

National Aeronautics and
Space Administration



EXPLORE SOLAR SYSTEM & BEYOND

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PAC Meeting
June 14, 2021

Planetary Science Division - ROSES 20

ROSES 20 - Program Name	Step-1 Due Date	Step-2 Due Date	Panels Held	Selections/ Proposals	Selection Dates	Days from Step-2 to Select
Exobiology (EXOB)	04/22/2020	05/22/2020	Yes	23/156 (15%)	10/20/2020	151
Exoplanets Research	03/27/2020	05/29/2020	Yes	26/153 (17%)	11/9/2020	164
Emerging Worlds (EW)	04/17/2020	06/01/2020	Yes	20/125 (16%)	11/19/2020	171
Solar System Observations (SSO)	04/22/2020	06/17/2020	Yes	11/47 (23%)	9/10/2020	85
Yearly Opportunities for Research in Planetary Defense (YORPD)	04/22/2020	06/17/2020	Yes	9/45 (20%)	10/26/2020	131
Cassini Data Analysis (CDAP)	05/07/2020	07/09/2020	Yes	13/57 (23%)	9/28/2020	81
Development and Advancement of Lunar Instrumentation (DALI) Program	04/17/2020	07/10/2020	Yes	5/43 (12%)	12/1/2020	144
Laboratory Analysis of Returned Samples (LARS)	05/15/2020	07/14/2020	Yes	6/30 (20%)	1/15/2021	185
Maturation of Instruments for Solar System Exploration (MatISSE)	04/17/2020	07/17/2020	Yes	5/58 (9%)	12/3/2020	139
Planetary Data Archiving, Restoration, and Tools (PDART)	05/15/2020	07/24/2020	Yes	22/132 (17%)	3/30/2021	249
Double Asteroid Redirection Test (DART) Participating Scientist Program	08/10/2020	10/01/2020	Yes	4/19 (21%)	3/26/2021	176
Discovery Data Analysis (DDAP)	08/28/2020	10/30/2020	Yes	12/50 (24%)	4/2/2021	151
New Frontiers Data Analysis	09/03/2020	11/05/2020	Yes	14/44 (32%)	1/29/2021	85
Mars Data Analysis (MDAP)	09/25/2020	11/20/2020	Yes	31/96 (32%)	5/6/2021	167
Planetary Instrument Concepts for the Advancement of Solar System Observations (PICASSO)	09/18/2020	11/20/2020	Yes	11/94 (12%)	4/8/2021	139
Planetary Science Early Career Award Program	N/A	12/08/2020	Yes	5/45 (11%)	4/28/2021	141
Habitable Worlds (HW)	11/17/2020	01/15/2021	Yes	XX/71	TBD	
Solar System Workings (SSW)	11/13/2020	01/29/2021	Yes	XX/253	TBD	
Lunar Data Analysis (LDAP)	12/01/2020	03/05/2021	Yes	7/44 (16%)	6/11/2021	98
Early Career Fellowship Start-Up Program for Named Fellows	09/01/2020	03/29/2021				

Some notes on ROSES20

- Average time to notification is improving. There were several anomalies:
 - PDART: COVID-related issues led to a significant delay
 - MDAP and DART-PSP: Delays due to finalization of funding levels
- We expect all remaining ROSES20 programs to have decision letters out within the next month (or so).
- Next meeting, we expect to provide some observations/data from the first PSD Dual-Anonymous Peer Review (DAPR) program (Habitable Worlds)
 - As HW is the last of the DAPR pilot programs, we *may* have a larger presentation discussing DAPR overall.
 - Reviewers were, overall, very positive about DAPR!

Updates on ROSES 21

- No-Budget experiment with DDAP
 - Require proposals to only identify their overall program in coarse budget bins
 - Budgets only submitted after review of scientific merit and relevance
 - Reduced effort for PIs (and their orgs) and for reviewers.
- A few reminders:
 - Dual-Anonymous Peer Review for all Data Analysis Programs (DAPs)
 - No Due Date (NoDD) programs (open now!)
 - <https://science.nasa.gov/researchers/NoDD>
 - Remember rules on duplicate proposals (see C.1)
 - Compliance: We are checking and strictly enforcing compliance rules. Non-compliant proposals may be returned without review or be declined on this basis *regardless of intrinsic merit score from the panel.*
- No Due Date Programs: Too soon to comment yet, but at the next PAC meeting...



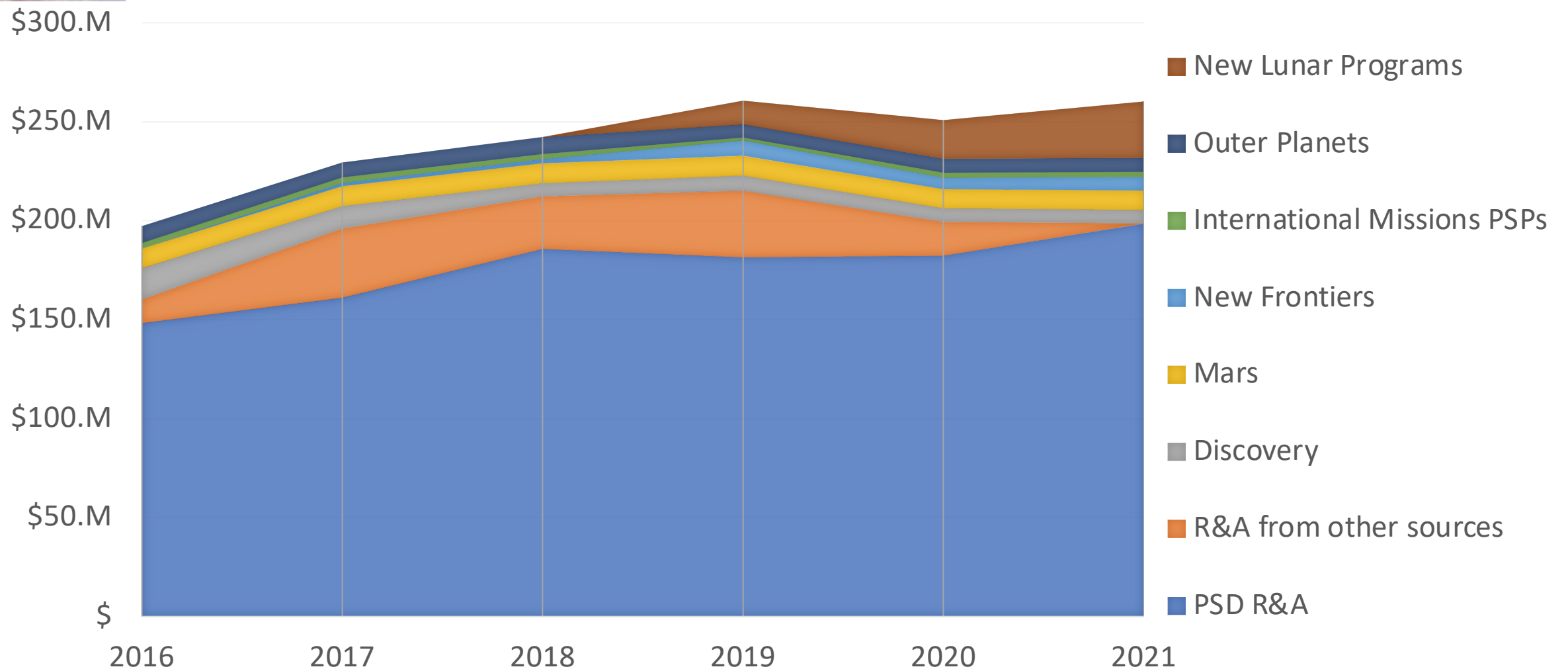
Other updates

A new portal for uploading papers (and other Science and Technical Information) is coming:

- Expected roll-out this month
- PIs should be notified when the portal is active
- Science and Technical Information Program website: <https://sti.nasa.gov/research-access/>
- Note the presentation later about data management and archiving

FY21 Budget

RESEARCH BUDGETS OVER TIME

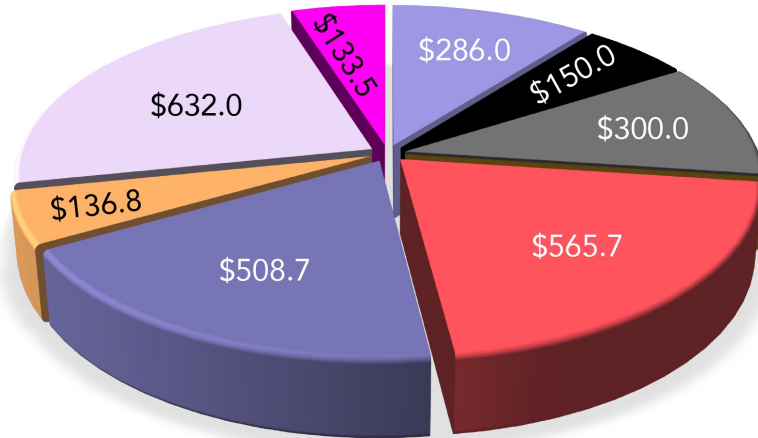


Lori already talked about this, but comments from the R&A perspective....

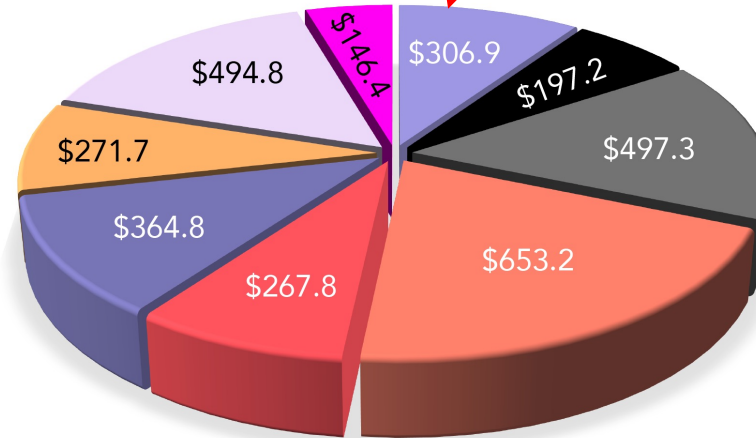
FY22 Budget

R&A lives here, along with AMMOS, PDS, etc.

FY20 Actual (Total: \$2,712.6M)



FY22 Request (Total: \$3,200.0M)

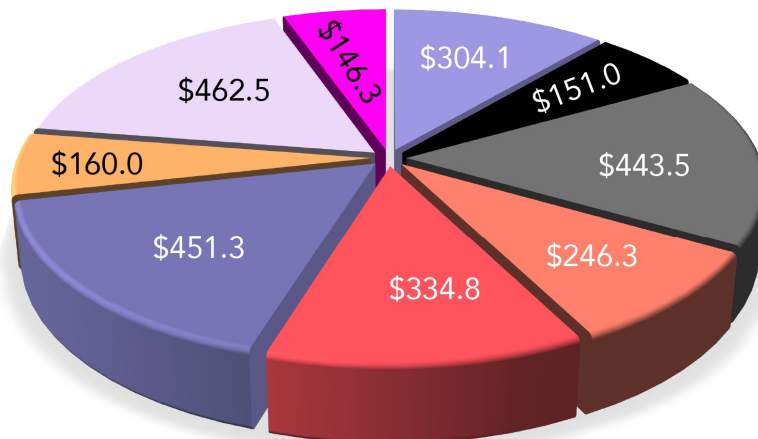


The FY22 request includes \$11M additional funding for R&A!

This funding will be incredibly valuable, allowing us to:

- Establish a Facilities program
- Significantly reduce or eliminate all of the out-year “mortgages” for R&A.

FY21 Operating Plan (Total: \$2,699.8M)



Finding from the March PAC meeting

The PAC appreciated the dialog with NASA, initiated with specific discussion questions posed regarding PSD's research and analysis (R&A) programs, and we look forward to continuing this dialog to understand the forces driving proposal pressure and increased proposal costs, which in turn lead to lower selection rates. The PAC recommends:

That PSD make efforts to help R&A scale up when the PSD budget grows, and keep it constant if the PSD budget shrinks. We are extremely grateful that PSD's budget has grown substantially in recent years, but the PAC notes that the percentage of funding devoted to R&A has declined from roughly 15% to 8%. This greatly impacts NASA's ability to maximize the science return from its planetary missions, especially as the volume of available observation data increases.

That NASA highlight the importance of the contributions of reviewers for its R&A programs at every opportunity when addressing the community, since quality reviews depend upon many scientists performing this community service. The PAC commends PSD for finding new ways to cultivate this culture of reviewing, for example by continuing to include an Executive Secretary role on panels, but other ideas would be welcome. The PAC recommends that NASA investigate ways of incentivizing reviewers where possible, including enabling appropriate compensation for the time needed to do the work (such as possibly allowing reviewer labor hours to be costed in its research grants).

That NASA examine data on a Step 1/Step 2 triage process where possible, such as in other divisions where this has been tried previously, in an effort to decrease both total proposer and reviewer effort. As part of this process, NASA should estimate the fraction of proposals that would have to be triaged out to justify the resources required for the additional set of reviews and evaluate the potential for a reduced burden on the system via a simplified Step 1 process.

That NASA should aim to issue calls for proposals every year where feasible, since reliability of calls is important to the community.

That proposers be sent a reminder at approximately 6 months before the end of a grant to archive related publications in PubSpace.

Full Version

Finding from the March PAC meeting

Recommendations from dialogue about R&A:

- 1) R&A budget should scale up with overall PSD budget

We agree – but note that we don't set budgetary priorities

- 2) Highlight importance of reviewers for R&A programs; look for ways to incentivize reviewers

We strongly agree! See next slide.

- 3) Consider a Step-1/Step-2 option

Slide on this coming up

- 4) Try to have annual calls whenever feasible

Slide on this coming up

- 5) Send reminders about PubSpace ~6 months before end of grants

We agree! We will engage NSSC to explore how this can be incorporated into the set schedule of reminders.

Short Version with short answers

Importance of Reviewers

2) Highlight importance of reviewers for R&A programs; look for ways to incentivize reviewers

We completely agree!

We're trying to think of better ways to compensate reviewers, but that gets complicated:

- Recognition – that whole anonymity thing...
- Paying for time: how could this be done in an equitable way?
 - And perhaps more to the point, shouldn't this be part of institutional overheads?
- Allowing grants to be used to cover review time
 - This is not forbidden by grants policy
 - It is an institutional policy question; if your institution allows it, it's allowed.
 - But if you're charging your time for doing a review to a NASA grant, you are not allowed to also take the honorarium.
- We welcome any suggestions that anyone might have on this front!

I'm going to come back to this topic in a little bit....

Step-1/Step-2 Options

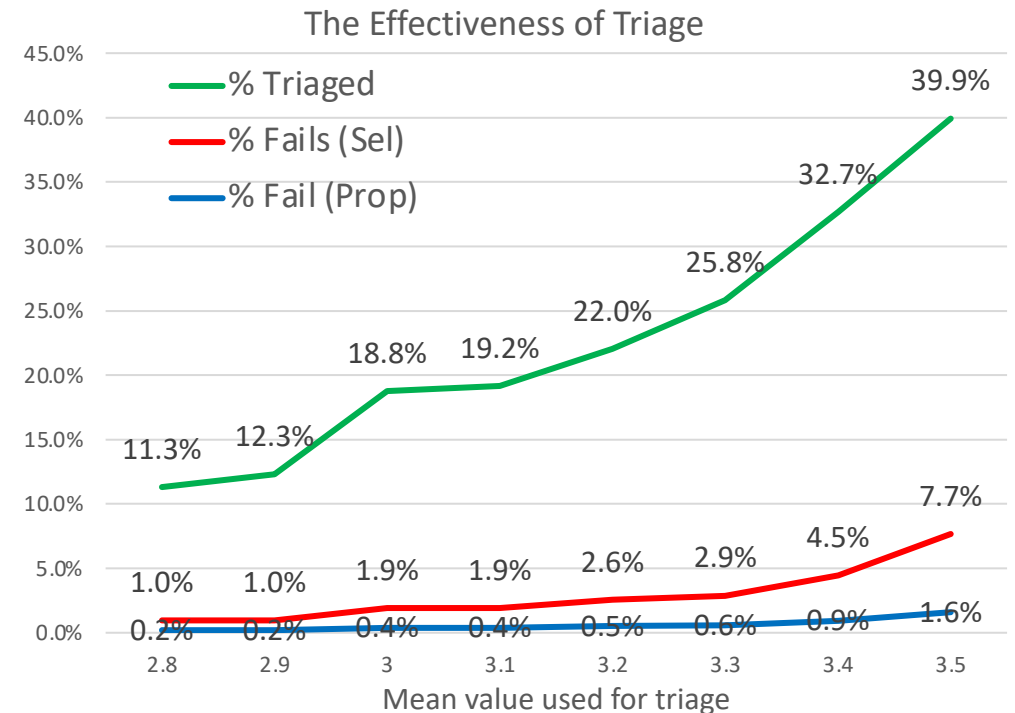
3. Consider a Step-1/Step-2 option

- This has been tried in other Divisions and has largely proven unsuccessful
- There are a few programs in the Applied Science portion of ESD's R&A portfolio where they do this, but their overall methodology is quite different.

The fundamental problem in bullets:

- Writing a reviewed Step-1 isn't much less work than writing a full proposal
- Reviewing a Step-1 isn't much easier than reviewing a full proposal (it might be harder!)
- To actually keep the reduce the amount of effort would require at least 70% of Step-1 proposals – even then, it might be more total effort!

Question: Might triage (as being explored for NoDD) be an option for other programs? Not clear that it helps enough with really low selection rates, but....



Maintaining yearly calls

We agree, in principle. But, here's the math:

Input effort = writing proposal + reviewing proposal + HQ effort (review & management)

Output effort = Funding dollars / (\$/effort)

Balance these two things using some conservative assumptions about the above, and Input Effort = Output Effort when the selection rate is 9%.

Does it make sense to run a program that has a net **cost** to the community?

ISFM Update: ISFMs renewed

Center	ISFM	Lead	FY22	Duration	Last Review	Reproposed	Next Review	Other Divisions
ARC	Mars Climate Modeling Center (MCMC)	Kahre	1,280,000	10/21-9/24	Jun-20	Mar-21	~Mar-23	
ARC	Habitable Environments and Biosignatures / Center for Life Detection (HEB/CLD)	Hoehler & Parenteau	1,615,000	10/21-9/24	Jun-20	Mar-21	~Mar-23	BPSD
ARC/GSFC	Evolutionary Processes that Drove the Emergence and Early Distribution of Life (EPDEL)	Ditzler & Pohorille	857,000	10/21-9/24	Jun-20	Mar-21	~Mar-23	BPSD
ARC	NASA Center for Optical Constants (NCOC)	Sciamma-O'Brien	297,200	10/21-9/24	Jun-20	Mar-21	~Mar-23	
ARC	Astrobiologically Important Organics during Early Planetary System Formation and Evolution	Sandford	300,000	10/21-9/24	Jun-20	Mar-21	~Mar-23	
GSFC	Planetary Geodesy	Mazarico	545,000	10/21-9/26	Jun-20	Mar-21	~Oct-24	
GSFC	Fundamental Laboratory Research (FLaRe)	Elsila & Stern	4,100,000	10/21-9/26	Jun-20	Mar-21	~Oct-24	
GSFC/ARC	The Goddard Instrument Field Team (GIFT)	Young & McAdam	778,989	10/21-9/26	Jun-20	Mar-21	~Oct-24	
GSFC	Sellers Exoplanet Environments Collaboration (SEEC)	Mandell & Kopparapu	2,378,000	10/21-9/26	Jun-20	Mar-21	~Oct-24	APD/HSD
GSFC	Exosphere-Ionosphere-Magnetosphere Modeling (EIMM)	Sarantos & Tucker	1,220,000	10/21-9/26	Jun-20	Mar-21	~Oct-24	HSD
GSFC	(R3D) Resolving Orbital and Climate Keys of Earth and Extraterrestrial Environments with Dynamics	Way & Kiang	199,423	10/21-9/26	Jun-20	Mar-21	~Oct-24	
JSC	Coordinated Analysis (CA)	Keller	1,950,000	10/21-9/25	Jun-20	Mar-21	~Oct-23	
JSC	Geo-Cosmochemistry (GC)	Simon	2,199,938	10/21-9/25	Jun-20	Mar-21	~Oct-23	
JSC	Planetary Process Simulation (PPS)	Righter	1,320,657	10/21-9/25	Jun-20	Mar-21	~Oct-23	
JSC	Organic Geochemistry (OG)	Burton	500,862	10/21-9/25	Jun-20	Mar-21	~Oct-23	
JSC	Mission Enabling (ME)	Rampe	1,092,143	10/21-9/25	Jun-20	Mar-21	~Oct-23	
MSFC	Marshall Interdisciplinary Planetary Science	Zanetti	630,000	10/21-9/25		Mar-21	~Oct-23	

Total Budget from PSD: \$20.6M (internal cap at \$20.8M)

Increase in PSD budget comes from moving directed work from SERA to ISFM and by moving a cross-divisional contribution into this portfolio.

High-Risk / High-Impact: History

In 2018, SMD asked reviewers about the **risk** and **impact** of proposals they reviewed:

Hypothesis: Panels unconsciously downgraded proposals with high-risk

The data showed that hypothesis was false; if anything, high-risk proposals were overrepresented in selections (10% of proposals were deemed HR/HI; 15% of selections were deemed HR/HI).

This is **not**
implementation
risk

Define “risk” and “impact”

A high-risk research project tests novel and significant hypotheses with little precedent or preliminary data or counter to the existing scientific consensus

A high-impact research project is one that, if confirmed/successful, would have a substantial and measurable effect on current thinking, methods or practice



High-Risk / High-Impact: Risk

NASA SMD values both foundational research and innovative, high-risk/high-impact science.

We do not have specific solicitations for HR/HI proposals, we ask PIs, review panels, and Program Officers to identify potentially HR/HI work.

To catalyze HR/HI research, SMD set up a "Blue Ribbon" panel to assess HR/HI proposals that were not initially selected within their program.¹

Each Division was asked to put forward a few proposals that were thought to have high reputational risk. These were then evaluated by the Blue Ribbon panel.

¹ See Thomas Zurbuchen's presentation to the ASEB-SSB Joint Meeting on 5/26/21

High-Risk / High-Impact: The Blue-Ribbon Panel

Call	PI	Proposal Title	Status
EW20	Nakajima	Moon formation via Streaming Instability	Selectable

The BR panel recommended funding of two PSD proposals. One of the two – can't talk about it yet. The other:

PSD was in the process of changing the Nakajima proposal from Selectable to Selected prior to the results from the BR panel.

The Blue Ribbon panels will continue for at least a few more years. Proposers may (in NSPIRES) claim HR/HI status and justify the claim with a short paragraph; reviewers will be asked to agree/disagree with this claim. PSD will put forward 0-3 proposals each year for consideration by the panel.

Question for the PAC

The Challenges of Proposal Review:

Question 1: What else belongs in the boxes below?

Question 2: What can be done to make the review process better?

Desires/Needs		
PIs	Reviewers	HQ
<ul style="list-style-type: none">• Justification of the grade• Constructive criticism• As fast as possible• Equitable and fair process	<ul style="list-style-type: none">• Clear instructions and process• Keep the workload reasonable	<ul style="list-style-type: none">• Feedback to inform selections<ul style="list-style-type: none">• Grades• Useful and defensible comments• Context<ul style="list-style-type: none">• Not ranking proposals, but understanding how they all fit into the program

Question for the PAC

Some desires/needs for different groups are in conflict

Desires/Needs		
PIs	Reviewers	HQ
<ul style="list-style-type: none">• Justification of the grade• Constructive criticism• As fast as possible• Equitable and fair process	<ul style="list-style-type: none">• Clear instructions and process• Keep the workload reasonable	<ul style="list-style-type: none">• Feedback to inform selections<ul style="list-style-type: none">• Grades• Useful and defensible comments• Context<ul style="list-style-type: none">• Not ranking proposals, but understanding how they all fit into the program

These are often in conflict!

Question for the PAC

Others are in accord

Desires/Needs		
PIs	Reviewers	HQ
<ul style="list-style-type: none">• Justification of the grade• Constructive criticism• As fast as possible• Equitable and fair process <p>These needs are similar</p>	<ul style="list-style-type: none">• Clear instructions and process• Keep the workload reasonable	<ul style="list-style-type: none">• Feedback to inform selections<ul style="list-style-type: none">• Grades• Useful and defensible comments• Context<ul style="list-style-type: none">• Not ranking proposals, but understanding how they all fit into the program

Sidebar on Reviews

The Hidden Brain podcast – “Our Noisy Minds”, featuring the author of this book.

More about the book in the Post:

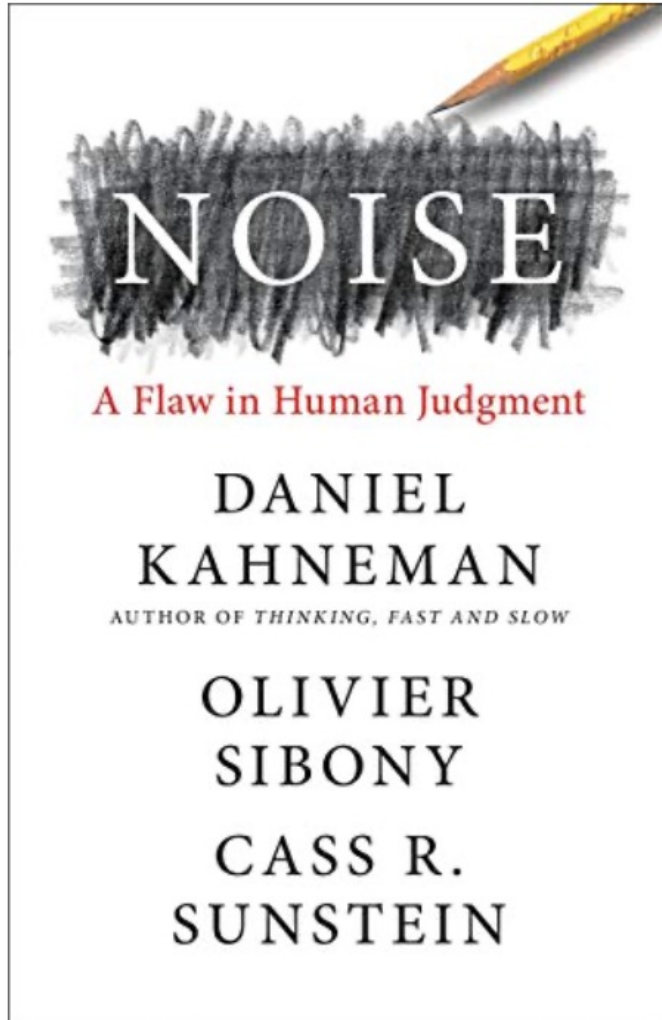
https://www.washingtonpost.com/outlook/how-to-turn-down-the-noise-that-mars-our-decision-making/2021/05/19/758be210-b370-11eb-9059-d8176b9e3798_story.html

From the Post article:

“Systems are also noisy because, over time, the same professionals apply inconsistent standards. To illustrate, a study of 22 physicians who each examined the same 13 angiograms two times, several months apart, found that they disagreed with themselves between 63 percent and 92 percent of the time.”

and

One study “examined 682 actual decisions by college admissions officers: They weighted applicants’ academic strengths more heavily on cloudier days and applicants’ nonacademic strengths more heavily on sunnier days.”



Question for the PAC

Desires/Needs		
PIs	Reviewers	HQ
<ul style="list-style-type: none"> Justification of the grade Constructive criticism As fast as possible Equitable and fair process 	<ul style="list-style-type: none"> Clear instructions and process Keep the workload reasonable 	<ul style="list-style-type: none"> Feedback to inform selections <ul style="list-style-type: none"> Grades Useful and defensible comments Context <ul style="list-style-type: none"> Not ranking proposals, but understanding how they all fit into the program
Making Life easier?		
<ul style="list-style-type: none"> No Budget experiment? NoDD? 	<ul style="list-style-type: none"> Additional review support? <ul style="list-style-type: none"> Technical writers? Expanded exec sec roles? 	<ul style="list-style-type: none"> NoDD?

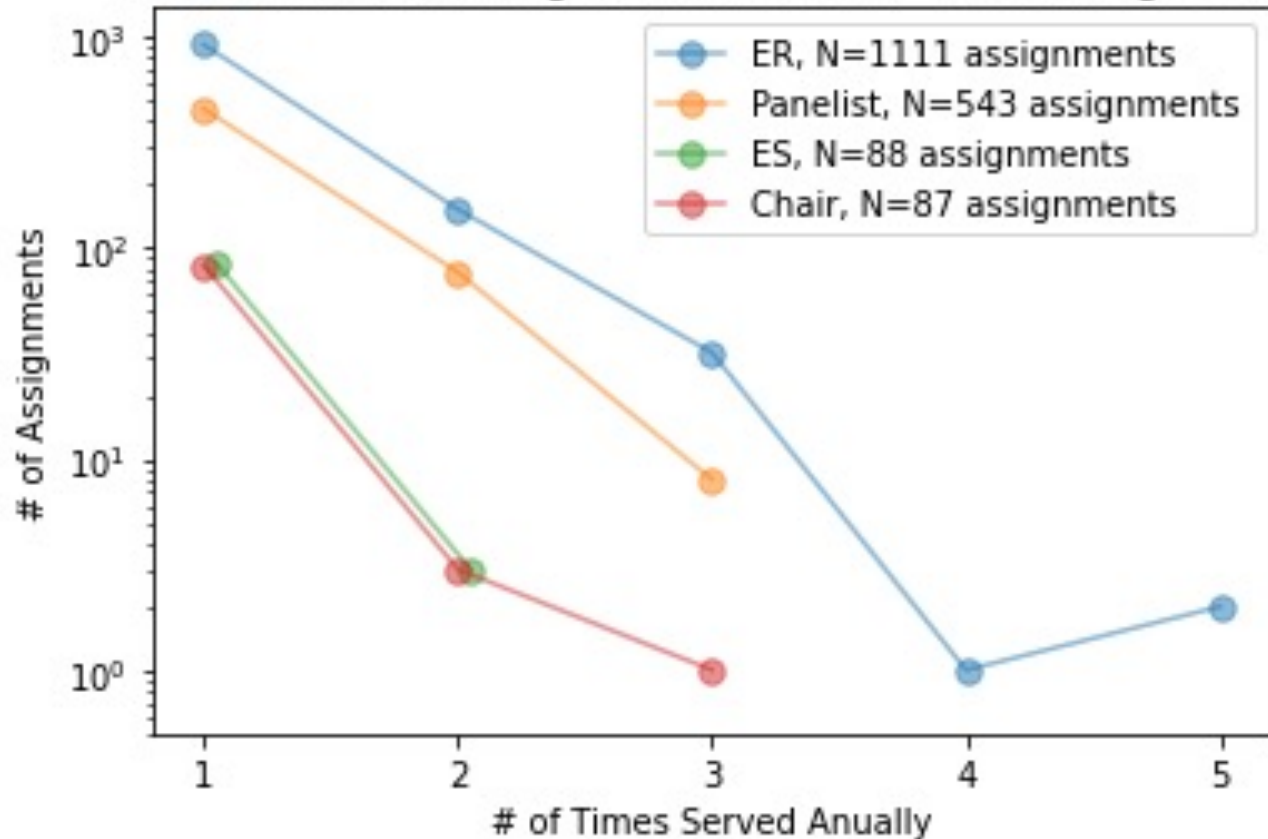


Backup Slides



Reviewers: A little bit of data

Annual Reviewer Assignments, PSD, N=1829 assignments



ROSES 2019, N = 3561 proposals

