Mars and Earth Activities Aim to Get Spirit Rolling Again

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Wheel slippage during attempts to extricate NASA's Mars Rover Spirit from a patch of soft ground during the preceding two weeks had partially buried the wheels by the 1,899th Martian day, or sol, of the Spirit's mission on Mars (May 6, 2009). Image credit: NASA/JPL-Caltech

(PhysOrg.com) -- NASA's rover project team is using the Spirit rover and other spacecraft at Mars to begin developing the best maneuvers for extracting Spirit from the soft Martian ground where it has become embedded.

A diagnostic test on May 16 provided favorable indications about Spirit's left middle wheel. The possibility of the wheel being jammed was one factor in the rover team's May 7 decision to temporarily suspend driving Spirit after that wheel stalled and other wheels had dug themselves about hub-deep into the soil. The test over the weekend showed electrical resistance in the left middle wheel is within the expected range for a

motor that has not failed.

"This is not a full exoneration of the wheel, but it is encouraging," said John Callas of NASA's Jet Propulsion Laboratory, Pasadena, Calif., project manager for Spirit and its twin rover, Opportunity. "We're taking incremental steps. Next, we'll command that wheel to rotate a degree or two. The other wheels will be kept motionless, so this is not expected to alter the position of the vehicle."

Another reason to suspend driving is the possibility that the wheels' digging into the soil may have lowered the body of the rover enough for its belly pan to be in contact with a small mound of rocks. The rover team is using Opportunity to test a procedure for possible use by Spirit: looking underneath the rover with the microscopic imager camera that is mounted on the end of the rover's arm. This might be a way to see whether Spirit is, in fact, touching the rocks beneath it.

NASA's Mars Odyssey orbiter is also aiding in the Spirit recovery plan. As a result of winds blowing dust off Spirit's solar panel four times in the past month, Spirit now has enough power to add an extra communication session each day. The Odyssey project has made the orbiter available for receiving extra transmissions from Spirit. The transmissions include imaging data from Spirit's examinations of soil properties and ground geometry.

Rover team members are using that data and other information to construct a simulation of Spirit's situation in a rover testing facility at JPL. The team is testing different materials to use as soil that will mimic the physical properties of the Martian soil where Spirit is embedded. Later, the team will test maneuvers to get the rover free. Weeks of testing are anticipated before any attempt to move Spirit.

Provided by JPL/NASA (news : web)