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SBAG Steering Committee

Dawn at Ceres Participating Scientist Opportunity and an Analysis of the Draft DFRAP Solicitation

SBAG strongly supports a Participating Scientist (PS) program for Dawn at Ceres, with scientists selected before the encounter, contributing to the mission prior to orbit insertion, and participating in the orbital mission at Ceres. A PS program brings in scientists outside the team to augment and broaden the expertise of the team and has proven integral to many NASA missions across the solar system. PS programs have enabled NASA to maximize the scientific return from their large investments in a cost effective manner by enabling scientists with the specific scientific expertise to participate in the active data collection phase of missions. The importance and contributions of PS programs to NASA's planetary science missions is recognized across the community and not debated.

In about April 2015, Dawn will become the first spacecraft to visit Ceres, a fascinating and mysterious rock-ice dwarf planet world with roughly one third the mass of the entire asteroid belt. Enabling participation from scientists with expertise related to Ceres is critical for NASA to maximize the science accomplished at Ceres and realize the full potential of their large investment in this mission. Without a PS program in the active mission at Ceres, the mission science will suffer to the detriment of NASA and the planetary science community.

Participating Scientists involved in the Dawn at Vesta phase of the mission made many key contributions, including providing expertise in volatile processes, cratering processes, geologic mapping, and photometry; running a ground-based observing program prior and during orbital operations; validating and calibrating data; heading key working groups; leading "first look" papers that appeared in Science and Nature, as well as many other early papers; speaking at press conferences; and convening the Dawn at Vesta workshop in February 2014. Dawn at Vesta PSs also played key roles in Education and Public Outreach activities.

SBAG finds that the draft text for a "Dawn Focused Research and Analysis Program" has a fundamental issue that needs to be revised. The Program's core requirement that "Spacecraft data that have not been obtained (i.e., future mission data), or those that have not been placed in approved archives may not be proposed for use in DFRAP investigations" will not enable any new scientists to participate prior to and during the Dawn at Ceres encounter. SBAG opposes the announcement text as presently written and suggests modifications that will allow scientists to participate in the active science mission at Ceres. Time is of the essence if the full potential of NASA's investment in the Dawn mission is to be retained.

Our assessment of the four main goals in the announcement with this constraining requirement is as follows:

1. Analysis of data archived, to date, by the Dawn mission.

The announcement states that data must be in the PDS 30 days prior to the due date of the proposal, with commencement of the work for selected proposals to start 6 months after the due date. With this requirement, no investigations will be funded to analyze Ceres data from the main mapping mission during the encounter. There would be no participation of new scientists during the Ceres encounter. The only additional U.S. scientists allowed to participate would be those with existing attachments to the team as Dawn Associates, funded by team members or the mission; since continuation of non-US participating scientists is not impacted, the effect would be to diminish the relative participation of US scientists in this mission.

2. Production of higher data products

With selected scientists prohibited from accessing data from the Ceres encounter in “real time”, the Ceres data would not have the advantage of being processed and analyzed with the techniques developed as part of this production, to the detriment of the overall Dawn mission.

3. Improved calibrations of existing data products.

If there is an improved calibration, it should be applied to all data products from the Dawn at Vesta and the Dawn at Ceres mission phases. Indeed, the inspection of data from another target and over a longer excursion in time would be key factors in producing a better calibration.

4. Research in preparation for Dawn’s upcoming rendezvous with Ceres

One of the hallmarks of the scientific method is that theories need to be tested with data, and that theories are modified as data is gathered. By having an investigator produce a model that needs to “contain a detailed and articulate description of how the proposed research will aid in observation planning or data analysis for the Ceres phase”, but not have that scientist be able to test and model his or her theory as new data is gathered, flies in the face of the scientific method and does not serve the best interests of the Dawn mission of planetary community. Furthermore, selected researchers cannot effectively communicate their findings to the Dawn team if they are not part of the team.

Parts of this section (1.3) were also poorly defined. What “field-based research” would be appropriate for this mission, and what are “earth-based analogues of Ceres”? Correlative data analysis, e.g. combining ground-based, Hubble Space Telescope, or similar observations to Dawn data is missing from the announcement.