

Phoenix mission to Mars will search for climate clues

May 22 2008

On May 25, 2008, approaching 5 p.m. PDT, NASA scientists will be wondering: Just how green is their valley? That's because at that time the Phoenix Mars Mission space vehicle will be touching down on its three legs to make a soft landing onto the northern Mars terrain called Green Valley.

Of course, no valley is actually green on the Red Planet. The place got its name after analysis of images from Mars Reconnaissance Orbiter's HiRISE instrument. HiRISE can image rocks on Mars as small as roughly a yard and a half across. Green is the color that that landing site selection team used to represent the fewest number of rocks in an area, corresponding to a desirable place to land. Thus, "green valley," a relatively rock-less region, is a "sweet spot" where the Phoenix spacecraft will land.

Peter Smith of the University of Arizona is principal investigator for the mission.

Also playing a key role in the Phoenix Mars mission is Raymond E. Arvidson, Ph.D., the James S. McDonnell Distinguished University Professor and chair of the earth and planetary sciences department in Arts & Sciences at Washington University in St. Louis.

Arvidson has extensive experience in planetary landing operations. He participated in the two Viking Lander missions in 1976 and has spent the past four years, first helping select the landing site for the 2004 Mars

Exploration Rover (MER) mission, then guiding the activities of the rovers Spirit and Opportunity as the mission's deputy principal investigator. Accordingly, Arvidson is NASA's Phoenix landing site working group chair. He also is the co-investigator for the Phoenix robotic arm, a crucial instrument that will collect soil and ice samples; the lead for archiving mission data, and a key science lead for the first week of surface operations.

Phoenix will touch down in Green Valley with the aid of a parachute, retro rockets and three strong legs with shock absorbing footpads to slow it down.

That's sol (a Martian day) zero.

"We'll know within two hours of landing if Phoenix landed nominally," said Arvidson. "It will land, deploy its solar panels, take a picture and then go to bed."

The next day, Sol 1, begins a crucial period of operations for the mission. Arvidson said, "We'll be checking out the instruments and begin robotic arm operations within about a week, if everything goes well, and collect soil and ice samples over the summer for analyses with the on-board instruments."

Phoenix will dig to an ice-rich layer expected to lie within arm's reach of the surface. It will analyze the water and soil for evidence about climate cycles and investigate whether the environment there has been favorable for microbial life. It also carries a weather station to monitor changes in the atmosphere. The primary mission is brief, just 90 days.

Martian weather channel

That first tense, exciting, crucial day, four Washington University

students will work with Arvidson at the University of Arizona. Two of them, sophomore Kirsten Siebach, and junior Rebecca Greenberger, are Fossett Fellows, a scholarship program established at WUSTL by the late adventurer J. Steven Fossett. A third, Tabatha Heet, will have just graduated with a bachelor's degree nine days earlier, and WUSTL doctoral candidate Selby Cull will be present as well. Thomas C. Stein, a WUSTL computer systems manager, will work with the Phoenix geology theme group and also archive data for NASA's Planetary Data System.

The four students are Phoenix Mission documentarians, responsible for recording all that is done on the mission and for informally naming geological sites in the area.

Heet played a key role in counting rocks in HiRISE images to enable a safe landing for Phoenix. She began the rock measurement and counting project in October of 2006.

Both Heet and Arvidson are excited to have the mission so close at hand after years of planning.

"It's still very exciting," the veteran Arvidson said. "This is a new place on an intriguing planet, and we can't wait to see what we'll find."

Source: WUSTL

Citation: Phoenix mission to Mars will search for climate clues (2008, May 22) retrieved 1 May 2024 from <https://phys.org/news/2008-05-phoenix-mission-mars-climate-clues.html>

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