

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Poster Session (P)

Author: Mr. Jeremy Straub
University of North Dakota, United States, jastraub@gmail.com

Mr. Josh Berk
University of North Dakota, United States, Josh5187@gmail.com

Mr. Anders Kose Nervold
University of North Dakota, United States, anders.nervold@my.und.edu

Mr. Christoffer Korvald
University of North Dakota, United States, christoffer.korvald@my.und.edu

Mr. Donovan Torgerson
University of North Dakota, United States, Donovan.Torgerson@my.und.edu

OPENORBITER: ANALYSIS OF A STUDENT-RUN SPACE PROGRAM

Abstract

Students at the University of North Dakota, as part of faculty-mentored teams in a student-lead program, are working to usher in a new chapter in humanity's exploration of space. The OpenOrbiter Small Spacecraft Development Initiative (OSSDI) is demonstrating two complementary paradigm-changers. First, the initiative facilitates student involvement in all aspects of a space program, without the preconceptions present in established space activities. Second, it is demonstrating a low-cost framework for small spacecraft development. These combined activities are poised to demonstrate a new way forward for space exploration: combined, they allow risk-taking exuberance and a cost of entry that makes risk-taking exuberance acceptable – even desirable.

The OSSDI includes over 200 students and 15 faculty members spanning more than five component colleges and numerous departments of the university. These individuals comprise 16 groups focusing on topics including typical STEM-related disciplines (e.g., electrical design, mechanical design, software design and development), mission operations, space policy, outreach and publicity. In addition to providing students with the opportunity to be involved in a fully integrated space program, it also allows them to learn about the disciplines that they will likely be required to work with in industry (whether aerospace or otherwise) and how practitioners in these industries work. Because of the educational environment, low cost and risk levels and, in many cases, a lack of knowledge about how things are 'supposed to work', innovative approaches have been tried and their level of success documented as part of the program.

To allow the level of flexibility desired, a low-cost approach to small spacecraft design had to be arrived at. The Open Prototype for Educational NanoSats (OPEN) design that is being implemented by involved students and faculty, thus, represents the other aspect of the paradigm change. OPEN will be a complete set of design documents, operating software, testing plans and fabrication and integration instructions that allow a 1U CubeSat-class spacecraft to be created with a parts budget of approximately USD 5,000. *This price point allows the project to be paid for from teaching and other small internal – to – the – university funding sources that do not carry with them the same risk of failure to the responsible faculty member (thus, allowing*

This paper presents the OpenOrbiter Mission and the paradigm changes it is enabling. It compares and analyzes the mission from a national/international policy perspective and as a pedagogical tool.