May 11, 2006 Palomar LGS IPT Meeting Minutes

A. Bouchez, 5/11/06

Palomar: Doyle, Henning, Thicksten, Velur
Caltech: Bouchez, Cromer, Morrissett, Petrie, Pickles, Roberts, Shelton, Troy
Chicago: Kibblewhite

1. Updates on LGS tasks

1. BTO stimulus upgrade. Solution proposed by Chris and Antonin (see Fig. 1) addresses the following:
   - Preserves the linear polarization of the 589 nm beam, eliminating need for ½-wave plate in Coude lab.
   - Allows fixed alignment and co-propagation of 589 and 660nm beams.
   - BTO loop could then be closed on 660nm beam by replacing quad cell neutral density filters with dichroics (inexpensive "night-sky filters" will do the trick).

   Proposals requires changing our nighttime operating procedure to keep the BTO servo loop closed on the 660nm eye-safe laser at all times, eliminating the need for precise open-loop calibration of the BTO motors. This is a big optical change, and we discussed whether to attempt to complete this before the June run. After some discussion, decided to take it on.

   Necessary sub-tasks:
   - CS and/or AB go to Palomar 5/15 to confirm new breadboard layout.
   - Order parts, particularly breadboard, ASAP.
   - Palomar build and install steel support frame for breadboard by 6/1.
   - CS and/or AB install and test optics starting 6/1.
   - Q3 safety system threshold needs to be adjusted in software.

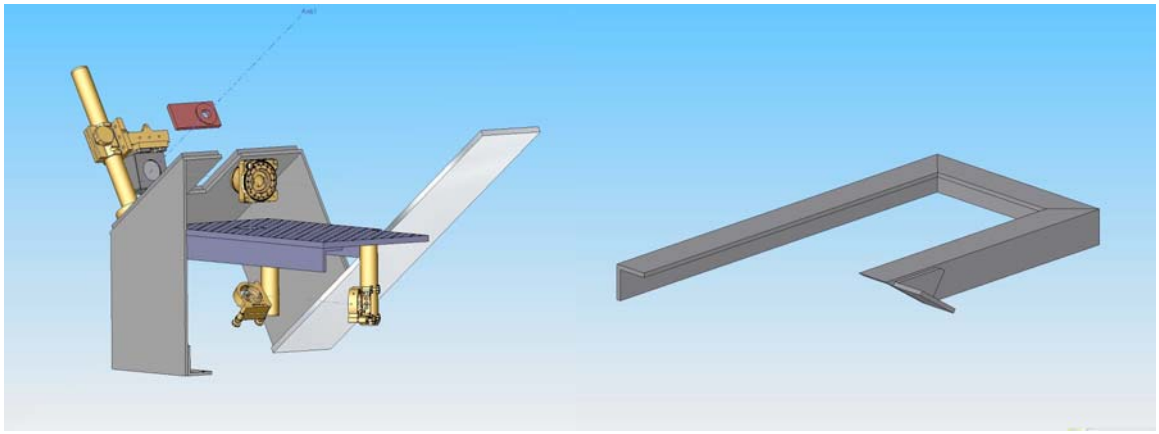

Fig. 1: Proposed new BTO layout below polar axis in Coude lab. The steel frame shown at right will support a slightly modified 1'x2' Thorlabs breadboard.

2. Raleigh rejection at framerates other than 500 Hz.
   - CCD frame-transfter is not feasible, due to the 4 readout aplifier geometry of the detector. Charge from Raleigh return would pollute the central subapperture images.
   - Chopper solution will take longer than 3 wks to implement. However several stock options exist. Jenny is looking into options.
   - Ed offered to consider possible changes to the laser pulse format to increase the power per pulse while reducing the pulse frequency.

- Chris is pursuing making changes in real-time AO software to allow coadding of Raleigh-gated WFS frames. This would only lead to √N improvement in SNR, but may be useful for June run.
- Reaffirmed approach for maximizing Raleigh-gated laser photons on WFS for June:
    - Increase laser to >8W.
    - Launch circularly polarized light.
    - Coadd frames taken at 500Hz rep rate.

    If this is not sufficient to close the HOWFS loop (at eg. 250 Hz), fall-back is to perform traditional background subtraction of Raleigh at arbitrary WFS frame rates.

3. LLT flexure
    - Hal has been investigating LLT pointing problems. Small improvements have been made to the secondary mount. He has identified one torsional mode in telescope truss, but this should not affect pointing with Pulnix camera. Primary motion does not seem to explain image shifts seen.
    - All minor issues will be addressed, but will have to wait for more on-sky testing to determined cause of large pointing shifts seen in April.
    - LLT 18" primary mirror update: The mirror is presently being figured, and is ahead of schedule. The expected delivery date is July 5 or earlier, at which time it will need to be aluminized. Bob will not be at Palomar 7/5-7/7, so we need to consider other options for coatings. Viswa suggests getting a protected silver coating. W need to look into coating labs ASAP, and get in a queue. It was noted that the mirror (or diagnostic data) should be inspected before coating

4. Aircraft camera software
    Need to address IR camera calibration problem. May have to send camera back to manufacturer.

Integrated schedule and coordination

- Mitch sent out integrated schedule last night – please check your tasks and make sure they seem reasonable. We will try to revisit this schedule periodically to track progress.
- Summary of new laser upgrade strategy: Ed will build new gain modules in Chicago. All testing will occur in laser lab at Palomar (no need to ship power supplies or chillers).

Meeting adjourned at 10:00am.