

SPACE PROPULSION SYMPOSIUM (C4)  
Interactive Presentations (IP)

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SYSTEMATIC PERFORMANCE ANALYSIS OF CUBESAT PROPULSION SYSTEMS USING THE  
HIGH PERFORMANCE SATELLITE DYNAMICS SIMULATOR HPS

**Abstract**

With growing use of cubesats for scientific applications, standard bus technologies such as the Attitude and Orbit Control System (AOCS) have to be converted and optimized on cubesat scale. However, size, mass and power budget put hard boundaries on the capabilities of these systems. Motivated by the need for an improvement of AOCS and mission scenario flexibility we look at standard cubesats equipped with various types of available thruster technologies (e.g electrical/chemical/monopropellant) in combination with magnetorquers. With technical specifications derived from state of the art cubesat technologies we look at different cubesat mission scenarios using the ZARM/DLR HPS orbit propagation software to analyse performance with respect to different criteria such as station keeping capability, maximum AOCS operation time, active change of orbital elements and deorbiting. In particular we look at the differences between low and high thrust concepts as well as the configuration itself (e.g single thruster with AOCS or multiple thruster assembly). We evaluate the feasibility and performance of each aspect with respect to the specified performance criteria.