

## Spirit Condition Upgraded As Twin Rover Nears Mars

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Hours before NASA's Opportunity rover will reach Mars, engineers have found a way to communicate reliably with its twin, Spirit, and to get Spirit's computer out of a cycle of rebooting many times a day.

Spirit's responses to commands sent this morning confirm a theory developed overnight that the problem is related to the rover's two "flash" memories or software controlling those memories.

"The rover has been upgraded from critical to serious," said Mars Exploration Rover Project Manager Peter Theisinger at NASA's Jet Propulsion Laboratory, Pasadena, Calif. Significant work is still ahead for restoring Spirit, he predicted.

Spirit has 256 megabytes of flash memory, a type commonly used on gear such as digital cameras for holding data even when the power is off. Engineers confirmed this morning that Spirit's recent symptoms are related to the flash memory when they commanded the rover to boot up and utilize its random-access memory instead of flash memory. The rover then obeyed commands about communicating and going into sleep mode. Spirit communicated successfully at 120 bits per second for nearly an hour.

"We have a vehicle that is stable in power and thermal, and we have a working hypothesis we have confirmed," Theisinger said. By commanding Spirit each morning into a mode that avoids using flash memory, engineers plan to get it to communicate at a higher data rate, to diagnose the root cause of the problem and develop ways to restore as much functioning as possible.

The work on restoring Spirit is not expected to slow the steps in getting Opportunity ready to roll off its lander platform if Opportunity lands safely. For Spirit, those steps took 12 days.

The rovers' main task is to explore their landing sites for evidence in the rocks and soil about whether the sites' past environments were ever watery and possibly suitable for sustaining life.

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