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March 30, 2007

Dr. Wayne van Citters  
National Science Foundation  
4201 Wilson Boulevard, Room 1045  
Arlington, VA 22230

**Regarding: NSF Senior Review Recommendations for the National Solar Observatory's  
Global Oscillations Network Group (GONG) Facility**

Dear Dr. Van Citters:

The Users' Committee of the National Solar Observatories (NSO) has received positive feedback regarding the Senior Review Report, in particular the recognition that NSO has developed an exciting scientific program for the Advanced Technology Solar Telescope (ATST) and directed significant effort toward that component of its future.

However, we wish to communicate strong concerns regarding the Senior Review recommendations for the Global Oscillations Network Group (GONG) facility. The scientific impact of imminent GONG closure would be far-reaching, more so than even many of our committee members had initially appreciated.

The consensus of the helioseismologists from whom we have heard is that the Senior Review report underestimates the scientific importance of operating GONG during the Solar Dynamics Observatory (SDO) era. While it is possible that HMI will operate beyond its planned 5-year lifetime, the recent failure of the ACS instrument on Hubble, shortly *before* its fifth anniversary, reminds us to take very seriously the limited lifetime of space experiments (indeed, SOHO and its MDI instrument were nearly lost three years after launch). Assuring the continuity of helioseismic measurements *through* the upcoming solar activity cycle is particularly crucial because *we do not yet know* what constitutes a "normal" helioseismic cycle. Only one activity cycle has been observed, and already there appear to be differences between the cycle we are leaving and the one we are entering.

Results from helioseismology are now of central importance for solar physics, yet the measurements are complex and subject to many subtle systematic errors, particularly with respect to secular variations. As an independent (as well as physically accessible and upgradeable) helioseismology system, GONG is an equal partner with spacecraft instruments in definitively establishing important new results, especially those that imply solar-activity related changes.

GONG serves a community that extends far beyond helioseismology. While the magnetograph capability of the upgraded GONG facility is relatively new, researchers are already beginning to incorporate these data as boundary conditions for heliospheric modeling. With continuous coverage, high cadence and sensitivity, and the critically important institutional support of a national facility charged with ensuring its quality and consistency, GONG magnetograms have the potential of becoming a standard source of data for heliospheric modeling and prediction. By its nature, heliospheric modeling and application development relies critically on long-term, stable measurements.

For the space-weather forecasting community — historically a heavy user of NSO data — GONG is a source for both magnetograms and helioseismic far-side imaging. Real-time operational facilities such as NOAA's Space Environment Center are particularly vulnerable to outages of single-point space assets. At a time of increased human presence in space, and increased reliance on technology that is itself subject to

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heliosphere-generated disruption, GONG plays an important backup role in maintaining a national predictive capability.

GONG has well served the NSF's long-standing role in training and nurturing scientists. The young field of helioseismology is just beginning to produce "the next generation," who are questioning, testing, refining, and discovering. Yet, current graduate students and post-doctoral researchers are questioning whether helioseismology is a viable career choice if data are limited to those from a single spacecraft.

Indeed, GONG is the NSF's primary, if not the only, funded tool with which to study the solar interior, its dynamics and evolution in the context of the broader stellar physics. This aspect establishes the GONG facility squarely within NSF's broad astronomical interests, and its support must be considered in this context.

Finally, GONG is an outstanding example of affordable international collaboration at a time when such partnerships are deemed vital to NSF efforts such as ATST. The impact of closing GONG would be felt most keenly at those sites located in developing nations.

The NSO Users Committee brings representation to the wide community of users of NSO data and facilities. We are aware that some of the concerns expressed above have been separately communicated to the NSF by individual members of the community. We also realize that all facilities exist in a competitive environment and that all will eventually close. However, with this letter we hope to highlight the breadth and importance of GONG's impact on the heliophysics and space weather communities. We urge the NSF to make every effort to continue funding for the operation of GONG while NSO investigates non-NSF funding, and to provide at least 50% funding for the duration of the SDO mission.

Yours sincerely,

NSO Users' Committee

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