

SPACE EXPLORATION SYMPOSIUM (A3)  
Small Bodies Missions and Technologies (4)

Author: Dr. Andy Cheng

The John Hopkins University Applied Physics Laboratory, United States, Andy.Cheng@jhuapl.edu

Dr. Patrick Michel

University of Nice-Sophia Antipolis, CNRS, Observatoire de la Cote d'Azur, France, michelp@oca.eu

Dr. Stephan Ulamec

Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany, stephan.ulamec@dlr.de

Mr. Andres Galvez

European Space Agency (ESA), France, andres.galvez@esa.int

Mr. Ian Carnelli

European Space Agency (ESA), France, Ian.Carnelli@esa.int

Ms. Cheryl Reed

The John Hopkins University Applied Physics Laboratory, United States, cheryl.reed@jhuapl.edu

ASTEROID IMPACT & DEFLECTION ASSESSMENT, AN INNOVATIVE SMALL SATELLITE  
MISSION

**Abstract**

On Feb. 15, 2013, an exceptionally close approach to Earth by the small asteroid 2012 DA14 was eagerly awaited by observers, but another small asteroid impacted Earth over Chelyabinsk, Russia the same day without warning, releasing several hundred kilotons TNT of energy and injuring over 1500 people. These dramatic events remind us of the needs to discover hazardous asteroids and to learn how to mitigate them. The AIDA mission is the first demonstration of a mitigation technique to protect the Earth from a potential asteroid impact, by performing a spacecraft kinetic impact on an asteroid to deflect it from its trajectory. We will provide an update on the status of parallel AIDA mission studies supported by ESA and NASA. AIDA is an international collaboration consisting of two independent but mutually supporting missions, one of which is the asteroid kinetic impactor and the other is the characterization spacecraft which will orbit the asteroid system to monitor the deflection experiment and measure the results. These two missions are the NASA Double Asteroid Redirection Test (DART), which is the kinetic impactor, and the European Space Agency's Asteroid Impact Monitoring (AIM) mission, which is the characterization spacecraft. The target of the AIDA mission will be a binary asteroid, in which DART will target the secondary, smaller member in order to deflect the binary orbit. The resulting period change can be measured to within 10

The AIDA mission will combine US and European space experience and expertise to address an international problem, the asteroid impact hazard. AIDA will also be a valuable precursor to human spaceflight to an asteroid and will return fundamental new science data on surface properties and interior structure. AIDA will target the binary Near-Earth asteroid Didymos with two independently launched spacecraft, with the deflection experiment to occur in October, 2022.