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DEVELOPING LAUNCH SOLUTIONS FOR ADVANCED CUBESAT TECHNOLOGIES

Abstract

In the year 2000, the initial CubeSat design specification restricted the use of several technologies in CubeSat class spacecraft. Some of these technologies included propulsion and hazardous materials. In addition, secondary launch opportunities on high-end launch vehicles further restricted CubeSat capabilities with additional constraints including RF power, energy storage, etc.

Over the past few years, Cal Poly and Tyvak have been developing solutions to enable the launch of ever more capable CubeSats. This includes the ability to launch advanced propulsion systems and sophisticated instruments. A number of CubeSats including such capabilities have already been placed into orbit as secondary payloads. The paper will describe the process developed to qualify these systems for launch. In addition, the paper will provide guidelines for spacecraft developers to facilitate access to space for advanced CubeSat systems. This guidelines incorporate lessons learned from previous missions to streamline the process and reduce the cost and effort for the CubeSat developers.

Moreover, the Tyvak/Cal Poly team has incorporated many of the lessons learned for these launch campaigns into a new version of the P-POD that will allow even more advanced CubeSat systems to fly into space. The design solutions in this new Mk IV P-POD will also be described in the paper. Several of these innovations have already been flown and the Mk IV P-POD has been qualified and will be available to CubeSat developers starting in 2014.