SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
In Orbit - Postgraduate Space Education (4)

Author: Dr. Elias Aboutanios
University of New South Wales, Australia

Dr. Barnaby Osborne
University of New South Wales, Australia

GROUNDING THE UNSW MASTERS IN SATELLITE SYSTEMS ENGINEERING - THE ROLE OF CUBESATS

Abstract

UNSW has recently launched a new Masters of Engineering Science program in Satellite Systems Engineering (ELECSS8539). It is the only comprehensive program in the Australasian region. It was developed as part of the Warrawal project that was funded by the Australian Government through the Australian Space Research Program. The ELECSS8539 masters was designed and developed in collaboration with Thales-Alenia Space (TAS), Optus, and ISAE. While the contribution of ISAE helped ensure the highest academic quality for the program, the involvement of the industry partners guaranteed that the practical aspect of the program is comprehensive. The cubesat format was chosen for the practical components of the masters as it gives a good balance of hands on experience with real space systems, short development time (from concept to test) and flexible scope of potential applications. Cubesats have been incorporated into a number of the core and elective courses and form the basis of the practical year-long project that students undertake in their second year. The practical project was designed and developed in close consultation with TAS in order to give students a complete experience in all aspects of a space mission. It requires student groups to propose, design and build a satellite subsystem that will be integrated and tested on a cubesat development platform. In order to enhance the students' educational experience, we have designed and a built a dedicated space systems laboratory. The intended capability of the laboratory is to a cubesat subsystem to be taken through the development process from the concept, through the test and evaluation, and integration up to flight readiness. This laboratory comprises 10 workstations where the initial hardware development will be undertaken. Mechanical design is aided by state of the art CAD/FEA software and a 3D thermoplastic printer to allow custom structural housings to be made. In addition to the workstations, the laboratory has two trolleys that are complete with cubesat development pumpkin kits. Once the hardware is designed and verified, students would then be required to integrate it with the pumpkin kit and run integration and verification tests. Testing capability currently incorporates integration testing and thermal testing. Neighboring lab facilities also of shock/vibration, EMC test capability. Future upgrades to this lab will allow cleanroom facilities for assembly and storage. This completes the student's experience. This paper discusses in detail the practical project and the space systems laboratory in the context of the new masters program.