

NOAO Users Committee

2010 Report

Submitted 04 July 2010

The Users Committee (UC) of the National Optical Astronomy Observatory (NOAO) held its annual meeting at NOAO in Tucson on 15 and 16 June, 2009. The committee was asked by NOAO Director Dave Silva to comment on:

1. the on-going modernization programs at KPNO and CTIO;
2. ongoing ReSTAR plans, including the current activities in phase 1 of ReSTAR and potential follow on phases of ReSTAR;
3. the Large Science Programs review;
4. how US observers utilise the Gemini telescopes. In particular, comments are sought on increasing the classical observing time, improving the proposal process and instrumentation issues;
5. NOAO's efforts to connect the community-at-large to LSST and GSMT;
6. whether or not NOAO is involved in the right balance of activities to meet the current and future needs of its user community given current fiscal constraints. In particular, we were requested to comment on the prioritization of ODI in relation to other NOAO responsibilities.

Six out of the eight committee members were present for the meeting: Ian Dell'Antonio, Eric Gawiser (acting Chair), Sangeeta Malhotra, Vera Margoniner, Adam Stanford, Nathan Smith, with Angela Speck (Chair), attending via a remote connection.

In preparation for the meeting, UC members discussed the relevant NOAO issues and documents with optical astronomy colleagues at conferences, in university departments, and by telephone and email via direct "cold calls" to NOAO users as per lists provided by NOAO. We also used our Facebook group to solicit feedback from users¹.

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 ReSTAR and ARRA-funded initiatives to upgrade various facilities, as well as the updates on the progress towards a unified "System" and NOAO's participation in LSST. We greatly appreciate the effort that went into preparing those presentations, updating us on the status of NOAO programs and initiatives, and engaging in fruitful and frank discussion with us about the status and future of NOAO.

Our report follows below. We have been asked to comment on KPNO, CTIO, ARRA and ReSTAR which are all interrelated, and as such make up a significant part of this report.

¹The Facebook group is now linked from the UCs webpage.

1 KPNO and CTIO

We commend NOAO for the progress made on renovation of infrastructure and instrumentation at KPNO and CTIO. These facilities continue to be productive in terms of publication number and broadly used as measured by the breadth of telescopes and instruments the publications represent. The users of the NOAO core facilities by-and-large are delighted to see the effort that is being carried out to improve the two mountaintops.

1.1 KPNO

At KPNO, the deployment of new capabilities on WIYN (the upgraded bench and WHIRC) and the Mayall (Mosaic 1.1) are especially welcome, as is the continued use of the 2.1m as a testbed for new instruments. Moreover, we also strongly approve of the repairs and improvements being made to keep the telescopes running and prepare the mountain facilities for the new suite of instruments. We continue to laud the performance of the KPNO leadership to maintain and strengthen relations with the Tohono O’odham nation. Similarly, we commend the efforts to coordinate with city, county and national committees to maintain the darkness of the skies at KPNO. Finally, we wish to express our gratitude to Dr. Buell Jannuzi for his successful efforts to maintain the competitiveness of KPNO as a world-class facility.

1.2 CTIO

At NOAO-south, significant improvements are noted. The renewal of staff hires is extremely important for the vitality of the institution and is commended. We are encouraged that the upgrades to the Blanco in preparation for both NEWFIRM and DECam are well underway, and expect that the last major steps (TCS upgrade and primary mirror cooling) will be completed in the next year. We feel that the users will appreciate the planned improvements to the computer and console room. We are impressed and gratified that the NEWFIRM transition to CTIO went off without significant problems. We are a little concerned that the planned time until the next move of the instrument is short, and recommend that an extension be considered if there are significant delays in the commissioning DECam. Progress on DECam itself appears good, and we are encouraged by the continued involvement of CTIO staff at Fermilab with the top-end simulator, because we feel that it will greatly streamline the commissioning and hand-off of the instrument when it arrives on the mountain. At SOAR, we see significant progress on the instrument side, and strongly encourage as much effort as is practically possible be committed to commissioning the SOAR Adaptive Optics Module (SAM). In addition, we encourage NOAO to keep pushing UNC to provide the tools for multi-slit observing with the Goodman spectrograph, as we feel that this is a valuable capability. With the upcoming commissioning of SIFS, BTFI and the arrival in a year of STELES, the capabilities of SOAR are growing extremely quickly. At the same time, we are still concerned that SOAR is still under-advertised in the user community, and urge that NOAO continue advertising the new capabilities aggressively. Finally, we are gratified by the continued health of the SMARTS program, and appreciate the continuing instrument development for the smaller telescopes.

1.3 ARRA

The NSF has provided \$5.6 million dollars from ARRA funding over the past year. While we recognize that this is only a fraction ($\sim 20\%$) of the recognized needs, we are encouraged by the efforts at NOAO to provide much-needed infrastructure. The projects that NOAO has chosen for their efforts are exactly the type of projects that are difficult to achieve via base-budget increases because they represent high-cost but rare expenditures. However, undertaking these projects is essential for the continued revitalization of the base NOAO facilities as recommended by the Senior Review and this committee.

Recommendation 1.1

We recommend that an extension of NEWFIRM's presence at CTIO beyond 18 months be considered if there are delays in the commissioning of DECAM.

Recommendation 1.2

We strongly recommend the continuation of the efforts initiated by outgoing KPNO director with respect to outreach, special programs and liaison with the Tohono O'odham nation.

Recommendation 1.3

We recommend that CTIO prioritize the order in which new instruments are commissioned on SOAR, such that SAM is given highest priority.

Recommendation 1.4

We support NOAO's efforts to encourage UNC to provide the tools for multi-slit observing with the Goodman spectrograph.

Recommendation 1.5

We urge that NOAO continue advertising the new capabilities at SOAR aggressively.

2 ReSTAR

In December 2007, the ReSTAR committee published its report on NOAO telescopes in the aperture range 1–6 meters. NOAO responded to the ReSTAR report with a 3-phase plan. Phase 1 of the ReSTAR Implementation Plan is underway with \$3 million in funding from NSF in FY09.

One of the first projects undertaken as part of the ReSTAR phase 1 is also broadly a part of the KPNO/CTIO renovation, in that it provides new instrumentation at those facilities. Versions of OSMOS are being developed for KPNO and CTIO. The work undertaken by NOAO on KOSMOS and COSMOS is to be lauded, and the UC greatly appreciates the opportunity to provide input to the instrument builders on the trade-offs in the various component choices. However, there are some concerns regarding the current proposed capabilities of KOSMOS. In particular, the proposed resolution ($R \sim 2000$) seems lower than the some of the user community would like. The discussion of KOSMOS revealed that higher resolution ($R \sim 5000$) is possible through the purchase of additional dispersers. We would like to see this "potential availability" made clearer and should be communicated to the user-base. We remind NOAO that the ReSTAR report recommended spectroscopy capabilities with resolution spanning the range $1000 < R < 100000$, not just the low end.

We applaud the upgrades currently underway for MOSAIC and planned for Hydra. The UC did appreciate the opportunity to respond to tradeoffs in detector choices, and the process worked well for both NOAO and UC. Our feedback on MOSAIC included input from the user-base, not just the UC members. This feedback mechanism is a good model for future upgrade/instrument building issues and we look forward to more interactions like this one.

One of the other ReSTAR initiatives involves acquiring time on telescopes outside of NOAO. There is some concern about the modest over-subscription rates (1.6-2.0) for Palomar time. As discussed in last year's report, we view an oversubscription rate of 2–3 as optimal. However, it takes some time for users to notice instruments, so the UC is not yet concerned about the subscription yet. We recommend the availability of this time, and the sensitivity of the instruments be better advertised.

One aspect of the ReSTAR report that has received little attention is the recommendation for further investment in remote observing with smaller telescopes. Last year the UC expressed its pleasure with the remote observing option offered at the SOAR telescope. Development of remote observing capabilities for small telescopes should go hand-in-hand with the applying this same to Gemini (see § 4.2). It would be highly advantageous to users to have the same basic system/software/interface used for all facilities (aside from differing instruments, obviously).

Various recent developments in the US O/IR system need to be brought to the attention of the ReSTAR committee when considering Phase II. In particular ReSTAR committee members should be cognizant of the ODI delays, the availability of more Gemini time, and subscription rates for NOAO instruments when re-prioritizing the phase-2 instruments.

It is important to maintain an ongoing conversation with the user community in building and renewing the US System of O/IR telescopes and instruments. We applaud NOAO's efforts to engage the user-base to build consensus and take advantage of the available expertise.

Recommendation 2.1

We continue to endorse NOAO's three-phase plan to implement the ReSTAR initiatives and reinvest in KPNO and CTIO.

Recommendation 2.2

We recommend the availability of Palomar time, and the sensitivity of the instruments be better advertised to the NOAO user-base.

Recommendation 2.3

We recommend that NOAO continue to pursue additional funds and continue an updating and prioritizing their infrastructure needs and involving the user community in the process.

3 Large Science Programs

NOAO has issued a call for proposals for a new major science project on the Mayall, comparable to the scope of the Dark Energy Survey and DECam on the Blanco.

The UC believes that NOAO is conducting the large science programs (LSP) solicitation of proposals in an open and clear manner. We continue to view this as a key step in the

revitalization of KPNO and as a positive opportunity for the user community to obtain access to a cutting-edge instrument on the Mayall 4m circa 2015. We appreciate that NOAO plans to optimize a combination of science, open access, and new capability in evaluating the proposal received, and we understand that the potential benefits to NOAO of a large cutting-edge project being performed on the Mayall are part of that equation. We also appreciate NOAO's plans to include members of the ReSTAR, ALTAIR, and UC on the review panel.

In conducting the proposal review, NOAO should insist that an approved LSP provide scientific open-access value to the user community at least as great as would be available without the new instrument. In other words, the increased scientific capability should fully offset the loss of nights. A more stringent but reasonable threshold for approval would be that the total scientific value available to the user community should be at least as great as would be available with a \$3-5M new instrument built directly by NOAO added to the currently-expected Mayall instrument suite.

In evaluating the net scientific capability enabled by the proposed LSP instrument, NOAO should consider any loss of access to instruments that would otherwise be part of the Mayall suite by 2015, e.g. MOSAIC 1.1, KOSMOS, and NEWFIRM (sometimes). If some of these capabilities are lost, users will expect that a clear path be available to replace them elsewhere in the U.S. O/IR system.

We support NOAO's suggestion that the proposed LSP be required to make its data public on the same timescale as NOAO survey programs.

It will be critical to communicate to the community the potential drawbacks of any approved LSP as well as the advantages to make it clear that a full analysis of costs and benefits led to the decision.

If an LSP is approved, the user community should be consulted on proposed terms of a Memorandum of Understanding with the LSP team before it is finalized.

Recommendation 3.1

We recommend that the time promised in exchange for an instrument be carefully considered, such that the scientific value of open access retained by users is at least as good as it would be without the new instrument.

Recommendation 3.2

We recommend that NOAO ensure that any loss of capabilities at the Mayall resulting from an LSP be made available elsewhere in the U.S. O/IR system.

Recommendation 3.3

We encourage NOAO to demonstrate to the user community that a full analysis of costs and benefits of a proposed LSP was performed in making the decision to go ahead.

Recommendation 3.4

We recommend that NOAO consult the user community on proposed terms of a Memorandum of Understanding with the LSP team before it is finalized.

Recommendation 3.5

NOAO should keep open their legal right to back out of the agreement for as long as possible before the formal agreement is signed.

4 Gemini

The US community's attitude to Gemini remains luke-warm and stems from a perceived lack of responsiveness from Gemini to the needs of US users. Having said this, we are encouraged by the efforts made to increase the connection between Gemini and its US users. Given increased US share of Gemini following departure of UK, NOAO should continue to advocate aggressively in the interests of the US community, which are still not being met. The UC feels that substantial redirection of the current operating model of Gemini is required in order to bring Gemini into alignment with needs of its majority user community, and especially to send a message to the US community that positive changes are afoot and that the observatory is likely to succeed. This may help to garner much needed US community support for possible continued future involvement in the observatory.

4.1 Instrumentation

The need for spectroscopic capability is extremely urgent, and Gemini must accelerate its initial steps to procure spectroscopic capability. When soliciting ideas for an instrument, Gemini should remain open to broad range of ideas concerning a moderately high-resolution optical spectrometer that will serve a broad community. Narrowing focus to a fiber fed instrument before reviewing instrument designs may exclude more desirable options that could accommodate long-slit modes, for example.

Expected return of GNIRS (to the north) is much welcomed, but still leaves a catastrophic lack of spectrometers in the south. Phoenix has been and is one of the most productive and desired instruments. As such, removing Phoenix from the telescope before another high-resolution IR spectrometer is available in its place would be seen by the UC as a critical mistake, and contrary to the needs of the US community.

Expediting FLAMINGOS-2, even if in a limited capacity, is requested. Web pages should reflect accurately the status of FLAMINGOS-2, especially around proposal time.

The planned detector upgrades for GMOS north promise impressive sensitivity at $1\ \mu\text{m}$. Depending on its success, upgrades of GMOS south would be worth considering.

4.2 Observing Modes

The strategy of increase in the fraction of classical observing seems to be effective. We applaud efforts so far, and the users appreciate available travel funding to make this a reality. With more telescope time for the US, longer observing runs may make classical observing more attractive.

Unfortunately, classical observing is not the best mode for all observers/programs. Remote observing options are needed and would be particularly useful for very short observing programs. We reiterate that NOAO should investigate some form of remote observing. Enabling remote observing (i.e. from home/office like IRTF, ARC 3.5m, Keck) is STILL an extremely high priority for US community, moreso than having a queue. The user community has been requesting this for many years. Such a capability can potentially mitigate need for a queue and save costs (both travel costs and Gemini staff time) while actually improving data quality and usefulness. Moreover, remote observing will allow observers to monitor

data quality, make real time adjustments, prioritize target and calibration data accordingly during the program – while still preserving many of the benefits of a queue (i.e. flexible scheduling for small requests or multiple partial nights, significant savings of travel time for observers, etc). It does not preserve the optimization of the queue, but other benefits listed above tend to outweigh this consideration. A scaled back queue can still be implemented for those programs that justify the need for it.

Immediate steps to implement remote observing will help send a strong message to US community that Gemini is becoming responsive to the needs of its major user community by providing a valuable capability that they have been requesting for many years. This can potentially be done faster than building a new high resolution spectrograph. In addition, as mentioned in § 2 the ReSTAR report recommended further investment in remote observing. Development of remote observing capabilities for Gemini should go hand-in-hand with the applying this same to other NOAO facilities, which the UC has been requesting for many years.

4.3 Mid-IR

The US is clearly the dominant user of the mid-IR facilities, but Gemini remains predominantly an optical facility despite its infrared optimization. Several users have expressed concerns that with the demise of Spitzer’s cold mission, and SOFIA not yet available, Gemini has become the only facility many US IR astronomers can use. Data-mining of IRAS, ISO and Spitzer continues, and combined with upcoming observations from Herschel, mid-IR facilities need to be accessible for follow-up work. Furthermore, Gemini provides high spatial resolution unattainable with Spitzer, WISE, SOFIA, or Herschel (and JWST), and can observe targets that will be too bright for JWST.

Although user community is small compared to optical community, maintaining mid-IR imaging and spectroscopy capability at some level follows the spirit and mission of the National Observatory System. Moreover, mid-IR astronomy is a clear strength of Gemini compared to other large telescopes. As such, we should capitalize on this capability to compete globally.

In the future, mid-IR will be an important component of 30-m telescopes (imaging exoplanets and disks, etc). Sustaining mid-IR community and training next generation of mid-IR instrument users is very important.

Recommendation 4.1

We encourage NOAO/NGST to follow the ALTAIR recommendations and facilitate action towards procurement of new high resolution spectroscopic instruments for the Gemini telescopes.

Recommendation 4.2

We recommend that NOAO encourage Gemini to expedite FLAMINGOS-2.

Recommendation 4.3

We urge NOAO to advocate for and help development of remote observing system akin to those available at e.g., IRTF, Keck, WIYN, etc.

Recommendation 4.4

We recommend that NOAO/NSSC encourages US observers to use the mid-IR capabilities of Gemini and supports mid-IR observer by encouraging Gemini to make the mid-IR instruments available more regularly.

Recommendation 4.5

We recommend that NOAO urge Gemini to maintain its mid-IR capabilities, with at least one instrument (T-ReCS more used), in south, and perhaps consider options of sharing a mid-IR instrument in the north with Subaru.

5 LSST

NOAO has been making in-roads in connecting the user community to LSST. The UC is pleased that a new LSST collaboration was formed in late 2009, and that 20 new scientists joined the science collaborations. This has, no doubt, been facilitated by the NOAO-hosted workshops for several of the science collaborations. We encourage more such workshops to be held in the future.

The 2009 UC report recommended improving communication between potential LSST users and the scientists in charge of the simulator. The UC is pleased to hear that Abi Saha and Steve Ridgway are leading the effort to improve the simulator in many ways. Further efforts should be made to make the simulator more accessible to the general community, including astronomers not in the science collaborations.

Las Cumbres network of small telescopes should be useful for followup of LSST discoveries and NOAO participation in developing this network is encouraged as funding allows.

Developing general purpose optical and NIR spectroscopic capabilities at CTIO is desirable for enabling LSST followup. The UC recognizes that NOAO has already started work on the optical spectrograph COSMOS, as part of ReSTAR, which will be useful in this regard. We would like to encourage NOAO to begin work on the copy of Triplespec if and when funding becomes available so that the community has a NIR spectroscopic instrument to use on a moderate-size telescope for LSST followup of brighter transient sources.

The UC believes that the efforts of the LSST Science Working Group at NOAO to develop a prototype of a system that would function as an event handler/clearinghouse for the community are worthwhile and should proceed.

Recommendation 5.1

We recommends that NOAO continue to facilitate the formation of new science collaborations.

Recommendation 5.2

We encourage NOAO to host more LSST science collaboration workshops in the future.

Recommendation 5.3

We recommend that efforts also be made to make the simulator more accessible to the general community, including astronomers not in the science collaborations.

Recommendation 5.4

We encourage NOAO to provide LSST follow-up facility by beginning work on the copy of Triplespec if and when funding becomes available.

6 Overall Balance

The overall balance of NOAO activities seems ideal for achieving the needs of its user community, modulo a few specific concerns that we detail below. The UC continues to endorse NOAO's philosophy of viewing all U.S. O/IR facilities as a System. Nonetheless, there are still many users who continue to apply for instruments they have used in the past even when other capabilities exist that would be better scientifically and/or have more time available. NOAO needs to make a constant effort to show the System to its users and to allow them to experience its advantages. The Users Committee made two recommendations along these lines in our 2009 report (Recommendations 9.1 and 9.2) that we were pleased to see NOAO agree to address in its response. However, we are disappointed that progress has not yet been made on either of them.

The first recommendation involved allowing users to propose back-up instrument choices in case their proposal grade is insufficient to schedule it on their first-choice instrument. Having this opportunity would give users incentive to examine the System and notice similar capabilities on new instruments and/or on less oversubscribed telescopes. Such runs could be assigned separate grades by the TAC and then scheduled if the grade is high enough and the higher-priority instrument is unavailable. Awarding some scientifically meritorious programs time on second-choice instruments could help improve the average scientific quality of proposals assigned time on less heavily subscribed facilities. Several UC members have served on the NOAO TAC before and do not perceive this as a significant additional burden for the TAC, although we recognize that it would make scheduling a greater logistical challenge.

The second recommendation involved improving the visibility and functionality of the Instrument Capabilities search page to help familiarize users with the instruments available to them.

The UC is concerned that the policy of allocating no more than 20% of the total time in telescopes of a certain size to surveys is not specific enough to guarantee general users significant access to new and exciting instruments and/or to all parts of the sky. A clear example of this problem is shown in the time allocation for NEWFIRM in 2010B, when 2/3 of the time was allocated to three survey proposals.

Finally we are pleased that much-needed improvements to the website and archive are underway.

Recommendation 6.1

We recommend that NOAO continue its rough balance of current activities and attempt to protect each of its core missions despite the current fiscal challenges.

Recommendation 6.2

We continue to endorse pursuing more partnerships, while also reiterating our strong belief that NOAO facilities should remain available for open access for the great majority of the time.

Recommendation 6.3

We continue to encourage NOAO to cooperate with the efforts to develop a funding source to ground-based observational studies and remove the necessity to apply for telescope time and data analysis funding separately.

Recommendation 6.4

We again suggest that the Instrument Capabilities search page be made more prominent so that it becomes the first thing users find when looking for a list of available capabilities. We urge NOAO to enable multiple buttons to be pressed in each category so that e.g. both large and medium telescope results can be displayed as one page.

Recommendation 6.5

We urge NOAO to allow proposals for 2nd and possibly 3rd-choice instruments via an "OR" clause added to the multiple instrument runs available in the proposal form.

Recommendation 6.6

We suggest that NOAO revises its policies of time allocation to protect general users and ensure that the entire community has access to the new and exciting instruments.

Recommendation 6.7

We recommend that NOAO follow a policy of only allowing survey proposals on an instrument following its commissioning.

Recommendation 6.8

We endorse NOAO's efforts to improve their website and archive interface and are willing to help with this continuing process.

7 ODI

ODI is a flagship instrument for both WIYN and NOAO, with capabilities that will make it a world-leading facility. Given this and the results of the ReSTAR report, we consider a fully functional ODI to be one of the cornerstones of the NOAO instrument complement and of the US telescope system going forward. However, we also recognize that the project is encountering extremely serious difficulties. We think it is essential for a complete review of the project to occur as soon as it is practical to identify the steps and costs needed to complete the project. The results of the review should be the basis for NOAO's continued support of ODI, because a credible schedule and budget are essential to the project. The review must identify not just the technical and budgetary issues that need to be solved to complete ODI, but also the modifications to the management and staffing of the project that are essential to its completion. With a coherent plan for completing and commissioning the instrument in hand, NOAO should then proceed (in conjunction with the other WIYN partners) to the step of identifying the resources to complete this essential project. We believe that WIYN with a functioning ODI is so valuable a resource to the community that NOAO should consider the possibility of losing time on WIYN with the current (still capable) instrument suite or even the possibility of a reduced share at WIYN in the future should it be necessary to find a partner for the telescope. However, because we expect ODI to be

heavily requested by the user community, we recommend that NOAO's share of WIYN in the ODI era should be as large as is possible consistent with finishing the fully-functioning instrument.

ODI is essential to NOAO's capability in wide field optical imaging, the highest priority of the ReSTAR report (which assumes a fully functioning ODI). It is also important to deploy a fully functional ODI, with complete OTA functionality. The UC considers a fully functional reduction and scientific software pipeline to be an integral part of the deployment of such a complex instrument.

Recommendation 7.1

we recommend that NOAO's share of WIYN in the ODI era should be as large as is possible consistent with finishing the fully-functioning instrument.

Recommendation 7.2

We encourage NOAO and its partners to complete ODI as rapidly as practicable.