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THE ASTER MISSION: EXPLORING FOR THE FIRST TIME A TRIPLE SYSTEM ASTEROID

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Abstract

2001 SN263 is a triple system asteroid. Although it was discovery in 2001, in 2008 astronomical observation carried out by Arecibo observatory revealed that it is actually a system with three bodies orbiting each other. The main central body is an irregular object with a diameter about 2.8 km, while the other two are small objects with less than 1 km across. This system presents an orbital eccentricity of 0.47, with perihelion of 1.04 and aphelion of 1.99, which means that it can be considered as a Near Earth Object. This interesting system was chosen as the target for the Aster mission - first Brazilian space exploration undertaking. A small spacecraft with 150 kg of total mass, 30 kg of payload with 110 W available for the instruments, is scheduled to be launched in 2015, and in 2018 it will approach and will be put in orbit of the triple system. This spacecraft will use electric propulsion and in its payload it will carry image camera, laser rangefinder, infrared spectrometer, mass spectrometer, and experiments to be performed in its way to the asteroid. This mission represents a great challenge for the Brazilian space program. It is being structured to allow the full engagement of the Brazilian universities and technological companies in all the necessary developments to be carried out. In this paper, we present the technological aspects of this mission, including the transfer trajectories to be used, and the buss and payload subsystems that are being developed and will be used. Also, we discuss the expected scientific and technological consequences that are expected for the Aster mission.

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