

NOAO Users Committee 2016 Report

June 2016

This report from the Users Committee of the National Optical Astronomy Observatory (NOAO) is based upon its annual meeting at NOAO, which was held in Tucson on June 1-2, 2016. The 2016 charge for the UC requested input on the following:

1. Please comment on the new NOAO mission. NOAO seeks to provide excellence in open access to telescopes, data, catalogs, and tools for the US community. Most helpful will be comments on NOAO's engagement with the community and the new mission.
2. Please comment on current operations and community engagement with DECam at CTIO. The committee should comment on current scheduling of community time including surveys to ensure the highest productivity.
3. Please comment on how NOAO can best support the community to maximize and prioritize science opportunities from DESI given the nature of the key project. Opportunities to consider include a) the imaging data sets from DECaLS, MzLS, and BASS, b) the public release of the key project spectra, Bright Galaxy Survey spectra and Milky Way Survey spectra (all initially proprietary), c) possible bright time community survey (400-500 hr per year), d) the Next DESI Survey..
4. Please comment on how NOAO can best support the community to maximize and prioritize science opportunities from the new NNEXPLORE spectrograph NEID (NNEXPLORE Exoplanet Investigations with Doppler spectroscopy) on WIYN.
5. Please comment on the ongoing deployment and early use of KOSMOS and COSMOS and TripleSpec.
6. Please comment on current plans for the NOAO Data Lab and associated catalog-based research services, with a particular emphasis on desired user tools (both basic and advanced) to be deployed and priorities for deploying those tools and associated data sets.
7. Please comment on current plans for the NOAO ANTARES prototype Event Broker, with a particular emphasis on desired user capabilities (both basic and advanced) to be deployed in a full-scale version.
8. Please comment on the current level of usage and scientific productivity of the NOAO share of SOAR. Suggestions about "quick wins" to improve scientific productivity would be particularly welcome as would comments on preliminary plans to position SOAR as a key LSST follow-up machine in the era of LSST operations.

9. Please comment on how US observers can best exploit the Gemini telescopes. The Committee should comment on how current processes and capabilities can be improved to enhance the user experience, increase the publication rate, and/or maximize science return on investment.
10. The committee should comment on relevant merits of individual Gemini programs, fast turn-around queue, and Large-Long Programs (LLP).
11. The Gemini next generation instrument RfP will be out by the time of the 2016 UC meeting. The committee should comment on the capabilities represented in the RfP and how they would be prioritized to best exploit new science on Gemini (with an eye to the LSST era).

The current NOAO UC includes seven members, Elizabeth Buckley-Geer (Fermilab, Chair), Karen Meech (Hawaii), Casey Papovich (Texas A&M), Mark Brodwin (University of Missouri-Kansas City), Armin Rest (STScI), John Moustakas (Siena College) and Christy Tremonti (University of Wisconsin-Madison). Prior to the meeting, members of the UC solicited feedback from the community via email and direct contact. The committee also reviewed a number of relevant documents, listed in the charge, in preparation for the meeting. Six of the members participated in the UC meeting (Buckley-Geer, Meech, Moustakas, Papovich, Rest, Tremonti); Brodwin was unable to attend. The recommendations in this report reflect the consensus of the entire UC.

We structure the remainder of the report in sections aligned with the items in the charge.

1. Overall Mission

Please comment on the new NOAO mission. NOAO seeks to provide excellence in open access to telescopes, data, catalogs, and tools for the US community. Most helpful will be comments on NOAO's engagement with the community and the new mission.

The UC commends NOAO for successfully developing a new vision for the national center in the near and medium term. Looking back over the past few years, the committee has been impressed by the efficiency and effectiveness with which NOAO has navigated this transformation in a challenging environment. We endorse this new vision of NOAO as the purveyor of data, and we particularly like the concept of the "third mountaintop" and the build-up of the infrastructure to do this while maintaining observing capabilities on the other two mountain tops.

Development of the NOAO Data Lab is progressing extremely well and it appears that this will be a valuable resource for the community. We think the idea of bringing in early adopters for the Data Lab now with a proposal process is a good one.

We also commend NOAO on successfully identifying partners to enable continued scientific productivity of the Mayall, WYIN, and KPNO 2.1m, and for maintaining open access to facilities to the extent possible.

The continued investments in the physical infrastructure (water, network, power, etc.) at both KPNO and CTIO are excellent, along with working with the University of Arizona to house the data facilities with minimal costs.

One of the challenges moving forward will be how to best advertise the new NOAO. We see significant benefit in continuous engagement of the US community via frequent, brief communication of news relevant to the community. We again suggest that NOAO consider developing an opt-in means by which users can receive brief news updates on instrumentation, telescopes, workshops, and major NOAO developments with a short turnaround time. NOAO should put plans in place for broad-scale community engagement for advertising as this next year will be important given the upcoming beta release of the Data Lab.

Recommendation 1: We recommend that NOAO continue to explore new avenues for effectively communicating with the full US astronomical community on the new NOAO, particularly the idea of the “third mountaintop.”

Some suggestions include:

- Short emails “bulleted” with links (not long newsletters).
- Larger, properly supervised social network presence (Facebook, Twitter).
- Focussed workshops demonstrating the Data Lab, maybe in the form of Webinars or other online seminars.

Recommendation 2: NOAO should ramp up strategic planning for telescope and instrument capabilities in the LSST era. In particular, it would be useful if NOAO could solicit community input and begin to build science cases for moving NEWFIRM to the Blanco; acquiring DESI; swapping DECam and DESI; and moving ARCoIRIS from Blanco to SOAR.

2. DECam

Please comment on current operations and community engagement with DECam at CTIO. The committee should comment on current scheduling of community time including surveys to ensure the highest productivity.

DECam is now a mature instrument, and is the most heavily used instrument in NOAO's portfolio. Observing with DECam is very easy, and we applaud NOAO for setting up and beta-testing remote observing. The number of publications are increasing, and overall DECam has been a great success.

The UC thinks that as long as DES virtually blocks all dark time in the B semester, the current balance between large surveys and PI driven projects is good. After DES, more time can be allocated to the large survey programs.

The CP reductions are good and they are used by the community. The UC strongly encourages NOAO to continue to work with DES to implement all the newest improvements into the CP, as well as with the DECam Legacy Survey (DECaLS) team, which is utilizing the CP-reduced imaging data products.

The possibility of moving NEWFIRM to the south once it is removed from the Mayall is compelling, although there are costs involved, both monetary and personnel. In the LSST-era it would be the only wide-field IR capability once VISTA installs the 4MOST spectrograph. Some effort should be made to solicit input from the community.

In the LSST era NOAO should investigate swapping DECam and DESI. This would give multi-object spectroscopic capabilities over a wide field to the south (supporting LSST), and wide-field imaging to the north.

Recommendation 1: The UC recommends to continue to work with DES and DECaLS on continuing to improve the community pipeline.

Recommendation 2: The UC commends NOAO for setting up and beta-testing remote observing. The UC encourages NOAO to make remote observing publically available as soon as possible.

3. DESI

Please comment on how NOAO can best support the community to maximize and prioritize science opportunities from DESI given the nature of the key project. Opportunities to consider include a) the imaging data sets from DECaLS, MzLS, and BASS, b) the public release of the key project spectra, Bright Galaxy Survey spectra and Milky Way Survey spectra (all initially proprietary), c) possible bright time community survey (400-500 hr per year), d) the Next DESI Survey.

The panel recognizes and commends NOAO for becoming a significant partner in DESI, both by providing resources (telescope time, observers, processing, and data delivery) to execute the public imaging surveys (DECaLS, MzLS, BASS), and through its direct involvement in the DESI Project. The UC hopes and anticipates that this involvement will allow NOAO to create more opportunities for the community to do science with DESI and the precursor imaging surveys than would have been possible otherwise.

Recommendation 1: The UC acknowledges NOAO's success in rapidly serving the raw and CP-processed data from DECaLS (and, going forward, the MzLS and BASS survey data), as well as the *Tractor* catalogs produced by the DECaLS team. In order to encourage scientific analyses, NOAO should regularly advertise the existence of these data to the community, especially as the catalogs are enhanced in subsequent data releases (such as the inclusion of WISE light curves in Data Release 3).

Recommendation 2: Although NOAO represents only one voice among many within the DESI collaboration, the UC recommends that NOAO advocate aggressively on behalf of the community for data to be released as early as possible during the DESI survey. These data releases could be incremental in ways that do not encroach on the DESI key project (for example, an early release of redshifts without the selection functions necessary to compute the correlation function) but which would maximize community science from DESI data. NOAO should strongly advocate for the final DESI data releases to include all the DESI data, including the 1D and 2D raw and pipeline-processed spectra.

Recommendation 3: NOAO should develop a plan on a relatively short timescale (the next 6-12 months) for determining how the community could utilize the ~400 hours of the brightest time with DESI. For example, this process might request white papers from the community, followed by an open call for proposals. Given the need for community users to raise their own funding in order to obtain access to DESI during this time, a large lead time is an important factor to consider.

Recommendation 4: The UC recommends that NOAO starts thinking soon about how the community could potentially gain access to the DESI instrument after the DESI 5-year survey has been completed.

4. NNEXPLORE

Please comment on how NOAO can best support the community to maximize and prioritize science opportunities from the new NNEXPLORE spectrograph NEID (NNEXPLORE Exoplanet Investigations with Doppler spectroscopy) on WIYN.

We are pleased to see the NNEXPLORE program moving forward with the selection of NEID. In addition, there have been a healthy number of NASA/WIYN proposals to use WIYN's current instrument suite for exoplanet science.

Recommendation 1: We encourage NOAO to continue working with the WIYN consortium to improve the telescope's acquisition and guiding capabilities to make WIYN more efficient at carrying out large surveys.

5. KOSMOS, COSMOS, TripleSpec

Please comment on the ongoing deployment and early use of KOSMOS and COSMOS and TripleSpec.

The three new spectrographs have seen somewhat limited use thus far, and therefore it is difficult to evaluate their productivity. We are glad to see that rudimentary exposure time calculators are available and that a pipeline has been adapted for TripleSpec through close work with an interested community member.

Recommendation 1: We suggest that NOAO make more of an effort to advertise the capabilities of the new spectrographs and their short and medium term availability as their current usage may not be reflective of community interest.

Recommendation 2: We encourage NOAO to push the development of exposure time calculators further. In particular, we suggest that they investigate a community developed "universal" spectroscopic exposure time calculator that is currently being used for eBOSS and DESI: <http://specsims.readthedocs.io>

Recommendation 3: We encourage NOAO to pursue community-based pipeline approaches for (C/K)OSMOS. A first step might be to ask current instrument users for contributions of code to a community Github repository.

6A. Science Archive

The UC commends NOAO on its continued effort to maintain a scientifically useful archive. We are enthusiastic about the effort to modernize the back-end of the data archiving process through the new TADA software. With this process nearing completion, we urge NOAO to focus on the front-end user interface. At present this is the main way in which users have contact with the "third mountaintop" and making this experience a positive one is important for shaping perceptions of NOAO's expanded mission.

The UC strongly supports the reprocessing of the DECam data to the most up to date community pipeline as this will greatly increase the scientific value of the data to the community.

Recommendation 1: NOAO should prioritize the development of effective tools for bulk/batch downloads of data, since this is critical to many science programs.

Recommendation 2: NOAO should prioritize improvements to the front-end archive interface to make it more user friendly. This should include better object search capabilities and modernizing the help feature with a formal ticketing system for requests.

Recommendation 3: The UC encourages NOAO to track the usage in the archive and follow up (on 6-12 month timescales) with large users to see how the data is being used, if the users need help, and to solicit feedback.

Recommendation 4: The UC recommends that NOAO Data Management Operations go through the exercise to assess the resources that would be required to reprocess all the DECam data through a uniform version of the CP, and to strive to automate the process to the greatest extent possible. Processing could take the form of applying basic image de-trending (e.g., bias subtraction, flat fielding, masking, streak finding) and astrometric calibration to all images along with the creation of inverse variance maps. It probably should not include coaddition of images or catalog generation as these are science specific and potentially difficult for a heterogenous data set.

6B. Data Lab.

[Please comment on current plans for the NOAO Data Lab and associated catalog-based research services, with a particular emphasis on desired user tools \(both basic and advanced\) to be deployed and priorities for deploying those tools and associated data sets.](#)

The UC is impressed with the vision, plans and tremendous progress in developing the Data Lab. The UC believes this resource will be highly valuable for the community to visualize and access existing complex datasets and future holdings in the science archive. The UC also supports the Guiding Principles of the design of the Data Lab.

The UC agrees that it is important that the design and tools of the Data Lab meet the needs of the community. The UC supports NOAO's plan to request proposals from users to test the interface and capabilities of the Data lab. The early proposers to use the Data Lab will become important advocates of the capabilities back to the community.

Recommendation 1: As the Data Lab development continues, the UC recommends that NOAO strike the right balance between basic functionality such as "find all objects passing a

selection within a given radius in RA/DEC” and the ability to export the results of selections versus more complex functionality such as being able to perform detailed analyses that might be better done outside of the Data Lab environment with an exported catalog.

Recommendation 2: The UC recommends that NOAO investigate ways to advertise the capabilities broadly to the community once the Data Lab’s systems and services are stable (i.e., it is important that users’ first experience with the Data Lab be positive). The demonstrations at AAS meetings are a good beginning. Additional outreach could include summer school programs targeting graduate students (and postdocs), a redesigned REU program, and/or sending NOAO staff to other institutions for “community days” to demonstrate the Data Lab systems and services and to provide hands-on assistance.

Recommendation 3: The UC recommends that the Data Lab provides mechanisms to host community developed software and tools (scripts) and user designed queries. The Data Lab should consider a way to store user queries linked to specific publications (linking queries and software to publications that use the Data Lab).

Recommendation 4: The UC recommends the Data Lab consider tools for identifying moving objects in the data.

7. ANTARES

Please comment on current plans for the NOAO ANTARES prototype Event Broker, with a particular emphasis on desired user capabilities (both basic and advanced) to be deployed in a full-scale version.

The UC recognizes that the NOAO ANTARES project has captured a leadership position in the quest to establish an event broker facility that will enable LSST follow-up science. We commend NOAO’s cross-disciplinary collaboration with the University of Arizona computer science and math departments.

The ANTARES prototype seems to work well and already has many useful features implemented. The UC recommends that as one of the next steps, a regression suite of real data sets should be identified for which the variables and transients are known. These data sets can then be used to simulate a real survey with alerts in order to determine the efficiency and contamination rate of ANTARES, and the overall number of alerts. This is a good way to track the progress of the system.

It is important to involve the community as soon as possible, which then can also be leveraged into contributions from the community maybe via open access code. One of the ways to achieve this is to have ANTARES connected to one of the public surveys as soon as possible, which both would involve the community, and test the system.

Recommendation 1: The UC recommends establishing a set of real test data to determine efficiency and contamination of the alert system and to track the progress of the system.

Recommendation 2: The UC encourages the ANTARES team to connect ANTARES to one of the public surveys in order to involve the community and battle-test the system. It will also help to determine what features the users want to have.

Recommendation 3: The UC encourages the development of a front end for ANTARES that has some ‘standard streams’, e.g. to identify SNe, RR Lyrae, etc, but also has the option for the (advanced) user to define his/her own event stream.

8. SOAR

Please comment on the current level of usage and scientific productivity of the NOAO share of SOAR. Suggestions about “quick wins” to improve scientific productivity would be particularly welcome as would comments on preliminary plans to position SOAR as a key LSST follow-up machine in the era of LSST operations.

We are pleased to see that consensus has been reached on the end date of the SOAR agreement and NOAO’s obligation to fund operations through FY20. NOAO has made good progress in improving the observing efficiency at SOAR with both improvements to the telescope and the instruments. We encourage the discussions regarding the move of ARCoIRIS from the Blanco to SOAR.

In the era of LSST there will be a need for medium to large facilities for rapid follow up of discoveries. SOAR could have a major role to play in following up brighter objects. In order to be an effective telescope for transient follow-up it will be necessary to develop queue observing capability.

We were pleased to see that a targeted survey of “major” SOAR users (those with more than 10 nights during 2011-2014 through the NOAO of Chilean TACs) has been carried out. This accounts for slightly less than half of all the NOAO/Chile time. Out of the 10 PI’s that responded there were a variety of reasons, e.g., waiting for more data from other telescopes, for why they have not yet published their data. However the survey did not identify any consistent source of inefficiency. There were a number of suggestions for improvements, some of which have already been made. There are plans to follow-up with a survey of all the SOAR users.

Recommendation 1: In order to identify what further obstacles might be limiting scientific productivity at SOAR, NOAO should finish the survey of the user community.

Recommendation 2: We encourage NOAO to continue to improve the efficiency of observing at SOAR and to think about developing a queue-observing capability.

Recommendation 3: We encourage NOAO to continue to develop a science driven strategic plan and a concrete definition of SOAR's role in LSST follow-up including thinking about how it might operate in a potential network of follow-up telescopes.

9. Exploiting Gemini

Please comment on how US observers can best exploit the Gemini telescopes. The Committee should comment on how current processes and capabilities can be improved to enhance the user experience, increase the publication rate, and/or maximize science return on investment.

The UC commends the National Gemini Office (NGO) for its proactive approach to obtain metrics for publications for band 1 programs. It appears that there are no substantial issues on the Gemini side that are hindering publications, and the publication rate is very healthy (104 in 2015), second only to Keck and the VLT for facilities in similar size class (Keck 1&2 ~ 300/ yr; VLT 1-4 ~ 350 / yr, HET highest ~ 55/yr, GTC highest 72 / yr, SALT highest 44 / yr). The UC would like to see this model employed for all of the NOAO facilities.

The UC also commends the NGO for the recent release of the GMOS Data Reduction Cookbook. The website is well laid-out and easy to follow, and will be a valuable tool for users wishing to reduce GMOS data.

The users find that the Gemini staff is very supportive during the runs, however, there are some issues that would make observing solar system observations more efficient for queue observing. For GNIRS/NIRI observations the Phase II requests that guide stars are provided, however, for a moving object that could be scheduled any time during the semester, this is a major burden. Similarly, Gemini requests standard stars to be selected for near-IR observations.

Recommendation 1 - One of the keys to producing the highest quality science is good calibration, therefore getting standard stars on different nights from the science observations is not optimal. The NGO should work with the Gemini staff to improve this situation.

Recommendation 2 - In order to significantly improve the efficiency of observing and publishing Gemini data, the UC recommends that Gemini implement a level 1 pipeline processing for

imaging and simple long-slit 2D spectral data (bias subtraction, flat-fielding, gain correction, combine chips into a single image, WCS for imaging and wavelength solution for spectra).

10. Gemini Programs

The committee should comment on relevant merits of individual Gemini programs, fast turn-around queue, and Large-Long Programs (LLP).

The oversubscription rate for individual programs on Gemini-N is 2.6 and Gemini-S is 1.8. The Gemini-N oversubscription is higher than any of the other NOAO facilities for which there are substantial nights available. The oversubscription for the fast turn-around is comparable, but the over-subscription for the Large and Long Program (LLP) allocation is very high at 6.1 in 2016B. Even taking account just the band 1 and band 2 pressure for the regular programs, which is about a factor of 1.5 higher (i.e. bringing the oversubscription up to between 3-4), there is still a big difference in the LLP program oversubscription. The fast-turn around program is working well, and is a welcome addition for the user community, enabling rapid access to the telescope in response to new discoveries and ideas. The community online review process is working very well.

Recommendation 1 - The UC recommends that Gemini investigate whether more time should be allocated to the LLP programs, perhaps by polling the user community. The UC notes that once the oversubscription in the whole individual program gets above around 3, that PIs start to get unhappy with telescope access. The Gemini PI program is one of the cornerstones of the US community.

11. Gemini Next generation instrument

The Gemini next generation instrument RfP will be out by the time of the 2016 UC meeting. The committee should comment on the capabilities represented in the RfP and how they would be prioritized to best exploit new science on Gemini (with an eye to the LSST era).

The User's committee agrees that the choice of a wide band medium resolution spectrograph (Gen4#3) is a high priority instrument that will enable Gemini to take advantage of LSST follow up. The committee notes that in the current Gemini instrument suite that GMOS accounts for 36% of the time requested at Gemini-N and 65% of the time at Gemini-S. The cost of building a second copy of the instrument is potentially much less than the first one, and we suggest that Gemini investigate the possibility of equipping both Gemini-N and S with this key LSST follow-up instrument.

Recommendation 1: The committee recommends that Gemini investigate the possibility of equipping both Gemini telescopes with the Gen4#3 instrument.

Recommendation 2: The wide wavelength coverage of the Gen4#3 is good, but the we would also like to encourage Gemini to consider choosing a proposal that offers multi-object spectroscopic capability.

12. Other Issues

The UC commends NOAO for their work to investigate unconscious bias in the proposal evaluation process.

In the context of unconscious bias, it is noted that solar system science may suffer from some unconscious bias, yet the Division for Planetary Science represents 20% of the AAS membership. Often moving object implementation is more complex and requires additional resources. In a cost-constrained environment the response for individual solar system requests is that it will be considered on a best-effort basis. Unfortunately, this has resulted in planetary capabilities rarely being implemented. The UC encourages NOAO to keep moving object issues in mind in all phases of operations.

Recommendation 1 - Consider having a presence at the Division for Planetary Science meeting being held in Pasadena from October 16-21 2016.

13. Community Feedback

Summary of solar system issues:

- The NOAO staff continue to be very dedicated and responsive, in spite of limited resources and the community appreciates this.
- The new Gemini data archive is a major improvement over the previous version.
- NOAO access to small telescopes is decreasing (including individual access to 4m-class telescopes), and this is a key aspect of many solar system projects.
- A lot of congressional funding is focused on the detection of potentially hazardous NEOs
- The community is concerned that not enough attention is being paid to data mining for non-sidereal objects in large astronomical databases
- Some solar system community members expressed concern that the TAC didn't understand that astrometry submitted to the Minor Planet Center is a refereed publication and that they continue to get criticism for not having refereed publications. This is a primary refereed data project as mandated by Congress for this community.

Other Feedback:

In this section we summarize the feedback that we received from the survey sent to a subset of the PIs of active NOAO programs. We received feedback from a small number of individuals. The UC would like to work with NOAO on other approaches to soliciting community feedback next year

1) Are any NOAO facilities critical for your research? If yes, which ones and why?

One user reported that low/medium resolution optical and near-IR spectroscopy is the most important capability for their research. This includes instruments such as COSMOS, the new near-IR spectrograph on the Blanco, Flamings-2 and GNIRS.

Another user highlighted Gemini/NIFS + Altair laser guide star AO as important. They noted that this is a world-best instrument combo right now for it's ability to get high-spatial resolution kinematics. It has enabled discovery of BHs in nearby low-mass galaxies and UCDs. The same individual is also a user of Gemini/GMOS (multi-object spectroscopy) and Gemini/GNIRS.

Gemini South is important for a user that is very involved with DES and they are relying on Gemini South for follow-up observations.

2) How was your experience applying for and using NOAO facilities?

One user was happy with their experience with applying to and using NOAO facilities over the last few years. They noted that they have obtained lots of good data through several proposals. They also had 2 successful fast turn around proposals on Gemini last fall, which turned out very well. They will likely continue to use that option in the future when appropriate. They also used COSMOS for the first time in the spring of 2015, and they were very happy with the sensitivity which they noted was much better than Goodman on SOAR.

Another user reported that they have had a good experience both in the regular TAC process, and recently in the fast-turnaround process (run by directly by Gemini rather than NOAO). They have also sat on the NOAO TAC and found the process to be fair. The oversubscription rate is low enough that most really compelling proposals get time (unlike e.g. NSF panels or even HST panels).

This user hasn't used NOAO much in the past, they applied for time last year and now this year, so they didn't have specific comments. They noted that this was because, at the time of writing, they had not yet heard about their 2016B proposals and that their experiences would likely be highly dependent on the outcome of the latest TAC meeting! They were disappointed that only 6/10 targets were observed in 2015B, but they understand that there were extenuating circumstances.

3) How does NOAO *not* currently meet your observing needs? Instrumentation? Access? Aperture? Support? Software?

One user would like to be able to observe remotely from their home institution on the Blanco with COSMOS and the new near-IR spectrograph.

A user noted that there are some capabilities that do have public access that they either use, or have specific proposed uses for:

- * Large, wide FOV IFUs. Access to a MUSE like (or KCWI like) instrument would be awesome
- * Wide-field imaging on >4m class telescopes: DECam is awesome, but e.g. for a project they have been working on to map out the halos of nearby galaxies bigger glass is needed to resolve individual RGB stars. HyperSuprimeCam or Magellan Megacam are the currently best available options.
- * Single-shot spectrograph like X-shooter with decent spectral resolution.

Another user would really like wide-field spectroscopy (\geq deg) in the south. The time exchange with AAT is nice, but there is just not that much of it.

4) NOAO has been undergoing significant changes as it refocuses its mission and places increased emphasis on providing community access to large astronomical databases. To what degree are you aware of these changes? To what degree do you expect various aspects of these changes to affect your research program?

One user was not familiar with what NOAO has been doing in this area over the last few years.

Another user noted that, like most astronomers, they regularly use SDSS, and also use the HST archive with great regularity. Providing tools to enable database level access to other datasets seems like an obviously good thing to do.

This user was somewhat aware of them, and as a member of DES and DESI, is involved with fairly big surveys. They suggested that it would perhaps be useful for NOAO to sponsor summer schools for students to learn methods to deal with large databases. They noted that they certainly plan to use big databases more and more.