Palomar Adaptive Optics Test Plan

Title	BTO setup
Version	2.4
Date released	9/18/2007
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Time requested	1 hr during the first afternoon of each observing run. Parts D and E must be performed after safety interlock checkout.
Required conditions	Dome closed

Purpose

1. Power up BTO, align mirrors using 660nm stimulus beam, save default positions.
2. Verify BTO alignment to LLT.
3. Align LLT to 660nm stimulus beam.

Test procedure

Notes:

- Requires 1 AO/BTO operator + 1 personnel in dome.
- Request that Coude block supervisor lock be unlocked before beginning procedure.
- Wear protective goggles while in Coude room and dome.

A. Power up Coude hardware:

1. Uncover BTO Coude optics.
   1.1. Remove blue FSM mirror cover.
   1.2. Open ports in Coude bench enclosure.
   1.3. Dust optics in main beam with Aero-Duster.
2. Power up ESP300 and FSM controllers.
3. Power up power strip behind Coude bench (laser & diagnostics electronics).
4. Power up 660nm laser using the following procedure:
   4.1. Unplug black wire from power supply.
   4.2. Turn on power supply. Check that power supply is set to 3.75V, 0.75A.
   4.3. Turn off power supply and reattach wire.
   4.4. Power on laser.
5. Power up Coude lab video camera, intercom, and both microphones.
6. Test intercom volume. Coude controls adjusts volume as heard from data room...

B. Power up Dome hardware:

7. Verify that telescope focus is nominal for AO (~61 mm)
8. Power up all BTO electronics in dome.
   8.1. telnet viswa_power
   8.2. > /on C2
   8.3. > /on C3
   8.4. > /on trolley
   8.5. > /on bto
   8.6. > /x
   8.7. Wait ~3 minutes for BTO computer to boot.
9. Start up BTO GUI.

9.1. ssh -Y aousr@lgs.palomar.caltech.edu (198.202.125.152)
9.2. bto_ctrl
9.3. > reset all (Note: this moves the laser focus stage on laser bench!)
9.4. > set trigger=internal
9.5. > set hadec=TCS
10. Prepare trolley optics for operation
10.1. Move trolley to +5200000.
10.2. Remove optics covers.
10.3. Dust optics with Aero-Duster
11. Set Track ON to move BTO mirrors to last zenith position.

C. Uncover and power up LLT (requires 1 person at prime focus)
12. Verify that all 4 LLT power strips are powered on.
13. Remove all optics covers on diagnostics bench (including blue FSM cover).
14. Dust all diagnostics optics in the main beam with AeroDuster.
15. Remove primary mirror cover, store in elevator.
16. Dust ¼-wave plate (in primary hole) and primary with Aero Duster.
17. Verify that FSM controller is powered on.

D. Align BTO (after clearing personnel from dome)
18. Verify that Coude light path is clear of obstructions (eg. Coude M5).
19. Open Coude block.
20. Enable perimeter alarm (all other zones disabled).
21. Verify that track is ON.
22. Erect the BTO by closing the servo loop to Q1, then Q2, then Q3.
22.1. If no light is visible on Q1...
- Visually check Coude beam path.
- Verify that stimulus beam is precisely centered on both Coude irises.
- Verify that telescope pointing data is OK (see step 9.5)
- Manually offset M1x,y until light falls on Q1, the close servo loop.
23. Set zenith and save default (saves stimulus zenith position & BTO default)

E. Align LLT to laser
(requires 1 personnel in prime focus, 1 in data room)
24. Remove LLT primary cover, FSM cover, any other optics covers.
25. Verify that UTT mirror controller is powered on, and positioned at [0,0].
26. Lock BTO servo loop with high speed on Q3.
27. Adjust the Q3 beamsplitter to center the laser on the UTT mirror.
28. Adjust the top fold mirror to center the laser on it.
29. Install reticles in the LLT primary mirror hole and on the LLT secondary.
30. Iterate between UTT mirror adjustments (performed by the AO operator) and adjustments of the LLT final fold mirror to center the laser on both retticles.
31. Remove the reticles and verify that the beam pattern on the dome ceiling is evenly illuminated and centered on the LLT secondary shadow.
32. Open the BTO servo loop.
33. Verify that the laser beam path in prime focus is clear of obstructions and everything appears ready for the high-power 589nm laser.

Results and conclusions