Presentation to the Committee to Review NASA Planetary Science Division's Restructured R&A Program

By Janet Luhmann
(previous PSS chair)
August 16, 2016

From May2012 PSS Meeting Report (meeting chaired by Jim Bell):

“Janet Luhmann officially took her place as the new chair (of PSS). A first order of business was to..poll the committee members on their biggest concern. Among the top few:

-R&A issues (slow notification, over-burdened program officers, budget instability, increased proposal pressure as missions wind down.” PSS meeting minutes also note declining selection rates in spite of increasing budget for R&A..why? Longer, larger grants? Delays in getting funding?, More proposals? All part of problem.”

Since then there have been persistent issues arising and PSS findings concerning R&A . The restructuring that came up during the presenter’s term (ending June, 2016) was one major source.

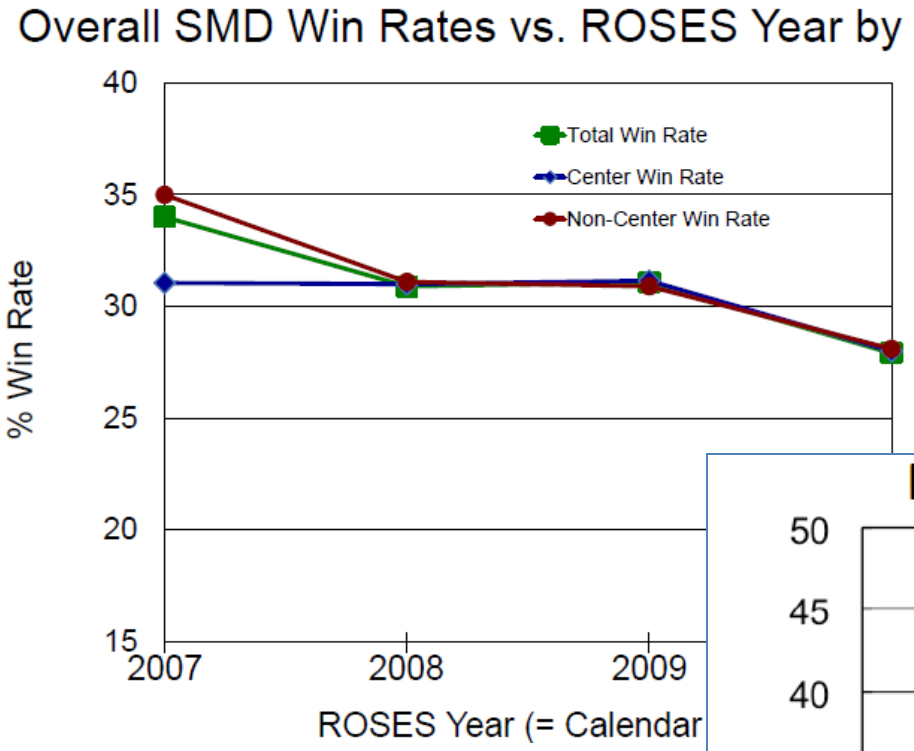
From “Trends in PSD R&A 2007-2011” (J. Rall Presentation):

* Overall: selection rates steadily decline from 35% to 24% while proposal submittal/year increases from ~1000 to >1300

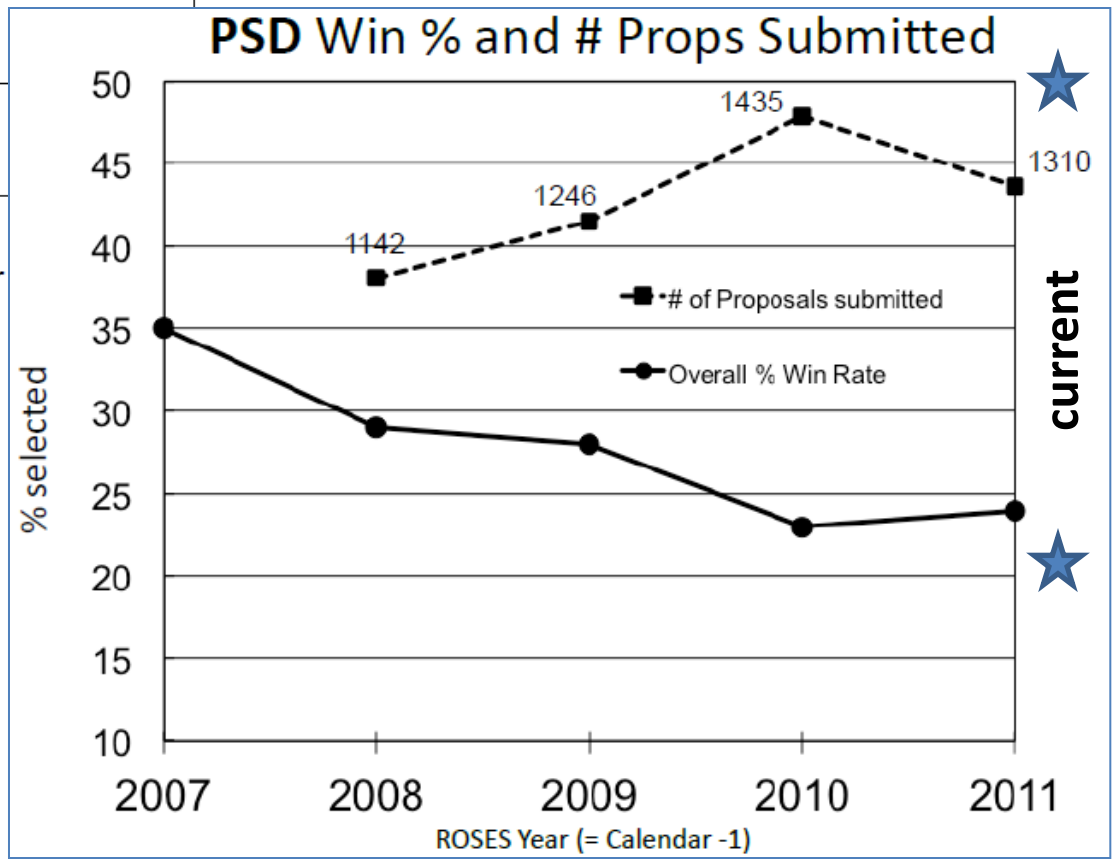
(update: ROSES 2015 total step 2 submissions=1400, and Selection rate ~21%)

* Specific cases of decreasing selection rate 2007-2011 in Core programs:

Cosmochemistry: ~55% to 20%
Planetary Geology: ~55% to 30%
Planetary Atmospheres: ~55% to <20%
Planetary Atronomy: ~60% to <20%
Mars Data Analysis: ~45% to ~20%
Mars Fundamental Research: >40% to <20%
Instrument Development: ~25% to <15%
Exobiology: >40% to <20%



Downward trends in PSD R&A were steeper than for all SMD even before FY13 budget issues



Footnote:
Current overall rate of selection (per J. Rall's presentation to PSS in June 2016 is 21% (includes ~100% of Es, 84% of E-VGs, 37% of VGs.). New program (restructuring) had ~no effect On the %, but has impacted some subareas and groups)

Timeline (approx) of events:

Spring 2012: Funding trends down and Program Managers and R&A Community under stress, due to both historically low chances of success and both opportunity and funding delays. PSD facing budget crisis in general.

Spring 2013 Overall struggles with low PSD budget, but turnaround in the air.

Summer 2013 R&A Program Managers briefly describe the restructuring exercise and schedule to PSS. Essentially an internal (to PSD) process.

Fall 2013 PSS requests information on the restructuring be provided to the community ASAP prior to the new ROSES call. Travel restrictions interfere with face meetings/critical discussions. Community concerned.

Late 2013 Town Hall on restructuring via webex provides info and announces plan to release draft ROSES 2014 for community comment.

Early 2014 ROSES 2014 call proceeds with new structure. Concern continues.

Mid-late 2014 PSS requests outcomes be reported on new structure consequences (to PSS and community) re. program balance.

2015-2016 PSD Program managers make tools for analyzing new program and providing PSS and community with updates and statistics.

Brief notes on Dec. 2013 Town Hall proceedings:

1. Adobe Connect vehicle (managed by ARC SSERVI Inst.) generally worked well as a mechanism for communication and 'managed ' exchange with 100s of listeners. FAQs available at LPI website. ROSES Feb. 2014 will use new structure.

2. Consolidation of PSD R&A into 5 Programs defined by PSD Science Goals in NASA's Strategic Plan PLUS other targeted/strategic elements:

Core Science Programs	**Targeted/strategic elements**
Emerging Worlds	*Instrument Devel. (PICASSO,MATISSE)*
Solar System Workings	*Data Analysis Programs (DAPs)*
Habitable Worlds	*Planetary-research related Technology*
Exobiology	*Exoplanet Prog. (joint with Astrophys.)*
Solar System Observations	*Emerging Topics (opportunities, PS and GI)*

3. No changes to Institute lines (SSERVI,NAI), Fellowships, Antarctic Meteorites, PDS, Astromaterials, Equipment, Planetary Protection, Support Facilities (LPI, NASA Computing, IRTF, Arecibo, etc.)

4. Illustrated mappings of existing programs and proposals to the new structure

5. Deadlines for core programs will be spread every few months through year and involve 2 step system and subpanel 'clusters'. Target is 6 mos . to funding.

R&A Program Restructuring from the presenter's perspective:

Fact remains: ~20% or less success probabilities are the norm (~no change on average from prior to restructuring although it has affected specific areas differently, some institutions, and some individuals). So the restructuring has not been only 'repackaging' (nor was that the PSD intent). It was designed to make it easier for PSD to attach awards and supported efforts to strategic goals (e.g. GPRAMA reporting), and PSD can say whether it is doing that. It stirred up the already over-stressed science community that depends on R&A to be able to do its work, requiring extra time and effort to adjust even while the new structure was being refined. It has shuffled the deck but the number of cards (low success probabilities) remain the same. While matters regarding the size, content, organization and operation of the R&A program itself, including the continuing low selection rates and their consequences, are not the purview of the present study-they are in fact the ultimate cause of the restructuring issues. If a 30-50% success rate for essentially all proposals graded from E to VG, as was once the case, prevailed, the reaction to a strategic restructuring would be much different.

Relevant PSS Findings and Minutes Excerpts

May 2012: Jonathan Rall presented slides on the status of the R&A program that he had recently shown to House Science Committee staffers at their request. There was some discussion about why selection rates are going down, despite increases in the overall R&A budget over the last several years. Jim Green noted that part of that is attributable to the trend towards 4 and even 5 year grants and larger average grant sizes over the last few years. Another factor is the extended delays in announcement of selections in the last couple of years, this year in particular, that forces people to put in more proposals (driving up the total number of proposals submitted and therefore reducing selection rates), since they don't know if their previous ones will be funded. This delay is the result of program officers being unable to make decisions until late in the year due to uncertainty in their budgets. It was suggested that Jim guarantee a certain percentage of each program's target budget, say 80%, in October, then a few selections could be made (even if money was not yet available) soon after the review, with those that fall in between the guaranteed and the target budgets receiving "selectable" notices until final budgets are determined and distributed. There was also considerable discussion of the workload issues for program officers in PSD, but there are constraints, SMD is currently over its allotment of civil servants, so it is not possible to bring more people on at this time. Another topic discussed was the idea of combining some of the reviews for complementary ROSES elements, which may have some advantages for improving efficiency and providing the right expertise, but also reducing the number of annual opportunities to submit proposals.

July 2012 Finding/Recommendation: Recognize that R&A programs are a vital part of NASA's science enterprises and one of its highest priorities by supporting internal efforts to better manage these programs. Specific recommendations include commitments by the Division Directors to program budgets near the beginning of the fiscal year to enable program officers to achieve the GPRA metric (80% of proposers officially notified within 150 days of proposal receipt). Another is the strategic combination of subprogram panels and shared proposal due dates, where possible and appropriate, to minimize the proposal and review process burdens on both NASA program managers and the community. In addition, uniformly implementing a policy to communicate overall program results (total proposals submitted, total selected, average 1st year grant size) to all proposers and post those results on the SARA website in a timely fashion would diminish the perceived need for multiple submissions by the proposing communities. Finally, enable addition of staff where warranted to better handle the work-flow in a timely manner. Reasons: **Streamline the R&A proposal and peer review process for both proposers and NASA program managers. Reduce inefficiencies, and unnecessary stress in the system from increasing proposal pressure and stagnant staff size.** Consequences of no action: Continued failure to meet metrics for performance in program management, over-worked program personnel, continued multiple submissions of similar proposals driven by uncertain or untimely results in the review and selection process.

PSS October 2012 Meeting Finding

Finding 2. Planetary Research and Analysis

The Planetary R&A program is a vital part of the PSD mission and is one of its highest priorities. Without adequate R&A, neither the fruits of NASA's planetary exploration, nor the benefits of informed future planning, can be realized. Two current challenges are the overall level of funding and management of the program given the existing budgetary uncertainties, and supporting a PSD workforce sufficient to exploit the returns of PSD missions.

We support the efforts being made within PSD to maintain the R&A program level of funding in the face of diminished overall resources, and at a time when mission operations and other demands are high. However, we continue to be concerned that R&A funding might be diminished or delayed in some years to help fund other activities. The recommendations of the decadal survey would have PSD R&A funding in FY13 increase relative to FY11 by at least 5%, and grown at least 1.5% per year thereafter. In the face of the continuing productivity of active missions no longer in their prime phases, the prospective end of several ongoing missions, and the hiatus in new mission opportunities, allocation of funds to support R&A is essential for ensuring the future of planetary science.

We also support the PSD efforts to improve management of the existing R&A program. These are essential to both ensure the high quality and level of impact of PSD science output, and to achieve the GPRA metric (80% of proposers officially notified within 150 days of proposal receipt) with timely information on decisions provided to the proposing community. We recognize and applaud the efforts that have been made by the Program Managers following the last PSS meeting, and recommend that PSD continue to improve the process. The support of the PSD Director is essential in this regard.

February 2013:

FY13 (Planned) budgets for each program element are the targets given to the Program Officers with which they can make their initial selections. These numbers represent a cut of ~12.7% from their full (in a perfect world) requests which were necessary to fit within the FY 13 Presidential Budget Request. Jim (PSD Director Green) notes that, even without sequestration, we lost 21% of the budget this year and we simply can't support as many people in planetary science. A PSS member asked if Jim had given any thought to ways to mitigate the consequences of the inevitable decrease in size of the planetary community, particularly the disproportionate effect on younger scientists. Jim said that he hadn't had the time to think that out, but it was a topic on which he would be very interested in getting input from the PSS.

April 2013: R&A programs are still struggling and sequestration and rescissions could further erode selection rates, particularly program elements with late-in-the-year due dates and decisions. In spite of the good budgetary news, the PSS is concerned about the impact of the budget cuts, of still uncertain amounts, to the individual scientists and efforts supported by the R&A programs. Because the missions are necessarily given priority in funding due to the long term commitments and investments they represent, the R&A programs that support smaller, focused, often less-visible activities are typically of lower priority in decisions on where to spend available resources. The R&A programs have had a recent trend of over-subscription and resulting low selection rates (~10-20%, typically) in part due to the increasing reliance of missions on the R&A programs for their extended science analyses, and in part due to the historical lack of other sources of support for planetary science and scientists (re. Bagenal survey). Thus this already struggling part of the PSD and its community is set to suffer even more shrinkage with the expected cuts. In particular, later-selected programs and the tier of previously 'selectable' proposals that used to obtain late-year support will suffer. In the view of the PSS, programs with selection rates below 10% are not viable. PSD science workforce and their expertise will be lost unless some special commitment is made by PSD to protect this element of the division's activities. Considering the windfall of new observations that have been accumulating and will result from reaping the fruits of the recent 'year of the Solar System', together with missions just arriving at their targets that have limited-size project-supported teams, this is a serious matter requiring renewed consideration.

Jul y2013: Jonathan (Rall) spoke briefly about the R&A program and the on-going exercise to completely reorganize R&A portfolios. He noted that the current array of R&A elements has grown up organically over time and it isn't clear that if you started with a blank sheet of paper this is what it would look like. This is of course a very difficult thing to do and it must be done thoughtfully and carefully. We (the PSD R&A Managers) will be incorporating input from the 2011 PSS (Greeley-Sykes) report on R&A. This process has already begun with the revamp of the tech program (PICASSO and MatISSE). We (PSD) have also, beginning in FY15, separated out the facilities (e.g. IRTF, AVRG, Aeolian lab, etc) from the R&A portfolio.

November 2013: The PSS finds that the details of the R&A program restructuring need to be communicated to the planetary science community as soon as possible to obtain feedback, to answer questions and make clarifications (including to existing grantees within the old programs), and to have the information disseminated before the next ROSES call for proposals in early 2014.

January 2014: The NASA Planetary Science Division (PSD) Research and Analysis (R&A) Program reorganization plans were announced to the planetary science community in November 2013 during a time of overall difficulty in meeting and communicating due to sequestration-related travel restrictions and the government shutdown. The plans included a very compressed schedule for the reorganization, including announcement of renewed plans to reorganize in November 2013, (provision of) program rationale and mapping presented via virtual town hall discussion in December 2013, a subset of draft calls posted for comment in late January 2014, and (a) full reorganized program plan to be posted in ROSES 2014 in February 2014. The delay in announcement and the very compressed schedule for development and roll-out of the reorganized program has created considerable uncertainty and anxiety within the planetary science community. Earlier communication from PSD to the community regarding reorganization plans and progress during the multi-year effort, as well as regular requests for community input, likely would have moderated the negative reaction. The compressed schedule left too little time for detailed program development, for providing adequate community and PSS feedback toward clarifying the ROSES 2014 calls, and for a measured response by PSD. The PSS finds that the reorganization plans are immature at this time, and major questions remain regarding the subject-matter boundaries between programs, the absence of many research elements including field work and geologic mapping from draft announcements, and a lack of consistency in guidance to proposers.

September 2014: **Finding: Status of the PSD Research and Analysis Program Reorganization**
The PSD Research and Analysis Program is critically important to PSD goals. Given its importance and the recent reorganization, **PSS finds that regular updates of the status of the PSD R&A Program are needed, both to the PSS and to the community at large. In particular, outcomes from the large Solar System Workings program will be important to report and evaluate. Reports from PSD assessment/analysis groups listed community concerns about ensuring that strategic balance is maintained within the programs. While these concerns remain, the PSS acknowledges the efforts of PSD program managers and all those involved in implementing the startup of the reorganized R&A Program proposal submission and review process. A special note of appreciation is warranted for the initiative taken to obtain panel reviewer reactions to the new process and quantitative information on proposal statistics for comparison to the prior system. From the survey it is apparent that for the first program elements through the new process, the panel experience has been similar to previous years and generally positive. The PSS finds additional efforts to track and report on the progress of the reorganized R&A Program are both desirable and necessary for informing both PSD and the community.**

November 2014: **Finding: Establish metrics and guidelines for applying programmatic balance to selection decisions in the R&A program.**

This is the first year of implementation of the new R&A program. A stated goal has been to achieve programmatic balance, yet the process by which this will be achieved and verified is not in place. This is especially a concern for the new Solar System Workings and Emerging Worlds programs, which assimilated several smaller programs. We suggest that this process be developed (possibly via proposal key words) and shared with the planetary community. We further urge that the metrics and statistics be provided for every year for the recent past and going forward into the future.

March 2015: The PSS applauds the initiation of an NRC study on the reorganized PSD R&A structure's effectiveness in achieving programmatic goals. We encourage continuing and regular dialog with the planetary science community about the R&A reorganization. As part of this ongoing dialog with the community, the PSS requests, across the full range of R&A programs within PSD, selection statistics, release of titles and abstracts of selected proposals, total funding levels ($) by program, selection rates by panel score for new program elements, and statistics on time required for determining selectable and selected proposals relative to proposal submission or review.

PSS Finding October, 2015

Assessment of Reorganized R&A

The PSS has requested open access to information on funded R&A Program proposals, including titles, areas, selection rates, and statistics on time to funding. This information is needed to both address community concerns regarding the outcomes of R&A Program restructuring, and to provide insight into R&A activities. Given current difficulties in assembling such information due to lack of tools, PSS requests resources be allocated to program managers to set up a database and software for regularly mining this information.

March 2016: **Assessment of Reorganized R&A**

The PSS recognizes the amount of effort required to compile information on PSD program elements in the reorganized R&A program and appreciates the thorough summary presented at the meeting on funding level by planetary body based on key words. We especially applaud the development of key word analysis tools that will allow assessment and reporting of programmatic balance in future years. The PSS continues to request the release of data on selection rates by panel score for new core program elements (e.g., EW, HW, SSW) and encourages continuing public release on a yearly basis on selection statistics, selection rates by panel score for core program elements, funding level by planetary body based on key words, and statistics on the time required for determining selectable and selected proposals relative to proposal submission and review**. One concern noted by the PSS is that the selection rates described (average of ~21%) may mean that an investigator can receive scores of Very Good (4.0) or Very Good/Excellent (4.5) and still not be selected for funding by NASA.** Because of the timing of the R&A reorganization and impending termination of older funding programs (e.g., PG&G, Cosmochemistry, etc.) within the next year, it will be possible to have >30% of the R&A-funded community that routinely receives high proposal scores (4.0-4.5) not selected for funding. Nevertheless, the PSS applauds PSD for efforts to fund early career investigators and ensure the future of our community, even in a challenging funding environment. The PSS recognizes that one solution to this problem is more funding, and encourages NASA to continue to work to increase the level of funding for R&A programs in future years.

Presenter Footnotes

-***Footnotes*** on related R&A Program issues from the past chair (as of June 2016)
Management actions in the R&A Program have major impacts and consequences .
A large fraction of the planetary science workforce has essentially no other (or few) sources of support (and entering workforce often has too-optimistic expectations).
There is oversubscription of essentially all R&A program elements, a sense of randomness /lottery in selection process due to ongoing low probabilities of success, a system where 'process' transgressions can disqualify competitors, a need to rely on early career reviewers and panelists vs more senior experts because inherent conflicts of interest exist in a highly over-subscribed peer review system, Illusory perceptions persist of R&A programs providing long-term career paths, already inadequate R&A funds and programs have become the source for almost everything not in active mission budget lines: e.g. extended mission science (for increasing #s of missions, some still gathering data, and with much new mission-enabling science left to do, many other mission-supporting needs including facilities, Labs, PS and GI programs, institutes, pre-mission studies, Pu production, NEO Activities, mission-enabling ground-based investigations, HEOMD SKGs, AGs, etc.
But R&A cannot be viewed in isolation w.r.t. other programs and opportunities for supporting a sufficiently productive scientific workforce (e.g. curtailment of prime mission run-outs and extended mission science budgets redirect need s to R&A earlier than desirable. Early career workforce integration requires mission involvement opportunities (e.g. theses, postdocs, apprenticeships) to ensure availability of continuing/needed mission-enabling expertise.) Needs NRC.

Need to create an R&A 'Drake Eq." equivalent:

Probability P of adequate (up to 100%) salary and associated research costs support for an individual PI:

P=a*b*c*d*….(etc)

Needs Terms related to
Number of programs tried
Number of proposals submitted to program over funds available
Number of proposals needed to make a salary (assuming 2-4 minimum)
Normalized Fraction of positive (E or E/VG) write-ins (if applicable)
Normalized Fraction of positive/knowledgeable/interested panelists
Probability of having a conflicted reviewer or panelist
Probability of a problem with a formatting, content, or Program requirements (e.g. DMP)
Standing in panel funding priority list (0-N)
R&A Program Officials' assessment of priority (0-N)

What are the odds of being a fully employed planetary scientist supported by R&A programs? Alternative: UK and European systems fund people, not single studies.