

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

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FROM GROUND UP: INCORPORATING A LOW-COST GROUND STATION TO MASTER
SATELLITE SUBSYSTEMS DESIGN THROUGH DATA HARVESTING

Abstract

In space engineering education, bridging the gap between academic theory and practical application presents a significant challenge, often hindered by the high costs associated with satellite materials, manufacturing, system verification and access to space. This paper discusses an innovative approach to overcoming these challenges incorporating a low-cost ground station to the campus infrastructure, and its integration into the global SatNOGS network, aimed to provide students a unique opportunity to engage with the global scientific community. This initiative not only exposes engineering students to practical space instrumentation but also deepens their understanding of satellite operation fundamentals.

The paper prioritizes identifying specific target groups and case-studies, outlining the benefits, and proposing methods to measure the impact of this hands-on approach to engineering education. Drawing on the University of Vigo's achievements in successfully launching and operating four CubeSat missions, this initiative offers students a clear, practical application of their theoretical studies. It emphasizes the "learning by doing" philosophy, ensuring students acquire hands-on experience in satellite systems, crucial for their future professionals in the space industry.

This work emphasizes the importance of incorporating satellite operations in their educational curriculum, directly addressing a significant gap between universities and the actual engineering workforce. By focusing on the ground segment, this approach introduces students to the foundational aspects of satellite operations, a field with a high demand for skilled professionals. Traditionally, these positions require extensive on-the-job training by their employers to become fully proficient; his initiative aims to reduce that learning curve by equipping students with operational knowledge and skills that are immediately applicable. Furthermore, it highlights the significance of post-launch activities. Effective planning, execution of operations, and remote problem-solving are underscored as crucial for mission success.