

PSS Findings from the March 9-10, 2016 meeting at NASA HQ

Europa Mission

The PSS applauds the strong backing for a Europa mission and supports the goal to launch no later than 2022 to enable arrival of a spacecraft at Europa as early as 2025. We applaud the progress made with instrument selection, accommodation, and mission formulation for the multiple flyby mission. The PSS encourages the plan to carry the lander in a separate, independent spacecraft, which minimizes some of the risk of delaying arrival at Europa. The PSS looks forward to the Europa Lander Science Definition Team report including how the science goals outlined in the Decadal Survey will be met by the Europa lander, as directed by Congress.

Ocean Worlds

We applaud the public and legislative interest in ocean worlds that has been spurred by recent discoveries related to the possibility of extant life in the oceans of Europa, Enceladus, and Titan. The increased resources made available to PSD significantly enhance future efforts to explore these special, astrobiologically-relevant environments.

To maximize the scientific return of the Ocean Worlds initiative, we support NASA's continued engagement of the science community through roadmapping activities, including the Outer Planets Assessment Group's (OPAG) Roadmaps to Ocean Worlds (ROW). These community-based roadmapping activities optimize the balance of research objectives and scope for small, medium, and large missions. The OPAG ROW final report is expected by December 2016 and will provide input for the expected mid-term Decadal assessment.

PSS encourages PSD to put in place as soon as possible a process to integrate community input into the incorporation of Ocean Worlds into the New Frontiers program. The Planetary Decadal Survey has much content on how to respond to new discoveries but Ocean Worlds were not (at the time of writing the last Decadal Survey) fully vetted as a New Frontiers mission concept. A major part of that process is the establishment of the science objectives and subsequent confirmation that implementation concepts exist that can achieve those objectives within the New Frontiers cost cap.

The PSS encourages PSD to ask the Committee on Astrobiology and Planetary Science (CAPS) to consider whether inclusion of Ocean Worlds in NF-4 can be done via the processes and practices available to the agency and the community. CAPS should help to identify the path for taking advantage of similar exciting opportunities of this nature going forward.

Mars Sample Return

The path to returning samples from Mars to Earth begins in earnest with the launch of the Mars 2020 drilling caching rover. The international Mars community has prepared a study of crucial elements in sample return including design considerations for a clean-lab facility where the landed canister can be opened in order to interrogate the contents of the sample tubes and, ultimately, to open the sample tubes so scientific study of material from Mars can progress. These design concepts may be relevant to the study of samples returned from other targets as well. In light of recommendations from the International Mars Architecture for the Return of Samples (iMARS) and International Mars Exploration Working Group (IMEWG), the PSS recommends a comprehensive and dedicated study of these design concepts in the context of both sample retrieval and a returned sample facility to handle and manage scientific study of samples.

Special Regions

Scientific interest has increased markedly in planning robotic missions that target Special Regions on Mars and ice-covered ocean worlds in the outer Solar System. Such regions are arguably the best choices for any meaningful search for extant extraterrestrial life, as well as for preparation for human exploration missions that contact planetary surfaces. Mission definition and engineering of spacecraft and instruments will require close coordination between the science community and the planetary protection offices at NASA and other space agencies. It is imperative for NASA and the National Academies to address how best to improve communication and to resolve conflicts related to robotic exploration of sites with seasonal or persistent liquid water. For planetary settings like Mars with discrete Special Regions rather than oceans, designation of particular areas of these regions for scientific study should be considered.

Assessment of Reorganized R&A

The PSS recognizes the amount of effort required to compile information on PSD program elements in the reorganized R&A program and appreciates the thorough summary presented at the meeting on funding level by planetary body based on key words. We especially applaud the development of key word analysis tools that will allow assessment and reporting of programmatic balance in future years. The PSS continues to request the release of data on selection rates by panel score for new core program elements (e.g., EW, HW, SSW) and encourages continuing public release on a yearly basis on selection statistics, selection rates by panel score for core program elements, funding level by planetary body based on key words, and statistics on the time required for determining selectable and selected proposals relative to proposal submission and review.

One concern noted by the PSS is that the selection rates described (average of ~21%) may mean that an investigator can receive scores of Very Good (4.0) or Very Good/Excellent (4.5) and still

not be selected for funding by NASA. Because of the timing of the R&A reorganization and the impending termination of older funding programs (e.g., PG&G, Cosmochemistry, etc.) within the next year, it will be possible to have >30% of the R&A-funded community that routinely receives high proposal scores (4.0-4.5) not selected for funding. Nevertheless, the PSS applauds PSD for efforts to fund early career investigators and ensure the future of our community, even in a challenging funding environment. The PSS recognizes that one solution to this problem is more funding, and encourages NASA to continue to work to increase the level of funding for R&A programs in future years.

Planetary Laboratories, Facilities, and Technical Support

Laboratory instruments and facilities are critical for analyzing extraterrestrial materials, terrestrial materials that inform planetary exploration and data analysis, constraining the interpretations of planetary remote sensing data, and developing future flight instrumentation. The community perceives that a significant proportion of such laboratories to the point at which the science they support is put at risk.

PSD is concurrently assessing the need for facilities that can serve the broader community rather than individual PIs and research teams. Because instrument development is generally done in PI laboratories rather than in facility-level laboratories, both types should be included in PSD's research portfolio.

NASA has supported laboratories and major instrumentation for many years. It is becoming increasingly difficult to maintain technical staff support, placing stress on the community's research and training needs. The PSS will obtain community input, through the AGs and other avenues as appropriate (e.g., the NAI), about the number and type of PI laboratories that undertake research supporting PSD objectives, and their technical staff support models. This is to understand the planetary community's capabilities and challenges, and define the magnitude of the stress on research and training needs. The requested information will be used to inform discussions with NASA PSD about the challenge and help formulate potential solutions.

Deep Space Network (DSN)

The PSS is alarmed by reports of increasing data losses by active planetary missions (e.g. Cassini, with details provided by OPAG in their February 2016 finding on the DSN), especially following a 10% funding cut to the DSN at the end of 2015. The PSS supports aggressive efforts to address this issue and would like to hear updates as soon as possible. In particular, current NASA science missions using the DSN should be asked to inform NASA about recent DSN performance changes they have experienced.

Arecibo Observatory

Arecibo Observatory provides a unique capability for a range of cutting-edge science, including planetary science, as well as planetary defense and NASA's human and robotic exploration missions. However, there is concern about a potential NSF divestment in Arecibo facilities and maintenance. The PSS encourages NASA to continue its current support of Arecibo and urges NASA to continue discussions with NSF to preserve the nation's science and security interests and provide for the stability and productivity of this critical national asset.

Planetary Defense Coordination Office

The PSS welcomes the establishment of a Planetary Defense Coordination Office (PDCO) within the Planetary Science Division. We feel that this is an important step for NASA, as it responds to the need for detection of Near Earth Objects, and the necessary planning and coordination needed to address planetary defense. Notably, the creation of the PDCO was a top recommendation by the 2010 NASA Advisory Council Planetary Defense Task Force.

US Participation in Foreign Planetary Science Missions

Other nations are continuing to develop planetary science exploration capabilities and plans, to which NASA can potentially contribute, toward achieving Decadal Survey science goals. PSS urges PSD to evaluate US opportunities to participate in and use data from foreign missions to planetary destinations throughout the Solar System, within the constraints of current State Department restrictions.