

ASPECT CubeSat mission to a binary asteroid

T. KOHOUT^{1*,2}, A. NÄSILÄ³, T. TIKKA⁴, K. MUINONEN^{1,5}, A. PENTTILÄ¹, A. KESTILÄ⁴, AND E. KALLIO⁴

¹*Department of Physics, University of Helsinki, Finland (*correspondence: tomas.kohout@helsinki.fi)*

²*Inst. of Geology, The Czech Acad. of Sciences, Prague.*

³*VTT, Espoo, Finland*

⁴*Aalto University, Espoo, Finland*

⁵*Finnish Geospatial Research Institute, Masala, Finland*

The ASPECT mission aims to study the composition of the Didymos asteroid and the effects of space weathering and shock metamorphism in order to gain understanding of the formation and evolution of the Solar System.

The joint ESA/NASA AIDA (Asteroid Impact & Deflection Assessment) mission to binary asteroid Didymos includes an impact experiment to demonstrate kinetic deflection of potentially hazardous asteroid. The mission will also include two CubeSat miniaturized satellites, released in asteroid vicinity by AIM (Asteroid Impact Mission) spacecraft (ESA AIDA mission component). This arrangement opens up a possibility for secondary scientific experiments. Whereas Didymos is a space-weathered asteroid, the impactor is expected to produce a crater and excavate fresh material. Spectral comparison of the mature surface to the freshly exposed material will allow to directly determine space weathering effects. It will be also possible to study spectral shock effects within the impact crater.

ASPECT is a 3U CubeSat (size of 3 unis Fig. 1) equipped with a spectral imager with 500–2500 nm wavelength range and spatial resolution better than 10 m.

ASPECT will also demonstrate the capabilities of a CubeSat and a miniature spectral imager for the first time in deep-space environment. This work is done under SysNova: R&D Studies Competition for Innovation contract with ESA.

Figure 1: Fig. 1. Proposed ASPECT CubeSat

