



National Aeronautics and  
Space Administration

# NASA SMD Advisory Committee Fall Meeting



# NASA SMD Fall Meeting

Fully online ☹️

October 8-10, 2024

## DAY 1: Tuesday, October 8, 2024 (Eastern Time)

- 10:30 Call to Order/Summary of Agenda**  
*Nathan Boll, Executive Secretary, NAC Science Committee*
- 10:35 Introduction of Members**  
*Amanda Hendrix, Chair, NAC Science Committee*
- 10:40 NAC Meeting Reports**  
*Amanda Hendrix, Chair, NAC Science Committee*  
*Noel Bakhtian, Vice Chair, NAC Science Committee*
- 11:00 NASA Science Mission Directorate Update**  
*Nicola Fox, Associate Administrator, NASA Science Mission Directorate*
- 12:00 *Break for Lunch*
- 1:00 Panel Discussion: NASA IDEA Initiatives and SMD Updates**  
*Elaine Ho, Associate Administrator, Office of Diversity and Equal Opportunity, NASA*  
*Michael New, Deputy Associate Administrator for Research, NASA SMD*
- 2:15 *Break*
- 2:30 Panel Discussion: SMD Open Science Initiatives Update**  
*Kevin Murphy, Chief Science Data Officer, NASA SMD*  
*Chelle Gentemann, Open Science Program Scientist, NASA SMD*
- 3:45 *Break*
- 4:00 Committee Discussion**
- 5:30 *Adjourn*

## DAY 2: Wednesday, October 9, 2024 (Eastern Time)

- 10:15 Call to Order/Summary of Agenda**  
*Nathan Boll, Executive Secretary, NAC Science Committee*
- 10:20 Division Advisory Committee (DAC) Chair Reports**  
*Kelly Holley-Bockelman, Chair, Astrophysics Advisory Committee (APAC)*  
*Jamie Foster, Chair, Biological and Physical Sciences Advisory Committee (BPAC)*  
*Sara Tucker, Chair, Earth Science Advisory Committee (ESAC)*  
*Paul Cassak, Chair, Heliophysics Advisory Committee (HPAC)*  
*Hope Ishii, Chair, Planetary Science Advisory Committee (PAC)*
- 12:00 *Break for Lunch*
- 1:00 Panel Discussion: Climate Change Strategy and SMD Roles**  
*Kate Calvin, Chief Scientist and Senior Climate Advisor, NASA*  
*Karen St. Germain, Earth Science Division Director, NASA SMD*
- 2:15 *Break*
- 2:30 Panel Discussion: Space Weather Hazard Mitigation and SMD Roles**  
*Joe Westlake, Heliophysics Division Director, NASA SMD*  
*Jamie Favors, HPD Space Weather Program Director, NASA SMD*
- 3:45 *Break*
- 4:00 Committee Discussion**
- 5:30 *Adjourn*

# NAC Spring Meeting (first since Summer 2022)

Washington, DC

May 8-9, 2024

1. Climate Change
2. Planetary Protection
3. Science Diplomacy and the ISS Transition

**Plus!** Science Committee Updates from May 2023, August 2023, March 2024

## Science Committee Report to NAC

Presented by Amanda Hendrix, Chair

1. Science Committee Membership Updates
2. Science Mission Directorate Update and Highlights
  - NISAR (ESD)
  - SEAQUE (BPS)
  - SPHEREx (Astrophysics)
  - ESCAPEDE (Heliophysics)
  - Clipper (PSD)
3. Science Committee Fall Meeting Preview (October 8-10, 2024)



# NAC Spring Meeting (first since ~2022)

Washington, DC

May 8-9, 2024

## 1. Previous Findings and Recommendations Approved:

1. Resolutions ... **approved, transmitted to NASA**
2. Science Mission Directorate (2023) → **action to SMD AA**
3. Science Mission Directorate (2024) → **action to SMD AA**
4. DAC Reports – Spring Meeting 2023 → **action to SMD AA**
5. DAC Reports – Summer Meeting 2023 → **action to SMD AA**
6. DAC Reports – Spring Meeting 2024 → **action to SMD AA**
7. Earth Science Observatory IRB Report (2023) → **action to SMD AA**
8. Tropospheric Emissions: Monitoring Pollution (TEMPO) Mission (2023) → **action to SMD AA**
9. Deep Space Network (DSN) (2023) → **action to Administrator**
10. Deep Space Network (DSN) (2024) → **action to Administrator**
11. Transform to Open Science (TOPS) Program (2023) → **action to SMD AA**
12. Inclusion, Diversity, Equity, and Accessibility (IDEA) at SMD (2023) → **action to SMD AA +**
13. Broadening SMD Science Impact (2024) → **action to SMD AA**
14. NAC Meetings (2024) → **action to NAC Exec Dir**

# NAC Spring Meeting (first since ~2022)

Washington, DC

May 8-9, 2024

Perspective from SMD Advisory  
Committee Chair Amanda Hendrix

## Other topics, discussion points at NAC

- Good discussion with Sen Nelson, Col Melroy
  - including their high-level thoughts on NASEM Crossroads report
- NAC Priority Focus Areas
  - International Collaboration
  - DEIA
  - Climate Change
  - Program Management & Acquisitions
- NASA's Summer of AI
- NAC Committees
  - Science
  - Technology, Innovation, Engineering
  - Aeronautics
  - STEM Engagement
  - HEO

*slides are posted on the NAC website  
and we can talk about them here as  
needed*

# NAC Spring Meeting (first since ~2022)

Washington, DC

May 8-9, 2024

## new Finding proposed at NAC

### Finding:

The cancellation of the VIPER mission presents profound impacts on the understanding of lunar volatiles, a key foundation of the Artemis program, and it adversely affects the leadership of the US in lunar exploration.



National Aeronautics and  
Space Administration

Now back to SMD meeting

# Astrophysics Advisory Committee Update

Kelly Holley-Bockelmann, Chair

10/9/24





**Kelly Holley-Bockelmann**; Chair – Vanderbilt University

**Daniela Calzetti** – University of Massachusetts, Amherst

**Regina Caputo** – Goddard Space Flight Center

**Hsiao-Wen Chen** – University of Chicago

**Jessica Gaskin** – Marshall Space Flight Center

**Erika Hamden** – University of Arizona

**Shirley Ho** – Flatiron Institute

**Shardha Jogee** – University of Texas, Austin

**Alina Kiessling** – Jet Propulsion Laboratory

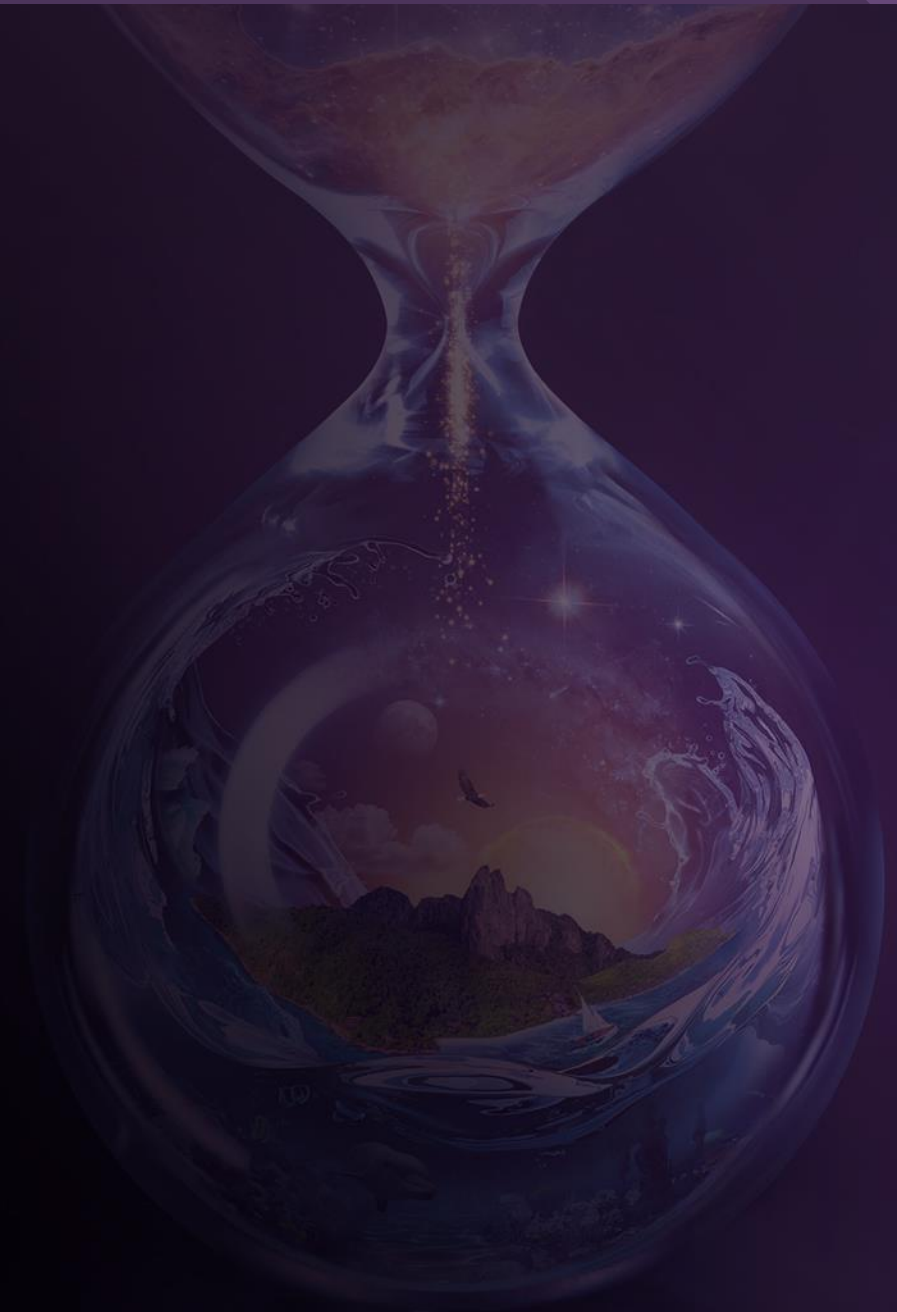
**Mark Mozena** – Planet Labs Inc.

**Rebecca Oppenheimer** – American Museum of Natural History

**Ilaria Pascucci** – University of Arizona

**Grant Tremblay** – Harvard-Smithsonian Center for Astrophysics

**Sarah Tuttle** – University of Washington





# APAC Summer Meeting

NASA HQ/online  
July 23-24, 2024

<b>Tuesday 23 July</b>		
9:00 a.m.	Introduction and Announcements	David Morris/Grant Tremblay/Kelly Holley-Bockelmann
9:05 a.m.	Astrophysics Division Update	Mark Clampin
11:00 a.m.	OPCR Committee Report	Rob Kennicutt
11:30 a.m.	OPCR Discussion	APAC members
12:00 p.m.	Public Comment Period	
12:15 p.m.	Lunch	
1:15 p.m.	Senior Review CFP Presentation	Linda Sparke/Janet Letchworth
1:45 p.m.	Senior Review CFP Presentation Disc	APAC members
2:00 p.m.	APD Tech Dev/Small Mssn Balance	Dominic Benford
2:30 p.m.	APD Tech Dev/Small Mssn Balance Disc	APAC members
3:00 p.m.	Break	
3:15 p.m.	TDAMM Comms SAG Report	Jamie Kennea/Judy Racusin
3:45 p.m.	SCaN Comms Presentation	Greg Heckler/Peter Schemmel
4:15 p.m.	Comms Discussion	APAC members
4:45 p.m.	Wrap up for Day 1	Grant Tremblay/Kelly Holley-Bockelmann

# APAC Summer Meeting

NASA HQ/online  
July 23-24, 2024

<b>Wednesday 24 July</b>		
9:00 a.m.	Opening Remarks	David Morris/Grant Tremblay/Kelly Holley-Bockelmann
9:05 a.m.	AWESOM SAG Update	Ryan Hickox
9:35 a.m.	AWESOM SAG Discussion	APAC members
10:00 a.m.	FINESST Update	Nino Cucchiara
10:30 a.m.	Break	
10:45 a.m.	PAG Updates	Ilaria Pascucci/David Pooley/Shouleh Nikzad
11:30 a.m.	SPHEREx Update	Jamie Bock
12:00 p.m.	Roman Update	Vanessa Bailey/Joshua Schlieder
12:40 p.m.	Public Comment Period	
12:50 p.m.	Discussion of APAC Topics from the Community	APAC members
1:00 p.m.	Lunch	
2:00 p.m.	Discussion	APAC members

**Next Meeting: November 7-8, 2024**

# Operations Paradigm Change Review for Hubble and Chandra

## Charge to the committee

Present findings of strengths and weaknesses of the options presented by HST and Chandra to meet the budget guidelines

No recommendations are requested, this is not a FACA committee, and unanimity is not required

## Review Process

April 20: Submissions by HST and Chandra distributed

May 7: Online meeting of committee

May 8: Presentation by HST (90 min + discussion)

May 9: Presentation by Chandra (90 min + discussion)

May 16: Follow-up meeting of committee

May 20: Summary report presented to NASA HQ

(most of these slides are taken from that report)

Submissions followed a prescribed format (text and budgets) and certain categories of costs could not be reduced.

## Hubble Space Telescope

Since its 1990 launch, the Hubble Space Telescope has changed our fundamental understanding of the universe.

● ACTIVE MISSION



# Operations Paradigm Change Review for Hubble and Chandra

## Summary of Findings - both

Chandra and HST are Great Observatories serving huge observing communities and producing frequent scientific breakthroughs from observations and archives, with increasing numbers of publications

Both received top marks in Senior Reviews: high return on the dollar

Annual operating cost a few percent of capital cost provides large and guaranteed return on investment

Both are unique: no other equipment now or approved for construction could replace them

Both have new scientific projects in synergy with JWST and time domain multi-messenger astronomy (a top priority in Decadal Survey)

Both are in good health, operating efficiently, in high demand (oversubscription), archiving and distributing data, and supporting widely used analysis tools. The thermal control issues facing Chandra have not had any impact on its scientific productivity.

Both have limited lifetime, but should run well into next decade

Both have approved end-of-mission plans

General Observer and Archive program funding ensures observations analyzed completely and published promptly. These programs also provide funds to train the future scientific leaders.

Archives widely used by astronomers around the world, including at small institutions that traditionally have more diverse student bodies.

Operations are highly streamlined and optimized after years of improvements - even small budget cuts require losses of services and capabilities

Operations costs are mostly staff: significant cuts would require RIFs, with legal implications and irreversibility

Ending either of these missions now would be premature and would have a large, permanent impact on science and the astronomical community



## HST

For reference the OPCR guideline budgets for FY25-FY29 compared to FY23

FY23	FY25	FY 26	FY27	FY28
105.6M	88.8M	87.5M	87.7M	82.9M

- HST explored reductions in three areas: GO funding, discontinuing instrumentation modes, and reduced (i.e., higher risk) mission operations.
  - Option A (in guide): most savings from reductions in GO funding
  - Option B (in-guide): elimination of instrument modes, less reduction in GO funding
  - Option C (in-guide): reduced mission ops, less reduction in GO funding
  - Option D (over-guide): avoid reduced capabilities, maintain most GO funding

## Chandra

For reference the OPCR guideline budgets for FY25-FY29 compared to FY23

FY23	FY25	FY 26	FY27	FY28
68.3M	41.4M	26.6M	26.6M	26.6M

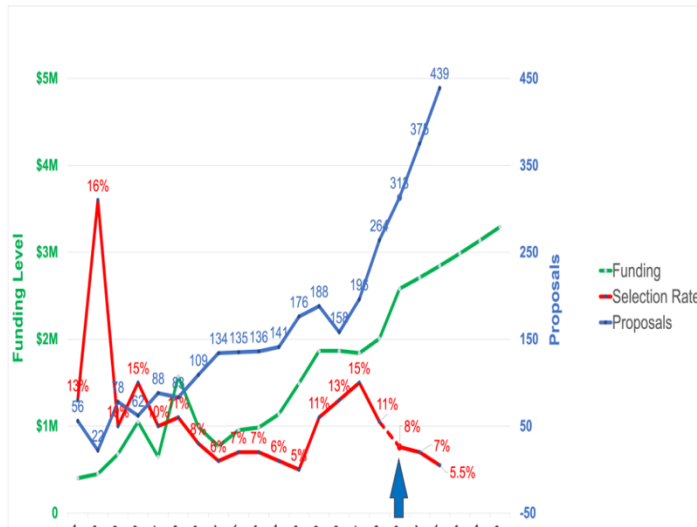
- The Chandra project had a considerably more challenging task, with much deeper cuts in the FY25 PBR
- The only viable in-guide option was to initiate termination of the mission (approved plan already in place). The other three options are over-guide, but with Options II and III entailing major reductions in funding compared to FY23 levels.
- Options:
  - Option I (in-guide): mission closeout
  - Option II (over-guide): “TSL” meaning TDAMM/Synergy/Legacy program elimination of regular GO observing and reduced user support
  - Option III (over-guide): “TSL+” meaning Option B with increased levels of user support
  - Option IV (over-guide): Full capability mission

# FINESST Working Group Findings

## FINESST for Astrophysics

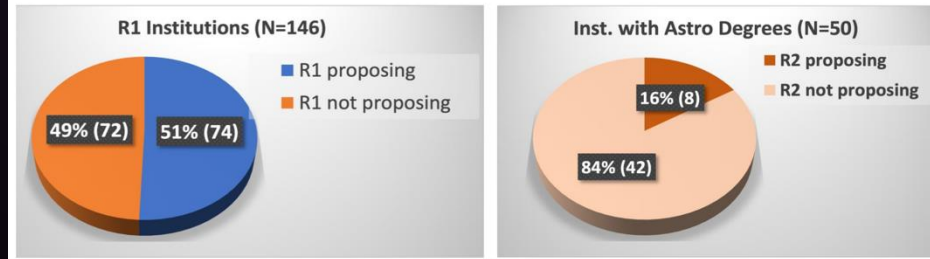
The program is incredibly successful in terms of submission numbers (313 in 2023, +20%). A deeper dive into the different aspects of the program (from solicitation language, to type of submitting institutions, and proposal evaluation) has led APD to reassess our participation in the SMD model.

- Despite an increase in funding allocation, the success rate remains below SMD ideal target
- Astro2020 Decadal and APAC recommend higher investments in early career scientist's development
- FINESST is APD's largest program by submissions

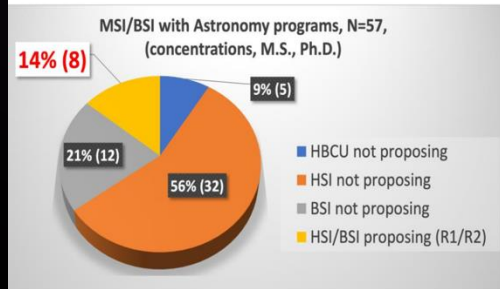


### Institutions that offer Astronomy-related postgraduate degrees (aka FINESST eligible)

We consider the "R2/R3/M1/M2" that offer terminal degrees in astronomy (M.S./Ph.D.): we found 50 of them.



Of 57 MSI/BSI with astronomy programs, only 8 (14%) proposed, mostly R1 (5)



### In Summary

We are **not reaching** a significant fraction of the astronomical community and/or there are **significant barriers** to applicants.

Not surprising, considering the Astro2020 Decadal (State of the Profession) as well as the response to the SMD RIA-23 Solicitation.

# FINESST Working Group Findings

## A Possible APD-focused New Program: STudent Astrophysics Research Grant (**STAR Grant**)

We recognize the different needs of the different Divisions as well as the communities they serve. For these reasons we envision an APD-specific program, that will not impact other Division's initiatives.

### Objectives:

- **Support the research** (or potential) of early career students (Master or PhD bound students)
  - Research that can advance Astrophysics and fulfill NASA objectives
  - Projects at a well defined stage, e.g. latter years of PhD projects (experienced applicants)
  - Projects at an early stage, that have potential for great discoveries (early grad students, M.S.)
- Support/increase **diversity of thoughts** (NASA strategic goals)
  - We want to serve the broader spectrum of astronomical community and its research endeavors because transformative ideas are everywhere
- Support the next generation of space-based **astrophysics leaders and role-models** (Astro2020 - State of the Profession).

## Summary of the Proposed Critical Changes

1. **Having a two tiers system with different audiences and purposes:** more fair competition, responding to differing needs of the candidates/institutions, as well as better alignment to NASA APD scientific objectives
2. **Limit the number of active awards or submissions by same "Linked Organization":** create a higher quality and manageable review process
3. **Full panel review:** provide deeper scientific review discussion, high quality and more constructive feedback to the proposing students

**We ask the APAC and the community for feedback on these ideas and possible implementation of the STAR Grant as stand alone APD solicitation**

**FINDINGS**

The *Chandra/Hubble* Operations Paradigm Change Review (OPCR) findings were presented to the APAC by Prof. Robert Kennicutt. The APAC thanks and commends the OPCR committee for delivering a thorough and thoughtful analysis, especially on such a compressed schedule. The APAC was not allowed to be involved in the OPCR process, did not receive the report, and was informed before the meeting that the APAC was not asked to comment on the results. We note, however, that fruitful discussion during the meeting clarified that APD would welcome comments from APAC on the OPCR. While we are sympathetic that APD is facing severe budget pressure and that difficult decisions must be made, we remain concerned about the lack of oversight and transparency in this process; the APAC is a Federal Advisory Committee charged with making formal recommendations on the priorities of the Astrophysics Division and should therefore at least be cognizant of any planned major changes to the astrophysics portfolio before they are made. We also note that an important role of the APAC is to inform the community about APD decisions and rationale, and that this function would be valuable to help the community restore trust in the Division.

The APAC also remains concerned that NASA has taken preemptive budget actions that have led to severe yet preventable impacts. In balancing the budget, the APAC urges the APD to also consider balancing science and budget. In particular, there are strong synergies between current and future missions, including Hubble, Chandra, JWST, and Roman, to support ambitious projects and enable big discoveries. The APAC understands that a nimble response is sometimes needed, particularly given the unpredictability of the appropriations cycle or when operating under a continuing resolution, but premature cancellation of Hubble or Chandra have downstream effects that will last a generation.

We also acknowledge that the responsibility for how a mission allocates its budget is not fully in APD's control. To both APD and STScl, the APAC reiterates its April 2024 letter: *'While NASA plans with the President's Budget Request in mind, the actual budgets are set by appropriators in Congress. Given the lessons learned from FY24, it would be prudent not to commit to FY25 spending plans in a way that locks in catastrophic cuts to major capabilities before Congress decides on the final budget.'*



**Chandra/Hubble Operations Paradigm Change Review**

The APAC understands that flagship missions do end, and recognizes the difficult task of balancing the portfolio amid a highly constrained budget. However, NASA's own OPCR committee found that both Chandra and Hubble are "*highly streamlined after years of improvements*", while both missions remain heavily oversubscribed, scientifically productive, and synergistic with current and future ground- and space-based

observatories, including JWST and Roman. The APAC recommends that budget cuts to Chandra and Hubble be kept at the minimum possible level, and that the irreversibility of workforce layoffs be given greater priority in making budget trades. Clearly, investment in

future missions and balancing the portfolio is important, but the community-wide damage done by irreversible cuts to two operating and highly productive Great Observatories now can have lasting effects that far outweigh the benefits of accelerated technology

maturation for a facility that may be decades away from launch. We recommend that APD take all reasonable action to preserve the unique science capabilities of these two operating Great Observatories, and to retain the resources needed to support the analysis and publication of their science output. Both chambers of Congress, through a House Authorization bill and two Commerce, Justice, Science Appropriations bills, have

expressed clear opposition to reductions in *Chandra's* operating budget. The APAC recommends that APD take no irreversible action with regards to Chandra and Hubble staff until completion of the next Senior Review, which should come at a time when we will have more clarity as to the FY25 Appropriations process.

Further, the APAC recommends that, going forward, APD follow more transparent procedures for large changes to the budget, priorities, and mission portfolio. The APAC strongly recommends that APD defer making major, irreversible choices until they are absolutely required to, and to defer to established community processes such as the Senior Review, mid-Decadal, and Decadal Surveys.

### **STAR Grant**

The APAC recommends that APD implement the STAR Grant as soon as is feasible. Of the changes mentioned in the presentation, the APAC recommends: 1) adopting tracks that separate early researchers from those with thesis research well underway; 2) increasing the award amount; 3) exploring a full panel review; and 4) requiring a budget only from students with awards. The APAC recommends against limiting the number of proposals submitted from each institution, as this may have the counterproductive effect of reducing submissions from under-resourced institutions that may lack the infrastructure for internal proposal evaluations. To broaden participation beyond R1 Primarily White Institutions (PWIs), APD may consider exploring a [Campus Champion](#) model, in which designees at institutions are responsible for raising awareness about STAR and assisting with the application process.

## Meeting Cadence of the NASA Advisory Council (NAC), NAC Science Committee (SC), and SMD Division Advisory Committees 2019+ History & Projected

227

DRAFT

	2019			2020			2021			2022			2023			2024		
NAC																		
SC																		
APAC																		
BPAC*																		
ESAC																		
HPAC																		
PAC																		

Legend:

- Green – Official Meeting
- Blue – Administrative (A) Meeting
- Gray – Planned Meeting

\*BPAC not formalized until early 2024

## SMD update

- Kudos to NASA SMD for disaster coordination work, actively using NASA data and working with other agencies (e.g. EPA) to make data available and usable
  - It is great that NASA data are being integrated into hazard/disaster mitigation programs/efforts
- In future SC meetings, the Committee would welcome a discussion - as a topic in the AA briefing - from the AA on the agenda topics and her thoughts on how the SC can support SMD in the areas covered on the agenda (and any other areas).
- DACs: The SC notes inconsistencies in the way the different DACs are operating - and particularly the frequency/cadence at which they meet (related to a past SC F&R and recent NAC discussion)



## IDEA Initiatives Panel

- Kudos to SMD for the useful Research and Analysis Program Yearbooks

### **Potential topics of F&Rs:**

- NSPIRES demographic questions are largely controlled by external policies, and any change would require OMB approval.
- There is currently not a named position at SMD for IDEA-related programs.
- Victims of sexual harassment, assault, and bullying need more support to address potential instances occurring at an institution, in the field, at a conference, etc. by NASA-funded individuals.
- Undergraduate research opportunities fall through the cracks in existing SMD programs, and they are important particularly for the retention of underrepresented people.

### **Topics for future SC meetings:**

- NAC SC looks forward to seeing SMD's response to the two NASEM reports:
  - Committee on Increasing Diversity and Inclusion in the Leadership of Competed Space Missions
  - Foundation for Assessing the Health and Vitality of the Science Mission Directorate's Research Communities

# Open Science Initiatives Panel

- Kudos: Office of the Chief Science Data Officer (OCSDO) is making great strides in the Open Science community and maximizing contributions with limited resources.

## Potential topics of F&Rs:

- NASA Open Science collaborate more with industry to advance science thru the TRL scale (e.g., vertical LLM agents).

## Topics for future SC meetings:

- OCSDO: update NAC SC at the next meeting on its Tiger Team status.
- OCSDO update NAC SC at the next meeting on what they are doing to improve quality of searches, collaboration, barriers to entry.
  - Equity in Open Science initiative is an area of concern
- Next NAC SC meeting: NASA AI, SBIR, Tech Directorate POCs to discuss art of the possible to build new products to capitalize on data for more collaborations.

## Climate Change Panel

### **Potential F&Rs (a sampling):**

There is a perception among the broader world that climate change is not a priority at NASA, and the observations being made are not enough.

- NASA should define and prioritize the intended outcomes of the NASA climate strategy (what will NASA have contributed if successful to climate change mitigation and resilience);
- NASA's niche/role as complemented by others in achieving the Administration's climate goals (mitigation and resilience);
- Metrics to assuring adherence to path to success in making a significant impact on climate change mitigation and resilience

## Space Weather Panel

Kudos: Great work with the Heliophysics Big Year and good job with cross-cutting work across agencies, especially with limited resources.

### **Potential F&R (sampling):**

- Awareness and understanding of the importance of Heliophysics should be improved.
- As discussed, there a number of challenges in terms of science to be done and measurements to be made.
- There is a risk of no real space monitors past L1, L3.
- Maintain the momentum of the Heliophysics Big Year.
- Expand assessment economic impact of these space weather events, including partnerships.



## R&A

### **Potential F&R:**

- R&A is very important, and yet there is significant proposal pressure in many/all divisions
- It's unclear what percentage of R&A is of SMD Division budgets, including selection rates.
- FINESST for Astrophysics is incredibly successful program. However, the program is not reaching a significant fraction of the astronomical community and there are significant barriers to applicants.

### **Topics for future SC meetings:**

- At the next NAC Science Committee, each DAC present each's Divisions' R&A budget, including percentage of overall budget, rationale to maximize transparency and clarification.

# VIPER

## **Potential F&R:**

- The cancellation of the VIPER mission presents profound impacts on the understanding of lunar volatiles, a key foundation of the Artemis program, and it adversely affects the leadership of the US in lunar exploration.
- It is important that these instruments stay competitive for lunar science, and preferably to keep rover intact
- It is hoped that no irreversible action will be taken before the science community can weigh in

## **Topic for next SC meeting:**

- NASA update NAC SC at the next meeting on the forward strategy for VIPER pending RFI results.

# Mission budgets, cancellations and extensions

## Potential F&R:

- Cancelling missions (e.g., GDC) impacts the broader space community. Extending missions must be balanced on new missions.
- In a constrained budget environment, transparent decisions on cancelling or extending missions should be more clear, as well as understanding science value versus cost.

## Topic for next SC meeting:

- How does SMD get independent evaluations of technical readiness and cost & schedule for flagship missions? What's the process?
- How to balance cost-overruns on big missions (say Discovery/Midex/NewFrontiers/Flagship) vs. R&A budgets? Is this something the NAC and/or Sci Comm and/or DACs should be involved in?

# ISS

## **Potential F&R:**

- ISS is a worldwide asset and key to space and science research as a national laboratory.
- Biological and physical sciences relies on a space station platform, government or commercial, and will be impacted by gaps or potential transitions or throttling back of capabilities.
  - Transition of capabilities to commercial LEO destinations/national lab concepts, space diplomacy, also requirements & communication thereof, is a concern

## **Topic for next SC meeting:**

- NAC SC requests a briefing on ISS transition to Commercial LEO Destinations (CLD)