



UNIVERSITY OF MARYLAND

Department of Physics
College Park, MD 20742

Dr. Glenn Mason
301.405.6203 TEL
301.314.9547 FAX
gmmason@umd.edu

March 18, 2005

Dr. Madhulika Guhathakurta
Living With a Star Program Scientist
Sun-Earth System Division
NASA Headquarters, Mail Suite: 3Q39
Washington, DC 20546

Dear Lika,

This note is our report from the Living With a Start (LWS) Management Operations Working Group (MOWG), which met on Feb. 23-24, 2005 at the University of Maryland, College Park, MD. We received excellent briefings from Dick Fisher, Chuck Holmes, and Barbara Giles on HQ activities, an update on the LWS Geospace missions from Dave Sibeck, and an update on Solar Probe from Haydee Maldonado, and on NOAA/SEC activities from Doug Biesecker. We also heard from several MOWG members on activities in study groups, etc. Since this was our first meeting since last May, much had changed and we appreciated the opportunity to get up to date.

A number of issues of special importance were written up as findings of the meeting, and these are given below. We were particularly concerned about the threatened termination of many of our missions, and the continuing stretch-out in the plans for new missions. These changes to ongoing and future missions threaten to disrupt the balance of the LWS Program's careful design to study the Sun-Earth connection as a whole, compromise the exploration spirit to understand not only Earth but other planets and solar systems, and significantly delay the potential benefits that will spinoff to the country's economy and national security. These are addressed in the findings, as are some other issues that seemed to require comment but were certainly not as critical for the health of the community.

An additional activity at the meeting involved exploration of metrics for LWS and indeed for the entire SEC area. This idea was a recommendation from the LWS Tiger Team which met at the AGU in December in order to consider LWS issues relevant to the ongoing roadmap activities. Karel Schrijver provided a strawman set of metrics to initiate discussion, and the MOWG spent some time exploring these to see if it appeared that a useful product might emerge. The consensus of the MOWG was that developing metrics of this kind could be useful for explaining the importance of aspects of our science to upper level management at HQ, the Congress, and other stakeholders. At the

same time it was recognized that developing such metrics would be a difficult task, and might best be done in a couple of workshops over the next few months. We encourage you to explore this further, and would be glad to use the MOWG as a resource. However, our trial session during the meeting made it clear that it would be necessary to put together a special panel that had the full range of expertise to carry this out.

Spiro Antiochos presented these findings to the ESSS meeting the week after the MOWG met, and I understand that they received a full discussion. I am grateful to Spiro for volunteering for this since I was not able to attend.

We hope that these findings are useful to you, and we look forward to working with you as we all seek to implement the exciting LWS science program.

Sincerely yours,

Glenn M. Mason
Chair, LWS MOWG

Finding (1) Sudden termination of operating missions in FY06-07

The LWS MOWG is alarmed at the prospect of imminent termination of the Voyagers, FAST, Polar, Ulysses, Geotail, Wind, and TRACE missions and of cuts or severe reductions planned for TIMED, SOHO and Cluster in FY-07. Many of these spacecraft constitute key and irreplaceable members of a distributed observatory of inestimable value for addressing fundamental problems regarding space weather and space climate. The MOWG finds that the evolution of the fleet of current and future solar, geospace, and interplanetary missions should be guided by a timely, comprehensive evaluation of 1) their impact on enabling and enhancing roles in human and robotic exploration, 2) readiness levels of space weather forecasts, 3) their collective potential for transformational science, especially the system science goal of LWS, 4) their role in the education of future space weather researchers, and 5) NASA's commitments to international partnerships on Ulysses, Geotail, Cluster, and SOHO. The MOWG strongly urges NASA HQ to find a means to keep these vital missions operating at the levels planned after the last Senior Review.

Finding (2) Incorporating System Science into the Senior Review Process

The goal of the LWS program is to address aspects of the Connected Sun-Earth system that directly affect life and society. The systems approach followed in LWS requires multipoint measurements from existing missions in addition to targeted new LWS missions to be flown in the future. The LWS MOWG is concerned that the existing the Senior Review process rates and ranks missions individually, with no provision for maintaining the system aspects as a whole. Understanding isolated pieces of a puzzle does not provide a complete picture. Understanding the whole system of inputs and responses is necessary to reach LWS goals. Without considering "system science," there is a likelihood that mission terminations will cause the loss of important, or even critical, observations needed to provide an accurate model or provide the full answer to a specific problem. Before terminating missions for which there is no obvious replacement, the process should ensure the system science will not be irrevocably, or substantially harmed. The MOWG strongly suggests that support of "system science" should be considered routinely as an additional step in the Senior Review Process - and if necessary that adjustments should be made for allocation of MO&DA funds to preserve the end-to-end measurements required for progress in many LWS areas.

Finding (3) LWS Data Environment

The LWS Data Architecture / Environment funding has been moved to NASA HQ MO&DA as a result of SEC adopting a system-wide distributed data environment concept. The LWS MOWG supports this move to HQ in view of the general adoption of systems concepts for the entire SEC program. The LWS program remains critically dependent on the implementation of this data environment. Therefore, the LWS MOWG endorses the continued effort to rapidly develop the SEC data environment in the VxO configuration with a healthy funding profile.

Finding (4) Solar Probe Study

The LWS MOWG is encouraged by the status of the Solar Probe Science Definition Team study. We are particularly encouraged that the only significant technology development identified for this mission is the heat shield, and in particular, that a robust development path for the heat shield can be defined. This is a major milestone. However, in order to meet the 2013 launch date the associated engineering studies should begin as soon as possible. The LWS MOWG reaffirms its strong endorsement of this mission and encourages and supports NASA in its effort to secure the new resources required to undertake this breakthrough mission.

Finding (5) Sentinels Science & Technology Definition Team Study

The Sentinels Science and Technology Definition Team (STDT) is developing a new and exciting mission concept for Sentinels. The status report presented to the LWS MOWG included a proposed mission consisting of phased, closely-coupled components that will measure particles and fields in those regions close to the Sun where astronaut-threatening solar energetic particles are accelerated, while delivering the global images that are necessary for quantitative predictions. While maintaining a reasonable yearly funding envelope, the STDT is also considering a spiral implementation plan that deploys critical components of the mission in time for overlap with the other LWS missions, in particular SDO which would provide critical context observations for the Sentinels in situ particle data. The MOWG finds that the mission concept proposed by the Sentinels STDT directly responds to the goals of LWS and to the needs of the manned exploration program while performing exciting, transformational science. The LWS MOWG endorses the STDT approach as presented and looks forward to a future briefing on the completed study.

Finding (6) Progress in the Targeted Research & Technology (TR&T) program

The LWS MOWG notes that the TR&T program is an integral part of the LWS program. Its goal is to provide Sun-to-Earth modeling capabilities, and to provide an avenue for cross-disciplinary scientific interaction. The MOWG congratulates the TR&T Steering Committee (SC) for proposing a novel approach to soliciting proposals and forming science teams to address focused science topics, which was implemented successfully by NASA HQ in the last TR&T competition. The MOWG encourages the TR&T to continue its effort to develop a scientifically diverse directed research and technology focus. We applaud the TR&T entrepreneurial efforts to initiate funding and infrastructure support partnerships with NSF, NCAR and others. We are concerned that these discussions should occur without distorting the program, and would like to see further discussion at a future MOWG meeting. A guiding principle in exploring these partnerships is that “all fund competition should be in a process open to all.”

Finding (7) Delays in implementing flight programs

The concept of simultaneity of the various LWS mission components is a critical aspect of LWS achieving its study of Sun-Earth connections as one coupled system. The MOWG recognizes the budgetary issues at NASA, but wants to express concern that the timeline for flying the Geospace and Sentinel components of LWS continues to be extended to later times. The planned overlap between the SDO and these follow-on missions is dwindling. This impacts the science and the ability of LWS to meet the current agency goals of exploration vision and protecting our home planet. For example, the EUV irradiance measurements from EVE on SDO support the IT storm probes. The MOWG is concerned about the continued delays in implementing the missions and strongly urges NASA to carry out these missions close to the originally planned timeline.

Finding (8) Advanced Technology Solar Telescope (ATST)

The MOWG is excited by the critical new dimension ATST will bring to space-based solar and coronal studies. The ability to routinely measure coronal magnetic fields is a key ATST observable that will enhance the value of several current and pending LWS missions. The MOWG encourages NASA to engage the NSF in a discussion to help realize the ATST mission.