

NASA, satellite company team up to explore unique asteroid

March 3 2017, by Aylin Y. Woodward, The Mercury News



An artist's impression of an asteroid breaking up. Credit: NASA/JPL-Caltech

Mention the word "asteroid" and you'll probably think about the downfall of the dinosaurs, or perhaps Bruce Willis and Ben Affleck duking it out in the movie "Armageddon."

Now, NASA and a Palo Alto-based satellite manufacturer are working to get a spacecraft to an asteroid before one gets to us.

Asteroid exploration has become one of NASA's top goals, and Space Systems Loral will play a key role in an upcoming mission that will allow scientists to get research equipment to a unique asteroid to study its composition. It's the company's first major foray into the world of deep-space exploration.

NASA's Discovery Program, aimed at improving our understanding of the solar system by exploring planets, moons and other celestial bodies, announced last month that it had selected two asteroid-centric missions - each with a \$450 million price cap - to launch in the next decade. One of the missions involves sending a spacecraft to Psyche, an asteroid named after the Greek goddess of the soul that is made entirely of metal.

Scientists say metal asteroids are one of the last remaining things in our solar system that they have never seen up close.

"We've looked at rocky planets, gas giants, icy planets, rocky asteroids, comets - but never anything like this," said Jim Bell, a professor of planetary science at Arizona State University, where a team of scientists is leading the Psyche mission. The scientists believe the asteroid may be the metal core of a planet that was stripped of its rocky outer layers when it was destroyed billions of years ago.

Asteroids - rocky space bodies that orbit the sun - range in size from 600 miles in diameter to dust particles. Like Psyche, most are in the [asteroid belt](#) between Mars and Jupiter. NASA estimates the belt contains between 1.1 million and 1.9 million asteroids larger than a half-mile in diameter, plus millions of smaller ones.

Lindy Elkins-Tanton, the Arizona team's principal investigator, recently

told Space News that visiting Psyche will allow scientists to "literally visit a planetary core - the only way that humankind ever can." Psyche's metallic iron and nickel composition is similar to Earth's core, so studying the asteroid may help scientists understand how planets' layers - such as cores and crusts - separate.

Bell, Elkins-Tanton's second-in-command, will be in charge of obtaining color images of the asteroid and figuring out its surface geology from the images.

For Bell, Psyche represents the opportunity to study a world made of metal. "We don't know what to expect regarding impact craters or tectonic features," he said. "Our predictions are all over the map of Dr. Seuss-like landscapes."

The mission, set to launch from Florida's Kennedy Space Center in 2023, hopes to use data collected from the metallic asteroid to help scientists learn about how planets with cores like Psyche formed during the early days of our solar system.

Erik Asphaug, another investigator on the team, likens himself to "a kid in a candy store." Like Bell, he yearns to understand the geology of an entirely metallic body: "Was there ever water on Psyche? Is there evidence for chemical processes? Plate tectonics?"

Added Bell: "We're also trying to figure out what these kinds of asteroids are like, to inform us about others like it that could be a threat to Earth in the future."

The Arizona team says it will take five to seven years for the mission's spacecraft to get to the asteroid - which is 130 miles in diameter - and then it will spend one year collecting data as it orbits the asteroid.

Bell's imaging camera, along with a gamma ray neutron detector to detect the asteroid's composition and a magnetometer to detect its magnetic fields, will also be making the journey. Information will be relayed back via a radio antenna on the spacecraft that communicates with the deep-space network antennas on Earth.

The responsibility of building the shuttle-bus-size spacecraft that will travel to Psyche falls to Space Systems Loral, or SSL - a 60-year-old company that constructs and launches commercial communications satellites for companies such as Sirius XM and DirecTV.

When the company announced it was awarded the mission's \$127 million contract in early January, SSL President John Celli said "years of experience and success in building state-of-the-art spacecraft" positioned the company to contribute to the NASA mission.

The spacecraft will be built in conjunction with NASA's Jet Propulsion Laboratory in Pasadena, which will later integrate the scientific instruments and computer "brain." Bob Mase, deputy project manager for the Psyche mission at JPL, called it a "tag-team effort that leverages both parties' strengths."

Harrison Pitman of Made In Space, a Mountain View company that manufactures technology for use in space, said that his company recognizes the importance of reaching resource-rich asteroids like Psyche.

Made In Space, which did not compete for the Psyche project contract, is working on another project aimed at traveling to an asteroid in deep space. The project involves using robotics to convert an asteroid into a self-propelled spacecraft that flies itself back to Earth's orbit. Once in orbit, the asteroid can be mined for resources like rare metals that are unobtainable on Earth.

"We believe that the insights gained on this Psyche mission and similar missions will provide the groundwork necessary to successfully develop asteroid-mining operations like ours," Pitman said.

The Psyche collaboration also marks a new trend at the nexus of scientific exploration and commercial production.

Al Tadros, a vice president at SSL who has been with the company for 28 years, said the firm has had to make some major adjustments to pull off the [asteroid](#) project - but is loving every minute of it.

"It's a change from communication satellites, which are business- and profit-driven," he said. "But like our commercial business, NASA projects demand low risk and on-time delivery."

Tadros said SSL was chosen from more than 20 proposals following an initial selection process, vigorous oral evaluations and an on-site visit from 80 NASA reviewers.

"It's pretty cool," Tadros said with a laugh.

©2017 The Mercury News (San Jose, Calif.)
Distributed by Tribune Content Agency, LLC.

Citation: NASA, satellite company team up to explore unique asteroid (2017, March 3) retrieved 24 April 2024 from <https://phys.org/news/2017-03-nasa-satellite-company-team-explore.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--