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NEO SURVEYOR MISSION: FIRST COURSE CORRECTION MANEUVER STRATEGIES

Abstract

NASA's Near-Earth Object (NEO) Surveyor mission is designed to significantly increase humanity's catalog and understanding of Potentially Hazardous Asteroids (PHAs) with a requirement to find a majority of asteroids large enough to cause severe regional damage. Expected to launch in September 2027, the passively cooled infrared space telescope will conduct its survey of NEOs from a Sun-Earth L1 halo orbit, which provides excellent viewing geometry of PHAs, short-range communications, and a stable, cold thermal environment. The reference trajectory is ballistic from launch injection through the completion of the multi-year science survey campaign. The complexities of the halo orbit dynamical instabilities, coupled with the tight attitude constraints driven by the Observatory's thermal design, result in unique navigation challenges, particularly during the mission's first week. This paper outlines the trajectory optimization and targeting strategies developed to maximize the first correction maneuver efficiency and minimize fuel usage while maintaining a balanced operations schedule.