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THERMAL DESIGN OPTIMIZATION FOR MICROSATELLITE CONSTELLATIONS

Abstract

In order to address the growing demand of microsatellite constellations, the Space Flight Laboratory has aimed to create repeatable, modular spacecraft designs that can be produced with lower cost and shorter timelines. DEFIANT is a spacecraft platform developed at the Space Flight Laboratory that has been adapted for a constellation mission. Microsatellite constellations present unique thermal challenges calling for innovative thermal design solutions. This paper will explore the thermal modelling approach and validation methodology which are at the foundation of the mission's optimized thermal design. On-orbit correlations between simulated results and temperature data from recently launched spacecraft were also integral to the tuning of the thermal design for future satellites. With this work, the DEFIANT spacecraft thermal design has been improved and streamlined, thus enabling the rapid production of future spacecraft to complete this growing microsatellite constellation.