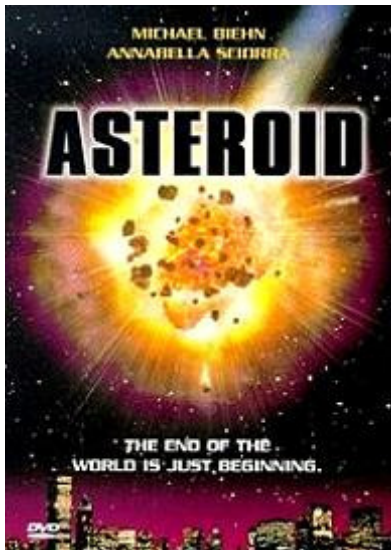


Teams Win Competition to Track Approaching Asteroid

By Mike O'Sullivan, Los Angeles
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In the movies, the scenario is simple, if dramatic. Scientists discover an asteroid heading for earth and officials send a team to destroy it. In the 1998 film *Armageddon*, the group was headed by Bruce Willis.

WILLIS: "The United States government just asked us to save the world. Anybody want to say no?"

Scientists say the key to protecting the earth from an asteroid strike is early monitoring of approaching bodies in space, and the Planetary Society sponsored a competition to "tag" and track an asteroid called Apophis. Discovered in 2004, it is named after a spirit of destruction in Egyptian myth.

In 2029, Apophis is expected to come within 30,000 kilometers of the earth, closer than the orbit of geostationary satellites.

Depending on the asteroid's trajectory, there is a very small chance the earth's gravity could alter its course so it would strike the earth on a subsequent approach in 2036.

The Planetary Society, an educational and advocacy group, solicited proposals for a hypothetical mission to assess the risk, and received 37 proposals from 20 countries.

The winning entry, which earned a prize of \$25,000, was a joint proposal from SpaceWorks Engineering of Atlanta, Georgia, and a California firm called SpaceDev. Their mission would place a small satellite in orbit around Apophis, which would follow the asteroid using a laser rangefinder and radio tracking from earth to determine its orbit. The spacecraft would carry just two instruments and a radio beacon, and the mission would be relatively cheap at under \$140 million.

C. Charania of SpaceWorks Engineering says the companies are part of a growing number of entrepreneurial firms that are helping to open up space. He notes that in 2004, a California team headed by Burt Rutan launched the first manned private spaceflight.

"And with other things in space over the last few years, entrepreneurial space, we see that," said Charania. "Small dedicated teams, with very focused, dedicated individuals with the right expertise can do a lot."

Multinational European teams earned second and third place in the competition. The contest was also open to students, and a team from the Georgia Institute of Technology

won five thousand dollars for its winning proposal in the student category.

Team member Jarret Lefleur says the students faced some choices.

"Do you design a lander? Do you design an impactor? Do you just kind of orbit around it," said Lefleur. "There are all kinds, thousands of different solutions. So you kind of match your objectives to your potential designs, and say, so which one of these gives you the most bang for your buck?"



Jonathan Sharma (l) and Jarret Lefleur

In the end, the Georgia Tech students designed an orbiter that would carry four instruments and launch a series of probes to the asteroid.

Runners-up in the student category came from Australia, the U.S. state of Michigan and Hong Kong.

Scientists believe a massive asteroid hit the earth 65 million years ago and killed off the dinosaurs. Louis Friedman, executive director the Planetary Society, notes that a much smaller asteroid flattened 2,000 square kilometers of Siberian forest 100 years ago, and says the risk remains of a similar strike today.

"It could be announced tomorrow that there's an asteroid coming close to the earth and it's going to impact within a year, and it's going to cause widespread devastation," said Friedman. "That is a perfectly plausible scenario. And we can't do much about it if that scenario comes about. So we know the risk with some certainty. The risk is a certainty and it's going to happen. We don't know when."



Bruce Betts

The Planetary Society's director of projects, Bruce Betts, says if a future tracking mission were to confirm an impending strike, there are options to avoid it, including the risky step of using a nuclear weapon. He says that given sufficient warning, there are better alternatives that would nudge the asteroid to a safer trajectory.

"They range from deflection using some type of propulsive device on the asteroid to a so-called gravity tractor, where you gradually tug at it with the gravity of your spacecraft, to about the only option you have if you really don't have much warning, which is, you try to hit it with a nuke [nuclear weapon]," said Betts. "But that carries its own dangers because you don't know how many pieces you might break it into."

Officials at the Planetary Society complain that the major space agencies are not doing enough to track near-earth objects such as asteroids, but note that officials of the U.S. space agency NASA and the European Space Agency were involved in the society's competition. Bruce Betts says both agencies will receive the winning proposals, although no plans are in place to implement them.