

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
On Track - Undergraduate Space Education (3)

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A COMPLETE SCALABLE LEARNING EXPERIENCE FOR AEROSPACE ENGINEERING
LEARNING

Abstract

Under the incoming opening of the first CubeSat laboratory on the Aeronautical Polytechnic Academy (APA) of the Chilean Air Force (FACH) dependencies by January 2024, we have designed an integrated and related set of aerospace projects in order to face the challenge of preparing capable young human resources in aerospace engineering.

This new CubeSat laboratory is part of the biggest Chilean aerospace initiative ever designed, called National Satellite System (SNSAT), managed by FACH, which aims to foster the aerospace industry and research in Chile, an underdeveloped country recognized as world leader in astronomy research, but, on the opposite, with a clear weak presence in the astronautical field.

Since year 2021, it has been defined and executed in APA, a clear scalable strategy to strengthen the aerospace teaching by offering related aerospace projects as topics for undergraduate theses; last step to finalize the career for our astronautical and electronics engineering students.

In this sense, the Low Cost Water Rocket Cansats (LowRCansats, research presented by the author in the IAC2018), has been defined as the first step in the research line of sub orbital projects, being the next one the chemical rocket launcher vehicle for CanSats, such as sugar rockets for example, and then the weather balloon with a CanSat-like payload. We have currently researched to design two stage water rocket to launch CanSats (able to reach more than 250 m height), and a powerful low cost ground station for command and telemetry.

On the research line of CubeSat/orbital projects, we have the first two finished theses: "Preliminary Design of the Communication System of a CubeSat-type Satellite", and "Low Cost Telemetry and Data Download Station", being the next ones related with Attitude Control Systems and Payload technologies. As it can be seen, we are strategically covering different subsystems of the CubeSat satellite.

We expect to present the complete matrix of these integrated and scalable projects in order to build a strong knowledge database for the SNSAT.