NASA Advisory Council
Subcommittee Recommendation

Subcommittee Name: Planetary Science

Chair: Sean Solomon

Date of Public Deliberation: 7-8 June 2007

Date of Transmission to Science Committee:

Short title of the proposed Recommendation:
Review of background to and effects of new requirements for PIs of PI-led missions.

Short description of the proposed Recommendation

The PSS recommends that NASA reconsider PI qualifications and share with the community the historical basis for any relationship between PI qualifications at selection and either mission cost growth or mission success. We recommend further that NASA advertise vigorously the routes by which interested scientists can gain the requisite experience to serve as mission PI. Finally, we recommend that NASA develop mechanisms to address other historical factors in mission cost growth as well as metrics for assessing how the new PI qualification requirements are achieving the intended outcomes.

Major reasons for proposing the Recommendation

The PSS was briefed by Paul Hertz on the new qualifications for Principal Investigators to the Small Explorer (SMEX) Program, as described in a draft AO recently released for that program, and to the expectation that similar qualifications would be made requirements for all future SMD solicitations for proposals to PI-led mission competitions (*e.g.,* Discovery, Scout, New Frontiers). In brief, proposing PIs must have at least two years prior experience as PI or deputy PI, project scientist (PS) or deputy PS, or project manager (PM) or deputy PM, for an instrument or experiment on a previous suborbital, Earth orbiting, or deep-space mission or for such a mission overall. The rationale given was that PI-led missions having PIs with such an experience base are more successful in general and are less susceptible in particular to cost growth.

The subcommittee discussed this new requirement at length. Those discussions would have benefited from tabular or graphical summaries of the documentation that such specific prior experience does improve chances for mission success or limits to cost growth.

Opportunities to serve as PS or PM for a mission are greater at NASA centers and analogous implementing organizations than they are at universities, so the new qualifications put university researchers at a distinct disadvantage. Further, the cadre of individuals who possess the newly stated qualifications includes few women or underrepresented minorities. Limiting the pool of potential PIs might also mean limiting the most innovative or promising mission concepts, an outcome that would not be to NASA's advantage.

The new requirements do not address the roles of NASA centers, other implementing organizations, and commercial contractors in helping mission PIs ensure that a mission remains beneath a cost cap and on schedule. Moreover, it was not made clear to the subcommittee that NASA has a plan in place to evaluate the impact of these new requirements on proposal submissions or on cost containment and mission success in the future.

The PSS is not advocating that NASA consider selecting missions for which the proposing PI is not appropriately experienced. Nonetheless, the experience of the entire proposing team is at least as important as that of the individual PI, and the background and expertise of the PI and team have always been important selection criteria in past competitions for PI-led missions. It was not clear to the PSS that PI experience is a defining factor in mission success and cost growth, or that the new qualification requirements would have a significant impact on cost containment for future missions.

The subcommittee was told that NASA intends to encourage suborbital experiments, missions of opportunity, and other options for members of the community to gain the requisite experience to serve at a later date as mission PI, although we did not hear plans for how these opportunities are to be made better known within the community.

Consequences of no action on the proposed Recommendation

The PSS is concerned that the newly announced qualifications for PIs on space missions, if unmodified, could exclude many potentially successful mission leaders, particularly from the university community as well as women and underrepresented minorities.