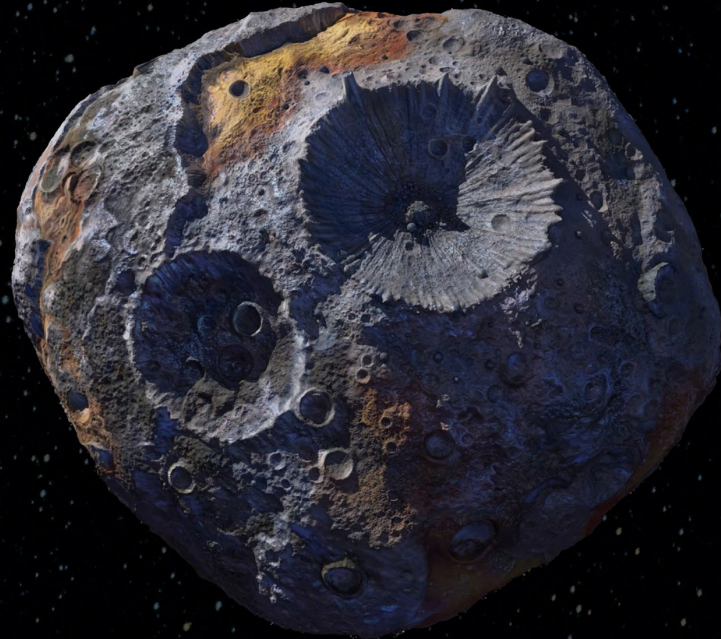


Psyche mission status

Lindy Elkins-Tanton

ASU



Psyche Mission

Psyche Project



Program:	Discovery, PI-led
Science Goal:	Determine whether (16) Psyche is a core
Classification:	Category 2 (per 7120.5E) Risk Class B (per 8705.4) LV Risk Category 3 (low risk, per 8610.7D)

Lead Organizations



PI (*Lindy Elkins-Tanton*)
Multispectral Imager, Science Data Center



Project Mgmt, Flight System, SI&T, S&MA, Mission Ops



Solar Electric Propulsion (SEP) Chassis

Partners



Gamma-Ray and Neutron Spectrometer



Multispectral Imager



Deputy PI (*Ben Weiss MIT*)
Magnetometer and Gravity Science

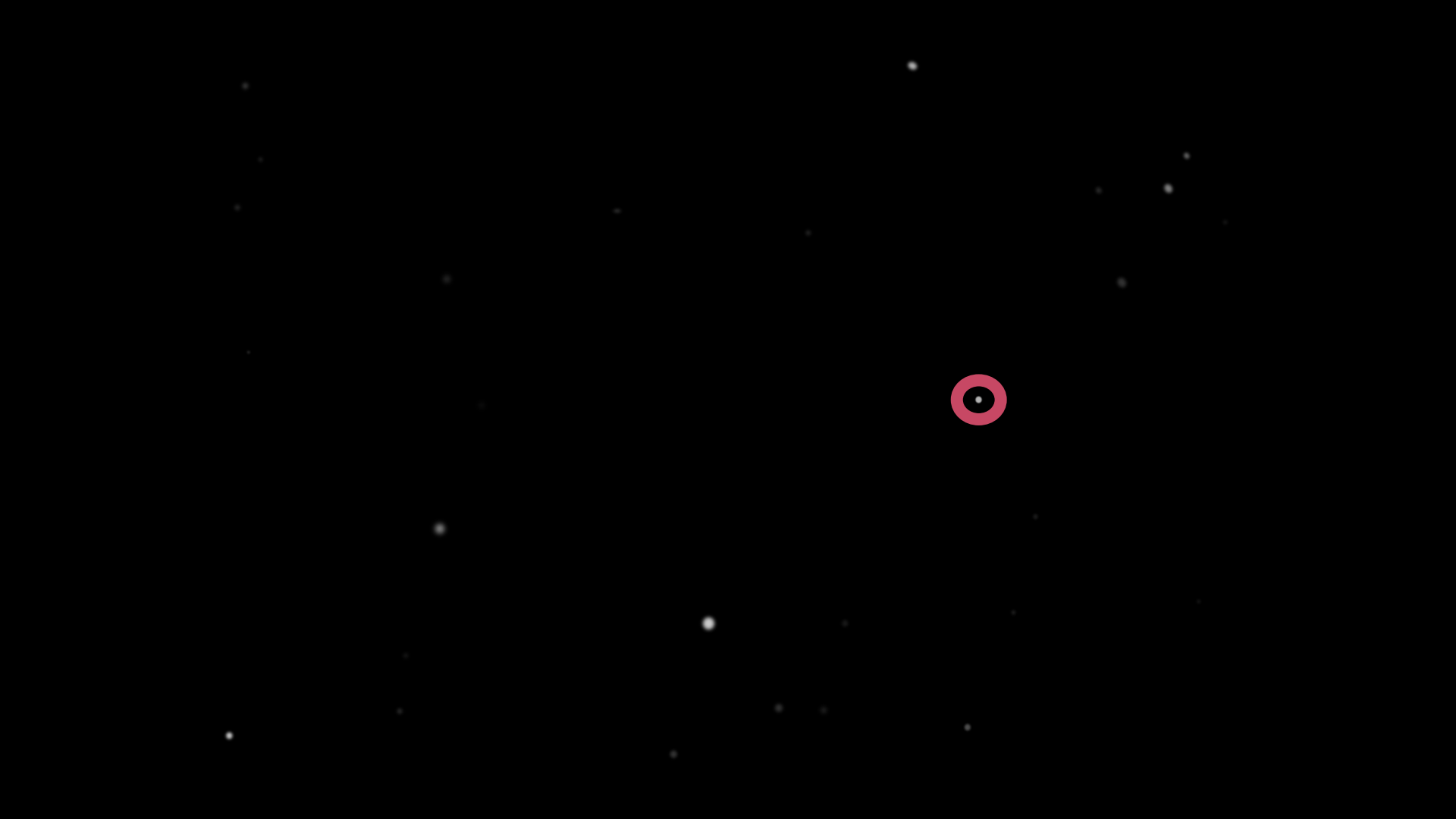


Falcon Heavy Launch Vehicle



Deep Space Optical Communications *Tech Demo*





Shepard et al 2017



Ferrais et al 2020



Shepard et al 2021



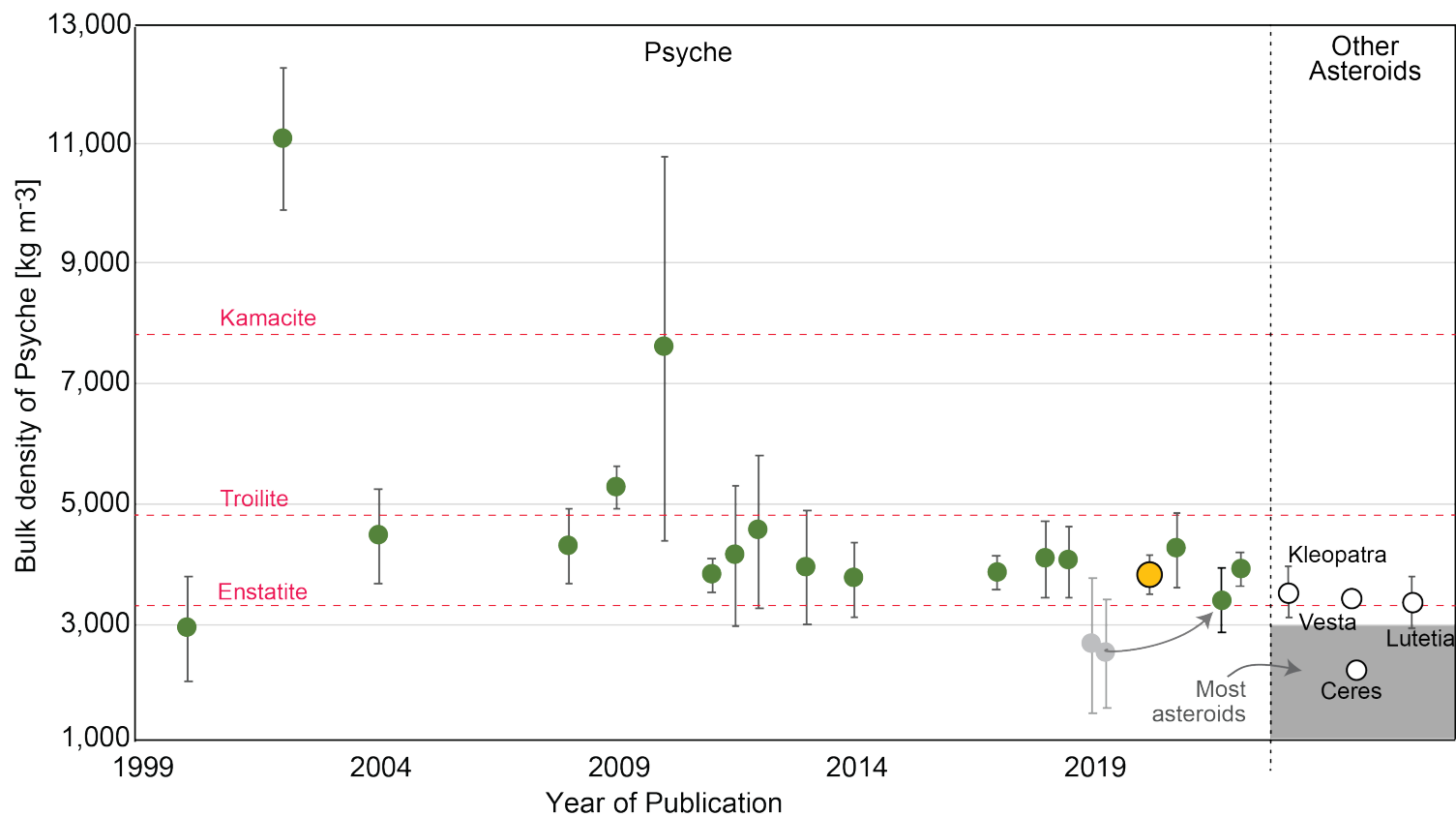
0°

270°

South Pole







ASTEROID BELT



EARTH



VENUS

MERCURY



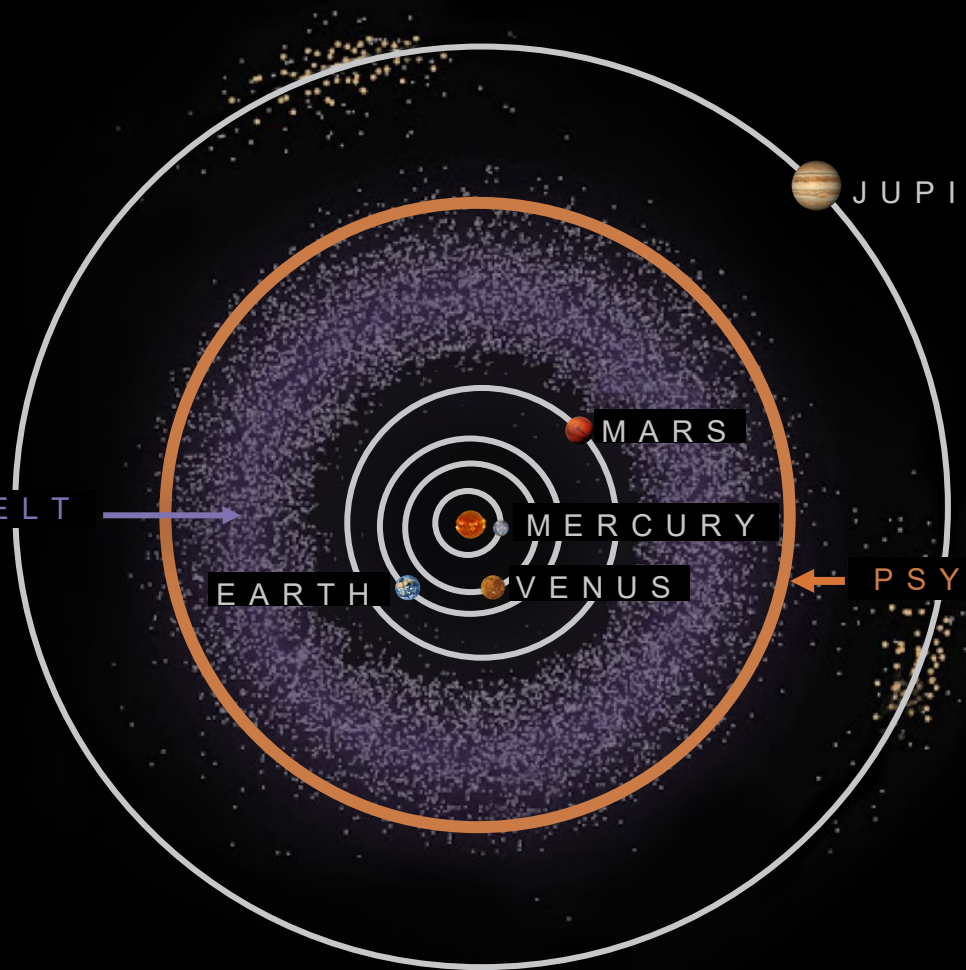
MARS



JUPITER



PSYCHE'S ORBIT



Forbes

SCIENCE

NASA Will Launch ‘Psyche’ Mission To Explore Asteroid Worth More Than The Global Economy

Jamie Carter Senior Contributor

I inspire people to go stargazing, watch the Moon, enjoy the night sky

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GIVE A

SMART NEWS

This Metal-Rich, Potato-Shaped Asteroid Could Be Worth \$10 Quintillion

In August, NASA is sending an orbiter to the space object, which may be the partial remains of planet-forming material made of nickel and iron



Elizabeth Gamillo

Daily Correspondent

January 4, 2022

Miami Herald

Business Politics Opinion • Food & Drink Climate Change Personal Finance Public Notices Obituaries

NATIONAL

Asteroid Psyche won't make you rich or hit Earth. NASA has another reason to visit it

BY KATIE CAMERO

UPDATED AUGUST 24, 2021 4:31 PM

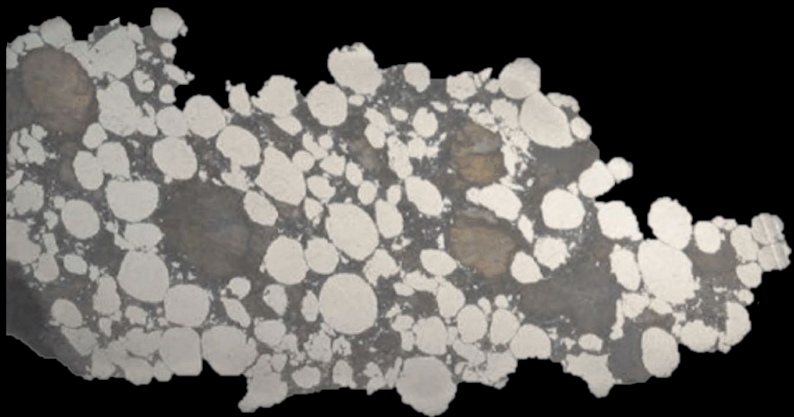


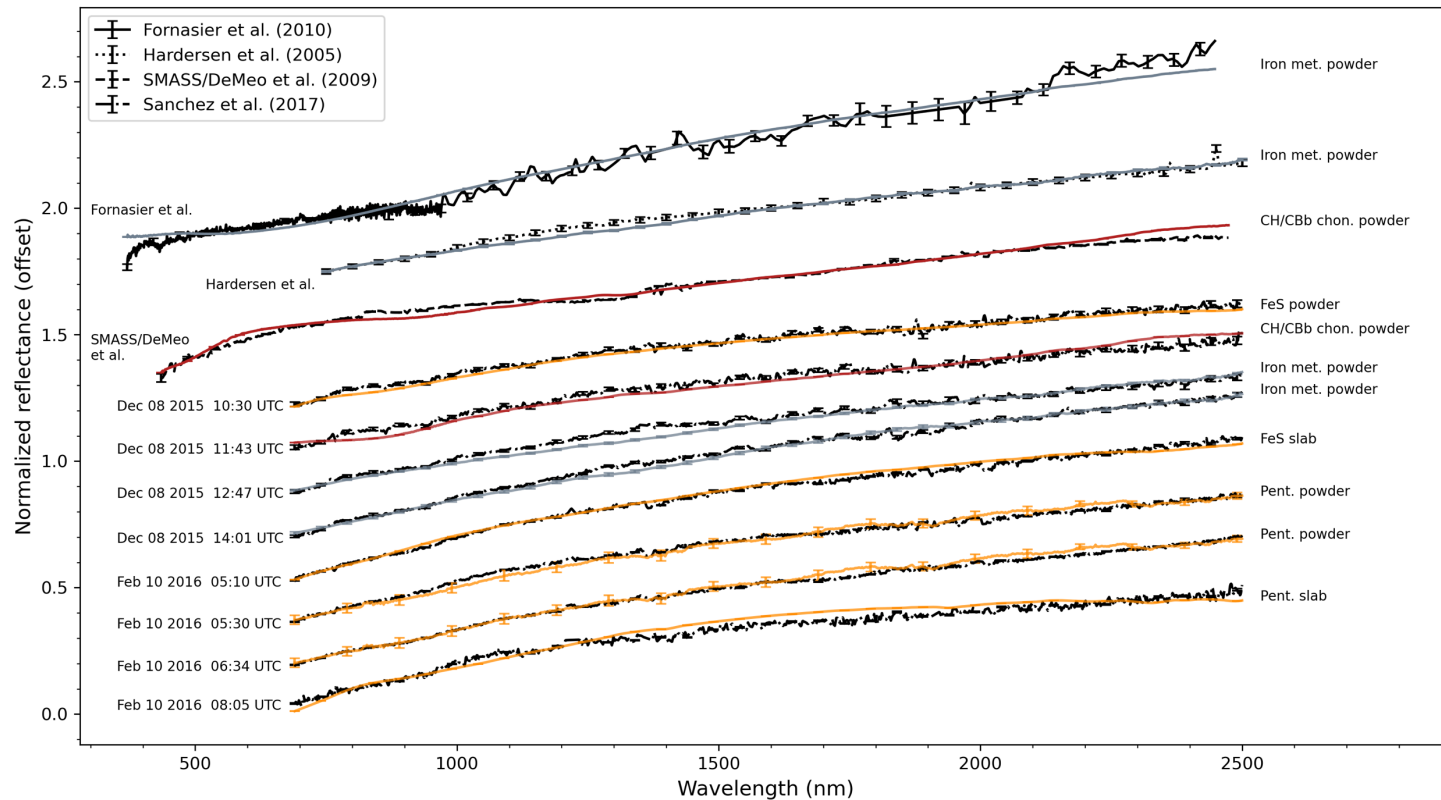
A NASA mission led by Arizona State University will visit the asteroid Psyche in 2026 following a four-year journey through the cosmos. It's thought to consist primarily of metal. *Courtesy of Maxar/ASU/P. Rubin/NASA/JPL-Caltech*



Objective A:
Determine
whether
Psyche is a
core, or if it is
unmelted
material







Dibb et al. (2023)

Student Collaboration & Public Engagement in 6th year

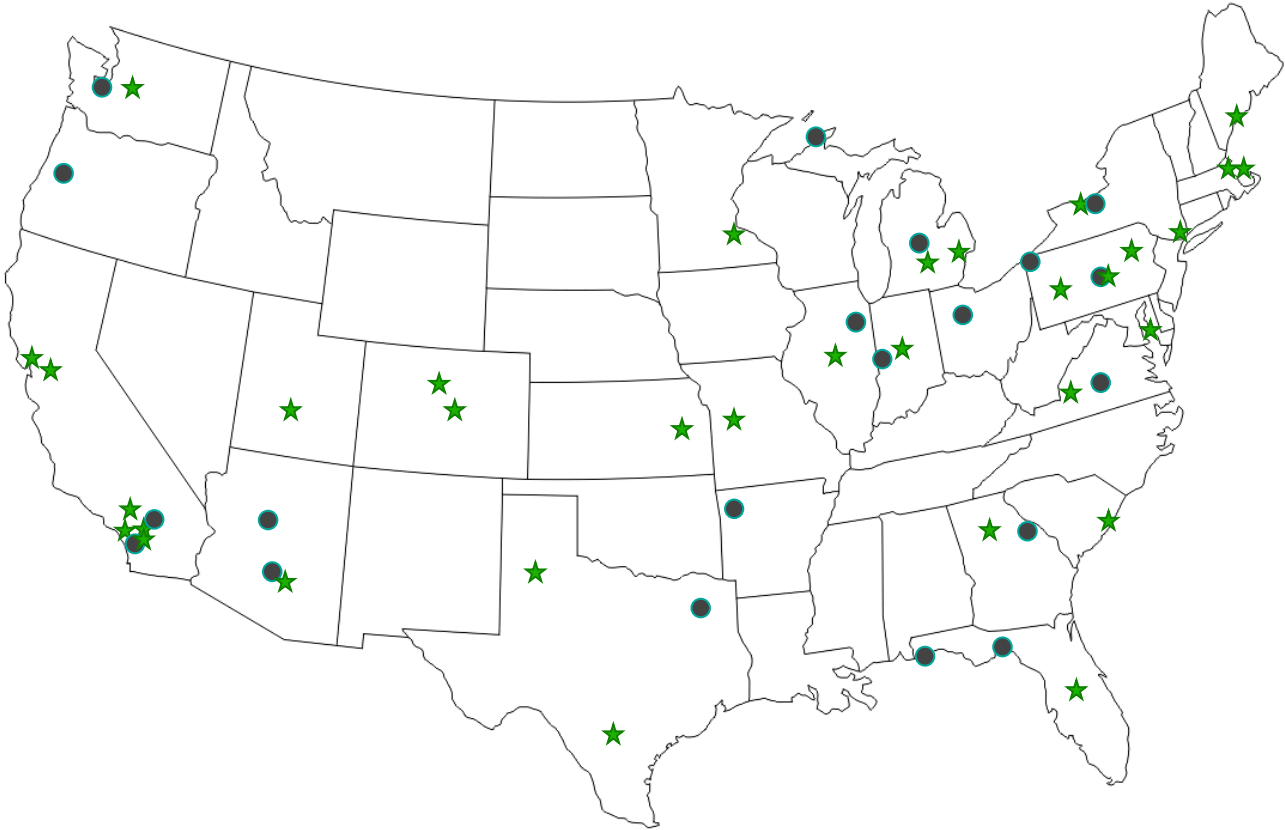
Prof. Cassie Bowman, ASU

- Undergraduate senior **capstone program**
- **Innovation Toolkit:** Free online courses
- **Psyche Inspired** artwork on the web/in museum exhibits – more than 325 works so far

Social Media/Web/blog/videos: @MissionToPsyche, nasa.gov/psyche, psyche.asu.edu



Student Collaborations Institutional Reach



1,523
undergraduates
since program
inception, at 58
colleges in 24
states and Puerto
Rico

- Capstone
- ★ Psyche Inspired

★ University of Puerto Rico, Mayagüez

But wait...

June 2022 We knew we could not accomplish 2022 launch

July 2022 Internal Review Board created, chaired by Tom Young

October 2022 Continuation/Termination Review - **Continued!**

November 4, 2022 press release

IRB report is available on NASA.gov linked to this release

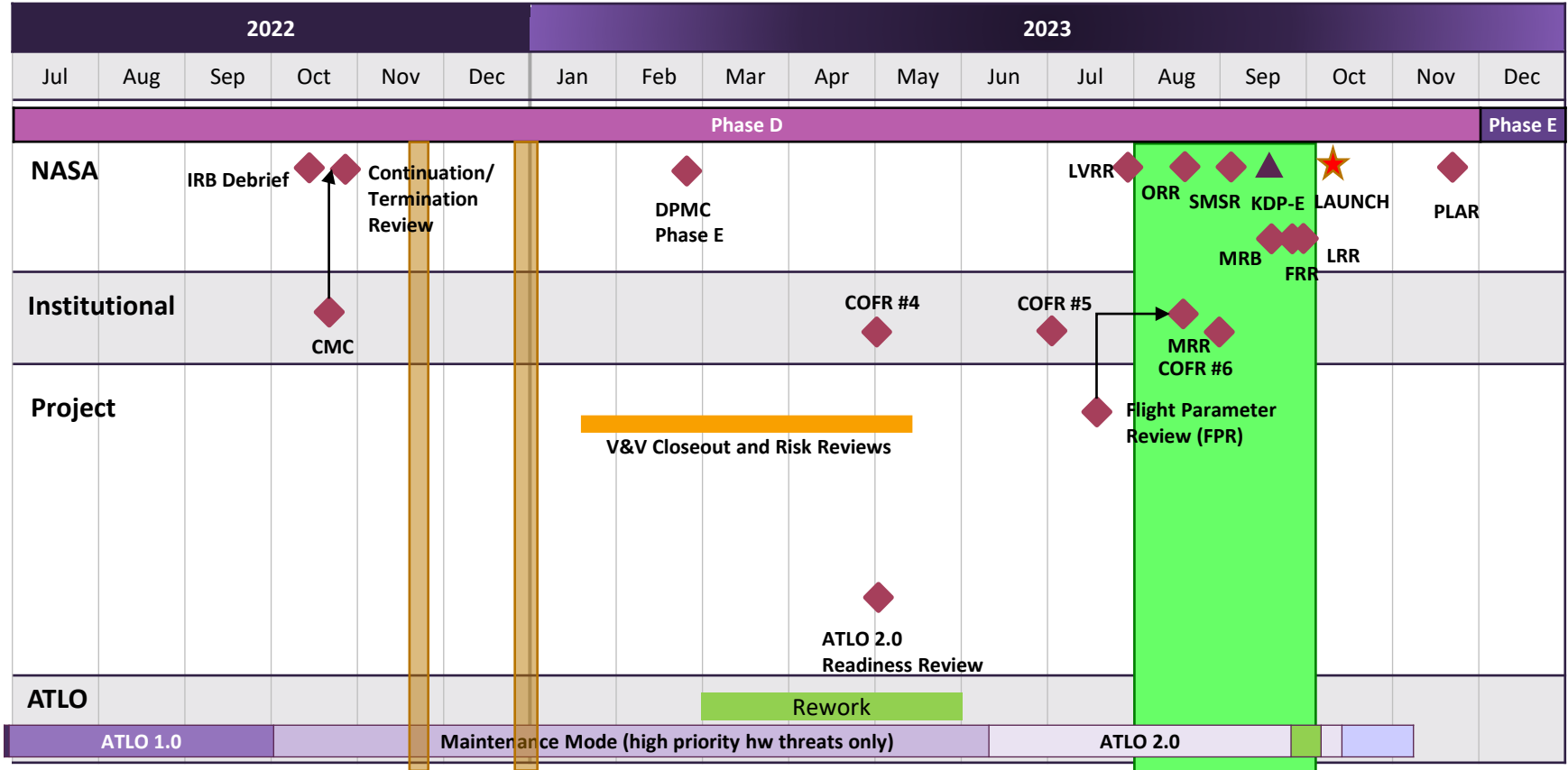
IRB major findings: Communications and staffing...

February 24, 2023 DPMC **confirming** our new Phase E budget and schedule



JUST A PART OF OUR 800+
PERSON TEAM

Project Schedule



Psyche

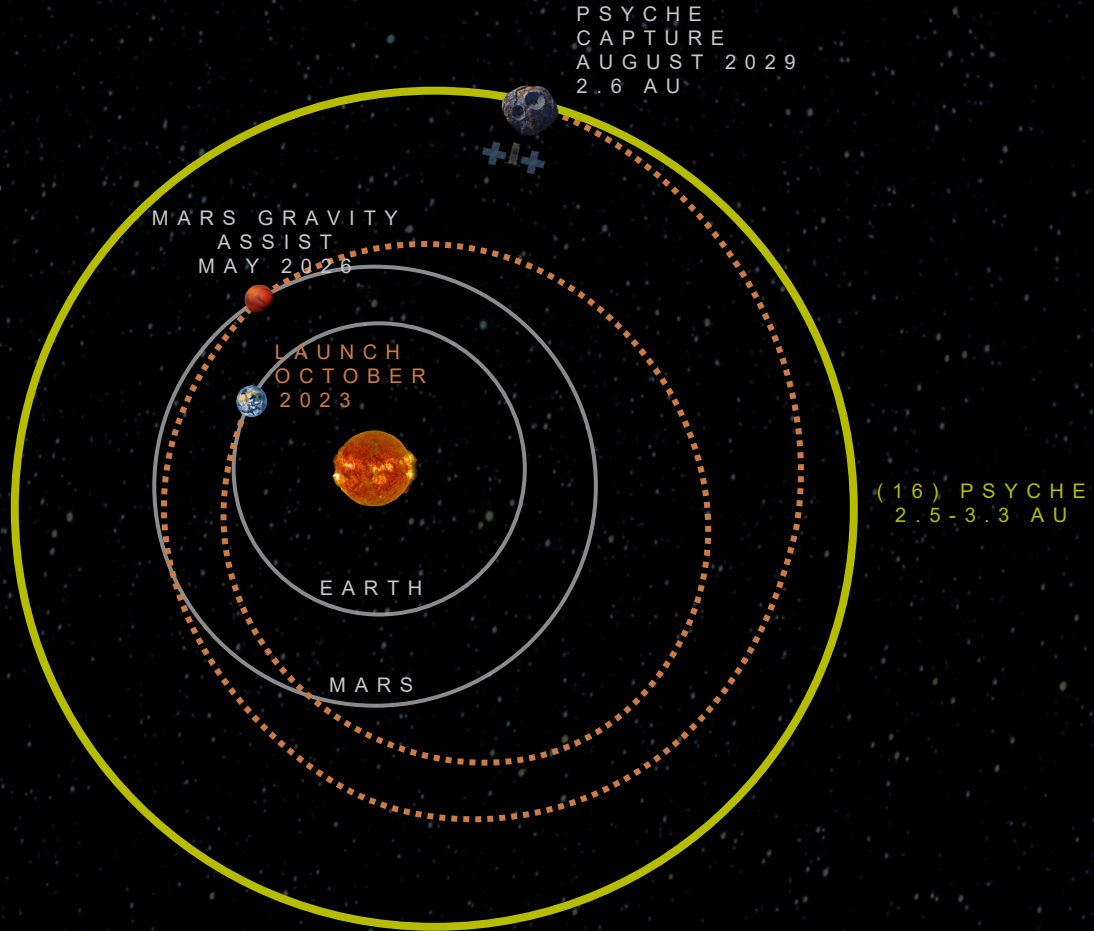
SPACEX



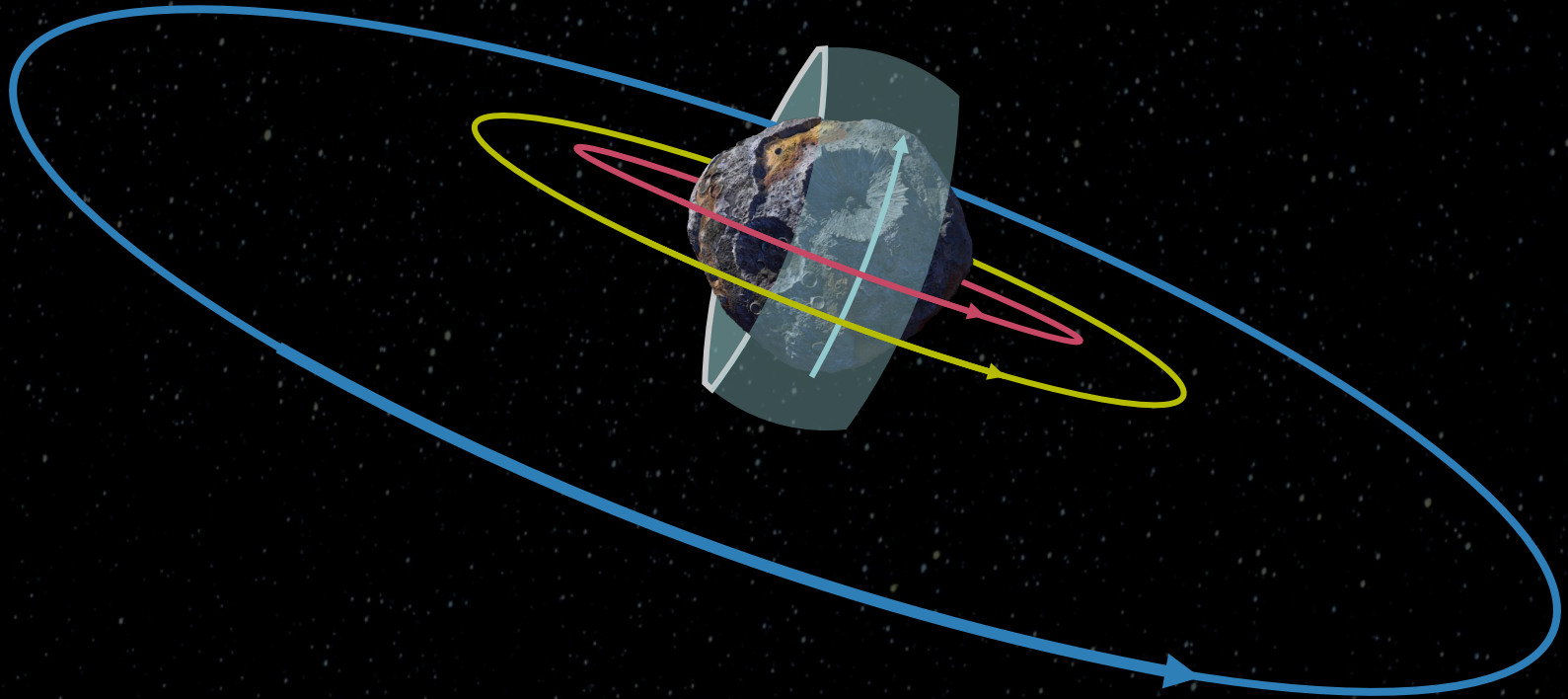
Launch Period:
August 2022
October 5-25, 2023

Arrival:
August 2029

■ (16) PSYCHE ORBIT
■ CRUISE TRAJECTORY

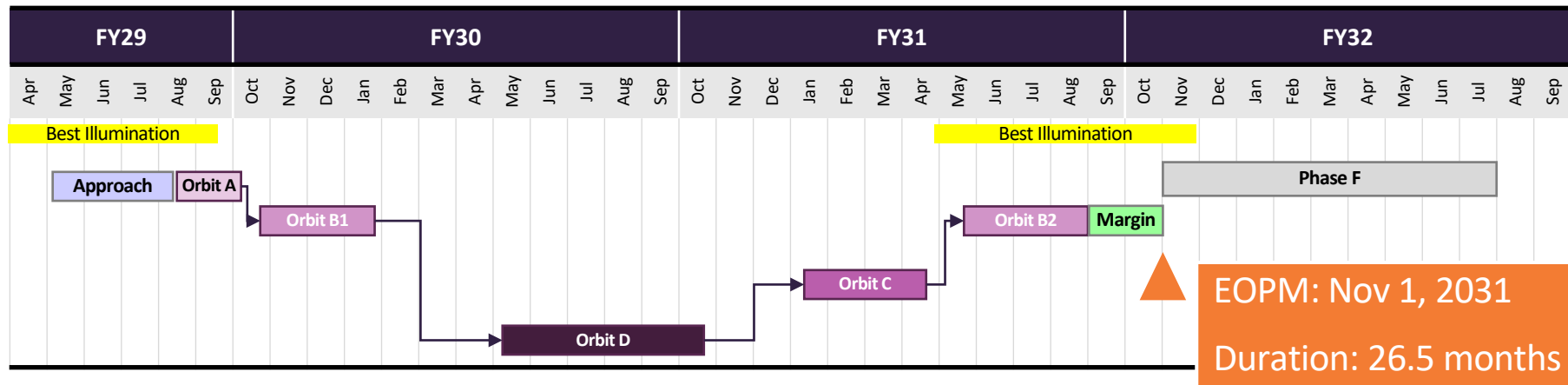


Psyche Science Orbits



New Science Mission Timeline

New orbital mission architecture meets all L1 Science Requirements



- **Orbit A:** Meets multispectral objectives
- **Orbit B1:** Achieves ~68% coverage (geologic mapping) and ~56% coverage (topography) vs 80% coverage rqmt
- **Orbit D:** Meets all GRNS objectives and avoids eclipses
- **Orbit C:** Meets all gravity science and magnetometer objectives (SEP angle > 40 deg throughout)
- **Orbit B2:** Completes all imager objectives and surface coverage requirements in primary lighting season
- Plan includes 2 months of Operational Timeline Margin at the end to accommodate anomalies that cause delays
 - Design for each orbit phase includes functional redundancy and margin to provide additional robustness

Shipping a spacecraft



Henry Stone and
me in the clean
highbay



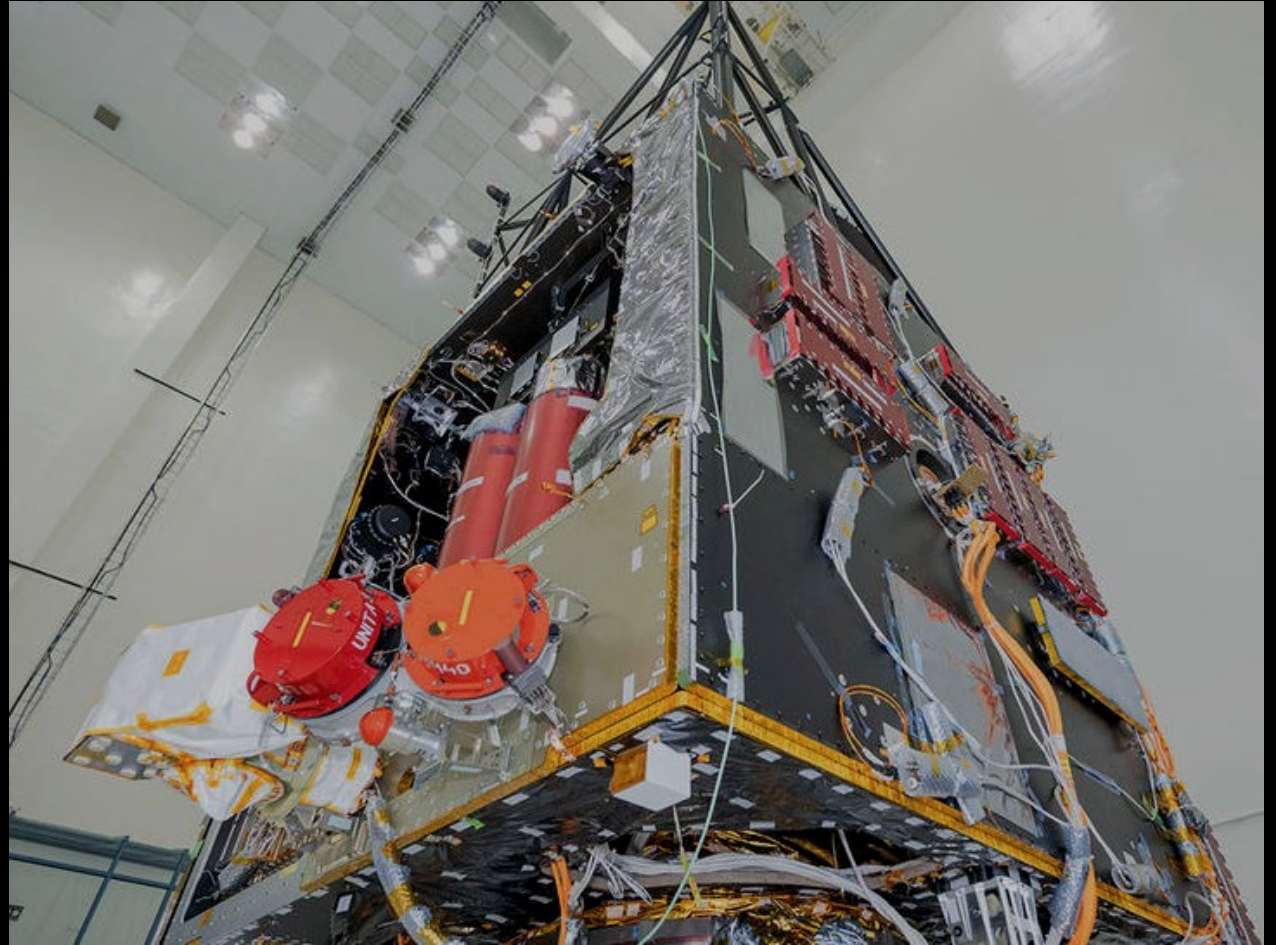
Deep Space Optical
Comm (tech demo)
installed,
July 2021



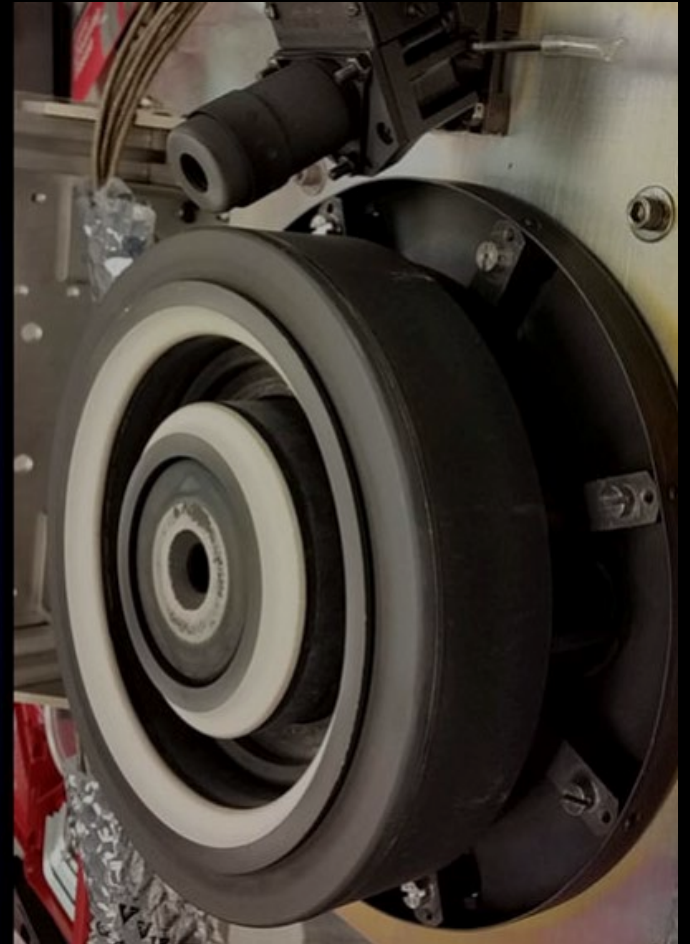
August 2021



SPT-140
Hall-effect
ion thrusters
installed,
August 2021



NASA Image of
the Day, October
2021



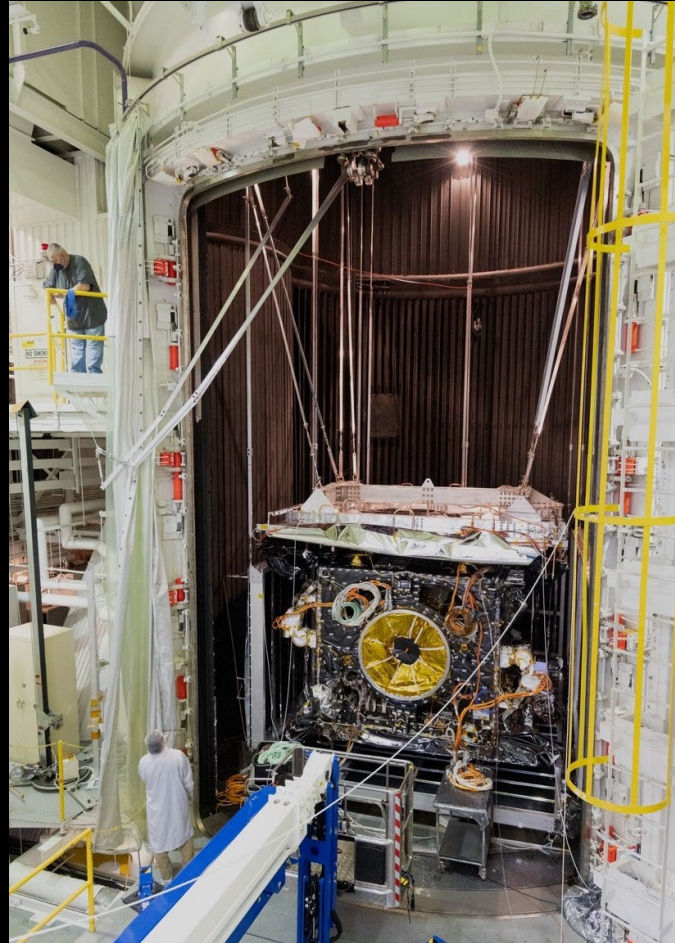
Lindy and Brian
Bone, our ATLO
manager, under the
spacecraft



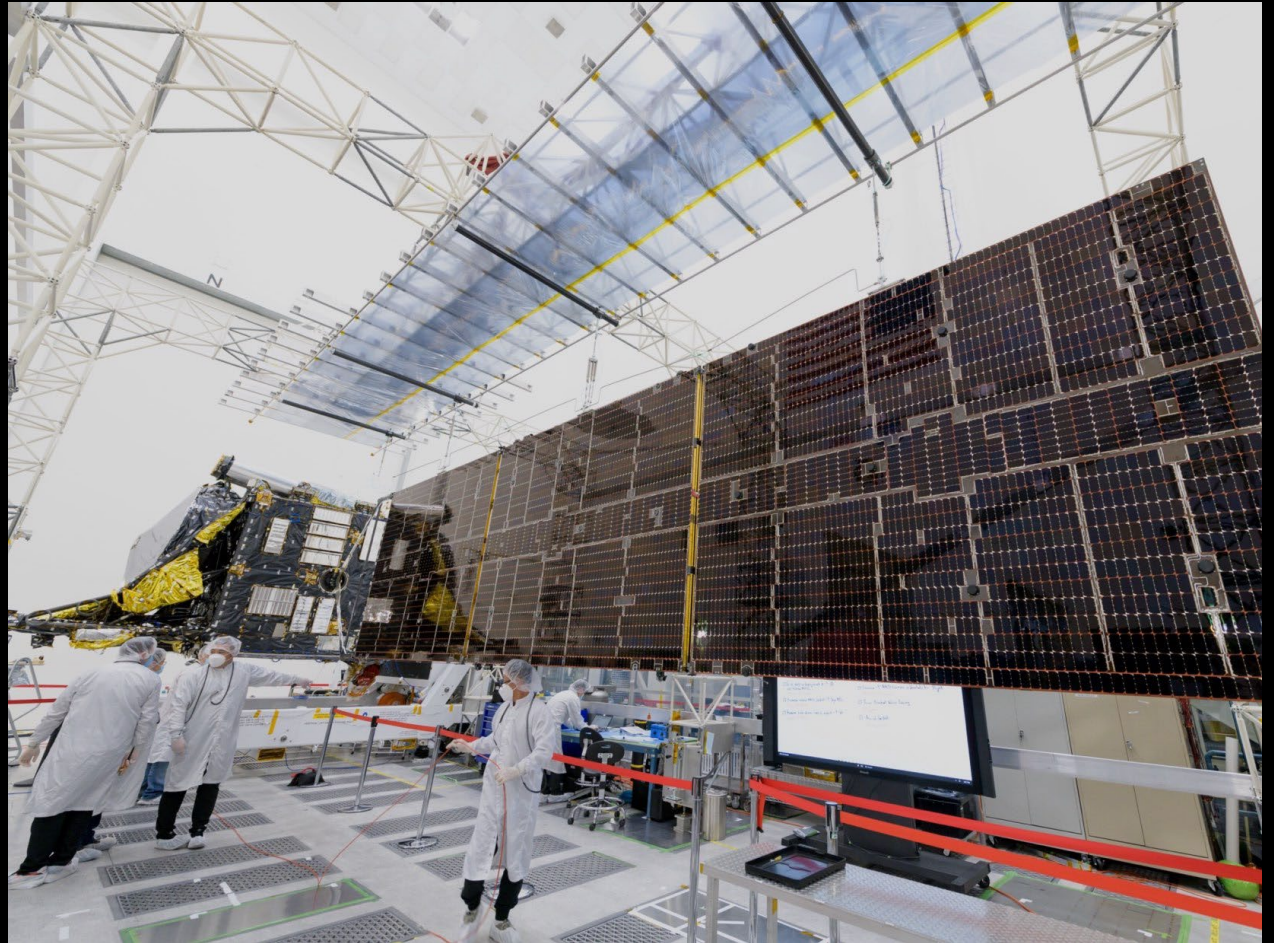
Preparing
for system
environmental
testing,
December 2021



Bottom of the
spacecraft as it
goes into the JPL
thermal-vacuum
chamber



With one solar
array wing partially
deployed



Psyche arrives at
Kennedy Space
Center in a C-17
transport plane
on April 29, 2022



