NATIONAL SCIENCE FOUNDATION
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**NSF 17-079**

# Dear Colleague Letter: MPS-AST Facility Divestment Activity

April 27, 2017

Dear Colleague:

## PURPOSE

The National Science Foundation (NSF) and its Division of Astronomical Sciences (AST) remain committed to the provision of leading-edge facilities as well as small and mid-scale funding opportunities that are made available to the U.S. astronomical community for the conduct of merit-reviewed science. This Letter provides the community with a top-level summary of the current status of NSF actions regarding facility divestment recommendations made in 2012 by a committee chartered to review the AST facility and program portfolio.

## BACKGROUND

In August 2010, the National Research Council (NRC) released the most recent in its series of decadal surveys in Astronomy and Astrophysics, entitled: *New Worlds, New Horizons in Astronomy and Astrophysics*[1] (hereafter referred to as *NWNH*). *NWNH* (p. 32) recommended that *"NSF-Astronomy should complete its next senior review before the mid-decade independent review that is recommended elsewhere in this report, so as to determine which, if any, facilities NSF-AST should cease to support in order to release funds for (1) the construction and ongoing operation of new telescopes and instruments and (2) the science analysis needed to capitalize on the results from existing and future facilities."*

In order to satisfy this recommendation, the National Science Foundation (NSF) Division of Astronomical Sciences (AST, also referred to in *NWNH* as NSF-AST) commissioned a community-based review panel. That Portfolio Review Committee (PRC) was charged to assess the AST facilities and grants programs in order to recommend the mix of capabilities, under a highly constrained budget, that would be best suited to deliver the science recommended by *NWNH*. The PRC delivered a report in August 2012.[2] NSF has reported the status of its response to the PRC report in two previous Dear Colleague Letters: NSF 14-022[3] and NSF 15-044[4].

The PRC report contains a set of recommendations regarding the capabilities that best deliver on *NWNH* science, including divestment from the AST budget of some telescopes judged to have lower priority for that science. Execution of the response to those recommendations remains critical in an era when the AST budget is no larger than it was in Fiscal Year (FY) 2010. The continued importance of the NSF response was highlighted in the August 2016 National Academies mid-decadal report, *New Worlds, New*

*Horizons: A Midterm Assessment*[5], Recommendation 3-1: *"The National Science Foundation (NSF) should proceed with divestment from ground-based facilities which have a lower scientific impact, implementing the recommendations of the NSF Portfolio Review, that is essential to sustaining the scientific vitality of the U.S. ground-based astronomy program as new facilities come into operation."* More recently, the March 2017 annual report[6] of the Astronomy and Astrophysics Advisory Committee (AAAC) provided two recommendations on divestment: *"The AAAC concurs with NWNH-AMA [New Worlds, New Horizons: A Midterm Assessment] recommendation that the NSF facility divestment process be moved forward and that the agencies work to ensure that individual investigators are funded, in order to capitalize on and leverage the full capabilities of the large projects that represent such important and substantial investments by the agencies."* and *"The AAAC supports the NSF approach of working to divest facilities to partners or non-federal organizations that will continue to operate them as scientific facilities."*

## NEAR-TERM DIVESTMENTS AND COLLABORATIONS CONCLUDED OR ON PATH TO CONCLUSION

Consistent with these recent recommendations, NSF continues to progress on implementation of divestment. In general, the Portfolio Review Committee considered divestment scenarios in which lower priority facilities were removed in their entirety from the AST budget. Subsequent community recommendations, including the reports cited above, stressed the desirability of maintaining some scientific access to facilities that were given lower priority. With this in mind, NSF carefully considers partial divestment paths only if they would result in a reduction of more than 50 percent of the pre-divestment AST funding level.

A number of telescopes that were recommended for divestment have evolved into collaborations with interested parties that may include significant changes in scope of work, and (in most cases) reduced NSF AST funding. In general, these telescopes are taking part in specific missions or experiments that are time-limited. As the current or prospective missions come to an end, formal studies of the possible long-term alternatives will be initiated at the appropriate times. The future continuation of collaborations involving these telescopes are subject not only to the availability of NSF funds, but also the availability of funding from the relevant collaborators. Telescopes in the category:

- The 2.1-meter telescope on Kitt Peak is now being operated by a university-based consortium for Robo-AO[7] (Adaptive Optics) from FY 2016 through FY 2018.
- The Mayall 4-meter telescope on Kitt Peak has been identified as the preferred platform for the Dark Energy Spectroscopic Instrument[8] (DESI), to be funded primarily by the Department of Energy (DOE).
- The National Optical Astronomy Observatory (NOAO) share of the WIYN 3.5-meter telescope on Kitt Peak has been selected as the avenue for a joint NSF-NASA exoplanet research program, NN-EXPLORE[9]. In April 2016, NASA selected a group led by Pennsylvania State University to construct a new Extreme Precision Doppler Spectrometer for this telescope. NSF intends to continue to fund the NOAO share of operations for the WIYN 3.5-meter, with the NOAO observing time open to the community for exoplanetary research.
- The Very Long Baseline Array has become the scientific instrument of the new Long Baseline Observatory (LBO)[10]. Beginning in FY 2017 LBO involves a substantial collaboration between NSF and the United States Naval Observatory (USNO). It is anticipated that operational funding will be shared primarily between NSF and USNO through FY 2021 through an Interagency Agreement,

currently in place, with other smaller funding contributors also participating in LBO. LBO will see a greatly increased use for maintenance and enhancement of the International Celestial Reference Frame, as well as rapid monitoring of Earth Orientation Parameters.
- Beginning in FY 2017, the Global Oscillations Network Group (GONG, part of the National Solar Observatory)[11] has a component of its operations funding provided by the National Oceanic and Atmospheric Administration (NOAA) through an Interagency Agreement, currently in place. It is anticipated that this Interagency Agreement will continue through the end of FY 2021. This NOAA funding supports the use of GONG and its data products for operational space weather forecasting.

## ONGOING ENVIRONMENTAL REVIEW PROCESSES

Several telescopes were recommended for divestment or consideration for divestment during this decade, but do not have collaborations in place that would reduce NSF funding to the degree needed. Those are: Arecibo Observatory; the Sacramento Peak Observatory component (centered on the Dunn Solar Telescope) of the National Solar Observatory; Green Bank Observatory (centered on the Robert C. Byrd Green Bank Telescope); and the McMath-Pierce Solar Telescope. Formal processes for the consideration of future avenues have begun for Arecibo Observatory, Sacramento Peak Observatory, and Green Bank Observatory. It should be emphasized that no decisions have been made yet about the future paths of these facilities.

The legally required processes for consideration of any substantial change in operations or infrastructure at a federal observatory include the following:

- formal environmental review pursuant to the National Environmental Policy Act (NEPA);
- consultation regarding potential impacts to historic properties under Section 106 of the National Historic Preservation Act (NHPA); and
- consideration of potential impacts to threatened or endangered species and/or their habitat under the Endangered Species Act (ESA).

In the cases of Arecibo, Sacramento Peak, and Green Bank, formal environmental reviews have begun, in the form of preparation of an Environmental Impact Statement (EIS) for each facility. The EIS process does not consider scientific priority, which is assessed by the community processes described above, or budget availability, which is determined by the annual federal budget and appropriations process, but the expected outcome of the EIS process for each facility, issuance of a Record of Decision, is expected to consider both. Besides science priority and budget availability, the Record of Decision for these facilities is expected to include other considerations such as risk assessments and the viability of collaborations, along with any accompanying mitigation efforts or conditions.

Under NEPA, the EIS process begins with a scoping stage in which NSF solicits public comment on the definitions and environmental aspects of a broad range of preliminary proposed alternatives, both through public meetings and written public input. As required by NEPA, the "No-Action" Alternative (i.e., continuing to operate a facility with NSF funding) always is included among the alternatives to be considered. Following the initial scoping process for an individual facility, NSF will publish a Draft Environmental Impact Statement (Draft EIS) for that facility; a Draft EIS contains a more specific description of the proposed alternatives, having been informed by the scoping process, and an analysis of the potential environmental impacts associated with implementation of these alternatives. A Draft EIS[12] was published for Arecibo on October 28, 2016, to be followed in 2017 by similar documents for Sacramento Peak and Green Bank. Another round of comments and one or more public meetings follow

the issuance of each Draft EIS, to accommodate further public input. After this comment period, NSF will prepare and publish a Final EIS, which will address substantive public comments on the Draft EIS. In parallel, NSF has been conducting the NHPA and ESA activities referred to above for Arecibo, Sacramento Peak, and Green Bank, including consultation with State Historic Preservation Officers and (where necessary) with the U.S. Fish and Wildlife Service. At least 30 days after release of the Final EIS for a given facility, NSF will complete its consideration of the anticipated environmental impacts associated with each proposed alternative as well as the separate scientific, budgetary, and programmatic issues, and will publish a Record of Decision, to be followed by implementation of that Agency decision.

The Draft EIS for Arecibo Observatory evaluated the anticipated environmental impacts stemming from implementation of several proposed alternatives. One of the alternatives being evaluated for Arecibo Observatory, Collaboration with Interested Parties for Continued Science-focused Operations, was identified in the Arecibo Observatory Draft EIS as the Agency Preferred Alternative. On January 25, 2017 NSF released a solicitation for future continued operations of Arecibo Observatory. The solicitation, which is running concurrently with preparation of the EIS, is intended to support the Agency Preferred Alternative.

Targeted timescales for completion of the EIS and related processes for Arecibo Observatory, Sacramento Peak Observatory, and Green Bank Observatory are as follows:

- June - November 2016: Initial scoping periods for EIS processes (now completed).
- October 2016 - July 2017: Draft EIS release, and comment periods for Draft EIS.
- May 2017 - December 2017: Final EIS release, and 30-day cooling off periods.
- August 2017 - January 2018: Issuance of NSF Records of Decision.

These time targets represent the fastest timelines envisioned for the EIS processes, but the actual timelines may be adjusted to allow sufficient time to consider relevant information. Further information on the status of these processes, including meeting notices, draft documents, and descriptions of the processes, continue to be provided to the community via a frequently updated web page.[13]

NSF is committed to maintaining the maximum availability of frontier science tools for the ground-based astronomy community in a highly constrained budget environment, while recognizing that difficult choices must be made to operate and maintain the advanced telescopes and data systems of the future. NSF also is committed to comply with the statutory requirements of NEPA, NHPA, and ESA, in order to inform its future plans for facilities that have not been given the highest priority by the broad U.S. astronomical community.

Sincerely,

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1. https://www.nap.edu/catalog/12951/new-worlds-new-horizons-in-astronomy-and-astrophysics
2. https://www.nsf.gov/mps/ast/portfolioreview/reports/ast_portfolio_review_report.pdf

3. https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf14022
4. https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf15044
5. https://www.nap.edu/catalog/23560/new-worlds-new-horizons-a-midterm-assessment
6. https://www.nsf.gov/mps/ast/aaac/reports/annual/aaac_2016-2017_report_corrected_letter.pdf
7. http://www.ifa.hawaii.edu/Robo-AO/
8. http://desi.lbl.gov
9. https://exoplanets.nasa.gov/exep/NNExplore/
10. https://www.lbo.us
11. http://gong.nso.edu
12. https://www.nsf.gov/mps/ast/env_impact_reviews/arecibo/eis/DEIS.pdf
13. https://www.nsf.gov/news/news_summ.jsp?cntn_id=139158