Geophysical Research Abstracts
Vol. 21, EGU2019-13147-1, 2019
EGU General Assembly 2019

Hera – the European contribution to the international AIDA mission to Didymos

Kleomenis Tsiganis (1), Michael Kueppers (2), Patrick Michel (3), Ian Carnelli (4), Stephan Ulamec (5), Andy Cheng (6), and the Hera Team

(1) Department of Physics, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece (tsiganis@auth.gr), (2) European Space Agency, Villanueva De La Canada, Spain, (3) UNS-CNRS-Observatoire de la Cote d'Azur, Laboratoire Lagrange, Nice, France, (4) European Space Agency Headquarters, Paris, France, (5) DLR, Germany, (6) Space Department, JHU/APL, Maryland, USA

Hera is an ESA mission of opportunity whose primary objective is to observe and validate the outcome of a kinetic impactor deflection test on a Near-Earth Asteroid, thus providing valuable information for future mitigation capabilities. Hera is part of the international Asteroid Impact & Deflection Assessment (AIDA) mission, together with NASA's Double Asteroid Redirection Test (DART). The DART spacecraft constitutes the projectile that will perform the deflection test, which will be observed by a cubesat provided by the Italian Space Agency (ASI), piggy-packed on DART, as well as from ground-based observations. Hera constitutes a rendez-vous mission that will closely examine the physical and dynamical state of the target asteroid – the small member of the binary Near-Earth Asteroid (65803) Didymos – in the aftermath of the DART impact, reaching Didymos a few years after DART.

The consequences of a potential asteroid impact on Earth to our society could be very severe. Impactors in the 100-500m range, causing damage on regional scale are relatively numerous. An asteroid impact is likely the only natural disaster that we may be able to accurately predict and prevent. AIDA will demonstrate and validate the technology of choice for impact mitigation. DART will hit the secondary component of Didymos, whose size ($\sim$170m) is within the range that is most relevant for mitigation purposes. Hera will measure the individual mass of Didymoon, which will allow us to estimate the efficiency of the momentum transfer – this will give us a better knowledge of the limits of applicability of the kinetic impact method (in terms of asteroid size). Furthermore, Hera will accurately measure the post-impact dynamical state of the Didymos system, thoroughly investigate the DART impact crater, and determine the surface properties of both objects. These observations that Hera will perform are essential for validating/refining our impact models, which will enable us to scale the Hera results to other asteroids, thus increasing our capabilities for efficiently deflecting an asteroid, when needed in the future.

Hera will be equipped with the Asteroid Framing Cameras (flight spares of the DAWN framing cameras), the Planetary Altimeter (PALT) as a lidar, and a hyper-spectral imager. In addition, two 6 unit cubesats will be carried to Didymos by Hera. The mission and payload status of Hera and AIDA will be described in this talk.