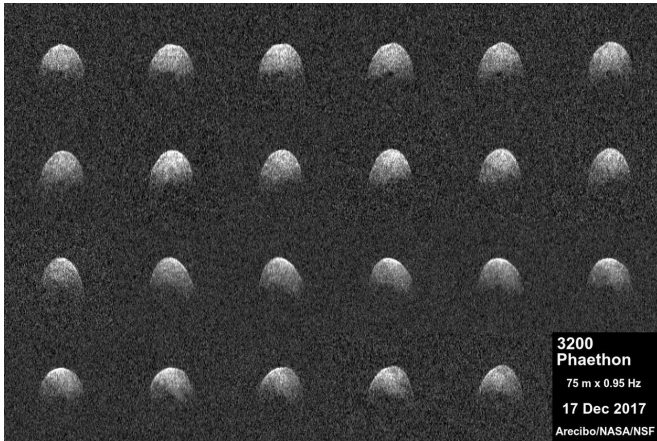


# Arecibo radar returns with asteroid phaethon images

22 December 2017



These radar images of near-Earth asteroid 3200 Phaethon were generated by astronomers at the National Science Foundation's Arecibo Observatory on Dec. 17, 2017. Observations of Phaethon were conducted at Arecibo from Dec. 15 through 19, 2017. At time of closest approach on Dec. 16 at 3 p.m. PST (3 p.m. EST, 11 p.m. UTC) the asteroid was about 1.1 million miles (1.8 million kilometers) away, or about 4.6 times the distance from Earth to the moon. The encounter is the closest the object will come to Earth until 2093. Credit: Arecibo Observatory/NASA/NSF

After several months of downtime after Hurricane Maria blew through, the Arecibo Observatory Planetary Radar has returned to normal operation, providing the highest-resolution images to date of near-Earth asteroid 3200 Phaethon during its Dec. 16 flyby of Earth. The radar images, which are subtle at the available resolution, reveal the asteroid is spheroidal in shape and has a large concavity at least several hundred meters in extent near the leading edge, and a conspicuous dark, circular feature near one of the poles. Arecibo's radar images of Phaethon have resolutions as fine as about 250 feet (75 meters) per pixel.

"These new observations of Phaethon show it may be similar in shape to asteroid Bennu, the target of

NASA's OSIRIS-REx spacecraft, but 10 times larger," said Patrick Taylor, a Universities Space Research Association (USRA), Columbia, Maryland, scientist and group leader for Planetary Radar at Arecibo Observatory. "The dark feature could be a crater or some other topographic depression that did not reflect the [radar](#) beam back at us."

Radar images obtained by Arecibo indicate Phaethon has a diameter of about 3.6 miles (6 kilometers)—roughly 0.6 miles (1 kilometer) larger than previous estimates. Phaethon is the second largest near-Earth asteroid classified as "Potentially Hazardous." Near-Earth objects are classified as [potentially hazardous asteroids](#) (PHAs), based on their size and how closely their orbits approach Earth.

"Arecibo is an important global asset, crucial for planetary defense work because of its unique capabilities," said Joan Schmelz of USRA and deputy director of Arecibo Observatory. "We have been working diligently to get it back up and running since Hurricane Maria devastated Puerto Rico."



Credit: NASA

Provided by NASA

The Arecibo Observatory has the most powerful astronomical radar system on Earth. On Sept. 20, the telescope suffered minor structural damage when Maria, the strongest hurricane to hit the island since 1928, made landfall. Some days after the storm, the telescope resumed radio astronomy observations, while radar observations, which require high power and diesel fuel for generators at the site, resumed operations in early December after commercial power returned to the observatory.

Asteroid Phaethon was discovered on Oct. 11, 1983, by NASA's Infrared Astronomical Satellite (IRAS). Observations of Phaethon were conducted at Arecibo from Dec. 15 through 19, 2017, using the NASA-funded planetary radar system. At time of closest approach on Dec. 16 at 3 p.m. PST (3 p.m. EST, 11 p.m. UTC) the asteroid was about 1.1 million miles (1.8 million kilometers) away, or about 4.6 times the distance from Earth to the moon. The encounter is the closest the object will come to Earth until 2093.

Radar has been used to observe hundreds of asteroids. When these small, natural remnants of the formation of our solar system pass relatively close to Earth, deep space radar is a powerful technique for studying their sizes, shapes, rotation, surface features and roughness, and for more precise determination of their orbital path.

The Arecibo Planetary Radar Program is fully funded by NASA through a grant to Universities Space Research Association (USRA), from the Near-Earth Object Observations program. The Arecibo Observatory is a facility of the National Science Foundation operated under cooperative agreement by SRI International, USRA, and Universidad Metropolitana.

NASA's Planetary Defense Coordination Office is responsible for finding, tracking and characterizing potentially hazardous asteroids and comets coming near Earth, issuing warnings about possible impacts, and assisting coordination of U.S. government response planning, should there be an actual impact threat.

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