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THE CO-ORDINATION OF A DISTRIBUTED EDUCATIONAL CUBESAT PROJECT THROUGH INTERNATIONAL COLLABORATION: LESSONS LEARNT SO FAR

Abstract

SEDSAT-2 is a CubeSat – that is founded, managed and developed collaboratively by an international group of students residing in different geographical locations across the globe. The current team includes students from Afghanistan, Austria, Bangladesh, India, Nigeria, Norway, Romania, United Kingdom and the United States.

Sub-systems of this CubeSat are developed in a modular, reusable fashion and some, including the command and control unit, software radio and power supply, are at an early prototype stage. Work is currently under-way to dene a proper payload, involving consultation with space-related academic and industry groups.

We aim to leverage the freedom that our status as a voluntary student project allows, in order to develop an interesting and useful payload which otherwise might not be developed. The main challenge of the project, and the focus of this paper, is the development of management, co-ordination and virtual collaboration systems and processes required for a complex technical system that is developed by an extremely distributed and constantly changing team of students, who are just beginning to learn about satellite development.

The virtual collaboration environment includes conventional communication tools (wiki, website, e-mail lists), web-based system denition tools and a novel distributed hardware development board and software, capable of linking sub-system prototypes over the Internet for inter-subsystem development and testing.

The tools and work ows developed here are useful for other student and international educational groups – either academic-related, or voluntary – as they assist in breaking down complex technical space systems into manageable sub-systems which students are likely to be capable of designing and building using the raw technical design skills they have learned within a University. Furthermore, this is achieved in a distributed, virtual working environment, lowering the management and cost barriers to entry in space system development and allowing increased student participation, collaboration and outreach.

This paper will give an overview of SEDSAT-2 technical sub-system progress, and will then discuss the management and organizational strategies which have been found to work well, and some which don't.

Finally, the technical tools which enable individual students to collaborate on a distributed, international space project will be described.