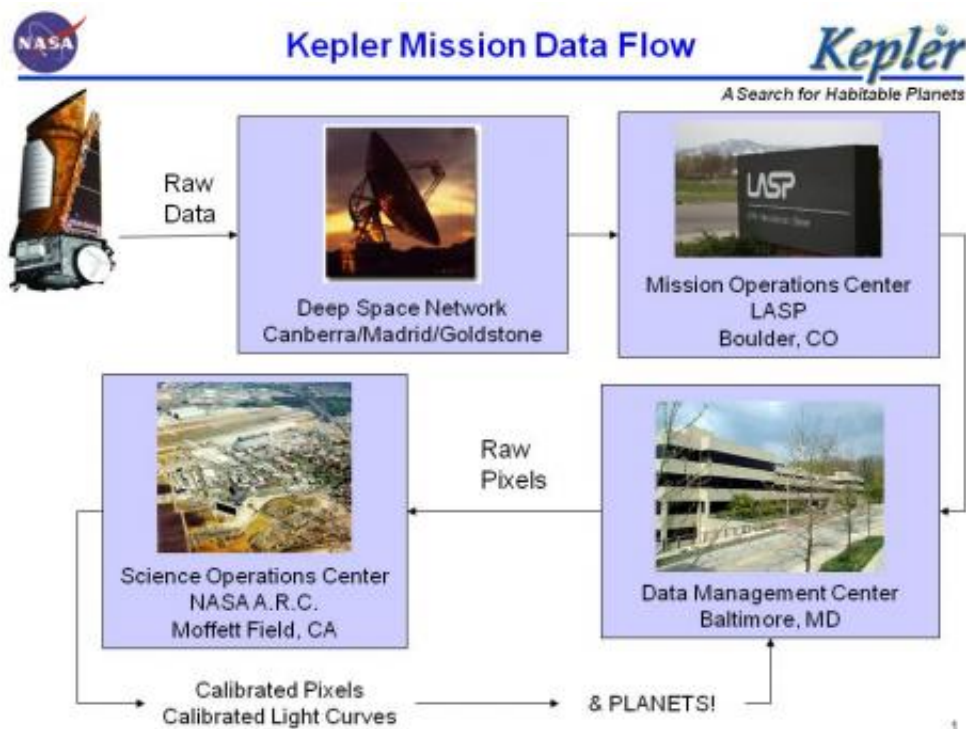# Another 93 gigabytes of data added to the Kepler archive

May 6 2011

The flow of Kepler Mission data from pixels to planets. The data is transmitted from the spacecraft to Earth via NASA's Deep Space Network (DSN). From the DSN, the data flows to the Mission Operations Center in Boulder, Colo., then to the Data Management Center in Baltimore, Md. The raw data is archived at the Data Management Center, and then transmitted to the Kepler Science Operations Center (SOC) at NASA's Ames Research Center, Moffett Field, Calif. At the SOC, the data is processed and analyzed to produce calibrated light curves. The light curve data are archived at the Kepler archive in the Multi-mission Archive at the Space Telescope Science Insitute (STSci) in Baltimore, Md. Credit: NASA/Jon Jenkins

(PhysOrg.com) -- During a regularly scheduled science data download on Tuesday, April 26, the project team reoriented the Kepler spacecraft to downlink data from its solid-state recorder (SSR). All data collected since March 20 was returned successfully. The Quarter 9, Month 1 science data collection download now is complete.

Communications with Kepler while it is in the science attitude is accomplished using a low gain antenna on the spacecraft that operates on X-band frequency. To return all the science and engineering data that has been stored on the SSR, a high-gain antenna (HGA) operating in Ka-band frequency is used. The HGA must be pointed at Earth to support the high rate downlink (4.3 Mbps). This temporarily prohibits the spacecraft from pointing at the science field-of-view.

The monthly activity includes collection of science calibration data; turning the HGA toward Earth; and, playing back the SSR data - approximately 45 minutes for engineering data and another 5.25 hours for 37 days of science data. The number of days in each month's science set varies a bit due to Deep Space Network, or DSN, availability and other scheduling constraints. A total of 93 gigabytes of data was downloaded in approximately six hours before reorienting the spacecraft to science attitude.

In order to return to the fine point attitude control, which is the highest pointing stability and what is required for science, the project team must wait for the spacecraft to return to the thermal condition it was in before the break. When the spacecraft is turned to a different attitude, the sun shines on different parts of the structure, which causes it to warp ever so slightly. This slight warping means that the angle between the star trackers and the telescope line of sight is a bit off. When it's maneuvered back to the science attitude, it takes time to settle back to its original

shape. Until the spacecraft has thermally settled, the telescope will not be aligned with its guide stars well enough for us to transition to fine point. This can take eight hours or more. This month's activity went very well, and the total science break, which includes the collection of calibration data, was about 17 hours. The monthly budget is 20 hours.

The data is downloaded via NASA's DSN operated by the Jet Propulsion Laboratory (JPL), a division of the California Institute of Technology (Caltech) in Pasadena, Calif. From the DSN, the data flows to the Mission Operations Center in Boulder, Colo., and on to the Data Management Center in Baltimore, Md. The raw pixels are archived at the Data Management Center and then transmitted to the Kepler Science Operations Center (SOC) at NASA's Ames Research Center in Moffett Field, Calif.

The data has arrived at the SOC and will be processed this week.

[Kepler](#) is currently 32 million kilometers from Earth, collecting science data at the Spring attitude (the angular orientation of the spacecraft), in its 9th quarter of operations. All subsystems are operating normally. The next download of science data is scheduled for May 25.

Provided by JPL/NASA