More Details Emerge on the NSF Senior Review

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As I outlined in the March 2005 NOAO-NSO Newsletter, the NSF Division of Astronomical Sciences (AST) is beginning the process of a “Senior Review” of its facilities portfolio. This review, a recommendation of the most recent Decadal Survey, is motivated at this particular time by a combination of the current Federal budget outlook, the ambitions of the astronomical community as evidenced in the Decadal Survey and in other reports such as "Connecting Quarks with the Cosmos," and by the growth in the AST budget over the past five years.

This review is designed to examine the balance of our investments in the various facilities that we support. The primary goal of the review, and the adjustment of balance that will result, is to enable progress on the recommendations of the Decadal Survey, including such things as operations funds for the Atacama Large Millimeter Array (ALMA), and other priorities.

NSF has adopted the following boundary conditions for the review:

- An assumption that the AST budget will grow no faster than inflationary increases for the remainder of the decade.
- In concert with the advice of every community advisory body (and in keeping with its own evaluation of balance and need), NSF will not use resources from the unrestricted grants programs to address the challenges of facility operations or the design and development costs for new facilities of the scale of the Large Synoptic Survey Telescope (LSST), the Giant Segmented Mirror Telescope (GSMT), the Square Kilometer Array (SKA), etc.
- No facilities will be considered to be “off the table.”
- The process and the adjustments in balance that may result must be realistic and realizable.
- Recommendations should be based on well-understood criteria.
- There should be ample opportunity for community input at all stages.

NSF expects that our deliberations will:

- Be based on extensive consultation with the user community.
- Involve evaluation of component facilities and capabilities using well-defined and carefully documented metrics to define productivity, cost effectiveness, and future utility.
- Take into consideration systemic issues such as complementing observations at other wavelengths, filling critical niches in the overall US system, roles in training and technical innovation, and impact on shared infrastructure.
- Explore opportunities to deliver scientific knowledge at reduced cost or increased efficiency through new operating modes.

NSF seeks to have our input by July 31. With this information in hand from all of the facilities, and with the best understanding of the needs for development and future programs, AST will then present a number of scenarios to the senior review committee for their comment and advice. These scenarios will necessarily trade progress on the various recommendations against preservation of existing capability. The challenge will be to strike an acceptable balance.

In the words of NSF AST Director Wayne Van Citters, “We recognize that this will be a difficult task and that the end result may well be that some facilities are judged to be no longer viable under the circumstances. We also recognize that the landscape of US astronomy could almost certainly change dramatically as a result of some these actions. The question for all of us is to judge whether these changes are viable and lead to a vital and sustainable future, or whether the pace and scope of change... continued
Motivated by the desire to collect complete community input, NOAO will assemble its input to the Senior Review on an open Web page at www.noao.edu/dir/seniorreview. This page features a feedback icon, and I welcome and look forward to your comments and input.

O/IR ground-based facilities, looking forward from 2005 to as far as 2030. The plan shows how present investments realize the new initiatives, illustrates convergence paths, lays the basis for facility closures and transfers, and addresses community structural change. Logical decision points for public investment and disinvestment are highlighted. An illustration of the roadmap is reproduced below, but, of course, we recommend you read the report in full.

Several staff members were recipients of 2005 awards from AURA, which were given out at the recent member representatives meeting in Tucson. Joan Najita received an AURA Science Award, Ron Probst received an AURA Technology/Innovation Award, and Charles Corson of WIYN received an AURA Service Award. Well deserved by all!
New Partnership Opportunities at NOAO

The NOAO Long Range Plan envisions that by 2010, NSF-provided core funding to the National Observatory will be focused on support of major new projects, including the Thirty Meter Telescope and the Large Synoptic Survey Telescope. By that time, most of the financial support for observing facilities at Kitt Peak National Observatory (KPNO) and Cerro Tololo Inter-American Observatory (CTIO) will need to come from operating partners rather than the NOAO base budget. These new partnerships are likely to be modeled on the partnership that successfully operates the WIYN Observatory.

Various budget demands have already led us to begin the transformation of our operations. Our immediate need is to raise the funds necessary to continue the scientifically productive operation of our existing facilities. We will be offering observing time in exchange for financial support of the operations of the observatory sites. We envisage agreements of limited duration during a period of transition that would end with the establishment of more permanent partnerships on the time-scale of 2010.

KPNO

At KPNO, shares of observing time on the 2.1-meter and Mayall 4-meter telescopes will be available, and we are eager to discuss these opportunities with interested parties. We are looking to make partnership time available on the 2.1-meter as soon as possible, consistent with the stated process in the NOAO Long-Range Plan of privatizing the 2.1-meter when NEWFIRM becomes available for scientific use. The timescale for partnership observing time using the Mayall 4-meter is likely to start in Semester 2006B or later. Partners that buy into the 4-meter or 2.1-meter could negotiate how they might trade some of their time for observing on other KPNO (or perhaps CTIO) telescopes.

At this time we are seeking informal expressions of interest only. We are interested in partners who will bring cash to the support needs of the observatory, and who will use the resulting observing time for their research and educational activities. While negotiable, our current estimate of a minimum share would be 1/8th of the available time over a two-year period, on either or both the 2.1-meter or 4-meter telescopes. Institutions or individuals desiring smaller shares are encouraged to amalgamate their interests with the aim of providing a single point of contact as an operations partner.

For more information on Kitt Peak opportunities, please contact Richard Green (rgreen@noao.edu) or Buell Jannuzi (bjannuzi@noao.edu).

CTIO

At CTIO, the SMARTS consortium operates the CTIO small telescopes (see www.ctio.noao.edu/telescopes/smarts.html). The SMARTS principal investigator is Charles Bailyn at Yale (bailyn@astro.yale.edu). We are about to put SMARTS II together, to run for three years beginning in February 2006. The typical buy-in is $50K/year, but you can put in more to get more time if you wish.

SMARTS has been very successful, and the consortium members have produced lots of good science. The telescopes are well-instrumented, with the exception of a search for an optical spectrograph for the 1-meter, so Charles is looking for people who need telescope time to do projects, and can pay for it. You’ll see there is a wide variety of observing modes—classical, service, queue—depending on the telescope. Charles would be very happy to talk to you if you are interested in this opportunity.

Partnerships for up to approximately 25 percent of the CTIO Blanco 4-meter are also available. Deals using a combination of telescopes, and perhaps creative “time swaps” with other NOAO facilities, including the SOAR 4.1-meter, are possible in principle.

In addition, the Dark Energy Camera consortium for the Blanco 4-meter continues to look for partners with funding resources. This Fermilab-led consortium, with Project Director John Peoples (peop@fnal.gov), aims to build a very large (2-degree-diameter field) CCD imager and new corrector for the Blanco prime focus. The instrument is scheduled to start the Dark Energy Survey in 2009. See www.ctio.noao.edu/telescopes/dec.html for more on this “super-Sloan survey.” The consortium presently consists of Fermilab, the University of Illinois, the University of Chicago, Berkeley/LBNL, UCL, and Barcelona high energy physics institutes. The latter two are waiting on funding applications. This is a $20M project, and partners will need to bring science synergy or be able to use the survey data for another purpose.

For more information on any of the CTIO opportunities, please contact Alistair Walker (awalker@noao.edu).

Please note that a competitive Announcement of Opportunity for Blanco and Mayall 4-meter time will be issued in the NOAO-NSO Newsletter at a later date. Any partnership arrangements are subject to the agreement of the NSF.
Tom Matheson joined the staff of the NOAO Gemini Science Center (NGSC) in September 2004, after four years as a post-doctoral fellow at the Harvard-Smithsonian Center for Astrophysics. He received his PhD in June 2000 from the University of California at Berkeley on the topic of the spectral characteristics of stripped-envelope supernovae, where his advisor was Alexei Filippenko. Tom has published more than 65 papers in refereed journals, including nine as first author. His service duties involve helping the US astronomical community get the best possible spectrographic results from the Gemini Observatory.

Q. What are your primary scientific interests?
My main interests are supernovae, gamma-ray bursts, and the cosmological uses of supernovae. Since supernovae are so bright, you can see them very far away, and that means you can use them to probe the distant universe by calibrating the distant ones using the nearby ones. Now that we know the cosmic acceleration from dark energy is real, the game is figuring out what is causing it.

One of the ways we are doing this is through the NOAO Survey Program named ESSENCE, using the Mosaic camera on the Blanco 4-meter telescope at CTIO. My role is to coordinate the follow-up spectroscopy of all the optical targets. To do that, we use virtually every large telescope on the planet we can get our hands on—we’ve used just about every telescope larger than six meters! We are still in the middle of the project. Right now, we have found 91 Type-Ia supernovae with spectroscopic confirmation, and I am fully convinced we will reach our goal of 200 when we are finished.

Q. What do your early results look like?
The goal is to determine whether the acceleration is the result of the cosmological constant the way it was envisioned by Einstein, and get a handle on the equation of state. So far, everything points to the cosmological constant being the most likely answer, but it is not definite. We should have a good answer in about two years; there is still a lot of analysis to be done.

Q. Why did you decide to come to work for NGSC?
I had been using Gemini a fair amount, and here I can be more closely integrated with the needs of the spectra for this project. Beyond that, Gemini is an ideal tool for observing supernovae and gamma-ray bursts because of the queue scheduling. Nobody else can provide that flexibility with a large telescope. I’m still working with a lot of data from the 1.5-meter at Mount Hopkins. But if you want to do faint objects, Gemini is clearly the best way to do these transient objects.

Q. What are your primary support tasks for NGSC?
My duties are all associated with supporting GMOS. I help people design their programs if they have questions. When the proposals come in, we do the technical reviews to determine if what they say that they want to do can actually be done. Then, once they go through the Time Allocation Committee process, I am the contact for the Gemini Phase II process to help them prepare their observing programs.

I also help with the queue observing about once per semester; I am about to go on my second one. I’ve learned that there are a lot of things that go on behind the scenes, and how much effort is put into supporting the community by the staff here. Even more help is available if people want it.

Q. What do you see as the future scientific promise of Gemini?
It has great capabilities for doing spectroscopy in the infrared, so that means you can push to higher redshifts than at a lot continued
of other telescopes. The infrared instruments at Gemini, both current and forthcoming, are unique. Infrared is virgin territory for the supernovae and gamma-ray bursts.

I am not sure that everyone realizes how capable the observatory is right now. I know that the people who use it tend to come back, because they find out how valuable it is. The queue scheduling is not just great for supernovae and gamma-ray bursts, but also for other kinds of variable phenomena, such as eclipsing binaries in other galaxies. You would never be able to schedule such observations easily at a more traditional observatory.

In addition, having two sites in two hemispheres where the weather is not the same is very helpful. For our projects, we chose objects that are visible from both sites, so we can get a spectrum "right now."

Q. Would the Thirty Meter Telescope have any special applications to your research areas?
With gamma-ray bursts, there are issues about being able to see things with mid-infrared instruments that would be too faint to do even with existing telescopes, such as being able to see the entire broadband spectrum from gamma-rays and X-rays down through infrared to radio. There are some interesting characteristics in the afterglow, and some tests of the synchrotron model for the afterglow. We have a program to try to do this with Spitzer, but it would be interesting to do it from the ground at different redshifts.

Q. What is your perspective on the Large Synoptic Survey Telescope (LSST)?
The hard part will be doing the spectroscopic follow-up to all the transient objects that the LSST will find. That is one of the reasons we were able to be successful in getting the ESSENCE survey approved. It illustrates the potential, and it has uncovered some of the challenges of doing a program like the LSST. How do you deal with that amount of data flow and analyze it in real-time in order to be able to act upon it? How do you tailor the observing campaign to maximize the science that you get out of it? It is a real-world example of an LSST-type of experiment.

Q. How have you found the working environment of NOAO and life in Tucson?
I had been visiting here for seven or eight times a year to use the telescopes at Mount Hopkins. I have always liked coming here, and I really like living here. My wife grew up in New York, and she expected to see sand and rocks when we got off the airplane the first time to look for a house, so she has been pleasantly surprised. And my dog likes it too.

Notable Quotes

"The Vision [for Space Exploration] is Moon, Mars and beyond. I like to remind people that 'beyond' is a very big place.”
—NASA Goddard Space Flight Center Director Edward Weiler, telling the Baltimore Sun that NASA Goddard should be protected from most potential job cuts at the space agency due to its active role in solar system exploration, 17 March 2005.