

NASA ADVISORY COUNCIL

Planetary Science Advisory Committee

September 26, 2018

Teleconference

MEETING MINUTES

Anne Verbiscer, Chair

Jonathan Rall, Executive Secretary

Table of Contents

Opening Announcements.....2
Planetary Science Division Status Report, Questions and Answers.....2
Planetary Science Division Research and Analysis Program.....5
Planetary Defense Coordination Office Update.....6
Senior Review Update.....7
GPRA-MA Review and Rating.....8
Discussion and Findings.....10

- Appendix A Agenda
- Appendix B Committee Membership
- Appendix C Meeting Attendees
- Appendix D List of Presentation Material

*Meeting Minutes Prepared By
David Frankel
PB Frankel, LLC*

**Planetary Science Advisory Committee Meeting
NASA Headquarters
Washington, DC 20546
September 26, 2018
1-5 PM**

TELECONFERENCE MEETING MINUTES

Wednesday, September 26, 2018

Opening, Announcements

Dr. Jonathan Rall, Executive Secretary for the NASA Advisory Council (NAC or Council) Planetary Science Advisory Committee (PAC or the Committee), called the teleconference session of the PAC to order at 1:00 p.m. and welcomed everyone to the meeting originating at NASA Headquarters (HQ). He announced that it was a Federal Advisory Committee Act (FACA) meeting and that there would be an opportunity for the public to make comments.

Dr. Rall introduced the Committee Chair, Dr. Anne Verbiscer, who participated telephonically. Dr. Verbiscer welcomed everyone to the meeting.

Planetary Science Division Status Report, Questions and Answers

Dr. Rall introduced Dr. Lori Glaze, Acting Director, Planetary Science Division (PSD), Science Mission Directorate (SMD). Dr. Glaze presented a graphic on planetary science missions color-coded to indicate the mission's status in formulation, implementation, primary operations, or extended operations. The Double Asteroid Redirection Test (DART) mission and the Europa Clipper mission went through preliminary design review (PDR) in July and August, respectively. The Origins Spectral Interpretation Resource Identification Security - Regolith Explorer (OSIRIS-REx) spacecraft and the New Horizons spacecraft have obtained first images of target destinations and are now able to use optical navigation. The Lucy mission is going through PDR. The Dawn mission is running low on fuel and "will be running on fumes soon." It probably will run out of hydrogen in mid-October. Dr. Glaze presented a slide showing the NASA Exploration Campaign "Swish" graphic. She noted that NASA is interested in small commercial landers for the Moon and is waiting to receive industry responses to a Request for Proposals (RFP). Selections should be made by the end of December. A key requirement is that instruments and technology need to be "ready to fly." Commercial vendors for small lunar landers, once under contract, will be asked to describe capabilities and how they would accommodate science instruments. Dr. Glaze presented a graphic on planetary defense. She reviewed a chart on the 2018 Research Opportunities in Earth and Space Science (ROSES-2018) due dates. In response to a question from Dr. Dana Hurley, Dr. Sara Noble provided information on the timing for the ROSES call and noted that there will be additional calls for instrument payloads.

Dr. Glaze discussed the results from a survey conducted in response to a National Academies of Sciences (NAS) recommendation for NASA to investigate appropriate mechanisms to ensure that high-risk/high-payoff fundamental research and advanced technology-development activities receive appropriate consideration during the review process. The recommendation noted that there is a widespread perception that NASA peer review—and possibly all peer-review—is hostile to truly innovative, high-risk

research and technology development proposals. All four NASA science divisions—Heliophysics, Astrophysics, Planetary, and Earth Science—participated in the study, which looked at the survey results from peer reviewers for 1,577 proposals submitted to ROSES-2017. The study concluded that (i) merit scores were driven by perceived impact regardless of perceived risk, and (ii) the panel process seems agnostic to risk level for proposals judged to have high-to-moderate impact. In response to a question from Dr. Verbiscer, Dr. Glaze explained that Dr. Michael [New, Deputy Associate Administrator for Research](#), SMD, would be presenting the study results to the Science Committee.

Dr. Glaze discussed the Mars Exploration Program (MEP) status. The Mars Atmosphere and Volatile Evolution (MAVEN) mission orbit has been adjusted to facilitate an improved communications relay for Mars 2020. There has been no response from the Opportunity rover since a major dust storm began on Mars. They are pinging it every day to try to wake it up. The plan is to continue pinging for 45 days. Following that, NASA will continue to listen for many months to give it every opportunity to wake up and respond. PSD is progressing in its technology maturation program to support a potential future Mars Sample Return (MSR) mission. Preparations are beginning for the next Decadal, and new studies and roadmap activities are being considered. Dr. Glaze described long-range planning for the Discovery and New Frontiers programs. She discussed the Research Collaboration Network (RCN) that NASA SMD is developing to support interdisciplinary and interdivisional research. She reviewed the timeline for Planetary Science studies and the plan for conducting pre-Decadal mission concept studies.

Dr. Glaze reviewed the PAC's July 2, 2018, recommendations, shown below, and PSD's responses, shown in blue.

1. FINDINGS CONCERNING THE UPCOMING PLANETARY DECADAL SURVEY: MISSION STUDIES

PAC is concerned that a rigid interpretation of the Federal Advisory Committee Act (FACA) rules is impeding the progress in getting mission studies completed for the upcoming Planetary Decadal Survey. Requiring all Science Definition Team (SDT) members for each mission study to be Special Government Employees (SGEs) significantly prolongs the formation of each SDT that will conduct these studies. We are on the eve of the charge for the next Decadal and the SDTs for these mission studies need to be formed soon. The SDTs do not provide advice to NASA in the same way that the PAC and other Advisory Committees do; therefore, the PAC encourages NASA to conduct mission studies in ways that do not require appointing numerous SGEs, possibly through the Assessment or Analysis Groups.

Missions studies will now be a ROSES call instead of FACA committees.

2. FINDINGS CONCERNING THE UPCOMING PLANETARY DECADAL SURVEY: OPEN NEW FRONTIERS

For the upcoming Planetary Decadal Survey, PAC encourages NASA to include in its charge to the National Academies that the New Frontiers mission class be open to all targets and destinations, as the Discovery mission class is, rather than limited to a fixed set of targets provided by the Decadal Survey. An open New Frontiers competition would enable proposing teams to be creative in their mission objectives and designs and to be fully

Deleted: Freilich, Director, Earth Science Division

Deleted: [Scribe comment: I am guessing that Dr. Freilich is the "Michael" to whom they were referring?] ...

Deleted: oll

responsive to new discoveries, enabling NASA to obtain the highest science return on its investments.

PSD is identifying allowable terms in the decadal survey statement of work, without unduly influencing the process.

3. FINDING ON NASA's INTERNAL SCIENTIST FUNDING MODEL (ISFM)

PAC appreciates NASA's efforts to increase efficiency in the use of science dollars; however, the implementation of the ISFMs at NASA centers must be done in a transparent manner so the Planetary Community is fully aware of this funding model. Key to the transparency of this funding model will be the performance metrics by which it is evaluated, to be made available to those both inside and outside of NASA centers.

- ✓ *We are just completing the first year of ISFM.*
- ✓ *We plan to have first year metrics at the next PAC meeting.*
- ✓ *Planned metrics include:*
 - ✓ *Number of submitted ROSES proposals (early evidence from Emerging Worlds indicates a drop)*
 - ✓ *Number of ISEF and-supported panel reviewers and other types of community service*
 - ✓ *Productivity reports and publications statistics*
 - ✓ *Number of Early Careers Supported*

4. FINDING ON THE PLANETARY DEFENSE COORDINATION OFFICE (PDCO):

Given the importance of planetary defense to NASA and the public, PAC recommended at its previous meeting in February 2018, that NASA's Planetary Defense Coordination Office (PDCO) make regular reports to the PAC on the progress and plans being made in regards to meeting the George E. Brown survey objective of detecting and tracking >90% of Near Earth Objects (NEOs) larger than 140m, and smaller NEOs. Now that the Administration has requested a significant increase in FY19 funding for PDCO, PAC would like to see the PDCO program objectives, summary program plan to meet these objectives, and roadmap with dates of key milestones included in the complete PDCO report at the next PAC meeting.

Agreed.

5. FINDING ON NASA FLIGHT MISSIONS GOING INTO SENIOR REVIEW:

PAC is concerned that many NASA flight missions are not getting sufficient budget guidance in time to write competitive proposals for the Senior Review. PAC recommends that missions be provided budget projections as early as possible to inform their extended mission proposals.

PAC will be evaluating terms of reference.

PSD recognizes the importance of budget guidance and is looking to send information to teams soon.

6. FINDING ON THE FORMATION OF A MERCURY ANALYSIS GROUP

PAC is delighted to hear that NASA will soon be forming a Mercury Analysis Group. PAC would like to see a Mercury mission on the list of mission studies to be done for the next Planetary Decadal Survey.

PSD is working on identifying Mercury Analysis Group POC.
PSD is considering adding Mercury mission study.

7. FINDING ON PLANETARY INPUT INTO THE ASTROPHYSICS DECADAL SURVEY

PAC is concerned that the Astrophysics Decadal Survey is proceeding without input from the Planetary Science Community. PAC recommends that there be representation from the Planetary community on the Committees assessing priorities for space and ground-based astronomy in the coming decade.

- ✔ Propose a presentation from the Astrophysics Assets for Planetary Science and continue from there.
- ✔ PSD is looking for additional feedback from NAC Science Committee (and Verbiscer).

Dr. Robin Canup asked whether PSD could follow the National Oceanic and Atmospheric Administration (NOAA) model, which allows sub-committees to be non-FACA. Dr. Glaze explained that the NASA requirement for all sub-committees to be FACA-compliant was based on legal advice from NASA's General Counsel.

Dr. Glaze concluded her presentation by describing an anti-harassment message from NASA SMD Associate Administrator (AA), Dr. Thomas Zurbuchen. The message will be included in all Announcement of Opportunities (AOs) along with detailed information on how to report violations. Dr. Hurley commended the effort to address harassment and asked how it would be enforced by NASA on multi-institutional teams. Dr. Glaze responded that the reporting process is extremely complicated.

Dr. Rall thanked Dr. Glaze for her presentation.

PSD Research and Analysis (R&A) Program

Dr. Rall updated the Committee on the R&A program. Four new Program Officers (POs) have been hired. Their expertise covers exoplanets, atmospheres, magnetospheres, ionospheres, outer planets, exobiology, planetary protection, technology, terrestrial geography and geophysics, and remote-sensing. An *ad hoc* committee has been formed to work on a response to an NAS study entitled "Sample Analysis Future Investment Strategy." He described new and updated R&A programs:

- Scientific Exploration Subsurface Access Mechanism for Europa (SESAME)
- Apollo Next Generation Sample Analysis (ANGSA)
- Lunar Surface Instrument and Technology Payloads (LSITP)
- Instrument Concepts for Europa Exploration 2 (ICEE 2)
- New Early Career Award—Caucus

Dr. Rall reviewed the ROSES 2018 due date schedule. He discussed a proposal to increase review panel honorarium to encourage greater participation and improved output. Dr. Justin Hagerty noted that

some companies do not allow soft money scientists to accept honorarium unless they use vacation time. Dr. Canup explained that different institutions have different policies on employees accepting honorarium. Some require employees to decline honorarium or turn the honorarium over to the employer. The rationale is that the employee's salary is supposed to cover all work performed during the normal work period.

Dr. Rall described the ISFM. It was developed as an option for direct funding civil servant scientists. The goals include reducing the burden of research competitions for civil servant scientists and having civil servant scientists write fewer proposals. An implementation plan has been approved by the NASA Mission Support Council. All ISFM-funded projects are required to have and implement data management plans. ISFM progress will be tracked by monitoring the reduction in proposals submitted, publications, presentations, new users, new collaborations, and service on review panels.

Dr. Verbiscer asked [a question from online attendee Ryan Watkins](#) whether there was a method other than a ROSES call for early career people to become involved in the Decadal process. Dr. Glaze explained that NASA wants a broad demographic to be engaged in the Decadal process. There has been some discussion for the NAS to allow some early scientist participation on its panels. She noted that serving on the Decadal survey is a nomination process that allows self-nomination.

Deleted:

Dr. Verbiscer thanked Dr. Rall for his presentation.

Planetary Defense Coordination Office (PDCO) Update

Dr. Rall introduced Dr. Kelly Fast, who briefed the Committee on the status of the PDCO. Dr. Fast reviewed the Committee's July 2, 2018 finding on PDCO; it provides:

Given the importance of planetary defense to NASA and the public, PAC recommended at its previous meeting in February 2018 that NASA's Planetary Defense Coordination Office (PDCO) make regular reports to the PAC on the progress and plans being made in regards to meeting the George E. Brown survey objective of detecting and tracking >90% of Near Earth Objects (NEOs) larger than 140m, and smaller NEOs. Now that the Administration has requested a significant increase in FY19 funding for PDCO, PAC would like to see the PDCO program objectives, summary program plan to meet these objectives, and roadmap with dates of key milestones included in the complete PDCO report at the next PAC meeting.

Dr. Fast discussed the National Near-Earth Object Preparedness Strategy and Action Plan. It is a report by the Interagency Working Group for Detecting and Mitigating the Impact of Earth-Bound NEOs. The report was released by the White House on June 20, 2018 and can be found at <https://goo.gl/6Fkn4g>.

[She](#) described the Interagency Working Group membership. It includes the PDCO, which serves as co-chair with the Office of Science and Technology Policy (OSTP). The plan has five goals:

Deleted: H

- Goal 1: Enhance NEO Detection, Tracking, and Characterization Capabilities.
- Goal 2: Improve NEO Modeling, Prediction, and Information Integration.
- Goal 3: Develop Technologies for NEO Deflection and Disruption Missions.
- Goal 4: Increase International Cooperation on NEO Preparation.
- Goal 5: Strengthen and Routinely Exercise NEO Impact Emergency Procedures and Action Protocols.

Dr. Fast described the PDCO. It was established in January 2016 to oversee planetary defense activities across NASA and coordinate U.S. and international efforts to address the asteroid impact hazard. She presented a graphic showing planetary defense projects to detect and characterize NEOs, and to plan, coordinate, mitigate, and assess in the event of an impact threat. She described the NEO Observations Program, implemented pursuant to the NASA Authorization Act of 2005, which made NEO detection, tracking and research one of NASA's seven explicitly stated purposes. She presented a graphic showing the current survey systems in NASA's NEO Search Program.

- Deleted: H
- Deleted: ,
- Deleted: ,
- Deleted: NEOs
- Deleted: H
- Deleted: H
- Deleted: i

Dr. Fast discussed NASA's NEO data processing and management. The International Astronomical Union Minor Planet Center receives positional measurement of small bodies from observations made around the world. It is responsible for identification, designation, and initial orbit computation. The NASA Jet Propulsion Laboratory (JPL) Center for Near Earth Object Studies computes high-precision orbits of NEOs. It predicts the impact time, location, and geometry in the event of a predicted impact.

Dr. Fast presented several charts showing the progress that has been made in discovering NEOs. The total population of NEOs 140 meters and larger is estimated to be approximately 25,000. At the current rate of discovery, it will take over 32 years to accomplish the goal to discover those objects. She described PDCO flight mission projects. The Near-Earth Object Wide-field Survey Explorer (NEOWISE) continues in extended NEO survey operations. DART will launch in 2021 and demonstrate the kinetic impactor technique on the moonlet of the asteroid Didymos in late 2022. The Near-Earth Object Camera (NEOCam) is an infrared survey telescope optimized for meeting the congressional goal to find and characterize NEOs down to 140 meters in size. Its System Requirements Review (SRR) and Mission Definition Review (MDR) was completed in February 2018.

- Deleted: H
- Deleted: a

~~Dr. Fast concluded his presentation with a discussion on the Planetary Defense Program Roadmap. Dr. Amy Mainzer asked Dr. Fast to describe the challenges for the program going forward. Dr. Fast responded that sustaining developmental progress will be challenging given the need to accommodate the DART mission's funding profile, space-based infrared survey development, and ongoing NEO survey and other activities within the President's proposed budget.~~

- Commented [KF1]: The roadmap chart was removed after I submitted the chart package and no roadmap was presented to the PAC. The PAC did not ask why the roadmap requested in their finding was not presented.
- Formatted: Strikethrough
- Formatted: Strikethrough
- Deleted: Lynn Carter
- Deleted: is

Dr. Rall thanked Dr. Fast for her presentation.

Senior Review Update

Dr. Rall introduced Dr. William Knopf, who briefed the Committee on the Plan for 2019 Planetary Mission Senior Review (PMSR). Missions subject to the 2019 PMSR are:

- Lunar Reconnaissance Orbiter (LRO)
- MAVEN
- Mars Exploration Rover (MER – Opportunity)
- Mars Express (MEX)
- Mars Odyssey (MO)
- Mars Reconnaissance Orbiter (MRO)
- Mars Science Laboratory (MSL – Curiosity)

Missions excluded from the 2019 PMSR are:

- InSight
- Juno
- New Horizons
- OSIRIS-REx

Two panels will report to a FACA Senior Review Subcommittee established under the PAC—the LRO Panel and the Mars Panel. Missions will be evaluated on scientific merit, value to the respective program, relevance to PSD and NASA strategic goals, technical capability, and cost reasonableness. The subcommittee will merge the findings of the LRO and Mars Panels and rank missions based on scientific merit, value to the respective program, relevance to PSD and NASA strategic goals, technical capability, and cost reasonableness. The subcommittee membership will be drawn from the LRO and Mars panels and will deliver its final report to the PAC. The PAC is responsible for reviewing the Terms of Reference (ToR) for the subcommittee and for delivering a final report to NASA reflecting the PAC’s formal recommendations, which must include an unedited copy of the subcommittee’s report.

Dr. Knopf reviewed a notional schedule for the 2019 PMSR and described the 2019 PMSR Communications Plan. A memorandum documenting the plan, in addition to the ToR and call for proposals, will be posted on the PAC website. He explained that the operating mission reviews are NASA’s highest form of peer review and are referred to as Senior Reviews, in recognition of the high level of the peer review.

Dr. Rhonda Stroud asked whether the FACA requirement for the panels could affect the timeline. Dr. Knopf responded affirmatively. He explained that assembling the Mars Panel would be challenging because most Mars-cognizant scientists are associated with one or more of the Mars missions and it is important to avoid conflicts of interest. Dr. Hurley commented that PAC members also were likely to have conflicts and asked whether members with conflicts would be allowed to participate. Dr. Knopf responded that he would investigate the question and report back to the Committee on whether there is a need for any recusals. Dr. Canup explained that conflicts could be based on both individual and institutional involvement. She expressed concern over the possibility that too many recusals could prevent the Committee from obtaining a quorum. Dr. Verbiscer agreed with Dr. Canup. [Online attendee John Keller](#) suggested that separating Mars orbiter panels from Mars Lander panels could eliminate many conflicts.

Deleted: S

Deleted: An online committee member

Dr. Rall thanked Dr. Knopf for his presentation.

GPRAMA Review and Rating

Dr. Rall introduced [Ms. Jennifer Kearns](#), who discussed the Government Performance and Results Modernization Act (GPRAMA). She explained that GPRAMA requires an annual performance evaluation report on NASA to be submitted to Congress and that NASA wanted the PAC to perform the PSD assessment. She described the five Annual Performance Indicators (APIs) in NASA’s FY18 Annual Performance Plan against which the PAC is asked to assess progress:

Commented [AJV2]: Hope my correction is correct, but in the APAC minutes, Jennifer Kearns was listed as Ms., not Dr.

Deleted: Dr

- API PS-18-1. Demonstrate planned progress in advancing the understanding of how the chemical and physical processes in the solar system operate, interact, and evolve.
- API PS-18-2. Demonstrate planned progress in exploring and observing the objects in the solar system to understand how they formed and evolve.

- API PS-18-3. Demonstrate planned progress in exploring and finding locations where life could have existed or could exist today.
- API PS-18-4. Demonstrate planned progress in improving understanding of the origin and evolution of life on Earth to guide the search for life elsewhere.
- API PS-18-5. Demonstrate planned progress in identifying and characterizing objects in the solar system that pose threats to Earth or offer resources for human exploration.

Ms. Kearns described the guideline for science progress ratings. A “green” rating should be awarded where expectations for the research program were fully met in context of resources invested. “Yellow” should be awarded where there were some notable or significant shortfalls, but some worthy scientific advancements were achieved. “Red” should be awarded where there are major disappointments or shortfalls in scientific outcomes, uncompensated by other unusually positive results.

Deleted: Dr

Dr. Rall noted that NASA’s Strategic Goal No. 1 is to expand the frontiers of knowledge, capability, and opportunity in space. He asked the PAC to grade PSD on whether it is making progress and on what level. Roberts Rules of Order was followed to conduct the evaluation. Dr. Rall identified the API, described NASA funded efforts related to the API, and then turned the item over to the Committee for its consideration. The results were:

- API PS-18-1. After discussion, the Committee awarded green, unanimously.
- API PS-18-2. Dr. Canup commented that there was a notable lack of papers connecting how objects in the solar system are formed. Dr. Rall agreed that that was something that should be noted in the report. After further discussion, the Committee awarded green, unanimously.
- API PS-18-3. Dr. Lyons stated that the Eigenbroe paper on Martian organics should be included. After further discussion, the Committee awarded green, unanimously.
- API PS-18-4. Dr. Lyons noted that Mongolian microfossils appeared twice in the presentation. After further discussion, the Committee awarded green, unanimously.
- API PS-18-5. In response to a question from Dr. Aki Roberge, Dr. Glaze explained that the assessment should be made in the context of the budget given to PSD. She added that the space-based infra-red instrument would enable the survey to be completed in 10-12 years, rather than 32 years. After further discussion, the Committee awarded green, unanimously.

Commented [AJV3]: My notes say that Tim Lyons pointed out this omission, and he offered to send the reference and abstract for that paper.

Deleted: Glaze

Deleted: o

Dr. Canup commented that great results were not included if the Principal Investigator (PI) did not happen to submit a research “nugget” to NASA HQ, and that it is difficult to track the papers produced by NASA’s R&A programs because of the use of an “antiquated” system in which research progress is reported by individual e-mails to the program officers without easily searchable results. She suggested that PSD adopt an automated grant reporting system like the one used by the National Science Foundation (NSF) that enables direct tracking of all publications that result from grants. Dr. Rall responded that PSD would like to change to that system immediately; however, it “is stuck with the tools we own.” Dr. Canup suggested using the NASA Solicitation and Proposal Integrated Review and Evaluation System (NSPIRES), which is a NASA website that facilitates the search for NASA research opportunities. Dr. Rall agreed that NSPIRES could be used, but with difficulty, since it is shared across multiple mission directorates. Dr. Glaze noted that the items presented to support the Committee’s evaluations are not intended to be exhaustive but rather are intended to be illustrative. Dr. Canup asserted that it would be worth the challenge to see if the process could be improved. Dr. Glaze agreed that it would make the Agency look good to have a list of all the published papers.

Formatted: Normal

Formatted: Font: (Default) +Body (Calibri), 11 pt

Deleted: commented that great results were not included when there wasn’t a Principal Investigator (PI) and that it is difficult to extract information because using email to process reports is “antiquated.” She suggested that PSD adopt the system used by the National Science Foundation (NSF).

Formatted: Font: Font color: Auto, Pattern: Clear

Dr. Rall thanked the Committee members for their assistance.

Discussion and Findings

Dr. Rall invited the PAC members to suggest possible findings. After discussion, the Committee reached a consensus on five findings:

1. FINDING: LINKING NASA PSD-FUNDED RESEARCH TO PUBLICATIONS

The PAC is concerned that NASA PSD is chronically leaving NASA-funded research out of its report in response to the 2010 Government Performance and Results Modernization Act (GPRAMA) because the report is based on a compilation of science “nuggets” submitted to the PSD during the fiscal year by its missions and R&A grantees and is not based on a thorough and exhaustive list of publications resulting from NASA PSD-funded research. Although the PAC appreciates that the GPRAMA report is not intended to be an exhaustive list, the PAC sees this as a missed opportunity for NASA PSD to highlight the productivity and success of its R&A programs. The PAC would like PSD to provide direct links from each PSD program element to publications resulting from NASA PSD-funded research.

2. FINDING: REVIEW PANEL HONORARIUM

NASA has increased the honoraria paid to review panelists for the first time in more than a decade. While the PAC appreciates the intent in increasing honoraria for review panelists, the objective of the increase may not have the desired positive effect, particularly for researchers at soft-money institutions. PAC recommends that NASA seek an alternative approach to compensate those panelists that are unable to accept honoraria because of their employment status.

3. FINDING: POTENTIAL 2019 PLANETARY MISSION SENIOR REVIEW (PMSR) CONFLICTS

The 2019 Planetary Mission Senior Review (PMSR) Subcommittee is now a formal, FACA-compliant subcommittee of the PAC. As such, the PMSR subcommittee will provide draft recommendations/findings and a final report to the PAC. The PAC will then be tasked with delivering a final report to NASA reflecting its formal Planetary Mission Senior Review recommendations. The PAC would like the PSD to provide its plan for addressing potential conflicts of interest between its members and the missions subject to the 2019 and future PMSRs. The PAC is concerned that too many conflicts may mean that the PAC does not have quorum to make a final report and recommendation to NASA.

4. FINDING: TERRESTRIAL ANALOG AND IMPACT CRATERING STUDIES NOT SUPPORTED APPROPRIATELY OR INADVERTENTLY DISENFRANCHISED IN NASA'S 2014 R&A REORGANIZATION

Proposals related to terrestrial analog studies and impact cratering studies may have been negatively affected by the NASA R&A reorganization in 2014. The sudden withdrawal of the PSTAR solicitation

from ROSES-2018 after the Step 1 deadline has exacerbated this problem with respect to analog research. Solicitation delays of 12 months or longer have detrimental effects on researchers at all career stages, but the impact of these effects is magnified for early career scientists. PAC would like to see the result of a statistical analysis on proposal keywords to determine the impact of the 2014 R&A reorganization on terrestrial analog studies and impact cratering studies.

5. FINDING: SUPPORT AND APPLAUSE FOR NASA'S POLICY STATEMENT ON ANTIDISCRIMINATION

On September 10, 2018 NASA Administrator Bridenstine signed the NASA Policy Statement on Antidiscrimination in NASA Conducted or Funded Programs, Activities, and Institutions. SMD AA Thomas Zurbuchen issued a strong statement of support for this policy, highlighting the information on filing a civil rights complaint online. Harassment in any form, whether it is based on personal or professional characteristics, is a scourge for scientists that can cause immense harm. By driving talent out of the field and by stifling creative output, harassment is unfortunately an issue facing scientists that demands action. The PAC applauds NASA's strong policy and statement against harassment encourages SMD to take a similar stance against professional harassment as well. The PAC looks forward to hearing more from SMD about how the reporting process will be implemented in the context of PSD missions and research.

6. FINDING: 2019 PLANETARY MISSIONS SENIOR REVIEW (PMSR) TERMS OF REFERENCE

The PAC has reviewed and approved the terms of reference for the 2019 Planetary Missions Senior Review (PMSR).

The Committee discussed when to hold its next meeting. A "Doodle" poll will be sent to the members to find the best date.

Adjourn

The meeting was adjourned at 4:55 p.m.

Deleted: [Jon—I was not able to hear the conversation clearly enough get a good handle on what the tentative findings were. I suggest that you replace my list with the final language developed by Dr. Verbiscer for the findings.] ¶

A better search tool is needed for identifying research publications and linking them to grants. ¶
The amount offered as honoraria for peer review panels should be increased or other alternatives should be identified to enhance participation and output. ¶

PSAC members participating in the senior review program have potential conflicts of interest and those members require guidance on how to proceed. ¶

The PAC is concerned about the impact from the reduction in funding for terrestrial analog studies in the Research and Analysis program. ¶

The PAC supports PSD's focus on workplace harassment. ¶

Planetary Science Advisory Committee Meeting

September 26, 2018

NASA Headquarters

Washington D.C.

Wednesday, September 26, 2018, 1:00 p.m – 5:00 p.m.

01:00	Opening, Announcements	(J. Rall)
01:05	PSD Status Report + Q&A	(L. Glaze)
02:00	PSD R&A Status	(J. Rall)
2:30	PDCO Update	(K. Fast)
3:00	Senior Review Update	(B. Knopf)
3:30	GPRA-MA Review and Rating	
4:30	Discussion and Findings	
5:00	Adjourn	

SUPPLEMENTARY INFORMATION:

DATE:

- Wednesday September 26, 2018, 1:00 p.m. to 5:00 p.m.,

ADDRESS:

- This meeting will be held telephonically and via Webex.

PHONE:

- USA toll free conference number 1-800-779-9966, passcode 5255996
- toll number also is available, 1-517-645-6359, passcode 5255996

The WebEx link is <https://nasa.webex.com/>;

meeting number is 999 932 505,
password is PAC@Sept26 (case sensitive).

MEETING ATTENDEES

Committee Members:

(via telecon, except Executive Secretary)

Verbiscer, Anne, *Chair*
 Rall, Jonathan, *Executive Secretary*
 Canup, Robin
 Carter, Lynn
 Filiberto, Justin
 Hagerty, Justin
 Hurley, Dana
 Lyons, Timothy
 Mainzer, Amanda
 McCubbin, Francis
 Roberge, Aki
 Schmidt, Britney
 Stroud, Rhonda

University of Virginia
 NASA Headquarters
 Southwest Research Institute
 University of Arizona
[Lunar and Planetary Institute](#)
 US Geological Survey
 Johns Hopkins Applied Physics Laboratory
 University of California, Riverside
 Jet Propulsion Laboratory
 NASA Johnson Space Center
 NASA Goddard Space Flight Center
 Georgia Institute of Technology
 US Naval Research Laboratory

Deleted: Southern Illinois University, Carbondale

Other NASA Attendees:

(at host site)

Glaze, Lori
 Knopf, William
 Broemsen, Scott
 Moore, LuJuan

NASA Headquarters
 NASA Headquarters
 NASA Headquarters
 NASA Headquarters

Deleted: h

WebEx Attendees:

(from WebEx record)

Aki Roberge
 Amy Mainzer
 Ashlee Wilkins
 Anne Verbiscer
 Bill Knopf
 Bob McMillan
 Britney Eluce Schmidt
 Dana Hurley
 Doris Daou
 Ed Rivera-Valentine
 Eric Christensen
 Fran Bagenal
 Francis McCubbin

- Jay Goguen
- Jeff Moore
- Jeffrey Grossman
- Jennifer Kearns
- JoAnna Wendel
- Jonathan
- Jonathan Rall
- Julie Rathbun
- Justin Filiberto
- Kenneth Hansen
- Larry Nittler
- LaJuan Moore
- Lucas Pagannini
- Lynn Carter
- Mathew Tiscareno
- Maurizio Balistreti
- Melissa Brucker
- Melissa Morris
- Michael Bicay
- Michael Foston
- Michael Kelley
- Micheline Tabache
- Nicolle Zellner
- Patrick Taylor
- Paul Voosen
- Rhonda Stroud
- Rich Zurek
- Rob Landis
- Rob Seaman
- Ryan Watkins
- Serina Diniega
- Stephen Fleming
- Steve Mackwell
- Tim Lyons
- Tommy Thompson

Deleted: r

Deleted: T

Telecon Attendees:

(from NWX-NASA-ARC conference call record)

- Aki Roberge NASA GSFC
- Amy Mianzer JPL
- Anne Verbiscer [University of Virginia](#)

Deleted: d

Deleted: NASA HQ

Dana Hurley Johns Hopkins APL
Doris Daou NASA HQ
Francis McCubbin NASA JSC
Justin Hagerty USGS
Kelly Fast NASA HQ
LaJuan Moore NASA support
Lynn Carter University of Arizona
Rhonda Stroud US Naval Research Laboratory
Tim Lyons University of California, Riverside

Aki Roberge NASA Goddard
Amy Mainzer JPL
Anne Verbiscer UVA
Ashley Wilkins American Astronomical Society
Betsy Goddard
Bob McMillan University of Arizona
Britney Schmidt Georgia Institute of Technology
Bruce Barnett Planetary Science Institute
Dana Hurley Johns Hopkins APL
David Ortman Self Employed
Doris Daou Planetary Science
Fran Bagenal University of Colorado Boulder
Francis McCubbin NASA JSC
Heather Smith KIPR
Jay Goguen JPL
Jeff Foust Space News
Jeff Grossman HQ
Jeff Moore NASA
Jennifer Kearns HQ SMD
Joanna Windel HQ
John Keller NASA
Jonathan Weinberg Ball Aerospace
Juan UCLA
Julie Rathbun PSI
Justin Hagerty USGS
Justin Filiberto USRA
Kelly Fast HQ
LaJuan Moore NASA
Larry Nittler Carnegie
Lucas NASA Goddard
Matthew Tiscareno SETI Institute
Max Bernstein NASA
Melissa University of Arizona
Melissa Morris NASA

Deleted: Ph

Deleted: a

Michael Bicay	NASA Ames Research Center
Michael Poston	Southwest Research Institute
Mike	NASA
Nicolle Zellner	Albion College
Patrick Taylor	USRA
Paul Voose	HQ
Rhonda Stroud	Naval Research Laboratory
Rich Burns	NASA
Rob Landis	NASA
Robert Nelson	Planetary Science Institute
Ryan Watkins	PSI
Serina Diniega	JPL
Steven Fleming	University of Arizona
Sutliff	NASA
Thomas Thompson	Cal Tech JPL
Tim Lyons	University of CA Riverside
Robin Canup	Southwest Research Institute

Deleted: e

Deleted: '

Deleted: an

LIST OF PRESENTATION MATERIAL

- 1) *Planetary Science Division Status Report*, Lori Glaze
- 2) *Planetary Science Division Research and Analysis Update*, Jonathan Rall
- 3) *Planetary Defense Coordination Office Update*, Kelly Fast
- 4) *Plan for 2019 Planetary Mission Senior Review*, William Knopf
- 5) *GPRAMA FY18 Working Copy 9-12-18 PSD*
- 6) *Government Performance and Results Act/Modernization Act (GPRAMA)
Annual Performance Evaluation*