

Report of the Heliophysics Subcommittee

The primary focus of the first two meetings has been approaching the science architecture for ESMD. We feel that significant progress has been made in developing a schedule and implementation plan for a workshop in March 2007. While the initial spreadsheet for science tasks appeared to have some major gaps, this was just a result of the rather hurried process that created the first draft of the spreadsheet. Hopefully, it will be recognized that all of the work up to and including the March meeting are really sketches of the science plan.

In order to properly plan for the Lunar Science Workshop a HP Lunar Science Sub-Panel has been formed to advise the HPS on the broad spectrum of science objectives for both for insuring safe operations in establishing operations on the moon and implementing science on the moon. **The published Heliophysics Roadmap provides an excellent plan for understanding and monitoring the lunar environment.** The HP Lunar Science Sub-panel has updated the science spread sheet, a more complete set of science rationales will be produced before the September meeting of the NAC science committee, and a draft which sketches the mass, power, volume, and cost of potential missions will be provided in mid-February 2007. A Lunar Science session of the AGU fall meeting has been scheduled. This session will allow the HP science community to present mission concepts that will take best advantage of the lunar opportunities.

During our breakout discussions we heard reports from all of the Heliophysics MOWG's. All of the MOWG reporters expressed concerns about the short fall in the R&A budgets. Just before the sub committee meeting there was a meeting of the Solar Physics Division (SPD) of the American Astronomical Society. During lunchtime special sessions and the evening Business meeting the SPD members and the society President expressed their concerns about both the current short fall and the prospects for further declines with respect to inflation. **The HPS shares these concerns because the R&A budget is a core element of the HP research enterprise.**

All the MOWG's also expressed concerns about the lack of opportunities for Explorer missions. Again the HPS shares this concern, and recognizes that the rate of new Explorer new starts has dropped to an unacceptable level. It seems clear that one major issue is that launch costs are so high that Explorers are almost driven over their cost caps by the launch vehicle.

The committee heard a presentation by Dr. Fisher and Mr. Gay on possible solutions to the launch vehicle problem. A key factor is the requirement for White House approval of a non-commercial launch. There does seem to be some hope for new lower cost vehicles that are currently under development and also possible piggyback launches, but this is several years in the future. We were informed of an Alternate Launch Provider Task Force that will provide recommendations in October 2006 on possible lower cost options. **It is essential that lower cost options for Explorer class launches be developed rapidly.**

The cost of developing smaller missions has been increasing steadily over the past few years. This has been documented in the recent NRC report on PI Led Missions. Although we heard some hopeful words, the cost impacts of the soon to be released version D of the NASA process document are not yet understood. We also heard statements from the Administrator that NASA was very risk adverse and it was not possible to launch anything but the most risk free mission that money could buy.

I don't believe any scientist wants to be engaged in a risky program. **But I do believe many of the processes and procedures now imposed in the name of reducing risk do not reduce risk.** In fact, in smaller programs, the principal engineers may have to spend so much time on satisfying process requirements, dealing with auditors, and attending multiple reviews that their engineering suffers. **I think that a good hard look should be taken on the impact of "One NASA," "Mission Success," multiple independent reviews to find the correct blend for each program.**

Simply breaking down programs to category 1,2, and 3 is not sufficient. Rather I believe that a tailored program for each mission should be constructed. On a complex mission with a mix of instruments one set of processes might be correct for the spacecraft, another for big experiments, and still another for a very small experiment. **Applying the same set of processes across such a mission would not necessarily reduce risk for the instruments.**

The committee heard much encouraging news about the current HP program. The successful launch of GOES-R, the upcoming launches of STEREO and SOLAR-B, and the generally GREEN status of all the major programs. We also had a discussion on the soon to be released Sentinels Mission Study Team report. The Sentinels are critical to understanding the physics of the propagation of solar events through the heliosphere. We were discouraged that the budget will only allow the launch of Sentinels in the 2015 time frame. This will allow minimal overlap with SDO, although it is hopeful, based on past experience, that both SDO and SOLAR B will still be operational.

Coupled in a yet to be defined manner is the possible US participation in the ESA Solar Orbiter mission. There seems to be modes in which both the US and ESA could benefit by combining functions of Sentinels and Orbiter that would allow for simplifications of both missions. A request for letters of intent was issued by ESA on 11 July 2006 that allows US participation in the mission.

In spite of the current healthy state of the HP division we are very concerned about the near and long-term future. **As mission costs increase the rate of flights will decrease causing the overlap of missions required for a systems approach to understanding the Heliosphere to fade away.**

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