

Mars Sample Return

To maintain the momentum established by the Mars Exploration Program (MEP), the PSS stands ready to help and requests that it have regular briefings on future mission architectures for the next Mars orbiter and for progress towards Mars sample return. These briefings should include continuing and planned trade studies (including those involving domestic and international partnerships) that are relevant to enabling successful planning and execution of these missions in the 2020s.

Background Information: The PSS commends the MEP for continuing successful management and support of its active orbital and landed assets. The PSS is also pleased by the ongoing development of an integrated Mars 2020 mission architecture that would enable emplacement of cached samples on Mars for eventual return to Earth (as per Decadal Survey recommendations). However, the PSS is concerned that there are currently no definitive plans to provide continuity of operational capabilities at Mars in returning samples after the Mars 2020 mission.

Sample Analysis Laboratory Facilities

The PSS commends the Planetary Science Division of NASA for responding to community concerns about the support of laboratory facilities, including results from a PSS survey about the status of PI-led laboratories, by asking the National Academy of Sciences to review and report on this issue. The data gathered by the PSS will be made available to the National Academy to inform their review.

Europa Lander

The PSS commends NASA for creating a well-qualified Science Definition Team (SDT) to develop the science case for a potential Europa Lander Mission focused on life detection. This is an exciting but challenging mission concept, both technically and scientifically. In view of the challenge, we are pleased that NASA has initiated the COLDTech program and intends to seek wide community feedback on the SDT's initial science plan. The PSS offers to create a task force to review and comment on this plan when it becomes available on or around 30 November 2016.

CubeSats:

The PSS notes that CubeSat missions present a great opportunity for training the next generation of mission scientists and engineers and is pleased to see these types of missions becoming an adjunct to the current PSD mission set. The CubeSats by themselves offer a unique, low-cost, often high-risk, opportunity for novel studies in planetary sciences. However, the PSS also notes that the low cost of such CubeSats as a ride share opportunity could be undermined because such an addition could be perceived to add risk to the prime mission that would need to be mitigated. The PSS suggests that guidelines be established in order to minimize both costs and risks of a CubeSat ride share with a prime mission. The PSS recognizes that the development of these guidelines would make ridesharing a more acceptable, and possibly more frequent, opportunity and open a new wave of low-cost planetary science investigations using CubeSats.

R&A Program Data

The PSS asks the Planetary Science Division to release on an annual basis, at the first meeting of the PSS after the completion of selections for a ROSES call, statistics on:

- (1) funding levels (total funds allocated, number of grants funded, and number of grants fully funded at their requested levels) by program, including both total funding and number of awards in each program;
- (2) overall selection rates across all ROSES programs;
- (3) selection rates by adjectival rating across all ROSES programs;
- (4) funding levels by keyword for both methodologies and planetary body studied;
- (5) timeliness of funding release by NSSC after last program officer action; and
- (6) all data should be provided to the subcommittee in advance of the meeting in both graphical and tabular form.

In each case, data for previous year(s), where available, should be made available to the committee for comparison.

Extended Missions

The PSS appreciates the report on NASA extended missions, prepared by the Committee on NASA Science Mission Extensions of the Space Studies Board of the National Academies of Science, and supports the general finding that extended missions are a good value for NASA. The PSS especially supports the report's recommendations on a flexible, three-year review cadence and on the need for additional time for the panel to review the proposals, conduct the review, and prepare a final panel summary of findings. For the latter, the recommended six to eight weeks between distribution of proposals and the review panel meeting is deemed appropriate and endorsed by the PSS.

Special Regions on Mars

The Planetary Protection concept of “special regions” on Mars requires a comprehensive science discussion to ascertain the significance of this issue. This potentially has serious consequences for landing site selection, lander and rover operations, and sample return. The PSS recommends that a workshop of experts be co-organized, with the Planetary Protection Subcommittee, to better define naturally occurring special regions and also assess the potential of “induced special regions” through landers or rovers creating a local environment that would be heated and contain aqueous fluids that have sufficiently high water activity and that could persist long enough to plausibly harbor life, and whether this should prevent further exploration of that site or the return of samples from the vicinity. Such a workshop could also include Ocean Worlds in order that the planned Europa and other potential missions can be designed with due diligence to planetary protection.

Background: “Induced special regions” might potentially occur through a failed landing or orbit insertion attempt or end-of-life scenario leading to high-velocity impact or the interaction of heat from rovers with RTG power interacting with the surface to induce local melting and high humidity at or just below the surface of Mars, as well as on/within the rover structure. Such conditions could theoretically promote activity of microbes brought from Earth or indigenous to Mars. Understanding the plausibility of this process is critical for developing protocols that would ensure prevention of both forward and backward planetary contamination.

Deep Space Network (DSN)

The PSS appreciates the summary presentation of the performance and management of the DSN by Space Communications and Navigation (SCaN). However, we are concerned that plans to decommission 34-m stations in Canberra and Goldstone in 2016 and 2017, respectively, will remove an existing redundancy to the aging 70-m stations, which are essential for communication with NASA’s most distant assets in the Solar System such as Voyager, New Horizons, and future missions. In particular, New Horizons, now in its extended mission to encounter a Kuiper Belt Object in 2019, has its longest view periods at Canberra. We also remain concerned about the shrinking DSN budget and we urge PSD to resolve this with the SMD Associate Administrator.

Action Item: The PSS requests the DSN management to provide unscheduled station downtime statistics to differentiate between weather and mechanical and other operational issues over the last 5 years. In addition the PSS requests SCaN to report their plan for future scheduled station downtime so its impact on flight missions can be assessed. We request these data be available by our next meeting in February 2017.