

G/MOWG Report to HPS

7 July 2006

Presented by *tbd*

Overview

- Met for two days during the week after the first NAC/Subcommittee meeting (I think)
- Ten findings documented
 1. Ionosphere-Thermosphere Science
 2. Research and Analysis Funding Cuts
 3. How HQ is Dealing with the R&A Budget Cuts
 4. Place of MOWGs in NASA's Advisory Structure
 5. Creation of the SMD Science Plan
 6. NASA's Risk Posture
 7. Access to Non-NASA Data Sets
 8. Training the Next Generation of Heliophysics Scientists and Engineers
 9. Access to Space
 10. Lunar Exploration Workshop

1. Ionosphere-Thermosphere Science

The Geospace MOWG finds that the NASA Heliophysics Roadmap (pg. 52) plan for implementing missions captures the priorities of the Geospace community given the currently understood constraints on the LWS and STP lines. We are concerned that gaps between ionosphere-thermosphere missions within the Great Observatory will impede the ability to achieve the objectives of the Heliophysics program - the currently planned mission cadence is the maximum gap between IT missions that can be sustained while preserving the core capabilities of the geospace community. The Geospace elements are vital and urgent for achieving NASA's heliophysics goals. For example, the first two objectives in the Heliophysics Roadmap, understanding the physical processes of the space environment and the impacts of the space environment on life and society, require Geospace mission elements as part of the Great Observatory.

Corollary findings are that:

1. NASA should form an ITSP Science and Technology Definition Team no later than FY07. This would capture the core science and requirements definition for the mission in a robust form.
2. ITSP is urgent and timely as overlap with the SDO and RBSP missions and a possible IT Imager will greatly increase the science return from ITSP. The ITSP mission has documented relevance to the National Space Weather program and the Exploration Initiative.
3. The Geospace Electrodynamics Connections (GEC) mission is the next element in the Solar Terrestrial Probes line and is recognized as a key element, along with the ITSP, in preserving core national capabilities and providing the continuity in the IT program.

2. Research and Analysis Funding Cuts

Robust support for Research and Analysis (R&A) is necessary to advance understanding of Heliophysics while the launching of new missions is critical for discovery in unexplored regions of space. The 15% cut in R&A funding adversely impacts the number of new grants funded in the Heliophysics division. Given the current constricted budget situation and the need for new missions, the GMOWG supports the position of the Heliophysics Subcommittee of the NAC that the Science Mission Directorate should try to ameliorate the R&A cuts without unduly affecting launch dates as per the current Roadmap plan. Longer-term solutions need to be found to bring the R&A budget back to the levels commensurate with its irreplaceable role as a major source of scientific innovation and discovery that is an integral part of the success of NASA's space missions.

4. Place of MOWGs in NASA's Advisory Structure

We are concerned about the flow of information (findings) from the MOWGs to the Heliophysics Subcommittee. In the current structure, there is no mechanism for the Geospace MOWG to present their findings directly to the Heliophysics subcommittee. We feel the degree of separation reduces the impact of our findings. The GMOWG will provide its results electronically to the Heliophysics subcommittee; it would be desirable to continue the tradition of MOWG chairs attending the subcommittee meetings to present the MOWG findings directly.

7. Access to Non-NASA Data Sets

The GMOWG remains concerned about diminishing access to processed and validated data from non-NASA missions. The problem has grown more acute in recent years due to significant reduction in funding to the providers of these datasets. The DMSP (and its follow-on, NPOESS) and LANL/GEO datasets are of particular concern, but access to other datasets may also be threatened. These two in particular provide unique and vital data resources that are widely used by the community. There is also concern about the loss of an upstream solar wind monitor for determining causality. The loss of these data would be a serious impediment for the geospace portion of LWS because that program relies heavily on continued access to data from these non-NASA space assets.

The GMOWG recommends that the NASA HQ LWS discipline scientists examine the costs associated with maintaining access to the non-NASA data sets on which this program relies, and determine how to appropriately fund the processing and validation of these data sets (perhaps from the TR&T Tools program).

8. Training the Next Generation of Heliophysics Scientists and Engineers

The GMOWG recognizes the importance of the next generation of space scientists and engineers, both for advancing science and building hardware for future space missions. The reliability of future flight programs depends on making an education and career in heliophysics an attractive choice for students in science and engineering. Contextual training of these scientists and engineers requires sound and attractive programs at universities.

Examples of what make heliophysics attractive include low-cost programs and fast turnaround missions, especially those with student participation, like sounding rockets, balloon experiments. Another is direct support of students, such as through the GSRP.

Synopses of Other Findings

3. How HQ is Dealing with the R&A Budget Cuts – supports the way discipline scientists are handling R&A FY07 shortfall
5. Creation of the SMD Science Plan – encourages the HP division to closely follow the Heliophysics Roadmap in creating the SMD science plan
6. NASA's Risk Posture – NASA's risk management strategy for geospace missions is absorbing an excessive portion of mission resources and has an unfavorable cost/benefit ratio
9. Access to Space – rapid growth in launch vehicles costs continues to adversely affect mission cadence and continuity of science
10. Lunar Exploration Workshop – encourages the HPS to proactively engage in the formulation and organization of the lunar exploration workshop being

Backup Slides

G/MOWG Members

Mike Liemohn, Chair

Phil Anderson

Bela Fejer

Maura Hagan

Mike Henderson

Larry Kepko

Bill Lotko

Kristina Lynch

Dirk Lummerzheim

Larry Paxton

Tai-Duc Phan

John Sigwarth

Full Text of Synopsized Findings

3. How HQ is Dealing with the R&A Budget Cuts

The Geospace MOWG expresses its support for the procedural decisions of the geospace discipline scientists at HQ to deal with the budget cuts to the FY06 R&A program. In particular, we would like to voice our agreement with the decision to only cut back on the number of new award selections, rather than trimming the budgets of existing or new awards. While it is disappointing that there was not sufficient funding to make awards to all of the proposals with competitive ratings from the panel, we agree with the programmatic ranking of the competitive proposals according to their relevance to NASA's near-term future missions.

5. Creation of the SMD Science Plan

The GMOWG encourages the HP division to closely follow the Heliophysics Roadmap in creating the SMD science plan. The steady support for the roadmap would give the space science community a better sense of stability at a time of decreasing resources.

6. NASA's Risk Posture

Discussions with mission PIs and NASA program managers suggest that NASA's risk management strategy for geospace missions is absorbing an excessive portion of mission resources and has an unfavorable cost/benefit ratio. The outcome for geospace missions is either substantial cost-creep in the project or, for cost-capped missions, a reduction in resources available for scientific and technological innovation during mission development. Some PIs expressed the view that risk avoidance and validation of system design and performance could be more effectively achieved through rigorous testing in lieu of the excessive review process now in place.

The GMOWG recognizes the importance of implementing sound risk management to achieve project goals within proposed costs, especially for fixed-cost missions. Indeed, in a 2003 finding it supported NASA management decisions aimed at improving the fidelity of cost and risk estimates. However, as currently implemented NASA's risk management practices appear to be undermining the desired fidelity of geospace missions.

9. Access to Space

The rapid growth in launch vehicles costs continues to adversely affect mission cadence and continuity of science, particularly for cost-capped PI-class missions. Given the tight budgetary constraints of SMD these increasing launch costs pushes the next spacecraft in a line beyond a timeframe where overlap. The panel notes, for example, that STP launches are every 5 years, although additional increases in launch vehicle costs threatens to increase the gap even further. The panel encourages NASA to continue to explore solutions to launch growth costs. Possibilities:

a) Partnerships and/or ride-sharing within SMD or with DoD, specifically the Air Force. Cooperation and partnership on international science missions should also be considered, particularly through the ILWS planning committee. This would need cooperation at high-levels for planning.

b) Reduce size of missions so that they can fly on smaller launch vehicles.

Option (b) has a problem, though. The lack of a viable low-cost launch option severely constrains the ability to design and launch small, Explorer-type missions. An emphasis on large spacecraft has a similar ripple effect through the mission lines, limiting overlap and reducing scientific return.

10. Lunar Exploration Workshop

The GMOWG strongly encourages the HPS to proactively engage in the formulation and organization of the lunar exploration workshop being organized by the NAC. We encourage HPS to solicit heliophysics community awareness and involvement with this workshop.