

STUDENT SPACE DESIGN COMPETITION
Project Statement

Asteroid Apocalypse



On June 30th, 1908, the sky above the Stony Tunguska River in Siberia was racked by a series of cataclysmic explosions. The blasts felled trees across an area more than half the size of Rhode Island. Atmospheric effects from the explosion were noted worldwide for weeks after the event. It is still not certain exactly what caused the explosions, but the general consensus in the scientific community is that the Tunguska explosions was the result of an asteroid or comet impact.

While the possibility is considered remote, the impact of a large (~2 km or greater) asteroid would be a disaster of global proportions. The resulting "impact winter" would result in a loss of crops worldwide and subsequent starvation and disease. A still larger impact could cause mass extinctions, like the one that ended the age of the dinosaurs 65 million years ago (15 km diameter and about 100 million megatons).



Meteor Crater, Arizona – A terrestrial impact crater formed 20,000 to 50,000 years ago by the impact of a ~80 foot diameter meteor.

Several teams of astronomers around the world are dedicated to finding and tracking objects whose orbits bring them near Earth (these objects are referred to as Near Earth Objects, or NEOs). The catalogs of NEOs are constantly expanding and our ability to detect a possible asteroid strike ahead of time is constantly improving. However, detection is only the first step – once an impact is confirmed, efforts will almost certainly be made to prevent it. Unfortunately, diverting the orbit of a 15 km diameter object traveling at 10's of kilometers per second is not an easy task.

MISSION STATEMENT

It has been confirmed that the recently discovered asteroid Hypotheticos, will impact the Earth on February 3, 2013. Hypotheticos is essentially identical to the asteroid that struck the Earth 65 million years ago at the end of the Age of the Dinosaurs, and the upcoming impact is expected to cause extinctions on a planet wide scale. You have roughly ten years to prevent this collision.



Artist's conception of the asteroid impact that ended the Age of the Dinosaurs 65 million years ago. (Picture courtesy of NASA)

PROJECT REQUIREMENTS

The project design should satisfy the following mission requirements:

1. The mission should be deliverable with existing launch vehicles and use technologies that will be reasonably available in the next ten years.
2. The mission should minimize the risk of launch or other accidents.
3. While cost is essentially not a concern, it would be best not to bankrupt the nations of the Earth while trying to save them.