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Author: Mr. Florian Marmuse
Laboratoire de Physique des Plasmas (LPP), France

Mrs. Florence Duveiller
Ecole Polytechnique, United States
Mr. Clément Pellouin
Ecole Polytechnique, France

CUBESATS, MARTIAN HOUSES AND FAILED COLLABORATIONS: SIX YEARS OF CREATING A SPACE CENTRE AT ÉCOLE POLYTECHNIQUE

Abstract

Space is a great education tool to train the engineers of tomorrow. In France, several universities and engineering schools currently carry space-related activities on campus, with various ambitions. Among them, École polytechnique in Paris - a non-space university - has been structuring its space activities around a student space centre called AstronautiX, triggered by the selection of a team of engineering students as a QB50 member team in 2011. In 2019, the centre counts one full-time engineer, more than 80 undergraduate and graduate students, a CubeSat in space, and several ongoing projects with external partners. For its first years, the centre has had little long-term coordination of its activites. Despite this, many ambitious projects have been successfully completed. More coordination is needed to shape and develop our activities: how can it be done efficiently in an student environment? Based on six years of lessons learnt, we explicit for the first time our vision of the thin line between under- and overcoordination of undergraduate educational space activities at École polytechnique. We look into how it affects interfaces with students, projects, the university administration, the laboratories, and external partners such as CNES, ESA or industries. Student space activities at École polytechnique are historically a bottom-up endeavour: students found ideas and motivation in their own environment and brought it to the student space association. The primary role of the space centre is to accompany such projects and add a layer of expertise to the students' motivation. On one hand, this non-student expertise is often essential to carry the project to its success, such as our flagship X-CubeSat project. On the other hand, the biggest difficulties emerged on the project when some students felt that the project was not purely a student project anymore and therefore decreased their implication. It is also shown that the administrators of the centre, even though mostly students themselves, have power only to propose, and not to impose a project or partnership to the new generation of students. Difficulties at École polytechnique also emerge from the fact that student typically spend only one year on a project. Building a space centre in a non-space university hence require a subtle management with a great amount of pedagogic skills in addition to the more traditionnal technical and management skills. After exposing our constraints and environment, we paint here our ideal set of skills necessary to manage such a space centre.