SPACE POWER SYMPOSIUM (C3)
Small and Very Small Advanced Space Power Systems (4)

Author: Ms. SNEHA VELAYUDHAN
Nitte Meenakshi Institute Of Technology., India, sneha.velu@gmail.com

Dr. Ravi Kumar H. M
Nitte Meenakshi Institute Of Technology., India, hmrgamma@gmail.com
Ms. Shruthi A Seshachalam
Nitte Meenakshi Institute Of Technology., India, shruthi3291@gmail.com
Ms. Manasa Gajanan Naik
Nitte Meenakshi Institute Of Technology., India, manasa.roopa16@gmail.com
Mr. Sujay Ghosh
Siddaganga Institute of Technology, India, sujayghosh111@gmail.com
Mr. RANJITH H.G.
Siddaganga Institute of Technology, India, hgranjith@gmail.com

DESIGN OF ELECTRONIC POWER SYSTEM FOR STUDSAT 2

Abstract

STUDSAT-2 is a STUdent SATellite program which aims to build Twin Nano satellites each weighing approx. 10 kg with the dimensions of 30 x 30 x 20 cm3 with an objective of demonstrating Inter-Satellite Communication for the purpose of improving temporal resolution for remote sensing applications. Payload, Attitude determination and control systems, Electronic power system, Command and data handling, Inter Satellite link, Structure, Communication are the major subsystems involved in STUDSAT-2.

The backbone for successful working of a satellite is the power system. More so in a Nanosatellite, the power system has to be designed within the constraints on size, cost and performance. STUDSAT-2 has both body mounted and deployable solar panels consisting of ITJ solar cells. The secondary power source for the satellite is the battery pack which consists of Li-ion cells because of its high volumetric and gravimetric energy density, enabling a compact design. The main objectives of the power system are to condition the power obtained from the solar panels, to provide the common regulated voltage, to regulate the power to the distribution unit as well as the battery unit with minimum losses, to optimize the number of batteries and its usage and to log data in the ARM Cortex M4 controller STM32.

This paper presents the power profile for both body mounted and deployable solar panels per orbit and also per year. It gives a brief description of how the power generated by the solar cells is conditioned and the power protection unit with simulation results. The calculation on battery sizing and Maximum power generated tracked by using Perturb Observe algorithm is delivered. The current and voltage parameters are data logged using suitable interface with the On Board Computer.