

NANO-SATELLITES THERMAL CONTROL

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SUMMARY: In the early phases of any satellite design, it is critical to consider thermal control system design by conducting sufficient analysis. This paper focuses on the thermal design and the results of an initial thermal analysis of the nano-satellite. The goal of this study is to take suitable measures to ensure all the components will operate in their safe range of temperatures with a proper heat rejection. A thermal control system of a nano- satellite at an altitude 600 km with an inclination of 98° is presented. A thermal analysis of the nanosatellite is performed with different altitudes from 500 km to 2000 km. The nano-satellite is designed for a circular, near sun synchronous Low Earth Orbit (LEO). Cube satellite (CubeSat) is a nanosatellite that has that has dimensions of 10cm x 10cm x 10cm and a weight of 1kg. The thermal model of CubeSat was built in ThermXL. The thermal control analysis of CubeSat's passive thermal control system has been conducted. A temperature distribution of the solutions was computed. Temperature data met the needs of the mission. The results show that temperatures are highly sensitive to the chosen surface coating of the nanosatellite. For this reason it is recommended to choose the surface coating at the early stage of the design.