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CUBESATS: THE WAY FORWARD FROM EDUCATIONAL TOOLS TOWARDS RELIABLE
TECHNOLOGIES

Abstract

Ever since the first of their kind in 1999, CubeSats have been developed for a variety of applications like remote sensing, scientific experiments, technology demonstration, and communications to name a few. The relative low-cost and ease of manufacturing of these platforms makes them a favorable option for space observation missions in low Earth orbit versus large scale satellites. However, the success rate of CubeSat missions is somehow low. This is owed majorly to the incapability of CubeSats to withstand the launch or the space environment. These malfunctions observed in CubeSats, ranging in size and mission, may be mechanical in nature or due to software bugs. This study was done to scrutinize and discuss malfunctions that can occur during the operations phase in CubeSats. Multiple CubeSat glitches are addressed independently and an understanding of what can go wrong and how it can be prevented is presented. These observations are based on knowledge acquired from first-hand experience of executing four CubeSat projects from start to finish; which includes design from scratch, system and component analysis, prototype building, flight model assembly, system integration, testing and operation of each satellite. While some speculations indicate possible reasons for a certain glitch, others are industrial insights gained that may prove beneficial in future CubeSat projects.