

National Aeronautics and  
Space Administration



# EXPLORE SCIENCE

**Lori S. Glaze, Ph.D.,**  
NASA Planetary Science Division Director

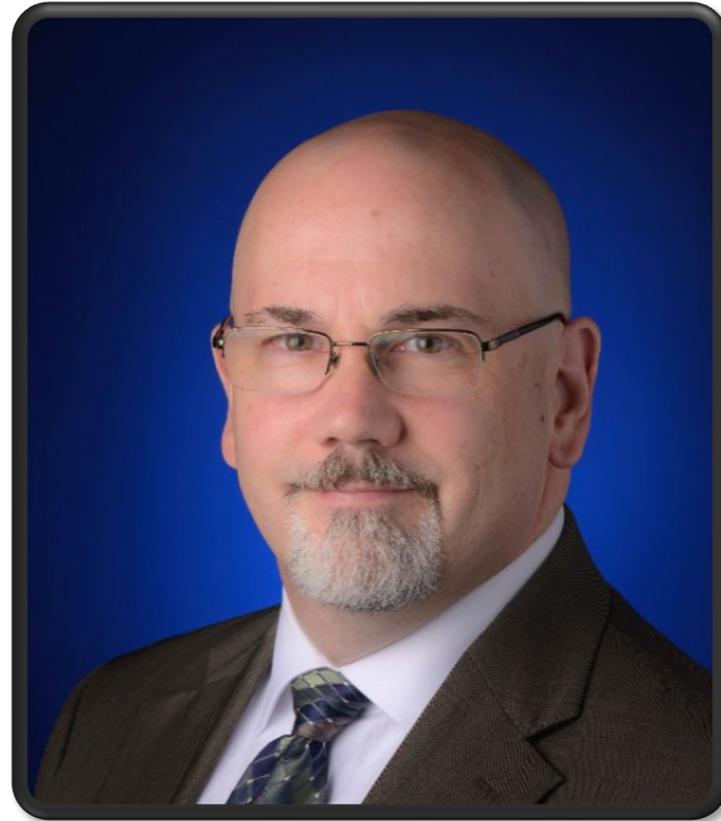
**Planetary Science Advisory Committee (PAC)**  
**February 28, 2023**



# SMD Leadership (Acting)



***Sandra Connelly***  
*Science Mission Directorate Acting  
Associate Administrator (Jan–Feb 2023)*



***Eric Ianson***  
*Science Mission Directorate Acting Deputy  
Associate Administrator (Jan–Feb 2023)*

# New SMD Leadership



**Nicola Fox**  
*Science Mission Directorate Associate  
Administrator*



**Sandra Connelly**  
*Science Mission Directorate Deputy  
Associate Administrator*

# PSD Leadership (Acting)



**Lori Glaze**  
PSD  
Director



**Joan Salute**  
PSD Deputy  
Director (Acting)



**Jeff Gramling**  
MSR  
Program  
Director



**Joel Kearns**  
Deputy  
Associate  
Administra-  
tor for  
Exploration



**Christy Layton**  
PSD Associate Director,  
Flight Programs (Acting)



**Stephen Rinehart**  
PSD Research Program  
Director



**Tiffany Morgan**  
MEP Director (Acting)

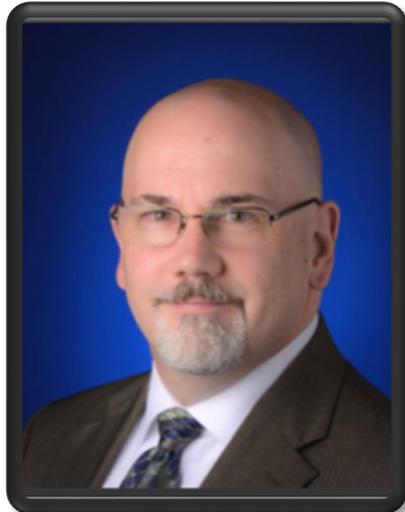


**Brad Bailey**  
Assistant Deputy Associate  
Administrator for Exploration

# PSD Leadership



**Lori Glaze**  
PSD  
Director



**Eric Ianson**  
PSD Deputy  
Director / MEP  
Director



**Jeff Gramling**  
MSR  
Program  
Director



**Joel Kearns**  
Deputy  
Associate  
Administra-  
tor for  
Exploration



**Joan Salute**  
PSD Associate Director,  
Flight Programs

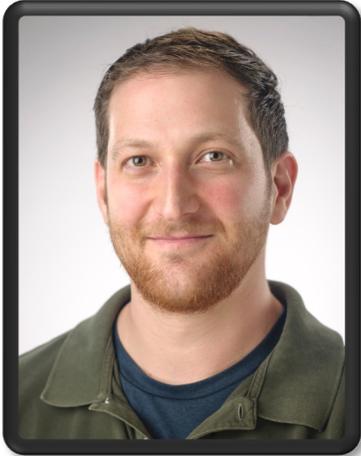


**Stephen Rinehart**  
PSD Research Program  
Director



**Brad Bailey**  
Assistant Deputy Associate  
Administrator for Exploration

# Welcome to PSD



*David Smith*



*Lina Carrington*



*Shaheed (Ish) Aslam*



*Curtis Williams*



*Andrew Maynard*



*Debra Hernandez*



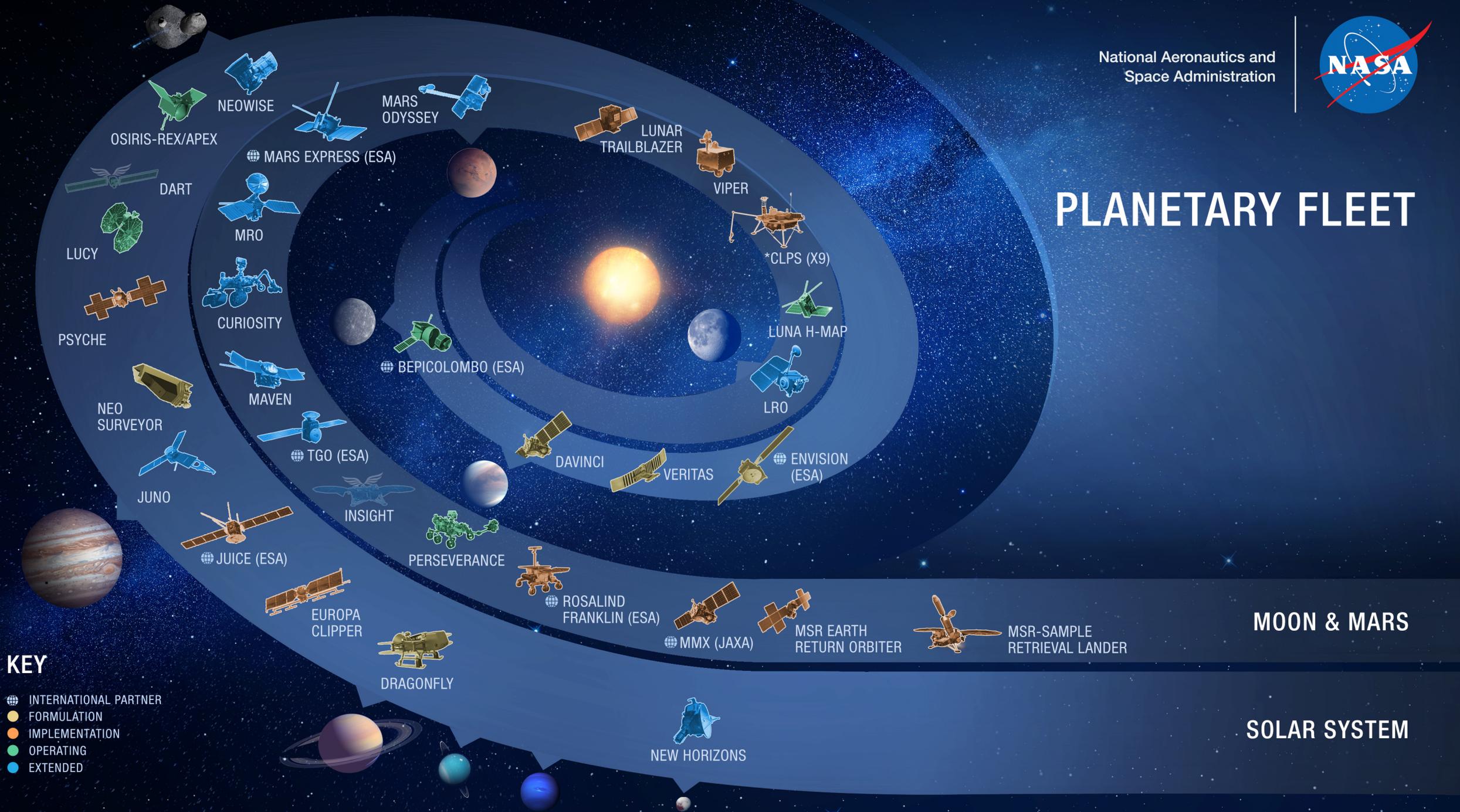
*Kenneth (KC) Hansen*



*Jose Chavez*



# PLANETARY FLEET



# Budget



# FY 2023 Enacted Budget

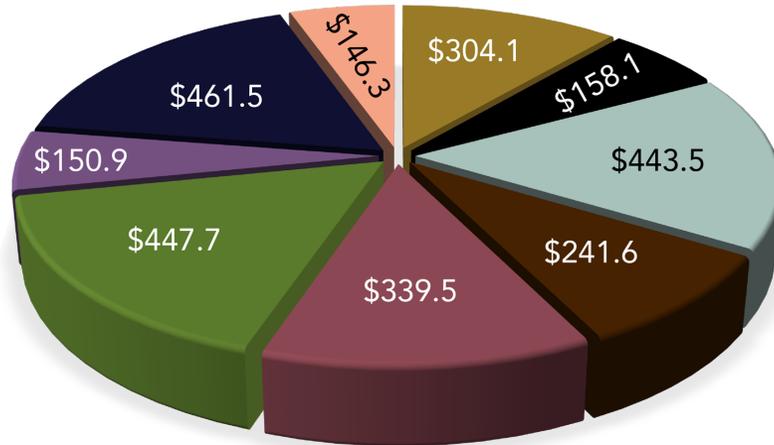
- NASA's FY 2023 Appropriations for PSD: \$3.2B
  - 2.5% growth over FY 2022
  - \$40M over PSD request (\$3.16B)
  - Increases to Dragonfly and NEO Surveyor total ~\$60M, so there is still a \$20M gap
- Includes continued support for:
  - MSR
  - LDEP, including VIPER (at 'not less than' level) and CLPS (at 'up-to' level)
- Awaiting approval of initial operating plan



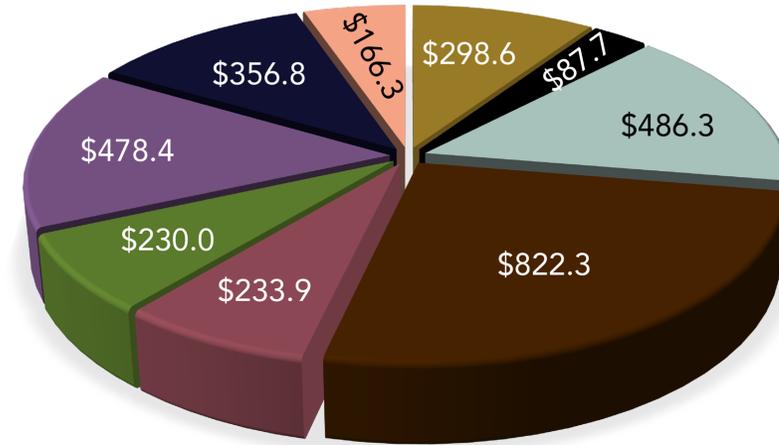
(\$M)	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23
PSD	1,342.3	1,446.7	1,628.0	1,827.5	2,217.9	2,746.7	2,712.6	2,693.2	3,120.4	3,200.0

# PSD Budget Breakdown

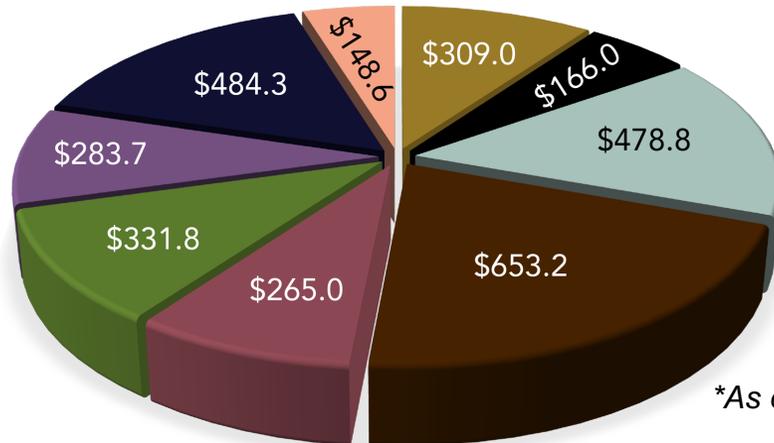
**FY21 Actual (Total: \$2,693.2M)**



**FY23 Request (Total: \$3,160.2M)**



**FY22 Operating Plan\* (Total: \$3,120.4M)**



*\*As of summer 2022*



# Mission Updates

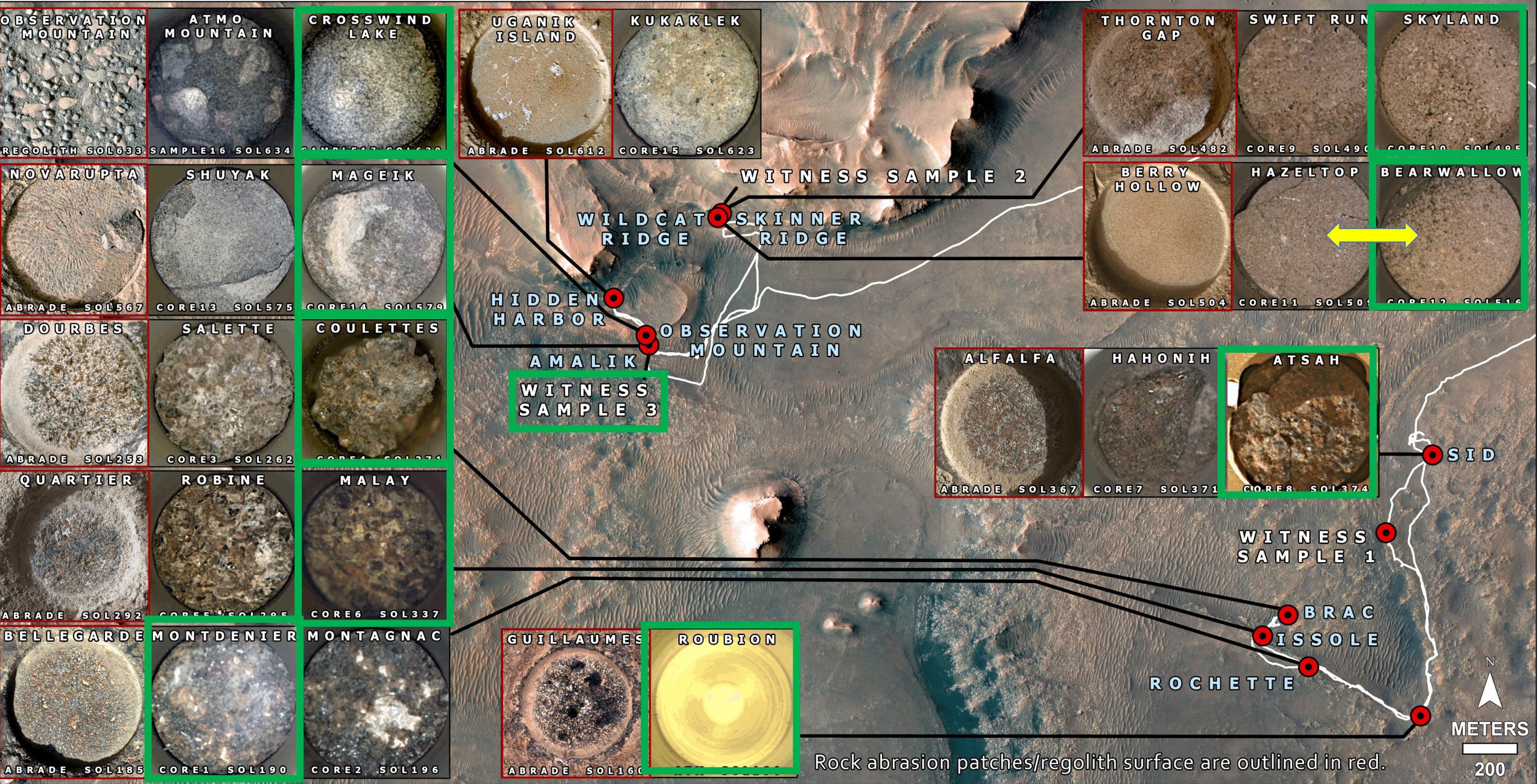




MARS 2020 PERSEVERANCE

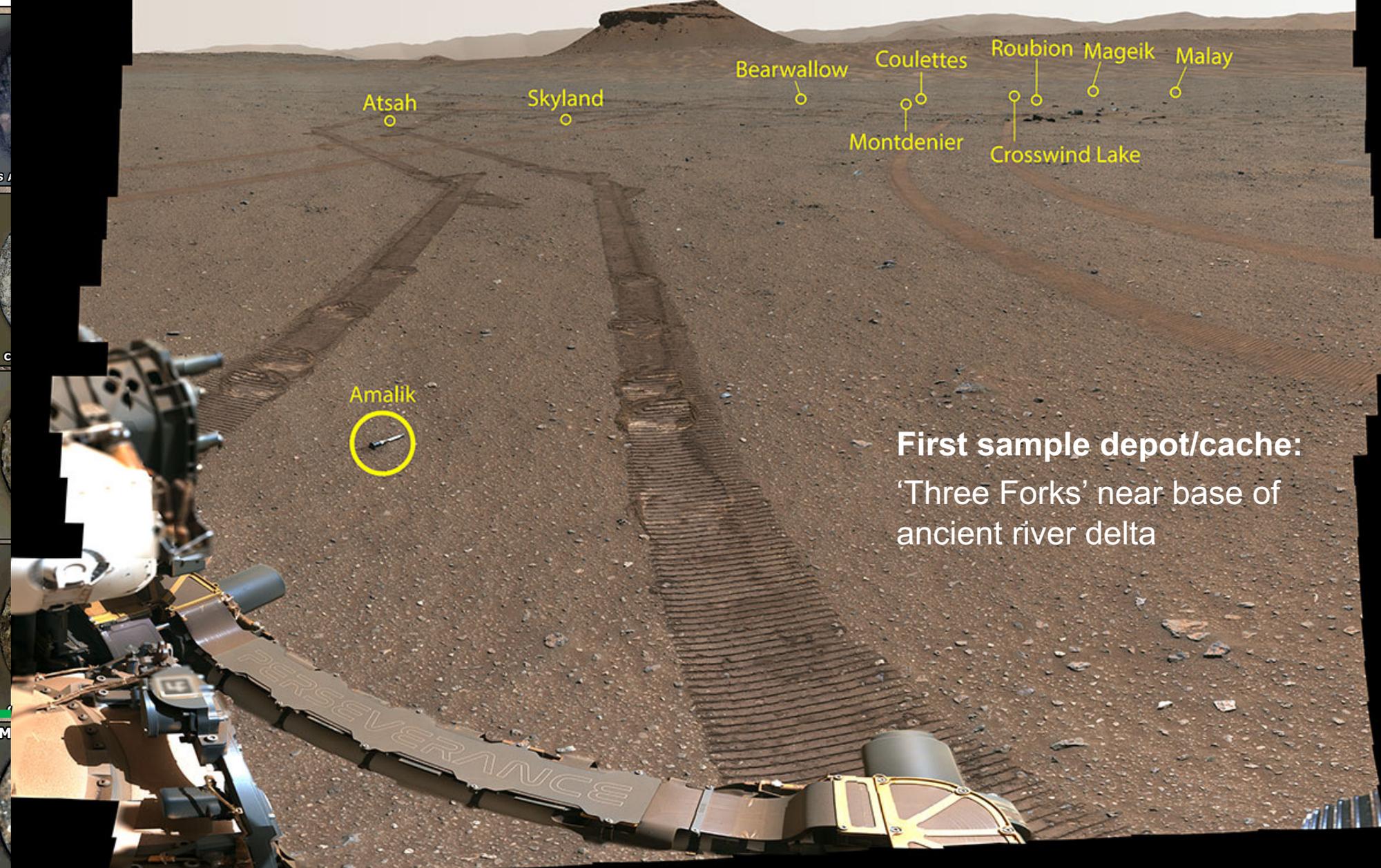
# Sample Collection Map: Tubes 1-21

Green highlights tubes cached at Three Forks



Rock abrasion patches/regolith surface are outlined in red.





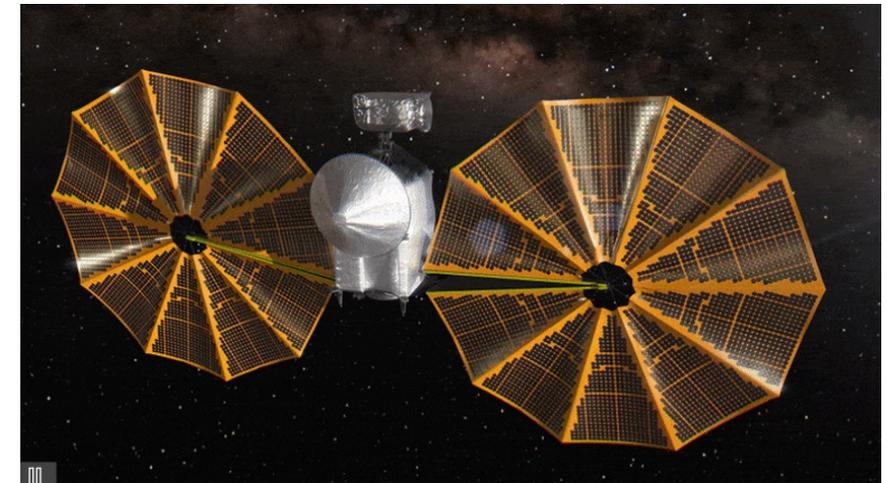
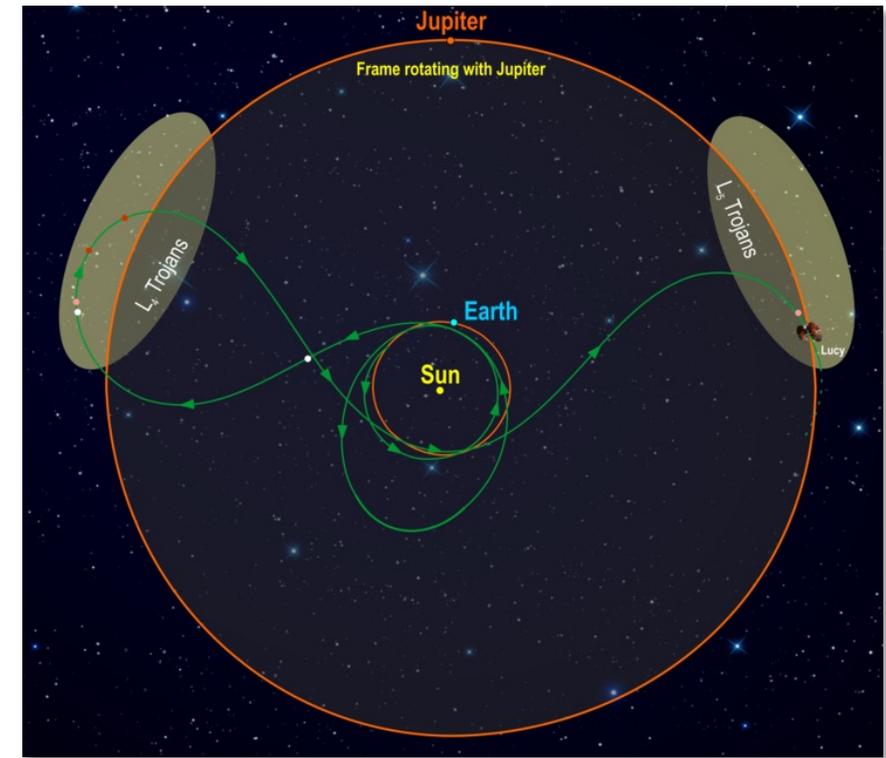
First sample depot/cache:  
'Three Forks' near base of  
ancient river delta





# Lucy

- A moon of Polymele was recently discovered – now **“*Twelve years, ten asteroids, one spacecraft*”**!
- Added encounter of Asteroid 1999-VD57 (Dinkinesh) in November 2023 will be a risk-reduction and calibration exercise
- First Earth gravity assist (EGA) on October 16, 2022 was successful
  - Spacecraft is now on a 2-year heliocentric orbit, to bring it back for second EGA in October 2024
- L’LORRI observed Didymos at the time of DART impact
  - Contributed high-time cadence light curve from slightly different direction than Earth
- One solar array still unlatched, but estimated to be >98% deployed
  - Further deployment activities have been suspended and mission will proceed in current state
  - Array is expected to have sufficient capacity to perform baseline mission, with margin



# Psyche & Janus

## Psyche

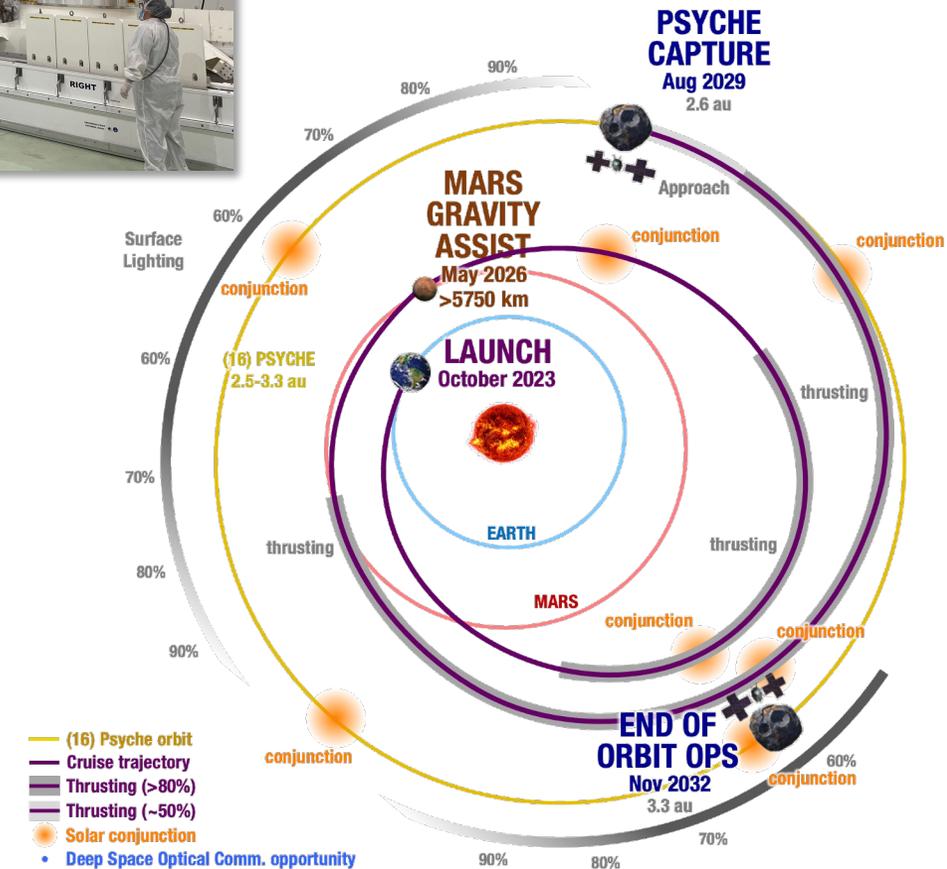
- Launch period: **October 5–25, 2023**
  - Arrives at Psyche August 2029
  - No new Ops activities/processes required
  - Does not stress spacecraft design
- ATLO 1.0 completed; spacecraft is in maintenance mode until ATLO 2.0 begins June 2023
- JPL working closely with project to maintain level of experienced staff to complete remaining work prior to launch
- Status DPMC held February 24, 2023

## Janus (SIMPLEX-2)

- Removed from Psyche's 2023 launch manifest
  - Would not be on a trajectory to meet science requirements
- Spacecraft reside at Lockheed Martin



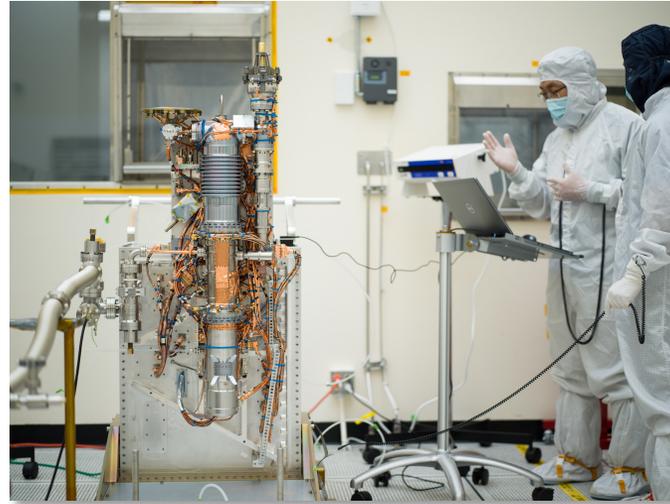
*Psyche after removal from storage facility at Astrotech, November 2022*



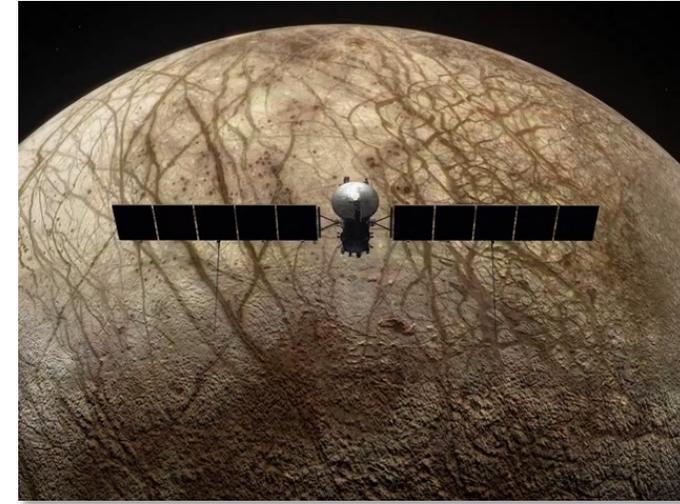
# Europa Clipper



- ATLO pace is accelerating: [live feed from High Bay](#)
- Six (of nine) science instruments have been delivered:
  - Plasma Instrument for Magnetic Sounding (PIMS)
  - Europa Imaging System Wide-Angle Camera (EIS WAC)
  - Europa Thermal Emission Imaging System (E-THEMIS)
  - Europa Ultraviolet Spectrograph (E-UVS)
  - Surface Dust Analyzer (SUDA)
  - Mass Spectrometer for Planetary Exploration (MASPEX)
- More hardware and science instruments expected by end of February 2023
- U.S. Poet Laureate, Ada Limón, will write an original poem to be engraved on the spacecraft
- Target launch: October 2024
- Jupiter Orbit Insertion: April 2030



*MASPEX instrument delivered to JPL, December 2022*



*Solar array 'wings' in cleanroom at Airbus, Leiden*



*Avionics module atop the propulsion module*

# JUICE



- First large-class mission in ESA's Cosmic Vision 2015–2025 Programme
- Spacecraft arrived at Kourou launch site February 2023 for integration with the Ariane 5 launch vehicle
- Launch window is April 5 to 25, 2023; target launch date is April 13, 2023
- Arrival at Jupiter in 2031 followed by four years of detailed Jupiter, Ganymede, Callisto, and Europa observations
- NASA is contributing three instruments – all flight models are undergoing final system integration with the spacecraft:
  - UV Imaging Spectrograph (UVS); developed by SwRI
  - Radar for Icy Moons Explorer (RIME); developed in partnership with JPL and TASI
  - Particle Experiment Package – Hi (PEP-Hi); developed by APL



*Top left: JUICE spacecraft in transit.*  
*Top right: JUICE spacecraft arrives at Kourou, Feb 9, 2023.*  
*Bottom left: JUICE spacecraft in cleanroom at Guiana Space Centre, Kourou*

# New Horizons



- SMD Multi-panel review of New Horizons was held in summer of 2022, led by Planetary Science Mission Senior Review (PSMSR) process
  - Demonstrated excellent science value that New Horizons could bring as a Heliophysics Division (HPD) mission
    - Continued operation of New Horizons would allow important questions about the heliosphere to be addressed from its unique position in the solar system
  - Demonstrated little more planetary science can be achieved by the mission
    - The chance of finding another Kuiper Belt Object for a close approach is unlikely
- PSD and HPD are coordinating on the future of New Horizons
  - HPD, in coordination with PSD and APD, will be releasing a Request for Information (RFI) soon, to understand the potential science that could be achieved with New Horizons should it continue operations beyond FY24

# Community



# R&A Updates

## ROSES-2023 is out!

- Things to note in Planetary (C.1):
  - No Due Date Programs (NoDD) continue (more info: <https://science.nasa.gov/researchers/NoDD>)
  - New **Open Science and Data Management Plan** (formerly Data Management Plans) requirements
  - Expanded list of **research facilities** available to proposers, including 10 selections made from the Planetary Science Enabling Facilities (PSEF) program in ROSES-2022.
    - All facilities are listed in C.1 and on <https://science.nasa.gov/researchers/planetary-science-enabling-facilities>
    - Next PSEF solicitation expected in ROSES-2024
  - **Triage** process may be followed by some program elements

## Reduced Proposal Pressure

- Fewer proposals (ROSES-21 and ROSES-22) are being submitted to R&A programs than ROSES-20

## SMD Scientific Information Policy (SPD-41a)

- New Policy released December 8, 2022
- Applicable to new grants starting in ROSES-23 and new missions

More  
information



A young girl with long dark hair, wearing a dark dress with white stars and red and white stripes, is looking down at a glowing jar she is holding. The background is a starry night sky with mountains and a sunset. The image is framed by a white curved border.

# PSD Science Nuggets – Updates

- Science nuggets: used to highlight important science results from across PSD (mission and R&A activities)
- Subset of nuggets are presented by PSD to SMD leadership, and potentially to NASA leadership, OSTP, the White House, etc
- All PSD nuggets submissions must be accompanied by a publication and be submitted here:  
<https://science.nasa.gov/researchers/PSD-Science-Nuggets>
  - E-mailed PowerPoint slides will no longer be accepted.
- Questions about nuggets: [HQ-PSDScienceNuggets@mail.nasa.gov](mailto:HQ-PSDScienceNuggets@mail.nasa.gov)

A young girl with long dark hair, wearing a dress with the stars and stripes of the American flag, is looking down at a glowing jar she is holding. The background is a dark, starry night sky with a soft glow on the horizon. The image is framed by a white curved border.

# New Frontiers 5

- Draft AO released January 10, 2023: <https://go.nasa.gov/NF5DraftAO>
- Current planned schedule:
  - Comment period closes: March 3, 2023
  - Target release of final AO: November 2023
  - Target proposal due date: April 2024
- Draft mission themes:
  - Comet Surface Sample Return
  - Io Observer
  - Lunar Geophysical Network
  - Lunar South Pole-Aitken Basin Sample Return
  - Ocean Worlds (only Enceladus)
  - Saturn Probe
- Comments and questions should be addressed to Curt Niebur, New Frontiers Program Lead Scientist ([curt.niebur@nasa.gov](mailto:curt.niebur@nasa.gov))

# PI Launch Pad

- Third SMD PI Launch Pad Workshop will be held **July 24–27, 2023** at the University of Michigan, Ann Arbor
- For those interested in developing their first flight mission proposal
  - People with potentially intersecting marginalized identities are strongly encouraged to apply
  - 35 to 40 participants will be selected
  - No cost to attend the workshop
- Applications due April 14, 2023 (to be submitted via NSPIRES)
- More information:  
<https://science.nasa.gov/researchers/pi-launchpad>



# Here to Observe (H2O) – Plans



- PSD is committed to sustaining and cultivating partnerships with underrepresented institutions, to improve outcomes in IDEA
  - H2O Program is in its second year with two MSI/Mission pairings: **University of Puerto Rico/Europa Clipper** and **Virginia State University/Dragonfly**
  - This second year will help scope a broader, reproducible, sustainable program for the future – to include more partner institutions and PSD missions
- More details about an expanded program, resources for support, and other information anticipated in spring 2023



# Coming Up



# Things to Watch



First CLPS  
launches



OSIRIS-REx  
sample return



Psyche  
launch



JUICE launch



Clipper ATLO



Discovery at 30

# Findings



# Finding 1: Mission Review Process

**Finding:** For the scientific community, the Psyche launch postponement and consequent delay of VERITAS has resulted in a crisis in confidence in NASA and loss of trust in the institutions that support NASA missions. Of particular concern to the PAC, and discussed in the Psyche IRB report, is that critical issues impacting flight readiness were not identified sooner in the SRB review process. The PAC appreciates NASA's transparency and understands that internal reviews of NASA processes relevant to the Psyche postponement are ongoing, and looks forward to a report on those findings in the future.

**Recommendation:** The PAC supports the IRB recommendations on the SRB review process, including that NASA/SMD should strengthen the SRB process to ensure that the timing of SRB inputs is well-matched to project stages, serious issues impacting critical factors are identified, and responses to concerns are thoroughly reviewed. In particular, the PAC emphasizes the importance of ensuring that "red" and "green" status codes are not averaged to "yellow" to reduce the severity of a score.

**Response:** PSD thanks the PAC for this finding and concurs with the intent of the recommendation. As mentioned in the NASA response to the Psyche IRB report, NASA is considering changes to the expectations from SRBs and their reports, decreasing the time between SRB reviews, and plans to assess if any LCR Success Criteria or other SRB approaches need to be modified. A presentation on NASA mission processes will be given on Day 2 of this PAC meeting.

# Note

Since the PAC meeting on February 28 and March 1, 2023, it was recognized that only two of the three specific requirements for the restart of the VERITAS mission were fully described in public statements by SMD and PSD. Although the NASA response to the IRB findings indicated the VERITAS launch delay, the response did not specify the requirements for restart.

The response to the PAC finding has thus been updated below. Text that has been removed from the original finding response and added to the updated finding response is highlighted in **yellow**.

# Finding 2: VERITAS delay decision [As presented, February 28, 2023]

**Finding:** The PAC recognizes that VERITAS will provide important new science results about Venus that are complementary to other recently selected Venus missions. The decision to delay VERITAS's launch has been met with significant disappointment in the planetary science community and raised concerns and fears regarding the potential need for additional mitigation measures impacting VERITAS and other NASA efforts in the future. The PAC also notes the negative impact of standing down a selected mission due to external issues on potential PIs and on scientists' participation in future missions. However, the PAC recognizes that the circumstances surrounding the Psyche delay had created great stress on JPL personnel and on the PSD budget that must be mitigated in some way. We thank PSD and the IRB chair for the detailed presentation of the broader issues that led to the decision to stand down VERITAS.

**Recommendation:** Both the PAC and the AGs strongly support launch of VERITAS on its new schedule, or sooner, should the situation allow. We request that the process for restarting VERITAS and the metrics that will be used to support this decision be clearly defined and communicated to the community as soon as possible. Finally, we strongly support the importance of competitive selections in the Discovery program. As a result, the PAC recommends that the launch of VERITAS should be prioritized over a possible new Discovery mission selection. In the event that the budget is a limitation in future years, Planetary Science and Astrobiology Decadal Survey guidelines for dealing with budget shortfalls should be followed.

**Response:** PSD thanks the PAC for this recommendation and acknowledges the support for the VERITAS mission. PSD refers the PAC to the published IRB findings and subsequent statements by SMD and PSD on the requirements for the VERITAS mission to be restarted. As stated at the time of the delay, there are three criteria to be met. First, JPL must—to SMD's satisfaction—successfully address the matters arising from the Psyche IRB report. The first part of this process is underway and NASA/SMD plans to review JPL again on the IRB issues in 2024. Second, PSD must secure funding in the appropriate years for the VERITAS mission re-start. PSD is aware of the Budgetary Decision Rules in the Decadal Survey and will carefully consider this input for future planning and budgeting processes. Third, the NISAR and Europa Clipper missions must stay on schedule for their respective launches.

# Finding 2: VERITAS delay decision [Corrected response, March 27, 2023]

**Finding:** The PAC recognizes that VERITAS will provide important new science results about Venus that are complementary to other recently selected Venus missions. The decision to delay VERITAS's launch has been met with significant disappointment in the planetary science community and raised concerns and fears regarding the potential need for additional mitigation measures impacting VERITAS and other NASA efforts in the future. The PAC also notes the negative impact of standing down a selected mission due to external issues on potential PIs and on scientists' participation in future missions. However, the PAC recognizes that the circumstances surrounding the Psyche delay had created great stress on JPL personnel and on the PSD budget that must be mitigated in some way. We thank PSD and the IRB chair for the detailed presentation of the broader issues that led to the decision to stand down VERITAS.

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**Response:** PSD thanks the PAC for this recommendation and acknowledges the support for the VERITAS mission. **The decision to delay the VERITAS mission was based on findings from the published Psyche IRB citing the unprecedented workload at JPL as an underlying driver for several of the proximal causes for Psyche missing its 2022 launch opportunity. There are three criteria to be met.** First, JPL must—to SMD's satisfaction—successfully address the matters arising from the Psyche IRB report. The first part of this process is underway and NASA/SMD plans to review JPL again on the IRB issues in 2024. Second, PSD must secure funding in the appropriate years for the VERITAS mission re-start. PSD is aware of the Budgetary Decision Rules in the Decadal Survey and will carefully consider this input for future planning and budgeting processes. Third, the NISAR and Europa Clipper missions must stay on schedule for their respective launches.

# Finding 3: DSN Update

**Finding:** The PAC appreciates the critical support supplied by the Deep Space Network, including extensive coverage of spacecraft operations provided through recent large activities (including the Artemis launch). The PAC has questions remaining about how projected supply/demand for downlink is estimated, especially as NASA is adding additional lunar and small spacecraft through Artemis and other programs. Crewed missions are especially demanding and ride-along SmallSats/CubeSats, while small in budget, often have significant requirements for DSN capability and large operational footprints. The development of the Near Space Network (NSN) and Lunar Exploration Ground Sites (LEGS) antennas will mitigate some of the increased demand, but during demand ‘spike’ periods, impacts to missions may still occur. Current and future missions may encounter DSN conflicts with ride-alongs and multiple missions on the same launch, and a number of mitigation options may need to be applied simultaneously across impacted missions that are in different mission classes.

**Recommendation:** The PAC recommends that NASA study how conflicts regarding resource allocation are occurring on present missions, including between human exploration and planetary mission needs. The PAC also recommends that NASA continues to study options for expanding the DSN capabilities as soon as possible to rapidly alleviate the current scheduling issues and provide robust capability for new missions. In assessment of future supply/demand needs, the DSN should engage with the wider planetary science community to ensure a consistent and robust process is used to anticipate DSN needs for proposed missions. The PAC requests to be updated on a regular basis, at least annually, on the status of DSN upgrades and the alleviation of supply/demand disparities.

**Response:** PSD thanks the PAC for this recommendation, but notes that the DSN is a separate group at NASA, with sponsors and stakeholders outside of PSD/SMD. As discussed during the December 2022 PAC meeting, NASA is currently completing several DSN studies and PSD therefore suggests that the PAC bring this finding to the NAC.

# Finding 4: Sample Data Curation

**Finding:** As NASA prepares to return samples from more planetary bodies, it is important that the sample analysis data management/curation needs are assessed well in advance, and that capabilities are developed to enable effective sharing of scientific results and procedural information. Additionally, it is important that researchers have adequate information so that their work can comply with federal regulations regarding public accessibility (similar to the requirement that spacecraft data is to be stored in PDS).

**Recommendation:** The PAC recommends that PSD take steps to incorporate data generated by the sample analysis community into the developing Planetary Data Ecosystem (PDE). If broad data repositories are to be created and/or required for ingestion and sharing of sample data, information about their planned design, when they are expected to come online, and mechanisms for training should be shared with the community so that these resources can be planned for and utilized. Finally, ongoing efforts undertaken under NASA program-led efforts (i.e., MEP, MSR, and Lunar Science) should involve and coordinate with broad sample-focused community organizations (i.e., ExMAG) to maximize scientific value of returned samples.

**Response:** PSD thanks the PAC for this recommendation and agrees that data generated by the sample analysis community should be incorporated into the Planetary Data Ecosystem. The intended repository for astromaterials data is AstroMat ([astromat.org](http://astromat.org)). AstroMat began its initial development phase in 2019 with the initiative of data restoration for the lunar collections at Johnson Space Center. Since its inception, AstroMat has continued to expand and increase its functionality, with its most recent project being focused on the ingestion of OSIRIS-REx sample analysis data. PSD intends to continue to fund AstroMat moving forward, to increase its capabilities and user functionality, to store data generated by the sample analysis community. The AstroMat team has held, and will continue to host, webinars, trainings, and booths at major conferences including the American Geophysical Union and the Lunar and Planetary Science Conference. Community feedback from ExMAG and other venues is always welcomed regarding this repository. In fact, AstroMat was named the required repository for the latest Apollo Next Generation Sample Analysis (ANGSA) call, which was the direct result of community feedback.

# Finding 5: Inclusion Plan Requirements

**Finding:** NASA is implementing agency changes that address the Executive Order On Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. One such effort is a potential new requirement for Inclusion Plans in ROSES proposals. This requirement has been piloted in recent years, first in a single ROSES 21 call in Astrophysics, then most recently to several more ROSES 22 calls, including PRISM within Planetary Sciences. The PAC recognizes that this pilot phase is an opportunity for community engagement and education. Furthermore, the PAC notes there are significant knowledge gaps in the community about Inclusion Plans, including where the legal bounds of information and actions that may be part of an Inclusion Plan lie.

**Recommendation:** Inclusion Plans, if ultimately implemented, would be intended to span all Divisions represented by ROSES program elements. The PAC therefore recommends that SMD-level coordination be provided for Inclusion Plan activities, to ensure consistency across ROSES. The PAC recommends that NASA consider, among other factors, the wide variation in proposal team needs and in resources available to PIs from different institutions. The PAC further recommends that, well-before Inclusion Plans would be utilized to determine proposal selectability, NASA provide sufficient, specific details about the elements of the Inclusion Plan that would be evaluated for scoring. The PAC also recommends NASA provide clear guidance, resources, and ongoing education to the community and prospective PIs as to how to write an effective and actionable Inclusion Plan, including what would be inappropriate and/or outside legal bounds. Such guidance should include avoidance of illegal disclosure of personal identifiable information (PII), especially with respect to any protected class status.

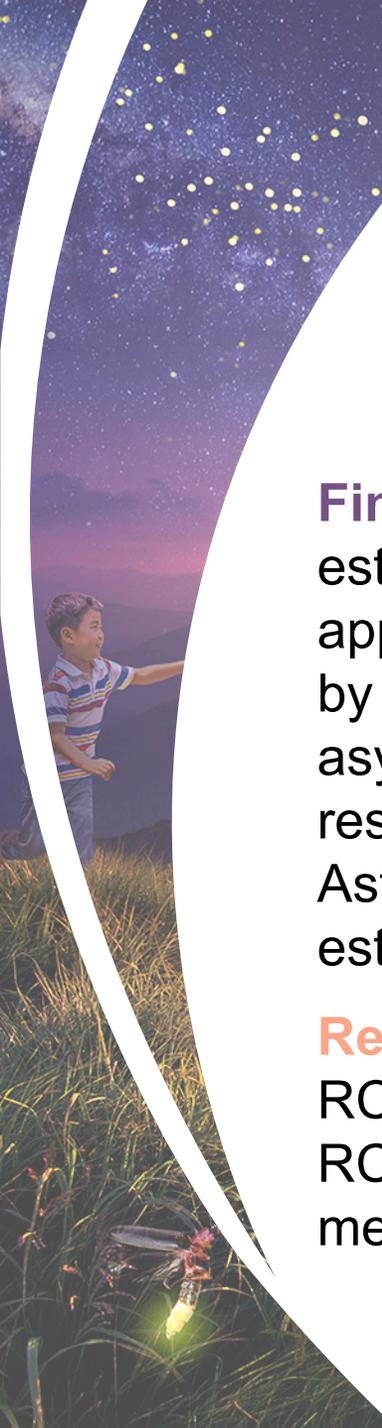
**Response:** PSD concurs with this recommendation and supports the Inclusion Plan Community of Practice group working at the SMD level to develop an approach to inclusion plans that is consistent across the Directorate. This recommendation is consistent with existing PSD and SMD planning.

# Finding 6: Community Inclusion in Science Strategies

**Finding:** Significant engagement of the scientific community as NASA forms science strategy and makes important science decisions within the framework of missions, including those with human exploration-driven architectures, is critical for keeping scientific gain as a primary motivation for, and result of, NASA's space exploration. Furthermore, such engagement ensures that broad relevant expertise is included as decisions are made, and that the science community is connected with ongoing missions and future opportunities. A recent good example of this was the Mars 2020/MSR Sample Depot Science Community Workshop, organized by MEP so as to gather community input with regards to the timing, location, and constituent cache of the first sample depot to be placed on the martian surface. Another example are the RCNs in astrobiology research (see Finding 7).

**Recommendation:** As has been stated before (e.g., *Finding 5 from November, 2021*), the PAC recommends that the NASA Lunar program and MEP communicate regularly and transparently with their relevant communities on their development of exploration and science strategies. Community involvement in development of those strategies is strongly encouraged to ensure alignment with the latest top science priorities and to increase community endorsement.

**Response:** The MEP team has developed a draft Architecture Strategy Overview for 2023–2044, based on inputs from several sources across the planetary and Mars science communities (Decadal Survey, KISS workshop, multiple SAGs, low-cost workshop, Moon2Mars objectives, etc). MEP is currently coordinating the overview briefing with internal NASA stakeholders in anticipation of publicly sharing the draft strategy with the MEPAG later this spring. The MEP team expects comments from the community on the draft strategy will be adjudicated and incorporated (where appropriate) near the end of the summer. In addition, as reported at the December 2022 PAC meeting, the PSD and ESSIO working group continue to develop an Integrated Lunar Science Strategy. We will engage and communicate with the community throughout the development of the strategy through community workshops, AG SATs, Science Definition Teams, National Academy Studies, and other venues (as appropriate). Community comments will be solicited on the draft strategy.



# Finding 7: Astrobiology Research Coordination Networks (RCNs)

**Finding:** The commitment of the collective Research Coordination Networks (RCNs) to establish and improve communication and inclusivity within the Astrobiology community is appreciated and commendable. For example, the seminar series that have been employed by several RCNs have reached a wide cross-section of the community, and allow asynchronous participation. The PAC particularly notes the efforts to involve early career researchers, recognizes the impact of bringing together different communities within Astrobiology and cross-pollinating with existing AGs, and encourages future plans to establish these types of cross-directorate networks.

**Response:** NASA thanks the PAC for this acknowledgement and support for the role of the RCNs in advancing the goals of the Astrobiology program. NASA will continue to invite RCN leads to present their activities and progress towards their goals at future PAC meetings.

# Finding 8: NSF Collaboration and ANSMET

**Finding:** The PAC continues to recognize the critical role of NASA's interagency collaboration and coordination with NSF. For example, over four decades, the U.S. has annually performed meteorite recovery through ANSMET (the Antarctic Search for Meteorites Program). The meteorites recovered by ANSMET are vitally important for planetary research, providing scientists from around the world with samples of planetary bodies not easily obtainable by other means and at relatively low cost compared to sample return missions. Meteorites motivate and provide key information to preparations for, analyses during, and context following current and planned missions to small bodies, moons, and planets. ANSMET meteorite recovery is funded by NASA, but relies on logistical support of Antarctic field activities by NSF. Due to the COVID-19 pandemic, the 2020-21, 2021-22, and 2022-23 ANSMET field seasons have been canceled, halting meteorite collection and field work on analogs in Antarctica.

**Recommendation:** The PAC encourages NASA to pursue conversations with NSF to prioritize support for critical work funded by NASA but requiring NSF coordination and support. In particular, the PAC recognizes the critical nature of the ANSMET field work for planetary science and encourages resuming ANSMET field seasons as soon as practical.

**Response:** PSD thanks the PAC for this recommendation and agrees that open communication with the NSF, especially regarding critical work funded by NASA, but requiring NSF coordination and support, is extremely important. Members of NASA PSD, the Smithsonian Institution, and the NSF (known as the Meteorite Steering Group) met in mid-January to discuss issues/concerns related specifically to ANSMET. There was strong acknowledgement among all parties that ANSMET is a low-risk, high-reward activity that should be supported. The most recent Antarctic season did not include ANSMET, but the rapid spread of COVID at McMurdo, limited some operations and some deployments. However, pending any unknown changes implemented by NSF leadership in response to problems this year, ANSMET is likely to recommence next season with good prospects for continuous support for the short term (3–5 years). NASA PSD will continue to work closely with the NSF on these and other partnership activities. Furthermore, SMD has been working with the NSF Office of Polar Programs on a variety of issues regarding access to the Antarctic and will be attempting to re-establish a joint working group to provide a forum for the two agencies to exchange information and explain priorities.

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