

Report of SSC Meeting Caltech, April 30 and May 1, 2008

Attending -

Co-Chairs: Jean Brodie and Tom Soifer

SSC members: Lynne Hillenbrand, Jason X. Prochaska, Mike Liu, Rachel Akeson, Chris Martin (attended by phone),

Ex-officio members: Mike Bolte, Shri Kulkarni, Jerry Nelson (attended by Polycom)

Observatory Report

The LRIS Red upgrade is proceeding well, but several significant issues have been raised since the last report. The newly found trapped charge issue will require careful consideration regarding contingency issues associated with loss of power in certain situations. The lack of a suitable spare for the superb devices is another issue of concern. The approaches to addressing the focus mechanism flexure and dewar overpressure concerns seem sound. The SSC is pleased that the delivery date appears to be holding. The SSC requests that the LRIS-R team provide a report on the trapped charge issue.

The report on the initial experience with the first MAGIQ unit, installed on NIRSPEC, is quite encouraging. We encourage the observatory to continue work to address all remaining issues as rapidly as possible. The SSC supports installing the next MAGIQ unit on LRIS.

The SSC is pleased that the FY 09 budget appears to have converged to the available funds without significant loss of commitment to projects presented at the Feb 08 SSC meeting.

In answer to the specific questions addressed to the SSC by the Directors:

Does the FY 09 plan reflect the scientific priorities of the approved 5-year plan?

Yes

What comments does the SSC have on the scientific initiatives included in the plan?

Order of MAGIQ upgrades (LRIS, then HIRES)

LRIS - fine, HIRES - yes

Deferral of concept studies for NGAO IR imager – The SSC agrees that this is reasonable, given the lack of a group available to do the work and the need for focusing the work on the basic AO system. As part of the NGAO phased plan the SSC requests that the team provide the information as to when instrument specific requirements and interface specifications are required.

Provision of the IR ADC for the AO system - this is consistent with the goal of

continuing to upgrade the existing AO systems, and has previously been endorsed by the AOWG and SSC. The SSC supports this.

Are there risks to scientific priorities inherent in the proposed plan?

In the extremely cost constrained environment that we find ourselves, it is the SSC's view that the priorities are reflected in the plan.

We regret that there are not more resources available for infrastructure renewal, instrument performance monitoring, seeing improvements and many other fundamental efforts that are being deferred. We wish this were otherwise, but believe that the plan reflects the highest priority activities of the Observatory.

NGAO Conceptual Design Review

Armandroff reported that a review committee comprised of Ellerbroek, Fugate, Ghez, Hubin, Sanders, and Scoville recently assessed the NGAO project, with SSC members Brodie, Martin, Liu, Nelson, and Greene also present. The review committee strongly endorsed the team and the overall (aggressive) strategy to implement a system that would uniquely address important science questions and provide complementarity to other premiere next generation ground- and space-based astronomical facilities. The NGAO system was also seen as an important precursor for the TMT's first-light AO system (NFIRAOS) and a pathfinder for its second generation AO.

The SSC recommends that the NGAO team:

- accept our kudos and congratulations on the successful NGAO effort to date
- start planning detailed responses to points made in the review panel report. By June the SSC would like to see the schedule for delivering these responses.
- better engage scientists, probably in the integrated scientific and technical case for NGAO and its instrumentation suite, where they both care more and can contribute more relative to the NGAO system itself.
- facilitate connection of the technical trades to the science
- produce a plan for developing a reliable cost, including a cost floor below which the system achieved for the money spent is deemed not worth having on the Keck telescopes.
- identify the break points in major technology areas (e.g. tomography, laser power, wavefront error, realtime control, etc.) that make NGAO a major leap over existing capabilities (either at Keck or elsewhere), and where significant break points in cost might lie in the path toward the achieving the goals of NGAO

Further SSC discussion ensued and included the issue of how to achieve community buy-in on the cost/benefit trades of NGAO, which are likely to be complex. Further, how to

assess what the Keck community will be willing to pay for this system and to understand the hidden (lost) opportunity costs? The SSC needs to be involved in, if not leading the discussion of scientific trade spaces. While the NGAO team understands the various rss terms in the wavefront error, and has comparisons between the current KII AO system, the new KI AO system, and NGAO, this still needs better connection to the science. A similar situation pertains to the cooling vs sensitivity trades on the science.

As an action, the SSC co-chairs, directors, and WMKO management will formulate a plan for proceeding. A goal is to move NGAO ahead without having the NGAO team always under some delta-review.

Reports on Existing Instruments

The SSC is generally impressed with the level of support and commitment from the Observatory support astronomers in the past year. The annual instrument reports are quite helpful. It might be better to schedule these during one of the SSC meetings in Hawaii to allow for direct interaction. The SSC would like to extend a welcome to Scott Dahm, our new SA. There was discussion of new observer input pages, perhaps in a wiki format.

HIRES

A new Th/Ar lamp with better argon/neon balance was purchased (with assistance from Lick). The electronics vault was removed and the laser enclosure put in place, which required moving HIRES power and electronics cables.

Repairs were made on several mechanisms due to aging and failures. Little time was lost on sky.

The current HIRES issues are:

- gradients (<1%) in CCD bias levels.
- wavelength drift at 1-2 pixel level
- runaway software processes (recent tracking of problem)
- focus slowly relaxing to pre-earthquake values
- small degradation on red collimator
- documentation

Jason Prochaska volunteered to provide exposure time calculator and Th/Ar atlas.

LRIS

This was a good year for LRIS with smooth operation. Observer documentation was updated at end of last year. Software upgrades include a compass rose on the blue side and focus procedure scripts.

The ADC entered operation in 2007B and was very reliable with no nighttime faults. The ADC does not limit polarimetry mode - thanks to Bob G and Hien for testing.

There was one major problem this year - the I band filter broke inside the instrument, possibly cracked during the earthquake. The crew cleaned the instrument, repaired chips in edges of the other filters and taped the edges. Observers were queried on the replacement filter - ordered I-band similar to Pan-STARRS.

There is work on improving calibrations at 3000-4000 Ang: Fe/Ar and deuterium lamps were purchased and should be available this fall.

The team is upgrading the slitmask frames and pickoff mirrors with the goals of improving reliability and slitmask alignment efficiency. Engineering tests are scheduled in May-June.

KOA

The pre-upgrade (single CCD) HIRES data have been included in the KOA archive and will be released in April and June. The KOA team is also working on producing browse product spectra for those data which can be processed by makee. These will be available in August and will include quality assessments.

NIRSPEC

The new MAGIQ guider has been installed and is running every night. MAGIQ's capability to do image quality measurements will be tested on-sky in May. Sensitivity thus far has been good, e.g. R~19 mag star requires 1 sec integration.

There is a dead quadrant in the slit-viewing camera that impacts all spectroscopic modes. The origin is unknown, with the next opportunity for potential repair during Fall 2008.

Anomalously noisy columns (1 in 8) in the NIRSPEC detector has been reduced, thanks to assistance from Tom Greene. Past problems with ice on the dewar window appear to be under control in the past year.

OSIRIS

A March 2008 servicing mission installed new K-band filters with built-in pupils, designed to reduce the thermal background of the 100 mas plate scale. Engineering time is scheduled in June to assess on-sky performance.

There is now an online cookbook for target acquisition, which can be quite tricky.

Instrument support continues to benefit from a strong relationship with the UCLA team.

NIRC2

Differential tracking has been implemented with LGS AO, which is useful for solar system objects and for observing in vertical angle mode. A web page has been written to describe the different observing modes.

There is a proposed NIRC2 servicing mission, to install new filters (including a new L-band filter and Y-band) and to implement a polarimetric mode. This earliest possible time scale for this is FY10 (Oct 2009). AOWG will provide input and report to the SSC on this.

DEIMOS

This instrument continues to perform well. Instrument faults are relatively low, with the grating mechanism being the primary time loss (~40% of loss, mostly due to 1 major failure).

There have been some minor improvements, including installation of a science-grade imaging flat and a new reflective variable longslit mask. Future priorities are to restore normal operation of the grating (a significant task), creating a combined longslit+focusing slitmask, and a troublesome CCD noise problem. Replacement of the V-band filter is not currently a high priority.

ESI

A major servicing mission occurred in May 2007. This included a repair of the imaging flat stage, cleaning of internal components, and removal of reflective optics for recoating. The instrument is working well again.

The optics were recoated at UCO/Lick with the "Holy Grail" silver-on-aluminum process. This new coating has excellent reflectance (~97% from 0.4-1.0 microns) and decent longevity is expected.

ESI usage is modest, ~12 nights/semester for the last 1.5 years. Use in 2008-B is expected to slightly decline.

MAINLAND OBSERVING

Nine sites in California now have remove observing capabilities, with another few more planned. Remove observing is now used on ~1/3 of nights.

Keck Science Meeting and Keck Strategic Planning Retreat

The Keck Science Meeting is scheduled for September 18, 2008 at UCSC. This will be a one-day meeting. The 2-day retreat will be held after the Science meeting at a location and date to be determined soon. Likely venues are Half Moon Bay or Asilomar.

Seeing-limited Instrument White Papers

The SSC reviewed white paper proposals received in response to a call for Concept Studies of Seeing-Limited Instruments issued by the SSC and the Observatory in April 2008. Four teams were asked to submit Phase II proposals for an down select at the June SSC meeting. Funding for concept studies has been set aside by the Observatory and will be allocated to one or more proposers with a start date of October 1, 2008.

Agenda for SSC meeting, April 08

Location: Caltech 023 Robinson

30 April -

8:30 Gather

8:50 - Writing Assignments - Brodie, Soifer

9:00 Observatory Report - Executive Session - Armandroff, Lewis et al.

10:30 Break

10:45 Report on NGAO Conceptual Design Review - Armandroff, Brodie, Green, Liu
(First half hour open, rest executive)

12:15 Break to gather Lunch

12:30 Reports on Existing Instruments - Goodrich et al.

2:30 SSC Retreat status - Akeson & Prochaska

2:45 Keck Science meeting status - Brodie

3:00 Break

3:15 Instrument Concept Selection - Brodie et al. - Executive Session

4:45 Final discussion

1 May

8:00 Gather

8:30 - Review Writing Assignments

8:45 - Write

10:00 - Review Writing

11:30 - Exit