

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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ORGANIZED CHAOS, EXPERIMENTAL LEARNING THROUGH PARTICIPATION IN
STUDENT-LED ROCKETRY DESIGN TEAMS

Abstract

With the proliferation of space commercialization, and a shift in the sector to more flexible, fast-paced approaches, interest and demand in the industry has surged. Consequently, engineering graduates find it challenging to stand out with a degree alone as companies increasingly look for individuals with demonstrated design experience. Thus, the importance of experiential learning to complement traditional post-secondary education is critical to produce industry-ready graduates.

Recognizing a gap in opportunities for gaining hands-on rocketry experience, students at the University of Manitoba Space Applications and Technologies Society (UMSATS) founded a rocketry team. Building on their experience with nanosatellite design, the UMSATS team successfully launched their inaugural rocket design as part of the 2019 Spaceport America Cup. This marked a new first for Manitoba, being the first fully undergraduate student-designed and manufactured high-powered rocket to come from the province. In the years following, the team has expanded on this initial success by growing the team as well as tackling more advanced designs.

Achieving this milestone was not trivial. While frustrating at times, due to the intrinsically chaotic nature of student-led design teams, they foster experiential learning which simply can not be taught in a classroom. With the stakes set lower than in industry and through being allowed to design and sometimes fail. The fast-paced and interdisciplinary nature of rocket systems provides students an opportunity to innovate and equips them with valuable hands-on skills in systems engineering and project management. Furthermore, it allows students to collaborate not only with their peers but also closely with members of faculty and industry to tackle real-world problems and receive mentorship. This both provides exposure to team work settings and allows them to expand their professional network. The rapid timelines that accompany design competitions also provide students exposure to multiple design cycles, a condensed version of the format found in industry, allowing for opportunities to develop presentation and technical writing skills through design reviews and reports. This paper details the motivation and process of founding of the rocketry team, focusing on the challenges faced throughout the process both technical and programmatic. It also reflects upon the key lessons learned throughout the process and their importance of these from a student, faculty and industry perspective