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THE BARCELONA ZEROG CHALLENGE. THREE EDITIONS OF AN INNOVATIVE
MICROGRAVITY HUB OF INSPIRATION.

Abstract

The 'Barcelona ZeroG Challenge' started in 2010 as an educational contest which provides graduate and undergraduate students worldwide an opportunity to make research in microgravity. Experiments are carried out at the UPC BarcelonaTech parabolic flight platform, located in Sabadell Airport (Barcelona, Spain). This innovative platform is in operation since 2008 (Perez-Poch A., González D.V., IAC-08), performing parabolas of up to 8 seconds of microgravity, by using single-engine aerobatic planes. It is the first platform of its kind in Europe. A joint-venture between Universitat Politècnica de Catalunya UPC-BarcelonaTech, the Aeroclub Barcelona-Sabadell and BAIE (Barcelona's Aerospace regional cluster) make possible its operations, intended for research and education.

We describe the results of the three editions conducted so far of this educational contest. The experiments are designed by international and interdisciplinary teams of 2-5 students. Noteworthy, as for these first editions, a previous workshop was conducted at the corresponding edition of the Summer Space Program of the International Space University (ISU). There, teams of students had to make a first design, with the requirements of the platform. A more detailed memorandum was later submitted; and senior scientists from ELGRA (European Low-Gravity Research Association) were in charge of the peer-review process which finally chose the best experiment to be conducted in microgravity. The contest was further publicized via students' associations like Euroavia and the Space Generation Advisory Council.

We describe in this paper the experiments that have already flown under the Barcelona ZeroG Challenge program in Barcelona, the student winners' involvement, and how this experience was relevant for their careers. One of the experiments, for example, was tested by students in the parabolic flight in Barcelona; and later it has been conducted in the ISS. Relevant publications in selected congresses and journals are a significant output from these experiments. Outreach activities like media broadcast were also important in terms of raising awareness of space activities to the general public, and promoting scientific and engineering studies in our university. Furthermore, an educational tutorial was developed, based on these experiments. Students from our university are being proposed with some exercises related to these experiments and they actually can visit the platform.

In conclusion, the Barcelona ZeroG Challenge has proven to be very successful, both in scientific and educational terms. Therefore, we will continue operating as a hub of motivation and inspiration for students and researchers worldwide.