Palomar Adaptive Optics Test Plan

<table>
<thead>
<tr>
<th>Title</th>
<th>LGS Target Acquisition</th>
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<tbody>
<tr>
<td>Version</td>
<td>3.3</td>
</tr>
<tr>
<td>Date released</td>
<td>4/3/2007</td>
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<tr>
<td>Lead</td>
<td>A. Bouchez</td>
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<tr>
<td>Time requested</td>
<td>30 min.</td>
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<td>Required conditions</td>
<td>N/A</td>
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**Purpose**
Acquire science target, lock all loops and be ready to perform science at this end of this procedure.

**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 co_zero centroid offsets.
      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. Set Acq to video (installs fold mirror).
      1.2.7. Stop chopper if running.
   1.3. Acquire star on the HOWFS.
   1.4. Close TT loop.
   1.5. Register DM (coarse and fine).
   1.6. Close DM and check that focus offload is allowed.
   1.7. Make a new telescope flat map and load.
   1.8. Optional: Record a 30 second PHARO exposure with only TT loop closed to measure seeing.
2. Slew telescope to coordinates of LGS target and center target on PHARO field.
   2.1. Center target on HOWFS sweet spot.
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. Set Acq to integrate 2s.
      3.1.10. 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)
   4.1. Move LGS_X to LGS position.
   4.2. Take a HOWFS background (offset llt_a 20")
   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").
   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