



UNIVERSITY OF CALIFORNIA OBSERVATORIES/LICK OBSERVATORY
DEPARTMENT OF ASTRONOMY AND ASTROPHYSICS

SANTA CRUZ, CALIFORNIA 95064

June 21, 2006

Dr Rick Howard, Acting Director,
Astrophysics Division, Science Mission Directorate, NASA

Dr. Wayne Van Citters, Division Director,
Division of Astronomical Sciences, MPS, NSF

Dear Dr Howard and Dr Van Citters:

Over the last year there have been discussions at several AAAC meetings about establishing an ExoPlanet Task Force (ExoPTF) to assess approaches and options for extra-solar planet detection and characterization, using both space and ground-based facilities. Planet searches are technically challenging and projects that will enable major advances have long development lead-times and will be costly. Planned space missions and major ground-based instruments will provide near-to-intermediate term results, but the way forward on a synergistic, cost-effective approach involving both space and ground-based facilities remains unclear.

In the 2006 AAAC Annual Report the AAAC recommended the formation of such a task force later this year so that its report would be available late in 2007 or early in 2008, providing guidance both to the agencies and the upcoming Astronomy Decadal Survey. The AAAC Annual report language is given below.

We recognize the concern that was expressed about having a number of such Task Forces running in parallel, but now that the Dark Energy Task Force Report has been completed, we feel that it would be valuable to have more detailed discussions of a possible structure, key elements of the charge and a timetable for the ExoPTF at the AAAC meeting in October.

Sincerely yours, on behalf of the Committee,

Garth D. Illingworth,
Chair, Astronomy and Astrophysics Advisory Committee

Cc:

NSF: Eileen Friel, Dana Lehr

NASA: Mary Cleave, Colleen Hartman, Paul Hertz, Michael Salamon

DOE: Robin Staffin, Kathy Turner

OMB: David Trinkle, John Sloan, Amy Kaminski, Joel Parriott,

OSTP: Rob Dimeo, Jon Morse

AS: David Spergel

AAAC: Neta Bahcall, John Carlstrom.

Bruce Carney, Wendy Freedman,

Katherine Freese, Robert Kirshner,

Daniel Lester, Angela Olinto,

Rene Ong, Sterl Phinney,

Catherine Pilachowski, Abhijit Saha

Excerpts from the 2006 AAAC report re Synergy and the ExoPlanet Task Force

ExoPlanet Task Force (ExoPTF)

ExoPTF: The AAAC notes that substantial progress is being made on ground-based planet searches and that substantial activity has occurred in defining future space-based facilities. The AAAC recommends that the agencies consider the establishment of a task force to develop a roadmap for planet detection and characterization, as well as planetary formation, with consideration of the relative roles and contributions of future ground-based programs and space missions. Such a report, as well as being a guide for agency planning, will also provide very valuable input to the Decadal Survey.

Interest in planet searches, in the characterization of planets, and in the broader scientific issues encompassing planet formation is rapidly growing in the community. The technological challenges associated with planet searching and characterization are formidable. This has led to a number of extremely innovative techniques and approaches being developed and applied on the ground and under consideration for use in future facilities in space. In the near-term a number of space missions, including HST and Spitzer, are being used to address the scientific questions with several missions planned or under discussion for the future, including Kepler, SIM, TPF-C, TPF-I, and Darwin. The science case for current and future large ground-based telescopes with innovative (and very challenging) AO capabilities includes programs that are contributing to this topic or are planned to do so. Given this great interest in the field of ExoPlanet research, and the challenges and high cost of both ground- and space-based experiments and missions, it would be very timely and valuable to undertake a study similar to what has been done recently for the CMB and for dark energy. The results of such a study would also be very valuable input for the next Decadal Survey. Given the dramatic changes that have occurred at NASA in the last two years with regard to

planet searching, the recommendations of such a group could also provide a more stable framework under which a planet search/characterization program could be developed. The AAAC recommends that the agencies consider establishing such a task force this year. Once started, this activity would likely take over a year, and so the availability of a report late in 2007 or early in 2008 would allow the community to build on its findings and recommendations in time for the next Decadal Survey later this decade.

Synergy

Another aspect of the synergy between ground and space has surfaced as a result of developments over the last year. The focus at NASA on the search for other planets (see TPF §5.10) has highlighted the scientific and public interest that is developing in the search for planets around other stars, their characterization and the broader issue of planetary system formation and evolution. Recent developments in adaptive optics (AO—and particularly the potential of what is now called Extreme AO—ExAO) have led many researchers into thinking about the great potential of large telescopes in the GSMT-class for tackling these problems in the upcoming decade. The high resolution available in the infrared with 30-m class, AO-equipped telescopes enables observations of some planets and disks closer to other stars than can be done with space telescopes with their smaller mirrors. Again, these ground-based capabilities will complement the space observatories under discussion and allow synergistic approaches to investigating how planetary systems develop around stars. See §6.9 for a discussion of the AAAC recommendation that the agencies form an ExoPlanet Task Force to evaluate the approaches to planet detection and characterization on the ground and in space.