

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Environmental Effects and Spacecraft Protection (6)

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PREDICT AND THERMAL ANALYSIS OF STUDENT CUBESAT 1U

Abstract

Space technologies have been changing and evolving at a faster rate, as has its industrial organization. The sector is currently undergoing a revolution in which new technologies and new processes for space exploration, telecommunications, and defense are emerging. Through this dynamism a new mission concept has emerged called CubeSat (miniaturized satellites). CubeSats are smaller scale satellites that encompass high-level technologies for a several different purposes. This type of mission is cheaper compared to conventional satellite missions due to its small size. In this way, the Gama Cube Design team at the University of Brasilia in Brasilia (Brazil) is developing GamaSat-1, a 1U CubeSat with the objective of producing new aerospace engineering capabilities in the university's students, as well as inserting the institution in the space field. For space missions, in general, the spacecraft is subjected to an environment with large thermal variations. In this way, this paper aims to predict and analyze the thermal profile and the influence of thermal variations in the GamaSat-1 project, for this purpose, a sun synchronous orbit similar to that of the Brazilian satellite, CBERS, is chosen. Based on this, it is possible to design a thermal controller that guarantees the survival of the small satellite in orbit.