

# Planning Deimos Observations with Simulations of Various Quasi-Stationary Orbits

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The Solar system hosts large numbers of small planetary satellites of great interest to scientists. However exploration of such bodies requires complex mission scenarios because the satellites typically move close to the primary and their own gravity fields are too faint to support Kepler-type orbits for the spacecraft. To address this problem we consider quasi-orbits, in which the spacecraft moves in an orbit very similar to that of the satellite, but at slightly different eccentricity and inclination. From the satellite, the spacecraft appears like being in orbital motion. This type of mission scenario is studied for a spacecraft moving near the Martian satellite Deimos.

We study the dynamics and life times of Deimos' quasi-orbits, and we investigate illuminating and observing conditions for mapping and line-of-sight conditions with Earth ground-stations for communication. Our preliminary results show that conditions for surface illumination and ground contact may be complex and require careful mission planning.

