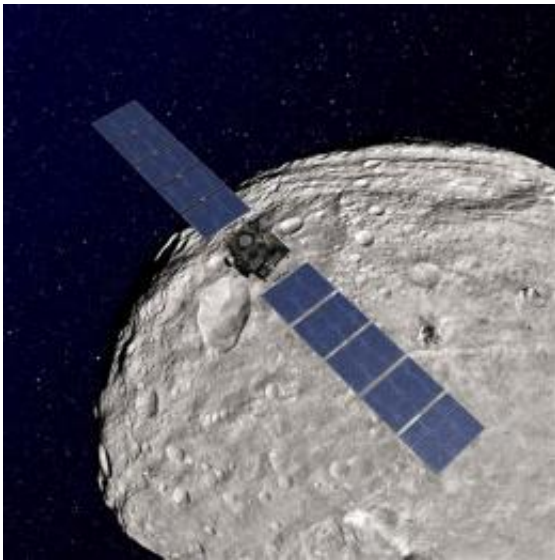


Dawn craft to depart asteroid for dwarf planet

September 5 2012, by Alicia Chang



An undated artist rendering released by NASA shows the NASA Dawn spacecraft in orbit around the giant asteroid Vesta. After spending a year examining Vesta, Dawn is poised to depart and head to another asteroid, Ceres, where it will arrive in 2015.(AP Photo/NASA)

One asteroid down, one to go. After spending a year gazing at Vesta, NASA's Dawn spacecraft was set to cruise toward the most massive space rock in the asteroid belt between Mars and Jupiter—a voyage that will take nearly three years.

Firing its ion propulsion [thrusters](#), Dawn had been slowly spiraling away from Vesta for more than a month until it was to pop free from its

gravitational grip. Since its antenna was pointed away from Earth during this last maneuver, engineers would not know until Wednesday how it went.

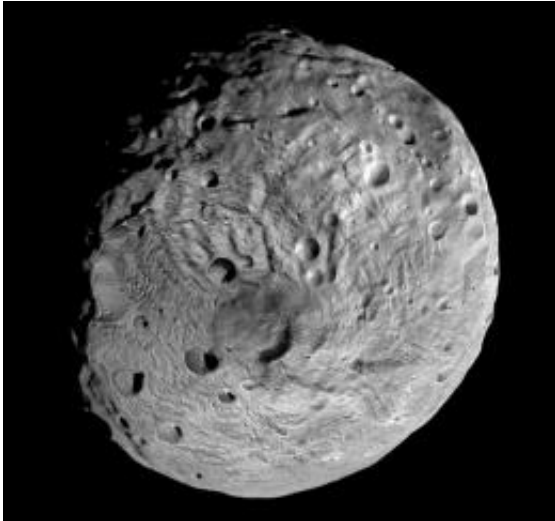
The departure was considered ho-hum compared with other recent missions—think Curiosity's white-knuckle "seven minutes of terror" dive into Mars' atmosphere.

"It's not a sudden event. There's no whiplash-inducing maneuver. There's no tension, no anxiety," said chief engineer Marc Rayman of the NASA Jet Propulsion Laboratory, which manages the \$466 million (€370 million) mission. "It's all very gentle and very graceful."

Launched in 2007, Dawn is on track to become the first spacecraft to rendezvous with two [celestial bodies](#) in a bid to learn about the solar system's evolution.

Dawn slipped into orbit last year around Vesta—about the size of the U.S. state of Arizona—and beamed back stunning close-ups of the lumpy surface. Its next destination is the Texas-size Ceres, also known as a dwarf planet.

Vesta and Ceres are the largest bodies in the [asteroid belt](#) littered with chunks of rocks that never quite bloomed into full-fledged planets. As cosmic time capsules, they're ideal for scientists trying to piece together how Earth and the other planets formed and evolved.



This undated image released by NASA and taken by the NASA Dawn spacecraft shows the south pole of the giant asteroid Vesta. After spending a year examining Vesta, Dawn was poised to depart and head to another asteroid Ceres, where it will arrive in 2015. (AP Photo/NASA)

During its yearlong stay at Vesta, Dawn used its cameras, [infrared spectrometer](#), and gamma ray and [neutron detector](#) to explore the asteroid from varying altitudes, getting as close as 130 miles (209 kilometers) above the surface.

Dawn uncovered a few surprises. Scientists have long known that Vesta sports an impressive scar at its south pole, likely carved by an impact with a smaller asteroid. A closer inspection revealed that Vesta hid a second scar in the same region—evidence that it had been whacked twice within the last 2 billion years.

The collisions spewed chunks of debris into space; some fell to Earth as meteorites.

With its rugged exterior—complete with grooves, troughs and pristine

minerals—and iron core, Vesta acts more like an "almost planet" than garden-variety, lightweight asteroids.

Vesta was "on its way to planethood if it continued to grow," said chief scientist Christopher Russell of the University of California, Los Angeles.

Asteroids have received renewed attention of late. President Barack Obama canceled a return to the moon in favor of landing astronauts on a yet-to-be-selected [asteroid](#) as a stepping stone to Mars. A private company headed by space entrepreneurs wants to mine precious metals from near-Earth asteroids.

After racking up 1.7 billion miles journeying to Vesta, Dawn has another 930 million miles to reach Ceres, where it will arrive in early 2015.

Such a trip is possible because of Dawn's futuristic [ion propulsion](#) engines, which provide gentle yet constant acceleration. Once confined to science fiction, the technology has been tested in space and is more efficient than conventional rocket fuel that powers most spacecraft.

Scientists expect a different world at Ceres. Unlike the rocky, pockmarked Vesta, the nearly spherical Ceres has a dusty surface with an icy interior. Some think it may even have frost-covered poles.

"Almost everything we see at Ceres will be a surprise and totally different from Vesta," Russell said.

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