The 1999 SMEX TMC-lite Solicitation

Comments by the Explorer Program Scientist

The 1999 SMEX AO incorporated a different solicitation and evaluation pattern for Small Explorer missions. It significantly reduced the technical, management, and cost (TMC) requirements on the Stage 1 proposal. In anticipation that some proposals would be received that offer high science merit but cannot be implemented within the SMEX cost and schedule constraints, and that without adequate TMC data NASA would not be able to identify those proposals that cannot be implemented within the SMEX constraints, NASA decided to select ~8 proposals for Phase A studies rather than ~4. It was hoped that this would ensure a sufficient number of proposals would still be deemed implementable within the SMEX constraints at the end of Phase A. NASA also decided to extend the Phase A concept study period from 4 months to 6 months in recognition that less preliminary definition may have been accomplished during the proposal phase.

The goals of the 1999 TMC-lite experiment were several fold. (i) To reduce the work required by the proposing community to submit a Stage 1 proposal. (ii) To reduce the work required by NASA to evaluate a Stage 1 proposal. (iii) To emphasize science merit over TMC considerations in the first level of competition. (iv) To reduce the expenditure of proposal resources on conducting technical feasibility and preliminary design studies, as well as evaluations, on mission concepts that do not have high science merit.

Having completed this experiment, NASA has decided not to repeat it in the 2003 SMEX AO. There are a number of considerations that supported this decision. These include:

- Most of the 1999 proposers who responded to my post-Stage 1-selection "survey" told me that they did not do significantly less work than they do for a full-TMC. I solicited responses from all PI's and Co-I's, as well as all industry partners. They did say that (i) they could not show us all of the work they did because of the TMC-lite page limits, and (ii) that the one place where they saved effort was in not obtaining institutional buy-in or approval on the budget numbers because they did not reveal their budget numbers to NASA in the proposal.

- Because the Stage 1 selection was based primarily on science, there was the usual pressure on proposers to squeeze as much science as possible into their SMEX proposals. Because there was insufficient technical, management, or cost data provided in the proposal, it was not possible for NASA to evaluate whether a mission with exceptional science merit could be realized within the cost and schedule constraints of a SMEX mission.

- During the Stage 1 selection process, many experienced NASA officials expressed skepticism that some Category 1 proposals could be realized within the SMEX cost and schedule constraints. Because there was no data within the proposal with which this belief could be validated, it was decided that this skepticism could not be used to

drive selection decisions. In this case, more than usual, proposed science merit drove the selection without being tempered by technical or cost realism.

- Since there was no TMC evaluation during Stage 1, those projects conducting Phase A studies did not receive the benefit of having their technical "tall poles" identified by an independent review board prior to Phase A. This raised the probability that project teams would not adequately address and retire their outstanding weaknesses during Phase A.

- The evaluation of the Phase A concept study reports focuses on evaluating the overall risk that the mission cannot be developed, launched, and operated as proposed within the SMEX cost and schedule constraints while still meeting the proposed science objectives. At the conclusion of Phase A, and based on the evaluations of the concept study reports, the seven projects taken as a group had significantly higher risk than analogous groups of projects at the end of any previous Explorer or Discovery competitive Phase A.

For these and other reasons, NASA has decided to return to the practice of soliciting full TMC data in the Stage 1 proposal for the 2003 SMEX AO.

Paul Hertz
Explorer Program Scientist
September 16, 2002