Palomar Adaptive Optics Test Plan

Title | LGS Target Acquisition
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Version | 3.4
Date released | 4/3/2007
Lead | A. Bouchez
Time requested | 30 min.
Required conditions | N/A

Purpose
Acquire science target, lock all loops and hand over system to observer.

Test procedure
1. Tune up AO system on a nearby bright NGS.
   1.1. Slew telescope to a V=7 star near the LGS target.
   1.2. Setup AO system for NGS.
      1.2.1. Set TAO mode to NGS.
      1.2.2. load cent_offsets=aocp:/tables/default/co_default2
      1.2.3. Move LGS_Z to NGS position.
      1.2.4. Move ACQ_Z to NGS position.
      1.2.5. Move WFS_Z to NGS position.
      1.2.6. Verify that focus offload is enabled.
      1.2.7. Set Acq to video (installs fold mirror).
      1.2.8. Stop chopper if running.
   1.3. Acquire star on the HOWFS.
   1.4. Take a HOWFS sky (offset telescope 60")
   1.5. Close TT loop.
   1.6. Align SSMs.
      1.6.1. Have observer center the star at the desired location on PHARO in the platescale to be used for science. Mark with crosshairs A.
      1.6.2. Switch to 40mas platescale and mark star location with crosshairs B.
   1.7. Register DM (coarse and fine).
   1.8. Close DM loop.
   1.9. Make a new telescope flat map and load.
   1.10. TX telescope.
2. Move to LGS target and center target on PHARO field.
   2.1. Offset to coordinates of LGS target.
   2.2. Center target on PHARO cross-hairs.
   2.3. Request spotter permission to project laser.
3. Acquire the LGS.
   3.1. Setup AO system for LGS.
      3.1.1. Set TAO mode to LGS.
      3.1.2. Set HOWFS frame rate to 150 Hz (or previous optimized value).
      3.1.3. Set llt_integral gain 1.6 (or previous optimized value).
      3.1.4. Set dm_proportional_gain 0.02
      3.1.5. Set dm_integral_gain 0.15
      3.1.6. Leave LGS_X in NGS position.
      3.1.7. Move WFS_Z to LGS position (90km or best estimate).
3.1.8. Move ACQ_Z to LGS position (best estimate from focus runs).
3.1.9. Verify LLT FSM positions.
3.1.10. Set Acq to integrate 2s.
3.1.11. Start chopper.
3.2. Project laser.
3.3. Center laser on HOWFS reflective spot.
   (Offset llt_a +x moves LGS up, llt_b +x moves LGS left)
3.4. Record centered position of LLT FSM.
4.1. Move LGS_X to LGS position.
4.2. Take a HOWFS background (offset llt_a 20").
   log wfp=ho, interval=5 immediately after starting bkg.
   log wfp=ho, interval=5 when done
   wfs_cam on, id=ho
4.3. Close UTT loop.
4.4. Verify HOWFS framerate is correct. If necessary:
   4.4.1. Open UTT loop.
   4.4.2. Change HOWFS framerate.
   4.4.3. Take a new HOWFS background (offset llt_a 20").
   4.4.4. Return UTT mirror to center and close UTT loop.
4.5. Close DM loop.
5. Acquire the NGS and close TT loop.
5.1. Setup LOWFS
   5.1.1. Set ttm_integral_gain 0.15
   5.1.2. Set LOWFS framerate to expected value for NGS.
   5.1.3. Move ACQ_Z to NGS position.
   5.1.4. Set Acq to integration time appropriate for NGS.
5.2. Identify NGS in Acq field and send LOWFS using ACQVIEW button.
5.3. Take a LOWFS background (offset telescope 60").
   log wfp=lo, interval=5 immediately after starting bkg.
   log wfp=lo, interval=5 again when done
   wfs_cam on, id=lo
5.4. If LOWFS residuals are >0.2, zero LOWFS centroids.
5.5. Close TTM loop.
5.6. Verify that LOWFS framerate is correct. If necessary:
   5.6.1. Open TTM loop.
   5.6.2. Change LOWFS framerate.
   5.6.3. Take a new LOWFS background (offset telescope 60").
   5.6.4. Return telescope to center and close TTM loop.
6. Close focus loop (pulldown on LGSFOC).
6.1. Close focus loop on LGSFOC tool.
6.2. Wait for focus to converge to <0.5 mm.
7. Acquisition is complete!

Results and conclusions