# History littered with failed Mars probes

Irene Klotz, Reuters

(Reuters) - NASA's Mars Climate Orbiter was about a week away from wrapping up an 11-month journey to the Red Planet in 1999 when engineers noticed a problem - the spacecraft, designed to study Mars' environment, was not where it was supposed to be.

The gap grew alarmingly over the next few days. On September 23, Climate Orbiter began the brake to enter Mars' orbit as planned, but disappeared behind the planet 49 seconds early, severing radio contact with Earth. It was never heard from again.

Launching probes to Mars is not for the faint of heart. Out of the 40 spacecraft dispatched to the Red Planet, only 14 lived to fulfill their missions.

Against those grim odds, NASA is poised for its most unorthodox and risky landing yet. The $2.5 billion Mars Science Laboratory is scheduled to touch down at 1:31 a.m. EDT Monday (0431 GMT) next to a mountain that may harbor life-friendly environments.

"This is the hardest NASA robotic mission ever attempted," NASA's associate administrator for science John Grunsfeld told reporters during a pre-landing news conference last month.

To deliver the one-ton robotic geologist near the mountain's base, engineers designed a contraption that would make cartoonist and inventor Rube Goldberg beam. The rover, about the size of a Mini Cooper car, is too heavy to bounce to the planet's surface in airbags or fly itself with rocket thrusters, systems successfully used by six previous NASA landers.

Instead, Mars Science Lab will be lowered to the ground on a tether spooled out by a flying platform that works like an aerial crane. NASA is the first to admit the idea sounds crazy, but managers are convinced it will work.

"We've done everything we could. We've tested everything we could test. We built everything to the best of our ability," said Doug McCuistion, who oversees NASA's Mars exploration programs. "Once you understand it, it's not a crazy concept."

History is not on NASA's side, though the United States has fared far better than Russia [1] when it comes to Mars exploration. Out of 19 attempted missions, Russia and the former Soviet Union have had only a few partial successes.

Launch failures claimed nearly half of Russia's probes, including the ambitious Phobos-Grunt sample return mission last year. Other spacecraft sailed blindly past Mars or burned up in the planet's atmosphere during landing attempts.

Newcomers Japan and China [2] have fared no better. Only Europe, which operates the Mars Express orbiter, has had beginner's luck on Mars.

"We learn from these things even if they aren't successful," McCuistion said.

Investigators have attributed the failed 1999 Climate Orbiter mission to human error: The flight software used metric units while the ground system that wrote the code used Imperial measures.

Two months later, a companion lander bit the dust - literally - when its rocket engines apparently shut down too early, causing the probe to crash to the ground.

And even when the engineering is perfect, Mars itself can throw mean curve balls. NASA's Mariner 9 and two Soviet orbiters arrived in May 1971 to find a global-wide dust storm in progress.

"We don't have the capability to predict these things," McCuistion said. "That is why Mars wins an awful lot of the time."

(Editing by Cynthia Johnston and Jackie Frank [3])

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