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PLANETARY DEFENCE – TIMELINE OF KEY DEVELOPMENTS

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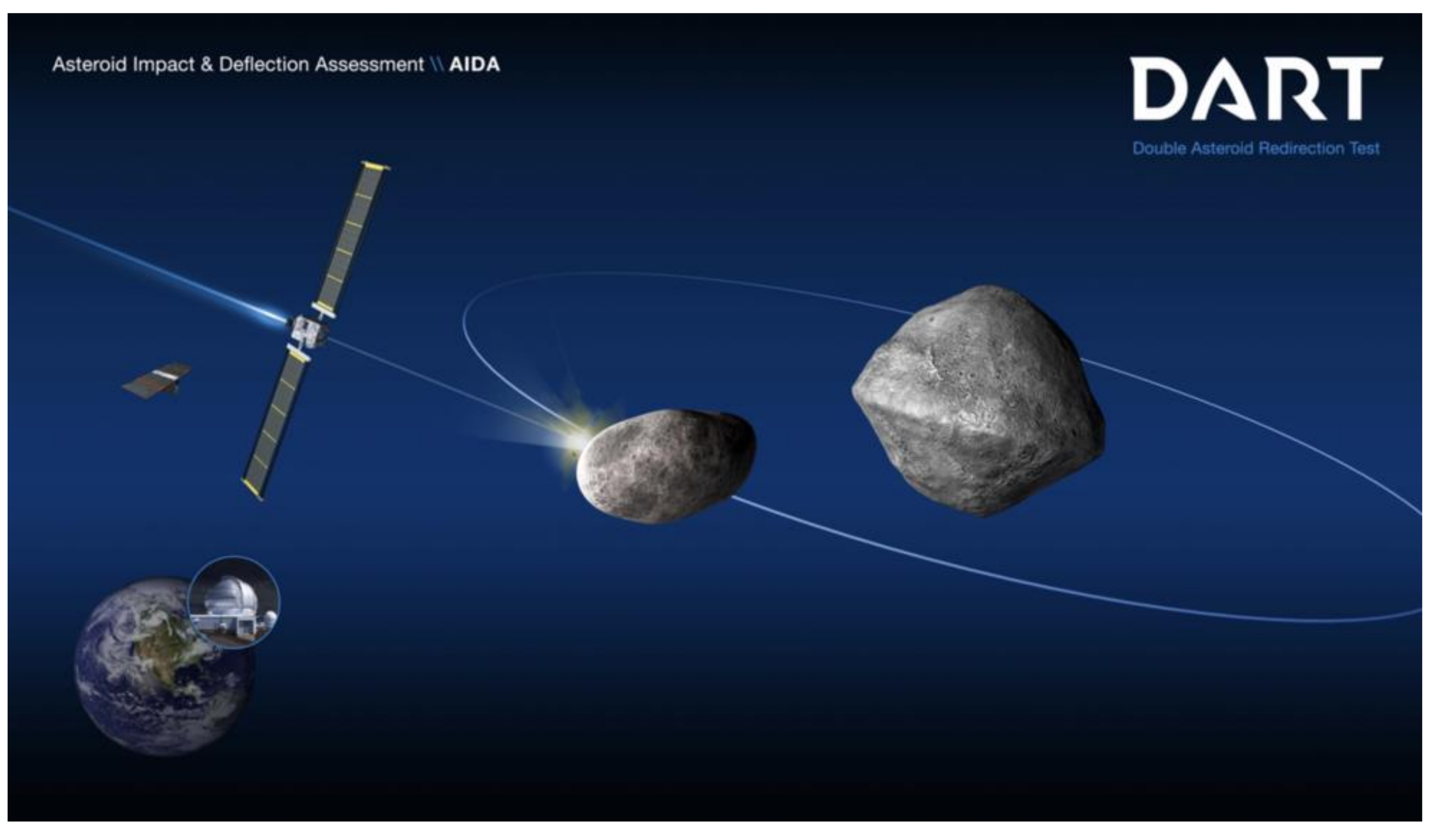
Asteroid impact avoidance comprises a number of methods by which near-Earth objects (NEO) could be diverted, preventing destructive impact events. Beginning with impact events millions of years ago, our planet has been affected by asteroids. The issue led to efforts to mitigate this threat. Considerations began to step up in earnest during the 20th century – during what we call the space age. These developments range from theoretical studies in the 1960s, to undertakings such as Spaceguard and SMPAG to current space missions such as AIDA. Events such as Shoemaker-Levy hitting Jupiter or the Chelyabinsk event also have to be taken into account, as are legal and political considerations undertaken at international fora such as UNCOPUOS or venues like the Planetary Defence Conferences or the Association of Space Explorers' efforts.

Select impact events

- The Chicxulub impact, 66 million years ago, is believed to be the cause of the Cretaceous–Paleogene extinction event.
- 1908 Tunguska event
- A large bolide impacted the Earth in the Sikhote-Alin Mountains, Primorye, Soviet Union in 1947
- A case of a human injured by a space rock occurred on November 30, 1954, in Sylacauga, Alabama.
- An asteroid entered Earth's atmosphere over Russia as a fireball and exploded above the city of Chelyabinsk in 2013.
- 2019 MO, an approximately 4m asteroid, was detected by ATLAS a few hours before it impacted the Caribbean Sea near Puerto Rico in June 2019

History of government mandates

- The 1992 NASA-sponsored Near-Earth-Object Interception Workshop hosted by Los Alamos National Laboratory
- In 1998, NASA formally embraced the goal of finding and cataloging, by 2008, 90% of all near-Earth objects (NEOs) with diameters of 1 km or larger that could represent a collision risk to Earth.
- The George E. Brown, Jr. Near-Earth Object Survey Act. This bill "to provide for a Near-Earth Object Survey program to detect, track, catalogue, and characterize certain near-Earth asteroids and comets".



NASA/Johns Hopkins Applied Physics Lab

The Spaceguard Centre & Observatory

Asteroids and comets and other small celestial bodies that are subsumed under the term near-Earth objects interest the public and scientists alike. This is on the one hand because study of these objects can contribute to our understanding of the origin and development of the solar system, and on the other hand due to the impact craters they have left on the surfaces of the Moon, the Earth and other planets.

How are we preparing?

The **Space Mission Planning Advisory Group (SMPAG)** has the primary purpose to prepare for an international response to a NEO threat through information exchange, development of options for collaborative research and mission opportunities, and to perform NEO threat mitigation planning activities.

The **International Asteroid Warning Network (IAWN)** linking together institutions that are already performing many of the proposed functions

ASE **Panel on Asteroid Threat Mitigation** – one of the objectives is to bring the issue to the attention of world leaders and institutions.

NASA's **Center for NEO Studies (CNEOS)** is NASA's center for computing asteroid and comet orbits and their odds of Earth impact.

Planetary defence **test missions** in outer space such as Deep Impact, Don Qijote, DART, HERA – conducted/planned by several space agencies

Spaceguard is a private organization whose purpose is to study, discover and observe near-Earth objects (NEO) and protect the Earth from the possible threat of their collision.

http://cdn01.dailycaller.com/wp-content/uploads/2012/12/asteroid-earth-public-domain-by-Donald-Davis-e1360264611778.jpg

Double Asteroid Redirection Test (DART) Mission

DART is intended to be the first demonstration of the kinetic impact technique to change the motion of an asteroid in space.

The DART spacecraft will achieve the kinetic impact by deliberately crashing itself into the target at a speed of approximately 6km|s , with the aid of an onboard camera and sophisticated autonomous navigation software

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