

# NSF MPS/AST Response to Portfolio Review Report

2012-08-30

## EXECUTIVE SUMMARY

This document comprises the initial response of the NSF Division of Astronomical Sciences (AST) to the report of the Portfolio Review Committee, a subcommittee of the Advisory Committee for the Directorate for Mathematical and Physical Sciences. After a discussion of approach and principles, summary responses are given to the recommendations on Small Grants, Mid-scale Projects, Facilities, and the nature of National Observatories. Actual implementation of responses will evolve from AST recommendations as they pass through NSF and Federal government decision-making processes, generally in the context of development of the President's annual budget request to Congress. Thus specifics of any proposed plan will be confidential until the President's Fiscal Year 2014 Budget Request is transmitted to Congress in February 2013. The implementation of the plan will be subject to Congressional review and appropriations following transmission of the 2014 Budget; no final decisions are likely to be made before the end of 2013.

### 1. Background and Statement of General Principles

Ground-based astronomy has a bright future; significant new capabilities recommended in previous decadal surveys are coming on line this decade, and will provide new discovery potential. However, budget constraints mean that operating the new telescopes, maintaining a healthy community, and starting any future initiatives will require tough priority choices and divestment of capabilities, some of which are unique. Without making these choices, little or no progress will be made on past and present decadal survey recommendations, and the grant success rate will continue to decline.

Each National Academy of Sciences (NAS) decadal survey provides a strategic vision for the field for subsequent decades. The Portfolio Review was carried out to provide an AST programmatic vision, taking the most recent NAS recommendations into consideration. These recommendations are found in the Astronomy and Astrophysics decadal survey, *New Worlds New Horizons in Astronomy and Astrophysics* (hereafter *NWNH*), and the Planetary Science decadal survey, *Vision and Voyages for Planetary Science in the Decade 2013-2022*. (The Solar and Space Physics decadal survey was not released until after the AST Portfolio Review Report was completed.) The charge to the Portfolio Review Committee directed the Committee to recommend the combination of new capabilities with existing and evolved capabilities in order to create a portfolio best suited to answering the key science questions of the decadal surveys. AST derived two hypothetical budget scenarios for the Committee based on recent funding trends; these are indicative of possible futures, but are neither upper nor lower bounds on possible long-term budgets. The full charge and the Committee report are available on the AST Portfolio Review web page at [http://www.nsf.gov/mps/ast/ast\\_portfolio\\_review.jsp](http://www.nsf.gov/mps/ast/ast_portfolio_review.jsp).

In sum, the specific reasons for commissioning the Portfolio Review are itemized below:

- Foreseeable budgets will be insufficient to meet the aspirations of the astronomical community.
- *NWNH* advised: "If ... budget is truly flat ... there is no possibility of implementing ... the recommended program ... without ... enacting the recommendations of the first 2006 senior review and/or ... a second more drastic ... review before mid-decade." (p. 240)
- Such reviews should be carried out periodically in any case, for responsible stewardship of the AST portfolio.

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From the AST perspective, the Portfolio Review had the following primary goals:

- Foster U.S. leadership in ground-based astronomical research in 2020 and beyond.
- Look to the future of scientific advances and of our community under a more constrained budget environment.
- Achieve the balance that enables the most progress on the key scientific questions from the recent decadal surveys.

AST will base its response to the Portfolio Review Report on the following guiding principles, which follow principles or recommendations articulated throughout the Report, together with some practical constraints on implementation:

- Take as a starting point the statement of principles established by the Portfolio Review Committee (Chapter 2 of their Report).
- Plan actions on facilities to the more pessimistic budget scenario, with higher budget levels resulting in more investments in small grants and mid-scale programs (Recommendation 10.2).
- In divesting, first seek transfer of a facility or telescope to another funding source, with a deadline near the end of Calendar Year 2013 to make decisions on divestment.
- Divest a telescope or facility in a manner responsible to its fellow tenants at observatories and to its long-duration user programs; give appropriate and due consideration to agreements with all partners; and respect contractual obligations and commitments (Recommendation 10.7).
- Maintain an optimal balance among program elements, as consistent as possible with the balance recommended by the Portfolio Review Committee, while recognizing that the slower pace of change in large-facility programs will inevitably cause short-term shifts in the balance. Make AST near-term budget and programmatic decisions with a view to their consistency with the longer-term plan for responding to the Portfolio Review Committee recommendations.

## 2. AST Response to Small Grants Recommendations

Small grants programs were critical in the *NWNH* report, and were the subject of several specific funding recommendations. In the discussion of individual investigator programs, *NWNH* (p. 134) states that “[r]eallocation of resources may have to come at the expense of support of existing missions/facilities and new projects.” However, for at least the next few years, the specific funding increments recommended in *NWNH* are not achievable in either of the Portfolio Review Committee’s budget scenarios. Acknowledging this situation, the Portfolio Review Report made seven recommendations related to the small grants programs, which include Astronomy & Astrophysics Research Grants (AAG), Advanced Technologies & Instrumentation (ATI) and other small grants programs in AST.

Portfolio Review Report Recommendation 10.1, “AST should maintain substantial funding to AAG, ATI, and a mid-scale program as a top priority,” is consistent with the priority given to these items by *NWNH*. AST will consider this recommendation as an over-arching guiding principle when implementing the response to the Portfolio Review Report. However, as pointed out by the Report, the Fiscal Year (FY) 2017 funding for these programs will still be reduced from the levels in FY 2010 if the more pessimistic budget scenario occurs, even if all recommended facility divestments are executed.

The six recommendations in Chapter 7 of the Portfolio Review Report that pertain to small grants include various increments to existing programs as well as the initiation of new programs. Given the

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constrained budget scenarios and the explicitly higher-priority recommendation for AAG and ATI, it is unlikely that AST will be able to respond positively to all of the recommendations for program increases over the next few years. AST does expect to maintain its commitments to the Research Experiences for Undergraduates program (Recommendation 7.2) and the Astronomy and Astrophysics Postdoctoral Fellowships Program (Recommendation 7.3) over the next several years, and also is in the process of starting a small program (in collaboration with NASA) on Theory and Computation Networks (Recommendation 7.1).

AST notes that the ability to respond positively to *any* of the small-grants recommendations is dependent on maintaining sufficient funding in the grants line, which is likely to be possible only if significant facility divestment can be achieved.

### 3. AST Response to Mid-Scale Recommendations

A gap exists within NSF for a competitive program to fund projects with total cost ranging between \$4M and \$130M (i.e., between the maximum for Major Research Instrumentation and the minimum for Major Research Equipment and Facilities Construction). *NWNH* recommended, as its second priority for large initiatives in ground-based astronomy, that AST create a “Mid-Scale Innovations Program” growing to \$40M per year by 2020. The annual funding rate for mid-scale programs in AST at epoch 2010 was about \$20M, up from only a few million dollars per year a decade earlier (see Table 5.3 of *NWNH*).

The AST Portfolio Review Report made recommendations about how a competed mid-scale program might be implemented, and what programs would be included. Recommendation 8.3 of the Report proposed that numerous projects that were previously part of separate programs, plus proposals for major new instrumentation at national observatories, be moved into this program. AST plans to follow the intent of this recommendation, although partnership complexities will necessitate further thought about how instrumentation at AST facilities can be incorporated into a general mid-scale program.

If sufficient funding is available, NSF will consider developing a mid-scale program addressing science projects, open access capabilities, mid-scale facilities, and development investments. These categories align with those recommended by the Portfolio Review Report in their Recommendations 8.1 and 8.5. Following the recommendations of the Portfolio Review Committee, the mid-scale program would include projects that previously fell under the Telescope Systems Instrumentation Program, the University Radio Observatories program, and the Renewing Small Telescopes for Astronomical Research program. (If a competitive mid-scale program is created, we expect that this merger will occur before mid-decade.) The mid-scale program would also include data management, archiving, and curation, tools for user interaction with data, and laboratory experiments; these capabilities are discussed by the Committee in Recommendations 8.3, 8.6, and 8.8 of their Report. Proposal review would be via merit-review panels and/or *ad hoc* reviews. The nature of solicitations and the budgets allocated to each of the four categories would depend on proposal pressure, programmatic emphasis, and the total funding available for the program.

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## 4. AST Response to Facilities Recommendations

After establishing the science-based prioritization of AST facilities, designing a balanced portfolio consistent with constrained budgets resulted in a Portfolio Review Committee conclusion that not all the current AST facilities fit within the portfolio. The Committee's Recommendation 10.6 advised AST to "divest" from numerous facilities. For AST, the practical interpretation of the phrase "We recommend AST divest from ..." a particular telescope is that funding for operations of that telescope should be removed from the AST budget. In responding to this recommendation, AST will first seek other sources of funding or operators for that telescope before moving toward possible closure. In order to have a realistic probability of achieving maximum savings for reinvestment by the beginning of FY 2017, the divest/close decision for any individual telescope should be made near the end of Calendar Year 2013. It is anticipated that, if AST determines to divest from an individual telescope, this telescope would be separated from the AST-supported parent observatory in any future management competitions.

In implementing a recommendation to divest from a telescope or facility, AST will use the following two principles, already stated in Section 1:

- First seek transfer of a facility or telescope to another funding source before decision to close, with a decision deadline near the end of Calendar Year 2013.
- Divest a telescope or facility in a manner responsible to its fellow tenants at observatories and to its long-duration user programs; give appropriate and due consideration to agreements with all partners; and respect contractual obligations and commitments.

A detailed implementation plan for facilities recommendations will be proposed by AST based on collaborative discussions with the observatories and their managing organizations. However, any such plan is subject to discussion and modification or concurrence from various levels of NSF management, other Federal agencies, and the White House. These discussions will take place in the context of Federal-government budget development, and will require that specific information be embargoed until Presidential budget requests are released. Such requests then are subject to review and appropriation actions by Congress. Because of these multiple, complex stages, a facilities implementation plan cannot be presented in any more detail at this time.

## 5. AST Response to National Observatories, Observatory Scope, and Open Skies Recommendations

AST understands the Portfolio Review Report recommendations and sentiments on the national observatories, observatory scope, and open skies, given in Chapters 11 and 12 of the Report. In practice, these items are the subject of complex negotiations with partners, and additionally are dependent on overall budget levels. All of these recommendations will be considered in the management competitions for AST facilities and in discussions of partnership agreements. Such negotiations and competitions will necessarily be unique to a particular observatory situation. AST will commit to considering the Portfolio Review Report recommendations carefully and incorporating them into the future discussions, but cannot commit to any specific outcomes at this time.

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