47th STUDENT CONFERENCE (E2)
Educational Pico and Nano Satellites (4)

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TACKLING CONSTRAINTS AND RISKS IN AN ALL-STUDENT CUBESAT BUILD

Abstract

We address lessons learned in building our first CubeSat, and the subsequent open source release of the bulk of its components to the community. That it was built at all is testament to our students, and we candidly talk about how the next generation can benefit from both our work, and changes we note in the evolving university space market. Issues ranged from a switch from parallel to serial development of components, the difficulty in learning as you build due to time constraints, and the importance of meeting milestones by descoping rather than adding risk. By defining a university-class mission as experimental, we recommend the launch community agree to allow for 'do no harm' testing as the gold standard to encourage access to space for smaller teams. We also cover items that went well, in particular structural and test evolutions we've provided back to the community. Our use of an Agile workflow is recommended both due to the work environment (academic) and to meet changing time frames (experimental design). We also achieved the milestone of having a secondary payload on a 3U CubeSat, which increased mission success by providing redundant success criteria. Finally, we discuss the balance between heritage and new designs, and suggest that documentation quality is as or more important than flight heritage. Our Combined Advanced Capitol Technology University (CACTUS-1) CubeSat's launch is part of the NASA CubeSat Launch Initiative (CSLI) program and with support from the MD Space Grant Consortium.