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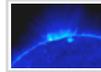


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## Mars Balloon Could Offer Supersharpest, Superfast Surveys

Brian Handwerk for [National Geographic News](#)  
October 4, 2005

A balloon-based spacecraft could survey Mars with rover-level detail in a fraction of the time it takes with ground-based vehicles, scientists say.

The U.S. space agency's celebrated Mars rovers, Spirit and Opportunity, have each roamed several miles during nearly two years on the planet's surface. Their mission has been an unqualified success, providing breathtaking images and important data.

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But a proposed balloon craft could potentially deliver the same kind of detailed images and scientific measurements in a matter of hours. It might be able to study the entire planet in detail in only a year.

"Rovers have a very limited range," said Robert Cassanova,

director of the NASA Institute for Advanced Concepts (NIAC). "Those on Mars have been just amazing, and they've produced fascinating results. But even though they've covered distances much greater than many people thought they could, they still can't cover distances like a balloon system potentially could."

Funded by NIAC, a balloon-based Mars mission concept is currently being developed by the Global Aerospace Corporation of Altadena, California.

### Autopilot Function Is Key

In 1984 the Soviet spacecraft Vega 1 deployed a balloon-based probe into the atmosphere of Venus. It transmitted data directly to Earth for the duration of its 47-hour flight, until contact was lost and the balloon

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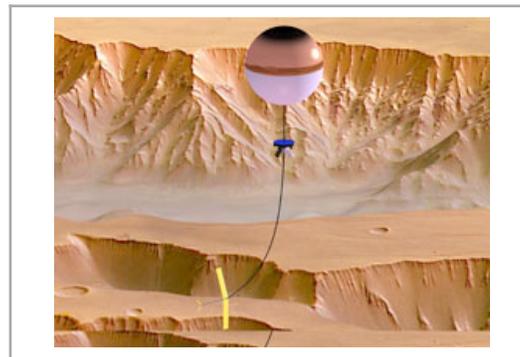


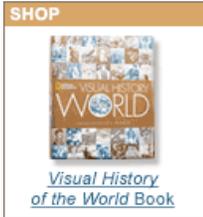
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likely burst due to overheating when it drifted into the sunny side of the planet.

Though space balloon systems are cheap and use little power, most concepts have been hindered by the same factor that likely did in Vega 1's balloon—a lack of steering that leaves crafts subject to the whims of wind.

Global Aerospace's concept features what they call a Balloon Guidance System (BGS). It includes an aerodynamic wing, which hangs on a tether several kilometers below the balloon and allows for rudimentary steering.

"It's not like flying an airplane, but you can guide it to some extent," NIAC's Cassanova explained. "That's a real advantage. Of course, you're sort of at the whim of prevailing winds, so you have to be patient. But there's little expenditure of fuel, so you can float for years, potentially."

Space distances create a time delay so large that an earthbound operator could not manipulate the balloon by conventional remote control—the signal simply would not reach the craft in time. As a result some autonomy must be built into the craft.

"It would most likely be a sophisticated computer program that would locate the balloon by observing the sun, the Martian moons, and surface features," said planetary scientist Alexey A. Pankine, who is developing the project for Global Aerospace.

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In an artist's conception, a proposed balloon-based Mars spacecraft surveys the planet's surface. A wing suspended below the balloon is designed to aid in steering. Planetary scientists say that such a craft could conduct detailed surveys of the red planet in a fraction of the time it would take ground-based rovers.

Illustration courtesy Global Aerospace Corporation, based on background image of Mars © ESA/DLR/FU Berlin (G. Neukim)

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