

Ground-Based Preparatory Activities (11)
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DEEP SPACE ENVIRONMENTAL TESTING FOR CUBESATELLITES

Abstract

Deep space exploration interest is currently trending in most space fairing agencies however, its success requires extensive testing. The launch and space environment can be extensively harsh, and this leads to satellite failure leading to an increase in space debris hence, adequate testing is of paramount importance to improve the survivability of satellites in such environments. Following the successful Sputnik 1 orbiting, there have been success stories for Low Earth Orbit (LEO) and Geosynchronous Equatorial Orbit (GEO) exploration missions. The quest for deep space exploration has significantly increased over the past years however, its achievement is heavily impeded by the harsh deep space environment and to a lesser extent, the structural failure during launch. Random vibrations and thermal effects are the major environmental inhibiting factors for deep space exploration. The need for prelaunch quality testing and acceptance testing with reasonable margins are key to the achievement of deep space exploration. As part of the verification of the safety design and workman-ship, vibration analysis, thermal vacuum tests, and thermal cycle tests. This paper outlines the vibration testing, thermal vacuum testing, and considerations taken into account on CubeSats development to ascertain their survivability, susceptibility, and vulnerability to the harsh deep space environment.