 5.4.1. *ao_focus_loop, current-600, 300, 5, 'acq', 'save_name', 'sky_name', time=6.0*

- 5.4.2. *ao_read_focus, data,file='save_name'*
- 5.4.3. *move acq_z best_focus*
- 5.5. Focus LLT
 - 5.5.1. *ao_focus_loop, current-100, 50, 5, 'llt', 'save_name', 'sky_name', time=6.0*
 - 5.5.2. *ao_read_focus, data,file='save_name'*
 - 5.5.3. *bto_control "move llt_focus XXX"*
- 5.6. Repeat steps 4.3 and 4.4 again if necessary
- 6. Tune center wavelength
 - 6.1. This depends....
- 7. Take photometry
 - 7.1. Install V filter in Acq. camera
 - 7.2. Record and save a final set of detuned and tuned 5s Acq images for measuring photometry and spot size.
 - 7.3. Image photometric calibrator
 - 7.3.1. Go to photometric standard NGS, Landolt ~mV=11.0
 - 7.3.2. Move acq_z to NGS focus (*move acq_z 14740*)
 - 7.3.3. Move star to approximate position of LGS
 - 7.3.4. Take two images, with a ~10" dither between them; record star name and image time tags.

Results and conclusions

UTT mirror calibration (section 4)

Mirror commands	llt_a position	llt_b position	Image time tag	x centroid (pix)	y centroid (pix)
centered					
<i>offset llt_a 20</i>					
<i>offset llt_a -40</i>					
<i>offset llt_a 20</i>					
<i>offset llt_b 20</i>					
<i>offset llt_b -40</i>					
<i>offset llt_b 20</i>					

Optimal focus settings (section 5)

UT Date			
LLT focus (μm)			
Acq_z (μm)			
LGS FWHM (pix)			

Photometric calibration (section 7)

UT Date			
Star ID			
Image time tags			
Star FWHM (pix)			