

ABSTRACT

Nano satellites are small satellites that have several types such as a 3U cube with dimensions (30 x 10 x 10) cm³. Electrical Power System (EPS) is a subsystem that determines the required electrical resources from a cube satellite system using solar energy which is processed by solar panels, distributed to each subsystem and payload, and can be used to charge the battery. Since EPS plays a very important role, the design must be made according to the needs of each satellite. In previous research, EPS was designed only to use battery charging and discharging. Given this problem, product development is carried out to add functions that have not been implemented before with the needs and specifications designed for each system, including a generation system with an output voltage of 12 V, a harvesting system that can charge batteries with a 2-cell 7,4 V configuration. Then, a distribution power load at eclipse is 5,32 Wh, a distribution that has a power load that must be distributed is 9,133 W, monitoring voltage, temperature, can control the output of the distribution switch, and has a protection system for over charge, over discharge, short circuit, safety switch, and battery voltage balancing system. The test results for each system begin with the output voltage generated by the solar panel of 6,14 V so that the voltage can be increased to 12 V, then this voltage will be used to charge the battery with a current of 1,5 A and obtain a battery energy capacity of 11,308 Wh. Then in the distribution system, an average maximum power output of 12,45 W is obtained. Then in the monitoring system there are results of a comparison of accuracy with error tolerance on voltage sensors that have an average accuracy of > 95%. The results obtained from the protection system are overcharge protection at 8,61 V, overdischarge protection at 4,81 V, short circuit protection, and the safety switch system can function properly. The results obtained from the balancing system are that the value of the battery voltage for cell 1 and cell 2 has a difference of $\pm 0,02$ V. So that from several test results from each system that has been carried out it can meet the needs of each system specification.