

Small Satellites (13)

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DESIGN OF THERMAL MODEL AND IMPLEMENTATION OF THERMAL SOLUTIONS FOR  
NANO SATELLITE**Abstract**

The paper describes in detail the thermal model of a 2U class nano-satellite, which takes into account, the design parameters including major thermal loads, heat sinks and the thermal properties of the various materials used in the satellite. Thermal model is subjected to various test scenarios varying with respect to orbit parameters which changes heat flux on panels. The current paper aims to demonstrate the thermal aspects of this under-graduate student team-built satellite which include the design of thermal protection for the satellite on the basis of thermal simulations. Only passive thermal control is used as Nano satellite design considerations severely limit the power, mass and volume margins thereby rendering active thermal control non sustainable within a small satellite system. Passive thermal control is attempted through paints and tapes of suitable thermo-optical properties. Heat sinks are discussed in the form of inter-PCB spacers, providing thermal path to the primary structure which radiates to space. It is a practice in heat sink design combined with verification of electrical requirements.