

IAF SPACE POWER SYMPOSIUM (C3)
Advanced Space Power Technologies (3)

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MODULAR ELECTRIC POWER SYSTEM WITH HIGH FLEXIBILITY FOR MICROSATELLITE

Abstract

The development of microsatellites has been widely increased by organizations and universities. Nowadays the complex missions that are usually done by large satellite can be accomplished by a single microsatellite or in a constellation. The electric power system (EPS) is one of the most important subsystem that shall be flexibly evolve following the mission. In a satellite project, the development of the EPS can only be started when the mission is already established and the engineering model of the satellite is available. For the micro or smaller satellite, size and shape usually become an issue. The modularity and flexibility of the subsystem components are mandatory. In this paper, a modular with high flexibility of EPS design is presented. A single line i2c data communication is used for up to 128 satellite components electrical power sensors (current and voltage). Fast response analog over-current and under-voltage detection which integrated with the sensors and fuses can directly cut the corresponding switches according to protect satellite component(s). All of that functions can be monitored and controlled by a single microcontroller. Moreover, the voltage and current limit fuse of each satellite component can be set by software without necessarily replacing any component in the circuit board. The implemented design can be integrated into a single Printed Circuit Board (PCB) or cascaded PCBs as needed. These features make the proposed EPS design to be modular and very flexible. It's useful not only for a microsatellite but also for a smaller size satellite such as a pico or nanosatellite.