Everything is coming together for launch of NASA’s mission to a metal asteroid



Enlarge / NASA’s Psyche spacecraft is the centerpiece of a $1.23 billion mission to explore a kind of asteroid that’s never been visited before.
Stephen Clark/Ars Technica

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TITUSVILLE, Florida—NASA’s Psyche spacecraft is running a year behind schedule before the beginning of its journey to explore a metal asteroid, but mission managers said Friday the probe is essentially ready for launch in less than two months.

The spacecraft is heading for asteroid Psyche, the mission's namesake, about three times farther from the Sun than Earth. Psyche is the largest metal-rich asteroid in the Solar System, with an average diameter of around 140 miles (226 kilometers). Observations from Earth indicate it's made mostly of nickel and iron.

The Psyche mission will be the first to explore a metal-rich asteroid, which may be the leftover core of a proto-planet that began forming in the early Solar System more than 4 billion years ago.

The spacecraft is ready for fueling inside a clean room near the launch site at the Kennedy Space Center in Florida. Two large solar arrays are folded up like an accordion against the central body of the spacecraft, and technicians have finished installing blankets of thermal insulation to shield the probe from the harsh cold of deep space.

In a few days, ground teams plan to start loading more than a metric ton of xenon gas into seven tanks inside the Psyche spacecraft, and cold nitrogen gas into three separate reservoirs. Those propellants will drive the Psyche spacecraft toward its destination in the asteroid belt between Mars and Jupiter.

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The xenon will feed an electric propulsion system with four Hall effect thrusters, which will pulse almost continuously for Psyche's nearly six-year voyage to its asteroid target, where it will enter orbit in August 2029. The spacecraft will maneuver into several different orbits around Psyche, getting as close as 47 miles (75 kilometers) before its primary exploration phase ends in late 2031.

Next steps

In September, SpaceX will bring in the two payload fairing shells for its Falcon Heavy rocket. The Psyche spacecraft will be closed up inside, and if all goes according to plan, that’s the last time the engineers and scientists who developed the mission will see their hardware with their own eyes.

Ars had a chance to see the Psyche spacecraft up close Friday with other news media representatives. The upshot: All’s good for Psyche’s launch on October 5.

“We are really buttoned up,” said Henry Stone, Psyche’s project manager at NASA’s Jet Propulsion Laboratory. “This is how the spacecraft will get mounted onto the interface to the Falcon Heavy.”

“When you look at the body of this vehicle, it’s about 8 feet across the bottom cube, and about 10 feet tall, not including the towers or booms, to which two of our science instruments are attached,” Stone said. “One of the obvious features on the spacecraft is these very, very large solar arrays.”

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