The HERA Milani Mission

(oral presentation)

M. Cardi[(1)], M.Pavoni [(1)], D.Calvi[(1)]

and
F.Perez Lissi[(2)], P.Martino [(2)], I.Carnelli [(2)]

and
Milani Consortium member

[(1)] Tyvak International srl, Via Orvieto 19, 10149 Torino (TO), Italy. Ph +39 011 1911607
(margherita@tyvak.eu)

[(2)] European Space Agency

Abstract

Hera is the European part of the Asteroid Impact & Deflection Assessment (AIDA) international collaboration with NASA who is responsible for the DART (Double Asteroid Redirection Test) kinetic impactor spacecraft. Hera will be launched in October 2024 and will arrive at Didymos in January 2027. The Hera mothercraft will accommodate two 6U cubesat, Milani and Juventas. The Milani cubesat is developed by Tyvak International leading a consortium of European Universities, Research Centers and Firms from Italy, Czech Republic, Finland. During the cruise to the Asteroid (+2 years), Milani CubeSat will be hosted inside the Hera mothercraft, periodically checked for health and charged. At arrival it will be deployed and commissioned while HERA is performing the Dydymos detailed characterization phase, at about 10 to 20 km distance from the asteroid. The Milani mission objectives are defined as to add scientific value to the overall Hera mission: i) Map the global composition of the Didymos asteroids, ii) Characterize the surface of the Didymos asteroids, iii) Evaluate DART impacts effects on Didymos asteroids and support gravity field determination, iv) Characterize dust clouds around the Didymos asteroid, enhancing the scientific return of the whole HERA mission. The scientific payloads supporting the achievement of these objectives are the main Payload “ASPECT” (developed by VTT, Finland), a SWIR, NIR and VIS imaging spectrometer and the secondary Payload “VISTA” (developed by INAF, Italy), a thermogravimeter aiming at collecting and characterizing volatiles and dust particles below 10µm.

The Milani mission and the project team is facing challenges such as, among others, the use of COTS components in deep space environment, optical navigation implementation, interfaces management with the HERA mothercraft since the very beginning of the design up to the mission. Tyvak International work focuses on the development and integration of the Milani CubeSat platform, including mission specifics development enabling the mission and vehicle models enabling early interface testing with Hera mothercraft.