

PROTECTING THE EARTH

**Statement of The Planetary Society in Support of Planetary Radar at the Arecibo
Observatory
to the U.S. House of Representatives Committee on Science and Technology
Subcommittee on Space and Aeronautics
November 8, 2007**

Less than a century ago, a near-Earth object (NEO) slammed into Siberia, devastating 1000 square miles. If it had struck just a few hours earlier or later in a populated area, it could have killed several hundred thousand people. NEOs pose a real and dangerous threat to Earth.

In the past few years, we have been discovering, tracking, and characterizing the comets and asteroids that travel through our neighborhood of space. We have learned much – about near-misses, the probability of collisions, the diversity of asteroid and comet physical properties, and the effects of impacts in the past. We have even learned that one asteroid, named Apophis, will pass closer to Earth in 22 years than our geosynchronous communications satellites, and its trajectory has a small probability of taking it on a collision course with Earth seven years after that.

Radar tracking is the only way to precisely know the probability of impact, and the Arecibo telescope is the most powerful instrument for the job, 20 times more sensitive for NEO radar tracking than any other instrument in the world. Unfortunately, Arecibo is slated to be closed by the National Science Foundation in a misguided attempt to free up funding for new projects that do not yet exist.

Arecibo is the largest radio-telescope in the world. It has been, and continues to be, an enormously productive scientific facility, covering a broad range of science studies. While its contributions to radio astronomy, ionospheric and atmospheric observations have proven valuable for the past several decades, it is its planetary radar capabilities that remain unique. Because of Arecibo's powerful one-million watt transmitter, and the large 1000-foot aperture, the telescope is uniquely able to characterize potentially hazardous NEOs and determine the danger they pose. Radar signals from this facility are the only ones that can be regularly used for reaching and tracking NEOs that may be coming close to Earth.

The cost of operating Arecibo is just a few million dollars per year. Isn't the safety of Earth worth that?

In addition to tracking NEOs, Arecibo has returned other recent important results from planetary radar, including the best physical characterization of any potentially hazardous asteroid as large as a kilometer, ultra precise determinations of Mercury's spin state that reveal that planet to have a molten core, and the identification of several binary asteroids in the near-Earth population.

Arecibo is caught in a bureaucratic argument. The Arecibo Observatory is a National Science Foundation (NSF) operation, but they consider the subject of NEOs and planetary radar to be in NASA's bailiwick. NASA supports ground-based astronomy, and supported the Arecibo radar for many years, but the agency now objects to picking up the funding of what is currently an NSF program.

The House Science and Technology Committee has been the leading government advocate for understanding the nature and possible threat from objects (NEOs) that might impact the Earth. In the past, the committee has had to direct NASA to provide increased support to this area. The Planetary Society has no position on whether this should be a NSF program or a NASA program; but, we strongly feel that it should be an *American* program with congressional support. We urge you to provide such support to keep the Arecibo planetary radar operating.

The Planetary Society recently conducted a privately funded, international competition to design a mission to tag the asteroid Apophis, in case its Earth approach is close enough to require higher accuracy tracking. The competition attracted thirty-seven proposals and has generated much public interest.

The cost of a tagging mission to Apophis would be at least \$100 million – and the only way to know if such a mission is necessary is to refine the current estimate of Apophis' orbit with the powerful radar tracking of a telescope like Arecibo. Avoiding one unnecessary tagging mission would more than pay back any investment of funds to keep Arecibo open. And if some object out there really is on a collision course with Earth and we don't have the means to track it properly, the price we would pay would be astronomical.

Thank you for your consideration.