

Multiple Asteroid Flyby Tour Design Utilizing Low-Thrust and Gravity-Assist for DESTINY+ Mission

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DESTINY+mission is a candidate for JAXA' s Epsilon small-class program to be launched in the 2020s. To enable lower cost and higher frequency deep space missions, the spacecraft will demonstrate advanced technologies that include a highly efficient solar electric propulsion system. For the science mission, the spacecraft will perform high-speed flyby observations; exploring the asteroid (3200) Phaethon as the nominal mission and several more asteroids as an extra mission. This paper presents the DESTINY+ mission analysis for multiple asteroid flybys utilizing electric propulsion and Earth gravity-assist techniques. We discuss candidate asteroids that the spacecraft can potentially explore. The target asteroids should be finally selected considering technical constraints, such as remaining propellant, and scientific returns. Multiple asteroid flyby tours are beneficial as precursor missions for future full-scale missions that include asteroid sample return missions.

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