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

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USING CAN-SIZED SATELLITE (CANSAT) SYSTEMS WITH PROBLEM-BASED LEARNING FOR INTERDISCIPLINARY EDUCATION – LESSONS LEARNED

Abstract

This research presents first-hand implementation and feedback/findings from a novel, interdisciplinary Problem-Based Learning (PBL) project developed by lecturers across the Aeronautical and Electronic and Computer Engineering departments at the University of Limerick. This ground-breaking "CanSat" project has collaboratively run over the past 3 years across both disciplines and has been highly successful to-date.

A CanSat (can-sized satellite) is a mock-up of a real satellite system, integrating all of the key components of such systems (power, sensors, communications, control, etc.) within the confines of a soft drink can. Using such a platform for third-level education across the different engineering disciplines allows students to realise all of the main satellite components and sub-systems in a format which would have been here-to-for impossible. Now, students from the aeronautical engineering space design course can work collaboratively with electronic engineering instrumentation students to engage in this interdisciplinary PBL assignment to build a "satellite" system.

The project introduces students to the design, development and construction of the CanSat system over the course of a single semester, enabling the interdisciplinary student group(s) to apply their aeronautical/electronic technical skills and capabilities to the realisation of a working CanSat system. By completing the project from design through implementation, testing and final flight stages, the students gain a greater understanding of the CanSat system and their respective disciplines by working together in their interdisciplinary team(s) on this space-based application.

The presentation will show how the CanSat kits are used to pivot the real-world, discipline-relevant PBL goal of designing, building and testing such a CanSat system (including payload) from a traditional module-based setting to an interactive, group-driven PBL project. Lecturers impressions and feedback on the process, associated benefits and challenges identified with the process will be presented. Student feedback at the end of the project will also be considered. Overall, the project was very well received by both students and staff, providing an interesting and rewarding platform for the development of space design and electronic engineering skills. The interdisciplinary nature of the project and groups appealed to both students and lecturers, motivating them to address any challenges and difficulties encountered, with novel solutions developed between the students and facilitators to overcome these also discussed.