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

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CUBESAT EDUCATION – BIGGER THAN STEM

Abstract

The Auckland Programme for Space Systems (APSS) is a non-credit undergraduate programme run over 2 years. It is open to students from all faculties. Currently in its third iteration, it has attracted over 400 students from engineering, science, arts, medicine, law and business. The programme equips the next generation with high demand skills including interdisciplinary teamwork, project management, systems thinking, risk analysis, entrepreneurship, and applying theoretical knowledge in the real world.

LEO satellites are often inwards looking, solving problems for population and environment. Identification of these problems usually lies in the domain of the humanities. With space activity becoming increasingly privatised, the business and law communities together develop a feasibility plan that allows a project to proceed. Once the need and feasibility are determined it is the role of the sciences to develop sensors and platforms for collecting required data. With the needs, finances and technologies set, engineering can proceed with the construction and delivery of flight ready hardware. Once the hardware is operational in space, IT and computing specialists manipulate the data stream to deliver end solutions.

The APSS mimics this real life environment. Students are required to form their own mixed-discipline teams. They must then identify and define a societal need or problem and come up with a solution to that problem using technology suitable for deployment in a CubeSat format. Their output is a written report that must include a business plan, as well as a promotional video and poster. After this first semester mission idea contest, the team 'most likely to succeed' is selected. This team is augmented and spends the next 18 months building a 1U CubeSat based on their idea. Remaining teams are given the opportunity to continue into semester 2 in one of two streams. They can either develop small payloads launching them to 1 km altitude in a CanSat style programme, or they can further develop their idea as a business start-up through the universities Centre for Innovation and Entrepreneurship.

To date the programme has successfully spawned one business start-up with a second on the way, has involved students in outreach through CanSat activities, and is building its first satellite to be launched at the end of 2018. It has been a catalyst for creating new post graduate research activities. Some of the struggles involve breaking down communication barriers within the institution, and student retention in a non-credit flipped teaching environment.