

Exploration of Near Earth Asteroids (4)

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CHARACTERIZATION OF A POTENTIALLY HAZARDOUS ASTEROID BEFORE MITIGATION

Abstract

A potentially hazardous asteroid may be identified early enough to enable a characterisation mission prior to a potential mitigation action. To prepare for this eventuality, the Committee on the Peaceful Uses of Outer Space (COPUOS) has put in place an action Team, the 'Space Missions Planning Advisory Group' (SMPAG). Its purpose is to elaborate an international response to a NEO threat through the exchange of information, development of options for collaborative research and mission opportunities, and to conduct NEO threat mitigation planning activities. One of the on-going tasks of SMPAG is to define the objectives of a space mission designed for a NEO characterization, and then to identify the instruments that can be made available for achieving such a mission. This consensual definition of a 'straw man payload' would be available on a reasonably short notice for a characterization mission targeted to NEOs that present a potential threat. This task, called toolbox for a NEO characterisation payload, is coordinated by CNES. The feasibility of any mitigation mission is highly dependent of the small body it is aimed to. The main parameters to select the most effective mitigation method for a specific NEO are its shape, its surface and subsurface characteristics, its internal structure homogeneity and composition.

The aim of this presentation will be to give an overview of the current state of the toolbox for a NEO characterisation payload. We will first summarize the outcomes of a CNES internal study dedicated to the NEO Apophis. We will elaborate on the characterization mission concept that was defined for that particular case, and on the corresponding straw-man payload. We will then identify a relevant set of short notice mission scenarios and specify the objectives of the associated characterization mission.