

Observatory Report

- Congratulations to all for the next TSIP award and for the successful MRI proposal for the laser launch telescope.
- Congratulations to the observatory on achieving first light and closing the loops with the new Keck I laser. The SSC hopes that the beam transfer problem can be resolved as rapidly as possible to put into service this powerful new capability.
- The Keck SSC recommends that, among the proposals known to us, that for a new Keck II laser be submitted for the April MRI.
- The SSC congratulates the Observatory for the great presentation on science metrics, and notes the outstandingly small amount of time lost to instrument faults during 2009, only ~2% overall, with NIRC2 at only 0.2%, HIRES and OSIRIS both below 1%, and LRIS slightly above 1%.

5yr Plan -- Strategic

- SSC agreed that 5 year plan is generally well aligned with strategic plan and the SSC strongly endorses it.
- Funding profile
 - The success of the Keck Scientific Strategic plan is dependent on future funding opportunities that in many cases are uncertain, in particular federal funding and private philanthropy. The SSC feels that the viability of the Strategic Plan and continued WMKO world leadership requires consideration of future funding options that are within our control, such as additional night exchanges and new partners
- NGAO
 - The NSF review comments on the MRI-R2 proposal(K-2 laser upgrade) and the strong publication record attest that Keck has an excellent reputation and maintains a world lead in LGSAO science and technology. The SSC is concerned this lead will be threatened by a failure to realize the NGAO project. Taft presented a number of options for consideration which fall between the following two extremes:
 - ✦ Realize NGAO: proceed full speed to June PDR and intensify all activity to finalize leadership gift.
 - ✦ Develop a less ambitious AO backup plan (~\$15M) for 2010-2020 for the Strategic Plan with a menu of upgrade options. This plan should emphasize maintaining Keck AO leadership in view of competition from other, better funded facilities.
 - In the interim, we should maintain NGAO readiness (successful completion of PDR) in anticipation of NAS Decadal Survey Report which could dramatically change the funding environment for large telescopes. In consultation with WMKO, the SSC should develop a backup AO plan in late 2010 for presentation to Board.

5yr Plan -- Strategic

- Instrumentation initiatives

- The SSC reiterated its view that competitive instrumentation is key to future vibrancy of Keck. The Five Year Plan shows 4 major instrumentation initiatives:

- ✦ KCWI: Now in Preliminary Design Phase

- ✦ NGAO: Now in Preliminary Design (PDR June 2010).

- ✦ NIRSPEC upgrade: Study upgrades for broad astrophysical applications.

- ✦ Multi-object optical spectroscopy: study options ranging from DEIMOS upgrade to ambitious new instruments

- Dedicated Exoplanet Radial Velocity Instrument: In light of potential NASA interest in an optical or NIR radial velocity spectrograph

- Progress in instrumentation requires continuing aggressive pursuit of TSIP proposals as well as taking advantage of other Federal opportunities, e.g. MRI, as well as private philanthropy. The SSC reiterated that new instruments concepts are encouraged from the Keck community, but plans for these should be coordinated through the SSC and the Observatory.

- Renewing infrastructure and maintaining adequate operations

- Aging and failing infrastructure threatens efficient science operations (cracks in mirror segments, obsolete telescope control hardware, HQ and summit facilities). The modest level of operations support compared to better funded facilities threatens Keck's position as world class facility. It is essential to maintain aggressive federal funding requests and consider new partnerships.

LRIS-R Repair

- Current status: 3 out of 4 amplifiers no longer have acceptable performance. Only 1 amplifier left working.
- Best guess is that the cause is related to thermal cycling. CCD is now powered during installations to stabilize the problem.
- We are concerned that the root cause has not been identified and could be systemic and recur in other devices.
- CCD replacements currently available:
 - “Orphan” LBL 4k x 2k CCDs in -hand: will be characterized by April 1, should have similar performance as the existing 4k x 4k CCDs.
 - Hamamatsu 2k x 4k: \$105K each, expected performance good
- Two repair options, both could be ready for 2011A.
 - (1) Make new LRIS-R dewar & deliver drop-in replacement to Keck:
~\$350K, ~1 month downtime, spare dewar available for future 4k x 4k
 - (2) Re-use existing LRIS-R dewar: ~\$250K, 1 semester of LRIS-R downtime
- The SSC strongly supports option (1).

MOSFIRE

- There has been good progress on this powerful, exciting new instrument. Cool Down #3 was successful, Cool Down #4 is now occurring, and Cool Down #5 is being planned.
- Flexure control system, pupil mechanism, grating turret mechanism, and CSU all operated properly in 17 different gravity orientations.
- The only new problem was that one masking bar in the CSU (# 75) had a clutch problem when cold and would not move.
- The CSU was tested extensively after warm-up; testing in Cool Down #4 is occurring. Repair will be done before Cool Down #5.
- Science flat mirrors were inspected just before the holidays, but silver coatings had degraded! The mirrors were rushed back to the vendor, stripped, recoated, and received back in early Jan.

Instrument Reports

- The SSC thanks the Observatory staff for their excellent review of the instrument readiness, improvements, and plans for upgrade and fixes.
- We commend their initiation of an intensive PM program and encourage its further development and integration within operations.
- The following slides summarize the primary activities for each instrument.

Instrument Reports

Instrument	SA	Improvement or Repair / Minor Issue / Major Issue Future Improvements
ESI	Greg Wirth	MAGIQ S/W now on ESI; IFU (throughput is 50%) R~15,000 mode with new grating??
DEIMOS	Greg Wirth	Grating tilt unrepeatability. Slit mask debris. Replace rotator control host; Upgrade instrument control host.
Slit mask mill	Greg Wirth	Slit mask 1% errors fixed w/ new tool for more accurate depth calibration, new spindle, flat table
NIRSPEC	Jim Lyke	Extended AO capability (Replace Br-gam filter with AO stop, access to KL, M-wide filters behind AO) SCAM reading all 4 quadrants; NIRSPEC server crashes diagnosed and are being mitigated

Instrument Reports

Instrument	SA	Improvement or Repair / Minor Issue / Major Issue Future Minor Improvements / Future Major Improvements
OSIRIS	Jim Lyke	<p>4th service to fix cooling issue/thermal leak successful; Fixed image scale instability Move to KI (TBD) late 2010B DRP v2.3 coming (wavelength vs. T, New AO dichroic) New grating? (measured efficiency ~30% could get ~60%): now Larkin found that one manufacturer is still available. Electronics upgrades: OSIRIS read noise = 10 e- (limits between OH lines) S/N improve of 2-6 for grating + detector improvements.</p>
NIRC2	Al Conrad	<p>Throughput monitoring. Service mission: Add new Y, L-wide, polarizer filters. LGSAO differential tracking mode (e.g., solar system objects) near guide stars (~17-18 m).</p>

Instrument Reports

Instrument	SA	Improvement or Repair / Minor Issue / Major Issue Future Minor Improvements / Future Major Improvements
HIRES	Scott Dahn	<p>FTS scans of iodine cell completed (R~500,000-1,000,000 scan)</p> <p>Utility board problem fixed; shutter replaced twice; Guider electronics replaced;</p> <p>Bias jumps associated with CCD cooling fan. (Fans on 100%)</p> <p>Exoplanet slit guiding algorithm</p> <p>MAGIQ camera upgrade; HIRES fiber scrambler.</p>
LRIS	Marc Kassis	<p>MAGIQ offset guider commissioned, started image quality testing;</p> <p>Red upgrade completed</p> <p>Blue side data slightly noisier</p> <p>LRISr upgraded camera now exhibits unacceptable noise and low CTE in 3/4 channels; Correlated with power cycling (thermal).</p> <p>Short-term fix: Continuous power mode, software modifications for 1 amp readout. Stable for a few months but concern for long-term viability.</p> <p>Long-term fix: Repair with new 2x4 detectors.</p> <p>New LRIS calibration lamps, DEIMOS style alignment</p>

Instrument Reports

Instrument	SA	Improvement or Repair / Minor Issue / Major Issue Future Minor Improvements / Future Major Improvements
NIRC	Marc Kassis	Not scheduled for 2010B
Interferometer	Sam Ragland	<p>ASTRA self-referencing phase (SPR) mode -- R~1700 in K-band; ASTRA dual-field phase referencing (DFPR) in shared-risk -- push to K~12 sensitivity; range of other advances</p> <p>Complete DFPR subsystems</p> <p>Development and testing of ASTRA astrometry</p>
AO	Randy Campbell	<p>Leaner operating model (1 spotter, reduced SA hours); reduced 'keep out cone' from 0.5 to 0.1deg;</p> <p>AO and laser faults; AO enclosure temperature 7-10 degrees too warm</p> <p>Improve laser pointing; Better policy toward laser collisions</p> <p>Improve AO observing efficiency (estimated savings of 1hr per NIRC2 night)</p>

Instrument Reports

Instrument	SA	Improvement or Repair / Minor Issue / Major Issue Future Improvements
KOA	Hien Tran	<p>Extracted (level 1) legacy HIRES data; NIRSPEC data release agreement signed; simplified user interface</p> <p>Visualization tool for extracted spectra</p> <p>Extracted spectra for NIRSPEC (probably MAKEE)</p>
Mainland Observing	Greg Wirth	<p>Mainland only is ~10%.</p> <p>Mainland-only expanded to Caltech#2 and eavesdrop to Swinburne University of Technology (SUT)</p> <p>Expand eavesdrop to Yale (maybe NOAO)</p>
Instrument PM Project	Grant Hill	<p>Database of PMs created and ingesting; web-based GUIs written and being used; scripting particular tasks; have already identified and address problems</p>
Instrument throughput	Bob Goodrich	<p>Using existing data when possible; develop and encourage use of throughput GUI (DEIMOS)</p> <p>Expand GUIs to LRIS; write scripts for HIRES</p> <p>Integrate into IPM</p>