

Kepler returns after safe mode event

March 23 2011

After a safe mode event that lasted 144 hours, NASA's Kepler spacecraft returned to science data collection at 2:45 p.m. EDT Sunday, March 20.

A [safe mode](#) is a self-protective measure that the spacecraft takes when something unexpected occurs. During safe mode, the spacecraft points the solar panels directly at the sun and begins to slowly rotate along a sun-aligned axis. This safe mode orientation provides the vehicle with the maximum power and limits the buildup of momentum from solar wind. The spacecraft also swapped to its backup subsystem interface box (SIB), an electronics component that provides thermal and power distribution control to all spacecraft subsystems, and powered off the photometer, the instrument used to measure light intensity to detect planets. This is a normal procedure when the spacecraft enters safe mode.

The anomaly occurred on March 14, immediately after the spacecraft issued a network interface card (NIC) reset command to implement a computer program update. The NIC is a key component of the SIB and supports its functions. The NIC also interfaces between the spacecraft's flight software, attitude determination, and its control subsystems and sensors. During the reset, the NIC sent invalid reaction wheel data to the flight software, which caused the spacecraft to enter safe mode.

During the spacecraft's recovery from the safe mode event, the project team performed the spring quarterly roll and downloaded science data collected since Feb. 4 from the spacecraft's solid-state recorder. That

data will be sent to the Kepler Science Operations Center at NASA's Ames Research Center, Moffett Field, Calif., where the science team will evaluate it. An anomaly response team will continue to evaluate the spacecraft data to determine the cause of the safe mode event.

Provided by JPL/NASA

Citation: Kepler returns after safe mode event (2011, March 23) retrieved 10 April 2024 from <https://phys.org/news/2011-03-kepler-safe-mode-event.html>

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