30 October 2003

Dr. Madhulika (Lika) Guhathakurta
Living With a Star Program Scientist
NASA Headquarters, Code SS
300 E St. SW
Washington, DC 20546

Dear Lika,

The LWS MOWG, at its meeting on October 21-22, 2003, received thorough briefings on several key aspects of the Living With a Star program, and the broader Sun-Earth Connections (SEC) program. The MOWG appreciates the in-depth and candid discussions. It also proved extremely valuable to have Dr. Opgenoorth of ESA meet with us and to have Drs. Koskinen and Schwenn present as members of the MOWG. As a result of the presentations and related discussions, the MOWG arrived at several findings which we hope you will find useful in managing the program. With this letter, I would like to summarize these findings and formally transmit them to you and to the Sun-Earth Connection Advisory Subcommittee.

From its inception, an integral component of LWS has been the Targeted Research and Technology Program. The role of the TR&T is to enable science that cuts across disciplines and mission boundaries in order to achieve understanding of the Sun-Earth system, and to deliver scientific advances that have demonstrable relevance to life and society. The MOWG notes that since the mission component of LWS is not scheduled to begin operations until 2008, or later, the TR&T is the key present opportunity for LWS to generate scientific results that will maintain the high level of support for LWS within the government, the public, and the scientific community. We should further note that we commend the LWS program for its fresh approach to sorting the TR&T proposals by topical areas instead of the traditional grouping by spatial regions. We recognize that this is a different and innovative method and therefore will be challenging and to some degree experimental. This is especially true this year in light of the large proposal over-subscription. However, we believe sorting the LWS proposals in this manner is a correct and proper approach and support this endeavor.

Our principal findings are grouped below by subject matter. Several of our current findings are similar to, but amplify upon, the findings from our first LWS/MOWG meeting that were transmitted to you by Len Fisk in his letter of 2 July 2003. Our findings are in what we judge to be priority order. They are intended to deal with issues that are of current high interest and thus they concentrate only on present problem areas. The members on the LWS MOWG are encouraged by the manner in which you and the SEC Division are attempting to execute this complex, but singularly important program, and we are dedicated to helping you achieve success.

LWS MOWG Findings:

1. HST-Explorer

The Explorer program has been a mainstay of NASA space science since the inception of the Agency. Explorer missions have been key to the study of the Sun, the heliosphere, and the near-Earth environment. Explorer missions continue to push back the frontiers of knowledge and provide opportunities for creative, focused ideas. The MOWG finds that it would be highly inadvisable for NASA to consider using Explorer funds to solve any program problems in other areas of the Agency. In particular, the MOWG finds that it would be unwise to use Explorer budgetary authority to pay for Hubble Space Telescope refurbishment or mission extension.

2. Loss of SDO coronagraph

The Solar Dynamics Observatory is the first mission of the LWS program, addressing science objectives important to the entire solar, heliospheric and geospace communities, in particular the coupling among the solar corona, the heliosphere, and Earth. A coronograph is a principal instrument to provide such observations, as was stated in the initial LWS Science Architecture Team. The LWS MOWG is therefore very concerned that such an instrument has been removed from the SDO mission. We therefore find that it is important to the solar and heliospheric communities to maintain a coronograph as part of the SDO payload, or to provide such observations during the prime phase of the LWS program. This accommodation needs to be provided within the context of the overall LWS program, so that the basic science objectives can be achieved.

3. ILWS collaborative approach: Reconvening the GMDT?

It has become increasingly apparent that in order to execute the Geospace Mission in a timely manner and within the cost target, options must be considered on how to implement the mission as defined in the GMDT report. We recognize that various costing options have been studied by the Geospace project including allowance for new margin requirements. We support the maintenance of the current cost target of $400M for Geospace, and we find it desirable to reconvene the Geospace MDT to discuss funding, schedule, science, and the potential augmentation or collaboration with the SWARM mission from ESA. In order to expedite the release of a Geospace AO, this should occur very soon.

4. LWS Cost Growth and Need for Simultaneity

Cost growth appears to be threatening the simultaneity of the different LWS components. Simultaneity was originally conceived as an important aspect of LWS. We urge that the issue of simultaneity receive significant discussion by the GMDT at its next meeting (see Finding 3 above). We also find that the issue of simultaneity should be a central focus of our next MOWG meeting.

5. A Revitalized LWS Program Plan

There is a need to develop and articulate a coherent plan for LWS that is consistent with the current budget realities. The basic science objectives need to be stated in priority order, and a program plan to achieve these objectives needs to be developed. The prioritization of objectives should serve as the basis for the inevitable decisions that will be made during the duration of the LWS program. NASA should engage in a process that documents the goals and priorities of the LWS program, and provides a clear exposition of the missions and integrating programs that will achieve these goals. The numerous studies and plans that have been developed for the components of the LWS program, and early integrating design studies should be the basis of plan.

6. FY 04-05 Budget cuts/Implications

Through an unfortunate set of errors, the LWS budget in FY04 and FY05 is facing a significant funding shortfall (~$100M). The MOWG realizes that "fixing" this problem is very difficult at this late date. But the MOWG is also concerned that the community be made aware of this problem and its implications. We find that NASA (Dr. Fisher) should make the community aware of the problem (possibly at AGU Agency Night) and caution against earmarks and other such assaults which would further exacerbate budget problems.

7. Clarifying the Scope of ILWS

The ISTP era of exploring the mass, energy, and momentum transfer throughout the solar-terrestrial system has given way to a new era under the ILWS umbrella of identifying, characterizing and understanding the governing processes of the system. Because ILWS covers a broader scope that includes all Sun-Earth science it is thought that a NASA involvement in ILWS should be from a broad SEC theme perspective. We find that this LWS-ILWS aspect should be clarified and codified.

8. Mission gap

Given changes in planned LWS spacecraft costs and schedules there could well be a significant gap between the beginning of LWS mission operations and the decommissioning of the Solar-Terrestrial Probe (STP) and NASA Explorer science fleet. The MOWG encourages the continuation of relevant science missions to avoid such a gap. We also encourage the pursuit of no-cost or low-cost partnerships with other agency and international organizations to maintain continuous baseline coverage of key space environment parameters until the new LWS fleet of missions is in place.

9. Solar Probe – Solar Orbiter

Now that the European Space Agency's planning for the Solar Orbiter mission is close to completion and the Science and Technology Definition Team is being formed for a Solar Probe mission, it is important to begin the planning for the inner heliosphere part of LWS (Solar Sentinels), which is aimed at clarifying the links between the photosphere/corona and the magnetosphere. The planning should take into account the

possible contributions of ESA's Bepi-Colombo mission, the Mercury MESSENGER Discovery mission and the Telemachus mission (part of the SEC roadmap) to go to high latitudes.

10. TR&T Steering Committee

The MOWG notes that the TR&T is essential to the success of LWS and commends the LWS program office for its strong support of the TR&T, and for the continued vitality of the program as evidenced by the large increase in proposals this year. The defining feature of TR&T is that it supports investigations that are TARGETED and that have DELIVERABLES. The TR&T SDT did an excellent job at defining an initial set of targets for the FY04 TR&T AO, but as recommended by the SDT, an ongoing steering committee is required in order to update periodically the designated targets for subsequent AOs and assess the success of the TR&T is meeting these targets and producing deliverables. The MOWG agrees with the recommendation of the TR&T SDT and finds that a steering committee should be organized in order to implement the full set of SDT recommendations. The ST should have the following characteristics:

A) Rotating membership similar to that of SEC MOWGs;
B) A Chair who is a full member of and reports to the LWS MOWG;
C) 5-6 members from the community who can represent the broad scientific interests of LWS and who have no potential conflict-of-interest with the TR&T AO for which they are defining targets; and
D) A schedule of 1-2 annual meetings that allows the ST to provide input to the yearly AO process and permits evaluation of TR&T results

11. Secondary ride on the SDO launch?

It was useful and interesting for the LWS MOWG to learn that the planned SDO launcher will probably have a good deal of extra throw weight capability. This is likely to be large enough that an additional (secondary) spacecraft could be included in the mission. We find that it is very important to alert the broad community about this possibility. By soliciting ideas of how to be able to best use this launch capability, NASA will make the wisest choice about a very valuable resource.

We look forward to working with you to address these findings.

Sincerely,

Daniel N. Baker, Chair
LWS MOWG