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Design and Analysis of Pico-Satellite Orbital Deployer for Multi-Launch Vehicle

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In recent two decades there has been a proliferation of CubeSats due to their low cost, standardized design and short development time. They are attractive as technology demonstrators for Universities and emerging nations. The primary mission of the CubeSat Program is to provide access to space for tiny payloads. NASA, ESA, Japan's JAXA, and other space agencies occasionally run launch opportunities for picosatellites (CubeSat). CubeSats, despite becoming a standard architecture, do not have a standard launch provider. Some have launched via Russian LVs, others lofted up to the ISS, and others still use the piggyback method. The CubeSat design configuration is a 10cm cube weighing almost 1 kg. So, the CubeSat structure intended for accommodating the subsystems not to withstand the launch vehicle induced loads. The main function of the picosatellite orbital deployer (POD) is to protect the CubeSat against launch vehicle mechanical loads. The POD is an aluminum, rectangular box with a door and a spring mechanism. CubeSats slide along a series of rails during ejection into orbit. CubeSats must be compatible with the POD to ensure safety and success of the mission, by meeting the requirements outlined in this document. Additional unforeseen compatibility issues will be addressed as they arise. The study commenced with a review of the deployment mechanisms currently available, such as the PPOD, T-POD, X-POD, ISI-POD, CSD and J-POD systems, as well as auxiliary launch adaptors. The aim of this study is to design a picosatellite orbital deployer compatible with wide range of launchers as possible. Results presented showed good compatibility with wide range of launchers.