

February 3, 2010

To: Wes Huntress, Chair, NASA Science Committee

RE: Report from the Astrophysics Subcommittee (ApS)

From: Craig Hogan, Chair, ApS

This note summarizes results from the ApS meeting of February 2-3, 2010.

The Subcommittee is grateful for presentations from Jon Morse, Michael Salamon, Eric Smith, John Huchra, Tom Prince, Doug Hudgins, Jim Kasting, Chris Martin, Linda Sparke, Mike Moore, Lia LaPiana, Wes Traub, Dan Blackwood, John Mather, Greg Williams, Paul Hertz, Erick Young, Padi Boyd, Bill Borucki, Richard Griffiths, Neil Gehrels, Wilt Sanders, and Jay Bookbinder. We are also grateful for support from NASA staff, especially Hashima Hasan, Vernon Jones, Mike Moore, Wilt Sanders, and Eric Smith.

*Program Analysis Groups:* Our subcommittee recently established an Exoplanet Program Analysis Group (ExoPAG), modeled after others in SMD (such as the Mars Exploration PAG), to facilitate community input and participation. We heard a report from its Chair (and ApS member) James Kasting. While carefully avoiding policy recommendations, the ExoPAG will organize community-based groups chartered by our subcommittee, or by the Division, to provide useful data and analysis on specific topics. A first set of studies was discussed with an executive committee and about 100 participants at the January AAS meeting. After reviewing these proposals we have agreed to charter these studies, and look forward to reports at a later date.

This early success encourages us to seek approval from the NAC to establish similar PAGs for our other science themes, Physics of the Cosmos and Cosmic Origins.

*Proposed Technology Fellowships:* At our previous meeting, an ad hoc working group was tasked to design the framework for a new fellowship program to advance the early careers of the best astrophysics technologists/instrumentalists. Chris Martin reported with a set of specific recommendations for a program. As reported previously, it is similar in some ways to other named fellowships (such as Einstein, Hubble, Sagan), but with important differences: there would be a longer duration, greater emphasis on industry partnerships, institutional support and mentorship, more restrictions on the number of fellows at each host institution, an opportunity for significant NASA support for an independent technology project, and an option for awards (with stipend only for summer) to junior faculty. Our subcommittee has now drafted and discussed a one-page template solicitation with these features and will work with the Division to advance this program to implementation. We recommend that the new Technology Fellowship should not be funded by

offsets to existing Astrophysics R&A elements, since it introduces a new activity that directly supports national technical workforce development.

*Competitive solicitations: Explorers and Missions of Opportunity.* We believe that significant science opportunities exist for experiments at relatively modest cost (~\$50M), through a combination of suborbital programs, international partnerships, and Space Station platforms. Future competitions should be structured in a way that gives these modest investments a fair scientific hearing. In general our committee also wishes to express enthusiastic support for the quality and success of Explorer and other PI-led missions: it is critical not to let this very cost-effective investment lapse in the broader competition with large, strategic missions.

*Science Plan:* We heard a report by Greg Williams on the current draft science plan. We endorse it in broad terms and will offer specific suggestions offline for edits.

*Missions under review by the Decadal Survey: LISA, SIM, JDEM and IXO.* We heard deep and detailed presentations about these ambitious projects. Their future will depend primarily on prioritization by Astro2010.

*Issues with the R&A and SR&T programs:* Linda Sparke and Mike Moore introduced several ongoing issues with administration of grants. For example, delays occur in expending funds due to the ways that university programs run their research with graduate students and postdocs. It was agreed that some (but perhaps not most) of this problem could be fixed with rather simple changes in financial operations and better communications about anticipated expenditures. Also, it was felt that the overall R&A program would benefit from additional support for early-stage (low TRL) technology development aligned with our missions.

*The Budget:* Jon Morse summarized the very recently released budget for 2011 and the five year projected plan. The Astrophysics budget reduction in FY2011 had been anticipated from previous budget requests, but the funding trajectory is projected to turn around in FY2012 and beyond. The near-term reduction is due to the high launch rate in 2008-2009 (Fermi, Kepler, Herschel, Planck, HST-SM4) and the transition from development to operations of these new facilities. The future budget trajectory remains consistent with previous projections that were shared with the Astro2010 Decadal Survey committee and panels during the past year. The subcommittee encourages the NRC to accelerate the release of Astr2010 by mid-summer, if possible, to enable the agency to incorporate its recommendations in the next budget cycle.

*Kepler:* The subcommittee heard early science results from the first months of the Kepler mission. The spectacular results included new data of unprecedented quality on stellar oscillations, and the discovery of an unpredicted new type of very low density planets around distant stars that introduce new challenges to theory. The system performance will be sufficient, after a few years, including sufficient follow-up observations to eliminate false positives, to achieve the exciting goal of the mission: the discovery of Earth-size planets in the habitable zone of other stars, if they are not very rare.