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Nukes for defence against asteroids?

Posted on [28 October 2014](#) by [Jay Tate](#)

Nuclear explosives have long been considered as a means of deflecting or disrupting an asteroid if there is insufficient time to use other deflection techniques. This recent article from the *Wall Street Journal* has stirred increased controversy about the role of nuclear explosives for planetary defense:

Some U.S. nuclear-warhead components, scheduled for disassembly in the next year, have gotten at least a temporary new lease on life. The reason: possible use in defending the Earth against killer asteroids. That bit of information was tucked deep inside a 67-page Government Accountability Office report on the National Nuclear Security Administration, which manages the U.S. atomic-weapons arsenal. The warhead components, containing highly enriched uranium, are being retained "pending a senior-level government evaluation of their use in planetary defense against earthbound asteroids," the April report said. An NNSA spokesman declined to comment.

Government officials and space scientists say we aren't anywhere near a real-life replay of "Armageddon," the 1998 science-fiction extravaganza in which actor Bruce Willis and friends used a nuclear weapon to smash apart a giant asteroid hurtling toward Earth. While hundreds of asteroids with a diameter of about a kilometer or bigger (the size that could "produce global devastation," according to a 2010 National Research Council report) pass relatively near the Earth's orbit, none are expected to be a worry for at least 100 years and probably much longer, they say. However, while no such mega-space rocks are on the horizon, an estimated 100,000 or more asteroids at least 50 meters in size also pass through Earth's neighborhood, said

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Lindley Johnson, a program executive at the National Aeronautics and Space Administration who oversees the effort to find such "near-earth objects." Probably no more than 5% of those objects have been catalogued so far, he said.

If a 100-meter-wide asteroid hit Washington, D.C., for instance, it "could wipe out everything inside the Beltway," Mr. Johnson said. Global upheavals from a roughly 10-kilometer asteroid or comet striking near the Yucatan Peninsula 65 million years ago are believed by many scientists to have caused the extinction of the dinosaurs.

Early last year, an asteroid exploded in the skies near Chelyabinsk, Russia. That object (estimated to be nearly 20 meters in size and carrying a force of more than 400,000 tons of TNT) injured several hundred people, mostly as a result of flying window glass and other debris. NASA estimates that more than 100 tons worth of tiny space debris hits Earth daily, much of it burning up in the atmosphere.

NASA and others are searching the skies for more potentially dangerous objects. Mr. Johnson said he would like to launch a space telescope with infrared-detection capability, which he estimates could locate more than 90% of the 100-meter-plus asteroids within a decade. But his \$40 million annual detection budget, a tenfold increase from what it was for most of the past decade, isn't large enough to accommodate the estimated \$500 million satellite cost, he said.

One relatively low-cost new earthbound detection project known as the Asteroid Terrestrial-impact Last Alert System, or ATLAS, will use small telescopes and powerful cameras to scan the night sky. The NASA-funded effort, scheduled to be operational in Hawaii by the end of next year, aims to provide emergency planners with advance warning, ranging from a day to a few months, of an impending impact, said John Tonry, a University of Hawaii professor and head of ATLAS.

Government officials and scientists are also looking at ways to defend the planet, which is where nuclear weapons come in. A nuclear armed craft could be sent into deep space, where the atomic explosion would aim to alter the object's course long before it got to Earth and without any fallout affecting the planet. However, some scientists say that in certain scenarios, radioactive asteroid debris from an explosion might intersect with Earth. Back on Earth, the U.S. government has detonated underground nuclear blasts for nonmilitary purposes, such as trying to stimulate natural-gas production. But such work stopped in the 1970s, according to the Energy Department.



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“Any time you talk about nuclear weapons, it’s controversial,” said

NASA’s Mr. Johnson. In an era when the size of the atomic-weapons stockpile has been shrinking as a result of arms-control treaties and other factors, asteroid defense “may be an excuse for keeping the nuclear arsenal together,” said Jay Melosh, a professor of earth, atmospheric and planetary sciences at Purdue University. But he thinks there are better, nonnuclear ways for defending the planet. Among possible options: a “gravity tractor” or an “impactor.” The former involves using the thrusters and the gravitational tug from the mass of a large space vehicle to change an asteroid’s course. The impactor, as its name suggests, would crash at high speed into the asteroid with the same purpose. However, some argue that such approaches would only work if the asteroid is small enough and seen soon enough. For larger objects and shorter response times, a nuclear explosion, because of the huge amount of energy it can deliver, “is the only option,” said Bong Wie, a professor and director of Iowa State University’s Asteroid Deflection Research Center.

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