

National Aeronautics and
Space Administration



EXPLORE SCIENCE

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PPIRB Planetary Science Overview

November 20, 2019

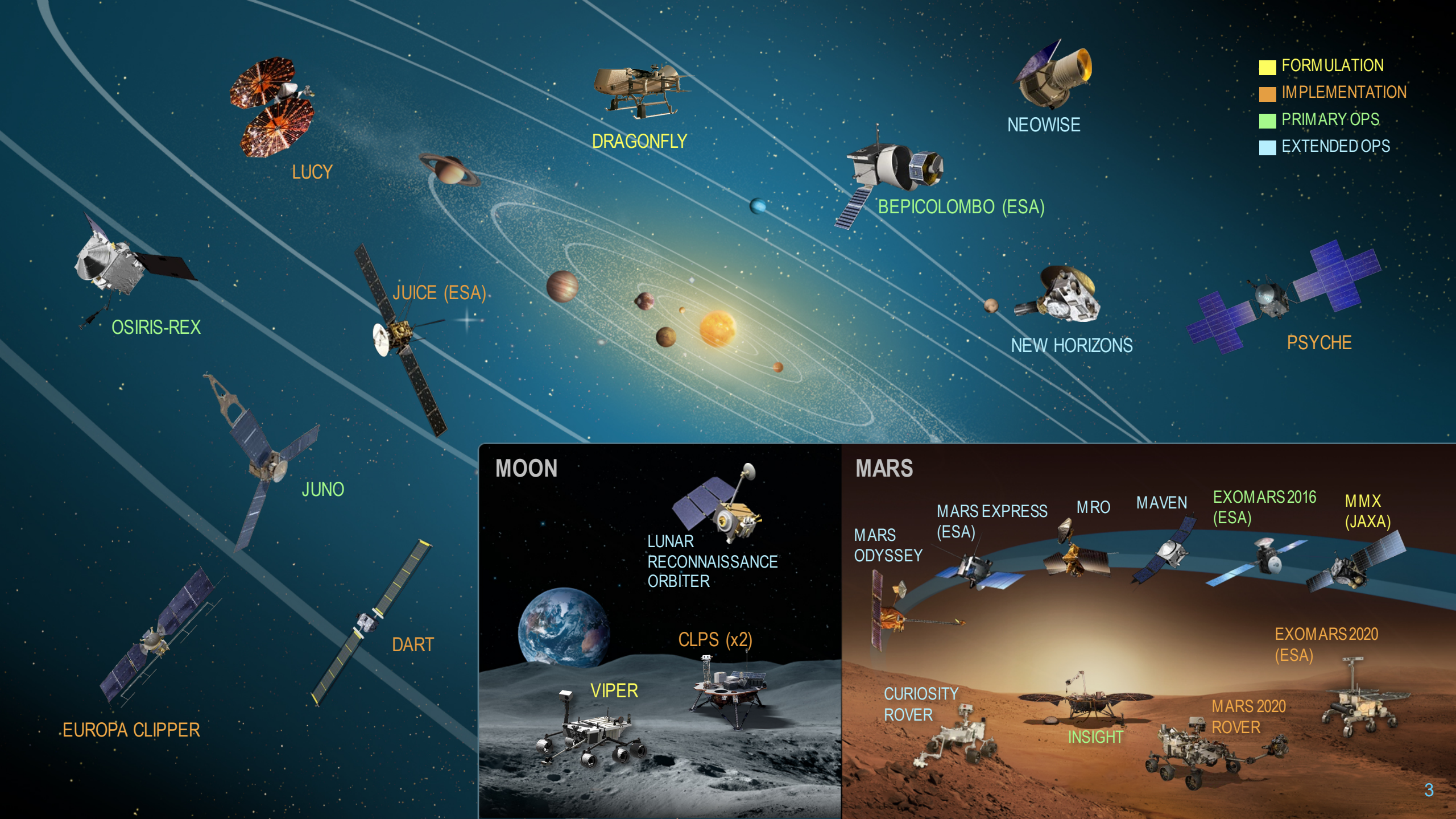
KEY SCIENCE THEMES

Protect & Improve
Life on Earth

Search for
Life Elsewhere

Discover Secrets
of the Universe

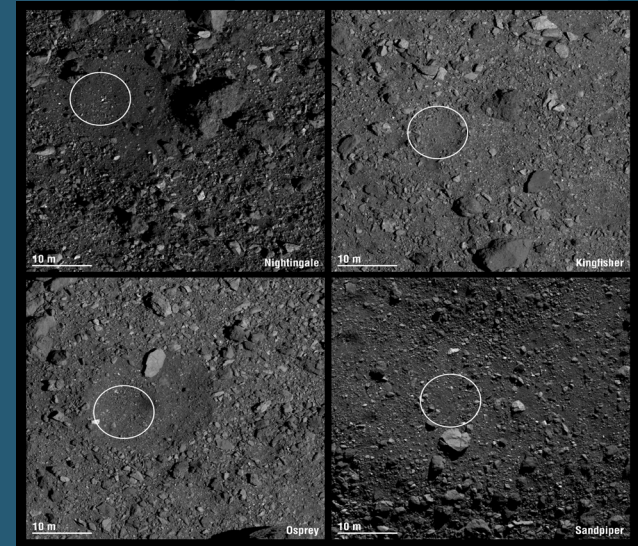




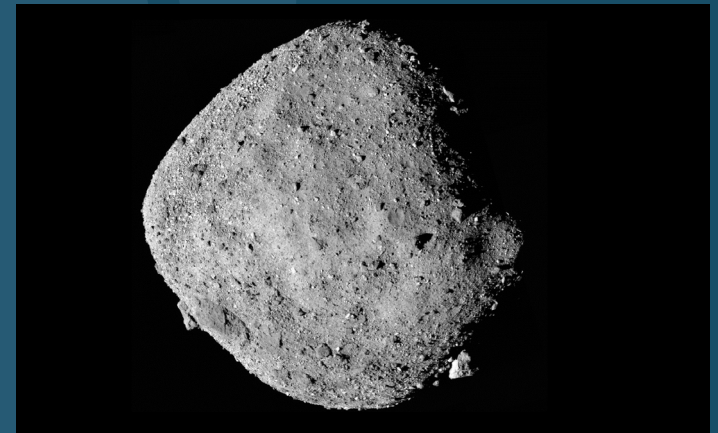
OSIRIS-REx

Bennu Arrival

December 3, 2018



Aug. 12, 2019 - Four candidate sample collection sites on asteroid Bennu



Dec. 3, 2018 – OSIRIS-REx showing Bennu in one full rotation from approximately 80 km away

InSight

TAKING THE 'VITAL SIGNS' OF MARS



Oct. 27, 2019 – After making progress over the previous several weeks, InSight's mole has backed about halfway out of its hole

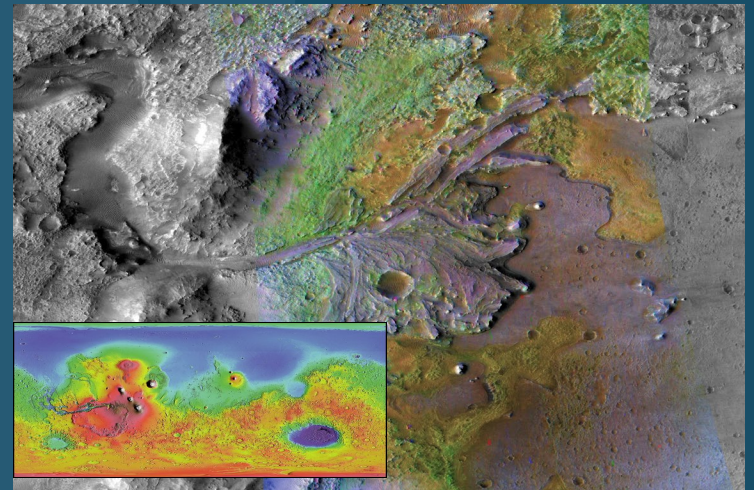


Dec. 19, 2018 – InSight seismometer on Martian surface – first time a spacecraft robotically placed a seismometer onto surface of another planet

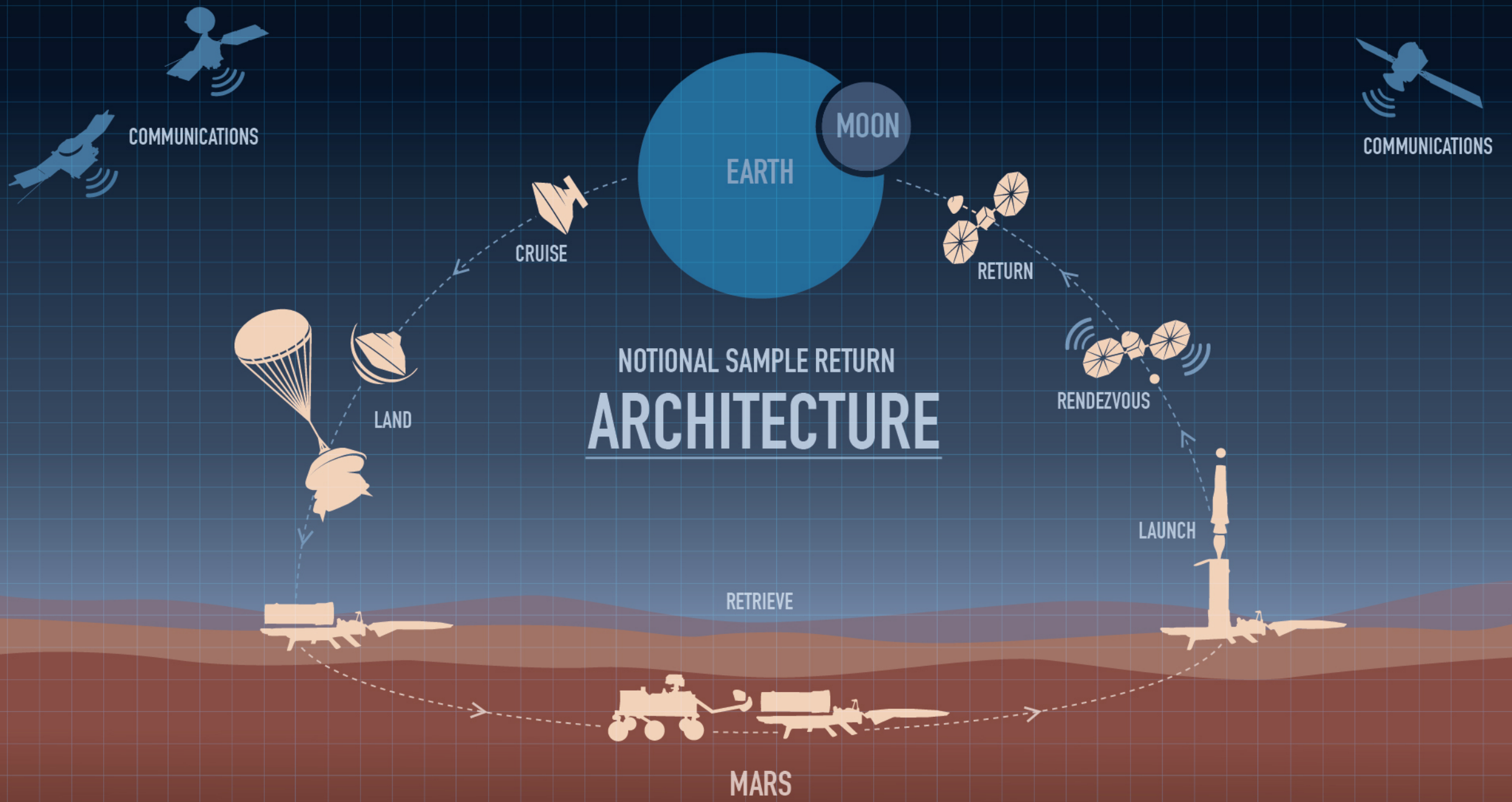
MARS 2020



Oct. 8, 2019 – Engineers, at NASA's Jet Propulsion Laboratory, lower the Mars 2020 rover to carry its full weight for the first time



Nov. 19, 2018 - NASA announced landing site for Mars 2020 Rover mission as Jezero Crater



MSR Science Planning Group (MSPG)

- Established by NASA and ESA to help develop a stable foundation for international scientific cooperation for the purposes of returning and analyzing samples from Mars
- Two workshops have been held:
 1. To what extent does MSR science need to be done in containment?
 2. How do the science objectives affect sample receiving facility contamination control requirements?
- In addition, Sample Management Working Group formulating options for the involvement of international scientists in different aspects of MSR

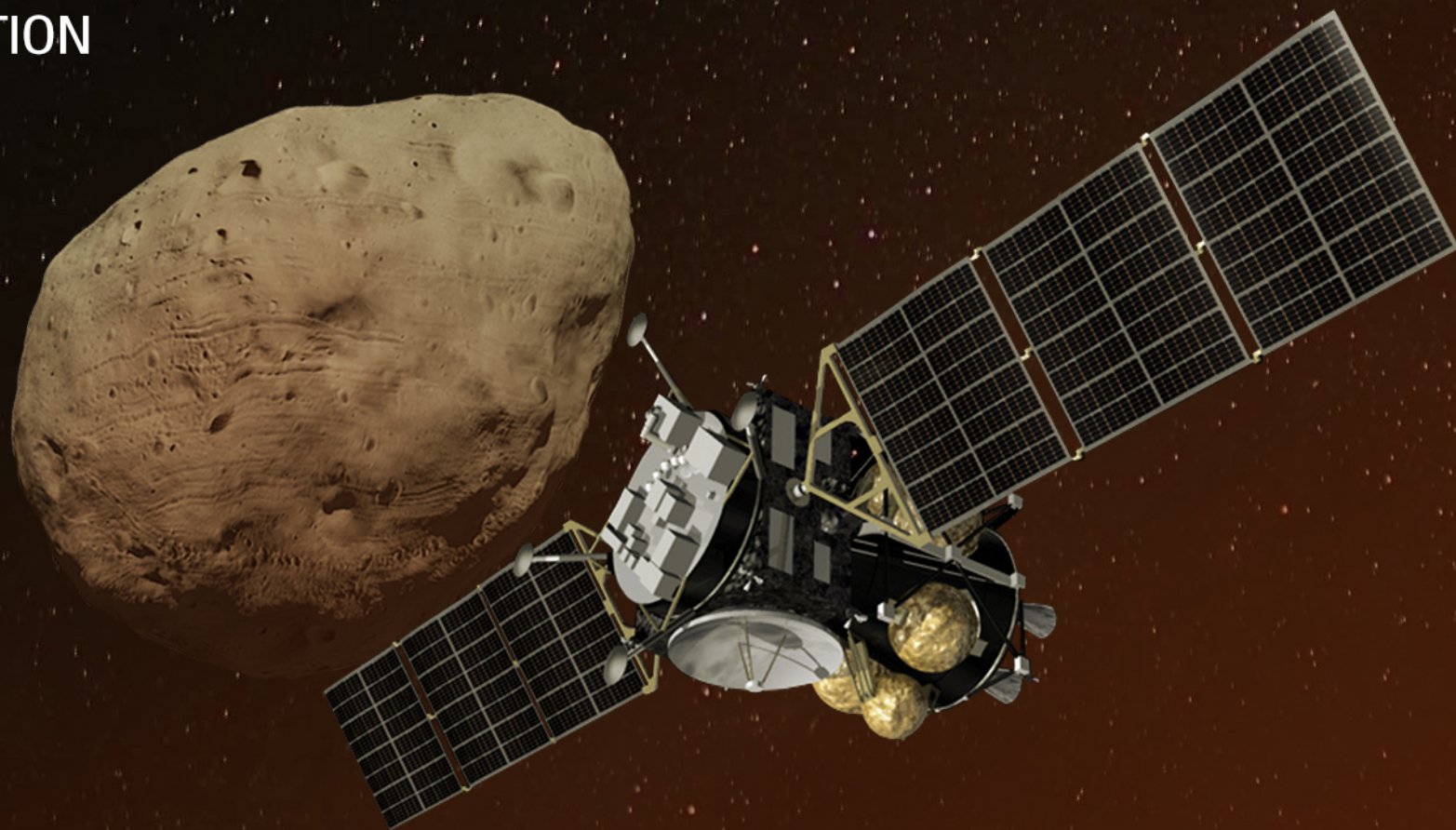
Restricted Earth Return (RER) Facility Planning



- We have completed a joint NASA/ESA assessment of potential science requirements for restricted samples
- This year we expect to establish an Operational Readiness Definition Team for RER
- PSD working with PPO, curation personnel, and NASA Environmental Management Division to develop criteria for RER facility
- Looking at all aspects of the process: receiving, transport, curation and analysis

MMX

MARTIAN MOONS EXPLORATION



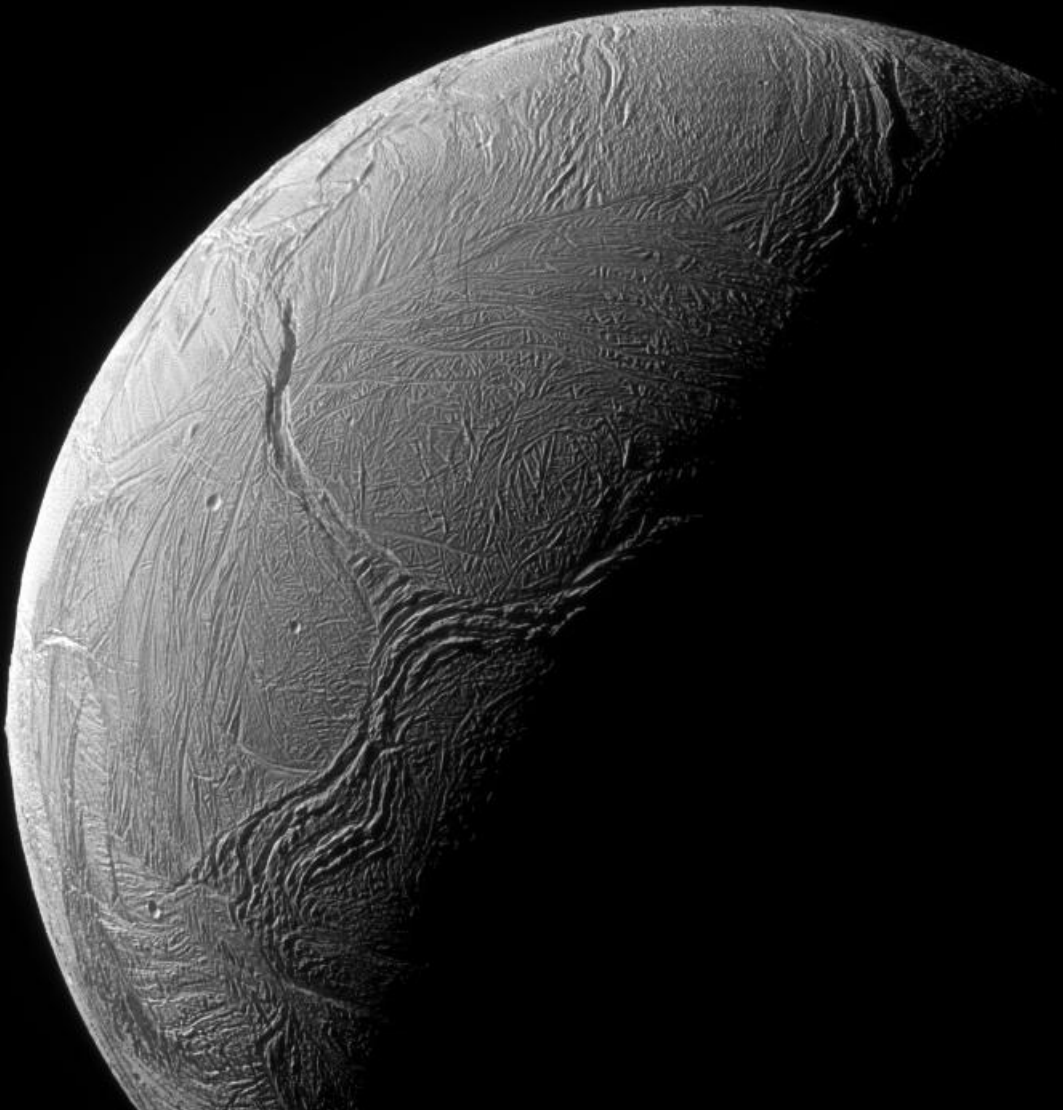
Ocean Worlds Exploration

Europa Clipper, confirmed August 20, 2019, is one of the highest priorities for a flagship mission in last Decadal Survey



Potential future lander mission concept





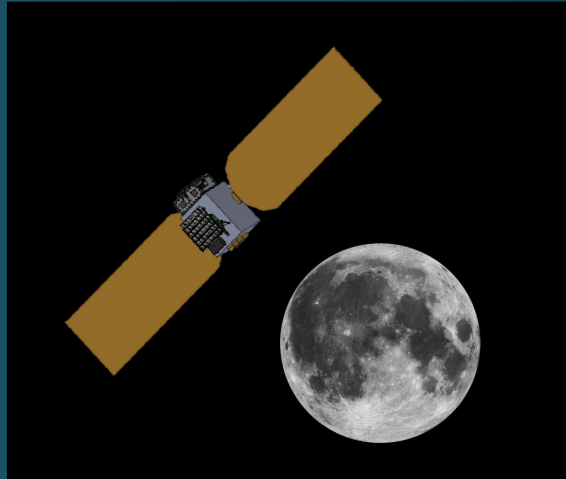
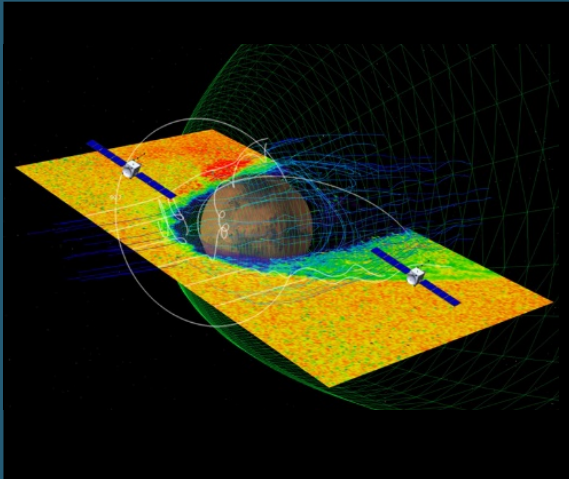
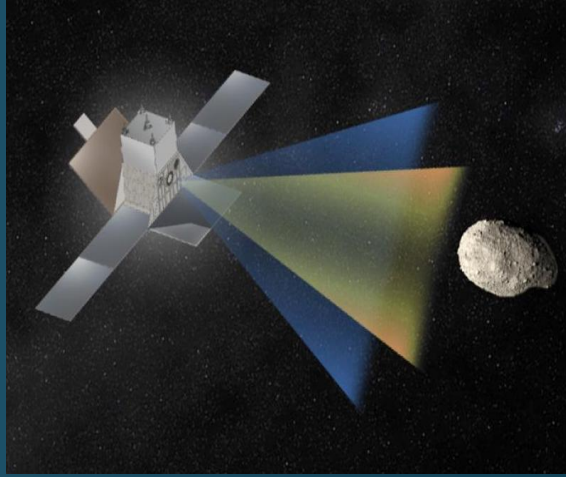
Commercial Partnerships

- NASA and Breakthrough Starshot Foundation, LLC Space Act Agreement (SAA) signed in September 2018
- Cooperating on Pre-Phase A activities for Breakthrough's Enceladus mission
- Breakthrough has also expressed interest in Europa

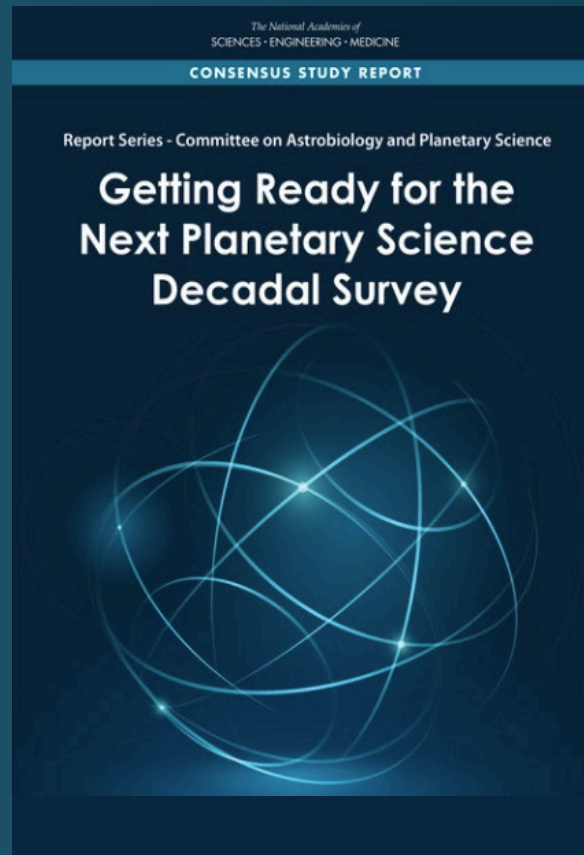
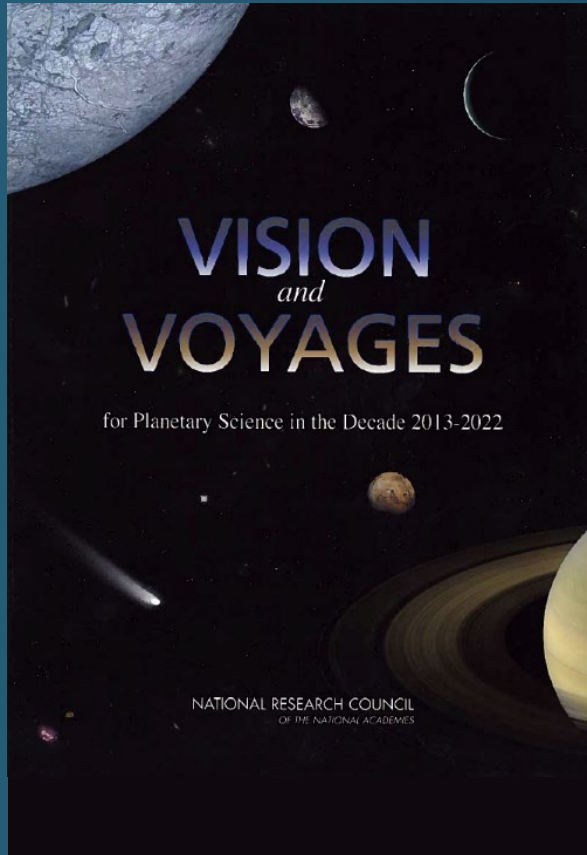
Planetary Protection R&A Program

- PSD has a Program Scientist dedicated to planetary protection research and coordination with NASA's PPO
 - Becky McCauley Rench currently serving in this capacity
- Call for proposals was updated in 2019 (ROSES-2018) to emphasize the most current PP research
- Response rate for proposals more than doubled this year due to the increased focus
- Selections for PPR ROSES-2018 announced on November 8, 2019
 - 20% selection rate maintained despite the large increase in proposals
- Currently selected research areas include:
 - Studying the capability of the deep UV fluorescence and Raman mapping for organic and microbial detection
 - Determining bioburden associated with solid rocket motor insulation and other spacecraft materials
 - Studying sterilization techniques against prion surrogate protein biological indicators
- Currently not planning to solicit PPR in ROSES-2020, but will solicit in ROSES-2021

Announcements of Opportunity



- AO language informs proposers of considerations required for planetary protection
- Instructions are coordinated with the PPO, who ultimately determines a mission's planetary protection categorization
- Once selected, missions are required to develop a planetary protection plan which is reviewed and approved by PSD and PPO
 - Per 7120.5, PP plan is baselined by PDR
- Compliance is then monitored and assessed by the PPO



Preparing for the Next Decadal Survey

- Planetary Mission Concept Studies (PMCS) proposals were due May 31, 2019
- Proposals were assessed by peer review panels this summer
 - 54 proposals received
 - 11 selected
- Results from concept study reports will be submitted to National Academy of Sciences to be included for consideration by the Decadal Survey
- PSD encourages those not selected to consider submitting a white paper



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