

Stress and thermal analysis of CubeSat structure

Abstract

This paper presents the stress and thermal analysis on the CubeSat structure to study the survivability of the CubeSat during the launching process or operating condition at the orbit is presented. Various design of mechanical structures were analyzed to determine the best design for different mission requirements. Analysis on the temperature of the batteries will be conducted as it is one of the most critical components that must operate in the required temperature to avoid failure of the CubeSat. ANSYS 13.0 was used to simulate both the structural and thermal analysis. Static structural was used to study the impact of G-force on the CubeSat during the launching process and Icepak was used to study the internal temperature. All of the result will be compiled in the table and comparisons were made among different designs to determine the advantages and disadvantages of each design. Results from simulation such as: safety factor, weight, internal available space and battery discharge rate were analyzed. From the findings, there is no best design in the CubeSat structure but only the most suitable design for the mission purposes. Battery discharge rate will play an important role to determine the requirement of heater in CubeSat.

Keywords — CubeSat, ANSYS, stress, thermal