

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

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HIGH SCHOOL STUDENTS DEVELOPING A NANO SATELLITE - TEAM BUILDING,
EDUCATIONAL GOALS, INFRASTRUCTURE AND LESSONS LEARNED

Abstract

At the Aerospace Lab Herrenberg a team of committed high school students is developing a nano satellite. The team is mentored by PhD and undergraduate students from the University of Stuttgart. The Jugendforschungszentrum Herrenberg-Gäu Aerospace Lab e.V. is a nonprofit association located in the city of Herrenberg close to Stuttgart, Germany. The association's main goal is to promote technical and scientific careers to high school students. In this paper the team building efforts, the educational goals of the project, the infrastructure to implement such an ambitious project and the lessons learned so far are described. Because the project is an extra curricular activity and the high school students are not graded for their performance the team building effort is crucial for the success of the project. At all time the intrinsic motivation of the students have to be kept high. This is achieved by an open and friendly self teaching environment, opposed to a school like teaching approach. Direct instruction of the students is kept to a minimum; instead the mentors decided to implement a "learning by doing" approach always being available to mentor the students and answer all their questions. The educational goals of the project are twofold. The primary goal is to motivate the students, especially the girls, to take up studies in the STEM (Science, Technology, Engineering and Mathematics) field. It can be said that this first goal already has been achieved to a great extend as two of the co-authors of this paper started as high school students in this project and are now aerospace students at the University of Stuttgart as well as mentors in the Aerospace Lab. The secondary goal is the communication of knowledge not only in the aforementioned fields but also self organization, structured learning and project management. In order to provide the open self teaching environment a certain infrastructure is needed. This infrastructure contains of a laboratory like working space, electronic equipment like soldering stations and oscilloscopes, a metal treating workshop and of course computer workplaces. Naturally such an ambitious project if implemented by high school students does not progress without set backs. This paper also describes the problems faced in such a project and the solutions to cope with these projects. The lessons learned by the mentors during the project are described in detail.