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Author: Mr. Roy Stevenson Soler Chisabas
Brazilian National Institute for Space Research - INPE, Brazil

THERMAL LOADS SIMULATORS AND SETUP STRATEGIES OF THERMAL TESTS FOR SMALL SATELLITES

Abstract

Since the start of the space race, satellites have become indispensable for everyday activities. Much of the investment in research and development was not just for created new payloads and experiments. A good part was used in research, design, and manufacture of systems to test their functionalities, performance, and quality, increasing their reliability. These investigations represented the design of Space Environment Simulation Systems, as well as Thermal Load Simulation Systems and devices (Solar Simulators, Cold Plates, Infrared Lamps, Infrared Arrays, Thermal Canisters, Skin Heaters, Cal-rods, among others), were designed to act specifically in the space sector. However, other equipment originally was developed for a distinct purpose and nowadays has been carefully adapted for use in space environment simulation tests. The systems and devices mentioned above are commonly used in the environmental testing campaign of large satellites; nevertheless, it is possible to adapt them for use in performing thermal tests of Small Satellites. At present, some SmallSats developers ignore the existence of practices, devices, and techniques capable of helping, enriching and, in some cases, generating monetary savings in the thermal tests necessary for the development and subsequent qualification of their projects. This paper describes, relates and suggests the use of some devices and support systems normally used for the execution tests in large satellites that can be adapted and used in performing thermal tests in Small Satellites. In this article, we will analyze the types of systems and devices, their application, particularities, type of assembly, combination, compatibility with the test environment, advantages and disadvantages, among other topics necessary for the understanding of developers of all types of Small Satellites.