IAF SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (Part 1) (4A)

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HERA – THE EUROPEAN COMPONENT OF THE ASTEROID IMPACT DEFLECTION ASSESSMENT (AIDA)

Abstract

Hera is ESA's contribution to the international Asteroid Impact Deflection Assessment (AIDA) cooperation, the first planetary defence mission. It targets the demonstration of the deflection of a hazardous near-earth asteroid. Hera will also be the first in-depth investigation of a binary asteroid and make measurements that are relevant for the preparation of asteroid resource utilisation. It is foreseen to rendezvous with the binary near-Earth asteroid (65803) Didymos and to spend several months close to the asteroid. This will allow to evaluate the outcome of the impact of NASA's Double Asteroid Redirection Test (DART) spacecraft into the secondary component of the asteroid, called Didymoon.

The payload of Hera includes the Asteroid Framing Cameras (the flight spares of the Framing Cameras of the Dawn mission) and the European Lidar. They will accurately measure the dynamical state of Didymos and completely map the surface. Those instruments will also measure the mass of Didymoon, from the "wobble" motion of Didymos due to the gravity of Didymoon. Hera will additionally carry a cubesat, with the ASPECT visible and near-IR imaging spectrometer as the baseline payload. It will allow the spectral characterisation of the targets, testing hypotheses of the origin of the binary. Observations of fresh, unweathered material in the DART impact crater will uniquely determine the meteorite analogue of Didymos. Ample mass and volume margin on Hera allows for complementary payload to be added.

The Hera spacecraft will demonstrate new technologies such as autonomous navigation and an inter-satellite link to use Hera as a deep-space data-relay system for the cubesat operation and data downlink, as well as providing ranging capabilities to enhance the cubesat navigation system and the mass determination in the Didymos system.