

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Interactive Presentations - IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (IP)

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CUBESATS AS A FRAMEWORK FOR MULTIDISCIPLINARY CAPSTONE DESIGN PROJECTS

Abstract

Space engineering provides a unique experiential learning opportunity for undergraduate students not enrolled in traditional space-focused engineering programs; the constraints imposed by space missions are typically not encountered and require students to explore systems engineering from a new perspective. By varying the operating constraints, system-level trade-off studies can be conducted not typically seen at the undergraduate level. Interdisciplinary space projects force students who are traditionally siloed into narrow disciplines to understand concurrent engineering processes to meet project goals in a multidisciplinary environment. CubeSats provide a low-barrier high-reward opportunity for undergraduate engineering students to engage in multidisciplinary, multi-group capstone design projects that reflect realities of working in the engineering profession. The Western University - Nunavut Arctic College CubeSat Project provides a framework for non-space engineering students to gain hands-on experience in systems engineering in a team-based dynamic and is used as a case study for the utility in large team-based capstone design projects in undergraduate engineering education. In this project thirty-seven students from five academic programs work on a system-level trade-off study on the preliminary design of a 2U CubeSat. The CubeSat mission and design project attracts a wide range of students and provides real-world experiences not found in traditional small-group one-off projects.