November 22, 2013

NASA Small Bodies Assessment Group (SBAG)

From November 7-21, questions, concerns, and comments were solicited from the SBAG community regarding the plan to restructure the Planetary Science Division's Research and Analysis Program, as presented November 5 at the Planetary Science Subcommittee meeting. Wide-ranging questions were received and are compiled in this report. All questions and comments received are included, and an attempt to organize them by general common themes was undertaken to make this report more accessible. Additionally, letters from the USGS Astrogeology Science Center, the Geologic Mapping Subcommittee (GEMS), and the Planetary Cartography and Geologic Mapping Working Group (PCGMWG) express well-developed, thoughtful questions of importance to the SBAG community and are included separately in this report.

The *Assessment of the NASA Planetary Science Division's Mission-Enabling Activities* by the Planetary Sciences Subcommittee, from August 2011, has been cited to motivate a restructuring of the Research and Analysis Program. As stated in the *Executive Summary* of that report:

> The SR&T (*Supporting Research and Technology*) Working Group found that the current Planetary Science Division mission-enabling activities can be mapped clearly to the specific scientific objectives contained in the NASA 2010 Science Plan. However, many of the research and analysis programs overlap. Because the workload on the scientific community and NASA Program officers has increased substantially in the last decade with regard to proposal preparation, review, and implementation, the Planetary Science Division should consider consolidating programs to eliminate overlap as a part of the portfolio management strategy. This consolidation should be net revenue neutral (i.e., overlapping tasks as well as their corresponding funding are combined – this is not meant to be a means of reducing overall research program funding). **The Working Group recommends that this action should be undertaken as part of a *Senior Review* of all mission-enabling activities.** The implementation of such a senior review would require that the Division develop clearly articulated criteria for evaluating the success of the mission-enabling activities and that the funding levels for all SR&T activities be made available for the review. The senior review would include assessment of workforce requirements needed to support these activities.

The SBAG Steering Committee finds that a Senior Review, as recommended in the 2011 Planetary Science Subcommittee report, *Assessment of the NASA Planetary Science Division's Mission-Enabling Activities,* prior to implementation would promote a successful restructuring of the Planetary Science Division's Research and Analysis Program. The scope of this review should also be informed by the questions raised by the planetary community with regards to the reorganization.

Questions, Concerns and Comments Regarding the Timing of Implementation:

- I heard somewhere that this is to be implemented for the next round. My question is, how can this be achieved, and have everyone (NASA managers and PIs) up to speed, before ROSES 2014?

- Major concern: It is difficult enough for soft-money researchers to support themselves during these times of diminished R&A funding, low proposal acceptance rates, fewer missions (forcing more into the R&A pool), threatened further cuts due to sequestration, etc. Independent of the theoretical merit of the proposed changes, this is a horrible time to add great uncertainty to the proposal process. Planetary researchers have learned the current procedures (both explicit in ROSES and implicit from past experience and anecdotes), typical dates that "renewal" proposals are due, the different criteria each of the many programs apply to proposals, the boundaries between different programs, the approximate budget levels typical of different programs, etc. To add uncertainties of all these changes to the highly volatile funding situation just is bad timing. My suggestion is that they postpone these changes for a year and give the research community the chance to discuss them and get used to them.

- Word is that this restructuring has been in the works for ~2 years. Why is it that the community has been given its first glimpse into the plan a mere 3 months before ROSES 14 will be issued?

- It is understandable that the R&A programs might need periodic restructuring, and I can definitely see where grouping them in a way that maps back directly to NASA's planetary science goals might be helpful at some level. Change always creates anxiety, so I can also understand the desire to get things out and moving despite community resistance. However, the planetary community, as a whole, is extremely dedicated to what we do, and eager to help make things better. Providing less than 4 months from the time of first notice of restructuring to the nominal release date of ROSES 14 is very little time for any kind of useful feedback to be integrated into the roll-out. It is likely that the community has a number of very valid concerns, as well as potentially really helpful ideas that may not have already been considered. Delaying the changes until FY15 would avoid a rush job on implementation of the changes, and potentially allow for things to be tweaked if groups raise critical concerns (or provide creative and helpful suggestions).

- Overall, I'm cautiously optimistic about this restructuring, but do want to hear more before I can say I'm completely behind it. I wish I had heard Jim's talk to go along with these slides as some of these questions may have been answered there. But right now, given that most people likely did not hear the talk, I think the biggest thing is putting out more information soon is critical to allow us to properly evaluate this plan for restructuring.

- The proposed schedule seems unrealistic: one electronic town hall meeting in early December before restructuring the ROSES 2014 program in whole or part. A whole year should be spent getting input and refining any new structure. Draft plans should show how the existing ROSES program can be restructured according to the new plans. How will review panels be constituted if the aim is to increase interdisciplinary research?

- There is not reasonable time to restructure an entire multi-faceted R&A program in 3 months time in order to be ready for the next ROSES AO in ~Feb. 2014 in order to not have a large gap in funding opportunities. It would be best to think this over and have it roll out for the Feb. 2015 AO instead.

Questions, Concerns, and Comments Regarding Program Balance and Mapping of Current Programs:

- Is there to be a one-to-one mapping of existing R&A programs into the five main themes, and if so, what is it? If not, are the new procedures intended to direct research in certain directions while de-emphasizing others? (The background slides suggest that some existing R&A programs are now obsolete. What programs are those? What research areas are expected to be de-emphasized in the new structure?)

- I think the results of the decadal survey support that the community, as a whole, wants to see a balanced program. However, it seems like maintaining programmatic balance under such broad topics is going to be extremely challenging.

- Exactly what programs are being reorganized?

- Will the new structure be consistent with NAS reports or with the new exploration initiatives?

- Will support across various subdisciplines be maintained or is that being modified? If so, how specifically?

- Virtually all of the existing programs have funded PIs, but the implication here that some of the programs are obsolete or duplicative, so funding these PIs was a mistake?

- Is consideration being made to the danger that successful programs may be lost in this streamlining? Corollary, will the new programs be sculpted around strong research groups regardless of new NASA directions?

- I know there's no direct map of what current program goes into what new program, but it seems to me that program number 2 is going to end up the one that most people have to apply to (or at least those of us who do not focus on Mars).

- Will there still be sub-panels that will evaluate, e.g., lunar geology proposals, or will all geologic studies be in competition with each other regardless of what planet they involve?

- What is programmatic balance under a particular science question? Is it a mix of techniques/methodologies, i.e., one sub panel of a program focuses on materials based/former cosmo-type proposals, one focuses on spectroscopy, etc, or is it balance among the solar system? Does the program officer have to choose which kind of diversity is best?

- I am concerned that this could lead to *less* transparency, as program officers have wider latitude to emphasize or de-emphasize science areas. Given the confidentiality associated with proposal panels, it will be *critical* for PSD to face up to and publicize their science goals. Otherwise it will be terribly unfair if, say, very few Venus proposals are funded and the community doesn't know if it's because the proposal quality was low or if their science was deemed low priority by a program manager.

- Either the Relevance section will need to be revamped because it takes on a tremendous importance, or there will need to be some other discriminator put in place to allow a fair discrimination between the top proposals. Otherwise, again, too much emphasis will be placed on untraceable decisions. Regardless, the way the Relevance section is handled has never been agreed-upon. When there were many programs, it didn't matter so much. Now uniformity is going to be critical.

- I looked over the slides that have been sent out on this topic, and they are too vague and high level to provide any insight into what they are planning. They don't demonstrate how the restructuring will meet their objectives and goals. It doesn't appear, by the information provided, that it will. A map is needed in terms of science, funding, and expected subscription of the current program to the new program in order for this to be evaluated.

- There is a big difference in Green's slides between the topic listed in the first summary slide "How did the Sun's family of planets, satellites, and minor bodies form and evolve?" and the detailed slide which is called "Building New Worlds" in which all the sub-divisions focus on solar and planetary systems.

- Will we have only 5 programs, or will there be "sub-programs" in each program? Will proposals concerning the lunar surface compete against those studying surfaces of comets or icy satellites? Will proposals concerning the interior of Mercury compete against those studying the interior of Jupiter?

- I want to hear more details on this plan. If this is the plan that is implemented for planetary, what would be the specific program calls for the next ROSES? Would Cosmochem still exist, but be under the "Building New Worlds" theme? Or would Cosmochem, LARS, and Origins proposals all go to a single solicitation entitled "Building New Worlds?" If the latter, how will programmatic balance be maintained, given the very different budget needs for a lab-based study versus a theory based study?

- The five planetary science questions do not translate into five core programs suitable for reorganizing the planetary R&A programs. Formation and evolution of planets clearly overlaps with the evolution and interaction of planetary systems. The five science questions provide excellent goals for NASA but do not constitute a workable management structure.

- The five core programs will each have a discipline scientist. That person may not be familiar with all of the types of research that get lumped into each program. Hopefully, these people will be able to learn about what each constituency does and can make rational decisions about relative worth across disciplines. Someone will have to do it. This is a great opportunity for someone to shift the balance in favor of their home community.

- Planetary R&A should not be reorganized around five science questions when the Heliophysics, Earth Science, and Astrophysics R&A programs are organized in a totally different way. Has anyone proposed that the Heliophysics program be divided into three "core programs" that address 1) what causes the Sun to vary, 2) how do the Earth and Heliosphere respond? 3) What are the impacts on humanity?

- The categories are pretty broad and vague. How strict will the boundaries be between proposal opportunities? Is the intent to really only have one opportunity per year for most

researchers to propose? That, of course, would make a single non-selection potentially detrimental. Having smaller opportunities spread throughout the year just seems inherently more stable to me.

Questions, Concerns, and Comments Regarding Program Funding

- Congress appropriated $20 million per year to NEOO, as best I remember. Does the merging of NEOO and PAST change or hide that specific allocation?

- A paranoid question: are these new policies really hiding decreases in funding in one or more research areas? Will previous balancing between research areas be changed WITHIN one of the five new programs?

- How much money will the new structure actually save?

- If items are being moved from a missions line (e.g., MFR) to the Planetary Science Research line (811073), will their budgets be moved as well, and is this reflected in the budget lines in the FY15 budget plan that is already well-advanced for delivery to Congress in February? Just considering that LASER is being transferred to 811073 in FY14 as are (supposedly) OPR and MFR, I do not find that sufficient resources are allocated to this line to support these programs without some cuts. We need to be sure (to the extent that we can) that the numbers add up.

- We need the information to compare the total budgets of the programs being reorganized to the budgets of the new programs.

- What happens to the total money allotted to R&A? What about the end of the LunarQuest program? Obviously researchers interested in lunar data will be proposing to the R&A program, is the total money thus decreasing because Lunar Quest is ending? Or is any extra money being put into the pot?

- Healthy and Sustainable Funding Levels - This was brought up on slide 41, and it is unclear that with this restructuring there is any more or less confidence in a sound, healthy, or sustainable funding level.

- Will the total R&A budget across all previous programs stay the same or increase with the new program?

- No one knows what the sizes of the new pots will look like. Are the pots sizes fixed? Will the pot sizes be dynamically adjusted so that the success rate of proposals is uniform across all areas?

- A main driver for the re-organization is that the amount of available money is declining. This means that there will inevitably be losers in this process. Again, I do not have a problem with downsizing in principle, if that is what our society and NASA choose to do. But because of the way that humans behave, it seems unlikely that a totally rational redistribution of resources will occur. Constituencies with strong personalities advocating for their interests will likely lose the least and may even gain resources. Small communities, and particularly small expensive communities, will be vulnerable.

- My main concerns are that this could increase the negative impact of funding interruptions (or delays) and could lead to a less robust peer review process.

Questions, Concerns, and Comments Regarding Proposing and PIs

- Is it planned to change average grant sizes?
- How many PIs does the new R&A Program support? How does that compare to the current number of PIs?
- Given the breadth of some of the new programs, can proposers submit multiple proposals on distinct subjects to one program with a reasonable expectation of being funded? Will proposers be required to merge disparate science projects (with different teams) into a single proposal?
- How many PIs are supported by current R&A programs, and how many PIs are expected to be supported by the new programs?
- If the number of PIs across all R&A programs are expected to be maintained, has the transition been modeled to ensure that adequate resources are being deployed?
- Given the subject matter distribution of current proposals, how many proposals are anticipated to be submitted to each of the new programs?
- Putting all your eggs in one basket makes it even more painful if you don't get the grant. Bottom line: we need acceptance rates to go up, which apart from maybe some elimination of duplication, will depend mostly on more money coming to R&A. It's not clear whether consolidation helps this or hinders it.
- Does NASA have a sense of how competitive a program can be before it collapses, i.e. if, after this restructuring, the success rate is 10% in each program, does NASA see any danger of good groups going into non-NASA research fields with a greater hit rate?
- Generally I'm in favor of consolidation, so long as there is a commensurate rise in the possible award size (so, e.g., you can pay for a postdoc out of a single grant, which is otherwise hard to do with NASA funds).
- Are researchers whose specialties used to fit nicely into some program now supposed to dream up tortured rationalizations of how their research is central to one of the 5 themes?
- While I'm not aware of a rule that forbids an individual from submitting two-or-more proposals to the same program, it has been very rarely done in the past. Is a researcher who now finds all of his/her research now in a single program now expected to (a) write multiple proposals to the new program with budgets similar to what have been reasonable in the past or (b) put all planned research into one proposal at several times the previous cost and cramming all description of that research into the 15-page limit (potentially drawing criticism from reviewers that specific details are missing)? (I'm thinking of the common category of soft-money researcher who supports their full-year salary from R&A programs.)
- With fewer programs to apply to, I anticipate people will have to submit multiple proposals to the same program (especially for those of us whose research does not remap into most of

the new programs). This will lead to a lot more risk for soft money people, and I imagine make review panels pretty difficult to put together.

- Will proposers be allowed to submit more than once to the same call?
- Will the grants still average about $100k/year? Will the lengths remain 3 or 4 years?
- Will the 5 calls be widely spaced, or close together? Obviously, the former would be better for the community.
- It looks like my research interests fall almost entirely within one or two of the five new programs, whereas previously I had a grant in three different ones. Thus it might become common for people like me to (hopefully) have two or three active grants in a single new R&A program. Will that be OK?
- Is there an expectation that grants will now have a larger scope and more personnel support, allowing everyone to ideally write grants less often? If so, are there plans to make sure the panels realize this? When the change came to let people apply for 4 and 5 years, every panel I was on began raising the bar for the longer proposals, evaluating them much more harshly because they wanted more than a standard 3 years.
- How are current grants going to be handled? Will multi-year commitments be honored, or will new proposals be required? Will they be assigned to particular new programs based simply on what program they'd been in, or based on a reassessment?
- Are there timing implications? Researchers are used to annual (or every 3-year) phasing of reports and proposals that hopefully produce no delays or gaps in funding. Will some proposers find new due dates that are more than 12 months past the usual due-date for proposals in a particular research area?

Questions, Concerns, and Comments Regarding Overlap

- Is the point that some high visibility groups received funds from multiple sources for the same work, so this is a way of spreading the funds more equitably?
- Consolidation - On slide 44-, from first glance and after some thought, we have not reduced overlap between programs if we go in this direction. For example, cometary science and origins provides insight to building new worlds, cometary science and evolution of small bodies provide insight to how planetary systems work, the study of whether comets brought water and organics to Earth provide insight to habitable worlds and touch exobiology, and as comets are small bodies that could impact the Earth their study is also applicable to the last bullet.
- I can see the initial appeal of having 5 core programs matched to 5 basic science goals, but I think organizing them this way is unlikely to achieve the stated goal of reducing overlap between program elements. For example, remote investigations of small body compositions would fit logically under elements 1, 2, and 5, at least.
- How can this possibly make proposal selection rates go up? The last time statistics were compiled, the majority of PIs only put in one proposal per year, so a large number of "duplicate" proposals aren't going to be eliminated.
- How will you deal with overlap? Right now (like it or not) the panel composition can make a big difference in whether something is selected or not. The same proposal may score very well in a Mars program, but terribly on a broader PGG panel. People on soft money positions right now can propose similar ideas to different programs, changing the target body or other options. If bigger grants become the norm, but answer multiple questions, can they be submitted to two programs and still be reviewed, or will there be a clause like is in some current program calls that if the program officer decides it fits better elsewhere they can decide not to review the proposal at all?

Questions, Concerns, and Comments Regarding Specific Programs

- Under what programs will facilities and archiving (e.g., IRTF, PDS) be bookkept? Will they be retained in 811073?

- What happens to NASA funded facilities (e.g., IRTF, AVGR, RPIFs, etc.)? My research specifically relies on use of the AVGR, so that is of most direct interest to me. Right now, the AVGR is funded through PGG. Researchers awarded PGG proposals in which the AVGR is used can use the facility for free, whereas in other programs it costs a lot of money – obviously that makes proposing to PGG very appealing for such studies. With the new restructuring, will there be such a place where use of the AVGR (or whatever else facility) is 'free'? Will these facilities continue to exist? How will they be funded? Will they be set against each other to fight for funding?

- What about facilities and programs like PGGURP that were formerly funded under specific programs. Is it possible to make these available to all NASA-funded proposers, or will they still be classed into a specific question?

- Does the walling off of NEOO and PAST (into a program with no catchy name, no less) mean that new telescopic observations will not be funded in the other four programs?

- Cosmochemistry uses a core set of analytical and theoretical techniques to address very diverse topics that span all of the five proposed core programs: e.g., Martian meteorite recovery, curation, and research; formation of stardust and nucleosynthesis; composition of Sun; characterizing NEO; origin of Earth's water; impact processing of planetary materials. It will suffer if it is split into five different "core programs."How do the Astrobiology Institute and SSERVI fit in? Is the intent for them to be merged into these new programs or to remain separate?

- This raises the question of whether rules forbidding observational (or other) techniques are planned, as in some of the current programs? If such restrictions are anticipated, it would be helpful to explain how exactly limiting permissible scientific techniques is seen as helping to advance the science. Such artificial restrictions seem especially damaging if encouraging interdisciplinary research is meant to be a goal for the reorganization.

- Will there still be Participating Scientist calls? Will they be separate programs as needed?

- The other specific driver of R&A funding is/will be missions. Do the Missions and associated R&A fit into the same core program? Or does the type of science that is to be done drive which program is going to be funded? In other words, is Genesis sample analysis in How Planetary Systems Work because it is aimed at understanding the solar wind or is it under Building New Worlds because that is the program that funds most sample-based analytical work? Hopefully the Discipline Scientists for the core programs will be willing to pass proposals submitted to them on to where they belong and not punish people for guessing wrong about what program is supposed to support their work.

- If the "Building New Worlds" core program is divided into sections that compare our solar and planetary system with extrasolar systems, there will be no guaranteed slot for

cosmochemistry. It would be detrimental to cosmochemistry to be continually competing with expanding missions to find and characterize Earth-like planets. The existing cross-division Origin of Solar Systems program provides a better way to promote this expanding field,

- What is the NASA budget for ANSMET and is it bookkept under 811073? In what FY was it/is it to be added?

- How will new needs be implemented in the future (e.g., each participating science call)?

- Cosmochemistry is a unique program because unlike most other programs it is the main source of funding for the research infrastructure. Expensive analytical equipment and labs require long-term funding. Will the proposed reorganization harm a unique and highly successful research program? Cosmochemistry is important because it helps to generate the justification for missions to small bodies by identifying important questions. How will this role be preserved in the restructured R & A program?

- Will there be any programs where PIs can get undergraduate researcher, like in the current PGG program?

- I am an early-career soft-money scientist focussed on analyzing returned samples. I have primarily worked on Stardust cometary and interstellar samples, and recently have started working with Hayabusa and Genesis samples. These returned samples offer great scientific rewards that are not accessible from meteorite samples, and also are much more challenging to analyze than meteorites. For these reasons, I hope NASA sees the benefit in continuing the LARS program after the reorganization. There is a great deal of specialized expertise in preparing returned samples for analysis, and it is also much more time-consuming to prepare and analyze returned samples. Combining LARS proposals with Cosmochemistry proposals would be hugely detrimental to the science output of these NASA missions. The conservative nature of NASA review panels will probably unfairly penalize innovative work on extremely small, rare, and difficult returned samples in favor of meteorite research. The investment cost of a sample-return mission is only recouped if the analysis of the returned samples is appropriately funded. The challenging nature of returned samples necessitates a direct investment by NASA, which should be seen as continued support for the missions.

- Observations of the objects in our Solar System, whether from ground-based observatories, sub-orbital facilities, or missions, would promote the study of one of the other 4 topics already covered. If you would like to have a category to support new observations vs. archived observations, that is something that should be distinct, but within the categories laid out for the consolidation, there shouldn't be a distinction whether a comet observation for example was acquired from the ground or a mission if it will help solve an overarching question. This would be the same for many Solar System bodies. Facility support and/or payload development should be considered separately. NEO observations can also fall under slide 48 and wouldn't have to be their own topic.

- Is the intent to separate cosmochemistry into different core programs or to preserve it? The latter seems preferable.

- For the Habitable Worlds Program, Titan maybe should be included. Asteroids and comets should also be considered as they are thought to have brought water and organics to the habitable worlds.
- For the Exobiology Program, all small body impacts to the larger habitable planets could be cause of mass extinctions and should be considered. Understanding the dynamics and populations of small bodies is important to characterize the frequency of mass extinctions.

Questions, Concerns, and Comments Regarding Exobiology and Exoplanet Focuses:

- A lot of emphasis on habitability/astrobiology. This is premature.
- There seems to be a huge focus on exobiology/life – this is specifically called out in 3/5 core programs, yet is the one thing we still have yet to find in the solar system.
- From the description it appears to be "exploration" heavy. The emphasis is not on fundamental research, but on life in the solar system. How do laboratory studies and theoretical modeling programs fall into the restructuring?
- First let me voice my biggest concern here: Planetary Science seems to be broadly defined in the slides used here or the terminology is not being used uniformly which may lead to confusion (or worse, open the door for loss of funds). On slide 44 (Planetary Science Objective: Ascertain the content, origin, and evolution of the solar system and the potential for life elsewhere.) there is a description of the 5 new core programs that are being established. As written here, these are all Solar System based—that is, goals that are focused on understanding the formation and evolution of bodies within our Solar System. I think this is appropriate, as the Planetary Science Division, outside of the Origins of Solar Systems program and some in Exobiology I think, funded research for just Solar System bodies in the past. However, on slides 45 and 47, the door is open to other planetary systems. On slide 45 (Building New Worlds: Solar Systems origins and evolution) there is the discussion of funding research on Protoplanetary Disks, Early Solar Systems, and Planetary Systems (note the plural on each of these on the slides). Again, this could be fine, but it comes down to how it is implemented. I think it is appropriate for us to be thinking about more than our solar system. BUT we have to be mindful of where this money comes from and how it is distributed. The astrophysics program in NASA also funds research related to the formation of other planetary systems (not our own). What we must be careful of here is that the broad definition of "planetary science" used here in defining research themes does not open the door to projects that are typically funded in Astrophysics (pure protoplanetary disk evolution, extrasolar planet studies, etc.) to find funding in this new scope. If the theme is on Solar System bodies then I think that will preserve those boundaries. However, if we talk "planetary systems" (plural) then that could broaden the scope of the planetary program, increasing the number of proposals sent to the Planetary Program (vs Earth Science, Heliophysics, or Astrophysics). Given the Planetary Program has been the subject to greater cuts than these other programs, this would make competition incredibly high and selection rates very low. This would be a major step backwards. I think the key here is that the Planetary Program support the research that it lists on these slides, but keep the focus on "Solar System" planets. If we expand the boundaries, then the restructuring is going to significantly hurt the community by allowing more people to fight for pieces of a small pie.

Questions, Concerns, and Comments Regarding Interdisciplinary Focus

- "To encourage interdisciplinary research." Why? [In other words, what's wrong with "traditional" research??]

- I worry about the emphases on "interdisciplinary" research. I am not opposed to this in principle and have been involved in research projects that cross traditional boundaries for my entire career. However, I also see what happens when NASA imposes "interdisciplinarity" from the top down. I have been a part the Astrobiology Institute and observed closely the first Astrobiology institute. I also reviewed a SSERVI proposal this year. When proposing, people say all the right things about doing interdisciplinary work. But most are not really prepared to commit to what they propose. There is a good reason for this. In spite of large total budgets, these "institutes" typically only provide a few weeks or a month of salary per year to the participants and some seed money for research projects. That means that from the point of view of the individual, this research is of low priority (I would spend time on the projects that fund 85% of my work at the expense of the one that funds 10-15% of my work every time, wouldn't you?). So from the point of view of the individual researchers, these projects supply some "gravy" to the main meal and do not generate a strong commitment to finishing the work. The result is a very inefficient use of funds. I suppose if each of us were only funded by a single grant and that grant is an Astrobiology or SSERVI or related grant, we would have to adapt and learn to work in that environment. But I think that PI-driven science (with collaborations established between committed PIs) is still the most cost-effective model for doing science.

- For me, one of the most exciting programs in all of ROSES is the Origins of Solar Systems program. I think all of our research should aim to be interdisciplinary, rather than being work that fits neatly into specific categories. I believe we have reached the point where major advances are going to be made at the boundary of disciplines. We should all be aiming to put our work into broad contexts for scientists of all types to understand and appreciate—not make more complicated models for the sake of adding bells and whistles or improve a measurement so that we can resolve that 7^{th} significant digit. I think Origins has encouraged that and supported good science in doing so. Despite a small budget, this is a program that gets >100 proposals a year. This year, there are going to be a large number of Excellent and Excellent/Very Good proposals that don't get funded in that program this year, not because the standards for evaluation there are lower than in other programs, but because the budget is not there to support all these exciting research programs. Note, however, that Planetary was not the only supporter of the Origins program—we cannot ask the Planetary Program to support all Origins work without increasing the budget.

Questions, Concerns, and Comments Regarding Managing Programs

- Given that a significant fraction of the planetary community may be expected to submit proposals to some of the broader new programs, what is the plan for managing the review of, say, 1000 proposals all at once?
- If the subject area of each call is very large and the majority of the community is proposing to a single call, will NASA be able to find qualified reviewers?
- Staffing panels when there is a high chance that qualified members of the community will be financially conflicted to all programs every year is a major concern.
- Is there a reorganization of Program Managers anticipated, and if so, how will that work?
- I'm concerned about the effect of the personality of a single program manager on funding. We already see that, to some negative effect, but it is diluted a bit. With fewer programs, one "rogue" manager could really be a problem.
- What we really need are details. In the 2011 report, they map programs led by many more than 5 program managers into the 5 core programs. I think they will have to keep subpanels to make this manageable. This could mean very little substantive change to our proposals & reviews, or a lot.
- With fewer opportunities, a larger fraction of each sub-field will propose to the relevant opportunity, leaving fewer potential reviewers. What steps will be taken to ensure a robust peer review process?

General Questions, Concerns, and Comments:

- The bottom line is that I'm not sure I could be positive about supporting vaguely defined changes, for vaguely defined reasons, appearing in a presumably seriously re-written ROSES 2014. If more information is forthcoming from above, I think we could at least provide suggestions to help mitigate some of the inevitable downsides, but we have not been given much to work with....

- Concern about uncertainty is important. People have to make life decisions based on how they view their prospects for the future. People who are paid entirely by NASA grants (senior scientists, Post Docs, graduate students) do not have the luxury of waiting until the dust settles to make decisions. People who support labs from individual NASA grants are in a similar bind.

- How big is the group that will finally sculpt the new programs that took decades to evolve, given that a Town Meeting is not a group?

- I just wanted to send a few comments regarding R&A restructuring. Please convey to the good folks at NASA how appreciative I am of the very hard work that they do on our behalf. Sometimes restructuring is necessary, and I am glad that they have come up with a robust scheme that will allow us to continue to do great science.

- Transparency to Congress, OMB, and the tax payers is good. Reducing the award announcement time is also a very good objective

- First and foremost, if there is a specific funding level, whether it is spread over 10 R&A programs where each get to select and award 1 $250K award or 5 R&A programs where each get to select and award 2 $250K awards, the total number of competitors remains the same across the board and the success rate will remain the same. The PI just has to decide where to submit his/her proposal. To go through the nontrivial and time-consuming task of restructuring and consolidating the R&A program and rewriting the ROSES AO, there has to be a strong reason to do so and a clear solution once it is finished. As it stands, the motivation and the solution are not clearly better than what we have. If a program is outdated or fits better within another currently operating R&A program, that is motivation to consolidate or remove it from the portfolio. However, shuffling around the programs just to shuffle them is not a good reason to do so.

- How does "To be more flexible in responding to changing research priorities" in the Program Officer's Goals get translated into real life? I assume those priorities are directed from above? Does this already happen?

- How would this "enable PSD strategic decision making"?

- 1) What is the motivation for doing this? a) To make external reporting easier for headquarters? b) In anticipation of upcoming funding decreases? c) Is there some rationale for this somehow being better for the community itself? I would like c to be true, but I would like to know what that rationale is. If a is true, then I'd like to see some effort to protect the

community from more work (inherent in any big change) just to satisfy accounting. If b is true, I'd like to see some rationale as to how this will help.

- The proposed reorganization of NASA's planetary research programs into five "Core programs" seems hasty, poorly designed, and ill-advised. The stated goals of 1) explaining the structure of the R&A program to those outside NASA, 2) introducing more flexibility, and 3) encouraging interdisciplinary research should be achieved without disrupting and totally restructuring the present organization, which is largely very successful. It would be better to critically examine each of the 20 existing programs in turn to see whether its goals are aligned with the planetary science performance goals and whether the goals are being met. Modify the current organization to make it more focused and flexible instead of discarding it.

- Overall, I do not see restructuring as a bad thing, other than the fear and uncertainty that comes with doing things differently than how they had been done for years. There will be a period of adjustment as people figure out where to submit proposals to, and perhaps how to write them if the restructuring leads to different mixes of people on review panels than had been seen before. I expect there to be a lot of outcry particularly from people who have grown familiar with the old system over the decades. It may or may not be warranted, depending on how the changes are implemented.

- This seems like it could either be a really big deal, or it may just be some restructuring on the high level that doesn't really impact us greatly on the grant-writing level. It is hard to know for sure just by looking at the slides.

From: U.S. Geological Survey, Astrogeology Science Center

(Corresponding author: Laszlo Kestay, laz@usgs.gov)

To: VEXAG, LEAG, MPAG, SBAG, OPAG, GEMS, CAPTEM

Re: Clarification of the proposed reorganization of the NASA Planetary Science Division Research & Analysis programs

Background:

At the meeting of the NASA Planetary Sciences Subcommittee (PSS) on November 5, 2013, the planetary science community was informed that a major reorganization of R&A programs of the NASA Planetary Science Division (PSD) was underway and to be completed shortly. The most prominent aspect of this reorganization is a reduction of the number of research and analysis programs within the PSD to streamline management and align to the five PSD strategic goals. The changes are a response to findings from 2011 by the Planetary Science Subcommittee, various Assessment Groups (AGs), and members of the national planetary science community who responded to earlier recommendations from the National Research Council.

The limited information provided to date about the R&A reorganization raises many questions. Here we compile the most exigent questions raised by the scientists, cartographers, software developers, and other members of the USGS Astrogeology Science Center – an organization that has been enabling humankind's exploration of the Solar System for 50 years. While all of these questions are considered to be very important, the most critical are highlighted.

Questions:

Explain the larger context for the reorganization:

- What is the expected budget for planetary R&A funding after the proposed reorganization? Specifically, will the overall R&A budget at least hold steady at the FY10 levels as recommended by the PSS in 2011 even if funding does not increase as recommended by the Decadal Survey?

- Can you provide a table that explicitly shows how the funding from the current programs will be distributed across the 5 science themes? What current R&A elements will remain outside of the new consolidated programs?

- How will the reorganization affect the balance of PSD's portfolio? Will the current balance be maintained for now? How often will the balance be revisited and what process will be used?

- What process will be used in the future to balance PDS's portfolio of R&A versus other "mission enabling" activities? For example, in 2011, the PSS recommended an external "senior review" process to advise on how the portfolio is balanced.

- Where will funding opportunities for planetary geologic mapping fall in the new organization?

- What metrics will demonstrate how the reorganization improves the effectiveness of the PSD's ability to meet its strategic goals?

- A fundamental tenet in the NRC report and 2011 PSS report is that all of the PSD's efforts must be "mission enabling activities." Since this reorganization is largely in response to these reports, will each program and/or proposal have to justify how it enables mission activities?

- How are the non-R&A "mission-enabling activities" within PSD being reorganized? On what schedule?

- Will ~7% of the budget be allocated for maturing technology for missions, *including data analysis/mining tools* as well as flight instruments, as recommended by the PSS in 2011?

- How will multidisciplinary data analysis tool development be supported and evaluated under this reorganization?

- What is the plan for what the PSS termed "supporting infrastructure activities" such as the PDS, sample curation, Arecibo, LPI, Planetary Cartography, the RPIF, and many laboratories? Currently most of these "activities" are housed within a scientifically related R&A program. Will this continue to be the case or will all infrastructure be overseen by some new program?

- How will science oversight for the "supporting infrastructure activities" be provided after the reorganization? Will there be open competition to provide services to PSD? Will all the different infrastructure activities be reviewed together or separately? Will the review process be more similar to R&A proposal review panels or to flight project senior reviews? How will the cost-benefit ratio of maintaining this infrastructure (versus funding more R&A grants) be assessed?

- Does the proposed reorganization include a uniform policy and procedure for ensuring healthy turnover in science team membership on flight projects, from Discovery to flagship scale, as recommended by the PSS in 2011?

- What is the plan for what the PSS termed "recruiting and training the next generation" of planetary scientists? Will these activities be contained within the R&A programs or a new program?

- Has NASA obtained approval from OMB and the relevant Congressional committees to undertake this reorganization? If not, what is the expected time table for obtaining approval?

Describe how proposals and grants will change with the reorganization:

- When will ROSES2014 be released?

- Will due dates be distributed over the year, allowing each researcher to submit the 4-5 times a year for a single area of expertise? Or is the expectation that the number of proposals submitted will drop to 1-2 per year per investigator - with the size of individual grants increased so a single award will cover 50-100% of an investigator's salary?

- If there is a reduction in opportunities to propose, will 5-year grants be awarded despite the difficulty in predicting the outcome of scientific research 5 years into the future?

- For data analysis programs, a reasonable 5-year plan often requires the use of data that has not yet been acquired. How will this be addressed?

- If longer duration proposals are solicited, and given the difficulty in predicting the outcome of 5 years' worth of scientific research, will review panels and program officers have an uniform process for providing provisional funding (i.e., reduced duration "pilot studies") for proposals that have strong early tasks but poorly described later tasks – with a simplified process for extending the grant if the pilot study is successful?

- Will proposals to produce large/complex/higher-level data products that maximize scientific return from spaceflight missions be looked upon more favorably in this "enabling science" situation because it is easier to lay out a 5-year work plan for such activities?

- If larger numbers of proposals are submitted to each opportunity, how will the conflict of interest rules be relaxed so a sufficient pool of qualified reviewers can be found?

- How will program officers to notify the community regarding R&A activities needed to support the PSD strategic goals but are encountering a shortage of fundable proposals?

- Is the reorganization expected to improve the timeliness and transparency of the proposal review process? For example, will feedback be provided $\leq$ 6 months after submission to allow concerns raised by reviewers to be meaningfully addressed?

- As part of the reorganization, will the proposal review feedback process be modified, providing more explicit explanation of why a proposal was not funded? This is essential if each investigator is expected to write fewer and larger proposals because the failure of two proposals in a row could easily terminate a scientist's career.

United States Department of the Interior

GEOLOGICAL SURVEY

James A. Skinner, Jr.
Astrogeology Science Center
2255 N. Gemini Drive
Flagstaff, AZ 86001
(928) 556-7043 office
(928) 607-9357 cell
jskinner@usgs.gov

November 20, 2013

Re: Geologic Mapping Subcommittee (GEMS) Response to NASA R&A Reorganization Plans
To: NASA Planetary Science Subcommittee, NASA Assessment Groups

All-

The Geologic Mapping Subcommittee (GEMS) is an advisory group to NASA's Planetary Cartography and Geologic Mapping Working Group (PCGMWG) as well as community researchers who focus on geologic mapping investigations. On behalf of – and in coordination with – PCGMWG and GEMS, I provide below the most salient and specific questions that have been voiced by the planetary geologic mapping community regarding the potential reorganization of NASA R&A programs.

- How will the planetary geologic mapping program be impacted by consolidating multiple R&A programs within the larger "How Planetary Systems Work" theme? Would planetary geologic mapping become a sub-theme?

- How does NASA HQ intend to maintain and promote a healthy planetary geologic mapping program through the proposed reorganization?

- Which themes (and sub-themes) will provide funds for the production of coordinated, standardized geologic maps?

- How will the coordination, review, and production of planetary geologic maps through the U.S. Geological Survey, presently overseen by NASA's Planetary Cartography and Geologic Mapping Working Group, be impacted by the potential R&A reorganization?

These concerns require specific consideration and response from NASA HQ in order to ensure that the broader science community continues to benefit from the objective, high-level context science that is provided by the existing planetary geologic mapping program.

Regards,

James A. Skinner, Jr.
Research Geologist
Chair, Geologic Mapping Subcommittee

From: Planetary Cartography and Geologic Mapping Working Group (PCGMWG)

To: VEXAG, LEAG, MPAG, SBAG, OPAG, CAPTEM

Date: 20 November 2013

Subject: *Proposed Restructuring of the NASA R & A Programs:*
Planetary Cartography and Geologic Mapping Working Group Programmatic Concerns

The lack of specific details about the proposed reorganization presented at the 5 November Planetary Science Subcommittee (PSS) meeting, coupled with the short timescale being offered to the community for NASA to adjust any plans according to community feedback, could have significant and unintended consequences. The NASA Planetary Cartography program is one example where the implementation of any restructuring requires careful, thoughtful consideration.

Development of cartographically sound standards, practices, and data products (coordinate systems, IAU recommendations, geologic mapping, consistent nomenclature, etc.) is vital for NASA goals and enables the widespread and accurate creation of data products for all NASA space exploration activities. At the user level, this means that data must be processed with cartographic elements properly in mind, that development of high-quality data and archive products are planned for and funded at a reasonable level, that standards are clearly identified and adhered to early on, and that individual researchers be encouraged or even required to abide by established cartographic standards. For these reasons, the Planetary Cartography program has for reasons both historical and practical been very closely and synergistically linked to the NASA Planetary Geology and Geophysics research program in particular, with broad community benefit for all of NASA's planetary research programs.

With that context in mind, and based on the briefing materials presented to the PSS in early November, the Planetary Cartography and Geologic Mapping Working Group (PCGMWG) has identified several specific areas of programmatic concern in the context of the notional planetary R & A reorganization. *We note at this point that the NASA Planetary Geology and Geophysics Geologic Mapping Subcommittee (GEMS), a subcommittee of the PCGMWG, has identified and submitted to the AG chairs a separate set of programmatic concerns relating to the geologic mapping program.*

First, the proposed reorganization plan does not include any specifics regarding community support elements, including the Planetary Cartography program (but also including the Regional Planetary Image Facility network and NASA supported laboratory facilities outlined in the ROSES call, such as the Ames Vertical Gun Range). These are critical components of planetary science research and how they fit into the notional new structure needs to be clearly delineated. A key question that NASA must address to the satisfaction of the community is: **Where do the Cartography program and other community support elements fit into the proposed R & A restructuring?** Corollary: **Is NASA going to continue to support infrastructure elements like Planetary Cartography directly?** Not supporting such elements either directly or through other programs would have a significant adverse impact on the community.

Second, if NASA does not intend to continue to support key community infrastructure as part of its broader R & A program, the inevitable follow-up question arises: **If not NASA, then who is going to support ISIS software development and interface with commercial entities such as ESRI to ensure software GIS support for NASA missions and maximum productivity by the community?** ISIS software development and ESRI interfacing are critical tasks now supported by the Planetary Cartography program. NASA support for these tasks is vital for continued activities in our field, though they are unaddressed in the proposed restructuring plan.

Third, there has been growing community support over the past several years for a specific, targeted, and competed R & A program to support the development of software tools to facilitate NASA goals (similar to the portfolio of the old Advanced Information Systems Research Program, AISRP, that used to be available in ROSES). Although the PCGMWG is primarily concerned here with facilitating the continued development of software tools to enable efficient geospatial processing of data products returned by NASA planetary missions, such a program could also include projects to develop software tools for spectral modeling, time series analyses, or petrologic investigation. This is brought up here as a PCGMWG programmatic concern because, to first order, a dramatic reduction of NASA's planetary R & A program elements would seem to preclude the future establishment of targeted, specific research programs of the kind being discussed here, to the detriment of the community. **Any proposed restructuring must not be so generic as to preclude meaningful targeted investments (such as software development) with broad community impact.**

The PCGMWG would be happy to answer any questions you might have on these vital topics as the community evaluations and discussion surrounding the notional NASA Planetary R & A reorganization continue.

Sincerely,
The NASA Planetary Cartography and Geologic Mapping Working Group, 20 November 2013

Samuel Lawrence, Arizona State University, Chair (samuel.lawrence@asu.edu)
Ross Beyer, The SETI Institute and NASA Ames Research Center
Shane Byrne, University of Arizona
David Crown, Planetary Science Institute
Brett Denevi, Johns Hopkins University Applied Physics Laboratory
Jani Radebaugh, Brigham Young University
Frank Seelos, Johns Hopkins University Applied Physics Laboratory