IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Lift Off - Secondary Space Education (2)

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A STUDENT-LED, VIRTUALLY-DEVELOPED SUBORBITAL PAYLOAD: INVESTIGATING THE STRUCTURE OF POLYURETHANE FOAM IN MICROGRAVITY

Abstract

The global COVID-19 pandemic impacted student science and innovation initiatives globally, forcing them to either cancel, postpone, or re-imagine their efforts in order to serve and inspire students. Shad Canada is one such initiative, a month-long summer STEAM and Entrepreneurship program for Canadian high school youth, that challenges its participants to create novel solutions to grand global and human challenges. In typical years, participants congregate physically in campuses to work in teams to devise solutions. In the era of COVID-19, Shad went virtual. The program devised a novel challenge for their 2020 cohort: to design a microgravity payload for suborbital flight that leverages space and microgravity in a meaningful and creative way with impacts for science, research and humanity - all while collaborating online. Shad partnered with Luna Design and Innovation to create Canada's first fully remote commercial space flight competition, offering one selected team 3-minutes of microgravity to test their research aboard

a reusable suborbital vehicle. Working with industry, academic partners, Canadian Space Agency engineers, and other mentors and experts, sixty-two teams of over 600 students took on the challenge, proving their ability to adapt, innovate, and come together under one common goal. A judging panel of Shad representatives and industry experts evaluated the final projects based on their impact, scientific merit, technical feasibility and project plan, and the final team, Mous4Inc., was selected as the winner of the Shad 2020 Design Challenge. Mous4Inc. developed a project that investigates the structural formation of polyurethane foam in microgravity. This diverse team of ten students from across the country continue to work with mentors to develop a spaceborne polyurethane foam, with potential terrestrial applications. In the end, having good communication, teamwork, and a central goal of connecting their ideas and interests was able to help Mous4Inc. design this winning project. This presentation centers around the student team's experience working on a novel design experiment, the first of its kind in Canada. This work will highlight both the novel virtual distributed payload development and building process, the value of such virtual payload development programs for other secondary students, lessons learned, and Mous4Inc.'s next steps with respect to launch, post-flight testing, publication and outreach.