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Small Spacecraft for Deep-Space Exploration (8)

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ITALIAN CUBESATS FOR MOON AND ASTEROID IMAGING

Abstract

In the last decades, small satellites have consolidated their role in support to implement space missions in a fast, cheap and effective way. Space science is one of the areas where cubesat can be used to complement the investigations performed by the traditional sized satellites. Modularity, standardization, intensive use of state-of-the art COTS technologies allow to manage cheaper missions in shorter time-frames, thus providing better opportunities to access quasi- and deep space, to a wider technical and scientific community. The Italian Space Agency promotes, funds and coordinates the national initiatives

in this promising sector, both for autonomous missions and in international cooperation. ArgoMoon and LICIACube (Light Italian Cubesat for Imaging of Asteroids) are 6U cubesat designed manufacture by the Italian company Argotec and managed by Italian Space Agency. Argomoon will be launched during the maiden flight of the NASA Space Launch System (SLS) named “Artemis1 mission”, with the aim to collect pictures of the SLS last stage and of the other piggy-back nanosatellites. After the first mission phase, few orbital manoeuvres will move the satellite in a geocentric highly elliptic orbit, whose apogee is high enough to allow flybys and imaging of the Moon and of the surrounding environment. Instead, LICIACube flies as piggy-back on Double Asteroid Redirection Test (DART), NASA mission. DART has devoted to test the kinetic impact technique in the frame of the Planetary Defense program. DART will act as a kinetic impactor deflecting the orbit of the secondary asteroid of the binary system Didymos: the entire event will be witnessed and recorded by LICIACube that will separate from the main satellite ten days before its impact on Dimorphos surface. LICIACube has on board cameras will capture images of impact effects, primarily the plume of ejecta, and of the not visible side of the secondary asteroid, so supporting the validation of kinetic impactor technique for trajectory deflection. Both these cubesat will make use of the NASA Deep Space Network for Ground Communications.