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MEETING MINUTES

Janet Luhmann, Chair

Jonathan Rall, Executive Secretary

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Wednesday, January 22, 2014

Welcome, Agenda, Announcements

With the Federal government opening 2 hours late due to weather, this meeting of the Planetary Sciences Subcommittee (PSS) of the NASA Advisory Committee (NAC) began at 10 a.m. instead of at the scheduled time of 8:30 a.m.

Dr. Jonathan Rall, Executive Secretary of PSS, asked the Subcommittee members to identify themselves. Dr. Janet Luhmann, PSS Chair, explained that the meeting would be compressed rather than extended, with brief introductory remarks and a working lunch. The main topic of the meeting was the NASA Planetary Science Division (PSD) restructuring of the research and analysis (R&A) program.

Introductory Remarks

Dr. James Green, Division Director of PSD, said that for Fiscal Year 2014 (FY14), PSD received \$127 million more than what had been in the President's budget request. Of that, \$80 million was earmarked for the Europa mission. PSD is determining how to spend the \$80 million on preformulation studies, with a view to implementation of a Europa mission in the future.

The funding bill included some welcome language regarding an early push for a Discovery mission. Congress wants the Announcement of Opportunity (AO) issued in May, with selections to be made by the end of the fiscal year. PSD will establish a schedule soon, taking into account the desire of Congress for this to occur quickly. Dr. Green hoped that no one would be caught off guard by the AO being issued soon. The Discovery AO will focus on technologies

In addition, Congress has given tremendous support to education and public outreach (E/PO) at NASA. Plutonium production received adequate funding, as did the fully reimbursable Department of Energy (DOE) infrastructure activity, so those will be moving forward as previously discussed.

The budget is good news for PSD, as it supports ongoing and extended missions, and provides adequate funding for missions in development, such as Interior Structure from Seismic Investigations, Geodesy and Heat Transport (InSight), Origins Spectral Interpretation Resource Identification Security Regolith Explorer (OSIRIS-Rex), and the Mars 2020 Rover.

Discussion

Dr. Green stated that the final AO will go out in FY14. A draft will go out first, followed by a comment period. The typical comment period is 3 months. Congress wants the AO out by May 1, PSD will do everything it can to meet the Congressionally recommended early release.

Dr. Louise Prockter asked how the Division would deal with the fact that the ASRGs are not available. Dr. Green said that he could not yet comment on that, as the approach is in development. There were also many excellent comments from PSD's Request For Information (RFI) about the most recent AOs, and some of material will be incorporated into the upcoming AO.

PSD Senior Review Status Update

Mr. William Knopf, Lead Program Executive for Mission Operations in PSD, discussed the upcoming Extended Mission senior review. This senior review will be more like those conducted by the other Science Mission Directorate (SMD) divisions, which means there will be a few minor differences from the review conducted in 2012. Mr. Knopf is working with program executives and scientists to refine the

process and develop guidelines. The proposal length may change, but the appendices will have no page limits. There might also be subpanels instead of a single panel. This review will put more focus on the program line and/or the type of mission.

Some spacecraft are used as relay assets for the Mars program and are therefore vital in communicating with the rovers. The relay asset budget will exist for programmatic support regardless of the status of the science and its funding.

The following missions are subject to the 2014 Senior Review:

- Cassini
- Lunar Reconnaissance Orbiter (LRO)
- Mars Exploration Rover (MER) Opportunity
- Mars Exploration (MEX)/Analyzer of Space Plasmas and Energetic Atoms-3 (ASPERA-3)
- Mars Odyssey
- Mars Reconnaissance Orbiter (MRO)
- Mars Science Laboratory (MSL)- Curiosity Rover

The Curiosity Rover is only addition from the previous senior review. NASA has lost contact with the Deep Impact mission, which is why it is not included.

The guidelines will be issued at the end of January. Budget targets from the President's FY15 budget request will probably be known in February. Proposals will be due around April, with the review panel likely to meet in May and results to be announced in early summer. The panel will meet by phone before the actual face-to-face review. Reviewers will look at proposals and develop questions that will be sent to the project teams. The project teams will then answer the questions and present an update at the face-to-face panel review.

Discussion

Dr. Green explained that the review team will look at the previous guidelines to determine if they should change to reflect community input and budget realities. The guidelines will request a proposal asking what new science the mission teams would do at the current funding level and what they could do at a reduced amount. The latter must be considered, as Dr. Green does not expect all missions to be fully funded in the extended mission phase. Some missions are already at their floor as extended missions having been reduced in previous years. Emphasis will be on science per dollar, as well as additional benefits from discoveries and changes that may have occurred in the prime mission. Operations and science will be separated especially the Mars relay assets. By 2018, the ExoMars rover will be able to leverage NASA's communications abilities.

Fuel is running out on the MErcury Surface, Space ENvironment, GEochemistry and Ranging (MESSENGER) mission. The last senior review proposal covers the period to the end of the mission. Similarly, Cassini will be asked for a proposal to completion.

Dr. Lori Glaze praised the previous guidelines, and particularly the science per dollar factor. She would like to see ratios of operations and science teams, along with other expenses. Dr. Green replied that he always took into account the publication record in peer reviewed journals showing team productivity and data going into the archive. Those metrics are extremely important. Dr. Greg Davidson produces a periodic report regarding what NASA science does. The latest report found that NASA had 15.3 percent of the worldwide science discoveries, and 14.8 percent of that was space science with a significant portion coming from planetary science.

The draft call for extended mission proposals should be released in January and will be followed by a brief comment period. The guidelines are not long. The review panel is kept anonymous up until the time of the actual review. PSD is currently soliciting some key people to participate. The goal is to have the panel members identified in March, which will leave time for logistics.

Dr. Mark Sykes sought an explanation of Cassini's funding, which went from \$80 million to \$60 million. Dr. Green explained that the \$80 million was for Cassini's prime mission, which ended some time ago. Cassini has gone through a couple of senior reviews, in which PSD asked for projected funding that is lower than that of the prime mission. The last review asked what would be done at both current and lower funding levels. The panel looks at mission health, orbit, equipment, fuel, and other factors.

PSD R&A Restructuring

Dr. Rall began by noting that some of the program revisions are still being completed. Dr. Luhmann added that neither PSS nor the community can write the language of Research Opportunities in Space and Earth Science (ROSES) announcements, so PSS was not being asked for explicit language inputs. However, general suggestions were encouraged. Dr. Rall further explained that analyzing the proposal load from any one year cannot be done by the public. PSS cannot be empowered to do this analysis, as the proposals are proprietary and therefore NASA employees must do the analyses. Dr. Rall presented a schedule for the restructuring effort, pointing out that it began with a community survey in 2010. The roll-out was affected by the 2013 government shutdown; the original plan was to have this discussion during a meeting some months ago.

Overview

The mapping of the existing structure to the new structure should be transparent. PSD has discussed some of the restructuring elements with the Assessment Groups (AGs). The main issue is the desired earlier due date on the Solar System Workings program. PSD must do this revision. It is in motion, and the budget will work, though that was not clear when the project began. R&A could have been forced to cancel calls.

Dr. Nancy Chabot, Chair of the Small Bodies Assessment Group (SBAG), said that she has heard widespread concern in the community. Dr. Prockter agreed, saying that while she felt a lot better once she had reviewed the reorganization with Dr. Green, the community remains concerned, and it is important to address their questions and comments.

Dr. Green explained that PSD will release drafts into ROSES and take comments that help solidify the next set of calls. He anticipates that as the Division moves through a ROSES cycle, PSS will discuss each upcoming call. PSD especially wants to address the concerns regarding the early calls, assuming that the later calls will reflect changes based on the first calls. It will take about a year to get this right.

Dr. Green added that his passion for the National Academy of Science (NAS) reports, including the Decadal Survey (DS), should be obvious. The NAS reports are important, and those reports said PSD should realign the program with its strategic goals and objectives. NASA agreed, and told NAS that PSD would execute that realignment. The Division has worked on this for a long time. The community should look at the mapping and submit proposals accordingly, and support the restructuring according to the NAS. PSD intends to iron out problems and produce a better program. Budget issues are not the driver. NASA has accepted this recommendation from the NAS.

Dr. Mary Voytek, a senior scientist at NASA, explained that the restructuring team had heard from people that it feels rushed, but the PSD R&A Program team feels like they have been working on this a long time. She asked what was behind the community feeling that this is rushed. Dr. Chabot replied that the

community has not seen anything since the 2011 recommendation. She asked why, if it is going to take a year to get it right, PSD would not take another year? Dr. Voytek said that PSD may not have seemed to be open and forthcoming in not responding to all input but we are being cautious. Doing a senior review of programs by individuals who might benefit from those programs could be considered a conflict of interest and the NASA lawyers have advised against it. Dr. Green added that Dr. Rall's slides would address some of the concerns.

There is now an earlier date than originally announced for the Solar System Workings call; it is scheduled for late July. Everything in ROSES-14 will use FY15 funding, but PSD can only show FY14 funding at this point, as the FY15 budget is embargoed. Once it is released to the public, the community can see how the funding will be allocated.

Dr. Candice Hansen, Chair of the Outer Planets Assessment Group (OPAG), said that most comments from members of the OPAG community were about implementation, not the restructuring. Dr. Jessica Sunshine said that two things were still missing and giving her pause. First, people are being told what PSD will do, so there is no dialogue, leading to concern about how the restructuring and implementation will be handled. Second, there has been no information on revenue and the tracking of dollars from one discipline to another.

Dr. Rall pointed out that NASA's Astrophysics Division (APD) went through this same process a few years ago. The support contractor can do massive panel reviews, and their support is what allows him to have the Solar System Workings call in July. Panels can be divided up to account for conflicts of interest (COIs). The rules for COIs will be refined. Dr. Luhmann pointed out that the community has been able to provide more input than ever before. They should be grateful for that, and continue giving input in order to make this work.

Dr. Rall explained that among the guiding principles in the restructuring, two were key: To provide bridge funding, where appropriate, to cover funding gaps resulting from this restructuring; and to ensure that program restructuring will be revenue neutral, so that removing overlap will not decrease the R&A budget. Some budgets are increasing. The PSD analysis shows that every funded FY13 activity and every proposal from ROSES-11 (the most recent call for which there is complete data) has a home in the new portfolio. PSD analyzed thousands of proposals by title, and while there may be a few errors, the crosswalk is largely accurate. The resulting diagrams cannot be used to predict either FY15 program size or program pressure, however. PSD has never used program pressure to set budgets.

The institutes are not included in the reorganization. Where a hypothetical proposal cuts across categories, the plan is to have the review occur in the area with the preponderance of proposed activities. Dr. Christina Richey of NASA added that the program is not interested in forcing lines, but instead wants to focus on the important science questions.

Mapping of program elements

Dr. Rall reviewed a series of pie chart diagrams that illustrated where each of the previous activities mapped to the new program elements in terms of activities (grants) and proposals. The proposals from ROSES-11 tracked as follows:

- Cosmochemistry proposals would be 77% Emerging Worlds and 23% Solar System Workings under the new system;
- Origins would be 86% Emerging Worlds, 10% Exoplanets, and 4% Habitable Worlds;
- Exobiology/Evolutionary Biology would be 63% Exobiology/Evolutionary Biology, 19% Habitable Worlds, and the remainder divided among several programs;

- Laser would have 49% of its proposals under Lunar Data Analysis, 36% under Solar System Workings, and the remainder divided among several programs;
- Planetary Geology and Geophysics would be almost entirely under Solar System Workings;
- Mars Fundamental Research would also be largely under Solar System Workings, with some proposals going to Habitable Worlds and other programs;
- Similarly, almost all proposals that would have been assigned to Outer Planets would be included under Solar System Workings, with a small number going to Emerging Worlds and other programs;
- Another area under Solar System Workings would be Planetary Atmospheres, though some proposals would go to Exoplanets;
- Near Earth Object Observations (NEOO) remains unchanged;
- Planetary Astronomy would be entirely under Solar System Observations.

Dr. Rall noted that the Habitability area is growing. The new structure will be more oriented to solar system processes.

Dr. Paul Steffes asked how the Exoplanet area would operate in terms of APD also researching this topic. Dr. Rall explained that PSD has a good relationship with APD, and the two divisions have shared programs. Dr. Richey added that the new cross-division call has the APD and PSD sides being identical. PSD wants to connect the two calls together and make it truly cross-divisional. APD has amazing observational capabilities, while PSD has amazing modeling capabilities. It is time to join forces.

Dr. Rall noted that each program element will have its own review. Even now, PSD breaks up reviews into multiple panels. There will be separate panels for the smaller programs, but the number of panels also reflects the number of proposals. Each element has what PSD is calling “caucuses” – a group of program officers to have cross-fertilization and back-up. An advantage of this will be the fostering of best practices across the panels, as well as some internal competition to move quickly.

Dr. Rall next showed a crosswalk of where the FY13 activities and ROSES-11 proposals might have gone had the new structure already been in place. The proposals track as follows:

- Emerging Worlds would include Origins of Solar Systems and Cosmochemistry, primarily, with a number of other activities as well;
- Solar System Workings shows a distribution that rather evenly weights the core programs;
- Habitable Worlds would be about half Exobiology and Evolutionary Biology, along with Mars Fundamental Research and other programs;
- The Exobiology program would include only proposals that went into the Exobiology and Evolutionary Biology area in the previous structure;
- Solar Systems Observations would encompass proposals that went to Planetary Astronomy and NEOO;
- Exoplanets would include Origins of Solar Systems and Planetary Atmospheres.

Dr. Chabot said that there has been concern about the large Solar System Workings program in terms of the programmatic balance. Dr. Rall replied that the analysis indicates that each program has its own average grant size, but the grants vary from one program to another. He hoped to do some additional mapping in this area.

Dr. Voytek explained that one of the goals of the reorganization was to have the flexibility to be much more proactive. This will include what is needed to maximize science for the present and future, advance necessary technologies, etc. PSD missions are big investments, and their related R&A will now be more

flexible and less stove-piped. The new structure will allow the Division to be more thoughtful and strategic.

Dr. Chabot said that while she appreciated the conversation, she still expected some comments. People are afraid that the emphasis is moving from fundamental research to mission support. Dr. Voytek replied that PSD addresses fundamental science questions, some of which call for basic research. The missions are there to answer the basic science questions and are driven by the basic research. Dr. Glaze agreed with Dr. Chabot's comment, noting that there is concern that upcoming missions could drive proposals. Dr. Rall understood the issue and said that the program officers discuss this frequently. Dr. Steffes noted that in past ROSES calls, relationship to a mission has been a criterion.

Institutes and Data Analysis Programs (DAPs)

There are core, strategic, and focused research programs. Institutes are not solicited in ROSES. Strategic programs are more narrow in scope and address certain strategic needs, while focused programs are both narrow in scope and limited in time; they do not go on indefinitely. The reorganization moves core programs onto the same funding line. The majority of the Data Analysis Programs (DAPs) are funded by the missions themselves and therefore kept separate.

The Planetary Mission Data Analysis Program (PMDAP) was originally created for the Discovery program, which funds it. Dr. Rall would like to see a single DAP, but funding requirements preclude the crossing of program lines that would be necessary for such a program. PMDAP picks up the data analysis that otherwise does not have a designated area. Dr. Michael New added that the funding for non-Discovery data analysis in PMDAP is not especially large, and Dr. Michael Kelly said that about half of PMDAP awards are from non-Discovery missions, including non-planetary and non-NASA projects. Proposed data analysis for Mars would go to the Mars Data Analysis Program (MDAP), while cross-over data analysis would take place under PMDAP. Dr. Luhmann expressed concern about the pressure on extended missions, and the possibility that scientists who face cutbacks in their work might try for funding from PMDAP. She wondered if the Discovery program would be able to bear that burden.

Dr. Rall explained that the Emerging Topics in Planetary Science area will allow research in emerging areas. There will also be a DAP for the Dawn mission (DDAP). He was not sure about MESSENGER. The DDAP will be the first short-term effort of this kind. Dr. Hansen said that another rationale for DDAP would have been the participation of scientists from outside the mission team membership. Dr. Chabot added that SBAG has been advocating a participating scientist program for Dawn at Ceres.

Feedback, communication, and evaluation of the new structure

Dr. Rall presented a schematic showing which of the existing programs map to the programs in the reorganized system. The dates of original calls were included. There have been some concerns that the consolidation will translate into fewer opportunities to propose and a corresponding diminished likelihood of success. However, PSD program managers are asking proposers to tell the programs what funding they need to do the work, as the program managers were told to increase grant size. PSD is asking that investigators scope proposals to cover their time and what they need to do. They should not over-promise and underbid.

Dr. Lisa Pratt asked which metrics PSD plans to use in evaluating the new structure. There is concern in the community about success rates; it is hard to propose when it appears the proposal is likely to be rejected. Dr. Rall said that PSD expects the overall success rate to remain the same. Success rates for proposals will always reflect the funding levels. There has been some difficulty with metrics due to budgets, an insufficient number of program officers and scientists, and other issues. The individual programs and the program officers managing the programs determine how fast the panel review happens and gets processed. APD has done this well for the past couple of years.

The community can provide ongoing feedback up through the Assessment Groups (AGs), and the AG Chairs present feedback to PSD management and program officers at PSS meetings. At the conclusion of the review panels, each panel will evaluate how the new program element was implemented and executed. Dr. Rall showed a list of the many program elements PSD has had in recent years, along with the funding levels. The Division has not yet determined how to account for spending on programs that are not going forward. PSD was given a research floor, a guaranteed number, to which the figures were adjusted. Regardless, the R&A program has about \$250 million for FY14.

Mission science support elements either do not compete or do not need to be competed. For example, the Infrared Telescope Facility (IRTF) is being converted to a contract, at the advice of the NASA lawyers, and will be funded through the Near Earth Objects (NEO) program. The Lunar and Planetary Institute (LPI) is funded through a cooperative agreement, so it will not be competed in the R&A program. Others will be moved to different lines for funding. The mission science support elements will undergo a senior review, because an evaluation of their contributions is necessary.

The Planetary Data System (PDS) has its own line. Dr. New explained that there will be a competition as the current set of grants expire in about a year. Dr. Luhmann asked whether it had been evaluated through a senior review or equivalent, to determine whether it is effective. Dr. New said that he would be happy to discuss this further with PSS. Dr. Prockter was concerned that some large facilities have had management changes, and suggested that they might also merit a review. Dr. Sunshine agreed, saying that PSS needs to see that these facilities have the right oversight.

Working Lunch

Dr. Rall reviewed the questions that the PSS was asked to discuss regarding the provided set of draft calls for ROSES 2014:

1. Do the new areas correctly map to PSD science goals? In the mapping from an old call to a new one(s), did PSD carry all the appropriate elements with it? Did we leave anything out?
2. Do the new areas address fully the science question?
3. Are there gaps in any of the solicitations?
4. Are the new calls written clearly? If not, which sections are awkward or unclear?
5. Only headquarters personnel, Intergovernmental Personnel Act (IPA) detailees, and un-conflicted contractors can write solicitations.

PSS used Dr. Hansen's analysis as a template for discussion.

Emerging Worlds

The Emerging Worlds area includes all of Outer Solar System, some cosmochemistry elements, and some exobiology and evolutionary biology elements. Dr. Richey explained that anything in our own solar system will be under Solar System Workings, while research about what is outside our solar system will go to Exoplanets or Emerging Worlds. Dr. Chabot observed it is confusing to the community when it comes to ground-based observations. Dr. Richey explained that Solar System Observations is well-funded right now, but such observations can also be included as a sub-task in Emerging Worlds or other areas. This program has potential for interdisciplinary research.

Data analysis is welcome under standard modeling and theory, but otherwise is more appropriate under a DAP. Dr. Jeff Plescia, Chair of the Lunar Exploration and Assessment Group, pointed out that all data come from some mission. He asked for more specificity in defining data analysis. Dr. Luhmann agreed, and said that ground-based observation should be part of that. Dr. Richey nodded in agreement.

Dr. Hap McSween, Chair of the Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM) committee, agreed with the statement that the delineation between cosmochemistry and Origins is not as clear as it should be. The wording is the same for the two programs, and one should be deleted. Dr. Rall acknowledged the comment that this should be deleted or refined.

Dr. Voytek explained that there is a difference between life and the inventory of organics in the solar system and its delivery to planets. It is not limited to those organics relevant to life. Dr. Pratt agreed, noting that she likes seeing more of the pre-biotic organics moving into Emerging Worlds and stating that we do not know the boundaries of what happened. When Dr. Voytek explained that prebiotic chemistry will not be under Emerging Worlds, Dr. Pratt said that she was referring to the inventory and delivery mechanisms and how they relate to early solar system activities. The language should be clearer.

Dr. Plescia thought that the boundary between Emerging Worlds and Solar System Workings was not clear, and he had questions about late heavy bombardment. Dr. Jeff Grossman of NASA said that this was still being worked out and input was welcome. Emerging Worlds will address what might have caused the bombardment, but it does not include impact studies on, for example, the moon.

Dr. Luhmann advised having a breakdown showing the kinds of topics PSD envisions falling under the various programs, to give an idea of which subtopics go to which programs. The sooner this goes out, the better. Dr. Lisa Gaddis suggested having this as part of an “exclusions and clarifications” section, which would be extremely helpful. As much information as possible would be helpful to investigators, who are concerned about the inability to plan.

Dr. Voytek agreed. The programs decided to have Solar Systems Workings reflect processes, not time. It was agreed that such a distinction could work with more definition and specificity. Dr. Voytek added that PSD is relying on the science questions rather than measurements, noting that some investigators use the same measurement to answer very different questions. The goal is not to limit, but rather to have an appropriate review with a clear decision. There will be gray areas, and PSD is trying to avoid stove-piping.

There will be a two-step process. PSD is very concerned, and if they make a mistake and something comes in that should have gone to a review that already occurred, they will deal with it. In the past, investigators were out of luck when this happened. Now, PSD is trying to prevent that.

Dr. Luhmann suggested that the community be given the ability to ask the program managers via a simple email if there is a question that is not answered in the guidelines. Dr. Grossman said that PSD expects that, especially this year, and encourages contact. If a proposer makes a valid argument and it goes to a panel, PSD expects the panel to award a good proposal, not say that the proposal is in the wrong place.

Dr. Pratt suggested that PSD have a teleconference to help answer questions and reassure proposers, particularly those in the early career stage. Dr. Richey explained that a large contingent from PSD will be at the upcoming Lunar and Planetary Science Conference meeting and will answer questions at the poster session. Dr. Rall added that there could be a question and answer session at the pre-proposal briefing in March.

The caucus members will be identified and listed by specialty. Dr. Steffes asked why Planetary Observations is alone in not having two steps. Dr. Rall said that there has been no change in the scope of planetary astronomy in NEOO, so the program officers did not see the need. It could still happen eventually. In terms of award length, the average duration is 3.2 years. Longer awards cause funding oscillations that inhibit PSD’s ability to offer new awards. Shorter awards allow stabilization. This is not

to preclude longer awards, but they create issues and are untenable. Panels also look at the longer ones skeptically.

More concern was expressed regarding the inflexibility in regard to the proposed investigator teams, which cannot be changed between the two steps of the process. Teams are not always finalized 60 days in advance of the panel reviews. Dr. Rall acknowledged that this had upset people and said that PSD will soften the language. Dr. Glaze gave an example in which a proposal was rejected after a team member was needed at the last minute and the addition was not allowed.

Dr. Rall explained that the caucus will evaluate Step 1 proposals strictly on the basis of relevance to the program. Those proposals will be one-page only. The caucuses will not reject Step 1 proposers, though they may direct them to other programs. PSD wants proposers to name the funded proposing team members listed in Step 1, then not change unless there are extenuating circumstances. Identification of the funded team members will allow the creation of panels without COIs. This can be handled in different ways, however, including by having review panels at staggered times. Dr. Voytek added that to organize 500 proposals with a changing cast of characters, the programs will need 60 to 70 reviewers, which means they will also need a clear list of who cannot participate. Modifications can disrupt the composition of panels. PSD is trying to be flexible, but the program managers need to be able to do their jobs.

Solar System Workings

Dr. Hansen said that she liked the basic program outline write-up at first, but the pervasive use of the word “planetary” made her think that many proposals could be judged noncompliant (if the proposal for example was for Pluto). Dr. Rall said that all planetary bodies, from dust to ice giants, were meant to be included and this was an oversight. Dr. Voytek said that recommendations for language would help. When there is a list, people notice what is missing. This area is supposed to include anything in planetary. If an investigator is using material to discover something about an ongoing process, it belongs here. Dr. Grossman added that this was one of the unresolved discussion areas.

Dr. Glaze noted the absence of field studies and a mapping component. Dr. Voytek replied that field studies should have been included and she will add it back. Mapping will go into one of three areas, depending on what the investigator is doing and the methodology. PSD will work on the language.

Dr. Plescia said that dynamics seem to be missing; Dr. Voytek said that it will be included. The list is not meant to be exhaustive. If anyone has additions, clarifications, or other comments, they should email her, Dr. Rall, or Dr. Jared Leisner. Regarding the facilities, the Division can provide guidance on what they are, what can be done with them, what is available, and so on.

Dr. Hansen was also concerned about implementation. For example, how would the study of dust devils on Mars be compared to a study of polar hexagons on Saturn? The sheer number of reviewers and the search for unconflicted individuals constitute another concern, along with proposers having to submit multiple proposals on the same deadline. Dr. New explained that it is much easier to evaluate one proposal than to look at four from the same person. The latter situation sometimes works against the individual. Dr. Hansen noted that some individuals with a variety of interests will have to have all their proposals done by a single due date. Dr. Voytek added that one thought for the future is to have the call twice each year, with the stipulation that an investigator can only submit a given proposal once per year. PSD hopes to spur more comparative work.

Dr. Prockter thought limiting proposals to a single proposal was risky. If an investigator can only propose under Solar System Workings, he or she has only one opportunity and only one proposal, and must then wait a year for another chance. Dr. New said that his analysis of 2006/07 proposals showed only about 10

percent duplication. Dr. Voytek added that the programs are trying to provide more opportunities and relieve the deadline pressure.

Dr. Plescia asked where a data analysis project on volcanism would fall. Dr. Voytek said that if the investigator is relying on something collected by a mission, it would be appropriate to submit it there. Dr. New added that PMDAP is the “orphanage” for data analysis. If a project is 80-90 percent data analysis, it should go to a DAP. If it is 50 percent, it may belong elsewhere. Dr. Voytek explained that PSD hopes that the data analysis programs are used when the primary resource for the proposed effort is mission data. If the data are used in modeling, the project goes under Solar System Workings. There will be some wording changes. Dr. Luhmann said that the issue is how to guide the proposer; the wording in the drafts needs to be fixed.

Dr. Voytek said that in regard to the question of funding fairly disparate proposals, those proposals rated “excellent” would get funding without a prioritization. The prioritization occurs among the “goods” and “very goods.” As APD already does, this will allow PSD to fund the best science with fewer categories. Dr. Hansen said that at the recent OPAG meeting, Dr. Green listed higher priority areas, and outer planets research was not among them. Dr. Voytek replied that PSD will take into account priorities, but selectable proposals can be funded as usual as funds are available.

Dr. Luhmann said that she has had experience with large panels, in which the different subpanels had varying scales on what was excellent and what was good. Dr. Voytek explained that the Exobiology program already does statistics midway to see if there is a panel that likes everything and/or one that hates everything. The top proposals tend to come out as such. In addition, the caucuses hope to be staffing the panels more completely. There will be plenary sessions at the reviews.

Dr. Chabot pointed out that many of NASA’s strategic decisions have to do with sample return, which is not possible with outer planets. The community is concerned about whether NASA will support the outer planet work. There is also concern about the facilities and continuation of their analytical expertise. Dr. New said that PSD is not bound to follow the panels. As far as the analytical capabilities associated with the facilities are concerned, that is not changing.

Dr. Voytek said that there are a lot of people who will not be submitting proposals, and PSD needs them to be on the panels. She asked PSS to encourage community members to be on the panels and to publicize the need for a broader range of the community to be involved. Dr. Luhmann asked if write-in review use would be reinvigorated to provide broader expertise in the proposal reviewing. Dr. Voytek indicated that she intended to use these and to encourage write-in reviewers by letting the community know these are going to be important in the panels. The Division is also relying more on virtual participation and international participants. Since the international community is not eligible for the funds, they are attractive as panelists.

Habitable Worlds

Dr. Hansen suggested that the PSD strategic goals be consolidated to allow simplification in this area. Dr. Rall replied that this area is strategically very important to PSD, and the Division bases missions on it. Many proposers will go to this area rather than to Solar System Workings. Dr. Voytek said that PSD wanted to break out habitability in order to nurture the area. Dr. Hansen felt that the science write-up in the call seemed weak and re-iterated her opinion that this area should be under Exobiology, where biologists would assess the proposals. Dr. Voytek explained that this is not about biology, but rather it has to do with geology, water availability, and other factors that would be under the purview of planetary scientists, not biologists. Dr. Hansen said that if she wanted to study water on Europa, she would put it under Solar System Workings. Dr. Voytek replied that if the point was to study the presence of energy to support life, that would be a habitability issue, and biologists would not evaluate it.

Call-outs for exoplanets, Mars, and icy moons reflect the understanding of current habitability issues. She agreed that the language should be clearer and include better examples, especially regarding the distinction between Habitable Worlds and Solar System Workings. Dr. Pratt added that the feedback she received indicated that the absence of the words “possible” or “plausible” makes some in the community think of science fiction.

Dr. Hansen also heard a lot of confusion about what goes to Planetary Science and Technology Through Analog Research (PSTAR), what goes to Habitable Worlds, and how to deal with lab and field work. Dr. Voytek promised to post the PSTAR right away, and asked for feedback regarding whether she has made the right distinction. She will also make it clear that pilot studies are accepted in all of the programs. The distinction between a pilot and a shorter duration project is that the former tends to address proof of concept.

Dr. Luhmann observed that the Habitable Worlds language calls out extant life. Dr. Voytek said that the wording allows past life and calls out contemporary possibilities. It excludes biosignatures, which would involve detection and therefore fall under Exobiology. Dr. Luhmann asked that the language be more specific and detailed. Dr. Plescia asked about the distinction between “explore the possibility of extant life beyond Earth” and “search for ancient and contemporary habitable environments.” Dr. Voytek explained that this would be a situation where investigators could see if life could be supported by the kind of soil that is present, not whether there are evolved organisms.

Regarding the necessity and uniformity of the two-step submission process, Dr. Mitch Schulte said that the idea is that the investigators must explicitly address what their research is doing on any specific body and also address the possibility of the capacity to support or sustain life. Otherwise, the proposal should go elsewhere. Dr. Richey said that PSD wanted to get the content to PSS quickly, and will modify it and check for consistency. Dr. Gaddis noted that some things have been unclear for many years.

Exobiology

Dr. Hansen did not think it made sense to create a new small program here. Dr. Voytek said that this has for many decades been a Division and Agency goal. There are other small programs that must remain separate. This is a growth area. The enabling and foundational science needs to be done in this area. Biosignatures are supposed to be included here, and she will change the language.

Solar System Observations and NEOO

This looked fine to Dr. Hansen. She found a typo and wanted to know if the commercial services and International Space Station (ISS) should be called out. Dr. Rall said that that will be added. Mr. Lindley Johnson, who heads the NEO effort, had not had the opportunity to update the previous NEO solicitation. Mr. Johnson does not see the need for a two-step process in this area, since there is little change. Comments should go to him. Suborbital flight investigations will continue under Solar System Observations and could include NEOs. PSD has identified some related science that could be done from balloons.

Cassini DAP (CDAP) and Participating Scientists

Dr. Hansen understood that this was supposed to be unchanged, but now there is a 10 percent decrease in available funds and a deep decrease in funding for participating scientists. Cassini has been very valuable, especially with the participating scientists, many of whom have made significant contributions. So this is a blow. Dr. Richey agreed. PSD is limiting CDAP to only three selections for participating scientists this year. A better funding environment in the future could allow more. PSD is in a very difficult position here, especially regarding the senior review. The programs cannot fund DAP participants to work on a program that no longer exists. CDAP will go on past the mission, but the community should know that it

is projected to end in 2017. This is a hard situation to address. There is nothing to stop a scientist from proposing to a DAP, however, and no reason not to apply as a participating scientist. She has selected DAPs without a participating scientist; there must be a DAP to have a participating scientist. There will be some gaps in funding.

Dawn Focused Research and Analysis Program (DFRAP)

Dr. Chabot noted that the community has much to say about this. NASA has made a huge investment in this mission, and to get the most out of that investment, there must be participating scientists when Dawn reaches Ceres in 2015. However, a participating scientist program is excluded in Section 1.5. Dr. Kelly explained that this is a multi-year, multi-call program. The program wants a call to go out as soon as ROSES goes out, as well as in at least two subsequent ROSES calls. That will provide twice as much funding for investigators as a participating scientist program would, and it will fund as many as three times more people than would a participating scientist program.

Dr. Chabot maintained that there is money available and that participating scientists are needed. Dr. Prockter added that participating scientists have been particularly useful on other programs, such as MESSENGER. Dr. Kelly explained that a number of factors led to the decision to do it this way, including PSD experience, internal discussions, and input from the participating scientists involved in Dawn at Vesta. Dr. Luhmann said that she agreed with Drs. Chabot and Prockter and thought there should be a Ceres-specific program for Dawn.

Dr. McSween observed that this is a Discovery program. The targets, Vesta and Ceres, were selected because they were very different from each other. The participating scientists bolstered the expertise in the Vesta portion of the mission. Dr. Rall suggested that PSS have a finding and recommendation about this. Dr. Chabot pointed out that the last minutes indicated that Dr. Green said that such a program would be possible. The participating scientists should be in place quickly.

Exoplanets

This program is operated with APD. Dr. Hansen sought clarification about having exoplanets as a separate program. She wondered if the community as a whole might be better off thinking about exoplanets and ice giants. Dr. Steffes pointed out that the reason the Kepler mission was moved to APD had to do with funding, and suggested that this might be similar.

Dr. Richey explained that this was not a separate program initially, but there is a goal of having cross-disciplinary programs. APD has all of the observation facilities and PSD has the modeling. This is a growing science topic area that has been eating away at other programs. There is also the potential to leverage it with APD. PSD does not want APD to have exoplanets exclusively. Dr. Glaze thought it was a great idea to call this out, bring the divisions together, and share expertise. The Heliophysics Division (HPD) could also participate. Dr. Richey agreed.

Next Steps, Findings, and Recommendations

Dr. Hansen said that the community was surprised when this R&A Program restructuring plan came out. In addition, OPAG members had many questions and have suggested a delay. There is no opposition to restructuring, but there is concern about implementation. PSD should read all of the comments.

Dr. Rall said that there will be a pre-proposal briefing in mid-March for the first calls. He will keep PSS informed. The community should continue asking questions through the AGs and program officers at NASA. He planned to release the names of those on the caucuses within a few days. The program managers would handle the grey areas. The Division will make a stronger effort to inform the community about where and when presentations will be given.

Some areas will have additional drafts posted on the Lunar and Planetary Institute (LPI) website. Program managers will use the input they have received to inform the modifications. The Division amends calls all the time and can do that in some of these situations. Funding neutrality will be part of the process, which Dr. Chabot thought would be helpful if it were transparent. Dr. Rall explained that it has been difficult to demonstrate funding neutrality in the current structure.

Findings

Dr. Luhmann noted a senior review of R&A would have to have occurred during the 4 years of work on the restructuring. Dr. Prockter noted that the original intent of a senior review of R&A was to do work that included reviewing the facilities. The issue is how best to move forward now. Dr. Rall said that there will be an ongoing review process. Each panel review will have an opportunity for feedback.

Dr. Glaze saw the fundamental issue as one of communication; she thought there might have been more information provided during the restructuring process. Dr. Prockter observed that PSS has been short-staffed, and Dr. Rall added that some members are rotating off. PSD has not been able to nominate new members, though there have been some suggestions. Extending terms is difficult, though that is an option. Dr. Prockter asked if PSS might have a finding about the speed at which new members are brought onto the PSS, which is currently very slow.

Dr. Nancy Chanover recommended a finding that would request regular briefings after PSD receives feedback from proposers and panelists, which Dr. Rall agreed would be feasible. Dr. Luhmann phrased this as “sharing proposer, panelist, and program manager feedback.” She and Dr. Gaddis made plans to write this finding.

Dr. Plescia said that the restructuring was not ready for implementation. There were too many questions and too little communication. Under those circumstances, release of the new structure would be premature. Dr. Chabot added that SBAG had a recommendation stating as much. She agreed with the restructuring and wanted to help, but it still felt rushed. Dr. Prockter asked what it would take to make Drs. Plescia and Chabot feel comfortable with it. Dr. Plescia answered that if the roll-out were ready, there would have been fewer questions and less concern about fundamental issues on boundaries, definitions, and so on. Dr. Luhmann said that she would write something about the perceived speed of the transition, communications, and getting the organization ready on time.

Dr. Hansen thought that some areas were ready, and others were not. Dr. McSween said that from the CAPTEM perspective, this all maps to the PSD objectives, which do not have equal weight. Dr. Rall replied that PSD presented the science objectives used in the restructuring to PSS with the recently reviewed NASA strategic plan. There have been questions about the objectives for a long time. If they are not right for guiding the R&A program, it is not clear why PSD would have them. The Division is held accountable to those goals. Dr. Steffes observed that the community in general does not reflect the objectives, which Dr. Luhmann suggested revisiting them at some future date. The findings this time will be focused on the active restructuring and the community reaction to it.

In regard to Dr. Prockter’s question about what would be needed to feel comfortable with the restructuring, Dr. Chabot was most interested in due dates and funding, the latter being something she did not know. Dr. Sunshine added that the funding allocations reflect the priorities.

Drs. Luhmann and Plescia agreed to work on a finding about the Subcommittee’s concern that the R&A restructuring might affect the extended mission oversubscription.

Regarding the participating scientist program, Dr. Prockter raised the issue of training younger scientists, and Dr. Chabot reiterated the SBAG membership's emphasis on having a participating scientist program for the Dawn at Ceres mission, which the members prefer to having a DAP. Dr. Luhmann added that the DAP for Dawn is very limiting compared to the CDAP, which could be a model. Dr. New explained that Dawn data are in the PDS. The participating scientist program is selected separate from the mission and is not necessarily part of it. A complicating factor is that any participating scientist would join the team as a new member. PSD decides whether or not to have participating scientists. Dr. Chabot pointed out that the participating scientist programs add a lot to NASA's significant investments, and reiterated that SBAG believes there should be a participating scientist on Dawn at Ceres. However, the call specifically forbids it.

Dr. Green said that there were problems with that call as written and that he promised to make the call clearer and more succinct. Scientists will be able to participate in the active part of the mission. There will not be participating scientists as part of the mission team, but scientists will have access to data from the Ceres portion of the mission. He repeated his assertion that PSD will change the call, updating and rewriting it. PSD will also address Dr. Chabot's comments.

Dr. Prockter explained to Dr. Green that PSS sees great value to adding participating scientists to a team, and would rather see funding spent on a participating scientist program than on the DAP. The Subcommittee was in the process of crafting a recommendation to that effect when he rejoined the meeting. Dr. Green asked that PSS complete the finding and provide it to him. Dr. Luhmann said that that was the main draft R&A program item troubling PSS. The others were more adjustable by editing in response to PSS, AG, and community feedback.. She said that the Subcommittee appreciated all the hard work he had done in communicating with the community.

Dr. Green replied that this has been a difficult process, one that would wear on everyone if it were to continue for another year. PSD wants continued constructive comments. PSD strives to put money into R&A, and whether or not the community trusts the Division's managers, the track record stands on its own. Comments made through social media can be quite polarizing or uplifting. PSD staff want to be open and honest to continue the dialogue. They are not stifling it or evading input; they are trying to be responsive. Some people have gone to Congress, the Office of Management and Budget (OMB), and the Office of Science and Technology Policy (OSTP). So has PSD. The Division has been very open with Congress, OMB, and OSTP and has received approval to move forward.

In the long run, there should be a home for every proposal, and PSD wants the proposals. The Division will do the peer review evaluation and administer the funds as quickly as possible. Not everyone sees the work the PSD staff do. They are dedicated and giving back to the community to make things better. PSD must take the sniping along with the constructive comments. But the staff does want to improve the program. In long run, this will be a better program for it.

Dr. Luhmann said that the strategic goals became a topic of discussion. There are questions about those goals, and it may be that PSS should revisit them. Dr. Green agreed that it is a good idea to always perform critical evaluations of those goals as we continue to make progress. The discussion can now concentrate on the strategic goals and whether the R&A program will be responsive. The next round of the Government Performance and Results Act (GPRA) review will be the perfect opportunity to address whether the strategic goals should be modified after we determine how much progress we have made. That will occur in the summer.

Adjourn

Dr. Luhmann said that any final discussions will be at the next meeting or teleconference, which Dr. Rall suggested having after the President's budget is released. He said that there will be spring and late summer face-to-face meetings, a teleconference meeting, and topical teleconferences as needed. Dr. Luhmann said that she will send the PSS findings to the NAC Science Committee, which will meet in March.

The meeting was adjourned at 5:31 p.m.

Appendix A Attendees

Subcommittee members

Janet Luhmann, University of California, Berkeley, *Chair, Planetary Science Subcommittee*
Jonathan Rall, NASA, *Executive Secretary*
Julie Castillo-Rogez, Jet Propulsion Laboratory (via WebEx)
Nancy Chanover, New Mexico State University
David S. Draper, Johnson Space Center (via WebEx)
Lisa Gaddis, U.S. Geological Survey
Lori Glaze, Goddard Space Flight Center
Candice Hansen-Koharcheck, Planetary Science Institute (via WebEx)
Mihalyi Horanyi, University of Colorado (via WebEx)
Christopher House, Penn State (via WebEx)
Lisa Pratt, Indiana University (via WebEx)
Louise Prockter, Johns Hopkins University Applied Physics Laboratory
Paul Steffes, Georgia Institute of Technology
Jessica Sunshine, University of Maryland (via WebEx)
Donald Yeomans, Jet Propulsion Laboratory (via WebEx)

NASA attendees

James Green, NASA HQ, *Director, Planetary Science Division*
Marc Allen, NASA HQ
Jeff Grossman, NASA HQ
Lindsay Hays, NASA HQ
Brook Lakew, NASA GSFC
Mike Kelley, NASA HQ
Jared Leisner, NASA HQ
Michael New, NASA HQ
Christina Richey, NASA HQ
Mitch Schulte, NASA HQ
Mary Voytek, NASA

Non-NASA attendees

Nancy Chabot, NASA Applied Physics Laboratory (APL)
John Limpews, Aerojet Rocketdyne
Jim Lochner, USRA
John McCarthy, Orbital Sciences
Jeff Plescia, John Hopkins University
Elizabeth Sheley, Zantech
Ana Wilson, Zantech

WebEx participants

Charles Acton
Brent Archinal, U.S. Geological Survey
Fran Bagenal
Raul Baragiola
Kelly Beatty
Linda Billings
Bill Bottke, Southwest Research Institute
Kathy Bucy
Peter Chi

Matt Chojnacki
John Cooper
David Crown
Rolf Danner
Doris Daou
Nicolas Dauphas
Brett Denevi, Johns Hopkins Physics Lab
David Des Marais, NASA Ames Research Center (ARC)
Serina Diniega
Cynthia Dinwiddie, Southwest Research Institute
Meredith Drosback
Carolyn Ernst
Cynthia Evans
Ilya Ferapontov
Christopher Flaherty, NASA
Robert Fogel, NASA HQ
Jeff Foust, The Space Review
Amara Graps
Edwin Grayzeck
Robert Grimm
Tim Haltigin
Amanda Hendrix
Gregory Herzog
Juergen Hill
Zhengwei Hu
Noam Izenberg
Jeffrey Johnson
Insoo Jun
Rachel Klima, NASA APL
William Knopf, NASA HQ
Theodore Kronmiller
Rob Landis, NASA
Melissa Lane
Mackenzie Lystrup, Ball Aerospace
Steve Mackwell, USRA
Sarah Mattson
Hap McSween, University of Tennessee
Beatrice Mueller
Juergen Nittner II
Sarah Noble
Daniel Nunes
Demitri Papanastassiou
Asmin Pathare
Patrick Peplowski
Miriam Quintal
Julie Rathbun, PSI
Vishnu Reddy
Kurt Retherford
J.R. Reynolds
James Roberts
Allison Rose-Sonnesyn, House Science Committee
Doug Ross, Lockheed Martin
Shmuel Rubens
John Rummel, East Carolina University
Marcia Smith, spacepolicyonline.com
Krista Soderlund

Allesandra Spingmann
Tom Statler
David Stillman
Rhonda Stroud
Mike Strutskie
Mark Sykes, Planetary Science Institute
Matthew Tiscareno
Allan Treiman
Anne Verbiscer, University of VA
Shannon Valley, NASA HQ
Gregg Vane, NASA JPL
David Williams
Rebecca Williams
Eliot Young

Appendix B
Membership Roster

Janet Luhmann, Chair
Space Sciences Laboratory
University of California, Berkeley

Jonathan A. R. Rall, Executive Secretary
Planetary Science Division
Science Mission Directorate
NASA

Julie Castillo-Rogez
Jet Propulsion Laboratory

Nancy Chanover
New Mexico State University

David S. Draper
Astromaterials Research and Exploration Science Directorate
NASA Johnson Space Center

Lisa Gaddis
U.S. Geological Survey

Lori Glaze
Goddard Space Flight Center

Candice Hansen-Koharcheck
Planetary Science Institute

Mihalyi Horanyi
University of Colorado

Christopher House
Penn State

Lisa Pratt
Indiana University

Louise Prockter
Department of Space Physics
Johns Hopkins University Applied Physics Laboratory

Paul Steffes
School of Electrical and Computer Engineering
Georgia Institute of Technology

Jessica Sunshine
Department of Astronomy
University of Maryland

Donald Yeomans
Jet Propulsion Laboratory

Appendix C

Presentations

1. *Update on 2014 Planetary Mission Senior Review*, William Knopf
2. *Restructuring Planetary Science's Research & Analysis Program*, Jonathan A. R. Rall

Appendix D

Agenda

**Planetary Science Subcommittee Meeting
January 22, 2014
NASA Headquarters
Washington D.C.**

10:00	Welcome, Agenda, Announcements	Luhmann, Rall, Green
10:15	PSD Update	Green
10:45	Planetary Mission Senior Review	Knopf
11:15	PSD R&A Restructuring Update	Rall
12:30	Lunch Break	
12:45	Discussions	All
5:30	Adjourn	