This mission will orbit asteroid 16 Psyche to fulfill the following objectives:

- Determine whether 16 Psyche is a core or if it is unmetalled material.
- Determine the relative ages of regions of its surface.
- Determine whether small metal bodies incorporate the same light elements as are expected in Earth’s high-pressure core.
- Characterize 16 Psyche’s topography and its impact crater morphology.

We will meet these objectives with three scientific instruments plus radio science:

1. Two block-redundant multispectral imagers with a clear filter and seven color filters will provide surface geology, composition, and topographic information.
2. A gamma-ray and neutron spectrometer will determine the elemental composition for key elements (Fe, Ni, Si, and K), as well as compositional heterogeneity across 16 Psyche’s surface.
3. Dual fluxgate magnetometers in a gradiometer configuration will characterize the magnetic field.
4. Radio science will map 16 Psyche’s gravity field using the X-band (microwave) system.

The mission is scheduled to launch in 2022, to rendezvous with 16 Psyche in 2026, and to orbit the body for 21 months. During the intervening years, the whole asteroid-research community has a new incentive to investigate topics we have largely overlooked: craters in metal, the likely topography of a metal asteroid, and the possibility of a metal asteroid having a magnetic field. There are also plans for years of student collaborations along the way, including art, writing, composing, primary and secondary education outreach (K-12 in the USA), and interdisciplinary capstone projects (a capstone project being a two-semester research project performed by a final-year school or university student).

Please visit the 16 Psyche website (https://sese.asu.edu/research/psyche) at Arizona State University for more information!

REFERENCES


