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Dear Lika,

This letter is our report from the Living With a Star (LWS) Management Operations Working Group (MOWG) which met on August 9-11, 2005, at the Greenbelt, MD, Marriott Hotel. The Solar and Heliospheric MOWG and Geospace MOWG also met simultaneously. We heard excellent briefings from Dr. Dick Fisher on the state of the Sun-Solar System Connection Theme; from Ted Hammer on the flight program status; from Cheryl Yuhas and Rob Pfaff on the Rocket program; and from Chuck Holmes on MO&DA Status, the Senior Review, and Guest Investigator program. We were especially glad to hear that the threatened ~\$20 million MO&DA cuts discussed at the last meeting had been reversed, and that the devastating demise of the SEC fleet and research program were averted. The community well recognizes that this would not have happened without the skilled advocacy of the NASA HQ SEC personnel, and we are extremely grateful for their extremely effective handling of this issue.

The main purpose of the MOWG meeting was a presentation of the SEC Roadmap, which had been crafted by a committee led by Dr. Todd Hoeksema of Stanford University. We were asked to carefully read the roadmap and in particular to comment on whether the program described in the document was vital, compelling, and urgent. We were also asked to examine draft comments from an NAS/NRC panel regarding an earlier version of the roadmap, and also to point out any significant errors or omissions in the document. It is a pleasure to report that the Roadmap team did an excellent job -- difficult in any case and even more so this year when agency directions and priorities were shifting repeatedly. The LWS MOWG enthusiastically joined the Solar/Heliospheric and Geospace MOWGs in a joint finding approving the 2005 Roadmap. That joint finding will be conveyed to NASA HQ by the meeting chair, Dr. Jim Clemmons.

The LWS MOWG did feel that an Executive Summary should be prepared to convey the Roadmap excitement and scope to higher agency and government officials who would likely not have the opportunity to read the full document. While there was a short Executive Summary in the document reviewed by the MOWG, it was not really a stand-

alone document of the kind we have seen in such reports as the recent Decadal Study (Lanzerotti committee). Such a summary could be separately bound and distributed. Our first finding regards this issue.

Another topic of concern to the community was the announcement of the RBSP AO with no mention of the ITSP mission, which from the Kintner report had been expected to precede the RBSP. The IT community in particular was very much concerned that this development might threaten the eventual realization of the ITSP mission. At the same time, the stretch out of missions due to budgetary squeezes and increased costs (including launch costs) for missions in development was inevitably leading to a delay for ITSP independent of the RBSP announcement. Since progress is being made in the IT community, for example with results from the TIMED mission, the community was concerned that its science definition and strategy conceived several years back might be getting out of date. While there was no consensus on this issue, the community members felt that a workshop or similar activity would be useful to re-assess their science plans. The LWS MOWG concurred that this could be a very productive activity, and for this topic we have joined with the Geospace MOWG in our second finding.

The most pressing issue that emerged from our meeting was the stretch out of missions throughout the LWS / STP / Explorer mission lines. The STP cuts and Explorer cuts have exacerbated this situation, but an additional factor has been the increased cost of missions. A number of factors, including launcher costs and extreme risk avoidance, have contributed to this problem, but the net result is that the SEC program has been seriously impacted by the mission timeline that results. The central impact of this development is well recognized by the community, and violates one of the central boundary conditions set up with the Science Architecture Team, namely:

“It will be necessary to have a multi-year period of simultaneous observations of the whole system in order to understand, and convincingly demonstrate that we understand all the linkages.” (LWS Report to SECAS, Aug. 2001, p 10)

The LWS MOWG recognizes that the Roadmap team was operating under tight deadlines that did not allow grappling with this issue. Indeed, it is not only a scientific issue, but also a question of NASA HQ policy. However, we believe that the problem must be squarely faced, and the community must devise ways to address this problem. Given the tight agency budget, it is unlikely that a solution will be found by increasing resources available to the program. Our third finding is on this topic, and we look forward to working with you and others at HQ to deal with these issues.

While we have mentioned serious concerns that the MOWG has, I should reiterate our community's enthusiasm for the progress in our missions under development and the stream of existing results from the existing missions and theory and modeling programs. Finally, although NASA HQ is always a dynamic organization, this past year seems to have been more volatile than any in recent memory, and the community is grateful to you and your colleagues for successfully shepherding this exciting program through many challenges!

Sincerely yours,

Glenn M. Mason
Chair, LWS MOWG

Finding of the LWS MOWG
on
The SEC 2005 Roadmap Executive Summary

The SEC 2005 Roadmap reviewed by the MOWG in its August 2005 meeting contains a 4-page Executive Summary that mentions all the major elements of the roadmap and includes a figure showing the flow of requirements from the SEC long term goals.

The MOWG believes that the Executive Summary is the only portion of the Roadmap is likely to be read by higher level officials in the agency, and elsewhere in the government, and should be written with that in mind. To these potential readers, it may be our best or only opportunity to explain the program and its urgency. (At its best the summary will entice some of these officials to delve more deeply into the full Roadmap document, but most will not.)

Key pieces of information such as the envisioned missions should be summarized in tables or figures to facilitate just what it is that the SEC community is planning. The anticipated progress towards solving our key questions should also be stated, and summarized in a table or figure. The summary should make clear the basic rationale for the whole process – missions in the prime phase plus the GO, stitched together with Virtual Observatories and the TRT programs which allow our current systems approach to SEC science. The new missions are to be carried out to solve key unsolved questions and adjust emphasis to accommodate requirements of the VSE which have appeared since the last planning cycle.

The tables and figures should be enough to get the thrust and rationale of the Roadmap from the Executive Summary alone. The MOWG believes that the summary should be printed separately, as was done for the Decadal Survey, for example, so that it can be easily and broadly distributed.

8/16/05

**Finding of the joint Geospace and LWS MOWGs
for
A workshop on ITM Science**

Context: Over the past 3 to 4 years important discoveries and progress in the area of Ionosphere-Thermosphere-Mesosphere (ITM) research have been made that re-enforce the vitality and urgency of its role in the strategic SSSC mission plan. For example, recent observations have shown that the dramatic features in the mid-latitude ionospheric are by no means confined to storm times as previously thought. Indeed, ionosphere structures that impede trans-ionospheric communication and navigation signals can occur even in quiet times. Another recent example is the discovery that many mid-latitude storm effects occur preferentially at longitudes over the eastern half of the US, appear to be correlated with solar wind variations, and occur on a frequent basis. This preference and correlation is not understood. Furthermore, the mechanisms producing these effects are not known because there are no simultaneous co-located measurements of the comprehensive parameter-set needed to understand the physics of this region. There is debate about whether the features are entirely transport-driven, or whether they are produced in-situ. Also, the transition region between collisional and collisionless plasma regimes of Earth's atmosphere remains essentially unexplored.

These recent discoveries underscore our lack of understanding of the ITM system and its potential economic impact on technological systems. While it is recognized that the ITM region is a vital component of the connected Sun-Earth system, many physical processes are poorly understood and unexplored. Because no other planned missions or observations can address these specific science questions, the LWS ITSP, including the IT Imager, and STP GEC play a singularly critical role in meeting national needs and achieving NASA's objectives. In anticipation of deploying these missions in the near term, a review and update of the compelling, vital and urgent science questions that motivate these missions is meaningful and useful.

Finding: The SSSC LWS and Geospace MOWGs find that in light of recent discoveries and progress in ITM science, a study be sponsored jointly by the LWS and STP programs as soon as possible that refines those science questions that are (1) most compelling for the advancement of knowledge, (2) most vital for achieving NASA's objectives, and (3) most urgent in meeting the Nation's needs.

8/16/05

Finding of the LWS MOWG
on
Stretch out of missions in the SEC 2005 Roadmap
and its impact on scientific progress and synergy

The LWS MOWG congratulates the SEC Roadmap team for creating a thorough survey and description of SEC science that conveys its excitement and importance, explains its relevance to other agency and national objectives, and describes implementation scenarios and decision points. The implementation section of the roadmap describes 14 missions listed on timelines developed for the 'current resources' scenario for the STP and LWS lines combined. This translates to an average interval of 6 years between missions per scientific discipline (solar, heliospheric, geospace, ITM). Such long intervals negatively impact the potential to respond to technological developments and changing scientific priorities, and causes scientific disciplines to lose momentum and expertise between successive experiments. It also creates unacceptably long intervals between leaps in resolution of successive instruments. For example, the 'current resources' scenario leaves solar spectroscopic observations for NASA missions at the same level for a period of 35 years.

This stretchouts also significantly affects the planned observations; for example, the planned overlap between SDO and the IT Storm Probes mission is lost; also, the IH Sentinels mission is shown launched in 2015, effectively missing most of the upcoming solar maximum. It also affects synergy between the missions as pointed out by the NAS/NRC review (p 34): “the baseline roadmap plan spreads the elements out over time to such an extent that this necessary synergy risks being lost.” The NRC review goes on to recommend that (p. 34): *“every effort be expended to better achieve the needed synergies between the different elements enabled by the simultaneous observations from multiple locations and observing perspectives.”* (italics in original).

The LWS-MOWG recognizes that the pace of its new strategic missions was not an area within the Roadmap committee’s purview, but we concur strongly with the NRC panel that measures must be explored to address this problem. The number of missions flown needs to be increased and the only realistic way to do this is to lower the cost of individual missions. Lower mission costs can be achieved by lowering the cost caps starting at the AO, as well as by flying smaller missions within the context of an existing fleet of complementary missions (i.e., as part of the SSSC Great Observatory). The community should be stimulated to compete to meet selected high-priority scientific goals that have been defined by the formal planning processes (including roadmaps and science definition teams) in order to find lower-cost alternatives to costly missions now in the Roadmap. The LWS MOWG finds that a community/HQ effort should be undertaken to address this issue.

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