



8 April 2014

Dr. David J. McComas  
Chair, NASA Advisory Council Science Committee  
Southwest Research Institute

Dear Dave,

The NASA Advisory Council's Astrophysics Subcommittee (APS) met at NASA Headquarters on 26-27 March 2014. In attendance were APS Members Jamie Bock, Joel Bregman, Julianne Dalcanton, Edna DeVore, Giovanni Fazio, Scott Gaudi (APS Vice Chair), Gabriela Gonzalez, Chryssa Kouveliotou, Gary Melnick, John Nousek, Terry Oswalt, Paul Ray, Ken Sembach, and Karl Stapelfeldt. Also in attendance were Paul Hertz (Director, NASA Astrophysics Division) and Hashima Hasan (APS Executive Secretary). APS Chair Bradley Peterson and member Fiona Harrison attended some of the meeting via telecon. APS member Gary Bernstein was unable to attend. Scott Gaudi chaired the meeting in Peterson's absence.

During the two-day meeting, we heard a general update on the Astrophysics Division (ApD) from Paul Hertz, as well as more focused ApD updates from Linda Sparke (R&A), Vernon Jones (Balloon Program), Wilt Sanders (Explorer Program), and Eric Smith (James Webb Space Telescope [JWST] Project). We heard interim reports from the WFIRST/AFTA Science Definition Team (SDT) from Neil Gehrels and David Spergel, and from the Science and Technology Definition Teams (STDTs) for EXO-S from Sara Seager for Exo-C from Karl Stapelfeldt. We also heard updates from three ApD Program Analysis Groups (PAGs): the ExoPAG from Scott Gaudi, the PhysPAG from John Nousek, and the COPAG from Ken Sembach. Finally, we were briefed on the findings of the Committee on Astronomy and Astrophysics (CAA) study of WFIRST/AFTA by Fiona Harrison, and we were provided an update of the European Space Agency (ESA) Cosmic Visions plan by Arvind Parmar. In addition to these presentations, Associate Administrator for the Science Mission Directorate (SMD) John Grunsfeld provided us with a general overview of the SMD, and engaged in discussion with the APS committee members. We would like to thank all of the presenters and participants for their time and effort.

Findings:

- The APS is pleased to report that JWST remains on schedule and maintains significant reserves, despite the loss of time due to the government shutdown. All four instruments have been integrated into the integrated science instrument module (ISIM)
- The APS is pleased to report that the NICER mission has passed its Key Decision Point-C (KDP-C) and moved from formulation to implementation. The APS notes the decision by NASA to maintain the current cost caps of the Explorer missions, following a discussion with the CAA.



- The APS commends the WFIRST/AFTA SDT and the Exo-S and Exo-C STDTs on the progress they have made in developing the scientific and technical aspects of these potential future missions. The APS looks forward to the final reports from these teams.
- The APS notes the extensive and varied activities of the three PAGs, which continue to provide important input to NASA through the reports and findings of their Science Analysis Groups (SAGs) and Science Interest Groups (SIGs). The APS approved the creation of the first ExoPAG SIG entitled “Toward a Near-Term Exoplanet Community Plan.” The APS also approved closing COPAG SAG #4 “Technologies for a Future Far-Infrared Mission” as it has completed its work.
- The APS notes the progress of the ApD Balloon Program, and in particular the continued development of the capability for Ultra Long Duration Balloon flights through Super Pressure Ballooning.
- The APS would like to commend the CAA Committee on the Implementation of WFIRST/AFTA for their thorough and insightful report. The APS concurs with the committee’s findings, and recommends that NASA sponsor an external review whose aim is to ensure that the cost and risk of the WFIRST/AFTA mission is consistent with the balanced program advocated by the 2010 National Research Council Decadal survey.

### Recommendations and Concerns:

- The APS requests that Paul Hertz give a presentation at a future APS meeting that provides a historical and holistic accounting of the distribution of all ApD research funding, including but not limited to R&A funding and mission-specific GO funding.
- The APS encourages NASA to more clearly define the metrics by which it establishes and maintains a balanced ApD program that is consistent with Decadal Survey recommendations. The APS notes that these metrics should consider the total mission development time and total integrated cost, in addition to the total cost per fiscal year.
- The APS continues to be concerned about the future of education and public outreach within the ApD, as well as more broadly in the Science Mission Directorate (SMD). APS understands that the FY '15 proposed budget includes \$15 million for EPO for the entire SMD (plus \$6 million specifically for GLOBE within Earth Sciences). As this is a significant reduction from the FY '13 budget of ~\$42 million for SMD EPO, APS recommends that the NAC Science Committee commission a task force to review the status and future of SMD EPO, and advise SMD on priorities for EPO in FY '15.
- The decision to greatly reduce funding for the Stratospheric Observatory for Infrared Astronomy (SOFIA) in FY15, and discontinue funding in FY16 and beyond, is of deep concern to the APS for several reasons.
  - 1) The decision to terminate a working \$1B observatory only two weeks into its prime mission is unprecedented. The APS recognizes that budgets fluctuate and decisions are required to adapt to changing funding realities. However, decisions of this magnitude made without community input undermine the manner in which NASA and its stakeholders have worked effectively for so many years. The APS is concerned about the opaque process followed in the case of SOFIA



and stresses the importance of following the well-established, community-input based process of the Senior Review in evaluation of missions.

- 2) The APS notes that SOFIA is the only observatory on Earth or in space that provides access to far-infrared wavelengths between 28-350 microns. Future facilities that might cover these wavelengths are at least a decade away.
- 3) The APS believes the decision to terminate SOFIA support abruptly greatly imperils the likelihood that SOFIA will return to operation under any future funding scenario. The imminent loss of such a large number of talented and experienced individuals on the SOFIA team makes the prospect of returning SOFIA to a productive scientific platform after an extended hiatus highly problematic .
- 4) The APS is greatly concerned with the repercussions that the termination will have with respect to our credibility with one of NASA's most important collaborators. SOFIA is a joint project involving the US and Germany (80%, 20%, respectively). Ending the mission barely before science operations carries the double negative of denying Germany any significant development savings while providing no return on their investment. Germany was not consulted regarding the decision to end US funding and the Deutsches Zentrum für Luft- und Raumfahrt (DLR) has clearly made its displeasure known. APS is concerned that the damage caused by the unilateral US decision could jeopardize German collaborations with NASA on a host of current and future missions and will undermine the confidence of our current and future international partners on other missions.

The APS urges NASA to accelerate its efforts to find a sustainable path forward for SOFIA that maintains the balanced program advocated by the 2010 National Research Council Decadal survey, and to seek strategies that may allow the project to retain the corporate knowledge needed to emerge successfully from any reorganization.

- Finally, the APS notes that the overall volatility of the NASA budget harms the APS's ability to advise NASA in a timely manner, harms NASA's ability to make long term plans and develop, manage, and execute missions cost-effectively, and harms NASA's ability to interact with other partners (e.g., ESA) that have more stable and long-term funding profiles. The Subcommittee was particularly struck by the stark contrast between the NASA's budget process and ESA's much more stable budget model.

Sincerely,

Bradley M. Peterson  
APS Chair

Scott Gaudi  
APS Vice Chair