

2005 Users Committee Report

The National Optical Astronomical Observatories (NOAO) Users Committee met in Tucson, Arizona on 4-5 Oct 2005 to provide NOAO with feedback and advice on all aspects of NOAO operations that impact the observatories' facilities, services, and users with a specific focus on current and short-term priorities and activities. Specific topics the committee were asked to address included the performance of the NOAO Gemini Science Center, the strengths and weaknesses of CTIO and KPNO facilities in the context of the larger system of US telescopes, and the progress and plans of programs including the Dark Energy Camera.

Committee members in attendance included Timothy Beers (Michigan State University), Arlin Crotts (Columbia University), James Lowenthal (Smith College), Angela Speck (University of Missouri), Nicole Vogt (New Mexico State University), David Turnshek (University of Pittsburgh) and Steven Majewski (University of Virginia). The meeting was chaired by Robin Ciardullo (Penn State University).

Before addressing the specific issues mentioned in the committee charge, we first discuss some overarching concerns about the nature of the Users Committee, and its role in providing advice to NOAO.

1. User Committee Issues

At its heart, the charge of the Users Committee is to represent the the opinions of the general US astronomical community. Unfortunately, feedback from the community to the Users Committee is (and always has been) almost non-existent. Although NOAO has very recently placed an e-mail link to the Users Committee on its home page, the location of this link, along with the lack of publicity advertizing it, makes its use unlikely. The lack of feedback from the community makes the Users Committee's task extremely difficult.

Recommendation 1.1:

The Users Committee recommends that the members of the Committee be rotated o_ more frequently than they have been: some of its present members have served for six years! By enforcing a 3-year term limit, NOAO NOAO can increase the community representation on the committee and involve more people in the decision making process.

Recommendation 1.2:

The Users Committee (and NOAO) needs as much information as possible from the users themselves in order to address how well their needs are being met by NOAO. Many (most?) members of the community do not know that the Committee exists. Moreover, as NOAO users become more involved in TSIP observations and archival data mining, some traditional methods of feedback (such having the users fill out end-of run report forms), will be insufficient. NOAO has to be pro-active in obtaining feedback at various stages along the application, data collection and data analysis process. (Suggestions for this process were described in last year's Committee report.)

2. Gemini Issues

Telescope Efficiency

The committee was pleased overall with the continuing efforts of the staff towards making the Gemini Observatory competitive with other 8m-10m class telescopes around the world. To this end, it would be useful to do all that is possible to boost the number of completed projects throughout all proposal bands. During the presentations, the Users Committee was presented with several metrics describing the efficiency of the Gemini Observatory. In the future, the Committee would like to see a wider variety of such metrics, such as shutter open time for science. However, based on the data presented to us, one concern is readily apparent.

In the view of the committee, a hard look needs to be given at the utility of Band 3. While the completion rates of Bands 1 and 2 are now acceptable, many of the Band 3 programs do not collect enough data for the publication of a paper. Indeed, because of this incompleteness, almost 50% of all Gemini time now goes towards programs that will not have an end publication. There are several ways to remedy this program. One is to abolish Band 3 altogether. Another is to make a more concerted effort to complete a program: there is no point in taking such a small amount of data (in any band) that the proposers cannot produce a scientific paper. Still another possibility is to carry over partially completed programs into subsequent semesters. (Currently, this is only done for the programs in Band 1, which are a small minority of the incompleting programs.)

Early Gemini users have indicated to members of the committee that upon being assigned Band 3 time, they did not bother filling out the Phase II forms, due to the complexity of the process and the low likelihood of completing a program. This indicates that the utility of Band 3 (or the general perception of it) has eroded to the point that it may no longer be an effective manner in which to allocate time. As an alternative, one might request that members of the community submit large projects which would be suitable for "backup" observations, when other higher-priority objects in the Band 1 and Band 2 list cannot be taken.

Recommendation 2.1:

The Users Committee encourages Gemini to consider the utility of Band 3, and to examine methods which might increase the fraction Gemini time devoted to completed projects.

Recommendation 2.2:

The Users Committee again encourages that Gemini adopt more straightforward and accessible metrics for gauging the efficiency of the telescopes, such as the shutter-open time, the fraction of clear evening hours spent integrating on the sky for proposed science observations (where "clear" is defined by some cloud coverage fraction, say 50% or less).

WF MOS and the Aspen Process

The Users Committee is concerned that in the Gemini instrument selection process, the descope options for the WF MOS instrument were not examined to the same level as for

ExAOC and HRNIRS. This has led to the situation where one instrument may kill another (i.e., “WF MOS killing HRNIRS”). The User Committee is not necessarily arguing against the instrumentation decisions made by the Gemini Board – without some knowledge of how WF MOS time will be allocated, how the Subaru/Gemini time trade-off will work, and a host of other issues, it is impossible to argue either way. However, the Committee is expressing a concern about the decision making process, and whether (1) the result may have moved away from the community needs and goals as defined in the initial stages of the Aspen process, and (2) the community is sufficiently aware of the ramifications of the Board’s decision (e.g., the loss of HRNIRS, the effect of staffing and maintaining the NOAO Tucson instrument labs, the time trade-off with Subaru, the shift away from P.I. driven projects towards campaign science, etc.)

Along this same line, the new, powerful, and expensive instruments that are part of Gemini’s future signal a rather large sea change in the way that astronomical research in the US (and the world) will be conducted. Taking WF MOS as an example, once it arrives and begins producing spectroscopy of hundreds of thousands to millions of objects, individual samples of stars/galaxies which do not represent at least a significant fraction of these numbers will no longer be interesting. The expertise and experience of large numbers of researchers in the broad areas of Galactic and Extragalactic astronomy will be more important than ever, in order to be sure that the data obtained are used to the greatest extent possible. However, the mode of operation of these astronomers will need to change, as well as the facilities needed for follow-up or complementary observations.

Recommendation 2.3:

NOAO must take a strong lead in engaging the community in a discussion of the ramifications of ultra-expensive instruments such as WF MOS, and how the decisions of the Aspen workshop are currently being implemented. The preception of the Committee is that this news has not reached the general astronomical community.

Recommendation 2.4:

NOAO must take a proactive role in preparing the community for the change in the way astronomy is done. This might take the form of a series of workshops, discussions (open houses) at AAS meetings, and an ongoing dialogue in the NOAO newsletter (and website).

3. CTIO Issues

The Committee is concerned that there seems to be no organized way to monitor the changing capabilities of the observatories. Despite the last year’s recommendation to present

the evolution of the facilities in a tabular or graphical fashion, it was difficult for committee to check whether capabilities are instrumental capabilities are being (temporarily and permanently) lost. While the Committee applauds NOAO’s efforts to broaden the accessible instrumentation via cooperative agreements with external instrumentalists, we caution that the majority of these “user-supplied” instruments seem to be for specific and limited projects. Consequently, they are not always inviting to the general user. The Committee

again requests that the observatory's capabilities for spectroscopy (i.e., wavelength coverage, resolution, throughput) and imaging (field-of-view, f-ratio, filter-size, throughput), be presented in a tabular or graphical form.

One specific issue the Committee has is with the change-over in 4-m class spectrographs. The Goodman High-Throughput Spectrograph is now slated to take the place of the RC Spectrograph. Currently, the grating selection for the GHTS seems to have stalled at a total of three, which falls far short of addressing likely user needs. (For comparison, NOAO's two RCSPs between them have a selection of 25 gratings.) Furthermore, the GHTS does little to replace the CTIO Echelle Spectrograph, for which easily available alternatives do not exist within the System.

Another concern involves CTIO's imagers. We anticipate a significant loss of capability will develop when more basic imagers are replaced by wide-field instruments with faster f-ratios. When this occurs, there is a real threat that deep narrow-band imaging will become extremely expensive, if not impossible. (This is an important issue, since narrow-band imaging is one area that will not be superseded by data from LSST.) The loss of spectroscopic versatility and the threatened decrease in imaging diversity could easily dampen the creativity of general users.

Recommendation 3.1:

The Users Committee recommends that NOAO publish a series of graphs or tables showing the current capabilities of the national facilities, and how these capabilities are expected to evolve with time. Various parameters to consider are wavelength coverage, resolution, and signal-to-noise (for spectroscopy) and aperture, field-of-view, and f-ratio (for imaging). These data, along with considerations concerning the number of nights available to the community, can allow the users (and the Users Committee) to better understand the scientific niches that are available (and unavailable), and what alternatives may be around the corner.

Recommendation 3.2:

Currently the NOAO and especially the CTIO webpages are replete with inaccurate information about the observatory's instrumentation. The Users Committee urges that NOAO keep these pages up to date, so that observers can properly understand the current (and future) capabilities of the observatory.

Recommendation 3.3:

Given the pressures on NOAO funding, it has become increasingly difficult for NOAO to maintain a vibrant instrumentation program. Consequently, it is now most practical to build instruments in partnerships with universities/institutions and, in exchange for resources, allow the institution a reasonable amount of access to the telescope. Unfortunately, this places the US community at the mercy of outside groups, in regard to what instrumentation (filters, gratings, etc.) will be available to do science. The Users Committee encourages NOAO to be a strong advocate for the user community in its negotiations with these instrument groups, and endeavour to make these instruments as

broadly useful to the scientific community as possible. NOAA should also be as forward-looking as possible, and examine ways to make

these instruments interesting and relevant in the coming era of the LSST and instruments such as WFMOS.

The Blanco Telescope

One of the big issues raised both in the presentation on the Senior Review, and that for CTIO, was the further "privatization" of the Blanco 4-m. We understand the need to raise money in this way, and support the proposed move. However, we wish to emphasize that we fully support the NOAO's position that it must retain a 50% share of this telescope. Although this facility is old compared to some of the system's other facilities, it is still very reliable, and with the proper instrumentation, it can still produce ground-breaking science. In a future dominated by large, campaign-style programs, the capabilities of this facility will be critical for producing follow-up science.

The Dark Energy Camera

The Users Committee notes progress in the design of the Dark Energy Camera for the Blanco telescope. In describing the design, NOAO has argued that the filters for the camera are so large that only four (SDSS *g r i z*) can be loaded at once, and so expensive (\$100K each) that ordering a larger complement is prohibitively expensive. However, the Users Committee feels that, given the enormous expense in money and telescope time of accommodating the camera at the Blanco telescope, the value added of including additional filters may be under-appreciated. We do acknowledge and appreciate the solicitation of comments from the community at the NOAO/DEC website (<http://www.ctio.noao.edu/telescopes/dec.html>).

However, the committee is concerned that potential users of the camera and/or the resulting database may not have been sufficiently polled about their filters needed for all the scientific programs for which the DEC might be used.

Recommendation 3.4:

NOAO and/or CTIO should be pro-active in soliciting input from the user community on the DEC filter complement. One possible group to target in particular might be MO-SAIC users, who are likely to be interested in the wide-field imaging capabilities of DEC. A workshop, similar to the one that defined the parameters of the Hubble Ultra-Deep Field would also be useful.

SOAR

One of SOAR's attractive features is its ability to accommodate Gemini instrumentation, such as Phoenix. More than ever, this is a useful property: as more and more Gemini instruments come on-line, the number of observations with any single instrument decreases. As a result, these very expensive, and very powerful instruments will become increasingly underutilized. SOAR should be trying to take advantage of this. Yet the Users Committee is not aware of any plans to share Gemini instrumentation with SOAR above and beyond Phoenix.

Recommendation 3.5:

NOAO, CTIO, and Gemini should arrange to get the maximum use out of the Gemini instruments by arranging for their possible use on SOAR. If possible, this should include spectrographic capabilities not (yet) provided by the Goodman spectrograph.

NEWFIRM

The Users Committee was asked to comment on how best to schedule the movement of NEWFIRM from Kitt Peak to Cerro Tololo. In particular, NOAO is worried about a possible conflict between the arrival of NEWFIRM in the south and the expected delivery of the Dark Energy Camera. The feeling of the Users Committee is that such an approach is fruitless. We do not know if/when DECam will be ready for installation at the telescope. Trying to base a relatively long term (couple of years) schedule on an unknown will lead to a great deal of wasted time and effort. The schedule for NEWFIRM's tenure at CTIO should be worked out independent of the possible impending arrival of DECam, and the scheduling of NEWFIRM's time on the telescope must take precedence over that for DECam. If and when DECam is known to be available, the details of its conflict schedule with NEWFIRM can be resolved.

4. KPNO Issues

The Users Committee continues to stress the importance of spectroscopy with 4-m class telescopes. This will especially be true in the coming era when large, archival datasets drive follow-up observations. Not all of these observations require 8-m class telescopes. Indeed, in addition to being useful in their own right, spectroscopy with 4-m class telescopes will be necessary to select targets for the (higher signal-to-noise) observations of larger telescopes.

Towards this end

Recommendation 4.1:

The Users Committee continues to strongly support the upgrade of the Bench Spectrograph on WIYN.

Recommendation 4.2:

The Users Committee recommends against replacing HYDRA with the One Degree Imager (ODI) when it comes on-line. The Committee sees both ODI and HYDRA as workhorse instruments, and it does not make any sense to keep swapping them in and out of the instrument port. It is critical that NOAO maintain the capabilities of the HYDRA spectrograph.

Recommendation 4.3:

The Users Committee unanimously and strongly supports the possibility of building a new big spectrograph for the Mayall 4-m telescope using any money that can be made available by Wisconsin/Indiana/Yale (or any other source). This will have the great advantage of allowing ODI to be more commonly available on WIYN without swapping off instruments. It will also go a long way toward reversing the eroding spectroscopic capability on NOAO telescopes.

Recommendation 4.4:

The Users Committee was asked to comment about the status of the 4-m Mosaic Imager when the WIYN's One Degree Imager comes on-line. The question here is one of pacing – Kitt Peak users should not be without some wide-field imaging capability on a 4-m class telescope. (This is especially true for narrow-band imaging, which is an extremely useful niche for the observatory.) Thus, Mosaic should be maintained until ODI is operational. Once ODI is working and can accept many of Mosaic's filters, then Mosaic can be de-commissioned from the 4-m telescope.

Graduate Student Training

The Users Committee wishes to emphasize that Kitt Peak (and CTIO) facilities have been, and continue to be incredibly important for the training the next generation of US astronomers. The Committee applauds NOAO's commitment to support the travel expenses of graduate students who are working on their Ph.D. thesis.

The Yale/ODI Survey

It was brought to the attention of the Users Committee that Yale is planning to commit 90 nights of its share of WIYN, over a three years period, to a survey using the One Degree Imager. This survey will provide both high sensitivity and high angular resolution z-band images, with the aim of searching for high redshift galaxies and measuring the parallax of nearby stars. The proposed survey is designed in such a way that images will be taken to provide both a deep survey and a wide survey in the z-band, with the added advantage of temporal resolution, which will not only aid the parallax study, but be a means of detecting a large number of supernovae at $z \sim 1$. The proposed survey will use 3 hours per night every 4th night, and will be executed by introducing a service observing mode. The purpose and possible uses of the proposed survey data will be shared with the community at large, in order for external proposals to be submitted through NOAO that would extend the utility/application of these data. Since ODI is 3-4 years from first light, the proposed survey is still in the planning phase. The Users Committee supports the proposed survey and looks forward to hearing more details as the plan evolves.

NOAO and the Tohono O'odham Nation

The Users Committee encourages KPNO in its continuing efforts to engage the Tohono O'odham Nation in a productive dialog regarding mountain development and operations, with an eye to the long term relationship as well as short term goals (e.g., VERITAS). We are cheered to hear that NSF appears to be taking a complementary view to KPNO in this respect.

We suggest the possibility of adding to all KPNO publications a specific acknowledgment of the benefit gained by the use of facilities on this culturally sensitive land, as is done routinely for publications tied to Mauna Kea. If KPNO decides to pursue this option, we suggest that the wording of the acknowledgment be decided in consultation with the Tohono O'odham Nation members. We attach a typical phrasing used for Keck manuscripts below, from an Acknowledgments section:

The authors recognize and acknowledge the cultural role and reverence that the summit of Mauna Kea has always had within the indigenous Hawaiian community. We are most

fortunate to have the opportunity to conduct observations from this mountain.

5. NOAO Science Archive

Data archives are becoming increasingly important in astronomy. Indeed, when LSST comes on-line, it is expected that data mining will be the primary source for many astronomers. The Users Committee applauds NOAO for its efforts in building the NOAO Science Archive. But to be effective, the user community must know that this archive exists, and must have tools to access it.

Recommendation 5.1:

The Users Committee strongly encourages that NOAO advertise its archive to its users, and provide assistance for science problems. On-line tutorials, and videos will help, but links to this material must be prominent on NOAO's main web page.

Recommendation 5.2:

The Users Committee strongly encourages NOAO to keep track of the use of its archive. How often is a particular archive accessed? Who has used it? What programs are most accessed? This information is critical to understanding how useful the archive is to the community, and whether the data mining tools are useful. In the long-term, it is also an excellent way of assessing the success of the NOAO Surveys program, whose purpose is to produce useful archives to the community.

6. Thirty Meter Telescope Issues

The Users Committee was presented with a number of issues concerning NOAO's long-term planning for a 30-m class telescope. Included among these were questions about the telescopes operation modes, the kind of support facilities needed, and ideas for instrumentation. The Committee realizes the importance of these questions, but felt that its meeting was an inappropriate venue for a full consideration of the questions. What is needed is a special meeting devoted to the challenges of operating a 30-m class telescope. The one issue that the Users Committee did consider was the role of smaller telescopes in the era of a TMT. The Users Committee feels that at such a time, the National Observatories suite of instruments/telescopes will be even more valuable to the community than it is today. Without the complementary facilities of NOAO, the scientific productivity of the large aperture will be compromised. Examples of projects which require a suite of apertures is appended to this report.