

Additional Kepler data now available to all planet hunters

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The Space Telescope Science Institute in Baltimore, Md., is releasing 12 additional months worth of planet-searching data meticulously collected by one of the most prolific planet-hunting endeavors ever conceived, NASA's Kepler Mission.

As of Oct. 28, 2012, every observation from the extrasolar planet survey made by Kepler since its launch in 2009 through June 27, 2012, is available to scientists and the public. This treasure-trove contains more than 16 terabytes of data and is housed at the Barbara A. Mikulski Archive for Space Telescopes, or MAST, at the [Space Telescope Science Institute](#). MAST is a huge data archive containing astronomical observations from 16 NASA space astronomy missions, including the

[Hubble Space Telescope](#). It is named in honor of Maryland U.S. Senator Barbara A. Mikulski.

Over the past three years the Kepler science team has discovered 77 confirmed planets and 2,321 planet candidates. All of Kepler's upcoming observations will be no longer exclusive to the Kepler science team, its guest observers, and its asteroseismology consortium members and will be available immediately to the public.

The objects already discovered may only be the tip of the iceberg. The data store contains clues to the existence of as yet undiscovered planets and a record of stellar behavior of stars near the Sun.

Since its launch, the Kepler spacecraft has stared almost nonstop at more than 150,000 stars in the direction of the summer constellations Cygnus and Lyra. The [Kepler mission](#) is operated by NASA's Ames Research Center in Mountain View, Calif.

The spacecraft simultaneously measures the variations in brightness of the stars every 30 minutes, searching for periodic dips in a star's brightness that occur when an orbiting planet crosses in front of it and partially blocks the light from its parent star.

These fluctuations are tiny compared with the brightness of the star. For an Earth-size planet transiting a solar-type star, the change in brightness is less than 1/100 of 1 percent. This event is similar to the amount of dimming if a flea were to crawl across a car's headlight viewed from several miles away.

These brightness variations are available in the Kepler inventory. Finding planets requires stellar detective work by repeatedly measuring variations in the brightness of target stars.

In addition to yielding evidence for planets circling some of the target stars, the Kepler data also reveal information about the behavior of many of the other stars being monitored. Kepler astronomers have discovered star spots, flaring stars, double-star systems, and "heartbeat" stars, a class of eccentric binary systems undergoing dynamic tidal distortions and tidally induced pulsations.

There is far more data in the Kepler archives than astronomers have time to analyze quickly. Avid volunteer astronomers are invited to make Kepler discoveries by perusing the archive through a website called "Planet Hunters," (www.planethunters.org/). A tutorial informs citizen scientists how to analyze the Kepler data, so they may assist with the research. Visitors to the website cannot actually see individual planets. Instead, they look for the effects of planets as they sweep across the face of their parent stars. Volunteer scientists have analyzed over 14 million observations so far. Just last week citizen scientists announced the discovery of the first planet to be found in a quadruple-star system.

NASA has extended the Kepler mission for at least another two years beyond its original three-year charter. Buried in the data from these upcoming observations are undoubtedly many more planets, some no larger than Earth. The Kepler survey ultimately will tell astronomers how common Earth-sized planets are in the Milky Way. Some fraction of these worlds may have conditions suitable for the origin of complex life. This will guide the design of future space telescopes capable of detecting the biosignatures of life on alien worlds.

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