

Space Robots May Mine Precious Metals

Donna Blankinship, Seth Borenstein, Associated Press

SEATTLE (AP) — Using space-faring robots to mine precious metals from asteroids almost sounds easy when former astronaut Tom Jones describes it — practically like clearing a snow-covered driveway.

Jones, an adviser to a bold venture that aims to extract gold, platinum and rocket fuel from the barren space rocks, said many near-Earth asteroids have a loose rocky surface held together only weakly by gravity.

"It shouldn't be too hard to invent a machine like a snow blower to pick up material off these asteroids," explained Jones, a veteran of four space shuttle missions.

But it will be risky and monstrously expensive, which is why some of the biggest and richest names in high-technology — including the barons of Google and filmmaker James Cameron — are behind the project.

If the plan gets off the ground as planned, robots could be extracting cosmic riches within 10 years.

Outside experts are skeptical because the program would probably require untold millions or perhaps billions of dollars, plus huge advances in technology. Yet the same entrepreneurs behind this idea also pioneered the selling of space rides to tourists — a notion that seemed fanciful not long ago.

"Since my early teenage years, I've wanted to be an asteroid miner. I always viewed it as a glamorous vision of where we could go," Peter Diamandis, one of the founders of Planetary Resources Inc., told a news conference Tuesday at the Museum of Flight in Seattle. The company's vision "is to make the resources of space available to humanity."

The inaugural step, to be achieved in the next 18 to 24 months, would be launching the first in a series of private telescopes that would search for the right type of asteroids.

The proposal is to use commercially built robotic ships to squeeze rocket fuel and valuable minerals out of the rocks that routinely whiz by Earth.

Several scientists not involved in the project said they were simultaneously thrilled and wary, calling the plan daring, difficult — and pricey. They don't see how it could be cost-effective, even with platinum and gold worth nearly \$1,600 an ounce. An upcoming NASA mission to return just 2 ounces (60 grams) of an asteroid to Earth will cost about \$1 billion.

The entrepreneurs of Planetary Resources have a track record of profiting from

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space ventures. Diamandis and co-founder Eric Anderson led the way in selling space rides to tourists, and Diamandis has a separate company that offers "weightless" airplane flights.

Investors and advisers to the new company include Google CEO Larry Page, Google Executive Chairman Eric Schmidt and Cameron, the man behind the Hollywood blockbusters "Titanic" and "Avatar."

Extracting water is key to deep space exploration, as well as for driving costs down, Anderson said. The water can be converted into fuel by separating the hydrogen and oxygen. On a manned flight, it could also be used for drinking and growing food.

The plan is to take water from an asteroid to a spot in space where it can be broken down into fuel. From there, it can easily and cheaply be shipped to Earth orbit for refueling commercial satellites or spaceships from NASA and other countries.

Anderson acknowledged the many potential pitfalls.

"There will be times when we fail," he said. "There will be times when we have to pick up the pieces and try again."

The mining, fuel processing and later refueling would all be done without humans, Anderson said.

The target-hunting telescopes would be tubes only a couple of feet long, weighing only a few dozen pounds and small enough to be held in your hand. They should cost less than \$10 million, company officials said.

The idea that asteroids could be mined for resources has been around for years. Asteroids are the leftovers of a failed attempt to form a planet billions of years ago. Most of the remnants became the asteroid belt between Mars and Jupiter, but some pieces were pushed out to roam the solar system.

Those free-flying asteroids — ranging from a couple of dozen feet (meters) wide to nearly 10 miles (16 kilometers) long — are the ones being targeted for rare Earth platinum metals that are used in batteries, electronics and medical devices, Diamandis said.

In the past couple of years, NASA and other space agencies have shifted their attention from the moon and other planets toward asteroids. Because asteroids don't have any substantial gravity, going after them costs less fuel and money than going to the moon, Anderson said.

There are probably 1,500 asteroids that pass near Earth that would be good initial targets. They are at least 160 feet (50 meters) wide, and Anderson figures 10 percent have water and valuable minerals.

"A depot within a decade seems incredible. I hope there will be someone to use it,"

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said Andrew Cheng at John Hopkins University's Applied Physics Lab, who was the chief scientist for a NASA mission to an asteroid a decade ago. "And I have high hopes that commercial uses of space will become profitable beyond Earth orbit. Maybe the time has come."

Diamandis and Anderson would not disclose how much the project will cost overall. By building and launching quickly, their company hopes to operate much more cheaply than NASA.

Harvard's Tim Spahr, director of the Minor Planet Center, said getting drilling equipment into space and operating safely sounds "expensive and difficult."

"It would be awfully hard to make money on it," Spahr said.

Richard Binzel, professor of planetary science at the Massachusetts Institute of Technology, said the effort "may be many decades ahead of its time. But you have to start somewhere."

Anderson said the benefit to humanity — and investors — is worth it.

"We do understand that the pot of gold at the end of this rainbow, if it's successful, will be big."

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