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SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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SATPRUST: SATELLITE PROTOTYPE FOR UNDERGRADUATE STUDENTS

Abstract

SATPRUST is the acronym for SATellite PRototype for Undergraduate STudents, a low cost project-based experience that is the learning backbone of the capstone courses of the Minor in Fundamentals of Aerospace Engineering at Pontificia Universidad Catolica de Chile (PUC). This Minor is the first formal undergraduate approach to Astronautics performed at PUC, and since its beginning, the difficult and sometimes "hard-to-apply" concepts in Space Sciences are given material form by the development of satellite prototype projects, an applied approach that follows modern pedagogical practice.

In order to have a "hands-on" experience in Space Systems Engineering, students are invited to take part in the design and construction of an "on-desk" satellite prototype, applying the knowledge gained in classes, from the first sketch to the final assembly of components and system integration and testing. SATPRUST refers to the latest version of the satellite prototyping experience, with the satellite prototype itself based on a carefully designed lightweight acrylic 3D printed structure with a Raspberry PI Camera and CPU, brushless DC motors, speed controllers, Li ion batteries and an RC control, all mounted inside a gyroscopic structure. The prototype is completely modular, and is therefore easily assembled and disassembled. Thanks to the current low (and decreasing) costs of new electronic and mechanical components, the development of TICs, and input from experienced senior aerospace engineers, this satellite prototype can be made for less than US$400.

Initiatives like SATPRUST are feasible and attractive for developing countries such as Chile that do not have a fully developed aerospace industry, and offers an interesting and modern educational approach for students that can potentially foster real on-Space satellite projects in the next few years as part of a step-by-step approach to space program development.

This paper addresses the method used for the SATPRUST project and presents feedback from students about their learning experiences.