

Spirit Resumes Driving While Analysis of Problem Behaviors Continues

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Spirit took this image on Apr. 8, 2009. Click on full image and caption to see the mound on the horizon that is one of the features that rover team has designated as a possible investigation site in future months. Image credit: NASA/JPL-Caltech

(PhysOrg.com) -- NASA's Mars Exploration Rover Spirit drove on Thursday for the first time since April 8, acting on commands from engineers who are still investigating bouts of amnesia and other unusual behavior exhibited by Spirit in the past two weeks.

The drive took Spirit about 1.7 meters (5.6 feet) toward destinations about 150 meters (about 500 feet) away. The rover has already operated more than 20 times longer than its original prime mission on Mars.

This week, rover engineers at NASA's [Jet Propulsion Laboratory](#), Pasadena, Calif., judged that it would be safe to send Spirit commands for Thursday's drive. They also anticipated that, if the rover did have another amnesia event, the day's outcome could be helpful in diagnosing those events.

Three times in the past two weeks, Spirit has failed to record data from a day's activity period into non-volatile [flash memory](#). That is a type of [computer memory](#) where information is preserved even when power is off, such as when the rover naps to

conserve power.

"We expect we will see more of the amnesia events, and we want to learn more about them when we do," said JPL's Sharon Laubach, chief of the rover sequencing team, which develops and checks each day's set of commands.

The team is also investigating two other types of problems Spirit has experienced recently: failing to wake up for three consecutive communication sessions about two weeks ago and rebooting its computer on April 11, 12 and 18. Engineers have not found any causal links among these three types of events. After checking last week whether moving the rover's high-gain antenna could trigger problems, routine communication via that dish antenna resumed Monday.

Spirit has maintained stable power and thermal conditions throughout the problem events this month, although power output by its solar panels has been significantly reduced since mid-2007 by dust covering the panels.

"We decided not to wait until finishing the investigations before trying to drive again," Laubach said. "Given Spirit's limited power and the desire to make progress toward destinations to the south, there would be risks associated with not driving."

The team has made a change in Spirit's daily routine in order to aid the diagnostic work if the rover experiences another failure to record data into flash memory.

To conserve energy, Spirit's daily schedule since 2004 has typically included a nap between the rover's main activities for the day and the day's main downlink transmission of data to Earth. Data stored only in the rover's random-access memory (RAM), instead of in flash memory, is lost during the nap, so when Spirit has a flash amnesia event on that schedule, the team gets no data from the

activity period. The new schedule puts the nap before the activity period. This way, even if there is a flash amnesia event, data from the activity period would likely be available from RAM during the downlink.

[Spirit](#) and its twin, Opportunity, completed their original three-month prime missions on Mars in April 2004 and have continued their scientific investigations on opposite sides of the planet through multiple mission extensions. Engineers have found ways to cope with various symptoms of aging on both rovers.

This week, Opportunity completed drives of 96 meters (315 feet) Tuesday, 137 meters (449 feet) Wednesday and 95 meters (312 feet) Thursday in its long-term trek toward a crater more than 20 times larger than the biggest it has visited so far.

Provided by JPL/NASA ([news](#) : [web](#))

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