NOAO Users Committee
2012 Report
Draft 18 July 2012

The Users Committee (UC) of the National Optical Astronomy Observatory (NOAO) held its annual meeting at NOAO in Tucson on June 5-7, 2012. The UC was asked by NOAO Director Dave Silva to comment on the following:

1. Whether NOAO is pursuing the right balance of activities at present and in its long-range plans given fiscal constraints;
2. NOAO's plans to engage the community in using the Dark Energy Camera at CTIO;
3. The on-going infrastructure and science capability modernization programs at KPNO and CTIO, including the ReSTAR program;
4. The plans for development of BigBOSS on the Mayall;
5. How to improve US observers' use of the Gemini telescopes, including future instrumentation, classical observing, the proposal process, data reduction, and the possibility of a unified TAC across the partnership;
6. The NOAO survey program and all aspects of its effectiveness, execution, and evolution, including whether the 20% target fraction of survey time should be increased, survey time on the Blanco during the Dark Energy Survey observing seasons, surveys on Gemini, and the future balance between surveys and PI time on the NOAO 4-meter telescopes.

The UC does not consider its discussions restricted to the specific items of its charge but felt that the first item was sufficiently broad that any additional aspects of NOAO operations of concern to its user community could be commented on therein.

During the past year, the UC expanded from eight to eleven members in response to the elimination of the U.S. Gemini Science Advisory Committee and the incorporation of that committee's responsibilities under the UC. Nine out of the eleven committee members were present for the meeting: Katelyn Allers (Bucknell), Marla Geha (Yale), Anthony Gonzalez (U. Florida), Kevin Luhman (Penn State), Ginny McSwain (Lehigh), Casey Papovich (Texas A&M), Armin Rest (STScI), Adam Stanford (UC Davis), and Eric Gawiser (Rutgers, Chair), with Rebecca Bernstein (UC Santa Cruz) and Jennifer Lotz (STScI) attending via a remote connection. In preparation for the meeting, UC members read key documents relevant to the charge and discussed related issues with colleagues at conferences, in university departments, and by telephone and email via direct "cold calls" to NOAO users. We also used our Facebook group to solicit feedback from users.

During the two-day meeting, NOAO staff members gave the UC presentations on various aspects of the NOAO System including updates on the status of CTIO, KPNO, and the implementation of modernization efforts, as well as the updates on the progress towards a unified "System" and NOAO's involvement with DECam, BigBOSS

and LSST. We greatly appreciate the effort that went into preparing those presentations, updating us on the status of NOAO programs, and engaging in frank discussion with us about the status and future of NOAO.

Our report follows and is split into sections according to the items in the charge.

1 Overall Balance

The UC considers the current balance of activities at NOAO appropriate given the current environment of constrained resources. The blend of emphasis on community access to the OIR system, software and data management infrastructure, and participation in development of new major facilities is well-considered.

Time swaps, such as the recently initiated exchange with the Anglo-Australian Telescope (AAT), are viewed as a favorable approach to enabling community access to a broad instrument suite in a challenging fiscal climate. We particularly encourage exploring possibilities that enable near-IR spectroscopy in the northern hemisphere on 4-m class telescopes if that capability is lost at KPNO.

The UC applauds recent efforts by NOAO to increase the availability of remote observing for the NOAO community with WIYN and SOAR, and we encourage future efforts to expand remote and service observing. Remote observing is viewed as particularly important for PIs in an era where grant funding has become increasingly competitive.

The use of smaller telescopes as testbed facilities for new capabilities in the form of visitor instruments is viewed as an important capability enabled by NOAO.

We were asked to comment upon priorities for future development in the event that additional resources become available; however, the committee felt that it would be premature to offer specific suggestions for this pending the outcome of the ongoing NSF AST Portfolio Review.

Recommendation 1.1
We recommend that NOAO maintain its balance of current activities, preserving its core missions to the greatest degree possible given budgetary constraints.

Recommendation 1.2
The UC recommends pursuing additional time swap agreements at all aperture sizes to further broaden the scientific capabilities available to the community, which is also a specific recommendation from the ALTAIR report. The extent of such time swaps, once established, can be re-evaluated and adjusted based upon proposal pressure for each facility.

Recommendation 1.3
We encourage NOAO to expand remote and service observing access.

Recommendation 1.4
We encourage continued access within the O/IR system for visitor instruments, recognizing that limited resources require that such instruments cannot demand a significant investment of NOAO support.

2 Community Use of the Dark Energy Camera (DECam)

The strong response to the call for Science Verification proposals on DECam on the CTIO 4-m shows that the U.S. community is engaged in this instrument. This implies that NOAO outreach efforts including the recent DECam community science workshop have been successful, but such efforts should continue. Having the DECam Community Pipeline available at the beginning of science operations is critical to the successful community use of DECam. The upcoming availability of DECam has prompted the consideration of assigning blocks of telescope time in smaller quanta than 1 night (e.g. 1/2 nights or even 1 hour blocks).

Recommendation 2.1
Further outreach to describe DECam capabilities and challenges is needed.

Recommendation 2.2
We encourage NOAO to maintain its pro-active role in developing the DECam Community Pipeline, providing technical assistance as needed and delaying acceptance of the instrument if necessary.

Recommendation 2.3
We strongly encourage NOAO to provide good documentation as part of the DECam Community Pipeline so that users will know what processing has been applied to go from raw to reduced data.

Recommendation 2.4
We encourage NOAO to explore a mechanism for assigning access to DECam in fractional nights.

3 Modernization at KPNO and CTIO

3a ReSTAR

Progress on ReSTAR Phase 1 represents a successful dialogue with the NOAO user community. The ReSTAR Committee found that the top two priorities of the

community for 2-5 meter telescopes should be wide-field, broad-band optical imaging and moderate resolution optical spectroscopy. The UC is pleased to see that these recommendations have been addressed and that several new and upgraded instruments are either completed or well on track to be completed in the next year. The biggest delay for CTIO 4-m instruments will likely be the repair of the f/8 secondary. NOAO users have expressed satisfaction with the new instrumentation that has and will come online over the next 1-3 years.

ReSTAR Phase 2 was intended to address the ReSTAR Committee's recommendations for time-domain studies, broader optical and infrared instrumental access for both hemispheres, and more 4-m access for the community. The Phase 2 proposal has been put on hold pending the AST Portfolio Review.

Recommendation 3.1
The UC recommends that NOAO revisit the priorities for ReSTAR Phase 2 after the NSF has completed the Portfolio Review implementation plan to ensure that NOAO priorities are consistent with available resources and community needs.

3b The partial One Degree Imager (pODI)

Progress in pODI since the project was revamped one year ago has been significant, and the UC commends NOAO for keeping the project on track. Local guiding mode remains technically challenging, and amplifier glow is a significant concern. NOAO plans to use the commissioning and initial operations of pODI to evaluate/improve OT chip performance and to solve the remaining technical obstacles before completing the full one-degree focal plane in the future if and when more resources become available.

Recommendation 3.2
The UC supports NOAO's current plans for commissioning and operation of pODI.

3c SOAR Adaptive Optics Module (SAM)

SAM is making excellent progress. The natural guide star (NGS) mode commissioning is complete, and laser guide star (LGS) mode is expected to be commissioned by the end of 2012B. The UC is pleased to see that the LGS mode should soon be available to observers.

3d Data Management Infrastructure

The infrastructure for data reduction and management is a high priority for the UC. The UC is pleased to see that IRAF v2.16 was recently released with improved capabilities for processing large mosaic images and interactivity with the Virtual Observatory. As the new suite of instruments come online, data reduction cookbooks and/or fully documented pipelines are essential to the future science impact of the System.

Recommendation 3.3
NOAO should provide documentation on the existing MOSAIC and NEWFIRM pipelines for the community.

4 BigBOSS

BigBOSS has been selected as a large scale program to be implemented at the Mayall 4-m at KPNO. The UC sees the potential for high impact community science with BigBOSS and is encouraged by on-going communication between NOAO and the BigBOSS team. Continuing communication between NOAO and BigBOSS is vital to optimizing community use of this instrument.

Recommendation 4.1
We recommend that an NOAO or other outside scientist be included as an observer on BigBOSS instrument design and review committees in advance of a signed MOU. This person should attempt to ensure that BigBOSS plans are compatible with community science interests.

Recommendation 4.2
The UC supports the creation of a BigBOSS Community Science Definition team. This team should include individuals with a wide range of scientific interests. We recommend that this group draft a community requirements document well in advance of a MOU.

5 Gemini

The coming increase in the US partner share of Gemini will provide a benefit for US astronomy. However, the UC recognizes that continued improvement towards a healthy, productive working relationship between NOAO and Gemini is necessary to maximize this opportunity, and to meet the needs of the US astronomical community. With the arrival of a new Gemini director, it would be reasonable to expect the Gemini instrumentation effort to evolve as well. To maximize the benefit for US astronomers with the increased partner share and to make Gemini instrumentation competitive, the lines of communication between NOAO and Gemini need to be as open as possible.

The UC is pleased with the increase in the number of publications and scientific impact based on Gemini data. Gemini remains a competitive facility, providing a significant amount of large-aperture telescope open access to the US community. The UC believes that the avenues discussed in the following subsections can further improve the impact of Gemini.

5a Current Instrumentation

A top recommendation for Gemini from the ALTAIR report was to provide an instrumentation suite that is either aligned with the needs of the US community or unique in capability to promote time-trades on other large-aperture telescopes. Instruments of this kind are currently under development (e.g., FLAMINGOS-2, GPI) that have unique capabilities within the international community, and they should be successfully commissioned as soon as possible. In particular, the lack of near-IR (1-2.5 micron) spectroscopic instrumentation at Gemini South is a serious limitation to its impact. GMOS remains the most productive instrument on Gemini based on oversubscription and science impact, and completion of the planned upgrades to its detectors should be given a high priority.

Recommendation 5.1

The UC recommends that NOAO press Gemini to complete the effort to modernize current instruments and to increase the number of commissioned instruments with competitive capabilities (e.g., FLAMINGOS-2, GPI), particularly at Gemini South, as rapidly as possible.

Recommendation 5.2

The UC recommends that NOAO pursue time trades between the Gemini telescopes and other large-aperture telescopes to provide US community astronomers access to a fuller range of observational capabilities.

5b Future Instrumentation

The ALTAIR report sets the instrument priorities for the needs of US astronomers. Gemini instrument selection should follow the recommendations of ALTAIR, allowing for the needs of the astronomical community to evolve. The newest instrument concept for a high-resolution optical spectrograph satisfies this criterion. Another instrument concept that follows these recommendations, and is in high demand based on U.S. community surveys, is a medium resolution slit-fed spectrograph spanning a combination of the optical and the near-IR, possibly with simultaneous coverage if technically and operationally feasible.

Recommendation 5.3

The UC recommends that NOAO work to ensure that the selection of new instruments for Gemini be based on the capabilities that are in high demand within the US community, as described in the ALTAIR report.

5c Data Reduction

Given their nature, the current suite of Gemini instruments produce complex data products, and they require a steep learning curve for a large fraction of US astronomers. A clear way to improve the scientific impact of Gemini observations is to provide to the community enhanced data tools (based on IRAF or other platforms) including documentation, including cookbooks with specific examples of reducing observations of common types of data from Gemini instruments. Another

improvement would be for NOAO to manage an online forum (FAQs, bulletin board, and/or wiki) where users are able to post questions about their processing of Gemini data with solutions to be posted by NOAO staff, Gemini staff, and the community of Gemini users.

Recommendation 5.4
The UC recommends that NOAO manage the development of data tools with documentation, and to manage online fora (FAQs, bulletin boards, wikis) to facilitate the reduction of data from Gemini instruments.

5d Observer "Eavesdropping"

The UC favors offering Gemini users the capability to "eavesdrop" remotely during the observations for investigator programs. This would improve contact between investigators and their data, which the UC believes will also improve science impact and publications. However, to take advantage of "eavesdropping", there must be a mechanism for Gemini users to view their data in nearly real time and to make adjustments to their program. Another option may be to develop modes of "remote classical observing", where Gemini users "observe" from either their home institution or from centers situated in different parts of the U.S. In addition, efforts should be made by NOAO and Gemini to inform observers immediately when their data are taken and available on the Gemini Archive (e.g., the data are available through the archive within minutes typically, but users are not normally notified until weeks later when data packages are constructed.)

Recommendation 5.5
The UC recommends that efforts to provide remote "eavesdropping" and remote classical observing should continue. The UC also recommends that NOAO and Gemini study how users could make rapid changes to programs to maximize the efficiency of Gemini observations.

5e Classical vs. Queue Observing

The UC feels that the current balance between classical and queue observing at Gemini among U.S. observers is reasonable, and that the balance should be mostly determined by user demand. The UC feels that NOAO should better advertise to the community the funding support available for classical observers on Gemini (although the UC acknowledges that NOAO has advertised this in the newsletter, call for proposals, and on webpages). The phase 1 and 2 proposal processes have continued to improve, particularly in terms of the selection of example programs in phase 2. The UC has suggestions to improve data reduction tools for the US Gemini community; those are described above.

5f A Unified Gemini TAC?

The UC does not see a clear benefit to the U.S. community from the establishment of a unified TAC across the Gemini partnership. Indeed, the UC finds that the US

community is generally pleased with the time allocation process on the Gemini telescopes and expects that the US community prefers to have a single US TAC to review the scientific merit of Gemini proposals along with other proposals on NOAO-operated telescopes to maintain scientific balance. This balance would be lost with a unified Gemini TAC.

Recommendation 5.6
The UC does not recommend that NOAO pursue a unified TAC across the partnership.

6 Surveys

It appears that the NOAO PI surveys have, on average, had high scientific impact, and the UC acknowledges that in the future surveys on all scales will play an important role in astronomy. Upcoming large surveys like the Dark Energy Survey (DES) and BigBOSS fill an important niche and enable the continued competitiveness of 4-m telescopes. In some cases the scientific impact of these surveys will be significantly enhanced by available follow-up time. Historically, the 4-m telescopes have been the workhorses for such follow-up, and have provided critical resources for the majority of the US community. In the near term, DES will use a significant amount of Blanco time in the B semesters. DES effectively increases the total time dedicated to surveys on the Blanco and reduces the amount of time available for standard observing programs. Therefore the UC feels that it is important to preserve a large fraction of the remaining 4-m time for standard (non-survey) PI programs.

Surveys on Gemini allow community access for unique scientific inquiries utilizing a larger aperture. There have been some issues regarding the completion and queue scheduling for Gemini survey programs. The UC thinks that these problems are solvable, e.g., by encouraging the proposers to ask for classical time or median observing conditions, and/or by enhanced feedback from the technical staff to the observer during the proposal process about the technical feasibility and schedulability of the programs.

Recommendation 6.1
We recommend that the PI survey fraction be kept at its present target of roughly 20% of the total time available to the community.

Recommendation 6.2
We recommend that surveys be allowed in the B semester on the Blanco. However, it should be made clear to the TAC and the proposers that any Blanco survey time proposed for the B semester needs to pass a high scientific bar due to the limited time available.

Recommendation 6.3
The UC recommends that PI proposals continue to be solicited for Gemini survey programs. NOAO should look into solutions to technical issues related to queue scheduling of survey programs.