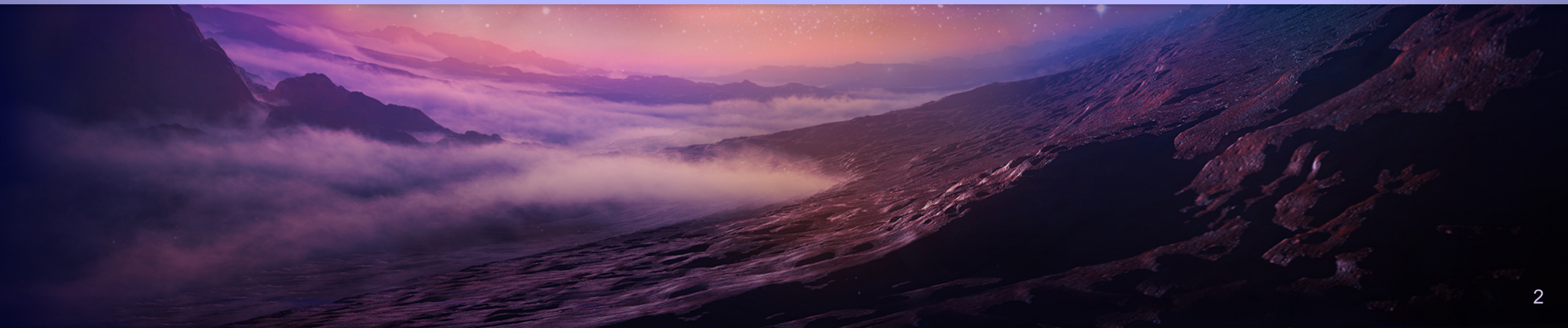
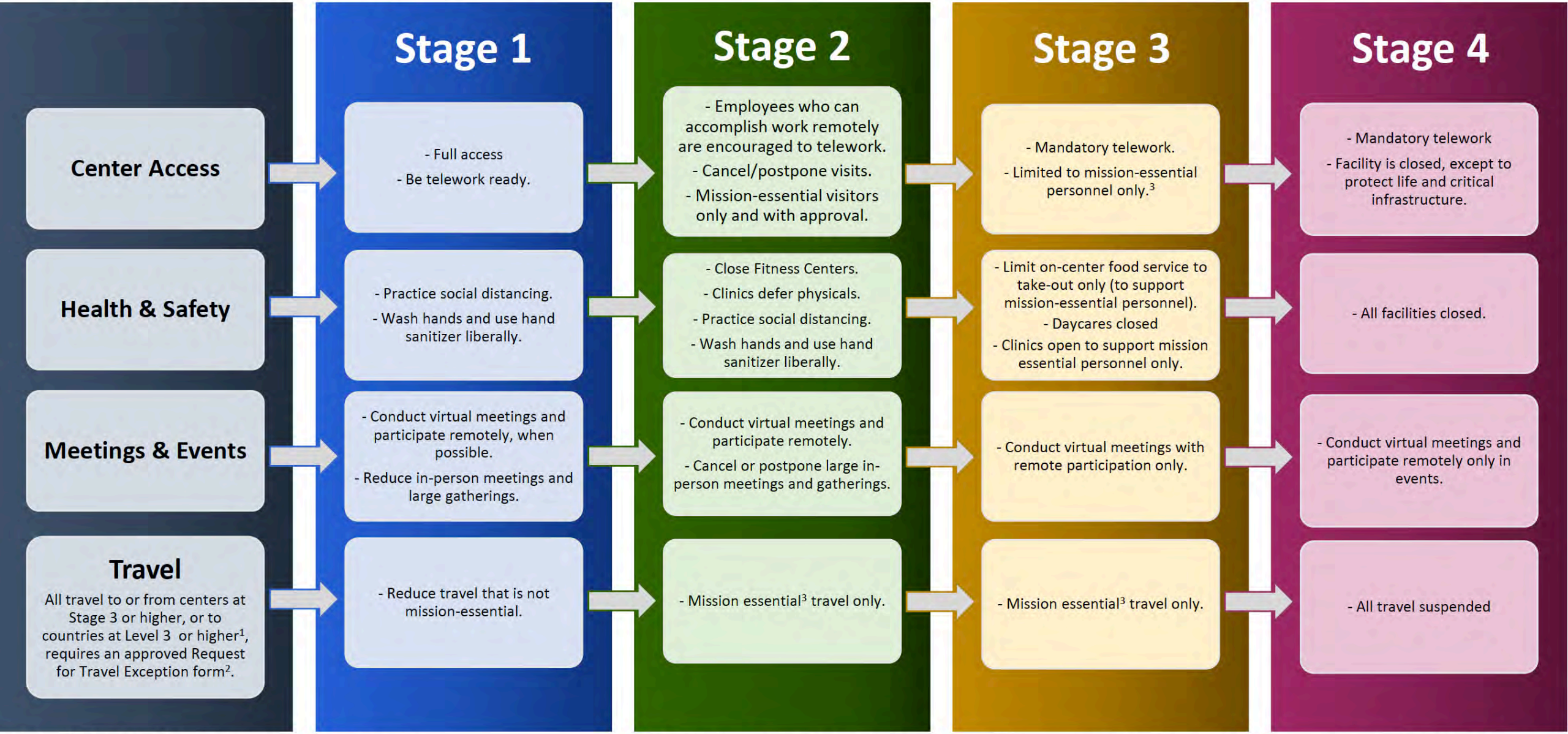
Lori S. Glaze, Ph.D.
NASA Planetary Science Division Director
CAPS Meeting
March 31, 2020

COVID-19



NASA Response Framework

* This guidance applies to NASA civil servants. Contract employees should reach out to their contracting officer's representative.

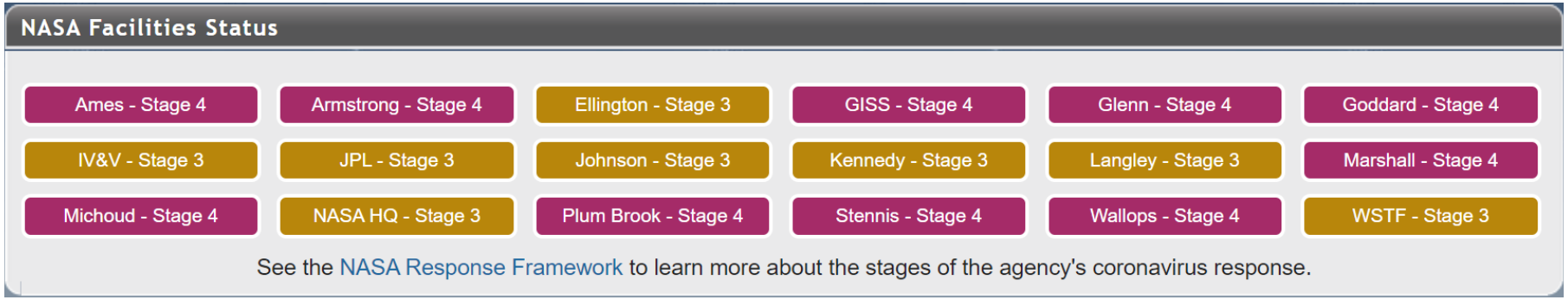


1. For the latest CDC international travel information, go to https://www.cdc.gov/coronavirus/2019-ncov/travelers/index.html
2. The Request for Travel Exception form is available on the NASA People website.

3. Mission Essential is defined as: work that must be performed to maintain mission/project operations or schedules AND cannot be performed remotely/virtually; OR work that has a justifiable impact on the safety of human life or the protection of property, AND there is a reasonable likelihood that the safety of human life or the protection of property would be compromised by a delay in the performance of the work.

Coronavirus (COVID-19) Response – Agency

- Agency leadership continues to monitor developments regarding coronavirus (COVID-19) around the nation, closely following the advice of health professionals and the White House Coronavirus Task Force to **keep our workforce safe**
- Effective March 17, all centers and facilities elevated to Stage 3 of NASA's Response Framework. All employees and contractors moved to mandatory telework until further notice. Mission-essential personnel will continue to be granted access onsite
- Some Centers have been elevated to Stage 4 of NASA's Response Framework:



- SLS and Orion manufacturing and testing activities at Michoud Assembly Facility and Stennis Space Center are temporarily on hold
- Ames Research Center is keeping the agency's supercomputing resources online
- Work associated with supporting International Space Station operations continues at Johnson Space Center

Coronavirus (COVID-19) Response – Science Mission Directorate (SMD)

- There will be impacts, and we don't yet know the extent. We're working with each mission and project in detail based on where they are in development process
- **Priority is everyone's safety and protecting hardware and integrity of data for operating missions**
- Conducted status assessment of all 47 flight projects in the SMD Portfolio
- Most missions are in development phases early enough (phases A-B-early C) that bulk of the work can be done virtually
- Missions in integration and testing (I&T) will continue to the extent possible with small teams
- Will work with our domestic and international partners to refine the prioritization of our projects, especially those in I&T
- Have consulted with the NASA Chief Medical Officer and have protocols for working in clean rooms
- **Anticipate impact to solicitations and evaluations**

Coronavirus (COVID-19) Response – Science Mission Directorate (SMD)

Missions

- **Mars 2020**, which includes the Perseverance Rover and Mars Helicopter, remains a high priority for the agency, and **launch and other mission preparations will continue**

- James Webb Space Telescope is suspending integration and testing operations; the observatory remains safe in its cleanroom environment

Coronavirus (COVID-19) Response – ROSES 2020

- We know that progress on funded research may slow, and in some cases, even stop due to necessary telework and lack of access to facilities and labs, and other family obligations
- SMD understands this potential outcome and will work with the research community and its institutions to mitigate any impacts and to make plans, when possible, for a way forward
- NASA has instituted a number of grant administration flexibilities to ease the burden on grant recipients during the COVID-19 emergency
- Considering converting all Step-1 proposals due within the next 30 days into mandatory NOIs to alleviate pressure on Sponsored Projects Offices
- SMD's policy on late proposals will be applied leniently on a case-by-case basis
- Expect that research progress may slow or stop; SMD is prepared to rephase or no-cost extend awards as needed on a case-by-case basis
- Encouraging all to continue to pay graduate students, post-docs, and lab staff
- **Watch the NSPIRES email lists for up-to-the-minute changes in due dates or policies**

Coronavirus (COVID-19) Response – R&A FAQs

- OMB has issued guidance in Memo M-20-17 (available at https://www.whitehouse.gov/wp-content/uploads/2020/03/M-20-17.pdf)
- Allows for paying soft-money researchers as well as graduate students, post-docs, and other lab staff during the COVID-19 epidemic, if the institution's own policies allow for it
- Allows for institutions to charge restart costs to their grants
  - SMD will make use of this modification allow other costs associated with resuming funded grant activities to be charged to currently active grants
  - SMD has not yet determined in detail its policy regarding augmentations to awards negatively impacted by the COVID-19 epidemic; it is likely that any policy on augmentations will not be issued until the full extent of the impacts of the epidemic are more clearly understood

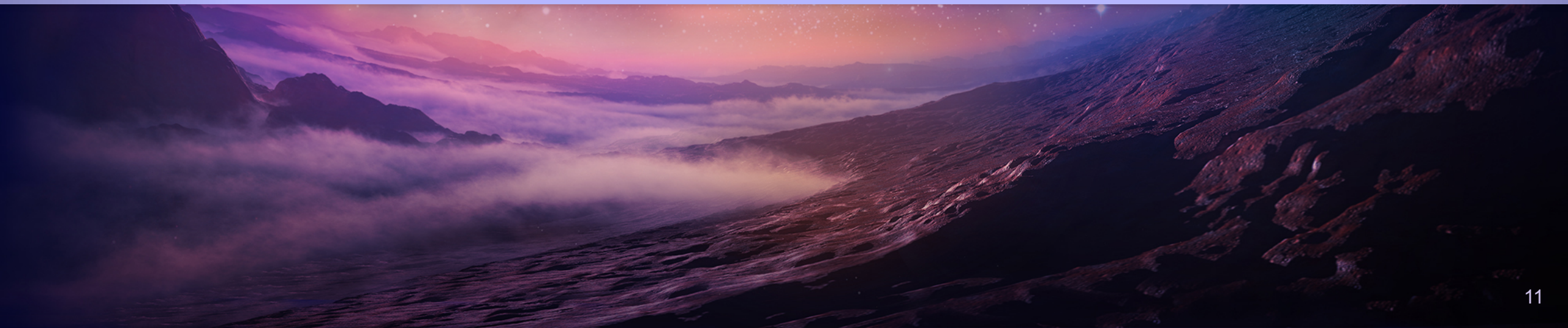
Coronavirus (COVID-19) Response – R&A FAQs (cont'd)

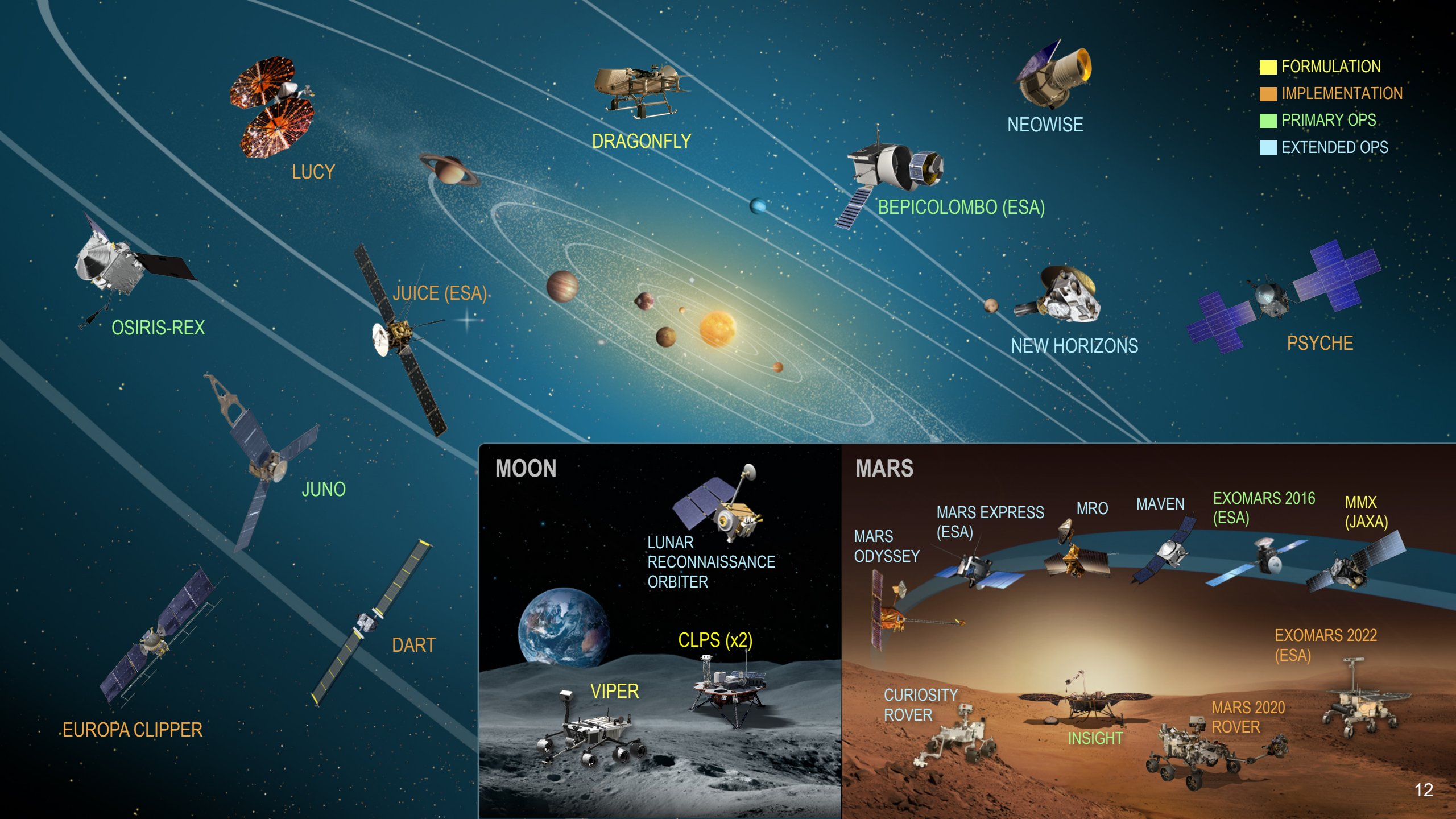
- OMB has issued guidance in Memo M-20-17 (available at https://www.whitehouse.gov/wp-content/uploads/2020/03/M-20-17.pdf)
- Provides agencies flexibility with regard to the submission of proposals.
  - SMD's policy on late proposals will be applied leniently on a case-by-case basis
  - Proposals started before the due date, but not submitted until after the due date due to the impacts of the COVID-19 epidemic, will be strongly considered for acceptance if they are submitted within seven calendar days of the due date
  - Proposals not yet started in NSPIRES by the time of the due date and submitted after the due date will only be accepted after an analysis of the particular reasons for the late start/late submission by the program element point of contact and with the agreement of the selecting official.

Coronavirus (COVID-19) Response – Stay Updated

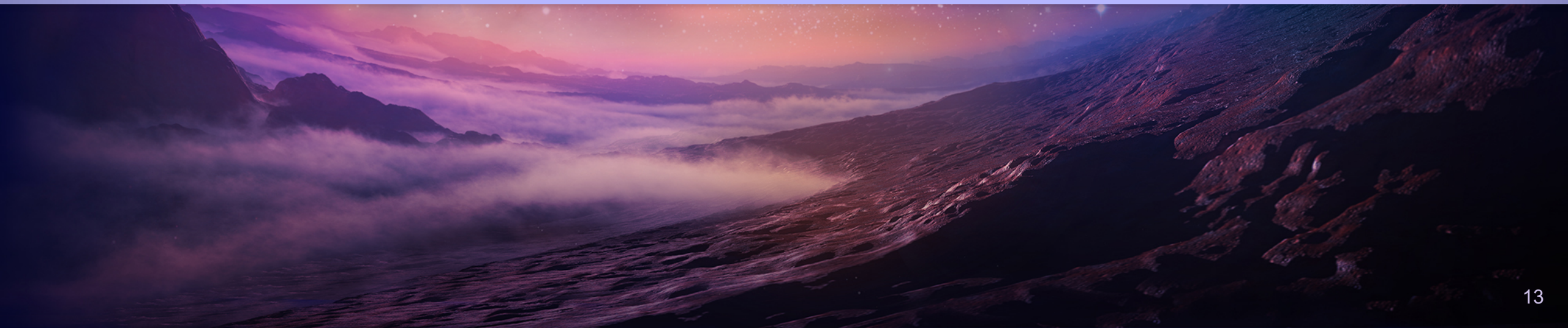
- This is a new and unprecedented situation
- We recognize everyone's personal and professional challenges at this time
- As the situation evolves, we will continue to communicate with all of you, whether through Town Halls, NSPIRES notices, or other modes
- In the meantime, please continue to follow agency updates:
  - Web: **nasa.gov** and **nasapeople.nasa.gov/coronavirus**
  - Twitter: **@NASA** and **@JimBridenstine**

Current Status

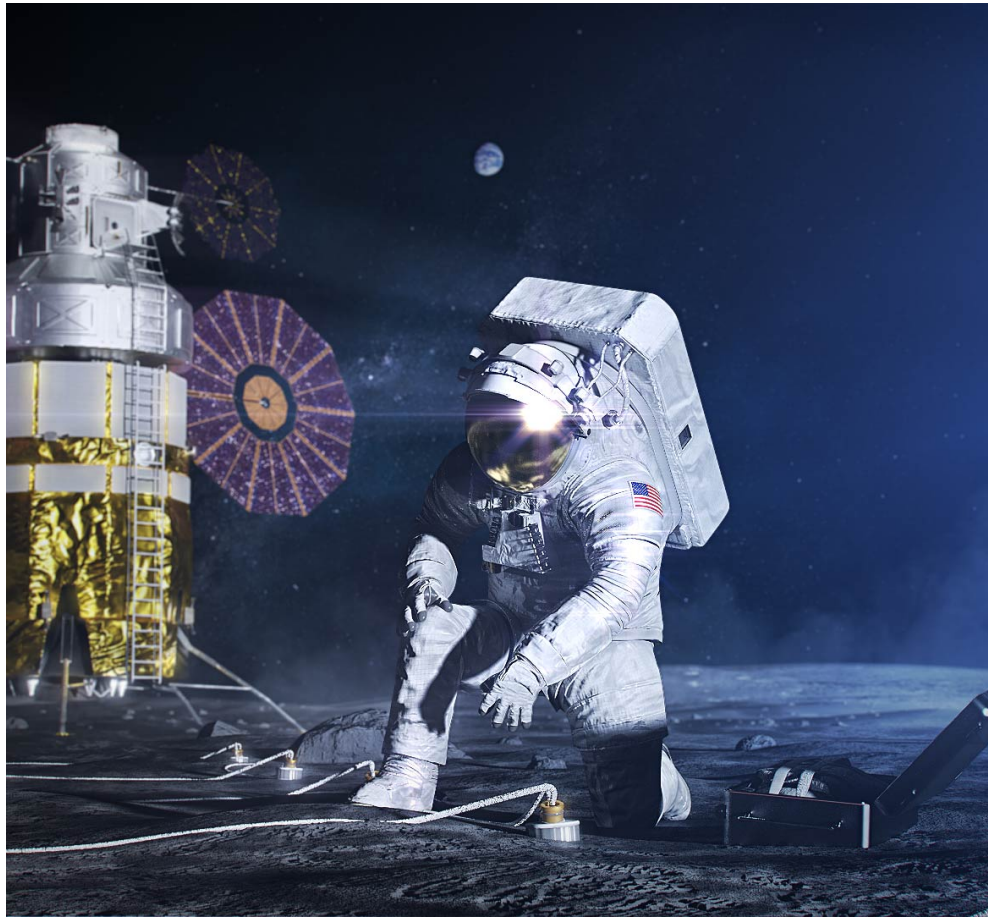



FORMULATION
IMPLEMENTATION
PRIMARY OPS
EXTENDED OPS
LUCY
DRAGONFLY
NEOWISE
BEPICOLOMBO (ESA)
OSIRIS-REX
JUICE (ESA)
NEW HORIZONS
PSYCHE
JUNO
DART
EUROPA CLIPPER
MOON
LUNAR RECONNAISSANCE ORBITER
CLPS (x2)
VIPER
MARS
MARS ODYSSEY
MARS EXPRESS (ESA)
MRO
MAVEN
EXOMARS 2016 (ESA)
MMX (JAXA)
EXOMARS 2022 (ESA)
CURIOSITY ROVER
INSIGHT
MARS 2020 ROVER

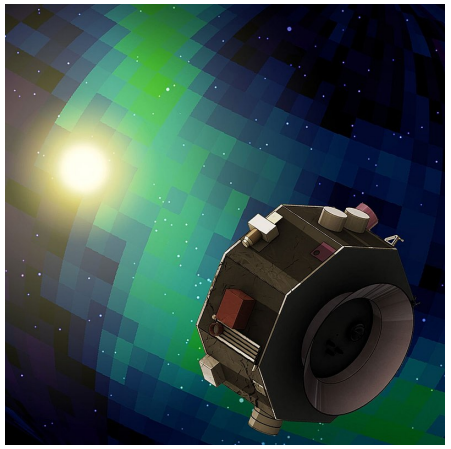
Budget

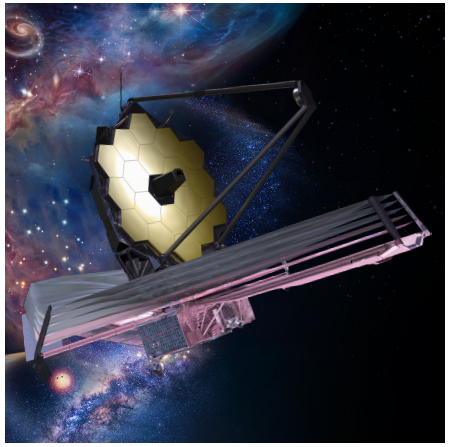


FY21 Budget – Agency Highlights



- One of the strongest budgets in NASA's history, investing more than $25 billion dollars for America's future in space
  - funding proposed represents an increase of about 12% over last year's request
- Keeps the agency on track to land the first woman and the next man on the Moon by 2024, and with the support of the Gateway, helps prepare for human exploration of Mars
- Budget supports decadal priorities such as:
  - Mars Sample Return mission
  - Europa Clipper






FY21 Budget Strategy

- Support Artemis
- Implement a balanced and integrated science program
- Advance compelling science program with highest national priorities
- Execute innovative partnerships

Science Budget Request Summary ($M)

	Actual FY 19	Request FY 20	Enacted FY 20	Request FY 21	Out-years FY 22	FY 23	FY 24	FY 25
Science	**6,886.6**	**6,393.7**	**7,138.9**	**6,306.5**	**6,553.5**	**6,575.7**	**6,705.2**	**6,766.9**
Earth Science	**1,931.0**	**1,779.8**	**1,971.8**	**1,768.1**	**1,878.2**	**1,846.1**	**1,834.5**	**1,984.6**
Earth Science Research	454.1	447.9		447.3	471.9	494.1	528.5	530.3
Earth Systematic Missions	932.7	719.2		608.3	706.1	695.6	640.7	797.3
Earth System Science Pathfinder	223.8	275.4		338.9	301.2	251.6	241.8	234.4
Earth Science Data Systems	202.0	214.4		245.4	259.9	263.2	278.7	277.7
Earth Science Technology	63.4	69.6		74.2	82.8	84.6	86.4	86.4
Applied Sciences	55.1	53.3		53.9	56.3	57.0	58.5	58.5
Planetary Science	**2,746.7**	**2,712.1**	**2,713.4**	**2,659.6**	**2,800.9**	**2,714.9**	**2,904.8**	**2,830.7**
Planetary Science Research	276.6	266.2		305.4	288.6	285.1	295.2	286.7
Planetary Defense	150.0	150.0	160.0	150.0	147.2	97.6	98.0	98.0
Lunar Discovery and Exploration	188.0	300.0	300.0	451.5	517.3	491.3	458.3	458.3
Discovery	409.5	502.7		484.3	424.4	434.8	570.1	505.8
New Frontiers	93.0	190.4		179.0	314.3	332.8	326.9	285.0
Mars Exploration	712.7	546.5	570.0	528.5	588.4	671.2	798.7	855.3
Outer Planets and Ocean Worlds	793.6	608.4		414.4	370.7	239.4	192.3	171.7
Radioisotope Power	123.3	147.9	147.9	146.3	150.1	162.8	165.4	169.8
Astrophysics	**1,191.1**	**844.8**	**1,306.2**	**831.0**	**891.2**	**1,000.9**	**959.7**	**975.5**
Astrophysics Research	222.8	250.7		269.7	279.1	327.2	314.9	331.1
Cosmic Origins	222.8	185.3		124.0	123.2	120.0	122.4	122.4
Physics of the Cosmos	151.2	148.4		143.9	160.8	155.3	169.8	154.1
Exoplanet Exploration	367.9	46.4		47.2	50.4	47.6	51.6	52.2
Astrophysics Explorer	226.5	214.1		246.2	277.7	350.8	301.0	315.6
James Webb Space Telescope	**305.1**	**352.6**	**423.0**	**414.7**	**175.4**	**172.0**	**172.0**	**172.0**
Heliophysics	**712.7**	**704.5**	**724.5**	**633.1**	**807.8**	**841.8**	**834.1**	**804.1**
Heliophysics Research	248.9	237.0		230.5	218.7	225.2	224.0	224.5
Living with a Star	135.3	107.6		127.9	134.5	246.4	225.5	233.3
Solar Terrestrial Probes	180.5	177.9	183.2	126.3	262.2	202.6	195.6	115.5
Heliophysics Explorer Program	147.9	182.0	182.0	148.4	192.4	167.6	189.0	230.8

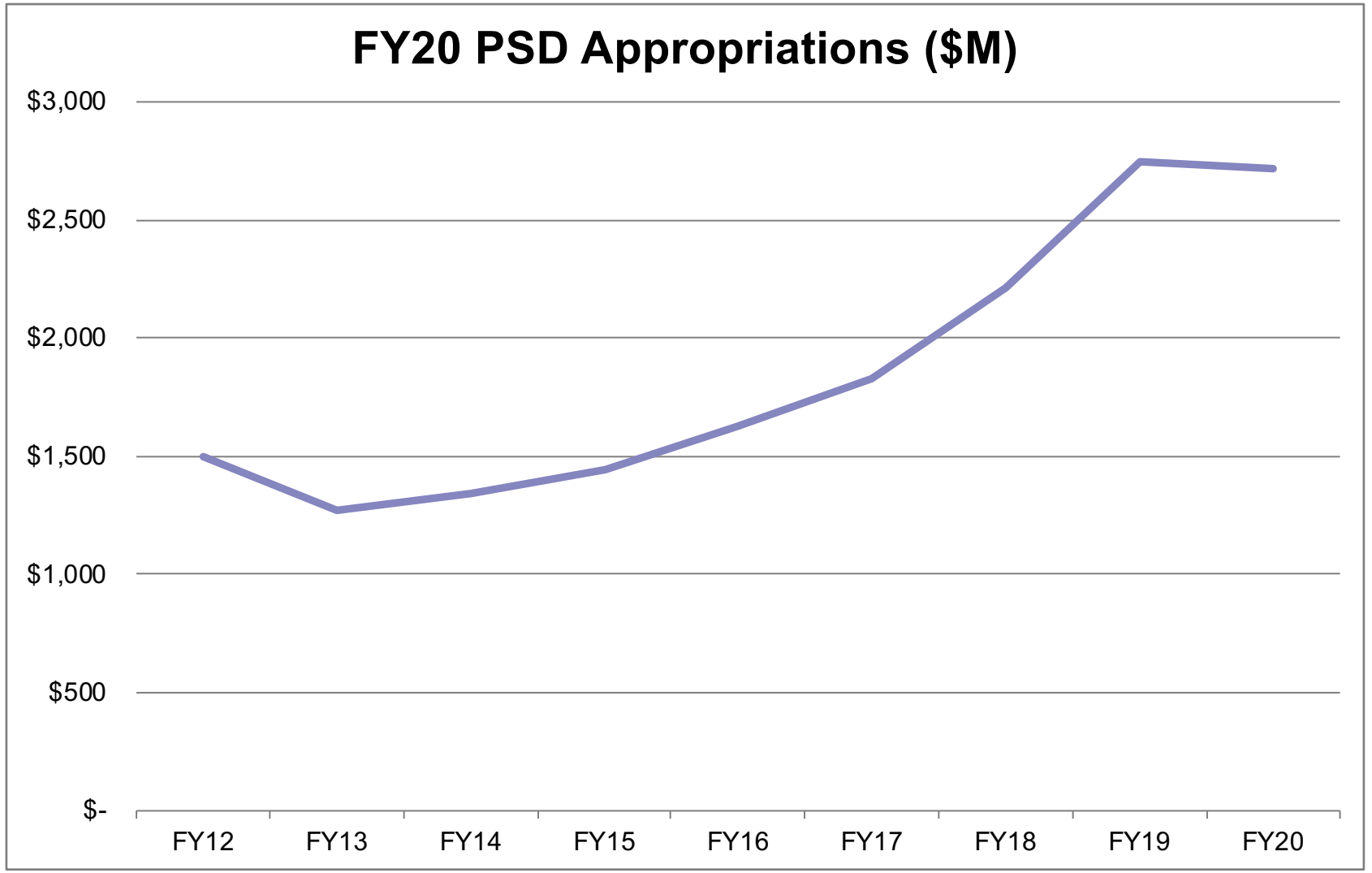
Planetary Science FY21 Budget Features

What's changed

- Proposes **Europa Clipper** launch in 2024 on a commercial vehicle, which saves over $1.5 billion and makes an SLS available to support an Orion launch to the Moon
- **Dragonfly** selected as next New Frontiers mission with launch readiness date in 2026
- Increases **Commercial Lunar Payload Services** based on awards to date
- Increases **SmallSat** future opportunities within the Discovery Program
- Increases **R&A** to maintain adherence to Decadal recommendation
- Begin **Mars Ice Mapper** planning with international and commercial partners

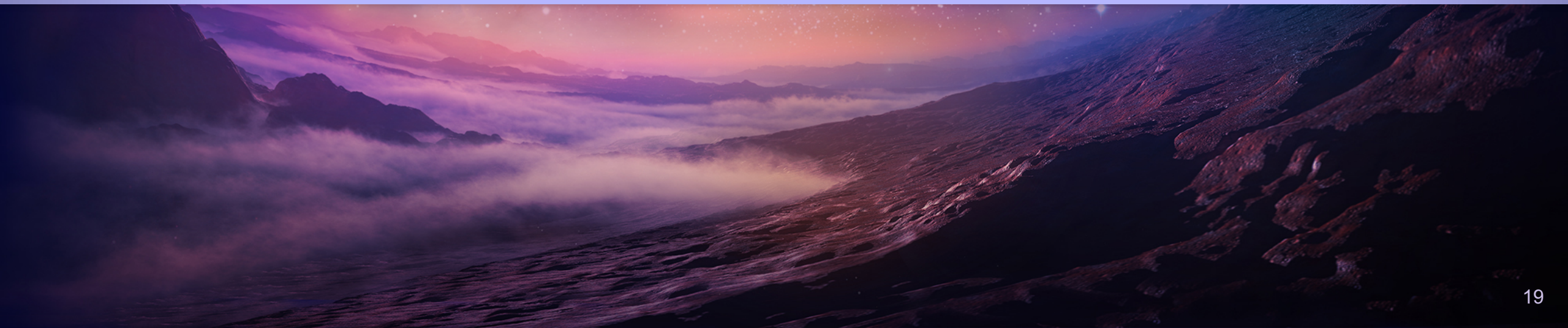
What's the same

- Enables a **Mars Sample Return** launch in 2026
- Implements **Mars 2020, DART, Dragonfly, Psyche and Lucy** as well as **instruments on ExoMars 2020, JUICE and MMX**
- Enables **Discovery** selection(s) in 2021 and **New Frontiers 5** AO release in 2022
- No funding for Europa Lander
- Maintains nation's **radioisotope power system** capability

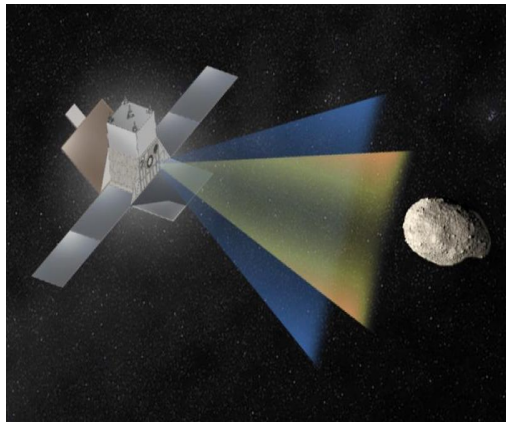


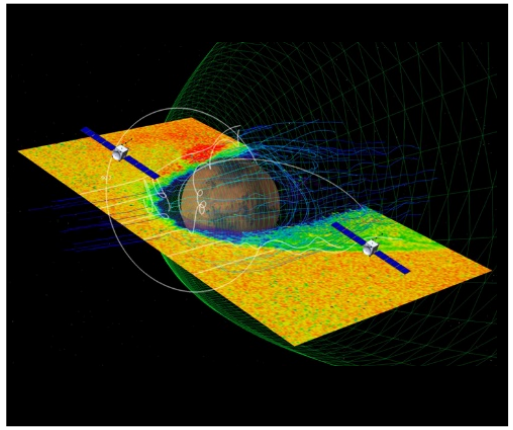
FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
$1,501	$1,272	$1,343	$1,447	$1,628	$1,828	$2,218	$2,747	$2,713

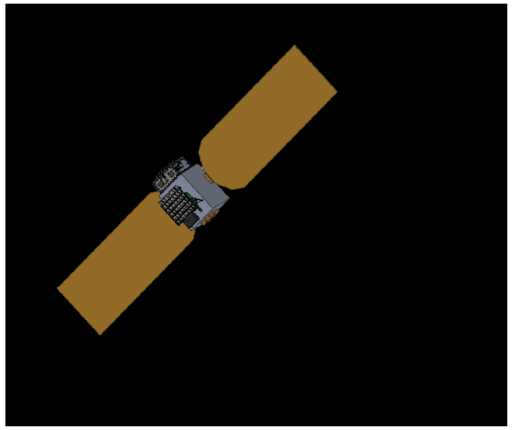
Opportunities



Announcements of Opportunity







Small Innovative Missions for Planetary Exploration (SIMPLEx)

- Three missions selected for Phase A/B development
- Currently capturing lessons learned through PDR for consideration during next cycle
- Release of next opportunity planned NET Sep 2020

New Frontiers #4

- Dragonfly selection announced June 27, 2019

New Frontiers #5

- To be released Fall 2022 (current schedule)

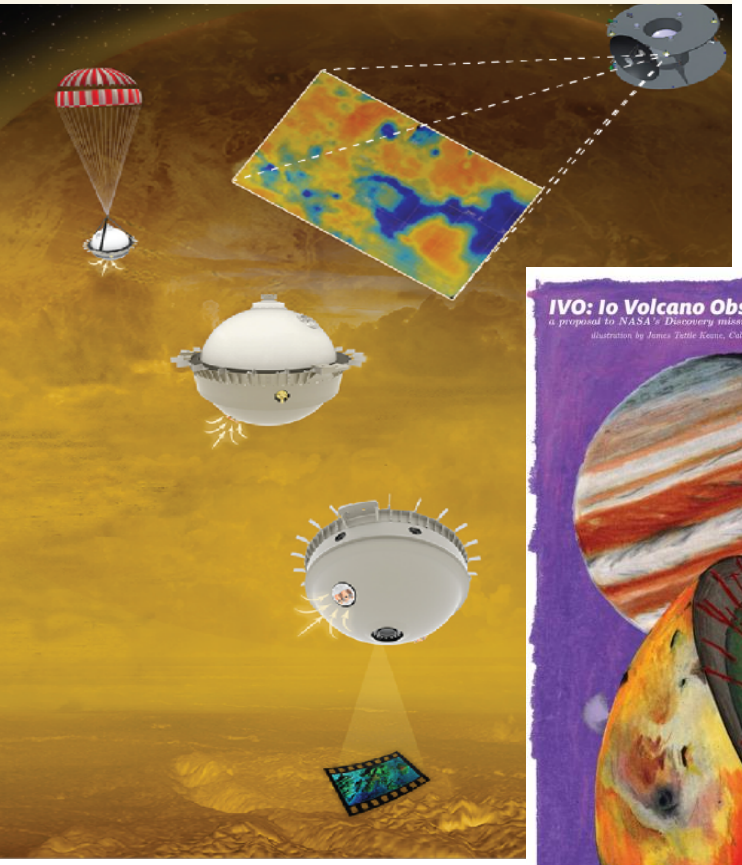
Discovery 2019

- Step-1 proposals were due July 1, 2019, with selections announced February 13, 2020
- Step-2 selections planned for NET April 2021

Four Discovery Selections for Phase A

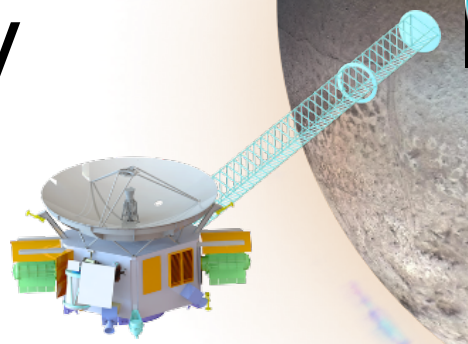
DAVINCI+

Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging Plus



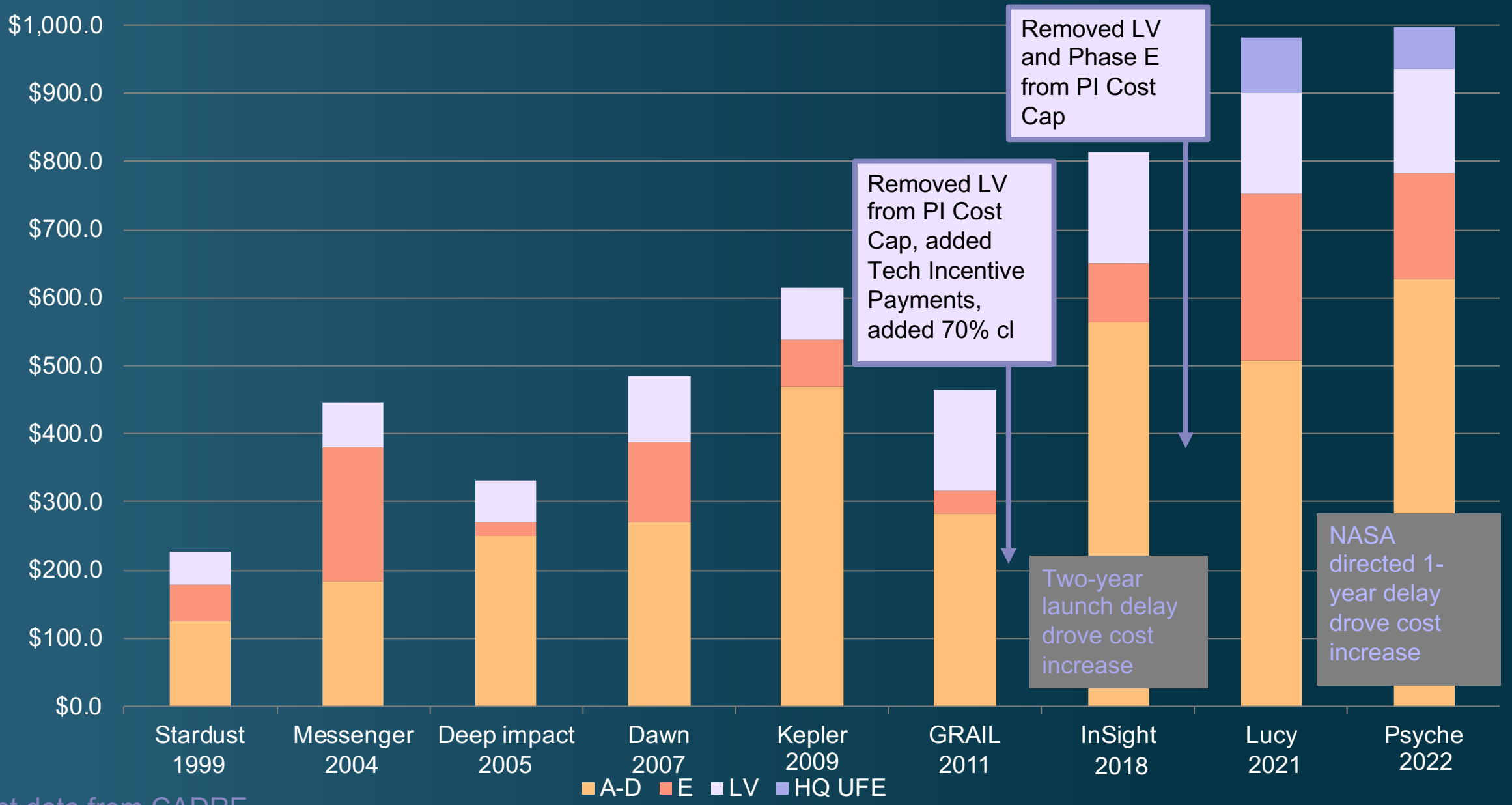
TRIDENT

MISSION TO AN EXOTIC ACTIVE WORLD



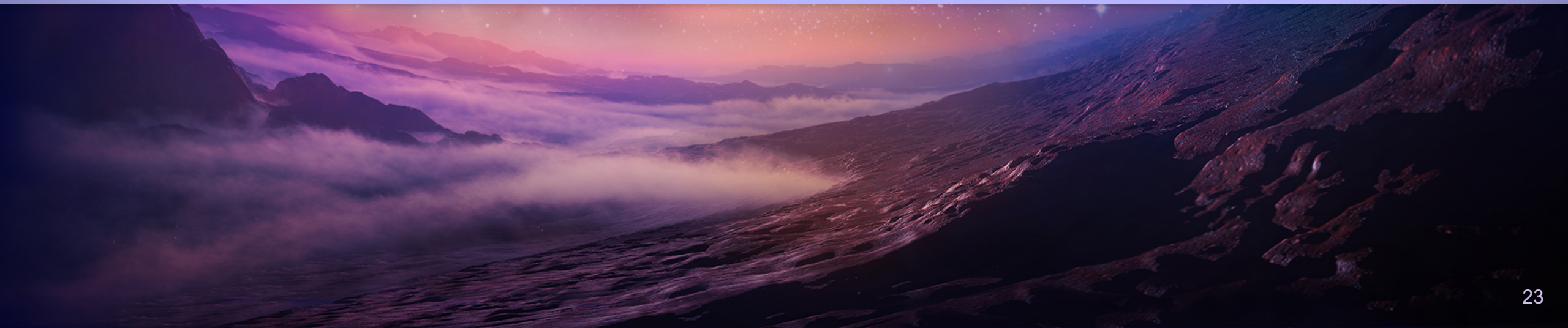
VERITAS

Discovery cost growth* from strategic decisions (RY $)

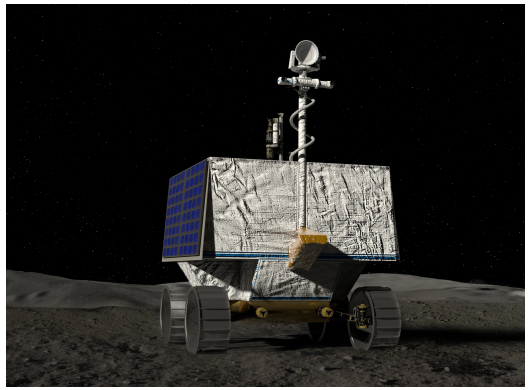


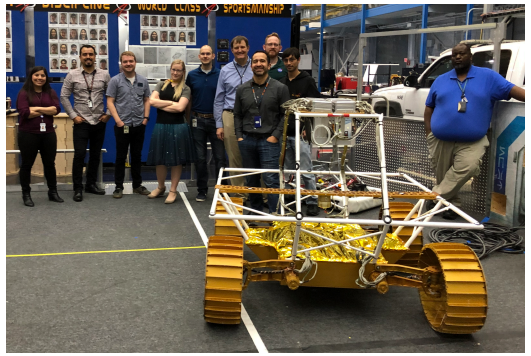
*Cost data from CADRE

Mission Updates



Volatiles Investigation Polar Exploration Rover (VIPER)



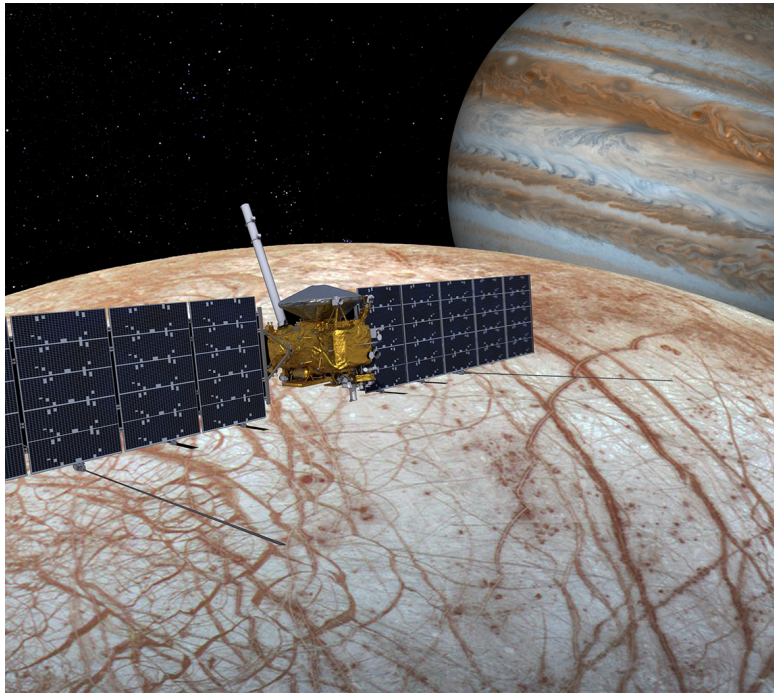


Science objectives:

- Characterize distribution and physical state of lunar polar water and other volatiles in lunar cold traps and regolith to understand their origin
- Provide data and resource maps necessary for NASA to evaluate the potential return of ISRU from lunar polar regions

- **Arrival at lunar Surface:** Nov. 2023
- **Lunar delivery:** CLPS commercial contract
- **Mission Duration:** 100+ Earth days
- **Instruments:** Neutron, Near-IR, and Mass Spectrometers; 1m Drill
- **Dark Survivability:** 96 hrs
- **PSR Working Duration:** 6 hrs

Europa Clipper Updates



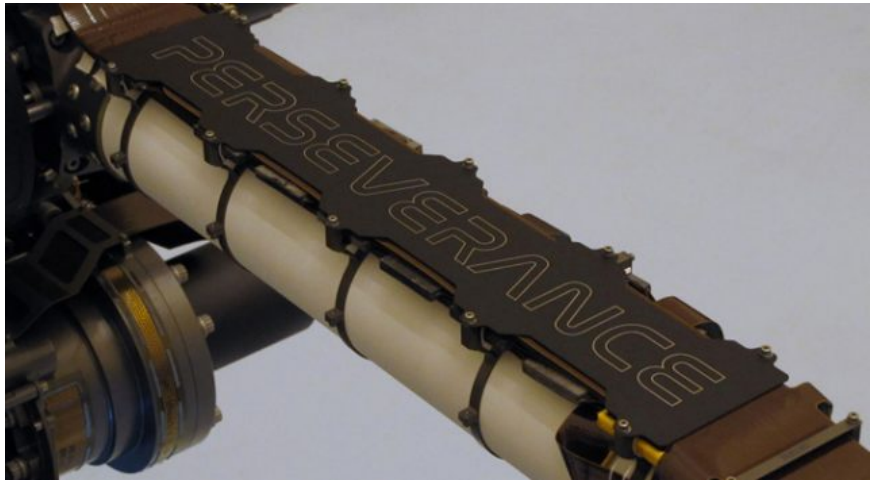
Project Schedule: Final instrument CDR in June, then Project & Flight System CDR this calendar year

Facility Magnetometer: Good progress toward achieving in-flight calibration using spacecraft rolls

Science Team Meeting 8, JPL, Feb. 2020: addressed planning tools, science V&V, cross-instrument science

Launch Vehicle: LV uncertainty is becoming an increasing concern; Congress directs use of SLS but availability before 2025 is not clear

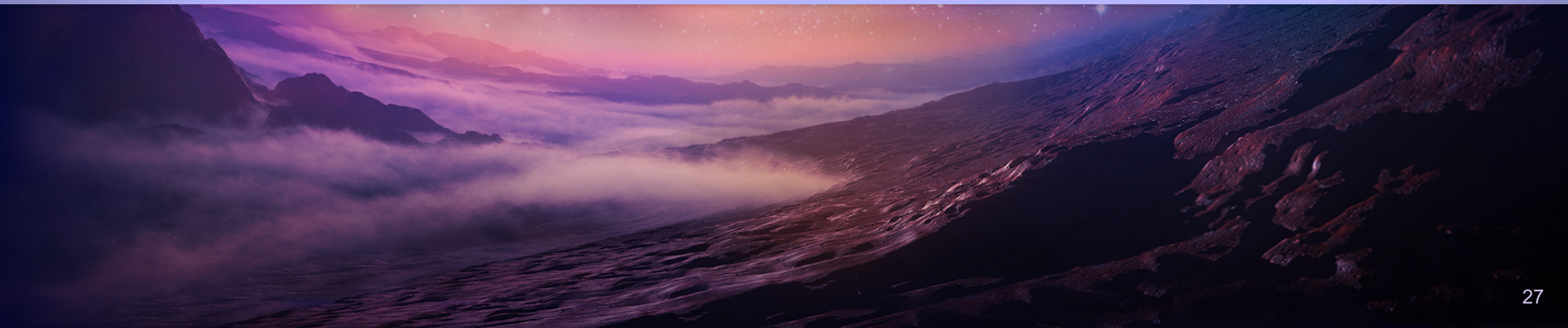
Instrument & Flight System Hardware: Now being built!



Mars 2020/Perseverance

- Mars 2020 is on schedule for launch in July (window opens on July 17)
- Agency has placed high priority on the health and safety of the individuals who are continuing to work the final assembly and test activities both at JPL and at KSC
- Almost all hardware is currently at KSC
  - Hardware that contacts the samples will ship soon
  - MMRTG on schedule for installation at KSC
- The rover name, Perseverance, was announced on March 5
  - Essay written by Alexander Mather was selected from over 28,000 entries
- Participating Scientist proposals received
  - Review will be conducted remotely
  - Selections expected this summer

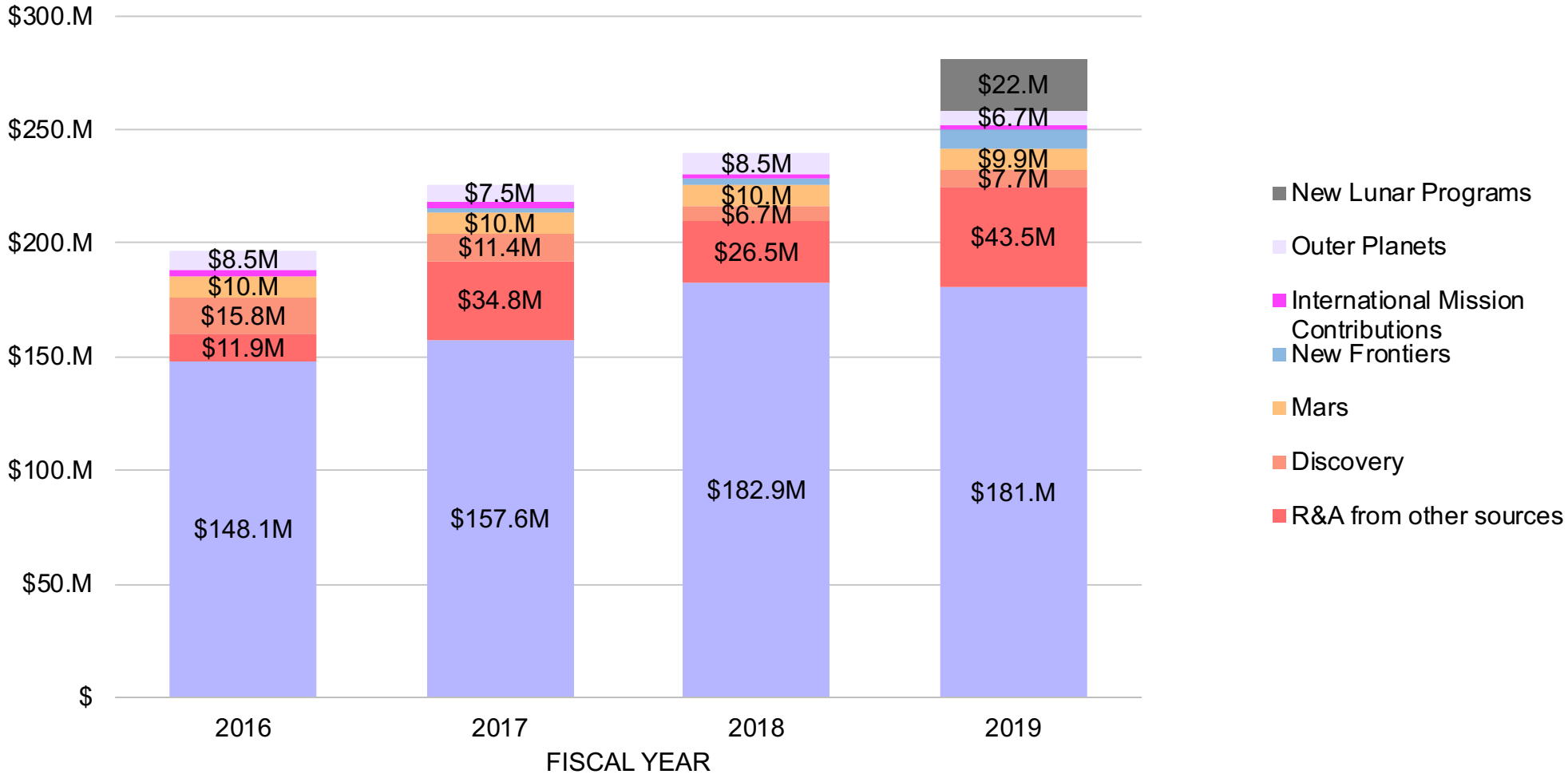
Research & Analysis



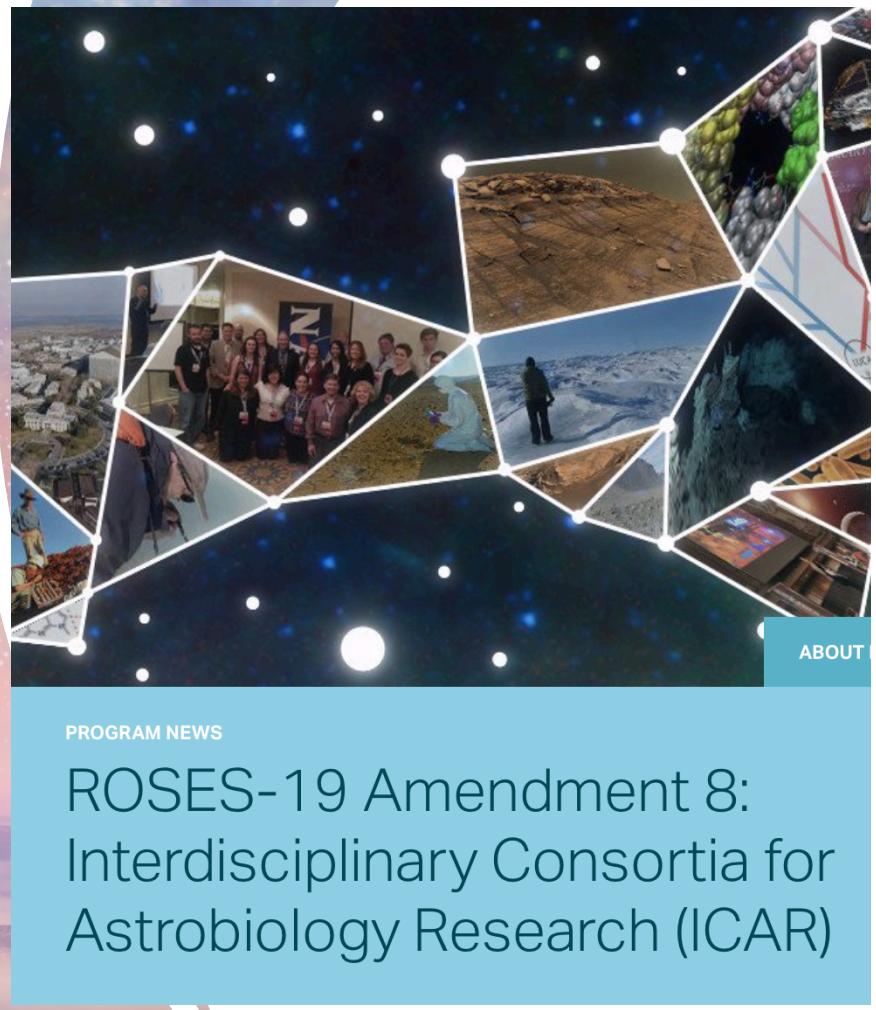
Research and Analysis (R&A) Highlights

- Facilities: Valuable recommendations made by the National Academies study
  - Plan to offer 1–2-year Planetary Major Equipment efforts with associated awards ($1M/year program total)
  - Considering a Facilities call every 2 years for new and existing facilities ($5M total for first call in 2020, growing over time)
- SMD received 104 responses to request for information regarding research program gaps
  - ~40 responses of interest to PSD are being reviewed
  - Thorough analysis and recommendations to SMD in a few months
- Dual Anonymous Peer Review: SMD is strongly committed to equitable and fair reviews
  - Trial implemented by Space Telescope Science Institute demonstrated resulting focus on science merit
  - Includes evaluation of team qualifications after merit review
  - Pilot study to be conducted with Habitable Worlds in ROSES 2020; webinars will provide more information on how to write a DAPR proposal
- PSD is focused on providing funding analysis to the community and Decadal Survey that is verifiable and repeatable

Overview of Research Programs Budgets – the more complicated story



Astrobiology Research



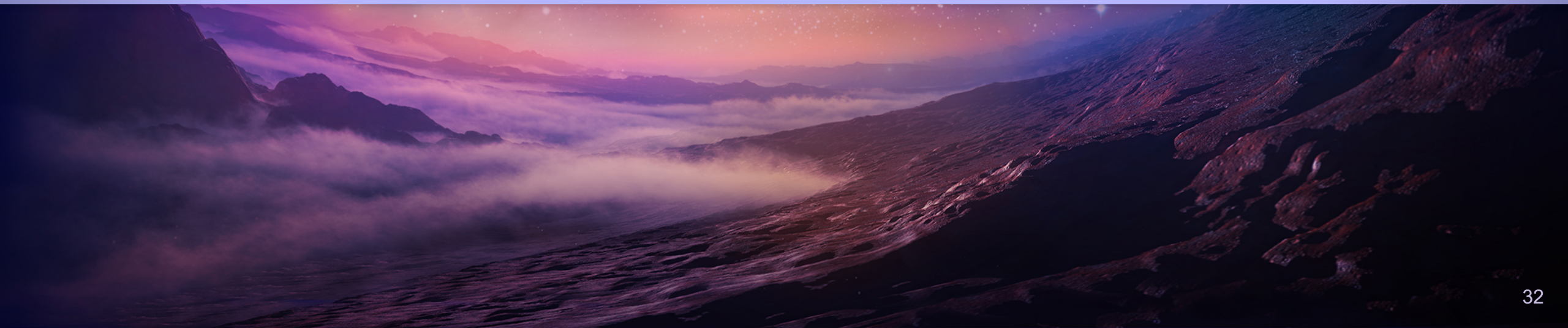
- Solicitation: NNH19ZDA001N-ICAR
- Targeted timing:
  - First Solicitation: Released November 25, 2019
  - January 31, 2020: Step 1 proposals were due
  - May 15, 2020: Step 2 proposals due
  - Fall 2020: new ICAR awards start
- Areas of research emphasis in this solicitation are linked to Research Coordination Network (RCN) topics:
  1. Exoplanet System Science - NExSS
  2. Prebiotic Chemistry and Early Earth Environments - PCE_3
  3. Earliest Cells and Multicellularity
- Selected proposals will become part of the RCN
- Calls will occur on the order of every two years
  - RCN topics that will be included will be staggered

Four New Research Coordination Networks (RCNs)

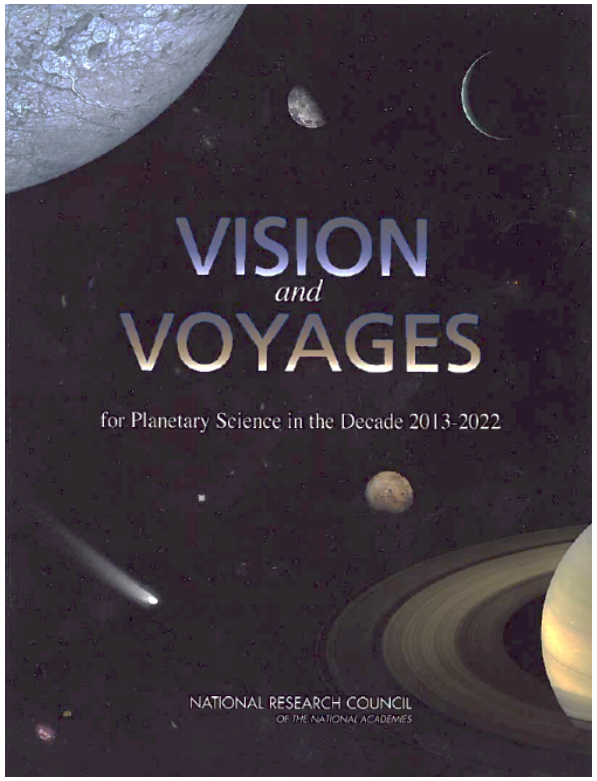
1. Exoplanet System Science – NExSS (2014)
2. Life Detection – NfoLD (2017)
3. Prebiotic Chemistry and Early Earth – PCE_3 (2018)
4. Ocean Worlds – NOW (2019)
5. Earliest Cells to Multicellularity – **coming soon** (Request For Information)

Relevant calls have checkbox for self nomination

Looking Ahead



Preparing for the Next Decadal Survey



- Information on the Planetary Decadal survey can be found at: www.nas.edu/planetarydecadal
- White Paper process will be led by the NAS Space Studies Board (SSB)
- LPI and AG websites are open for community collaborations https://www.lpi.usra.edu/decadal_whitepaper_proposals/index.cfm
- Activities to-date:
  - LPSC Decadal Town Hall led by NAS/SSB (held virtually March 16, 2020)
  - Early Career Kick-off (held virtually March 27, 2020)
- Upcoming:
  - Planetary Mission Concept Study (PMCS) status virtual workshop (Postponed, date TBC)

Notional Timeline for 2023 Decadal Survey

2019	
September	Organizing meeting and town hall at EPSC-DPS
October	Draft statement of task received from NASA
November	LPI launches white paper proposal web site
December	Town hall at AGU meeting
2020	
January	National Academies posts Statement of Task
February	Funding proposal to NASA, NSF agree to support
March	Early-career event and town hall at LPSC
Spring	White paper submission begins, chair announced
Summer	White paper deadline and meetings begin
2021	
Autumn	Complete draft of survey report assembled
2022	
Spring	Survey report released, dissemination starts
2023	End of dissemination/NASA contract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Conflict of Interest Statement

Prospective members of all National Academies' committees and panels have their financial relationships reviewed to prevent actual or perceived conflicts of interest. Additionally, the National Academies evaluates whether each prospective member is a strong, publicly known advocate for a specific project—broadly defined as a plan, mission, initiative, architecture, or the equivalent—that the committee or panel may evaluate. Such evaluation is necessary to avoid possible bias or a perception thereof.

Nominations and self-nominations to the decadal survey committee—i.e., the steering group and supporting panels—are welcome. Nominees with the following characteristics are encouraged:

- *Scientific and technical expertise, and objectivity;*
- *Experience in the management of a project, organization, or equivalent enterprise is desirable;*
- *Must be broad thinkers, open-minded, and not active proponents of a specific project; and*
- *Be able to participate in-person in survey committee activities.*

Conflict of Interest Statement (cont'd)

Additional considerations include the following:

- *All authors of science-focused whitepapers prepared for the survey are eligible to be considered as members of the steering group and its supporting panels;*
- *First authors of mission-focused whitepapers prepared for the survey cannot serve on the steering group or on any panel considering that mission; and*
- *Principal Investigators of the NASA-funded, pre-decadal mission-concept studies to be evaluated by the survey cannot serve on the steering committee or on any panel considering that mission.*