University of California Observatories Advisory Committee (UCOAC)

Minutes of the 18 April 2008 meeting

CfAO Conference Room, UC Santa Cruz

Present: Mike Bolte (UCO Director), Alex Filippenko (Chair), Claire Max, David Tytler, Gary Chanan, Rem Stone, Tomasso Treu, Lori Lubin, Burt Jones, Jerry Nelson, Geoff Marcy, Maureen Mclean, Jacky Leighton, Connie Rockosi (part of the meeting).

Attending by phone: Ian Mclean, Mike Rich.

Committee members not attending:
Jean Brodie, Gabriela Canalizo, James Graham, Raja Guhathakurta

I. **Lick Observatory (Mt. Hamilton) News**

Bolte:
3-meter Shane telescope news:

1. First 3-m "large program" underway (Aaron Barth, PI), with a solicitation for others.
2. KAST blue-side CCD failed; temporarily replaced with the CCD in the Nickel telescope spectrograph. New device has been purchased.
3. Kast upgrades continuing.
4. Remodeled 3-m library done, 3-m kitchen work delayed. Fireplace is only an electric heater; does not affect dome seeing.
5. Bandwidth issues: 4.0 Mb/sec now, with plans for 10 Mb/s or more for remote work, perhaps with microwave link to Ames. Need expanded bandwidth for running 1m and 3m remotely on the same nights.

Tytler:

1. We need a way for remote observers to phone Lick and reach a technical person; better communication overall is desired.
2. Need an instrument status method, either webcam in dome or web page.

Bolte:
Nickel news:

1. Nickel being used by undergraduates and graduate students in classes, with oversight of Marcy (UCB, last semester) and Crystal Martin (UCSB, next semester).
2. Marcy's class achieved 2 millimag differential precision, yielding PASP paper on an exoplanet transit.

3. Want to test and refurbish the Nickel spectrograph for modest student research and education.
4. Villages: first MEMS-based, open-loop adaptive optics (AO) system. Got Strehl of 0.2 in the I band! A press release is needed. This portends a new domain of high-resolution imaging, with UC leading the world.

Automatic Planet Finder (APF):

1. Mirror polishing completed (ROC), shipped to Tucson in Feb.
2. Current schedule has testing in Tucson through Sep., delivery to Lick in Oct. 2008
3. $600k gift in July 2007 from Ken and Gloria Levy for the "Levy Spectrometer" designed by S. Vogt.
4. Bolte will talk to president of U.S. EOST, but concerns remain about EOS continued delays and responsiveness.
5. Spectrometer designed by Vogt and being built in UCO is near completion.

Davidson Fund for graduate students:

1. Funds graduate student research trips to Mt. Hamilton. Interest currently yields $17K per year, but underused!
2. Currently there is a surplus of $100k. UCO will inform campuses that graduate students, and perhaps undergraduates, can request funds for room, board, and transportation to Lick Observatory. Keck is not an appropriate use.
3. Nickel telescope applications already have, and Shane applications will have, an explicit solicitation of request for Davidson support for graduate students. All UC students can apply for this.

Future of Lick Observatory:

1. Remote access being implemented for the Shane telescope (already common on the Nickel telescope).
2. Renovation of Kast and Hamilton spectrographs continues, especially for remote operation.
3. Lick Observatory Advisory Group's recent recommendations:

- Enhanced education and public outreach (EPO).
- Better utilization of AO: need better AO and better instruments for AO. AO is useful niche for Mt. Hamilton:
  - Near-IR where San Jose lights don't matter,
  - 3-m aperture gives good resolution.

  Foundation funding for Lick AO is being sought.
- Near-IR and/or high-resolution observations.
- Larger role in undergraduate and graduate education.
- Lick Observatory remains a good fund-raising venue;

bring potential donors.

4. Lick Observatory development discussions are ongoing with a private equity firm; they have expressed interest in helping. Bolte talked to them in early April 2008.) There are three parts to the proposal:
   a) Enhanced Public Outreach
      - Perhaps funding an Associate Director of Public Outreach.
      - Updated/improved exhibits.
      - Partnerships with Bay area science museums.
      - More public events.
   b) 36-inch dome safety modification.
   c) In-depth Mt. Hamilton infrastructure survey/upgrades.

II. UC Santa Cruz News

1. Hired Rebecca Bernstein as UCO faculty member.
2. Joe Miller is Vice Provsot for Silicon Valley Initiative.
3. Developed new coating capabilities:
   - Transmission: spin coat saphire, sol-gel; sol-gel/MgF2 gives ~99% transmission over 300-1000 nm range.
   - Reflection: New secondary coating 98%-99%, 400-1000 nm. Enormous potential improvement in instruments.
4. Lick AO Center transitioning from Moore money to UCO-supported facility.

III. Keck News

1. During the past 3 years, UC Berkeley's number of nights has been decreasing, while UCLA's has been increasing.
2. With several recent faculty hires, UCI and UCSD may increase usage of Keck.
3. K1 vs K2: In Semester 2008B, surprisingly, K1 is more oversubscribed than K2, perhaps due to previous statements that K2 time is so difficult to get.
4. NASA has requested to trade K2 time for K1 bright time (that NASA prefers). Bolte told them that UCO will sign up for 1 year, and see what happens. Others suggested that this was a good trade, and we could offer 3 years. But with K1 usage increasing, the AO laser guide star going on K1, and OSIRIS moving to K1 in 2010, it is difficult to know whether UC should trade, long term, some K1 for K2 time.

5. LRIS-R upgrade:
- New 2k x 4k CCD from LBL.
- Great QE, and no fringing in the range 700-1000 nm.
- Current schedule has commissioning in Feb. 2009.
- Concerns:
  Finicky CCDs: Connie Rockosi says these CCDs are highly sensitive to operating parameters (voltages, temperature, etc.).
  The thick substrate is sensitive to cosmic rays.
  UCO is accepting contingency risk on these chips that R. Stover is nurturing.
  Flexure vectors remain poorly known for LRIS-R.

6. MOSFIRE: Under construction.
- Multi-slit version of DEWIMOS. Near-IR, 6.1' x 6.1' field.
- Leaders: Ian McLean, Chuck Steidel, with other roles: K. Matthews, H. Epps, J. Larkin.
- Epps camera.
- Detectors are in.
- Rotator (UCO) done.
- $12.5M cost.
- Caltech/UCLA/UCO collaboration: A multi-campus instrument going well.
- Half funds from TSIP and half from Gordon and Betty Moore.
- Commissioning: April 2010.

7. Keck Segments:
- There are cracks in radial, axial, and sensor pads.
- Jerry Nelson and others are losing sleep trying to figure out.
- Dennis McBride is working on diagnostics and solutions.
- Adhesive companies are working on this.
- But, no repair will happen until external review.
- Replacement of segments (i.e., aluminization) is being held up, while we struggle to understand the problems.

8. K1 Laser Guide Star Project:
- K1 laser will be launched from behind the secondary, not beside the telescope.
- Cost: $2.1M.
- Better laser (20W, solid state).
- Give Keck two LGS systems instead of one on K2.
- Milestones:
  a) Beam transfer system (4/08).
  b) Detailed Design Review (5/08).
  c) Launch telescope delivery (5/08).
  d) Lockheed Martin Coherent Technologies (LMCT) Laser Delivery (optimistically scheduled for Oct. 2008).

9. OSIRIS move to K1:

Current schedule has instrument relocating in Semester 2010A.

10. MAGIQ: Multi-function acquisition and guiding imaging systems.
 - Next-generation guiders.
 - Improvements: photometric monitoring, more sensitive, autofocus, wavefront sensing.
 - $1.6M cost for first one; $100k per guider.
 - Beta testing on NIRSPEC for the last 6 months, and some on LRIS as well.
 - LRIS is next, when upgrade happens in Feb. 2009.
11. Next Generation AO:
 - Tomographic MEMS-based system using multiple laser guide stars.
 - Effort to identify science-based requirements.
 - 200-page report to Keck SSC in June 2006.
 - Keck/UCSC/CIT 18-month effort funded and underway.
 - TSIP proposal funded November 2007.
 - $3M spent on design.
 - Total cost expected to be $55M for NGAO system + new instruments (cannot be used by OSIRIS).
 - 2/3 of this cost needs to be raised through foundations and private funds, yet to be identified.
 - Upshot: NGAO would give major improvement in Strehl ratio in the range 500-3000 nm, and continue a unique technological lead vs. VLT and HST. But, cost of ~$50M will be a major hurdle. Potential donors are being sought for this world-class AO instrument. An Advancement Council is being established.
12. Challenges at Keck:
 - Finding unique niches relative to other 8-10 m telescopes.
 - Positioning Keck in ELT era.
 - Identifying funds for developing new capabilities.
 - Operating funds are barely sufficient; currently engaging actively the SSC and Keck community to find more funds.
13. Tytler comments on Keck: He is experiencing a diversity of expertise among the observing assistants at Keck. There needs to be a better feedback mechanism for instrument problems. Others suggested that Barbara Schaefer and Bob Goodrich must be told about such problems. Marcy suggested that Keck routinely prompt every observer after their run about problems to actively solicit their end-of-run report.
14. Data reduction and archiving: Brad Holden at UC Santa Cruz will be initiating a program to make pipeline data reduction packages available on computers at UC Santa Cruz for Lick or Keck data reduction.
15. George Blumenthal is a new member of CARA board, representing UC. Henry Yang (UC Santa Barbara) visited Keck twice this year.

IV. TMT Issues

1. AURA withdrew from the project in January 2007.
2. Moore Foundation gift of $15M in July 2007 to complete Detailed Design Phase (DDP).
3. Moore Foundation pledge of $200M in October 2007 with condition that UC and Caltech raise an additional $50M each by 2010.
4. TMT presentation made to AURA Decadal Survey Advisement Committee.
5. Meetings held with ESO Director General and E-ELT committee. ESO has large funding streams. Diameter 42 m, with 1.46-m segments, but telescope design is very different from TMT. They will use next-generation AO. All work being done with industrial partnerships. Start in 4 years, with stable funding wedge. Talks are proceeding between TMT and E-ELT, but no marriage.
6. Business plan of TMT is complicated, with $1B construction and $1B operating costs over 20 years.
7. NSF is likely/desirable source of operating costs.
8. Possible Japan partnership in TMT.
9. TMT Technical Updates:
   - Segment blanks produced, with fabrication vendors explored.
   - System engineering is proceeding.
   - M2/M3 contracts are out to industry.
   - TMT AO system NFIRAOS (at HIA).
   - Actuators/segment support/APS engineering proceeding.
10. TMT Instrumentation:
    a) WFOS: UCSC designated lead institution.
       - Rebecca Bernstein (PI) is working on an improved WFOS design.
       - Higher resolution mode, more feasible, smaller volume, larger wavelength coverage per exposure.
       - Highest spectral resolution in science requirement is R = 5000, and R = 7500 with a narrower slit.
       - Complete feasibility study by August 2008, conceptual design by August 2009.
       - Science team being assembled, Chuck Steidel lead.
       - Need bigger shop space to build WFOS, or upgrade shops at UCSC.
    b) IRIS: UCLA lead institution.
       - James Larkin (PI).
       - IFU spectroscopy.

- Significant Caltech and UCSC roles.

c) "MOSFIRE" for TMT on the backburner.

11. TMT Site options and site testing
- 5 options, not publicly available.
- Sites include locations on Mauna Kea, San Pedro Martir (Mexico), and Chile.
- There are renewed efforts to put TMT on Mauna Kea, with associated political advantages.
- Univ. Hawaii, Hilo now controls Mauna Kea.
- In the year 2033, Mauna Kea Reserve Lease is up. If not renewed, all telescopes must be removed.

12. UC fundraising for TMT
- Need $50M from UC to match the Moore $200M requirement.
- Chancellors set priority.
- Bolte is constructing a plan to raise $50M.

13. TMT concerns:
- Partnership remain incomplete.
- Telescope/dome engineering behind schedule.
- Management/design balance.
- Instruments underfunded.
- Site not known.
- Delays are expensive with marching army and escalation costs.
- UC share not clear. If not at least 15% should we pull out?
- Fundraising challenges are large.

V. SASIR: New, proposed "Synoptic All-Sky IR" Imaging Survey (essentially a next-generation 2MASS)

1. Ambitious 6.5-m telescope with time-domain component.
2. Being led by Josh Bloom, with Jason Prochaska and Enrico Ramirez-Ruiz.
3. Possible site: San Pedro Martir
4. 2MASS was 1.3-m telescope with big pixels (crowded in the Galactic plane). Bloom's idea: do it again, with a bigger telescope, and add the time domain in JHK.
5. Design work underway.
- Preparing proposals for design studies in Mexico and US.
- Telescope might be 6.5-m clone of Magellan.
6. Science drivers:
- Exciting survey, deeper than 2MASS, with wide benefits.
- Time domain.
- Very capable modern facility at new site.
- Potentially a completely new private funding circle.

VI. Changes at UC Office of the President (UCOP)

1. Steve Beckwith is the new Senior Vice Chancellor for Research. Bolte had a long discussion with him regarding Lick, Keck, and the TMT. He has visited several UC campuses and will be making additional visits.
2. Mark Yudof will begin in June as the new UC President.
3. There will be significant reorganization in UCOP.
4. The UC budget is not in good shape. Overall, there is likely to be a 4% cut, but for research the cut may be 10%.

VII. Adjunct professor access to Lick and Keck (Filippenko)

Questions have recently come up regarding adjunct faculty at UCSB.

- UCOAC members decided that such faculty are welcome to apply for time at the Lick 3-m and 1-m telescopes as PIs.
- Adjunct faculty are not eligible to apply for Keck time as PIs.

VIII. Additional issues (Mike Rich)

1. Keck archive: would be nice to have. Bolte said this is being considered, at least for HIRES, but no clear conclusions yet.
2. VSQ: Sometimes very full, and sleeping conditions at nearby hotels are imperfect.

- PIs should have priority at VSQ when space is tight.
- Perhaps limit VSQ to 2 people per team when space is tight.
- If nights are shared, second-half observers should get priority.
- Bolte will suggest these things to Taft Armandroff.

3. Time Allocation Commitees should be rotated. Bolte said this is already being done.