

Asteroid Spectral Imaging Mission (ASPECT) CubeSat to characterize asteroid surfaces

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Asteroid Spectral Imaging Mission (ASPECT) is a scalable 3-6U CubeSat with a visible – near infrared (VIS-NIR) hyperspectral imager payload. The concept was developed for ESA-NASA AIDA (Asteroid Impact Deflection Assessment) project and is proposed as a payload for ESA Hera mission. ASPECT can be deployed on an asteroid orbit to characterize the composition of its surface with sub-meter spatial resolution. The prospecting objectives of ASPECT are based on the capabilities of the payload – the VIS-NIR imaging spectrometer. The payload allows for global compositional mapping and imaging of the target asteroid with sub-meter resolution. The spectral range of 500-2500 nm covers most common silicate mineral (olivine, pyroxene, and plagioclase) absorption bands related to Fe²⁺ ions in their structure. Additionally, ASPECT can also detect hydrated minerals as serpentine using 700 nm Fe³⁺ absorption features. Direct presence of -OH and H₂O can be detected at 1400 and 1900 nm respectively. Additionally, observations at various phase angle allows for estimation of surface roughness. Currently, and extension of the hyperspectral imager to 4000 nm is being investigated. Such capability will allow for direct detection of water and organics.