



Briefing to the NRC SSB Review of NASA PSD R&A Programs

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NRC ad hoc Committee Charter

1. Are the PSD R&A program elements **appropriately linked** to, and do they encompass the **range and scope of activities** needed to support the NASA Strategic Objective for Planetary Science and the Planetary Science Division Science Goals, as articulated in the 2014 NASA Science Plan?
2. Are the PSD R&A program elements **appropriately structured to develop** the broad base of knowledge and broad range of activities needed both to enable **new spaceflight missions** and to interpret and **maximize the scientific return from existing missions**?

In conducting its task, the committee will:

- Not examine the PSD R&A programs as they were prior to the restructuring;
- Conduct its review in the context of current budgetary realities that have differed from projections assumed prior to the release of the most recent planetary science decadal survey; and
- Not comment on the strategic science goals and objectives of PSD, SMD, or NASA.



Relevant VEXAG Deliberations

- April-May – NRC questions directly to VEXAG membership; Executive Committee correspondence.
- LPSC Town Hall, Mar 2016
- 13th VEXAG Meeting, Oct 2015 (Washington, DC)
 - Announcement & discussion of upcoming NRC review of NASA R&A
 - Presentation by AAAC Proposal Study & discussion.
- 12th VEXAG Meeting, Apr 2015 (Hampton, VA)
- LPSC Town Hall, Mar 2015
 - Discussion with Dr. Voytek
- LPSC Town Hall, Mar 2014
- Virtual & AGU Town Halls, Dec 2013
- 11th VEXAG Meeting, Nov 2013 (Washington, DC)
 - Initial concept of R&A reorg presented by Drs. Green & Rall



NASA Science Goals	Decadal Survey Theme	Main NASA R&A Programs <i>At least 15 proposals funded</i> <i>Does not include "Institute" Programs</i>		
Formation and evolution of SS objects	Building new worlds	Emerging Worlds 2015–?/137; 2014–32/161 (20%)		
Physical & chemical processes in SS	Workings of Solar Systems	Solar System Workings 2015–?/477; 2014–82/386 (21%)		
Past & present habitats	Planetary habitats	Habitable Worlds 2015–?/?; 2014–15/72 (21%) Exobiology 2015–?/247, 2014 –30/144 (21%)		
Origin & evolution of life on Earth	N/A	EXO	Data Analysis Programs (multiple applications) CDAP 2015–?/79; 2014–19/78 (24%) MDAP 2015–?/?; 2014–28/104 (27%)	
Threats & Resources	Workings of Solar Systems	SSW	PDART 2015–?/113; 2014–23/105 (22%) SSO 2015–?/51; 2014–21/71 (30%) DDA 9 selections & LDAP 14 in 2014	



VEXAG Responses to Question 1

- The linkage of NASA PSD R&A program elements to Science Goals is clear if broad.
- Range and scope of activities are largely appropriate. Factors that currently or might benefit Venus science include
 - Venus-specific science \approx OK (7/85 SSW, 1/32 EW, 0/15 HW selections).
 - Comparative planetology that includes research on why our sister planet turned out so different
 - 2012, 2015 Comparative Climatology Conferences \rightarrow 2016 ROSES Emerging Topic in Planetary Science
 - 2015 Comparative Tectonics & Geodynamics Conference \rightarrow ?



VEXAG Responses to Question 1, cont.

- Venus enhancements, continued
 - Better access to orbital and suborbital measurement facilities
 - Gondola for High-Altitude Planetary Science (GHAPS) is a good start.
 - Instruments and technology for the Venus environment (e.g., Glenn Extreme Environments Rig, NF Homesteader,)
 - Venus participating scientist opportunities in foreign missions; acquisition and analysis of Venus data acquired during flybys by other missions (VEGASO).
 - A new Venus mission (oops, not R&A).



VEXAG Responses to Question 2

- NASA is a target-oriented exploration agency but the current PSD basic R&A structure is process-based.
 - e.g., Venus mission tries to answer origin & evolution together, but EW & SSW are separated.
 - R&A program overall lacks specific structure to develop target-oriented knowledge base
 - Exception: SSERVI, because they are putative HEOMD targets
 - Target-based calls are tactical, not strategic.
- NASA is not NSF
 - Broad calls to the scientific community to identify the most compelling problems.
 - Uncontrolled, undirected, unactionable (in mission sense) responses
- VEXAG restructured Goals away from cross-disciplinary for better traceability



VEXAG Responses to Question 2, cont.

- *Factors influencing scientific workforce efficiency in responding to NASA's needs*
- Stovepiping the R&A programs into a few science questions has resulted in programmatic imbalance due to the overwhelming response to SSW.
 - 13 non-flight, non-instr. Prog. EW = 11%, **SSW = 28%**, EXO+HW = 15%, DAPS/Obs = 46%.
 - Main issues are reviewer burden (clear) and viability of multiple submittals (need stats)
 - Now requires 150-225 panelists, >1000 external reviews: hard to meet
 - Three proposers were successful winning 2 proposals in SSW.
- Proposal vetting and timing is incomprehensible: Step 1 has introduced institutional burdens; encouraged/discouraged produces no actionable results; proximal Step-2 due dates (Exoplanets/EW, MDAP/LDAP) discourage additional valuable proposals.
- Concerns (incomplete info?) about transparency and uncompetited directives.
 - Perceptions that restructuring was essentially a money-saving exercise without regard to community burden, SSERVI selections noted overwhelmingly from prior NLSI teams, NExSS constituted from Astrobiology runners-up without new competition.



Funding Rate

- NASA has calibrated most 2014 programs to ~20% funding rate.
- Regardless of “current budget realities,” this is well below the 30-35% threshold* that would
 1. provide a healthy competitive environment
 2. better utilize community facilities
 3. break the negative feedback of many resubmitted unsuccessful proposals

*AAAC Proposal Pressures Study Group, 2015.



Summary of VEXAG Responses

- VEXAG has a relatively small constituency that is largely a consequence of no US Venus mission launched in 27 years. Nonetheless our community remains active in research, workshops, annual meetings, and mission development.
- There isn't much to argue with the broad linkage between NASA Goals and R&A programs via the Decadal Survey. Some additional scope would be beneficial to current and future studies of Venus.
- The main R&A program is process-based, which is not well aligned with the needs of a target-based agency.
- R&A program is imbalanced within due to the SSW behemoth. There are some perceptions of lost funding opportunities and noncompetitive selection.
- Low success rates induced negative feedback and decrease workforce efficiency.