

## Recommendations and Finding from the PAC Telecon Meeting December 6, 2019

### Recommendation on Dual Anonymous Peer Review (DAPR):

Recommendation: The PAC recommends that NASA engage social science experts in the design of the pilot study to implement dual-anonymous peer review (DAPR) using four program elements in its 2020 Research Opportunities in Space and Earth Sciences (ROSES). The PAC also recommends that NASA compile and analyze data from past ROSES awards to evaluate possible biases in the current review process (e.g., with respect to gender, stage in career, institution, etc.) in order to provide a basis for future comparison with DAPR.

Major Reasons for the Recommendation: Concealing the identity of the proposers and their institutions from peer reviewers evaluating the scientific merit of proposals is not only possible but has potential value. The Space Telescope Science Institute (STScI) has pioneered this approach in its reviews of Hubble Space Telescope (HST) observing proposals and has demonstrated that this practice reduces gender, seniority, and institutional biases in their evaluations. The PAC recognizes the importance of ensuring fair and unbiased evaluations from NASA ROSES program element review panels. The successful HST program was initiated after careful evaluation of peer reviews dating back to 2001 demonstrated small but persistent biases in its prior awards. However, a comparable study of prior NASA awards has not yet been performed. Because these social science experts, including social and political scientists as well as professional societies, have already worked to address the topic of ensuring fair peer reviews, their input will help facilitate effective and accurate implementation of future studies.

Consequence of No Action on Recommendation: Implementing DAPR without input from social science experts may result in an ineffective process and/or unintended consequences.

### Recommendation on Satellite Constellations and Their Potential Impact on NASA's Ground-Based Observing Programs:

Recommendation: The PAC recommends that NASA conduct a quantitative analysis of the impact of mega-constellations of broadband communications satellites on all of NASA's ground-based observations, including observations of Near-Earth Objects (NEOs) and Potentially Hazardous Objects (PHOs) and support observations for NASA flight missions.

Major Reasons for the Recommendation: Ground-based NEO studies play a critical role in fulfilling the Congressional mandate to NASA to "detect, track, catalog, and characterize the physical characteristics of near-Earth objects equal to or greater than 140 meters in diameter", with a goal of cataloging 90 percent of these objects by 2020. The advent of mega-constellations of broadband communications satellites presents uncertain and unanticipated challenges for ground-based astronomy. Potential adverse effects include

contamination from stray light trails in wide-field images obtained with ground-based telescopes, such as those used to find NEOs and PHOs, and those used to provide support for NASA flight missions. NASA's Planetary Defense Coordination Office (PDCO) has already invested in a study to assess the ability of the upcoming Legacy Survey of Space and Time (LSST) to locate NEOs and PHOs.

Consequence of No Action on Recommendation: Without a quantitative analysis in hand, NASA will not have sufficient supporting information to advocate for mitigation of the potentially devastating effects on its ability to detect NEOs and PHOs, in particular from the LSST to be conducted at the Vera C. Rubin Observatory in Chile, and to support NASA flight missions.

Finding on Planetary Major Equipment/Facilities 2018 Selection Delay and Cancellation for 2019:

The PAC finds the cancellation of the ROSES 2019 Planetary Major Equipment/Facilities (PMEF) solicitation and the ongoing delay in selection of awards from the ROSES 2018 PMEF solicitation inconsistent with the Planetary Science Division's (PSD's) stated commitment to addressing the recommendations of the National Academies of Sciences, Engineering, and Medicine (NASEM) 2019 report on *Strategic Investments in Instrumentation and Facilities for Extraterrestrial Sample Curation and Analysis*. Delays in these investments have the potential to adversely affect the readiness of the scientific and curation communities for NASA's first asteroid sample returned from the OSIRIS-REx mission, expected to arrive in 2023, for Mars sample return, and for new lunar samples from the upcoming Artemis mission.