Dear Dr. David,

The Astrophysics Subcommittee (APS) of the NASA Advisory Council met in Tempe, Arizona, on 26 February 2007. The APS preceded the Workshop on Science Associated with the Lunar Exploration Architecture. At the meeting, the committee heard presentations from Michael Salomon (via telephone), Rick Howard (via telephone) and Steve Ridgway.

This letter summarizes the main issues identified for extended discussion by the APS, and lists its specific recommendations.

ACS Failure and SM4

The loss of ACS has significantly reduced HST's capabilities. This underscores the importance of SM4. If it is possible to restore ACS, it would be useful to involve the community in evaluating the relative priorities of STIS and ACS repair, either through the STUC or through an ad-hoc mechanism.

The APS is very excited about the post-SM4 HST science capabilities. However, HST with its older instruments currently has significantly reduced capabilities. Given the significant cuts to R&A funding in other areas and the reduced science yield from HST (until SM4), there is an opportunity to consider rebalancing R&A funding.

As recommended in the Decadal survey and in our earlier letters, we are eager to see reduced operations costs for post-SM4 HST. Given the ACS failure, this pre-SM4 window may be an opportune time for implementation of reduced operations costs.

Recommendations:

- *We recommend that NASA engage the STUC or some other community committee in its deliberations of the relative scientific merits of repairing STIS and/or ACS during SM4.*
- *. In order to better balance R&A funding within astrophysics, we recommend shifting money from pre-SM4 HST operations and data analysis to other competitive R&A programs. While the subcommittee is very excited about the post-SM4 HST science capabilities and does not recommend a reduction in post-SM4 data analysis, HST has significantly reduced capabilities with its older instruments. As recommended in the Decadal survey, we are eager to see reduced operations costs for post-SM4 HST.*
- *We recommend implementation of reduced operations costs for HST, and request a presentation regarding this at our next meeting.*

Cuts to Precursor Theory Programs

The 15% cut in the Astrophysics Theory Program (ATP) primarily from the Beyond Einstein Foundation Science (BEFS) area, and the elimination of the TPF Foundation

Science (TPF-FS) program, have together produced a 30% cut in basic theory funding. More importantly, the eliminations of BEFS and TPF-FS have effectively zeroed out theme-based research programs.

In the context of the current budget situation, we support the decision to have a single ATP/BEFS selection in the current ROSES. However, we also remember that the NAS decadal recommended a program of theory challenges that linked theory to future major NASA missions and themes. Such programs are designed to provide the foundation for future astrophysics missions, which is why they are named "foundation" science. The APS is very concerned about the reduced level of Research and Analysis (R&A) funding for these theory programs.

Over the long term, the APS would like to see fundamental growth in R&A support. The National Academy, as well as this Subcommittee and its predecessors, have emphasized the importance of foundation R&A for developing new ideas, evaluating mission data, and developing the future STEM workforce.

In the short term, given the aforementioned cuts, the APS is concerned about a lack of balance in R&A funding within astrophysics

Recommendations:

- *We recommend restoring theme-based fundamental science programs in the Navigator and Beyond Einstein programs as the funding levels increase over the long term.*
- *We recommend that the Division find modest resources within other program lines to sustain these lines in the immediate out-years.*
- *We request that a comprehensive discussion about the balance of R&A (operating missions versus foundation science for future missions) be presented at the next Subcommittee meeting.*

Explorer Program

The subcommittee applauds the restoration of the Explorer program and is pleased to learn of plans for a new selection. Because the science requirements of the astrophysics and heliophysics community are different, the AO needs to be open to a broad range of possible missions.

While the lack of medium-size launch vehicles limits the mass of the next Explorer, there may be a "niche" for a low mass MIDEX with either more extensive instrumentation or actively cooled optics. There may also be a number of promising Missions of Opportunity. The community is eager to learn about the available launch capabilities, cost cap and schedule for the upcoming selection.

Recommendations:

- *We recommend expediting the decision on the structure of the Explorer AO.*
- *We request a detailed discussion of the Explorer program at the next meeting.*

Lunar Program in the Context of the Decadal Survey

The Subcommittee is looking forward to participating in the workshop that follows its meeting, and hopes there will be worthwhile astrophysics opportunities that are enabled by the planned lunar architecture. If so, the most promising lunar applications may need technical studies so that they can be evaluated in the decadal process.

Recommendation:

- *We recommend that all lunar-enabled projects that draw on Division resources be evaluated in the context of other astronomical priorities in the NAS Decadal Survey process.*

Sincerely yours,

David Spergel, Chair

Chair for the Astrophysics Subcommittee