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Ongoing and Upcoming Mission Highlights

ESA Mission Studies for Apophis Reconnaissance

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ABSTRACT

Asteroid 99924/Apophis will have a very close encounter with Earth on the 13th of April 2029, with a closest approach distance to Earth at only about 31000 km above the surface of our planet. The European Space Agency (ESA) is currently studying several options and scenarios for a reconnaissance mission that will be capable of observing Apophis in close proximity during its encounter with Earth.

The baseline mission option consists of a 12U-XL CubeSat on a heliocentric trajectory, which would rendezvous with the asteroid approximately one month prior to Earth Closest Approach (ECA). The recently conducted study on this option (under the name of "Satis") by ESA's Concurrent Design Facility (CDF) team concluded with a recommendation for an adapted version of the M-ARGO CubeSat concept. The baseline payload configuration consists of a hyperspectral imaging system and a low-resolution infrared imager. The foreseen launch would be approximately two years prior to the rendezvous with Apophis.

With this simple mission configuration, it will be possible to obtain high-resolution images of the surface of the asteroid, capable of detecting potential reconfigurations due to tidal effects induced by Earth's gravity.

While this baseline option will be studied in more detail by the Planetary Defence Office, further options will be studied by ESA's Preparatory Element. The aim of these studies will be to explore if significant enhancements can be achieved with minimal impact to cost and complexity of operations.

We will present here an update on the latest status of all studies. The conclusion of these general studies is foreseen for mid of 2023. The respective outcomes will define the way forward for the definition and implementation of the final mission concept.

Comments:

(Oral presentation preferred)