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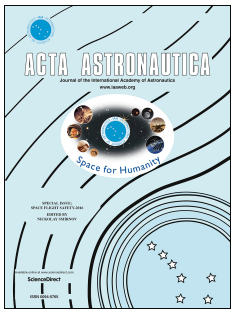

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Trajectory design for the System of Observation of Daytime Asteroids

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Abstract

System of Observation of Daytime Asteroids (SODA) is a space mission project, intended to detect and monitor hazardous asteroids approaching the Earth from the Sun direction, namely from the daytime sky. In particular, the SODA mission aims to detect small celestial objects of size ∼10 m, approaching the Earth from directions inaccessible to ground-based and near-Earth space-based telescopes, and to inform beforehand whenever a risk of collision with the Earth occurs.

The system uses one or two spacecraft launched into the vicinity of the Lagrangian point L1 of the Sun-Earth system, about 1.5 million km from the Earth. This paper considers main aspects of trajectory design for the SODA project at its initial stage. Selection of an orbit about L1 point, transfer from the Earth and stationkeeping in the vicinity L1 are discussed. A launch scheme making use of a lunar gravity assist is proposed to achieve a desired configuration of the two spacecraft.

Keywords: hazardous asteroid, Sun-Earth Lagrange point L1, lunar gravity assist

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