

How to deflect asteroids and save the Earth

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You may want to thank David French in advance. Because, in the event that a comet or asteroid comes hurtling toward Earth, he may be the guy responsible for saving the entire planet.

French, a doctoral candidate in aerospace engineering at North Carolina State University, has determined a way to effectively divert asteroids and other threatening objects from impacting [Earth](#) by attaching a long tether and ballast to the incoming object. By attaching the ballast, French explains, "you change the object's center of mass, effectively changing the object's orbit and allowing it to pass by the Earth, rather than impacting it."

Sound far-fetched? NASA's Near Earth Object Program has identified more than 1,000 "potentially hazardous asteroids" and they are finding more all the time. "While none of these objects is currently projected to hit Earth in the near future, slight changes in the orbits of these bodies, which could be caused by the gravitational pull of other objects, push from the [solar wind](#), or some other effect could cause an intersection," French explains.

So French, and NC State Associate Professor of Mechanical and Aerospace Engineering Andre Mazzoleni, studied whether an asteroid-tether-ballast system could effectively alter the motion of an asteroid to ensure it missed hitting Earth. The answer? Yes.

"It's hard to imagine the scale of both the problem and the potential solutions," French says. "The Earth has been hit by objects from space

many times before, so we know how bad the effects could be. For example, about 65 million years ago, a very large asteroid is thought to have hit the Earth in the southern Gulf of Mexico, wiping out the dinosaurs, and, in 1907, a very small airburst of a comet over Siberia flattened a forest over an area equal in size to New York City. The scale of our solution is similarly hard to imagine.

"Using a tether somewhere between 1,000 kilometers (roughly the distance from Raleigh to Miami) to 100,000 kilometers (you could wrap this around the Earth two and a half times) to divert an asteroid sounds extreme. But compare it to other schemes," French says, "They are all pretty far out. Other schemes include: a call for painting the asteroids in order to alter how light may influence their [orbit](#); a plan that would guide a second asteroid into the threatening one; and of course, there are nukes. Nuclear weapons are an intriguing possibility, but have considerable political and technical obstacles. Would the rest of the world trust us to nuke an asteroid? Would we trust anyone else? And would the asteroid break into multiple asteroids, giving us more problems to solve?"

The research was first presented last month at the NC State Graduate Student Research Symposium in Raleigh, N.C. The research, "Trajectory Diversion of an Earth-Threatening [Asteroid](#) via Elastic, Massive Tether-Ballast System," has also been reviewed and accepted for presentation this September at the American Institute of Aeronautics and Astronautics SPACE 2009 Conference and Exposition in Pasadena, CA.

Source: North Carolina State University ([news](#) : [web](#))

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