

DATE: May 25, 2009

FROM: NASA Heliophysics Subcommittee  
Dr. Roy Torbert (Chair)  
Dr. James Clemmons, The Aerospace Corporation  
Dr. Edward 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. Jack Burns, Chair, NASA Advisory Council Science Committee

SUBJECT: Report of the Heliophysics Subcommittee

Dear Jack,

The Heliophysics Subcommittee (HPS) met at NASA Headquarters on May 19-21, 2009. A total of 13 of the 16 members attended the meeting. The meeting agenda is attached to this memo.

The charge to the subcommittee for this meeting was twofold. The first charge was to complete development of the Heliophysics Roadmap by performing a Red Team review of the draft provided by the subcommittee's roadmap subpanel. The second charge was to provide comment on proposed updates to the Heliophysics Data Policy for operating missions. In addition, the Heliophysics division provided briefings on several topics that were either requested by the subcommittee or that the division thought would be of interest: the NRC Heliophysics Performance Assessment, processes for the evaluation of interdisciplinary proposals, LEAG roadmap status, the extended mission status of the THEMIS and Artemis missions, and the recent Solar Orbiter science investigation selections. The science talk featured the TWINS mission and was provided by Jerry Goldstein of the Southwest Research Institute.

#### *Administrative Matters*

Approximately one-third of the Subcommittee members have or will soon reach the end of their term of service. The Heliophysics Division honored the past three years of service by the following members: Alan Title, James Clemmons, Todd Hoeksema, Robert Lin, and James Russell. The subcommittee acknowledged the additional service performed by our previous Chair, Alan Title as he ably represented our community's interests and concerns to the NAC

Science Committee. As you know, I was appointed as a member of the NAC Science Committee and have been re-appointed to the Heliophysics Subcommittee as chair. Additional appointments will be announced as they are completed.

### *Regular Business*

This was a productive meeting covering a variety of issues, most of which are summarized in our list of findings which are attached. We summarize a few other items in the paragraphs that follow.

We heard an overview of the Heliophysics Division status from Division Director Richard Fisher that touched on on-going and future plans for the division. There was an initial discussion of the 5-year Decadal progress report by the NRC, entitled “A Performance Assessment of NASA's Heliophysics Program.” The official NASA response to this report was not available at the time of the meeting, awaiting official approval at both NASA and OMB levels. Further discussion is planned at our next Heliophysics Subcommittee meeting on 13-14 July 2009 at NASA Headquarters, immediately preceding the next NAC Science Committee meeting.

We had a very helpful and productive discussion with the SMD Associate Administrator, Ed Weiler.

The subcommittee heard a presentation on modifications to the Heliophysics Data Policy, particularly as it applies to archive plans and their use. We requested a demonstration of some of the planned tools at our next meeting to more fully understand the implications of this policy.

There was a discussion of the Artemis/THEMIS extended mission status, which led to a finding on the Mission Operations and Data Analysis program in our list of findings.

A large fraction of our time was devoted to a thorough discussion and review of the 2009 Heliophysics Roadmap. The Subcommittee was very favorably impressed with the extensive work of the Roadmap committee, ably led by Prof. Andrew Christensen. The finding of the subcommittee is listed below.

The HPS decided on both a future work plan and an on-going communications plan to keep our science community informed of issues. We intend to institute a regular letter in the AGU SPA and AAS SPD Newsletters, in addition to the newsletter that is presently posted by our Executive Secretary. We also intend to make the subcommittee presentations more immediately available on a web site that the Chair of the HPS will host.

### *Agenda Items for Future Meetings*

The HPS recommends that the following items be included on the subcommittee's agenda for its July 13-14 meeting:

- Discussion of Decadal Performance Assessment and NASA Response
- Demonstration and Discussion of Heliophysics Data Policy
- Further Discussion of HP Roadmap
- On-going MOWG Findings
- Update on the Inter-Agency Planning for L1

Our agreed-upon work plan for the year follows:

### **HPS Work Plan**

- Monitor and advise on NASA's science launch capabilities for small, medium and large missions
- Monitor NASA's implementation of relevant NRC decadal surveys, and assess the congruence of NASA planning documents with the NRC recommendations
- Provide guidance on late-breaking technical and/or scientific advances that were unforeseen by the NRC decadal surveys but may affect NASA's research strategy
- Review lessons learned from cost growth or underestimation in current large mission developments and advise on how they may be applied to new and future projects.
- Continue to support, encourage, and monitor LEAG in the development of a Lunar Science Plan.
- Work with the NAC SC and the SSB to ensure that NASA science directorate is included in competitiveness and stimulus initiatives (for scientific and technical innovation) at the national level.
- Monitor and provide advice on interagency planning for a new L1 solar wind monitor that would provide real-time measurements for space weather forecasting that can be made available to the science community for the investigation of solar wind coupling to geospace.
- Investigate methods for leveraging the full potential for scientific discovery and learning inherent in the HSO and the developing cyber-infrastructure to make progress on grand challenge questions in Heliophysics system science.

We hope that the NAC Science Committee will find our recommendations useful and we are at your disposal for further information.

Respectfully Submitted,

[signature on original]

Roy B. Torbert, Chair

cc:

Edward Weiler, Associate Administrator, NASA Science Missions Directorate

Richard Fisher, Director, NASA Heliophysics Division

Marguerite Broadwell, Executive Director, NASA Advisory Council

Gregory Williams, Executive Secretary, NAC Science Committee

Barbara Giles, Executive Secretary, NASA Heliophysics Subcommittee

Heliophysics Subcommittee

## **FINDINGS TO BE CONSIDERED BY THE NAC SC:**

### **2009 Heliophysics Roadmap**

The HPS reviewed a near-final draft of its 2009 NASA Heliophysics Roadmap. This report presents an innovative new approach to strategic planning intended to maximize flexibility and at the same time control costs through competitive implementation. The approach of identifying highest-priority science targets, scoped to fit within broad cost envelopes, with specific implementation solutions deferred to competitive definition, addresses several problems inherent in the previous strategic planning process. The hard work of the roadmap team and broad community input is evident in the document and much appreciated. The HPS commends them for their efforts and vision. We believe that this Roadmap represents an exciting and compelling plan to accomplish vital Heliophysics science objectives identified by the 2003 Decadal Survey, within available resources. It has our strong support.

### **Identification of Cross-Disciplinary Proposals**

The HPS recommends that NASA provide an option on science proposal cover pages that allows authors to identify cross-disciplinary subject matter contained in their proposal. This will alert the NASA program officers to select reviewers with the appropriate expertise to help in the evaluation process.

### **L1 Solar Wind Monitoring**

The HPS commends the collaboration between NASA, DoD and NOAA to explore options for an L1 sensor suite to continue the operational functions of ACE and Wind. Continuous measurements of the IMF and solar wind plasma are extremely valuable also for system-level scientific studies of geospace. The HPS requests more information on the proposed solution as it becomes available, including the planned measurements, data products, and data availability.

### **Heliophysics MO&DA Program**

The subcommittee was informed of the status of the Heliophysics Mission Operations and Data Analysis (MO&DA) Program. The subcommittee learned that the MO&DA budget is not adequate to implement all high priority recommendations of the 2008 Senior Review, especially in run-out years. New infrastructure liens on the program and unanticipated increases in operational costs have the potential to prevent highly ranked, high priority science investigations from being implemented. The subcommittee finds that the program is managing its priorities appropriately within the resources available. However, the committee also finds that as a result of the underfunding of this program, there are highly important scientific objectives and space flight assets that will not be fully utilized.

### **Recognition of Retiring Members**

The subcommittee expressed its appreciation and thanks for the faithful service of our retiring members, Alan Title, James Clemmons, Todd Hoeksema, Robert Lin, and James Russell, and acknowledged the additional service performed by our previous Chair, Alan Title.

## **FINDINGS OF INTEREST PRIMARILY TO HELIOPHYSICS DIVISION:**

### **Solar & Heliospheric LWS Instrument Development Proposals**

The Solar and Heliospheric MOWG notes that instrument development proposals related to projects that ‘directly affect life and society,’ i.e. LWS topics, are excluded from the Solar and Heliospheric SR&T program. This creates a perceived gap because the LWS TR&T program does not explicitly solicit such proposals. The HPS recommends that the LWS and SR&T programs find a way to accommodate such relevant proposals and inform the community.

### **TWINS Prime Mission**

The HPS heard a TWINS Mission of Opportunity (MoO) science presentation and applauds the initial results and early progress made on understanding global magnetospheric structure, dynamics, and energetics through stereoscopic ENA imaging and supporting modeling. This commendation affirms more generally the high value of MoO's towards achieving HPS science objectives.

**Heliophysics Subcommittee Meeting  
May 19-21, 2009**

ver 5: 19 May, 2009

**NASA HQ, Washington, D.C.**

**Tuesday, May 19 – Room MIC-7 (7H45)**

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|------|---------------------------------------|-------------------------------|
| 8:30 | Subcommittee Room Open                |                               |
| 9:00 | Welcome, overview of agenda           | Roy Torbert, HPS Acting Chair |
| 9:10 | Heliophysics Division Status Overview | Richard Fisher, NASA HQ       |
| 9:45 | Flight Program Status                 | Victoria Elsbernd, NASA HQ    |

10:00 BREAK

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|-------|--|--------------|
| 10:15 | News from the Science Community  | Subcommittee |
|       | <i>Important meetings, publications, or new ideas/concepts. Purpose is to inform, understand relevance to broader system goals, and foster synergies across disciplines.</i> |              |

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|-------|--|--------------------------|
| 11:00 | Revision of the Heliophysics Data Policy | Aaron Roberts, NASA GSFC |
|-------|--|--------------------------|

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|-------|---|---------------------|
| 11:30 | Evaluating Interdisciplinary Proposals at SMD | Paul Hertz, NASA HQ |
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*Open Telecon Line: Toll Free Number: 866-453-7557 Passcode: 5625587*

NOON LUNCH IN ROOM: Results from the TWINS mission, Jerry Goldstein, Southwest Research Institute

*Close Telecon Line*

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|------|--|--|
| 1:15 | Red Team Draft of the Heliophysics Roadmap | Andrew Christensen, Dixie State University |
| 2:15 | Review of the Heliophysics Roadmap         | Subcommittee                               |

3:00 BREAK

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|------|--|--------------|
| 3:15 | Review of the Heliophysics Roadmap ... Continued | Subcommittee |
| 4:15 | General Discussion                               | Subcommittee |
| 5:30 | END OF DAY                                       |              |

6:30 Group Dinner, Clyde's, 707 7th Street, NW 202-349-3700

**Wednesday, May 20 – Room MIC-7 (7H45)**

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|------|---|-------------------------------|
| 8:00 | Subcommittee Room Open                      |                               |
| 8:30 | Report from Recent NAC Meeting              | Roy Torbert, HPS Acting Chair |
| 9:00 | LEAG Roadmap Status                         | James Spann, NASA MSFC        |
| 9:30 | Artemis and THEMIS, extended mission status | Jeffrey Hayes, NASA HQ        |

10:00 BREAK

*Open Telecon Line: Toll Free Number: 866-453-7557 Passcode: 5625587*

10:15 MOWG Reports  
Geospace MOWG William Lotko, Dartmouth College  
Solar Heliospheric MOWG Joseph Gurman, NASA GSFC  
11:00 Q&A with the SMD AA Ed Weiler, NASA HQ

*Close Telecon Line*

NOON LUNCH IN ROOM

1:00 NASA Response to NRC report, *A Performance Assessment of NASA's Heliophysics Program*  
Link to NRC report: [http://www.nap.edu/catalog.php?record\\_id=12608](http://www.nap.edu/catalog.php?record_id=12608) Richard Fisher, NASA HQ

2:00 Discussion Subcommittee

3:00 BREAK

3:15 Solar Orbiter Mission ... Selections and Plans Chris St. Cyr, NASA GSFC, SO Project Scientist

4:00 Discussion Subcommittee

5:00 END OF DAY

**Thursday, May 21 – Room PRC (9H40)**

8:00 Subcommittee Room Open

8:30 Planning for Future HPS Meetings: dates, etc. Subcommittee

9:00 Subcommittee Work/Discussion Session Subcommittee

10:30 BREAK:

11:00 Debrief with Heliophysics Director Richard Fisher, NASA HQ  
Subcommittee

1:00 ADJOURN