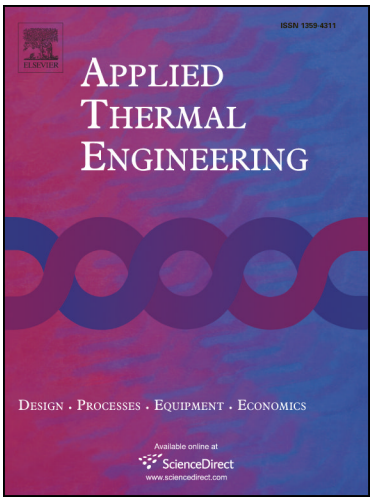

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Thermal analysis of the SMOG-1 PocketQube satellite

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Abstract

CubeSats have revolutionized the space industry in the past two decades. Its successor, the PocketQube class seems to be a lower size limit for a satellite which can operate continuously and can be received by radio amateur equipment. The present paper discusses the simulation of the thermal environment of the SMOG-1 PocketQube satellite at low Earth orbit by both thermal network and finite element models. The major findings of the analyses are the following. Even a single node per printed circuit board model can provide adequate information about the thermal behavior without tuning the physical parameters. By applying a finite element model with few magnitudes more nodes, the predicted inner temperature increased as the losses were reduced in the radiation-dominant environment compared to the thermal network model. Therefore, this latter method provides a more conservative temperature estimation. The most sensitive component of small-sized satellites is the battery which remains in the desired positive temperature regime even in this

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