IAF SPACE SYSTEMS SYMPOSIUM (D1)
Interactive Presentations - IAF SPACE SYSTEMS SYMPOSIUM (IPB)

Author: Dr. Evelyn Honore-Livermore
Norwegian University of Science and Technology, Norway

Dr. Sivert Bakken
SINTEF, Norway
Dr. Roger Birkeland
Norwegian University of Science and Technology, Norway

A FRAMEWORK FOR COLLECTING LESSONS LEARNED FOR UNIVERSITY CUBESAT PROJECTS

Abstract

In this paper, we present a framework for collecting, discussing, and implementing lessons learned from university CubeSat projects. The framework is demonstrated on the 6U CubeSat HYPSO-1 (Hyperspectral Small Satellite for Ocean Observation) which was launched in January 2022. HYPSO-1 is the first research CubeSat mission from the Norwegian University of Science and Technology (NTNU), and it carries a novel hyperspectral imager payload with a configurable on-board processing unit for oceanographic data collection. The payload was developed by NTNU and NanoAvionics (LT) provided the satellite bus.

The HYPSO-1 project was started at the end of 2017, and almost 100 students have been involved since then. The project team is based on bachelor and master students with support from PhD and post-doctoral researchers. A challenge for the team has been the high turnover of students each semester, and how to successfully ensure knowledge management and transfer of responsibilities in the transitions. Furthermore, now that the first satellite has been launched, how to effectively ensure that the lessons learned from HYPSO-1 are carried over to future satellites to reduce risk and increase mission performance. The HYPSO-2 satellite is largely based on the HYPSO-1 design, but there is a need from the stakeholders to increase the performance and to add a second payload. At the same time, most of the researchers are graduating from their PhD, which leaves the HYPSO-2 at a risk from losing the inherent knowledge gained from these researchers during HYPSO-1.

We describe a framework for lessons learned for university CubeSat teams, based on best practices from the Project Management Institute (PMI). We also describe how to incorporate these lessons learned into the semesterly design reviews and agile framework used for software and hardware development of the HYPSO-X satellites.