

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Space Education and Outreach (8)

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SPACE 2004-2011: CASE STUDY OF AN INCREMENTAL PROGRAMME OF CHALLENGING
HANDS-ON SPACE EDUCATION AND OUTREACH OPPORTUNITIES IN HIGH-SCHOOL,
STARTING FROM SCRATCH**Abstract**

High-altitude ballooning is an increasingly popular hobby worldwide. Some of the private organisations flying weather balloons are offering primary and secondary schools the chance to fly small experiments free of charge, thus providing low-threshold, low-cost access to near-space for schools wishing to give students a hands-on 'space' project. Indeed, from plant seeds or lower animal eggs up to microcontrollers with steerable instrument platforms and a plethora of sensors, a very wide range of technological knowhow (and financial commitment) is covered, making it possible for every school to make an entry in the field, however modest or sophisticated.

In this paper, an overview will be given of experiments that have been proposed and carried out by secondary school students from Sint-Pieterscollege Jette (SPJ) between 2004 and 2011 showing that a secondary school can have an incrementally growing, challenging and rewarding, yet versatile and cheap hands-on space education programme.

The learning-opportunities students can derive from such a programme range from life-cycle studies in plants and design of electronic dataloggers to writing papers and giving presentations (as SPJ students did at several of ESA's Symposia on European Rocket and Balloon Programmes and Related Research). Exceptionally, even zero-g can be within reach, as shown by SPJ-students' participation in ESA's 2006 Student Parabolic Flight Campaign.

Critical evaluation and assessment of project succes allows successive generations of students to design and build experiments of ever-increasing complexity. It takes the students two years or more to learn the basics of physics, chemistry and biology, the basics of what the space environment is like and the basics of electronics using microcontrollers that are needed to come up with a suitable research question and whatever it takes to tackle it adequately. After designing and building their experiment, their efforts should culminate in a balloon flight carrying their experiment, preferably before they graduate. Hence the need for recurring flight opportunities, which are increasingly hard to come by.

Fortunately, an agreement was reached between the Royal Meteorological Institute (RMI) of Belgium, SPJ and ESERO (European Space Education Resource Office). As of April 2011, RMI offers one weather balloon flight per year to SPJ, under the condition that excess payload capacity is offered to other schools, paving the way for their own hands-on space education programme. A multiplier effect is hoped for, increasing the numbers of students that can go 'per ardua, ad astra!'