

January, 2012

Letter to NSF AST Portfolio Review Committee Regarding the National Solar Observatory

The Solar Observatory Council (SOC), AURA's management arm for the National Solar Observatory (NSO), commends the committee for its willingness to undertake the portfolio review during these challenging times. We wish to take this opportunity to emphasize a number of issues concerning the NSO of which the panel is no doubt aware, but which we feel it is worthwhile to state explicitly.

The Deputy Director of NSF's Astronomical Sciences, in a letter dated Oct. 26, instructed observatory directors to prepare input for your panel under the assumption of constant purchasing power. NSO has only just begun construction of its flagship facility, the 4-meter Advanced Technology Solar Telescope (ATST), which promises to revolutionize solar astronomy later in this decade and beyond. At this time, however, no operating budget has been allocated to the new observatory. Since ATST was first proposed, the NSF and AURA have been planning for an operating budget to be assigned upon completion of construction and commencement of operations, currently expected in 2018. Indeed the ATST project has carefully estimated these costs, which currently are reflected in long-range NSF budget plans. It therefore seems sensible to the NSO, and this management council, that the constant purchasing power condition be applied to the anticipated operating budget that includes ATST, rather than to the current base budget.

A related issue concerns several one-time costs associated with the proposed streamlining of the NSO. In response to recommendations of the 2006 AST Senior Review, the Observatory plans to decommission most of its current facilities and consolidate operations at a new directorate site in Boulder, CO. While these actions will enable more efficient management in the future, they require two key investments in the near term. First, NSO will incur one-time costs associated with moving its bifurcated operations (currently split between Arizona and New Mexico) to the single new headquarters site. Second, there are costs associated with decommissioning the old facilities in both New Mexico at Sacramento Peak and Arizona at Kitt Peak. The closures will free up resources in the future for ATST and Synoptic operations, but do not directly achieve scientific goals of the kind your panel is charged to consider. It is unclear how these one-time costs would be allocated under a plan of constant purchasing power, or indeed even within the current facility support model of AST at NSF.

A final issue with regard to the Portfolio Review's ground rules, as stated in the letter to the facility directors, concerns the consideration given ground based solar physics and the ATST in the Astro2010 decadal survey.

(1) The ATST was undertaken as a result of the high priority recommendation it received in the previous astronomy decadal survey, *Astronomy and Astrophysics for the New Millennium* (2000); however, since then the National Research Council (NRC) has initiated a separate series of heliophysics decadal surveys, beginning with *The Sun to Earth and Beyond* (2003), aligned more closely with solar physics. Indeed, solar physics is presently being reviewed in a separate NRC heliophysics decadal survey (*A Decadal Strategy for Solar and Space Physics [Heliophysics]*), and publication of its report is not expected until later in spring of this year.

Consequently, many of the scientific priorities of solar physics were intentionally excluded from consideration in the recent Astro2010 study upon which your panel has been charged to base its deliberations. Even so, ATST is mentioned explicitly in NWNH as requiring an adequate increase in the NSO base funding to effectively operate the \$300M facility.

(2) NWNH recognized the importance of synoptic observations for solar science. In addition, ground-based solar observations, especially from the Synoptic Program, are an essential part of space weather prediction, an area that has key National Security implications and direct societal impacts, above and beyond the pursuit of fundamental scientific knowledge that characterizes the rest of astronomy and upon which decadal priorities are largely based. While the Air Force now supports the collection of H-alpha data from Synoptic/GONG sites, it is NSO's synoptic science program that provides near real time magnetic maps that are important for short-term space weather predictions, as well as long-term (multi-decadal) measurements of solar cycle attributes necessary to gain insight for long-term predictive capabilities. While these vital "operational" aspects of solar physics are accounted for in the Heliophysics reviews, they do not have the same visibility in the astronomy decadal survey.

The SOC acknowledges that all the AST facilities likely believe that they merit special treatment in the Portfolio Review. We wish to make the case strongly, nevertheless, that solar physics stands at the threshold of a major observational revolution later this decade with the commissioning of ATST. Inadequate support for the operations of the new observatory, for the closure of existing facilities, or for the consolidation of the existing dispersed NSO into a single headquarters, could jeopardize the scientific impact of the \$300M investment that NSF is making in building the new ATST observatory.

Sincerely,

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