

# A company has plans to mine asteroids that zip close by Earth, both to provide supplies for future interplanetary travellers and to bring back precious metals

KENNETH CHANG

PERHAPS it will be a platinum rush that finally opens up the final frontier.

Tuesday, a new company called Planetary Resources Inc. will unveil its plans to mine asteroids that zip close by Earth, both to provide supplies for future interplanetary travellers and to bring back precious metals like platinum.

The venture may sound far-fetched—perhaps along the lines of Newt Gingrich's campaign promise to colonize the moon—but it has already attracted some big-name investors, including Larry Page and Eric Schmidt of Google, as well as profitable technology development contracts.

"If you believe that resources in space are critical towards a space-faring future, you will inevitably come to the result that the asteroids—in fact, the near-Earth asteroids—are the stepping stones to the rest of the solar system," Eric C. Anderson, one of the company's co-founders, said in a telephone interview.

He was quick to add that the company's business premise was not as impractical as it might sound. Because an asteroid is devoid of air and its gravitational pull is negligible, getting there is relatively easy. Unlike landing on the moon or Mars, a robotic mining spacecraft

would not need parachutes or a large engine to fly up to and attach itself to a small asteroid.

"There are probably about 1,500 near-Earth asteroids that are energetically easier to reach than the surface of the moon," Anderson said.

Some of the asteroids are icy—up to 20 percent water—and the water could be drawn out by melting the ice. The water could be taken to supply stopovers for future astronauts or broken down into breathable oxygen or propellant for spacecraft on interplanetary missions.

Other asteroids are rocky and metallic. A throng of robotic mining spacecraft could grind up pieces of the asteroid and smelt it to capture precious metals within.

Platinum—which is used for jewelry, electronics components and automobile catalytic converters—fetches about \$1,500 an ounce these days, so a single spacecraft would not have to bring back a lot of it for the enterprise to make money. More common metals like iron could perhaps be used as raw materials in space factories, churning out spacecraft and other structures.

Anderson and Peter H. Diamandis, the other founder of Planetary Resources, are already in the space tourism business with a company called Space Adventures, which has arranged eight trips to the International Space Station. While that ven-

ture has been a "reasonably good success story," Diamandis said, "the realisation, at least for us, was it wasn't on track to really drive humanity opening the space frontier at the level that we desire."

About three years ago, Diamandis recalled, he and Anderson asked the question, "So what's next?"

They set up Planetary Resources a couple of years ago but have kept quiet about it until now. The president and chief engineer is Christopher A. Lewicki, who previously

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worked as a manager on Mars missions at NASA's Jet Propulsion Laboratory. Based in Bellevue, Washington, the company employs about 25 engineers and has development contracts for technologies like laser communications that it believes it will need for prospecting and mining missions.

"The company is cash flow positive, already," Anderson said.

In addition to the leaders of Google, investors include Ross Perot

Jr., chairman of Perot Systems; and Charles Simonyi, a former chief software architect for Microsoft and one of the space tourists who has visited the space station. Thomas D. Jones, a former NASA shuttle astronaut and James Cameron, the filmmaker and deep-sea explorer, are advisers.

Anderson declined to say exactly how much money the company has raised.

"It's plenty," Anderson said. "The collective net worth of our investors is like \$50 billion, and they know what

they're getting into."

The plan is to launch the first spacecraft—a small telescope to find small nearby asteroids—within the next two years. Next, the company would send out a batch of small explorers to visit some of them. Actual mining would begin after that, first targeting water and then platinum.

From meteorites that have landed on Earth, scientists know that some asteroids have concentrations of plat-

inum 20 times that of ore in a platinum mine on Earth. But the concentration of the platinum would still be tiny—perhaps a few hundred atoms per million—and the company would need to develop robotic technology to extract the element from the rocks.

"To do large, large-scale mining of asteroids, you're talking about decades," Anderson said.

One possibility the company is considering is to nudge a small asteroid, perhaps one as long as a football field, into an orbit around Earth closer than the moon. Then Planetary Resources—and possibly other companies—could try out their ideas of how to set up a mining operation.

"As one of the many options of how we could start the resource development, that's certainly among them," said Lewicki, the company president.

Drawing on nearby asteroids for natural resources is actually a very old idea. In 1926, Konstantin Tsiolkovsky, a Russian scientist who worked out many of the basic requirements of rockets and space travel, listed colonization of the asteroid belt as number 12 of 16 steps in his "plan of space exploration." Other dreamers have come along more recently.

"This is actually the fifth or sixth company that has been invented for purpose of doing it," said John S. Lewis, a retired University of Arizona professor who wrote a 1997 book,

*Mining the Sky* (Basic Books), that described much of what Planetary Resources is looking to do.

The American Rocket Co. in the mid-1980s developed a rocket motor but Lewis said George A. Koopman, one of that company's founders, told him the ultimate destination was the riches of the asteroids. When American went out of business in 1995, James Benson, one of its founders, started another company, SpaceDev.

A decade ago, Benson made promises similar to the ones Planetary Resources has. SpaceDev's Near Earth Asteroid Prospector was to rendezvous with an asteroid, conduct scientific observations and claim it as private property. It was never built. (While SpaceDev never got to orbit, the company, now part of Sierra Nevada Corp., did have a notable space achievement. Its motors powered the SpaceshipOne, the first privately financed manned flights to space, and will also be used in Richard Branson's upcoming Virgin Galactic spacecraft.)

Lewis thinks that Planetary Resources has a better shot at getting to the asteroids—he was involved with both American and SpaceDev and is also an adviser to Planetary Resources—because unlike previous ventures, "this one has the distinct advantage in that it has technical savvy and adequate capitalisation to get started."

NYT