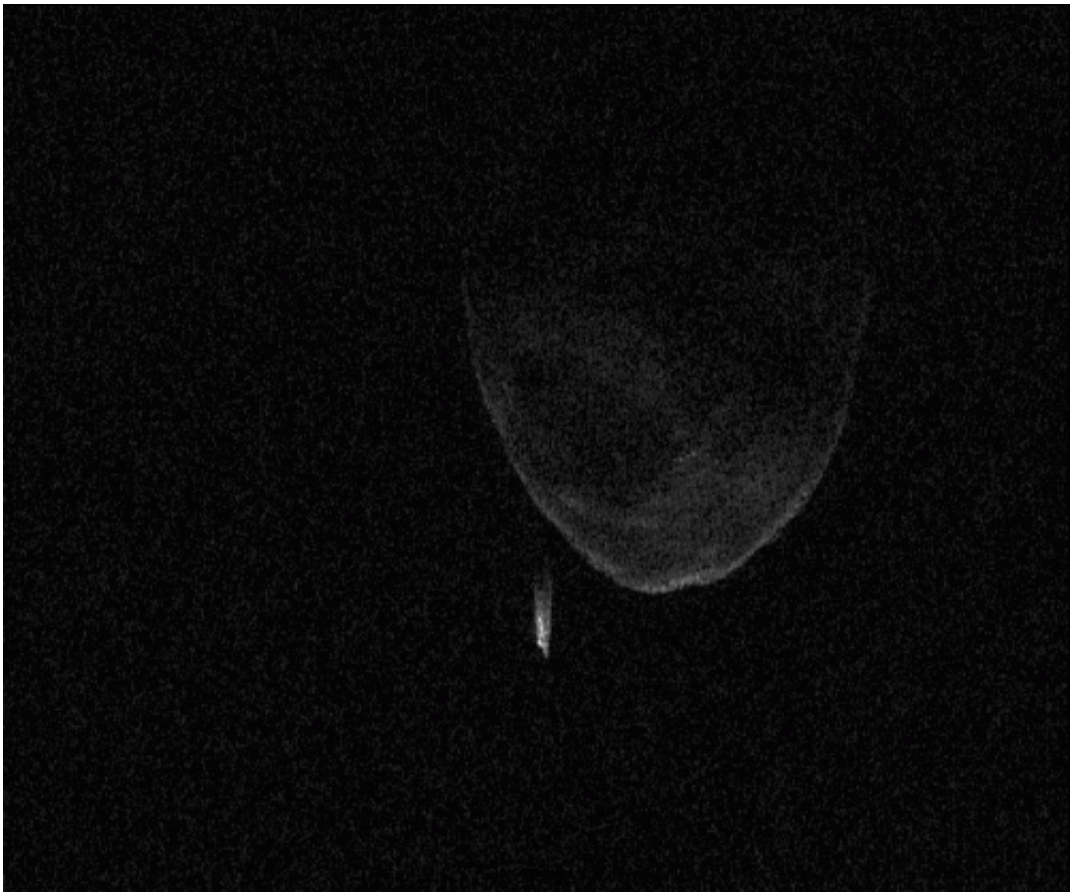
Earth-passing asteroid is 'an entirely new beast'

June 17 2013, by Jason Major



Radar images of asteroid 1998 QE2 and its satellite on June 7. Each frame in the animation is a sum of 4 images, spaced apart by about 10 minutes. Credit: Arecibo Observatory/NASA/Ellen Howell

On the last day of May 2013 asteroid 1998 QE2 passed relatively closely

by our planet, coming within 6 million kilometers… about 15 times the distance to the Moon. While there was never any chance of an impact by the 3 km-wide asteroid and its surprise 750 meter satellite, astronomers didn't miss out on the chance to observe the visiting duo as they soared past as it was a prime opportunity to learn more about two unfamiliar members of the Solar System.

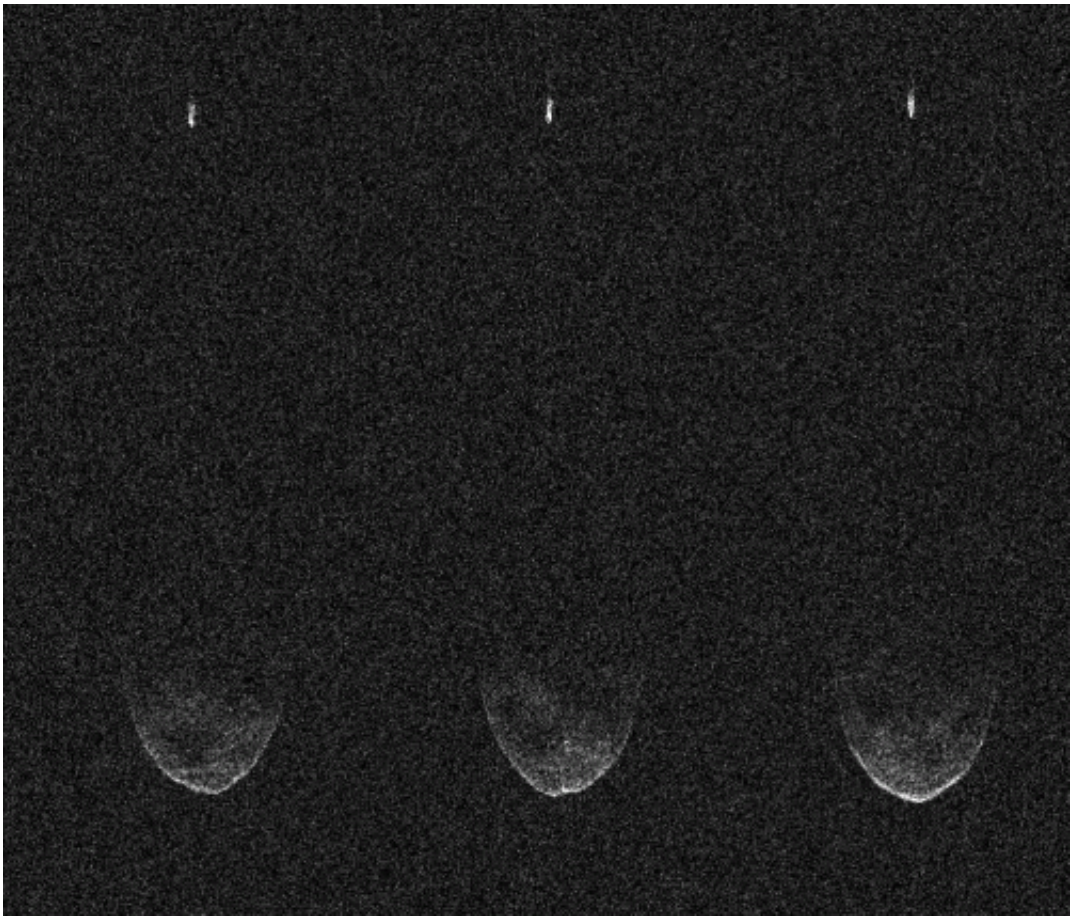
By bouncing radar waves off 1998 QE2 from the giant dish at the Arecibo Observatory in Puerto Rico, researchers were able to construct visible images of the asteroid and its ocean-liner-sized moon, as well as obtain spectrum data from NASA's infrared telescope in Hawaii. What they discovered was quite surprising: QE2 is nothing like any asteroid ever seen near Earth.

Both Arecibo Observatory and NASA's Goldstone Deep Space Communications Complex in California are unique among telescopes on Earth for their ability to resolve features on asteroids when optical telescopes on the ground merely see them as simple points of light. Sensitive radio receivers collect radio signals reflected from the asteroids, and computers turn the radio echoes into images that show features such as craters and, in 1998 QE2′s case, a small orbiting moon.

QE2′s moon appears brighter than the asteroid as it is rotating more slowly; thus its Doppler echoes compress along the Doppler axis of the image and appear stronger.

Of the asteroids that come close to Earth approximately one out of six have moons. Dr. Patrick Taylor, a USRA research astronomer at Arecibo, remarked that "QE2′s moon is roughly one-quarter the size of the main asteroid," which itself is a lumpy, battered world.

Dr. Taylor also noted that our own Moon is a quarter the size of Earth.



Radar images of asteroid 1998 QE2 and its satellite (top) on June 6. Credit: Arecibo Observatory/NASA/Ellen Howell

QE2′s moon will help scientists determine the mass of the main asteroid and what minerals make up the asteroid-moon system. "Being able to determine its mass from the moon helps us understand better the asteroid's material," said Dr. Ellen Howell, a USRA research astronomer at Arecibo Observatory who took both radar images of the asteroid at Arecibo and optical and infrared images using the Infrared Telescope Facility in Hawaii. While the optical images do not show detail of the asteroid's surface, like the radar images do, instead they allow for measurements of what it is made of.

"What makes this asteroid so interesting, aside from being an excellent target for radar imaging," Howell said, "is the color and small moon."

"Asteroid QE2 is dark, red, and primitive – that is, it hasn't been heated or melted as much as other asteroids," continued Howell. "QE2 is nothing like any asteroid we've visited with a spacecraft, or plan to, or that we have meteorites from. It's an entirely new beast in the menagerie of asteroids near Earth."

Spectrum of 1998 QE2 taken May 30 at the NASA Infrared Telescope Facility (IRTF) on Mauna Kea was "red sloped and linear," indicating a primitive composition not matching any meteorites currently in their collection.

For more radar images of 1998 QE2, visit the Arecibo planetary radar page here.

Source: Universe Today