Paper ID: 85542
oral

IAF SPACE POWER SYMPOSIUM (C3)
Interactive Presentations - IAF SPACE POWER SYMPOSIUM (IP)

Author: Mr. Vito Centonze
Sitael Spa, Italy

Mr. Antonio Gabriele
Sitael Spa, Italy

A POWER CONTROL AND DISTRIBUTION UNIT FOR CONSTELLATIONS

Abstract

This paper focuses on the qualification, acceptance and main performances obtained on a compact, light and low cost PCDU (Power Control and Distribution Unit) which has been designed as a modular and configurable equipment for Low Earth Orbit (LEO) satellites with a maximum power capability of 1600W. This PCDU has been fully qualified in the framework of the Italian Space Agency (ASI) program PLATINO and will be used in the IRIDE constellation, as well as other missions such as EAGLE-1, and a specific configuration will be embarked on the PLATINO-2 mission. The PCDU supports a maximum of 4 independent power inputs (up to 75 V) and provides a 28 V unregulated power bus. Maximum Power Point Tracking (MPPT) is independently performed on each input; MPPT relies on buck regulators with direct drive capability, operating in 'N+1' cold redundancy. The unregulated bus is protected and distributed through nominal plus redundant LCL/RLCL and fuse protected lines for heaters and HDRMs. The PCDU, which is fully monitored, controlled, and configured through the N+R CAN bus, can be easily tailored for various missions since its functionalities are segregated in different and specific stackable electronic boards, and FPGAs are programmable. The PCDU has been designed with a mixed approach, with COTS components supported by Sitael heritage and radiation tests, and MIL/Space qualified components for critical functions, and can be mainly manufactured through automatic soldering process and accepted through automatic EGSEs, it is particularly suitable for missions with tight time to market, stringent budget requirement and peculiar functionalities which requires tailoring of the unit.