2004 Users Committee Report

with Responses by NOAO in blue

The National Optical Astronomical Observatories (NOAO) Users Committee met in Tucson, Arizona on 12-13 Oct 2004 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 was 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 specific programs including SMARTS, new telescope instrumentation, and the Data Products Program. Committee members in attendance included Timothy Beers (Michigan State University), Arlin Crotts (Columbia University), James Lowenthal (Smith College), Angela Speck (University of Missouri), and David Turnshek (University of Pittsburgh). Steven Majewski (University of Virginia) participated by telecon. 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.

User Committee Issues

The committee felt strongly that its current charge and form are not the most effective for providing timely, well-informed, and constructive advice to the Observatory. Committee members were concerned that they lacked access to basic information from the user community, that the committee met or was consulted too infrequently to participate in current developments, and that the relationship between the Users Committee to other NOAO advisory boards and committees was unclear. Apparently many people in the community are not even aware of the existence of the Users Committee, let alone its function.

Recommendation 1.1:

The Users Committee should be merged with the US Gemini Science Advisory Committee, or at least should have a representative who sits on that committee and can serve as an informed liaison.

Now that the Gemini Observatory has full operational status, and Gemini proposals outnumber those from KPNO and CTIO, it makes good sense to combine the wisdom of the NOAO Users Committee and the US Gemini SAC. Many of the Gemini issues raised by the Users Committee have been discussed extensively by the U.S. Gemini SAC. NOAO plans to implement this recommendation, in one form or the other, based on consultation with the NSF and the US Gemini Science Advisory Committee.

Recommendation 1.2:

The Users Committee, in whatever form it takes in the future, needs access to more information from the users themselves in order to address how well their needs are being met by NOAO. Answers (which could remain anonymous) from observers to the following questions would be especially helpful: Were your observing needs met? Could observations be executed more efficiently or successfully? Is there anything NOAO could be doing to better facilitate your scientific goals?

The committee suggests that user feedback be solicited at several stages along the scientific process. For example,

• On the NOAO Proposal Web Form: NOAO and the committee needs to hear from from would-be proposers who explored but abandoned the possibility of using an NOAO facility, due to lack of available instrumentation, perceived inefficiency of available facilities or operations, or other reasons.

• On the NOAO Post-observing run form: NOAO should add a comment section that gets sent directly to the Users Committee (but not necessarily to the Director). This is particularly important for users of other telescopes in the US system, *i.e.,* Gemini and the TSIP facilities. Currently, the Users Committee has virtually no information about whether the community is satisfied with the TSIP arrangements.

• On a feedback form on the NOAO home page, or at least on the Users Committee web site.

• At AAS meetings: Solicitation for input to the Users Committee could be done at the NOAO booth or at a special session.

• By email: Input could be solicited from observatory users or, better yet, all proposers via mass email.

A plan to implement this is in preparation. This will provide the committee with better data.

Recommendation 1.3:

NOAO should consult the Users Committee more frequently than once per year, especially as important decisions arise, such as external proposals for instrumentation/telescope time partnerships that strongly affect access and availability to NOAO facilities by general users.

This is clearly desirable. These communications are with the Chair of the committee. The Chair should request a committee telecon with the NOAO Director on particular issues.

Recommendation 1.4:

NOAO should provide the Users Committee with statistics on instrument requests, not only on their rate of use. This will help the committee better gauge community demand for particular facilities. This goes not only for KPNO/CTIO instruments, but also for Gemini and TSIP facilities, and especially for Keck.

These statistics are already available to the Users Committee as well as to the community-at-large; they appear in the June and December Newsletters (after each Call for Proposals cycle). They are broken down by telescope as well as each individual instrument.

Gemini Issues

The user community is keenly interested in the Gemini telescopes: this is quantitatively demonstrated by the facility's extraordinarily high oversubscription rates. The Gemini telescopes really are becoming the crown jewels of the NOAO community. However, it is also true that in the face of the great progress being made at competing facilities (e.g., Keck, VLT, Magellan), the community cannot help but view Gemini in the context of these other large telescopes. Obviously, the relative newness of Gemini makes a fair comparison of scientific productivity difficult. However, since the timeline differences between Magellan, VLT, and Gemini are not that large, comparisons are being made.

Various lines of evidence suggest that the Gemini telescopes are fulfilling their promise in terms of image quality and system throughput. Yet the Users Committee senses that there is a perception within the community that things are not going as well with Gemini as they should. This sentiment is combined with some frustration over the process of using the telescopes, and acquiring its data. Whether deserved or not, it is within the purview of this committee to relay, rather than interpret, these community attitudes.

Some common complaints seem to concern:

• the proposal process. There is widespread community discontent about the Phase II process, which is perceived to be too complicated. The committee has been reassured that the relevant staff are working hard to help users through Phase II, but many users are not inclined (or don't know) to "bother" these people and are depending on on-line instructions that are neither clear nor accurate, and that have a long learning curve.

NGSC acknowledges that there is a learning curve in the Phase II process. We have noted significantly greater user comfort with the Phase II process once a user completes his/her first Phase II. As more users become experienced in Phase II, we expect the situation to improve. NGSC is addressing the issue of user assistance by e-mailing P.I.s with the names of the NGSC staff member assigned to assist them and useful Web links early in the Phase II process. Much productive contact occurred between NGSC staff contacts and P.I.s during the 2005A Phase II process. Initiatives on Web page improvement (see below) are also a component of addressing Phase II satisfaction.

• the efficiency of the system. At the moment, the overhead rates for Gemini observations are excessive, and dire if they in any way reflect reality. The Users Committee attempted to look into this question, but the "Gemini Availability" statistics that are published at `http://www.gemini.edu/sciops/telescope/telPerfMetricsIndex.html` only speak to telescope/weather shutdowns and not to the net efficiency of telescope use. (We note that this web page is also out of date, since the last information about "delivered availability" is for semester 2003A.)

• the rate of project completion. This quoted rate of project completion is low for the highest band (60% for Band 1), and downright poor for programs in Bands 2-4 (30%). The typical observer would contend that classical observing does not fail 7 out of 10 times, and probably does not even fail 4 out of 10 times. The committee recognizes that the above metric is deceptive, since it is subject to a complex weighting (*e.g.,* number of hours requested by band for various observing conditions and instruments) that is difficult to evaluate and track

from semester to semester. Nevertheless, the use of this kind of metric only fosters the view that the "actual success rate" is being obfuscated. Moreover, the combination of the low probability of getting data plus the effort required for Phase II has people dropping out at this stage. ("If I have a 70% chance of not getting any data, why bother?")

NGSC emphasizes that the percentages given above are completion rates. For a program to be complete, every observation must be taken in conditions equal to or better than that requested by the proposer, and all observations must pass quality assurance testing. The percentages of programs that received a majority of their requested data are significantly higher than the percentages listed above. These percentages are also a result of the Gemini queues being overfilled, which is being relaxed starting in semester 2005A (see below).

• the rate of Gemini publication. This is related to the issue of project completion. The Committee notes that, since it has no information about Gemini user satisfaction, the definition of a "completed" program is unclear. Is the data being acquired by Gemini of sufficient quality for publication? Anecdotal evidence suggests that this is not always the case, and this perception is supported by the Gemini publication rates presented at `http://www.gemini.edu/sciops/telescope/telPerfMetricsIndex.html`. These rates have not risen significantly since 2002 (and in fact have DROPPED when papers by NOAO staff and the users are combined, from 78 papers in 2002, to 55 in 2003 and 59 currently shown for 2004 as of November).

One must be careful in interpreting the numbers of publications on the Web page `http://www.gemini.edu/sciops/telescope/telPerfMetricsIndex.html`. One should only use the "Papers by Users." The "Papers by Staff" includes some non-refereed and technical publications and also has some papers that are already included in "Papers by Users." The "Papers by Users" are all refereed and all based on Gemini science data. The "Papers by Users" goes from 30 in 2002, to 28 in 2003, to 49 in 2004. Gemini data are clearly of sufficient quality for publication. One need only glance at the spectra of the very faint galaxies obtained for the Gemini Deep Deep Survey and published in 2004. The following URL lists the 49 Gemini papers published in 2004: `http://www.gemini.edu/science/publications/users_2004.html` NGSC would be happy to discuss Gemini publications at the next Users Committee meeting.

• the Gemini web-site. Since most users do not travel to Gemini, the USGP web pages are the community's first and primary link to the telescopes, its instrumentation, the observing procedures, and the proposal process. Yet much of the data on the site is either out of date, incomplete, or poorly presented. As described above, the quality of the web pages is one reason for the Phase II complaints.

Recommendation 2.1:

The Users Committee strongly encourages that NOAO adopt more straightforward and accessible metrics for gauging the efficiency of the system, such as 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). Alternatively, a way to make the "completion rates" meaningful would then be to scale them by their total requested integration times divided by the total clear observing hours in the semester.

The metrics that are referred to in this recommendation are measured and recorded by Gemini Observatory, not NGSC. NGSC will advocate within the Gemini governance structure for a public metric along the lines described above.

Recommendation 2.2:

The Users Committee recommends improving the Gemini web site and keeping it up to date. This is particularly important for information related to Phase II. Not only will this go a long way towards easing some of the complaints about using the telescope, but it will free up resources. It is inefficient to have Gemini staff hand-holding each person one-on-one through the Phase II process.

NGSC accepts this recommendation for an improved Gemini Web site. Many of the Web pages that are referred to in this recommendation are maintained by Gemini Observatory, and some are maintained by the NOAO Gemini Science Center (NGSC). NGSC wishes to note that many of the Gemini Web pages have seen recent improvements. As just one example, the GNIRS Web pages (`http://www.gemini.edu/sciops/instruments/nirs/nirsIndex.html` and pages below this one) have been extensively updated for semester 2005A. However, NGSC agrees that there is certainly room for improvement in the Gemini and NGSC Web pages. NGSC will undertake an effort to improve the pages that it is responsible for and to work with Gemini Observatory on the Gemini pages. Specific feedback on needed enhancements and missing information from the Users Committee and Gemini users in general would help this process greatly.

Recommendation 2.3:

The Users Committee recognizes the need to oversubscribe a queue, in order to make sure there are always objects available to the telescope. However, too large an oversubscription rate will cause observers to "drop out", and skip the painful Phase II process. It will also cause the users to question the Gemini TAC process, since being "allocated time" will no longer be equated with "getting data". The Users Committee recommends that Gemini look into making the Phase II forms easier to use, and to increase the probability that users with approved Gemini programs actually get data.

Through semester 2004B, the Gemini queue was overfilled in time beyond the total available hours (assuming all time is clear and usable) by factors of 1.2 to 1.5. It has become clear that weather and technical losses diminish the available hours significantly, and thus that filling the queue to the nominal number of hours available in the semester should result in sufficient programs for the expected distribution of conditions. Therefore, beginning in semester 2005A, Gemini and the National Gemini Offices initiated a policy of filling the Gemini Queue to the number of hours planned for scientific use in the semester (independent of expected weather and technical losses). This new policy results in fewer programs in the Queue, and it is expected to significantly increase program queue completion percentages. It should thus result in greater user satisfaction (and fewer users who go through the Phase II process and then receive little or no data). As part of the change in queue filling, there is no longer a Band 4 starting in semester 2005A.

Recommendation 2.4:

One of the best ways of getting data out of a queue scheduled telescope is to exploit "soft spots" in the queue. It would be helpful if NOAO and/or the TAC could provide some commentary about where the soft spots in Gemini queue are. For example, should users be proposing for 4-m class science that can be done with Gemini in bad weather or non-optimal conditions?

Each semester, NOAO's Gemini Merging TAC, which consists of the Chairs of each TAC panel and the NGSC Director, explicitly reviews the observing conditions requested by the US Gemini observing programs relative to the frequency of occurrence of those conditions at Gemini. As we assemble the US programs for input to the Gemini Queue, the observing conditions are explicitly considered before a program is included. Thus, programs that request poorer observing conditions have a higher priority, at fixed TAC science grade, of being included in the Gemini Queue. NGSC has advertised this fact in articles in the NOAO/NSO Newsletter. However, given this recommendation, NGSC will again broadcast the need for Gemini programs that make use of non-optimal conditions.

Recommendation 2.5:

Given the extremely high oversubscription rate for the Gemini telescopes, it does not seem necessary to put much effort into workshops which advertize the telescope. A much better way of presenting Gemini to the community is to provide help and give accurate information via the facility's web pages. If NOAO wants to spend time/effort/money on a workshop, it can be done in a 1/2 hour presentation in a scientific meeting. However, the User Committee feels that this is a low priority, that special workshops to engage the Gemini community are certainly not needed.

NGSC will prioritize web page improvements significantly higher than Gemini-related workshops.

Recommendation 2.6:

Queue scheduling is expensive, and the 85%/15% split between classical and queue is costly in terms of staff requirements. Users should be educated that classical observing is a possibility. The Users Committee is aware of the requirement that classical observing can only be scheduled if the run is at least 3 nights in length. However, there are ways around this constraint. For example, efforts can be made to link proposals: NOAO can offer proposers the option of applying for a 2 night classical run, but with the requirement that the observer be on-site for 4 nights, and share the start-up with another observer. In these times of fiscal constraint, classical observing may be more efficient to the NOAO user community than queue observing, since it can allow resources to be allocated to other pressing needs. In addition to freeing up resources, classical observing also has the advantage of putting the users on-site, where he/she can learn first hand of the telescope's advantages and limitations.

NGSC has encouraged classical observing by the US community at Gemini. In fact, semester 2005A initiates the use of Phoenix at Gemini South in purely classical mode, supported NGSC. All Phoenix observers will receive training and assistance during the first

night of their classical run from NGSC Staff. NGSC will monitor the satisfaction and scientific success of the Phoenix classical users in order to evaluate potential future initiatives in classical observing.

Recommendation 2.7:

By far, the quickest way to speed up the rate of Gemini publications is to minimize the time from data acquisition to the end of data reduction. Data acquired by Gemini should always be given to the end user in a timely fashion. (Apparently, this does not always happen.) More importantly, the user must have access to proper data reduction tools. The Users Committee recommends that NOAO increase its effort to make data reduction pipelines quick, easy to use, and painless. Cookbooks are useful here, as well.

NGSC agrees that rapid distribution of Gemini data is important. Data distribution is handled by Gemini Observatory. An initiative is underway to transition data distribution from mailed media to electronic distribution from the Gemini Science Archive. NGSC is optimistic that electronic distribution will greatly enhance timeliness. NGSC also agrees that data reduction software for Gemini data is critical to scientific productivity. NOAO has is engaged in a collaborative effort with Gemini Observatory to develop and enhance the Gemini IRAF package, with the goal of ease of reduction of Gemini data. NOAO has been investing about 2 FTEs of effort in Gemini IRAF, with Gemini Observatory making a similar investment. Release 1.7 of Gemini IRAF occurred in October 2004. Gemini IRAF supports the reduction of the great majority of types of data produced by Gemini. Additional releases and developments are planned. The current status of Gemini IRAF is shown at: http://www.gemini.edu/sciops/data/dataSoftwareReleases.html NGSC would be happy to make a presentation on Gemini IRAF at the next Users Committee meeting.

Recommendation 2.8:

The Users Committee strongly endorses the idea of organizing a system by which interested parties could "eavesdrop" on observing with the Gemini telescopes. This would not only be useful for astronomers, but it would provide a great opportunity for public outreach and education. There are many locations around the US (and indeed throughout the world) that might like to set up "Gemini Evenings" (either in classrooms or planetaria) and invite students and the public to watch "big science" in action. The key would be to provide a comprehensible set of GUIs which would make it clear what is going on at any particular time, and display the data that is being collected in near real time. This is something which NOAO and its E/PO office should pursue with enthusiasm, as it is one of only a few areas that simultaneously improves science education and science productivity.

Eavesdropping requires the investment of resources by Gemini Observatory and the National Gemini Offices to implement. Most of the investment would be in software and procedures to allow the eavesdropping astronomer access to telescope, instrument, and weather information, and to the data obtained. This access must be given in a manner that protects the proprietary nature of the data. In addition, the attention of one or more staff members at the telescope is needed periodically to interact with the eavesdropper. NGSC is embarking on a program to demonstrate an eavesdropping trial, in collaboration with Gemini Observatory. Given the resource issues, it is important to demonstrate and explore

eavesdropping for programs that benefit scientifically from eavesdropping (e.g., synoptic or rapid-response programs). Thus, NGSC will pursue this scientific demonstration and the implementation for scientifically beneficial eavesdropping before it devotes scarce resources to public outreach eavesdropping. NGSC would like to emphasize that eavesdropping would be a new mode with Gemini and that its success requires developing procedures and policies that are supported by both the National Gemini Offices and Gemini Observatory.

Recommendation 2.9:

Very few large telescopes in the world are scheduled in a way suitable for time-domain astronomy, either because individual proposals receive little time, or because of instrument scheduling constraints. Since the Gemini telescopes are operated in queue mode, they should be well-positioned to exploit this potentially lucrative niche. The Users Committee understands that large numbers of synoptic programs are likely to make the Gemini queues unworkable, but we suggest that a small number of such programs might be compatible with normal operation of the queue. The Users Committee urges the Gemini schedulers to consider if a very limited number of high-ranked proposals might be able to operate in time-domain mode within the Gemini queues, and what constraints must be placed on such successful proposals in order for them not to significantly strain the queue scheduling system.

NOAO agrees with the Users Committee that the Gemini telescopes and their operating mode enable time-domain astronomy. In fact, there are numerous time-domain programs in the Gemini queues. Such programs are working profitably in queue mode. Examples time-domain astronomy carried out in the Gemini queues include: optical and infrared spectroscopy of supernovae, radial velocity monitoring of pre-main-sequence binaries to derive masses, spectroscopy of cataclysmic variables, eclipsing binaries in M31, and spectroscopy of gamma ray bursts. NGSC would be happy to give a presentation on time-domain astronomy being carried out with Gemini at the next Users Committee meeting.

TSIP Issues

The Users Committee was asked to comment on the strengths and weaknesses of the CTIO and KPNO facilities in the context of the system of US telescopes. Yet very little information is available on the TSIP telescopes. Information is not being collected on user satisfaction, the ease/difficulty of proposal preparation, or the data quality. NOAO has made itself the place for "one-stop shopping" for these telescopes, but aside from allocating the telescope time, it has little to do with these facilities.

Recommendation 3.1:

NOAO should collect information on the user experience with TSIP telescopes. This can be done with a post observing run questionnaire, similar to that given to observers after KPNO/CTIO runs. If users are consistently dissatisfied with their experience with a TSIP telescope, or if the data quality of a facility is poor, NOAO should consider dropping the facility from the TSIP system.

NOAO will implement a means of collecting this information for both the Users Committee and the System Committee.

CTIO/KPNO Issues

The CTIO and KPNO facilities continue to be crucial to the needs of US astronomy. More than ever, these facilities are proving to be invaluable for the survey work needed to efficiently use the larger telescopes. NOAO is to be commended for keeping these facilities productive and in the forefront of astronomical research.

In order to consider the future needs of these facilities, the Users Committee broke down the topic of the KPNO/CTIO facilities into several sub-components.

User Committee Issues

In attempting to consider the needs of the US community, the committee found itself struggling to understand the present (and more importantly, the future) capabilities of the CTIO and KPNO facilities. At the Users Committee meeting, slides were presented detailing the number of nights that available to the US community, now and in the future. However, these graphics did not break down the nights by instrument capability. Although such a plot may be difficult to make, it is an absolute necessity. (If the number of nights increases, but the number of instrument modes decreases, this is not necessarily a good thing for the community.)

As an example of the problem, the Users Committee points to the situation of optical/UV spectroscopy in the southern hemisphere. The CTIO Echelle has been retired and no comparable spectrograph has come on-line (as Magellan/MIKE is unavailable to users in the general community). In addition, the RC spectrograph will soon be retired in favor of SOAR/Goodman HTS. While this is a plus, the Goodman HTS will only have three gratings available in the near future. When will the selection of Goodman VPH gratings compare with that of the RCSP? The User Committee invites the CTIO staff to make a chart showing Resolution on one axis and Wavelength (in the UV/optical) on the other, and to mark those regions where instrumentation is (and will be) available. The Users Committee needs to see this type of graph (and how it is changing with time), to understand the status of the medium-sized telescopes.

The Users Committee also found it difficult to comment on some of the options presented to it without knowing the context of those options. For example, the Committee recognizes that NOAO has hard decisions to make when it comes to the retirement of existing resources and the undertaking of new initiatives. As NOAO clearly recognizes, a vibrant organization doing forefront science cannot be living in the past. It is therefore understandable that NOAO must often think in terms of retiring resources to make room for the new. At the same time, the Users Committee often feels compelled to take a stance which protects the telescope/instrument resources that have benefited NOAO users over the years and are still providing excellent data. In particular, it sometimes seems that decisions to sell-off (parts of) telescopes or retire older instruments may be unnecessary, simply because the amount of dollar savings to NOAO is likely to be minimal in comparison to the (uncertain) budgets for new initiatives. There may be other issues involved, such as the real need to keep talented instrument designers and builders on staff, or the desire to have an integer number of FTEs, but the Users Committee does not see this part of the picture.

Recommendation 4.1:

At future meetings, NOAO should supply the Users Committee with information not only on the number of nights available to the community on CTIO and KPNO telescopes, but also on the number of nights users can expect to be devoted to imaging (optical and IR) and spectroscopy (low, medium, and high resolution).

Accepted.

Recommendation 4.2:

To minimize communication problems, NOAO should provide the Users Committee with a detailed budget impact analysis for every proposed instrument retirement. This would allow the Committee to distinguish between a plan that seeks to retire an instrument to make way for an otherwise impossible new initiative, versus a plan to retire an instrument because some sort of sacrificial lamb is needed. A detailed budget analysis is also necessary for proper consideration of new initiatives.

The Observatories Council conducts this sort of analysis, and it is straightforward to present these considerations to the Users.

New Instrument Initiatives

The Users Committee emphasizes that, in order to make maximum use of Gemini and other 8-m class telescopes, the community must have access to a suite of imagers (optical and IR) and spectrographs (with differing resolutions and targeting options) on 4-m class telescopes in the north and south. Ideally, these should be modern, high efficiency instruments, not decades old. To ensure access to these capabilities, the suite of available instrumentation needs to be revisited every few years, with an eye towards the needs of the next generation. The best place to do this is probably in an "Aspen Style" workshop for medium sized telescopes, or, at the very least, during "town meetings" at AAS meetings.

The User Committee re-iterates its concern about sole-source bidding for instruments, such as the Dark Energy Camera (DECam). Since DECam was the only proposal in what amounted to a very short call for new instruments, it was selected by default. The User Committee again states that this is not the way decisions concerning new instruments should be made. This process leads to decisions that are not science driven, but based on the whims of whoever happens to have money on hand. Every effort should be made to avoid this situation.

Recommendation 4.3:

Given the pressures on NOAO funding, it is probably 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. However, a new mechanism for the procurement of instrument proposals needs to be implemented. Rather than offering a limited window for proposals and jumping at the first viable (*i.e.,* fundable) project that comes along, NOAO should consider having an open ended call for ideas. This would allow NOAO to occasionally turns down a proposal and wait for another that better serves the needs of the user community, perhaps as identified by a workshop on new instruments for medium-sized telescopes.

Instrumentation partnerships with universities are clearly the future for all NOAO telescopes. It would be appropriate to publish a schedule of planned announcements of opportunities in the long range plan, giving universities years rather than months to prepare an instrumentation partnership proposal.

Recommendation 4.4:

The Users Committee recommends that important instruments not be retired until their successors are capable of performing the same (highly ranked) science.

In the context of the System this should be a feasible policy. The NSF has recently announced a Senior Review of AST facilities. NOAO has requested that the Users Committee should provide input to and be consulted on the recommendations of the Senior Review.

The Dark Energy Camera

The committee understands that the purpose of the Dark Energy Camera project is to survey the sky using multiband (g, r, i, z) images with a view towards studying galaxy counts, clustering, weak lensing, and SNe Ia distances. In order to achieve its goals, DECam needs to receive dedicated time on the Blanco 4-m telescope for much of the fall semester for 5 consecutive years.

The Users Committee notes that the DECam project is fundamentally different from previous NOAO instrument solicitations in two respects. First, if DECam proceeds, the project will displace all other Blanco 4-m science in the fall for several years. At the very least, this will severely limit the ability of the US community to work on several popular targets (such as the Fornax and Sculptor group galaxies). Second, the shelf life of the DECam instrument is extremely short. Once the Large Synoptic Survey Telescope (LSST) comes on-line, DECam will no longer be a competitive instrument, and its science will be superseded. If the project gets delayed, the project will quickly become uninteresting.

The Users Committee also understands that to partially offset the loss of community telescope time, the data from DECam will be made public. If so, thought should be given to how the project could best be structured to serve that community. For example:

- Should the instrument be modified to take other filters? We understand that it might not be possible to construct interference filters for DECam. However, the instrument would be more versatile and have a longer shelf life (*i.e.,* it might be useful beyond just the 5 years Dark Energy survey) if it were possible to incorporate narrow- or intermediate-band filters.
- Should the instrument and survey be modified to include a U filter? Since the data from DECam will become publicly available, such an addition might produce a large amount of value-added science.

Recommendation 4.5:

The User Committee urges NOAO to not only consider the science that DECam will do, but the science that will not get done due to the loss of the southern hemisphere/fall season to the US community. At the very least, NOAO should attempt to find some creative solutions (perhaps obtaining increased access to SOAR during the fall season) to make up for the loss of access to that part of the sky.

Recommendation 4.6:

If NOAO proceeds with the project, the Users Committee recommends that it take special care to see that the project stays to schedule. If the DECam schedule slips, NOAO should consider "pulling the plug" on the project.

The Memorandum of Agreement will include the normal decision points at PDR and CDR.

Recommendation 4.7:

The User Committee notes that before defining and undertaking the Hubble Space Telescope Ultra-Deep Field Survey, the Space Telescope Science Institute solicited input on its scope. Specifically, the Institute held a workshop in which users presented ideas on how to maximize the scientific output of the survey. If the Dark Energy Camera project is approved, NOAO should hold a similar workshop, to allow users to suggest additional filters, observing modes, etc. The User Committee recommends the inclusion of a U-band filter, but opening up the discussion to a wider audience will undoubtedly bring in more suggestions and will provide the survey with the means to have broader scientific impact.

CTIO will consult with Fermilab on these issues.

NEWFIRM

The Users Committee was presented with various arguments in support of cloning the NEWFIRM IR array. The committee was told that cloning the instrument would cost as little as $\sim$ \$1M, and probably no more than \$3M. We agree that this is a bargain. Similarly, the argument that NEWFIRM needs to be cloned soon before the expertise on the instrument is lost is well taken. NEWFIRM is an excellent instrument and building a clone would be a plus for the community.

However, the committee also recognizes that other needs of the KPNO/CTIO telescopes may be more pressing. The sudden preponderance of (upcoming) imaging instrumentation and the paucity of new spectroscopic options is disturbing and needs to be examined. While there is currently a lack of IR imagers with narrow band capabilities, various instruments already approved and due to come online in the next few years will fill this gap. Current plans do not provide for such an expansion of KPNO/CTIO's spectroscopic capabilities. The Users Committee feels that if the funds could be put towards building an instrument similar to NGOS or possibly the Goodman spectrograph, it would be more beneficial to the US community than a clone of NEWFIRM.

Recommendation 4.8:

If NEWFIRM is not cloned and is shared between KPNO and CTIO, it should be moved North/South no more often than once per year. This would allow the community to use the instrument over the entire sky with no more than a one year delay for any given program.

Accepted.

SMARTS

The Users Committee continues to be impressed with the SMARTS program for the small telescopes of CTIO, and recommends that it continue. If the budget of CTIO continues to fall, it may be preferable to include other telescopes (such as the Blanco 4-m) in the SMARTS operation, rather than just closing the Blanco down.

We concur. The new decadal survey facilities will not deliver optimum results in isolation. A supporting system of telescopes is required. The lead role in sustaining intermediate scale OIR facilities (Magellan, WIYN, SOAR, MMT, the 4 & 5 meters, LBT, and Keck), with the exception of Gemini, where the NSF is executive agency for an international partnership, is played by the independent observatories. A number of these are public-private partnerships. The role of NOAO through the TSIP program and its System Committee is

- an appropriate quantum of national, merit based, peer reviewed, user access,
- a system strategic view of instrumentation and data management.

Key elements of any expansion of SMARTS, a process which must be fully transparent to the community, will be

- identification of the relevant telescopes by levels of subscription and productivity,
- announcement of opportunity for operations partnerships styled on the SMARTS consortium
- selection of proposals, based on scientific, technical, education & outreach, and management plans, followed by negotiation for optimum public share and management/operational arrangements.

The Survey Program

The Users Committee is obviously concerned about opening up the survey program before the Observatories Council review is carried out. The presentations given to the Users Committee all assumed that once the review is over, everything will be fine. Given that nothing much has changed since last year — many of the surveys are still late, and little information is available concerning the community's use of the survey data that is available — the utility of restarting the program at this time is unclear.

If the Surveys Program is restarted, the Users Committee feels that its structure can be improved. Specifically

Recommendation 5.1:

The Committee feels that a fixed 5-year window for NOAO Survey Programs is too long. Such an interval is out of step with the typical 3-year funding cycle of the NSF and of postdoctoral appointments. Consequently, it is likely that the resources available to a survey team will change significantly during the course of the program. This can adversely affect the ability of the team to complete the data reduction and deliver the promised dataset. The Committee therefore recommends reducing the period of a survey program to 3 years. The Committee recognizes that such a reduction may mean that the number of nights allocated per year to a particular survey may need to be increased, and that the number of survey

proposals accepted each year may need to be decreased. The Committee feels that this is a worthwhile tradeoff.

This is the recommendation we'll make to the Survey Program Review.

Recommendation 5.2:

The Committee feels that better care must be taken to avoid survey duplications. The Users Committee notes that at least one of NOAO's survey programs is essentially identical to another (public) effort being conducted at another observatory. While a certain amount of redundancy and competition is appropriate, it is inappropriate to undertake a major data collection on behalf of the user community when a similar dataset will soon become publicly available. To avoid this duplication in the future, the Committee recommends that the NOAO staff inform their users (*e.g.,* via a web page) and the TAC about the details of completed or ongoing astronomical surveys throughout the world, including providing an estimate of when these datasets might become available (*e.g.,* "no sooner than 2008") to the international community. The survey TAC can then make use of this information when evaluating new NOAO proposals.

Fundamentally, this is the responsibility of the Survey TAC. NOAO will brief the Survey TAC with information gleaned from observatory web pages, *e.g.,*

`http://www.eso.org/observing/ESOPublicSurvey.pdf`

`http://www.eso.org/science/eis/`

`http://www.astro.lsa.umich.edu/ mmateo/magellan/`

`http://www2.keck.hawaii.edu/science/tksurvey/index.html`

`http://www.cfa.harvard.edu/oir/ .`

Recommendation 5.3:

Since data reduction is a major bottleneck in delivering the results of a survey to the community, the Users Committee recommends, when possible, NOAO staff provide data pipelines for approved survey programs. This will ensure that the community has future and timely access to the data.

The need to provide data reduction pipelines for NOAO instruments that are commonly used for surveys is recognized by the Data Products Program. Such pipelines will be available for the CCD Mosaic Imagers by the end of 2005 and for NEWFIRM when that instrument is delivered.

Recommendation 5.4:

The User Committee recommends that team members applying for time for new surveys be required to inform the TAC about the status of any previous NOAO surveys with which they were/are involved.

We agree, and the question about "past allocations of telescope time" will be modified on the survey proposal form to remove the two year limit for previous surveys.

6. Data Products Program

The importance of data processing pipelines and data reduction software packages is frequently overlooked even at large observatories. Poor software reduces user satisfaction and, more importantly, decreases scientific productivity. The Users Committee commends NOAO on its proactive development of the Data Products Program and the National Virtual Observatory. This initiative moves data reduction, processing, and archiving to a realm far above that of the original IRAF package. Furthermore, the committee notes that the scientific productivity of HST and other NASA missions is in no small part linked to the availability of funds to support data reduction, analysis, and publication.

Recommendation 6.1:

NOAO should continue its investment in and leadership of the DPP and the NVO. The observatory should consider promoting itself as an international "one-stop shopping place" for pipeline reductions.

Recommendation 6.2:

NOAO should seek additional funding to support development of the DPP and analysis of NOAO data archived in the NVO or other DPP products.

NOAO has pursued a number of paths to acquire additional funding to support development of DPP products. The possibility of supplemental NSF funding in FY 05 to support cyberinfrastructure and cyberscience appears promising.

7. Other

If the US wants to remain competitive and productive in accomplishing forefront science, it is important to recognize that both telescope time and resources (*e.g.,* funding to hire a needed postdoc or graduate student) must be simultaneously available to undertake some scientific programs. For example, it is troubling that some approved NOAO survey programs had insufficient resources to reduce and deliver their data in a timely manner. Of course, NASA explicitly addresses this issue by providing grant funds to proposers who successfully obtain time on space-based telescopes. Thus, the Users Committee believes that the current regular proposal form should be modified to include questions about the resources a proposer has available to him/her to accomplish the science program. The TAC could then consider this when ranking proposals. All other things being equal (*i.e.,* when TAC grades for programs are statistically equivalent), this information could be used to decide the actual telescope time assignments.

Recommendation 7.1:

The Users Committee recommends adding a question to the NOAO proposal form. One possible phrasing of the question is this: "Assuming you are allocated time and successfully collect the required data, what resources in the way of funding and/or staffing do you have to support data processing, data analysis, and publication of the results? Explicitly mention any external funding (e.g., from NSF) you may currently have to support your work."

A question has been added to the proposal form for semester 2005B.