Paper ID: 79505
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IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Interactive Presentations - IAF MATERIALS AND STRUCTURES SYMPOSIUM (IPB)

Author: Mr. Saifulmajdy Ahmad Zahiri
Malaysia, majdy@spacein.com.my

Dr. Norilmi Amilia Ismail
Universiti Sains Malaysia, Malaysia, aenorilmi@usm.my

STRUCTURE DESIGN, MANUFACTURING, AND TESTING OF THE SPACEANT-D POCKETQUBE-BASED TECHNOLOGY DEMONSTRATION SATELLITE

Abstract

This paper presents the design, manufacturing process and testing of the structure for SpaceANT-D, a technology demonstration satellite. SpaceANT-D is developed based on the PocketQube platform, sized 50mm x 50mm x 50mm with an additional baseplate of 64mm x 58mm x 1.6mm. The material used for the structure is aluminium 6061 and fibreglass (FR4). The satellite undergoes a vibration test with vibration frequency ranging from 20 Hz to 2000 Hz in each 3 axes for 2 minutes. Additional environmental test of the Thermal Vacuum and Thermal cycle has been conducted in thermal vacuum chamber with thermal cycles ranging from -30C to +60C with 5 x 10-5mbar of vacuum pressure. The test duration lasts for two cycles and communication performance is monitored during the test. All the tests were conducted in the Malaysia Space Agency (MYSA) AIT facility. The satellite passed all the tests with no structural deformation and functionality test shows no performance degradation. This paper discussed ore on the challenges in designing and testing a pico-sized satellite and the lesson learned from the process of development of the satellite.