Power Distribution System for a CubeSat

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Contents

Objective

To design and implement a fully autonomous power generation, storage and distribution system for a CubeSat

Project Outline

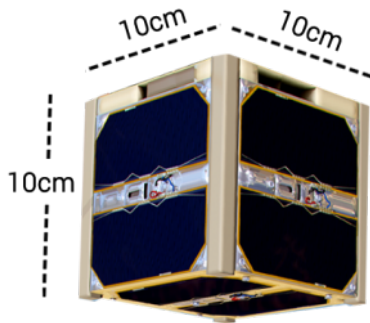CubeSat(1U):

- Dimensions-10x10x10 cm
- Weight-2 kg.

Figure 1: CubeSat 1U (Source: GIS Geography)

Project Outline (Contd.)

Electrical Power System (EPS):

- Harvests energy from the solar panels
- Manages power storage and distribution
- Protects circuits from damage
- Redundant architecture
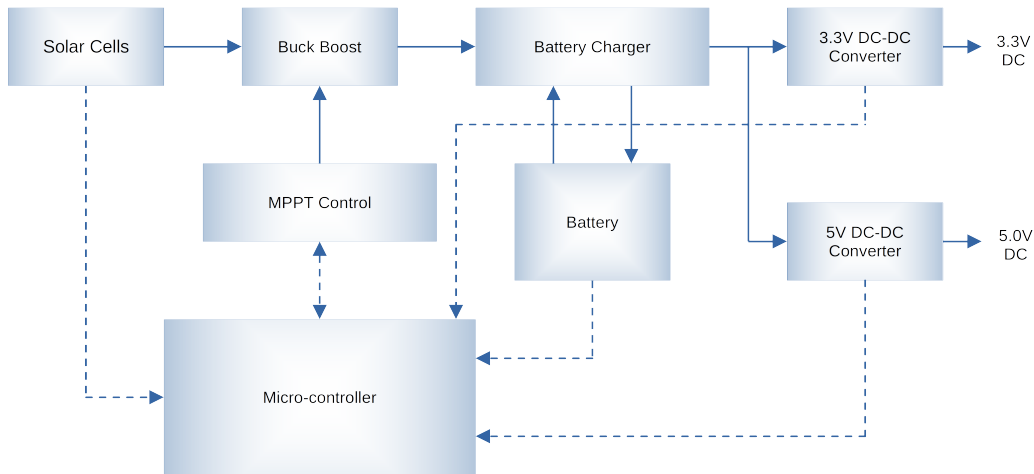
System Architecture

Figure 2: CubeSat EPS Architecture

Methodology

- Identifying the power requirements
- Literature Review
- Forming Specifications
- Architecture design and topology selection
- Design and simulation
- Procurement of components
- Fabrication and testing

Requirements

Equipments Requirements:

- SMD Soldering Station
- Oscilloscope
- Power Supply
- Function Generator

Software Requirements:

- MATLAB/Spice
- KiCad
- STM32 CubeIDE

Budget Estimate: Component cost

Sl. No.	Item	Amount (Rs.)
1	STM32 NUCLEO Development Board	3000
2	SMD soldering station	9000
3	Li-ion Cell (x2)	1000
4	Regulated Multi-Output Power Supply	5000
5	Solar Panel	2000
6	Components	8000

Budget Estimate: Fabrication cost

Sl. No.	Item	Amount (Rs.)
1	PCB Printing	3000
2	SMD soldering	990
3	Inductor Fabrication	1000

Project Timeline

Activity	October 3rd & 4th week	November 1st & 2nd week	November 3rd & 4th week
Literature Review			
Hardware Design			
Report Writing			

Project Timeline

Activity	December 1st & 2nd week	December 3rd & 4th week
Literature Review		
Hardware Design		
Report Writing		
Procurement of Components		
Fabrication		
Software Development		
Testing		