

ASTRODYNAMICS SYMPOSIUM (C1)  
Orbital Dynamics - Part 2 (4)

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BREAKWELL LECTURE: ORBITAL MECHANICS ABOUT SMALL BODIES

**Abstract**

Small solar system bodies such as asteroids and comets are of significant interest for both scientific and human exploration missions. However, their orbital environments are among the most highly perturbed and extreme environments found in the solar system. Uncontrolled trajectories are highly unstable in general and may either impact or escape in timespans of hours to days. Even with active control, the chaotic nature of motion about these bodies can effectively randomize a trajectory within a few orbits, creating fundamental difficulties for the navigation of spacecraft in these environments. In response to these challenges our research has identified robust and stable orbit solutions and mission designs across the whole range of small body sizes and spin states that are of interest for scientific and human exploration. This talk will describe the challenges of exploring small bodies and present the practical solutions that we have discovered which can enable their exploration across the range of small body types and sizes.