SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Innovative and Informal Space Education (4)

Author: Dr. Jan Walter Schroeder
Germany

Mr. Didac Zurita Piñol
Spain

AER0G - THE PORTAL TO WEIGHTLESSNES: AEROBATIC FLIGHTS AS AN EDUCATIONAL PLATFORM FOR MICROGRAVITY EXPERIMENTS

Abstract

Controlled parabolic flights with an aerobatic aircraft can be used as an approach to obtain several seconds of microgravity to perform experimental research in weightlessness. In previous work it was shown that the microgravity achieved with aerobatic flights is suitable for professional microgravity research.

Aer0g is part of the Astrinnova framework which bundles innovative ideas to force the space sector and make it more understandable and accessible to the general public. This economic platform can be offered to high schools, to give students the chance to fly self designed microgravity experiments as part of their academic education. Together with their teachers supervising the project, they propose an experiment which can be in the field of material and fluid science, life science or ergonomics. The proposals are sent to aer0g and after a reviewing process of experienced scientist the experiments get accepted for an implementation. The students then have 3 months to carry out the project before they have a weekend at an airport where they first follow an educational program and safety briefings the first day and then install their experiments the second day. A student or a responsible person, i.e. the teacher of the students will then take care of the experiment during the parabolic flights.

From an educational point of view such an activity has a very strong learning effect because it covers all the steps of a professional research investigation including the technical proposal, the team management, the financial planning and the mechanical design of an experiment.

Such an interesting approach motivates students of high schools for the aerospace sector. The model can be used in every city where general aviation is common and can be spread to other countries to inspire educational institutions for the aerospace research sector.

In this paper we present how aer0g: The portal to weightlessness works in detail. The educational model including the application process is explained as well as a selection of possible experiments.

We also report on the safety issues and how this approach can be made as safe a possible to predict accidents. It is discussed how this approach can be spread to other countries as an educational outreach and how the platform can be used to further educational purposes such as access to research for disabled persons. The first aer0g flight campaign is planed to take place within the year 2009.

Keywords: parabolic flights, aerobatics, space education, microgravity research, general aviation