

Dr. Richard R. Fisher  
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NASA Headquarters  
300 E. Street, SW  
Washington, DC 20546

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Dear Dick,

Many thanks to you and the other NASA Headquarters staff for the opportunity to discuss issues of importance to the Heliophysics Division, especially as they pertain to Solar and Heliospheric Physics. Interactions like these are extremely valuable and give the community a sense of partnership with NASA. We, the troops, like to have a voice in the many important decisions that you must make, and hopefully you benefit from the input.

We were pleased to learn that progress is being made on many of the findings from last year. We encourage you to continue that progress, especially in areas like the development of new faculty positions at universities. There seems to be widespread agreement that this is vital to the future of Heliophysics. A new idea that came up at this meeting is the possibility of named faculty positions, for example the “SDO Professorship” or the “MMS Professorship,” where the funds to seed the position would come from the mission. We realize that it may be difficult to set aside funds for missions that have already launched or are far along in development, but perhaps this could be a standard element of future missions, much like E/PO is today.

We have identified a number of new findings that we wish to share with you. We live in uncertain and austere times, as you stated very clearly, and many of the findings offer ways to deal with this difficult situation.

### **Finding 1: Vital Role of Research and Analysis (R&A) Funding**

In creating the Heliophysics System Observatory, NASA has invested heavily and continues to invest in a broad range of missions. These space assets produce large amounts of exciting data that hold tremendous promise for greater understanding of the heliospheric system. However, the data are of little value without a commensurate investment in analysis and modeling. Only then can the scientific payoff be fully achieved. It is therefore very discouraging that funding for research and analysis (R&A) has recently been cut. The Living With a Star Targeted Research and Technology (LWS-TR&T) program has decreased by 20% and is not expected to recover; the Supporting Research and Technology (SR&T) program has declined by 5% in each of the last two years; and the Guest Investigator (GI) program was not even competed in 2010.

The SH-MOWG finds that the Heliophysics Division should undertake a careful assessment of the balance between building new missions, maintaining old missions, and supporting the associated R&A (including data analysis, theory and modeling, and technology development). Currently the Division spends about 10-15% of its budget on R&A, and we suggest that 20-25% is more appropriate for maximizing the science productivity. Assuming a zero-sum budget environment, this would likely require a gradual stretching out of new mission starts in exchange for an increase in R&A. Though this is not ideal, it makes little sense to fly missions at significant cost and then not follow through with adequate funding for research and analysis.

### **Finding 2: Closer Interaction with NASA's Office of Chief Technologist (OCT)**

The Heliophysics Division and the NASA Office of Chief Technologist (OCT) could mutually benefit from a close interaction. All NASA missions, both manned and unmanned, are affected by space weather. The SH-MOWG suggests that OCT: (1) pursue technologies that are not as susceptible to space weather, and (2) support development of new technology and measurement techniques that help advance space weather warning observations. Such efforts would fit well within OCT's roadmap of Scientific Instruments, Observatories, and Sensor Systems (Roadmap Technology Area 08). Collaboration between OCT and the Heliophysics Division can address cross-directorate goals and provide important benefits for Heliophysics Division missions.

### **Finding 3: Leveraging Opportunities with Other Agencies**

During these difficult budgetary times, it is especially important that NASA take advantage of leveraging opportunities with other agencies. One possibility is NOAA's upcoming DSCOVR mission. The thermal electron experiment, one of the three space science instruments on DSCOVR, was designed for high-cadence science quality observations. However, NOAA's forecasting needs are met without these measurements, so NOAA will not pay refurbishment costs for this instrument. It has been proposed that a very modest NASA investment of perhaps \$50k for the test and possible replacement of a micro-channel plate (MCP) would restore the instrument to its original science quality. The unique high-cadence measurements it would then provide could be critical for joint studies of solar wind evolution with Solar Probe Plus and Solar Orbiter, given that even the lower cadence WIND and ACE measurements might be unavailable by that time.

The SH-MOWG finds that NASA should investigate this opportunity. The timeframe for action is short, but an initial investment of \$50k does not seem risky. The much more significant cost of approximately \$0.5-1M/yr for science processing and possible DSN coverage would need to be looked at more carefully. One approach would be a proposal to the Senior Review.

#### **Finding 4: Corporate Sponsorship**

It is likely that we are in an era of declining or at best flat budget profiles. Research and analysis funding has been cut, and extended missions falling under the Senior Review process are receiving minimal data archiving and validation budgets. It is clear that the Heliophysics Division could use an augmentation of funds, and it is unlikely that this will come from within NASA. Therefore, following a suggestion in a white paper for the Decadal Survey, we encourage NASA to explore outside sources of funding for research and missions, and in particular, corporate funding. Ground-based astronomical telescopes provide a model for this as, for example, the Keck Observatory is funded from a combination of federal and private funds. The Voyager Interstellar Mission, which is in search of the heliopause and the interstellar medium, could be a good fit for Google or another search engine company. New missions in development could be sponsored by companies as well. We encourage NASA to explore the possibility of corporate sponsorship as a way to increase the level of funding for NASA researchers.

#### **Finding 5: Clarifying the Role of Science & Technology Definition Team (STDT) Reports**

Science and Technology Definition Teams (STDT) provide a valuable service to the community by drafting and publishing sets of scientific priorities and technologies to motivate future missions. The reports from these teams are widely distributed and serve as guidelines for the community in terms of potential scientific objectives and methods for a future mission.

The SH-MOWG finds that the scope and the applicability, or even the relevance, of an STDT report is currently unstated or unclear, with the result that the reports often command greater respect than intended. Furthermore, we find that there is no opportunity for a wider community input to question, augment, or revise the suggestions of the STDT. Therefore, we feel that a vetting or review process of the STDT report would be beneficial. NASA must ensure, even with a comprehensive and exhaustive STDT report, that it not be construed as a governing document by those reading the consequent AO. We find that there should be a clear communication in the AO as to the relevance and applicability of the STDT report.

#### **Finding 6: James Webb Space Telescope (JWST) Cost Overruns Threaten All of NASA**

Currently, the Science Mission Directorate has the policy that Division specific budgetary problems are solved within the Division that has the problem. Lately, budgetary problems involving the James Webb Space Telescope (JWST) have received widespread attention, and the SH-MOWG is concerned that the resolution of these problems may greatly impact the Heliophysics Division. The science of JWST is outstanding, and we understand NASA's desire to solve the problems and proceed with the project. However, we strongly feel that a solution to JWST should not involve a budgetary contribution from the Heliophysics Division. Our budget is already highly strained, as evidenced by the cuts we discuss in other findings, and to incur additional costs would do further damage to our science. The SH-MOWG encourages NASA to

seek additional support for JWST from Congress, so that other programs that had no role in creating the JWST situation are not affected. We note that solutions to NASA-wide problems that are not Division specific, such as the new launch vehicle costs, are not the subject of this finding.

Sincerely,

*Jim*

James A. Klimchuk

On behalf of the SH-MOWG