SPACE POWER SYMPOSIUM (C3)
Poster Session (P)

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DESIGN OF ELECTRIC POWER SYSTEM OF PARIKSHIT NANO SATELLITE

Abstract

There are various subsystems in a satellite and one of the most integral subsystems of a satellite is the Electric Power subsystem (EPS). The main task of electric power is to generate power efficiently, for the proper functioning of the other subsystems till the end of the mission. The power budget of Parikshit is 1.9-3.5 Watts. To support this we are having solar panels from spectro-lab with an efficiency of 26% and the power generated up to 5 Watt. The Lithium-Ion battery is being used with nominal voltage of 3.6V. MPPT tracking is being implemented in Parikshit so that the maximum efficiency of the solar panel can be achieved. There are battery charge regulators, buck converter, over-current protection circuit, battery protection IC's being used. A switching pattern is being used in the satellite to provide power during various conditions such as when payload works, during eclipse period this is being done because of the limit on the power that we have put. The batteries are provided with a battery protection IC that will check the ambience inside the battery box such as the temperature, the reaming capacity, the discharge rate of battery and many more, this IC is interfaced with the main on-board processor with the help of I2C protocol which will send the data back to us through beacon. There are various test that are being conducted on the power system such as individual test of the IC's are done by making the PCB's then the system interfaced with other system by the collaboration of various PCB's leading to single test PCB. There is also a power management algorithm that is being pre-fed in the processor if the power system fails, the algorithm is such designed that the satellite is supplied power till the very end of the satellite life with regard to the functioning of many component will have to be stopped. The MPPT test is being conducted in the Simulink based environment.