November 6, 2006 LGS Facilty IPT Meeting Notes

A. Bouchez 11/06/06

Caltech: Angione, Bouchez, Cromer, Guiwits, Moore, Petrie, Pickles, Roberts, Shelton
Palomar: Henning, Doyle, Tripathi
Chicago: Kibblewhite

1. Laser upgrades and automation

Ed will be at Palomar December 2-12. Work planned during his stay is as follows:

- December 2-4 (prior to run)
  - Measure laser bandwidth.
  - Measure micropulse width.
  - Replace mechanical mounts for etalons, improving thermal time constant.
- December 5-7 (engineering run)
  - Operate the laser for engineering.
- December 8-12 (after run)
  - Replace laser heads and characterize laser performance.

Other laser tasks and issues:

- Operating procedures
  - Need Viswa and Ed to comment on the startup and shutdown procedures.
- Documenting laser optical design
  - Renu making progress understanding optical design using papers on MIT-LL laser.
- New laser heads
  - Renu/Antonin to send cylindrical lenses (2cm square, F=40-50mm, 12 of them) and machined lens holders to Chicago. Small metal bits (~1cm x 2cm, with small groove which holds lenses) are in desk in laser lab. Could send entire contents of bottom left drawer, excluding cables.
  - May need extra plumbing parts, but will evaluate this once Ed arrives at Palomar.
- New sodium cell.
  - Parts ordered. One Na cell and oven have arrived. Waiting on controller.
  - Assemble this week. Will test with Chris later this week or next (2 days?).
  - Will use a dither lock using PZT.
- Replace LBO crystal for 1.32 laser?
  - Renu should contact company again. Have them specify how the crystal should be used.
  - Renu will reinstall and test LBO, with assistance by Viswa or Chris if necessary.
- Confirm linearity and calibration of photodiodes.
  - Chris will move calibration control in electronics box when at Palomar next week.
  - Chris and Renu will check photodiode calibration.
- Laser lab cleanliness
  - Renu is investigating options for small cleanrooms/curtains. Work is ongoing.
- Laser computer development.
  - Laser computer is at JPL, and contains 2 cards (ADC/DAC and serial). Need to define what it is going to be talking with before purchasing more hardware.
  - Steve will contact McShane to see if C code for thermal controller GUI is available.
  - Digital delay generator control also runs on PC now. Will need to investigate whether linux code is available.
  - This week, Steve will focus on getting communication with the cards working.

2. BTO, LLT, and Diagnostics Benches

2.1. Status of diagnostics benches (11/17 email from Anna)

Coude diagnostics
Status so far
Near field camera, far field camera, shear plate with remote viewing mode and photodiode are installed. Limited testing on 589nm laser was performed during the last run.
Immediate tasks:

a. Is single coax cable sufficient for photodiode? Not clear this was the case during the last run. Chris Shelton suggested using 2 coax cables to reduce the pick-up, this may well be required (AMM/John Henning)
b. Currently the 3 video outputs travel via coax to a monitor. This needs to be changed to a multi-input acquisition card in the pc (AMM)
c. Is image from near field camera acceptable? (AMM)

LLT diagnostics:
Status so far:
Near field camera, far field camera, photodiode, Pulnix and relay optics, FSM and Q3 are mounted to an optical breadboard currently attached to the side of the LLT. Alignment procedure of LLT to Pulnix, and subsequent alignment of LLT to 200inch was discussed and attempted at length before and during the run. It's clear that this procedure requires deeper thinking. The above diagnostics were aligned with the red laser with appropriate filters to leave the images unsaturated, but this was too much attenuation when the 589nm laser was switched on.
Immediate tasks:

a. Look at zemax- why is current alignment procedure with pulnix not working? (AMM)
b. Rethink alignment procedure for LLT to 200inch and laser (Hal/AMM)
c. Redo lens mount in LLT, check centration (Hal)
d. Decide whether to return LLT diagnostics bench to Caltech before the next run
e. Assemble and test Shack Hartmann sensor (AMM) 1 week
f. Where to mount SH sensor on LLT diagnostics bench, assemble? (AMM) 2 days
g. Is coax feed from photodiode sufficient? (AMM/John Henning) 1 day
h. Design and make baffling (AMM) 2 days
i. Enclosure/protective cover for LLT diagnostics (AMM/Hal) 3 days
j. Test bench with 589nm laser, adjust filters (AMM)
k. 589nm test bench in coude room (Hal's suggestion)?

2.2. Additional items brought up at the meeting

- For next run, will use Anna's PC for display.
- Shack-Hartmann may slip.
- We need additional ND filters and holders.
- Mike Doyle will evaluate possibilities for moving the LLT into the Coude lab.
- In the near term, we will store and work on the LLT in the AO instrument lab (aka. laser lab).
- Once development is completed, the LLT will be stored in an instrument bay on the 200-inch dome floor.

3. BTO

3.1. Remaining software development (10/31 email from John)

Critical:

- Come up with a good way to switch between red and yellow lasers.

Make the BTO easy to use:

- Improve automation:
  - "ALIGN" command, to automatically align the BTO to the red laser.
  - "TRACK ON" timer.
  - Check motor positions before allowing the shutter to open.
- Improve integration with AO system:
  - Fix late messages (Mostly Steve, with my help).
  - IDL scripts (zero to infinite, depending on what you want).
- Improve "User Friendliness":
  - Better response messages.
  - Make SET ZENITH work better.
  - Warn when MOVE or OFFSET with track on.

Useful for engineering/testing:

- Command to switch between TAO/TCS for HA and Dec.
- Add "laser" field (red or yellow) to BTO_STATUS (Thang, Steve and John).
- Improve bto_cmd_gui interface to BTO.

Somewhat longer term:

- Reconnect to TCS after TCS error.
- Rewrite ADC/DAC driver.
- Write a parallel port driver.
- Come up with a sane save/restore file format (Thang).
- Come up with a sane command set (Thang).
- Documentation.
- Add BTO code to CVS.

3.2. Additional items brought up at the meeting

- We will have a separate meeting on finalizing the BTO command set on Wednesday 11/8.

4. Safety systems

- Progress made during the last run:
  - Found problem with communication to laser shutter from ASCAM. Solved.
  - Changed the threshold on the IRCAM.
  - Both cameras run "locally", displayed through VNC.
- Tasks for December engineering run:
  - Write test plan to compare spotter and camera aircraft sensitivity.
  - Update SOP to reflect new interlock system.