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### Near Earth Asteroid & Comet Discovered

From: [NASANews@hq.nasa.gov](mailto:NASANews@hq.nasa.gov)  
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#### PLANETARY ASTRONOMERS START YEAR WITH TWO DISCOVERIES

Two newly detected members of the Solar System -- a rare asteroid orbiting close to Earth and a distant comet making its only appearance -- mark the first discoveries of the year for a team of astronomers at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA.

The discoveries, reported Jan. 10 by JPL planetary scientists Eleanor Helin, Steve Pravdo, David Rabinowitz and Ken Lawrence, were made possible with a few nights of clear observing weather and use of a sensitive, charge-coupled device (CCD) camera called the Near-Earth Asteroid Tracking (NEAT) system at Mt. Haleakala, Maui, HI. Since their initial sightings, both objects have become the focus of worldwide observations by astronomers in Japan, China, Australia, Canada, Italy and the Czech Republic.

"This asteroid is a member of a rare class of asteroids, called Atens, which stay within Earth's orbit most of their lifetimes," said Helin, principal investigator of the NEAT project. "The object has a higher inclination to the plane of Earth's orbit than most Atens; in fact, at 31 degrees, it has the second highest inclination of all the Atens we've discovered."

The highly inclined orbit, which is unusual, may result from long-range interactions with the planets, or may be the outcome of previous orbits passing near the Earth. With the discovery of more Atens, the relative importance of these competing influences may be better understood.

Dubbed 1997 AC11, the asteroid is a faint object with an absolute magnitude of 21, and probably measures about 600 feet in diameter. It is only the 24th Aten to be discovered in 21 years, since Helin found and named the first Aten in January 1976. With orbits that are smaller than Earth's, and short periods, Atens are in the vicinity of Earth frequently. This closeness to Earth makes them more likely to impact the planet than other types of

asteroids.

"Atens never wander far from the orbit of Earth and can cross Earth's orbit as many as four times a year," Helin said. "1997 AC11, for instance, has a period of 8/10ths of a year, or roughly 9.5 months. As we continue to observe it in coming months, we will be able to characterize its orbital path with more precision. With more precise data, we will be able to examine its potential for collision with Earth at some time in the future."

Along with the newest Aten, astronomers also discovered a new comet, still distant but moving toward the Earth and Sun, as it passed through the constellation of Leo. Designated Comet 1997 A1, the celestial snowball is expected to make its closest approach to Earth on Feb. 6, passing at a distance of about 230 million miles, but remaining visible in the night sky for several months thereafter.

"This comet has traveled a long distance, originating in the Oort Cloud, a region far beyond Pluto's orbit which is believed to house trillions of incipient comets," Helin said. "It has a parabolic orbit, which means it will travel through our Solar System once and probably never be seen again. Parabolic comets do not present their calling cards before arriving in the inner Solar System. They appear without warning."

At discovery, 1997 A1 was fairly dim at magnitude 19, and showed a weakly condensed nucleus with a diffuse halo and short tail, Helin said. The Minor Planet Center at the Smithsonian Astrophysical Observatory in Cambridge, MA, announced the discovery, reporting it as a parabolic comet, with an orbital inclination of 145 degrees from the ecliptic plane, and indicated that it would not pass any closer than 3.17 astronomical units (295 million miles) from the Sun.

JPL's NEAT team, in conjunction with another observing effort under way at the Laboratory's Table Mountain Observatory in San Bernardino, CA, will continue to track and characterize the comet over the next several months until it is no longer visible.

During its closest approach on Feb. 6, the newly discovered comet will be visible in the constellation of Cancer and brighten to a magnitude of about 18. Moderate-sized telescopes with CCD chips will be able to observe the comet, Helin said. Astronomers report that the comet is continuing to outgas, or warm up and boil off some of its ices, as it moves toward the Sun.

Low-resolution black-and-white images of both objects are posted on the Internet at the following URL:

<http://huey.jpl.nasa.gov/~spravdo/neat.html>

Discoveries of very faint or distant objects, and those surprisingly close by, are increasing due to the introduction of technologically advanced, fully autonomous CCD telescopes. The NEAT camera, for example, employs a very large, very sensitive 4,096-by-4,096-pixel CCD. The camera is installed on a 39-inch telescope operated at the summit of Mt. Haleakala by the U.S. Air Force.

Using this powerful, fully automated system, astronomers are discovering many more objects than was possible in the past. The January observing run, for instance, produced more than 700 asteroid sightings, including high-inclination inner-belt asteroids and a number of potential Mars-crossers, which will be confirmed after more observations become available. Total detections since NEAT began operations in late 1995 have climbed to more than 9,000 objects, of which more than 50 percent are new objects and more than 800 of those have received new designations.

NEAT was built and is being managed by the Jet Propulsion Laboratory for NASA's Office of Space Science, Washington, DC.

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