Paper ID: 46583
student

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

Author: Ms. Roxanne Fournier
University of Toronto, Canada

# CANADA'S FIRST UNDERGRADUATE STUDENT PARABOLIC FLIGHT CAMPAIGN: A UNIQUE DESIGN CHALLENGE BUILDING ON THE NEXT GENERATION OF SPACE INDUSTRY LEADERS

**Abstract**

Parabolic flights have been used to simulate short periods of microgravity and hypergravity since the 1950's. These flights provide suitable test conditions for astronaut training, technology development, and basic microgravity science which has resulted in a better understanding of this unique physical environment. Lately, parabolic flights have also had success as educational tools. NASA's Reduced Gravity Education Flight Program has provided thousands of high school and undergraduate students with a chance to experience weightlessness and conduct valuable microgravity research since the 1990's. Similarly, the European Space Agency has been running its own student parabolic flight campaign, Fly Your Thesis!, for post-graduate students since 2009. In Canada, no such government program has ever existed which motivated Students for the Exploration and Development of Space Canada (SEDS-Canada) to develop a nationwide design challenge targeted at undergraduate and graduate students enrolled at Canadian universities. In 2017, four student teams were selected by SEDS-Canada and its partners, the National Research Council of Canada (NRC) and the Canadian Space Agency (CSA). The teams were tasked with designing, building and testing a microgravity experiment on board the NRC's Falcon 20 aircraft which has been modified by the Canadian Space Agency to perform parabolic maneuvers. In contrast to the large aircraft typically used for parabolic flight campaigns, the Falcon 20 is a small, modified business jet which enabled greater flexibility for the four teams to customize the flight path for their experimental needs. This paper will describe the 2017 campaign in detail, outline its challenges and outcomes, and provide a practical framework for other student-led organizations who wish to initiate their own parabolic flight opportunities for students. There will be special emphasis on the skills and experience gained by the student participants to highlight how such campaigns can bolster the next generation of leaders in the space industry. The latest 2018 campaign will also be briefly introduced including improvements implemented. Finally, recommendations for ensuring long-term stability of such parabolic flight opportunities will be presented.