

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

Author: Ms. Roxanne Fournier
University of Toronto, Canada, roxy.fournier@mail.utoronto.ca

Ms. Kristen Cote
University of Toronto, Canada, kcote@physics.utoronto.ca

CANADA'S FIRST AND ONLY UNDERGRADUATE PARABOLIC FLIGHT CAMPAIGN

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. For two consecutive years between 2016-2018, a total of eight student teams (four per year) 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 eight teams to customize the flight path for their experimental needs. An overview of other available parabolic flight programs across the world will be provided to contrast to our Canadian campaigns. This paper will describe the two campaigns in detail, outline their challenges and outcomes in order to provide a practical framework for other student-led organizations who wish to initiate their own parabolic flight opportunities. 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 current and future Canadian campaigns will also be briefly introduced including improvements implemented. Finally, recommendations for ensuring long-term stability of such parabolic flight opportunities will be presented.