



National Aeronautics and
Space Administration

NAC Science Committee

Dr. Noël Bakhtian, Vice Chair

May 8, 2024





Science Committee Members

Noël Bakhtian (Vice Chair), Bezos Earth Fund

Paul Cassak, West Virginia University

Chair, Heliophysics Advisory Committee (HPAC)

Jamie Foster, University of Florida

Chair, Biological and Physical Sciences Advisory Committee (BPAC)

Linda M. Godwin, University of Missouri

Kelly Holley-Bockelmann, Vanderbilt University

Chair, Astrophysics Advisory Committee (APAC)

Hope Ishii, University of Hawai'i at Mānoa

Chair, Planetary Science Advisory Committee (PAC)

Sara Tucker, Ball Aerospace & Technologies Corporation

Chair, Earth Science Advisory Committee (ESAC)

Executive Secretary: Nathan Boll, NASA Headquarters

The Science Committee recognizes with gratitude the contributions of the following individuals:

Outgoing Science Committee Chair

- Ellen Williams has served the NAC SC and community to the fullest extent.
- We thank her wholeheartedly for her service and she will be missed.

Outgoing Science Committee Members

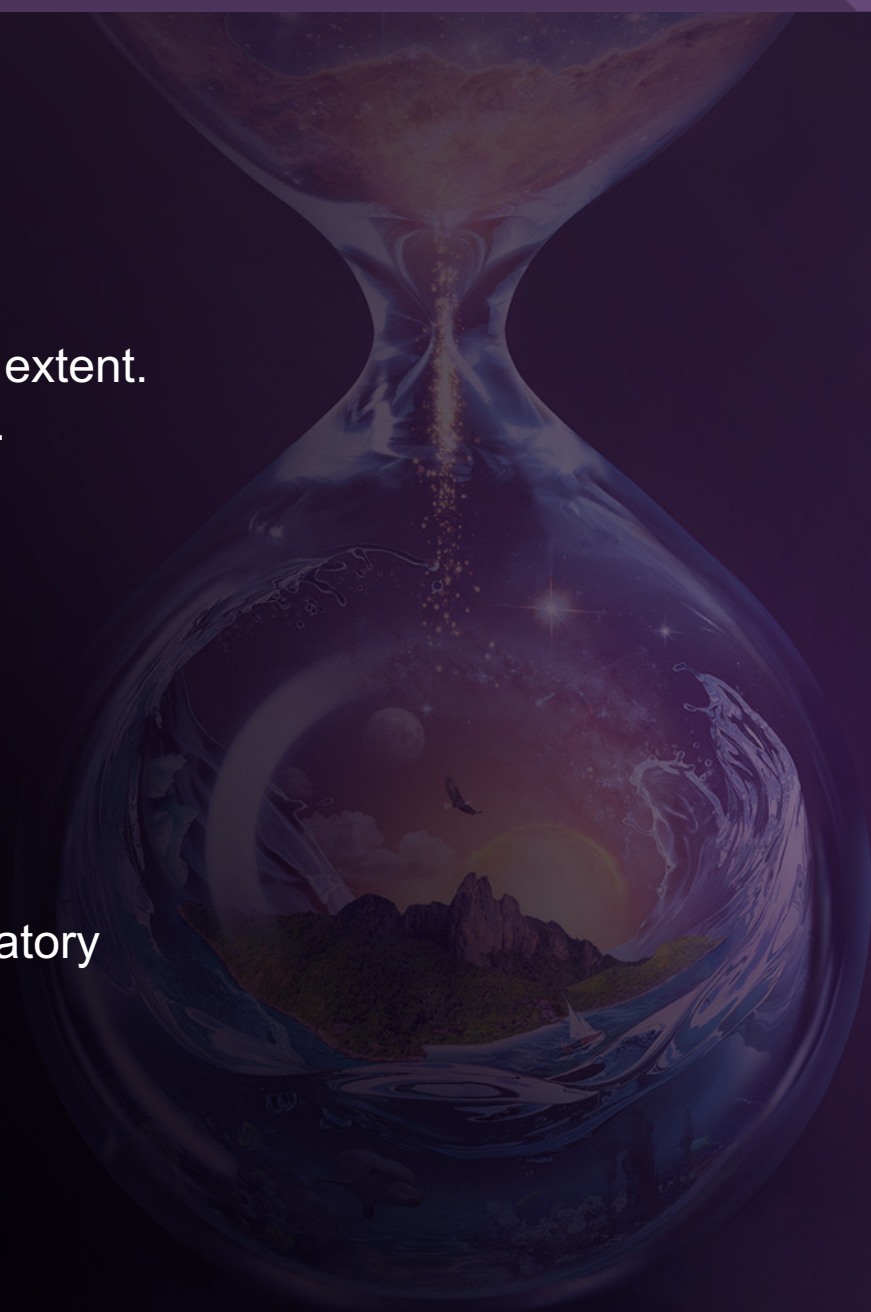
- Vinton Cerf, Google
- Serina Diniega, Jet Propulsion Laboratory
- Willie E. May, Morgan State University
- Marc Weiser, RPM Ventures

HPAC Interim Representatives

- Matina Gkioulidou, Johns Hopkins University Applied Physics Laboratory
- Nicole Duncan, Ball Aerospace

Outgoing Executive Secretary

- Jason Callahan, NASA Headquarters





SMD Update



Dr. Nicola "Nicky" Fox

Associate Administrator

Science Mission Directorate

- Recently served as the Director of the SMD Heliophysics Division
- Formerly served as the Chief Scientist for heliophysics at the Johns Hopkins University Applied Physics Lab
- Awarded the NASA Outstanding Leadership Medal and the American Astronautical Society's Carl Sagan Memorial Award for her demonstrated leadership in the field of heliophysics
- Holds a Ph.D. in Space and Atmospheric Physics from The Imperial College of Science, Technology and Medicine in London
- Extensive background in heliophysics and space weather research

SCIENCE ENGAGEMENT & PARTNERSHIPS DIVISION (DO000)



DIRECTOR
Dan Woods
(Acting)

RESOURCE MANAGEMENT DIVISION (DL000)




DIRECTOR
Holly Degn




DEPUTY
Kate Wolf

ADMINISTRATION BRANCH (DA030)




CHIEF
Thomas Reyna

POLICY BRANCH (DA040)




CHIEF
Jens Feeley

SENIOR ADVISOR
Paul Hertz



SPACE TRAFFIC COORDINATION PROGRAM OFFICER
Travis Blake



OFFICE OF THE ASSOCIATE ADMINISTRATOR (DA000)




ASSOCIATE ADMINISTRATOR
Nicola Fox



DEPUTY ASSOCIATE ADMINISTRATOR
Sandra Connelly


MARS SAMPLE RETURN PROGRAM OFFICE (DA050)



DIRECTOR
Jeff Gramling



DEPUTY
Donya Douglas-Bradshaw
(Acting)




CHIEF ENGINEER
Steve Thibault




DEPUTY-BUSINESS
Rich Ryan

MANAGEMENT



DEPUTY ASSOCIATE ADMINISTRATOR
Karen Flynn




ASSISTANT DEPUTY ASSOCIATE ADMINISTRATOR
Dan Woods

EXPLORATION




DEPUTY ASSOCIATE ADMINISTRATOR
Joel Kearns




ASSISTANT DEPUTY ASSOCIATE ADMINISTRATOR
Brad Bailey

RESEARCH




DEPUTY ASSOCIATE ADMINISTRATOR
Michael New




ASSISTANT DEPUTY ASSOCIATE ADMINISTRATOR
Dan Evans

PROGRAMS




DEPUTY ASSOCIATE ADMINISTRATOR
Wanda Peters




ASSISTANT DEPUTY ASSOCIATE ADMINISTRATOR
Shannon Fitzpatrick

CHIEF TECHNOLOGIST
Carolyn Mercer



CONJUNCTION ASSESSMENT PROGRAM OFFICER
Laurie Newman



EARTH SCIENCE DIVISION (DK000)



DIRECTOR
Karen St. Germain



DEPUTY
Julie Robinson



ASSOCIATE DIRECTOR
Scott Schwinger
(Acting)




ASSOCIATE DIRECTOR
Jack Kaye




ASSOCIATE DIRECTOR
Tom Wagner

BIOLOGICAL & PHYSICAL SCIENCES DIVISION (DP000)




DIRECTOR
Lisa Carnell




DEPUTY
Paul Hertz
(Acting)


HELIOPHYSICS DIVISION (DJ000)



DIRECTOR
Joe Westlake




DEPUTY
Peg Luce




ASSOCIATE DIRECTOR
Nicki Rayl

JOINT AGENCY SATELLITE DIVISION (DN000)




DIRECTOR
John Gagolian




DEPUTY
Joe Smith
(Acting)


ASTROPHYSICS DIVISION (DH000)




DIRECTOR
Mark Clampin



ASSOCIATE DIRECTOR
Eric Smith




DEPUTY
Sandra Cauffman




ASSOCIATE DIRECTOR
Tahani Amer
(Acting)


PLANETARY SCIENCE DIVISION (DG000)




DIRECTOR
Lori Glaze




DEPUTY
Eric Ianson



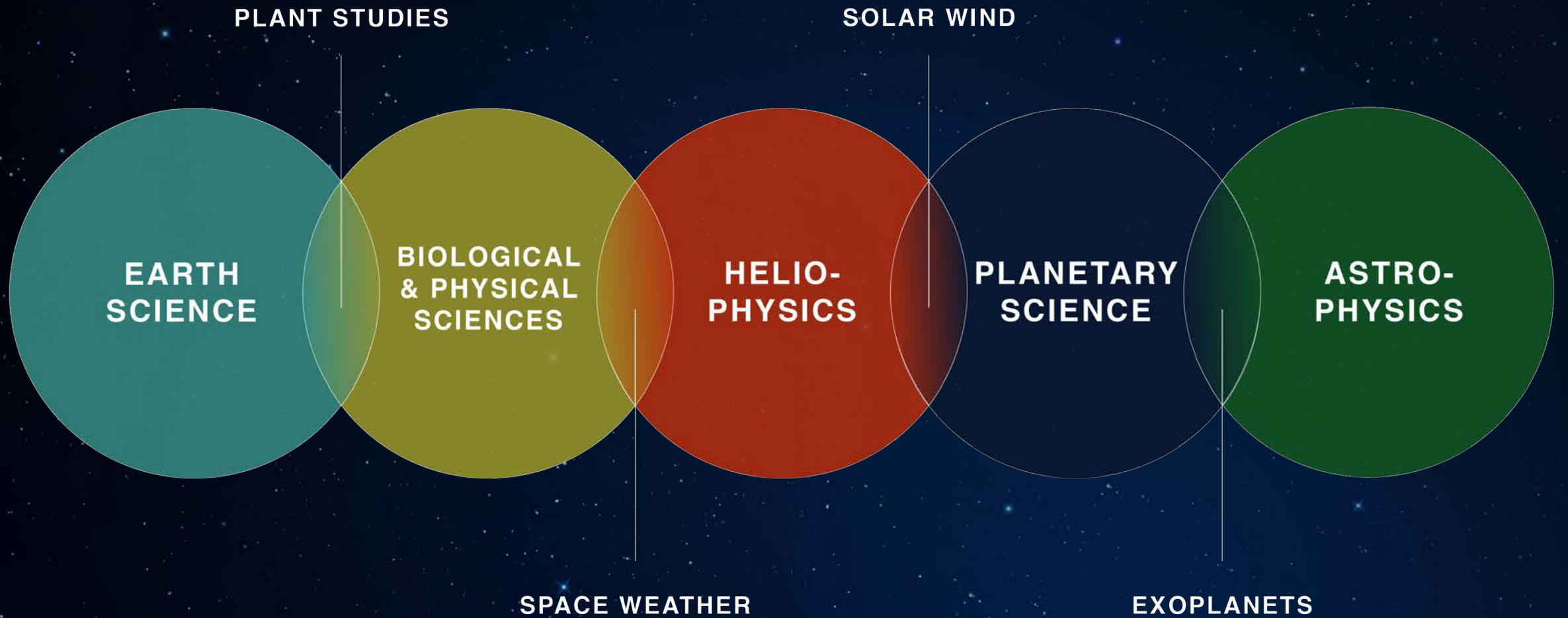
ASSOCIATE DIRECTOR
Charles Webb
(Acting)

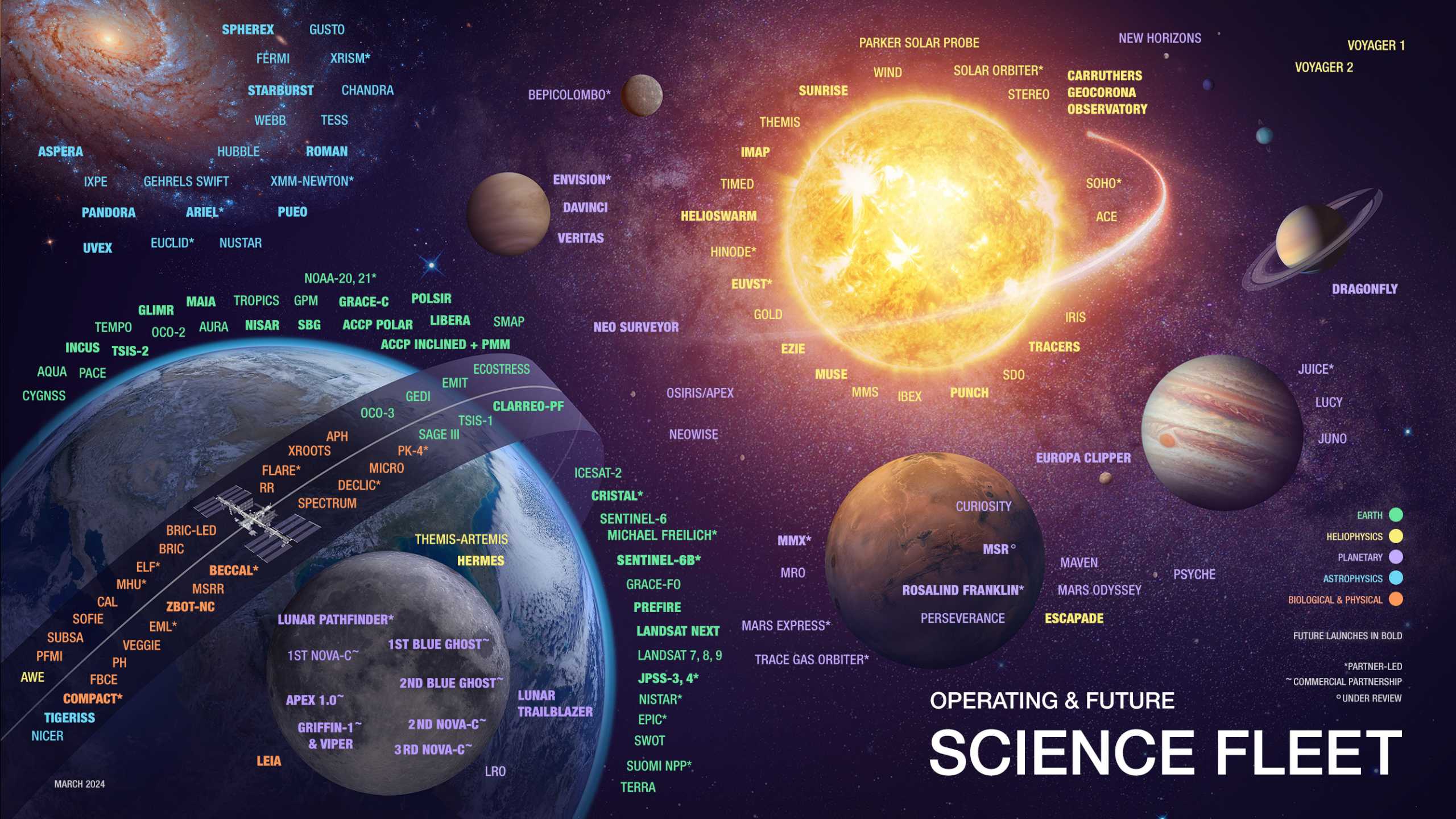


CHIEF SCIENCE DATA OFFICER
Kevin Murphy



CHIEF MARS SCIENTIST
Vacant





SPHEREX
FERMI
STARBUST
WEBB
HUBBLE
ROMAN
GUSTO
XRISM*
CHANDRA
TESS

ASPERA
IXPE
PANDORA
UVEX
GEHRELS SWIFT
ARIEL*
EUCLID*
NUSTAR
XMM-NEWTON*

NOAA-20, 21*
GLIMR
MAIA
TROPICS
GPM
GRACE-C
POLAR
LIBERA
SMAP
TEMPO
OCO-2
AURA
NISAR
SBG
ACCP INCLINED + PMM

INCUS
TSIS-2
AQUA
PACE
CYGNSS
ECOSTRESS
GEDI
EMIT
OCO-3
SAGE III
TSIS-1
CLARREO-PF

XROOTS
APH
RR
FLARE*
SPECTRUM
MICRO
DECLIC*
BRIC-LED
BRIC
ELF*
MHU*
MSRR
ZBOT-NC
SOFIE
EML*
VEGGIE
PH
FBCE
COMPACT*

THEMIS-ARTEMIS
HERMES
LUNAR PATHFINDER*
1ST NOVA-C~
APEX 1.0~
GRIFFIN-1~
& VIPER
LEIA

1ST BLUE GHOST~
2ND BLUE GHOST~
2ND NOVA-C~
3RD NOVA-C~
LUNAR TRAILBLAZER
LRO

BEPICOLOMBO*

ENVISION*
DAVINCI
VERITAS

NEO SURVEYOR

OSIRIS/APEX
NEOWISE

ICESAT-2
CRISTAL*

SENTINEL-6
MICHAEL FREILICH*

SENTINEL-6B*

GRACE-FO
PREFIRE

LANDSAT NEXT
LANDSAT 7, 8, 9

JPSS-3, 4*

NISTAR*
EPIC*
SWOT

SUOMI NPP*
TERRA

PARKER SOLAR PROBE

SUNRISE

THEMIS

IMAP

TIMED

HELIOSWARM

HINODE*

EUVST*

GOLD

EZIE

MUSE

MMS

IBEX

PUNCH

SDO

OSIRIS/APEX
NEOWISE

MMX*

MRO

MARS EXPRESS*

TRACE GAS ORBITER*

CURIOSITY

MSR °

ROSALIND FRANKLIN*

PERSEVERANCE

WIND

SOLAR ORBITER*

STEREO

CARRUTHERS
GEOCORONA
OBSERVATORY

SOHO*

ACE

IRIS

TRACERS

EUROPA CLIPPER

MAVEN

MARS ODYSSEY

ESCAPADE

NEW HORIZONS

VOYAGER 1

VOYAGER 2

DRAGONFLY

JUICE*

LUCY

JUNO

EARTH ●

HELIOPHYSICS ●

PLANETARY ●

ASTROPHYSICS ●

BIOLOGICAL & PHYSICAL ●

FUTURE LAUNCHES IN BOLD

*PARTNER-LED

~ COMMERCIAL PARTNERSHIP

° UNDER REVIEW

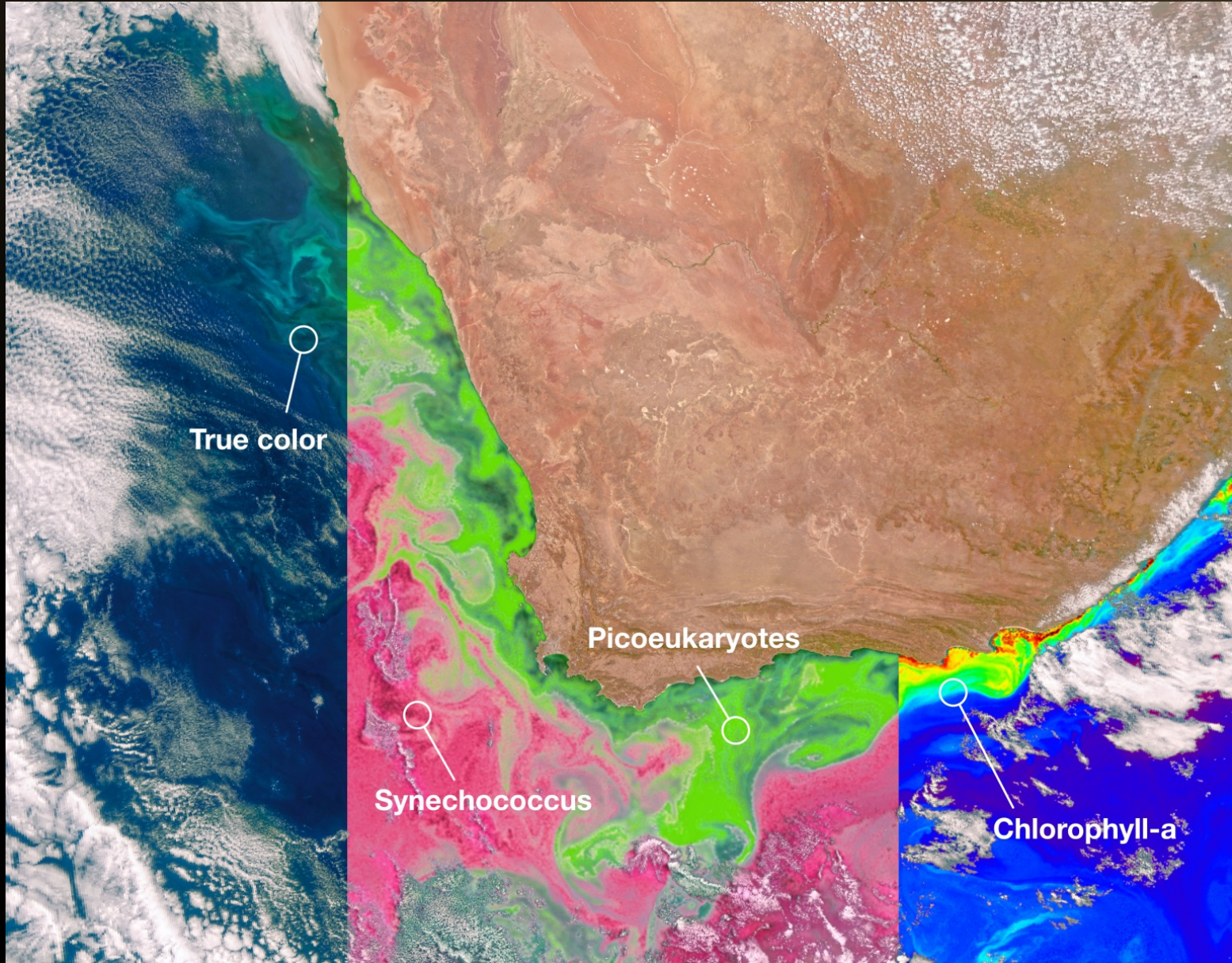
OPERATING & FUTURE SCIENCE FLEET

1st-of-their-kind
measurements

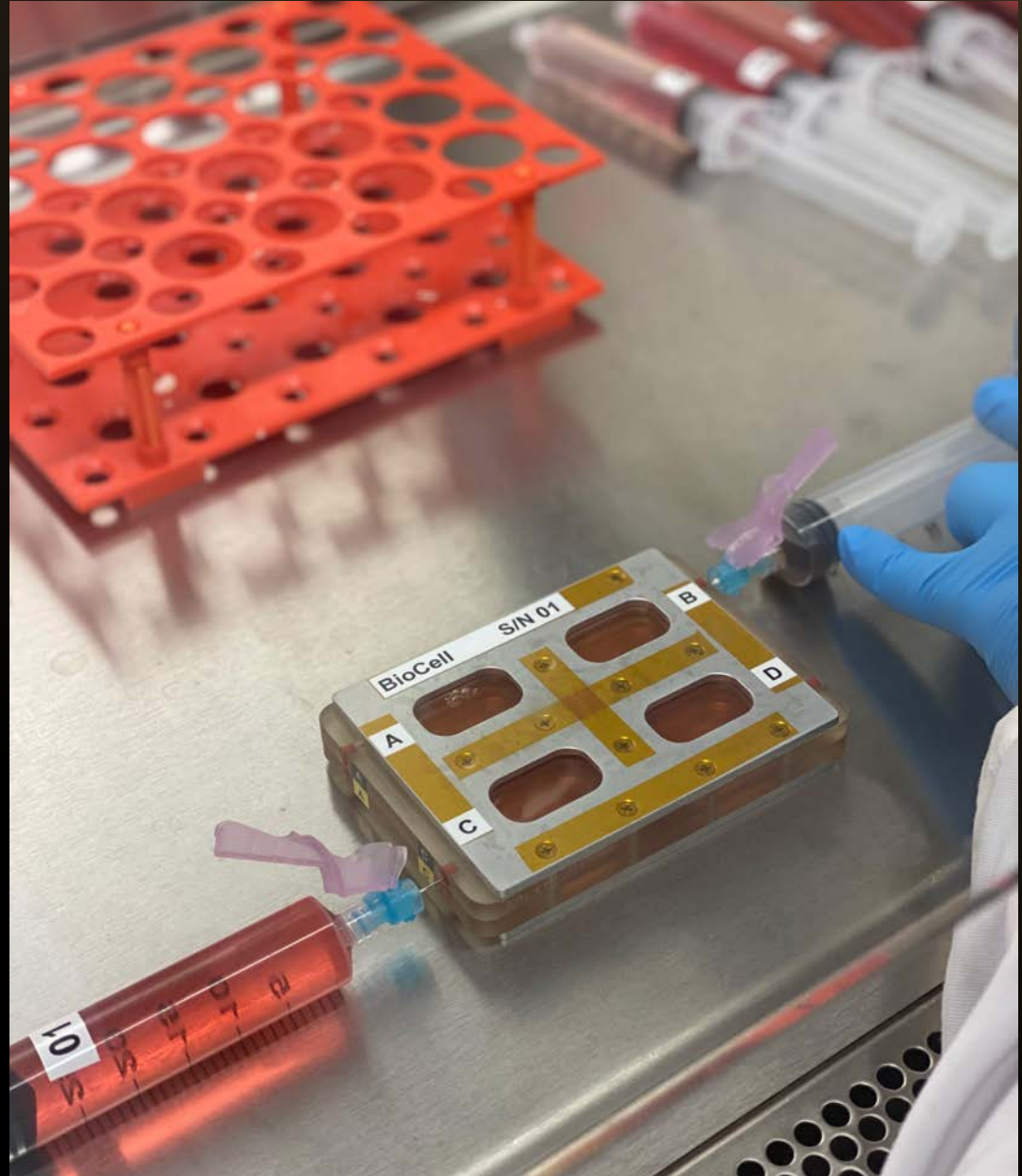
Ocean Health

Air Quality

Changing Climate



Differentiate communities of phytoplankton

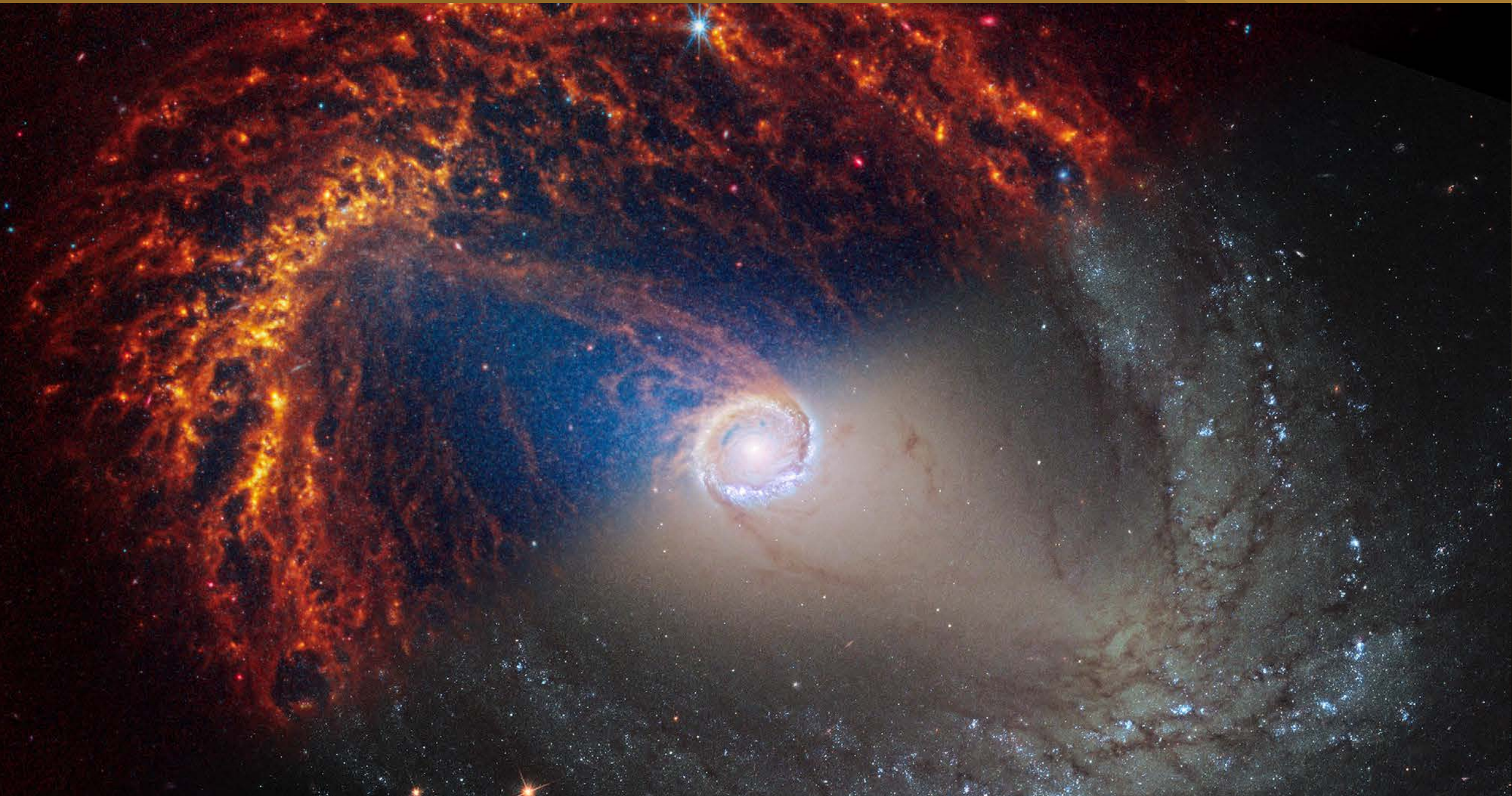




A view of the outside of the OSIRIS-REx sample collector. Sample material from asteroid Bennu can be seen on the middle right.



OSIRIS-REx sample return shortly after touching down on Sept. 24, 2023, at the Department of Defense's Utah Test and Training Range



Science Committee Meeting Summaries





NAC SC Spring Meeting 2023

NASA Headquarters, Washington DC
May 31 - June 1, 2023

- SMD Update
 - Nicky Fox
- Division Advisory Committee (DAC) Reports
- Earth System Observatory: Independent Review Board Report
 - Geoffey Yoder
- Tropospheric Emissions: Monitoring of Pollution (TEMPO) Update
 - Karen St. Germain
- Deep Space Network: SMD Needs
 - Sandra Cauffman
- Transform to Open Science Update
 - Kevin Murphy
- JUpiter ICy moons Explorer (JUICE) Lecture
 - Curt Niebur



NAC SC Summer Meeting 2023

Jet Propulsion Laboratory, Pasadena CA
August 29-30, 2023

- SMD Update
 - Sandra Connelly
- Division Advisory Committee (DAC) Reports
- Panel Discussion: Deep Space Network Status and Outlook
 - Phillip Baldwin, Suzanne Dodd, Sandra Cauffman
- Panel Discussion: NASA SMD Initiatives to Lower the Boundaries to Science Research
 - Manil Maskey, Curt Niebur, Tom Statler
- Heliophysics Big Year Lecture
 - Gina DiBraccio

NAC SC Spring Meeting 2024

Virtual Meeting
March 25, 2024

- SMD Update and Budget Discussion
 - Nicky Fox
- Division Advisory Committee (DAC) Reports
- Summary Discussion



Findings and Recommendations



Table of Contents

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

1. Resolutions

1. The NAC Science Committee is pleased to welcome Dr. Nicola Fox as the Associate Administrator for the Science Mission Directorate and look forward to supporting her on the future pathways of NASA's scientific exploration and innovation.
2. The Science Committee was pleased to hear of new appointments in SMD – Dr. Lisa Carnell, the new Division Director for the recently created Biological and Physical Sciences Division (BPSD), Dr. Joseph Westlake, the new Division Director for the Heliophysics Division, and Dr. David Grinspoon, the new Senior Scientist leading the Agency strategy for Astrobiology.
3. The Science committee thanks SMD for arranging the Public Lectures on the JUpiter ICy moons Explorer (JUICE) mission, given by Dr. Curt Niebur, and on the Heliophysics Big Year, given by Dr. Gina Di Braccio.
4. The Science Committee is also grateful to the Jet Propulsion Laboratory and its Director, Dr. Laurie Leshin, for their hospitality during the 2023 Summer Meeting and for providing inspiring tours of selected mission facilities.

2. Science Mission Directorate (2023)

The SC received SMD updates from Nicky Fox on May 31, 2023 and from Sandra Connelly on August 29, 2023.

Findings:

1. The FY 2024 NASA budget request provides good support for SMD mission and goals.
2. The SMD Summer Meeting presentation summarized the launch of new missions and the continuation of outstanding mission science.
3. Decadal Survey recommendations focus on the most impactful basic research questions. The subsequent development to missions can take up to a decade and require significant budgetary commitments and planning. SMD has consistently sought to honor Decadal Survey recommendations (*e.g.*, Mars Sample Return).

Recommendations:

1. SMD should provide input to future NAC SC meetings that includes:
 - a. SMD philosophy on balance of innovation and risk (*e.g.*, SMD CLPS missions)
 - b. The status of preserving the integrity of planetary bodies under international exploration and possible future commercial development
 - c. Update on the SMD climate change research strategy (*e.g.*, what missions/programs are in place and under planning)
 - d. Planning based on the release of the BPS Decadal Survey
 - e. Update on detection and warning capabilities for Space Weather events

3. Science Mission Directorate (2024)

The SC received an SMD Update from Nicky Fox on March 25, 2024 and appreciates the need to deal with difficult budgetary constraints and balance different factors.

Findings:

1. NAC SC can provide better feedback to SMD if provided with direct input concerning the budget and the factors considered in making decisions about where and how cuts should be applied.
2. Greater clarity on these topics would help SMD better communicate with its stakeholders.
3. Each division in SMD will support science under the Artemis program.

Recommendations:

1. SMD should present budgetary information in the main presentation to the SC, including comparisons with recent previous budgets, requested budget, and notional outyears budgets.
2. SMD should improve communication with the SC and stakeholder communities by addressing the factors considered in implementing the budget including:
 - a. Clarify what tradeoffs were made, and how the consequences were assessed in line with the SMD strategy, and risks / mitigations.
 - b. Clarify the procedures to be used in pending decisions, such as the change from mini-Senior Review to operational paradigm review for Chandra and HST;
 - c. Clarify how scientific goals will remain a pillar of SMD participation in the Artemis Program;
 - d. Develop guidelines for addressing budgetary issues that create conflict with Decadal Survey priorities, such as cancellation of the Geospace Dynamics Constellation (GDC) mission, which is a flagship mission in the existing Heliophysics Decadal Survey

4. DAC Reports – Spring Meeting 2023

The SC heard updates from the Astrophysics Advisory Committee, Earth Science Advisory Committee, Heliophysics Advisory Committee, and Planetary Science Advisory Committee on June 1, 2023.

Findings:

1. Current SMD efforts include generation of a collection of IDEA resources, but still need better connection with the science communities; towards this aim, the PAC has suggested the creation of a community-facing SMD point of contact for IDEA efforts to facilitate communications, resource sharing, and new program development:

- a) See Finding 8, from June 2022 PAC Findings:

https://science.nasa.gov/science-pink/s3fs-public/atoms/files/Final%20PAC%20findings_June2022_0.pdf

“An existing model that may inform efforts to address this is the Planetary Data Ecosystem (PDE), where a paid, non-civil servant Chief Scientist has a mission to engage the community, is supported by an internal NASA group, and provides institutional support for a central information repository.”

Recommendation:

1. While respecting the diversity of the SMD Divisions in their approaches to inclusivity, SMD should identify, standardize, and disseminate core best practices that all can use to prevent/minimize duplication of effort.

5. DAC Reports – Summer Meeting 2023

The SC heard updates from the Astrophysics Advisory Committee, Biological and Physical Sciences Advisory Committee, Earth Science Advisory Committee, Heliophysics Advisory Committee, and Planetary Science Advisory Committee on August 30, 2023.

Findings:

1. Presentations summarized the launch of new missions and continuation of outstanding mission science.
2. Neither the Earth Science nor the Heliophysics Advisory Committees have met for the last year.

Recommendation:

1. SMD should provide input to future NAC SC meetings on the purpose and philosophy of the SMD advisory committee structure, execution of committee meetings, and potential standardization across the divisions.

6. DAC Reports – Spring Meeting 2024

The SC heard updates from the Astrophysics Advisory Committee, Biological and Physical Sciences Advisory Committee, Earth Science Advisory Committee, Heliophysics Advisory Committee, and Planetary Science Advisory Committee on March 25, 2024.

The Committee appreciates the quality of reporting from the Division Advisory Committee (DAC) chairs and recognizes that SMD is working toward more regular scheduling of DAC meetings (see Meeting Cadence chart).

Findings:

1. The DACs provide input to NASA from subject matter experts who are deeply engaged with NASA's mission.
2. There is variability across the SMD divisions in how the NAC SC DACs operate. In particular, Divisions differ in how much information about decision making and budget is provided to the DACs and how often they meet.
3. The DACs may present their F&Rs directly to SMD. If the DACs have F&Rs that require attention of the NAC, these are discussed/vetted at the Science Committee so these F&Rs can be elevated to the NAC.

Recommendations:

1. SMD should establish guidelines for knowledge sharing and transparency between SMD divisions and their DACs, including participation of the DACs in proposing agenda topics, and a regular meeting frequency.

7. Earth Science Observatory IRB Report (2023)

The SC received a briefing from ESO IRB Co-Chair, Geoffrey Yoder, on May 31, 2023.

The Science Committee commends SMD for establishing an Independent Review Board to proactively assist with assessing the plans and goals for the Earth System Observatory.

Findings:

1. ESO requires special attention because its three major components must be coordinated to realize its full potential. Implementing the coordination across components and the supporting Centers will be complex and challenging. SMD has the ability to support ESD in navigating the complexity inherent in ESO, including the importance of embracing potential partnerships holistically, including public or private partnerships.
2. There is tension within ESO development between budget constraints and innovation. NASA has traditionally embraced calculated risk in taking on unprecedented tasks. In addition, enabling there to be space for taking calculated risks can simultaneously support innovation and diversity and help reduce costs.
3. NASA partially concurred with the IRB recommendation to have a single person oversee the ESO portfolio, indicating instead that the integration of the observatory across disciplines of project management, engineering, science, applications, and data, may require more than designation of a single person for oversight.

8. TEMPO Mission (2023)

The SC was pleased to receive a status update and review of plans for the Tropospheric Emissions: Monitoring Pollution (TEMPO) mission, which is the first funded project of NASA's Earth Venture Instrument program, from ESD Division Director, Dr. Karen St. Germain, on May 31, 2023.

Findings:

1. The context of the NASA Earth Action Strategy, and the strong public health implications of TEMPO necessitates a broad range of partnerships with other government agencies, and with the private sector.
2. The mission will require significant support for gathering data, coordination, and dissemination, and the end-product will save lives and could further environmental justice.
3. This mission is developing a future operational capability that could be transferred to the private sector or become a permanent government service.

The Global Deep Space Network



Canberra, Australia (CDSCC)



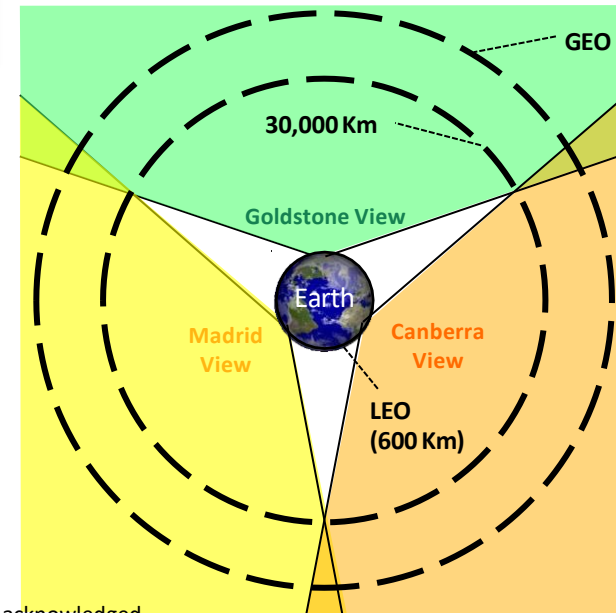
Madrid, Spain (MDSCC)



Control Center at JPL
Pasadena, California



Goldstone, California (GDSCC)

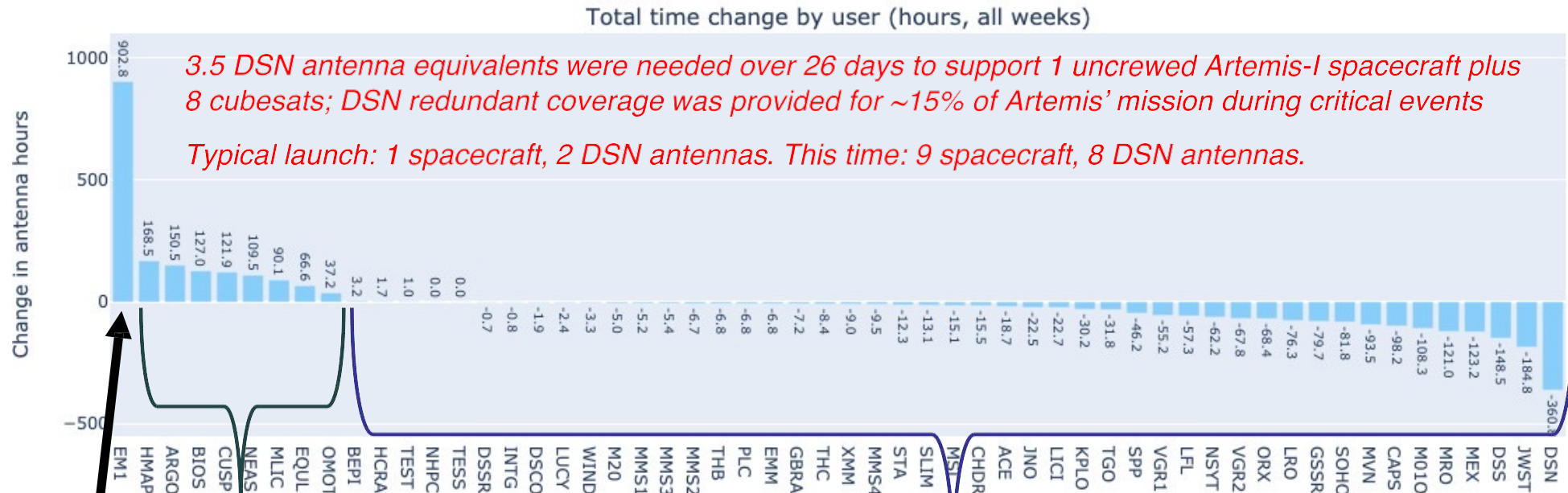


Artemis 1 and CubeSat Experience

Interplanetary Network Directorate

Artemis-I + Deep Space CubeSat Support: DSN Impacts

Impact (antenna hours by mission) of EM1 Nov16 launch schedule on 2022 weeks ['2022-46', '2022-47', '2022-48', '2022-49']



3.5 DSN antenna equivalents were needed over 26 days to support 1 uncrewed Artemis-I spacecraft plus 8 cubesats; DSN redundant coverage was provided for ~15% of Artemis' mission during critical events

Typical launch: 1 spacecraft, 2 DSN antennas. This time: 9 spacecraft, 8 DSN antennas.

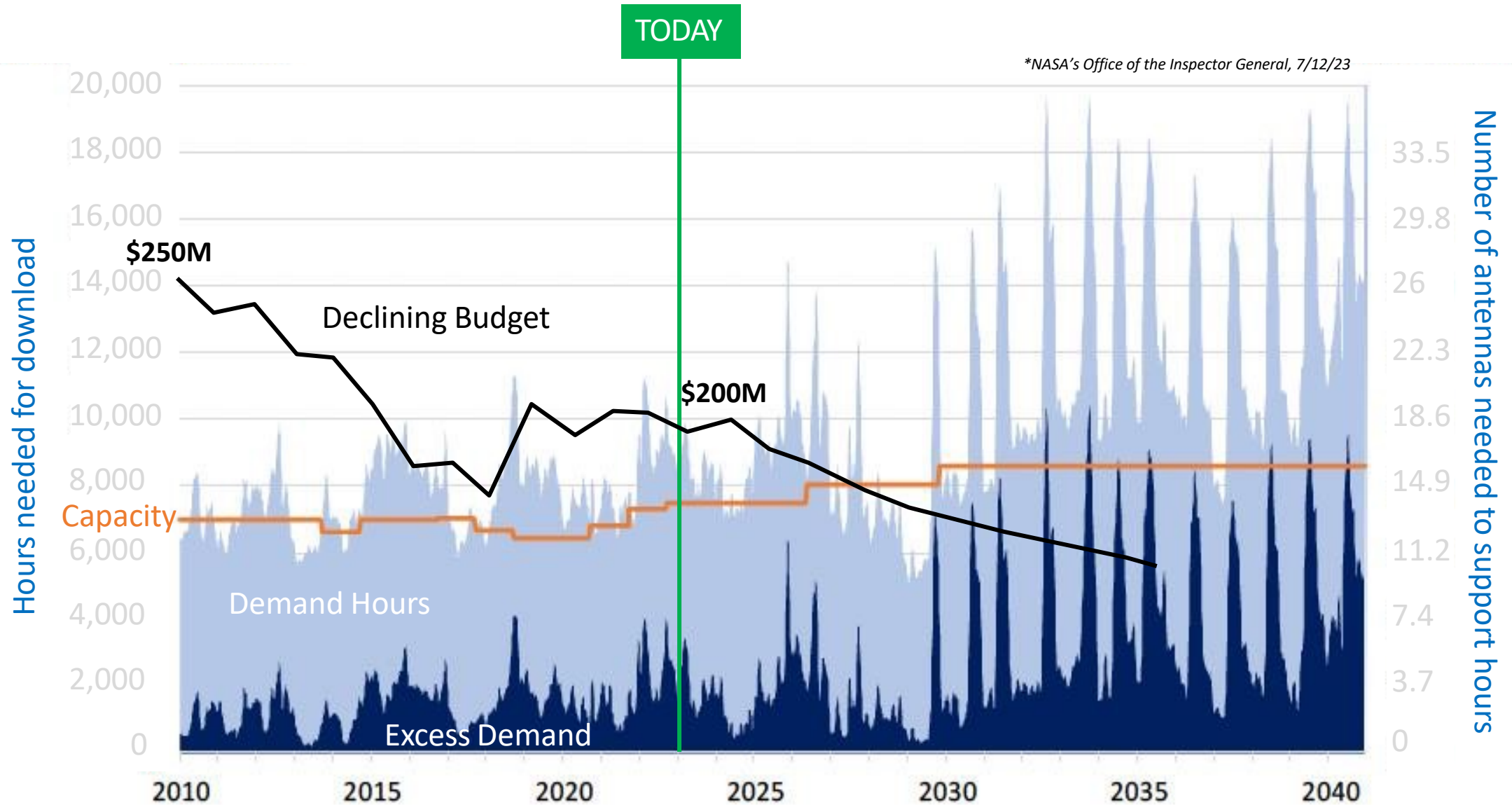
Artemis I:
+903 hrs
(1.8 antennas)

CubeSats:
+871 hrs
(1.7 antennas)

Existing SMD missions: -1585 hrs
DSN Maintenance: -509 hrs

DSN maintenance deferral – not a sustainable approach

The DSN Budget is Declining while Mission Load is Increasing



NASA and the Community are Taking Notice

July 12, 2023

NASA
Office of Inspector General

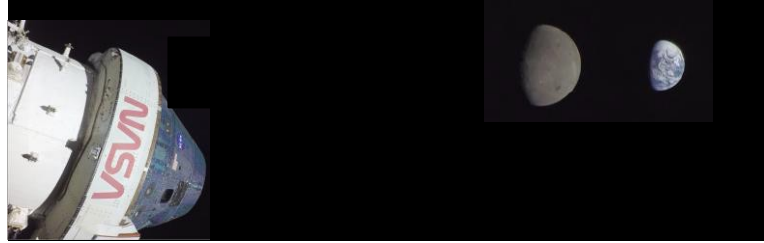


Audit of NASA's Deep Space Network

"NASA's DSN is currently oversubscribed and will continue to be overburdened by the demands created by an increasing number of deep space missions, including crewed and robotic missions."

"NASA's DSN is vital to providing the communication links for the Agency's most complex and expensive space exploration missions such as the JWST and the Agency's Artemis lunar campaign."

April 24, 2023



Private Cloud Appliance (PCA) Failure Review Report

33-hour outage of GDSCC during Orion flyby of the moon due to PCA failure.

"Oracle PCA and operating systems out of date.... No redundancy"

"SCaN funding profile is a stressor on prioritization of Operations and Maintenance"

August 9, 2022



Joint SMD and SOMD Study evaluating DSN Support to JWST

"the DSN's ongoing challenge to balance limited supply and growing mission demand, was a key contributor to the challenges faced by JWST"

"19 findings across five categories... 17 recommendations and the corresponding 40 actions are listed in the report"

9. Deep Space Network (2023)

The SC was presented with a report on the status of the Deep Space Network (DSN) and its implications for SMD missions and SMD partnerships with other directorates on May 31, 2023. The SC then received a DSN status update and discussed future planning with a panel of NASA representatives on August 29, 2023.

Findings:

1. The DSN is heavily subscribed and does not appear ready to support the increasing data rates of modern missions, including JWST, deep space missions, and the surge needs of the Artemis missions and ride-along small missions without curtailing service to other missions or risking potentially dangerous outages.
2. The DSN infrastructure suffers from deferred maintenance, and it needs significant modernization and increases in capacity to avoid putting NASA's legacy, present, and future missions at risk. Since November 2022, there have been three ~24-hour+ full site outages, including one during the Artemis 1 mission.
3. DSN is managed by SCA and thus not under SMD's direct control. SMD is providing input to the SCA DSN Futures Study.
4. Oversubscription of the Deep Space Network (DSN), deferred maintenance, and poor prioritization of usage have created a massive deficit of support for the DSN. This is an existential threat not only to present and future SMD missions but also to human exploration, future commercial development, and national security.

9. Deep Space Network (2023 continued)

Recommendations:

1. SMD should increase internal resources to evaluate DSN needs and approaches, and to provide input to SCA and NAC.
2. SMD should evaluate short-term options to improve the efficiency of the present DSN, such as the GSFC/JPL and other labs/ activities on Delay/Disruption Tolerant Networks.
3. SMD should inform and consult the science community about the available communications capabilities.
4. SMD should evaluate the availability of interagency capabilities and potential commercial capabilities, including pros and cons.
5. NASA should immediately begin addressing deferred maintenance of DSN.
6. NASA should immediately develop a sustainable, systems-level DSN management model with immediate plans for increased annual funding. Considerations should include technical aspects, business plan (e.g. user facility tax, contributions beyond US government), and system-level awareness (e.g. multi-national potential, issues with small sats).
7. NASA should inform and consult the National Space Council on the issues with the DSN and their resolution.
8. SMD should champion addressing the possibility of the DSN becoming part of a public-private, multi-stakeholder, sustainable, collaborative Solar System Internet as part of the Future DSN study.

10. Deep Space Network (2024)

The SC had reviewed issues with the Deep Space Network at its previous two meetings in 2023 and continued the discussion at its Spring 2024 meeting. The SC continues to be deeply concerned about the developing negative impacts on SMD programs.

Findings:

1. The DSN network is already oversubscribed at peak use periods, and demand is increasing, e.g. with the planned launch of Roman as well as the CLPS and M2M programs.
2. DSN/SCAN is a pressing concern of the Science Committee, particularly in the context of new budgetary constraints.

Recommendation

1. NASA should immediately communicate how it is planning to maintain sufficient deep space communications capability for its missions planned for the next decade.

11. Transform to Open Science Program (2023)

The SC was presented with an update on the Transform to Open Science (TOPS) program, focusing on implementation steps by Dr. Kevin Murphy on June 1, 2023.

Findings:

1. NASA/SMD is continuing to develop capabilities to support the providers and users of open-source science, and effectively using standard methods of community engagement to assess user needs
2. SMD is commended for including TOPS principles in funding criteria.
3. The TOPS Open Science 101 course now in beta-testing is a useful first step to incentivize and support the use of good data science principles.
 - a) Specific inclusion of participants from non-R1 institutions in Open Science 101 is an important link of TOPS with Inclusivity, Diversity, Equity, and Accessibility (IDEA) efforts.
 - b) The use of 'badges' for completion of the stages of the Open Science 101 course provides a useful incentive structure for organizations building Open Science capabilities.
4. There remain community concerns about archive/storage requirements for software.

Recommendations:

1. SMD should provide clear documentation and examples for the use of standard packages such as ORCID, Zenodo and Github for open-source data and software.
2. The Open Science 101 course design should expand or add a module on the benefits and coordination of TOPS/IDEA practices.
3. The prioritization criteria for migrating information to the cloud and quickly making information broadly available should include environmental social justice.

12. IDEA at SMD (2023)

The SC was presented with many excellent examples of IDEA activities at SMD by a panel of NASA representatives on August 30, 2023.

Findings:

1. The SMD 'Lowering the Boundaries to Science' initiative includes a powerful approach to IDEA as part of the Europa Clipper mission with its Clipper Next Generation Initiative. The goal of the initiative is to develop a diverse team of scientists prepared to lead the mission beginning in 2035 when Clipper is approaching Europa. The long-term program includes student cohorts, mentors, pathways, and cultural considerations to support students through the stages of their education and early professional life.
2. NASA's Earth Information Center provides compelling content and core services to provide stakeholders with access to data and software that supports broad participation in research and applications. Partnerships with other US and international agencies broaden the potential impact of the EIC

Recommendations:

1. SMD should expand the impact of the Lower the Boundaries initiatives by developing an overarching set of principles, top-level strategies, lessons learned, best practices, incorporating previously successfully-tested efforts.
2. SMD should develop a centralized repository and identified POCs to capture consolidated LTB best practices and share with others.
3. SMD should continue to build on the capabilities of the EIC, including full development of the Science Discovery Engine

13. Broadening SMD Science Impact (2024)

The SC had received briefings on SMDs goals in DEI, Open Science, and Open Source Software issues at its previous two meetings in 2023 and continued discussion of these issues at its 2024 meeting.

Findings:

1. These young programs are still developing operational procedures and may be particularly at risk in a period of budgetary constraints.
2. Implementation of Open Source Data and Software requirements has raised concerns about possible negative impact on career development for scientists who play a primary role in producing these resources.
3. Universities with teams implementing NASA IDEA programs may face legal issues in states that have enacted legislation banning or limiting DEI programs.

Recommendations:

1. SMD should develop clarification on how proposal requirements for DEI, OS and OSS will be fairly matched to budgetary resources available.
2. SMD should develop clarification of how researchers with primary responsibilities for data or source code production can be recognized and rewarded.
3. NASA should provide guidance to universities and project teams in states with policies limiting DEI activities on how effective DEI activities can be legally supported.

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

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

Legend:

- Green – Official Meeting
- Blue – Administrative Meeting
- Gray – Planned Meeting

*BPAC not formalized until early 2024

14. NAC Meetings (2024)

NAC SC findings and recommendations must be presented to the NAC and then reviewed by the NASA Administrator before NASA SMD can formally receive and act on the advice and observations.

Findings:

1. NASA SMD has not been able to formally receive or act on timely information from the most recent three NAC SC meetings due to infrequent meetings of the NAC. (See Cadence Chart on the previous slide).

Recommendations:

1. NASA should prioritize regular scheduling of NAC meetings with meeting dates established well in advance to ensure that the work of Committees, Sub-committees and Task Forces are presented in a timely fashion.



**ANNULAR
SOLAR ECLIPSE**

OCT. 14, 2023



**TOTAL
SOLAR ECLIPSE**

APR. 8, 2024



**CLOSEST
APPROACH TO SUN**

DEC. 24, 2024



Thank You!

Nathan Boll, NAC Science Committee DFO

Joy Burkey, NAC Science Committee, Deputy DFO

Mike Lehner, NAC Science Committee, Policy Analyst

Amy Reis, Sr. Conference Coordinator, Tom & Jerry, Inc.

EXPLORE



With Us