July 10, 2006

Dr. Wayne Van Citters
National Science Foundation
Division of Astronomical Sciences
4201 Wilson Blvd., Room 1045S
Arlington, VA 22230

Dear Wayne:

In the last five years, the concept of a US astronomical "Telescope System", as recommended by the National Academy's Astronomy Survey Committee, has been developed and partially implemented. This system approach recognizes that astronomy is a field in which there are very significant private and state resources devoted to building telescopes and instruments. As a result, among large US O/IR telescopes, the collecting area operated by independent observatories exceeds that in publicly operated telescopes by a ratio of roughly 5:1. The System approach is designed to leverage NSF funding to gain wide community access to a variety of forefront facilities while simultaneously providing a funding source for improving the capability of the independent observatories. This is the foundation for public-private partnerships that appears essential for the next generation of extremely large telescopes in the U.S.

We are concerned that, despite an excellent start to the TSIP and AODP programs, the FY 2005 and 2006 budgets resulted in a seriously increased imbalance of funding in the "Telescope System" approach and undermined its promise. We are encouraged that the President's 2007 budget restores some of the cuts to programs that are important, indeed crucial, to the System, but feel the payoffs of leveraging NSF dollars are so great that an even larger investment in the System is warranted. Indeed, given the distribution of available collecting area, this appears to be the only immediately available way to maintain the long standing leadership role of the U.S. in O/IR astronomy in the face of strong European competition and to supplement public access to cutting edge observing facilities beyond Gemini and NOAO telescopes. In this era, community access to the equivalent of one 8-m telescope (Gemini) is completely insufficient to allow the U.S. to remain in a competitive position. We, therefore, urge that NSF take steps to ensure and protect funding for the "Telescope System".

In the area of AO, there is an important purpose beyond achieving a more robust system. That is, AO represents one of the strongest technological drivers in astronomy today. Future competitiveness in astronomy is directly related to the ability to foster innovative approaches to AO. The role that astronomy plays in

driving developments in AO is a significant contribution to the American Competitiveness Initiative.

I. Specific Recommendations.

To prevent future imbalances like that in FY05/06, and to optimize the international competitiveness of U.S. O/IR astronomy we recommend that:

1. NSF-AST provides more vigorous support for the "Telescope System" as endorsed by the Astronomy Survey Committee. This program represents a "win-win" opportunity. It opens to the community dramatically increased telescope and instrument opportunities while simultaneously allowing the independent observatories to improve their instrumentation. In addition, it places resources at institutions that are producing the next generation of O/IR astronomers and that have developed a vast number of new instrumentation concepts. We suggest that NSF-AST identify a "Telescope System" Program Officer.

2. In allocating resources, NSF-AST should give greater weight than is currently the case to leveraging external funding sources. TSIP, AODP, and ATI provide mechanisms for accomplishing this and, except for ATI, provide a direct return in community observing time. TSIP is the core of the "public-private partnership" effort within the O/IR community. AO is perhaps the most important area of development both for the Extremely Large Telescopes of the future but also for internationally competitive research with today's large telescopes: the AODP is an essential element in maintaining U.S. leadership in the field. The ATI program is the lifeblood for innovation in instrumentation. All three should be augmented to achieve a strategic funding target that will allow the US to keep pace with ESO and others. We propose target annual budgets of TSIP - $7M [1] and ATI - $12M respectively. For AODP, the funding target set by the Decadal Survey and generally accepted by the community has been $5 M per year, much beyond what has been achieved. We recommend that this be set as a floor for future planning purposes.

3. The NSF should strive to avoid the sharp downward discontinuities in funding for programs such as TSIP, AODP and ATI such as occurred for FY 2005 and FY 2006. The System's contribution to the overall health of astronomy requires steady investment if it is to serve and to flourish as anticipated by the Astronomy Survey Committee. Furthermore it needs to maintain flexibility if it is to exploit the advantages offered by the independent observatories – namely independent and creative thinking.

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[1] The $7M for TSIP is derived by applying the nightly costs of telescope operations to the number of nights that each independent observatory indicated (at a meeting in February 2006) that they would be interested in providing to the community in return for TSIP funding.

4. NSF-AST should participate in the next System Workshop, which will be organized cooperatively by ACCORD with specific support from NOAO. One goal will be to identify areas in which NSF-AST might optimally invest funding to maintain U.S. leadership in O/IR ground-based astronomical research. In addition, ACCORD has discussed the need to develop an update to the roadmap for adaptive optics, which adequately recognizes all of the public and private activity underway and results in a strategic approach, together with requisite funding, for moving AO forward. We believe that the NSF should be a proactive participant in both of these efforts.

Sincerely,

AURA Coordinating Council of Observatory Research Directors (ACCORD)