

DATE: June 20, 2008

FROM: NASA Heliophysics Subcommittee
Dr. Alan Title (Chair)
Dr. Roy Torbert (Vice-Chair)
Dr. James Clemmons, The Aerospace Corporation
Dr. Ed Deluca, Harvard-Smithsonian Center for Astrophysics
Dr. Sarah Gibson, NCAR High Altitude Observatory
Dr. J. Todd Hoeksema, Stanford University
Dr. Janet Kozyra, University of Michigan
Dr. Mary Hudson, Dartmouth College
Dr. Robert Lin, University of California, Berkeley
Dr. Richard Mewaldt, California Institute of Technology
Dr. Donald Mitchell, JHU/APL
Dr. Craig Pollock, Southwest Research Institute
Dr. James Russell, Hampton University
Dr. Harlan Spence, Boston University
Dr. Michelle Thomsen, Los Alamos National Laboratory
Dr. Allan Tylka, Naval Research Laboratory
Dr. Daniel Winterhalter, NASA Jet Propulsion Laboratory

TO: Dr. Edward David (Chair, NAC Science Committee)

SUBJECT: Report of the Heliophysics Subcommittee of the NASA Advisory Council

Dear Edward,

The Heliophysics Subcommittee (HPS) of the NASA Advisory Council (NAC) Science Committee met for its second meeting of the year on 12-13 June 2008, at NASA Headquarters in Washington D.C. A total of 13 of the 17 members participated in the meeting. The meeting agenda is attached to this memo.

The HPS participated in plenary sessions during the morning and early afternoon of each day, late afternoon sessions were reserved for work sessions to complete subcommittee work products. The charge to the subcommittee for this meeting was threefold. The first charge was to provide an assessment of Heliophysics Science Performance for FY2008. The second charge was to provide an initial reaction to the Heliophysics Roadmap effort, recently undertaken by the Mission Planning Working Group, a subpanel of HPS, for delivery to the Heliophysics Division by the end of CY2008. The third charge was to provide comment on the results of the Heliophysics Senior Review for Heliophysics operating missions, recently completed in May 2008.

Administrative Matters

The HPS chair, Dr. Alan Title, was unable to attend the meeting; HPS Vice-Chair, Dr. Roy Torbert, agreed to chair the meeting and produce this consensus report. The subcommittee welcomed five new members, Dr. Richard Mewaldt of the California Institute of Technology, Dr. Donald Mitchell of the Johns Hopkins University Applied Physics Laboratory, Dr. Craig

Pollock of Southwest Research Institute, Dr. Harlan Spence of Boston University, and Dr. Allan Tylka of the Naval Research Laboratory. All members present received their Annual Ethics Briefing from Dave Barrett of the NASA Headquarters Office of the General Counsel.

FY2008 Heliophysics Science Performance Assessment

The HPS completed its Science Performance assessment assignment. The HPS was asked to act as an “external expert review” panel to assess performance for NASA Annual Performance Goals APG8HE01, APG8HE03, and APG8HE05. The HPS was asked to assess the degree that achievements represented growth in the previously existing body of knowledge. The assessment was limited to evaluation of published results in the general press or peer-reviewed literature during the 2008 fiscal year (i.e. October 2007 – September 2008). Due to the timing of the subcommittee’s annual review, significant items from the June 2007 to June of 2008 period were included in the FY 2008 evaluation process.

Prior to the meeting, the Heliophysics Division at NASA Headquarters polled the Project Scientists for the Heliophysics operating missions, suborbital program, and the several R&A programs for their top science accomplishments for FY08. This information was consolidated, consistent with the format and style of NASA Performance and Accountability Reports, and provided to the subcommittee as initial input. The subcommittee reviewed the input, edited and, in some cases, replaced material provided to complete their report, which is submitted via this letter report. The subcommittee documented their assessment by assigning a color-code “grade” for each APG and provided short explanatory text, including an overview and a few example achievements. An appendix with the full range of achievements considered and associated literature or press citations, was included.

In short, the committee found all the elements of the Heliophysics science activities were in the “green.” Heliophysics has made significant progress toward understanding our local space environment and the fundamental science that is beginning to enable a reliable space weather predictive capability, something that is a critical requirement for many of NASA’s top priority endeavors. Several specific highlights are included in our report.

Progress on Heliophysics Roadmap

Dr. Barbara Giles of NASA HQ provided the status on the 2009 NASA Strategic Plan and 2009 SMD Science Plan development efforts. Dr. James Spann presented the progress on the Heliophysics Roadmap by the Mission Planning Working Group for the working group chair Dr. Andrew Christensen. The subcommittee discussed the approach and progress of the working group and gave no additional advice or comment.

Heliophysics 2008 Senior Review

NASA’s Science Mission Directorate (SMD) periodically conducts comparative reviews of Mission Operations and Data Analysis (MO&DA) programs to maximize the scientific return from these programs within finite resources. The acronym “MO&DA” encompasses operating missions, data analysis from current and past missions, and supporting science data processing and archive centers. Performance factors include scientific productivity, technical status, budget efficiency, and contributions to the “Heliophysics Great Observatory.”

NASA uses the findings from these comparative reviews to define an implementation strategy and give programmatic direction to the missions and projects concerned for the next two

to four fiscal years. The HPS heard a summary of the results of the 2008 Senior Review from Dr. Charles Holmes of NASA HQ. The 2008 Heliophysics (HP) Senior Review considered the following twelve missions: ACE, AIM, Cluster, FAST, Geotail, RHESSI, SOHO, STEREO, THEMIS, TIMED, Voyager, and Wind.

The HPS offers the following specific recommendation to NASA regarding the 2008 Senior Review:

RECOMMENDATION #1: The HPS appreciates the outstanding work of Dr. Charles Holmes in administering the Heliophysics MO&DA program over the last solar cycle. We heard a report regarding the most recent Senior Review of operating missions and heartily approve of the process and generally endorse the resulting plan. However, there is concern about the proposed termination of the FAST mission in April of 2009. Given the unique characteristics of this solar minimum, there are emerging scientific issues that can be addressed by FAST auroral observations as part of the system science enabled by the Heliophysics Great Observatory. These issues were not yet evident at the time of the review, and it is possible that their significance could become clearer over the remaining year before the FAST termination. In light of that, we encourage the HPS division to revisit the unique science potential of continued auroral observations by FAST before finally terminating the mission.

Other Subcommittee Business

The Subcommittee received a thorough review of the Heliophysics Program from Dr. Richard Fisher, Director of the Heliophysics Division at NASA HQ. The status of the Flight Programs in development was presented by the Heliophysics Division Deputy Director, Ms. Victoria Elsbernd.

The Subcommittee received status presentations on two National Research Council studies: (1) "Societal and Economic Impacts of Severe Space Weather Events" and (2) "Mid-term Assessment of Decadal Survey for Solar and Space Physics".

Dr. Charles Swenson of NASA HQ provided an update on the Sounding Rocket Program including ITAR clarifications for sounding rocket science teams.

Dr. Charles Holmes of NASA HQ presented a plan to establish a Heliophysics Data Project Office to manage the continued development and operation of Heliophysics Virtual Observatories and Resident Archives.

The Subcommittee also heard a report from the Geospace Management Operations Working Group (GMOWG).

The HPS offers the following specific recommendation to NASA regarding the on-going problem of securing appropriate launch vehicles:

RECOMMENDATION #2: Given the critical need for medium-lift vehicles to further SMD's science objectives within cost constraints, the committee strongly endorses an initiative to explore common goals with the Department of Defense that might utilize the capabilities of military vehicles, such as the Minotaur.

The subcommittee also heard a summary by Dr. Karel Schrijver of Lockheed and Dr. George Siscoe of Boston University of their white paper entitled “The Scientific Discipline of Heliophysics – a Perspective.” Copies of the study report were distributed to HPS members.

Agenda Items for Future Meetings

The HPS recommends that the following items be included on the subcommittee’s agenda for the September 24-26 meeting:

Multi-disciplinary Science – Inter-disciplinary Science – System Science: Efforts to engage the Heliophysics Science Community on these topics appear to be hindered by both institutional and programmatic policies. Studies commissioned by the National Science Foundation have examined this problem and may provide some guidance applicable to NASA’s Heliophysics programs. The Subcommittee requests an overview of these NSF studies and the current Heliophysics Research Opportunities in this area.

Instrument Development Program: The subcommittee requests that the Heliophysics Management Operations Working Groups (MOWGs) review the Heliophysics instrument development opportunities for their programs and provide input to the subcommittee on the general principles that should guide future instrument development activities within the Heliophysics Program.

Explorer AO rate: Given the fundamental mission of the NASA Explorers Program, which is to “provide frequent flight opportunities to single PIs for space-based scientific investigations capable of being built, tested and launched in a short time interval compared to large community-consensus missions”, the Heliophysics Subcommittee will discuss whether more frequent Explorer Announcements of Opportunity (AO) are generally preferred over a slower cadence of opportunities with more mission selections per AO.

We hope that the NAC Science Committee will find our recommendations useful. I am sure that members of our committee would be more than happy to provide any additional information that you may need.

Respectfully yours,

Roy Torbert for the Heliophysics Subcommittee

cc:

Dr. Owen Garriott, NASA Advisory Council

Dr. Edward Weiler, Associate Administrator, NASA Science Missions Directorate

Dr. Richard Fisher, Director, NASA Heliophysics Division

Mr. Paul Iademarco, Executive Director, NASA Advisory Council

Dr. Barbara Giles, Executive Secretary, NASA Heliophysics Subcommittee

Heliophysics Subcommittee

Heliophysics Subcommittee Meeting Agenda
June 12-13, 2008

ver 6: 10 June 2008

NASA HQ, Room MIC-3 (3H46), Washington, D.C.

Thursday, June 12

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| 8:30 | Subcommittee Room Open | |
| 9:00 | Welcome, overview of agenda, membership status | Roy Torbert, HPS Vice-Chair |
| 9:05 | News from the Science Community
Important meetings, publications, or new ideas/concepts. Purpose is to inform, understand relevance to broader system goals, and foster synergies across disciplines. | Subcommittee |
| 9:30 | Flight Program Status | Victoria Elsbernd, NASA HQ |
| 9:45 | BREAK | |
| 10:00 | Heliophysics Division Overview and Program Status | Richard Fisher, NASA HQ |
| 10:30 | Science Mission Directorate Status and Update | Edward Weiler, NASA HQ |
| 11:00 | Annual Ethics Briefing | Dave Barrett, NASA HQ |
| NOON | LUNCH IN ROOM: <i>Phoenix on Mars</i> – Bobby Fogel, Phoenix Program Scientist | |
| 1:00 | The Scientific Discipline of Heliophysics – a perspective by Karel Schrijver and George Siscoe | Karel Schrijver, Lockheed Martin and George Siscoe, Boston University |
| 1:30 | Plans for 2009 SMD and NASA Strategic Plans | Barbara Giles, NASA HQ |
| 1:45 | Mission Planning Working Group Status | James Spann for Andrew Christensen, Roadmap Team Chair |
| 2:15 | Discussion | Subcommittee |
| 3:00 | BREAK | |
| | Heliophysics FY08 Science Performance Assessment (aka GPRA) | |
| 3:15 | Introduction and work plan | Barbara Giles, NASA HQ |
| 3:30 | Work Session | Subcommittee |
| 4:45 | Vote | Subcommittee |
| 5:00 | Discussion | Subcommittee |
| 5:30 | END OF DAY | |

Friday, June 13

- 8:00 Subcommittee Room Open
- 9:00 MOWG Reports (15 min each)
Solar & Heliosphere MOWG Joseph Gurman, NASA GSFC
Geospace MOWG William Lotko, Dartmouth College
- 9:30 Results of Heliophysics Senior Review Charles Holmes, NASA HQ

10:15 BREAK:

- 10:30 Status on NRC Report: Societal and Economic Impacts of Severe Space Weather Events Workshop Daniel Baker, Univ. of Colorado (via Telecon)
- 11:00 Status on NRC Report: Mid-term Assessment of Decadel Survey for Solar and Space Physics Brant Sponberg, National Research Council
- 11:30 Sounding Rocket Program Update Charles Swenson, NASA HQ

NOON LUNCH IN ROOM: *From Galaxies to Wireless Sensor Networks* – Alex Szalay, Johns Hopkins University

- 1:00 Update on National Space Weather Program Activities Madhulika Guhathakurta, NASA HQ
- 1:30 Virtual Observatories, Resident Archives, and the Heliophysics Data Project Charles Holmes, NASA HQ
- 2:00 Discussion Subcommittee
- 4:00 Debrief with Heliophysics Director Subcommittee
- 5:00 ADJOURN