ESEIAAT

Cubesat Constellation
Astrea

Report

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2.1 Structure and mechanics

EMPTY

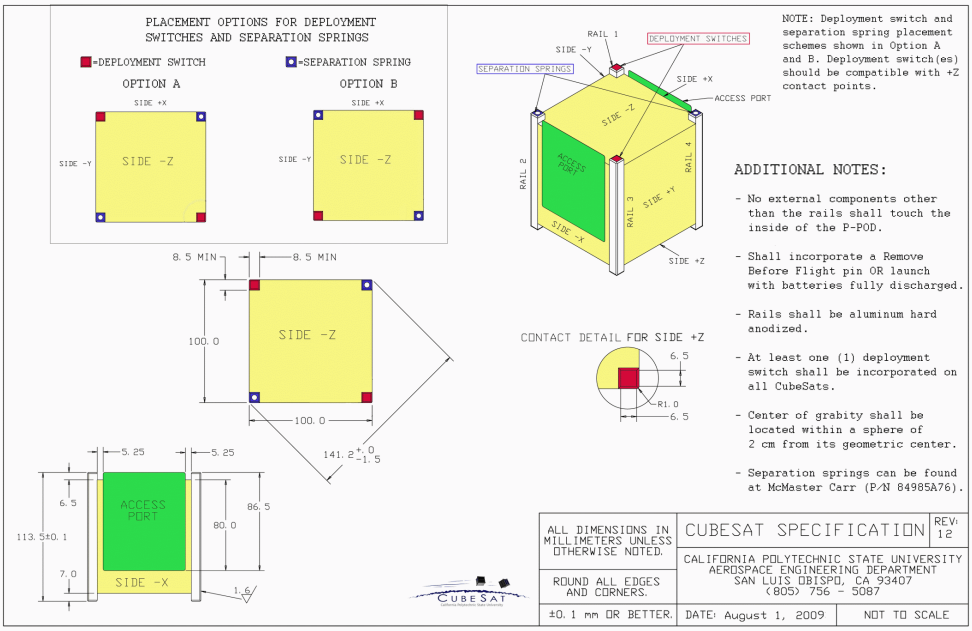

Figure 2.1: Dimensions of a 1U CubeSat [**?**]

2.1.1 Structure

EMPTY

2.1.2 Deployments

EMPTY

2.1.3 Thermal protection

EMPTY

2.1.4 Study of the commercial available options

EMPTY

Brand and model	Features and description	Money (€)
Solar Panels		

Fabricant 1	EMPTY	2000000
Chuscas 1	EMPTY	20000
Truñaas 1	EMPTY	20000
Cuescas 1	EMPTY	20000

Table 2.1: Options studied

Of all the options in 2.2, we have chosen the following options.

2.2 Electrical Power System

The Electric Power System of the satellite must provide and manage the energy generated efficiently in order to have all the systems operating under normal conditions. The Electrical Power System of a Cubesat is, probably, the most fundamental requirement of the satellite payload, since a failure of it results in a mission failure. High level functions of the EPS are to control and distribute power to the Cubesat, to suppy a continuous source of electrical power for the duration of the mission or the service provided by Astrea, to protect the satellite against bus failiures and to monitor and communicate the system status to the on-board computer. The role of the EPS is very diverse and the following subsystems have to be analyzed in detail.

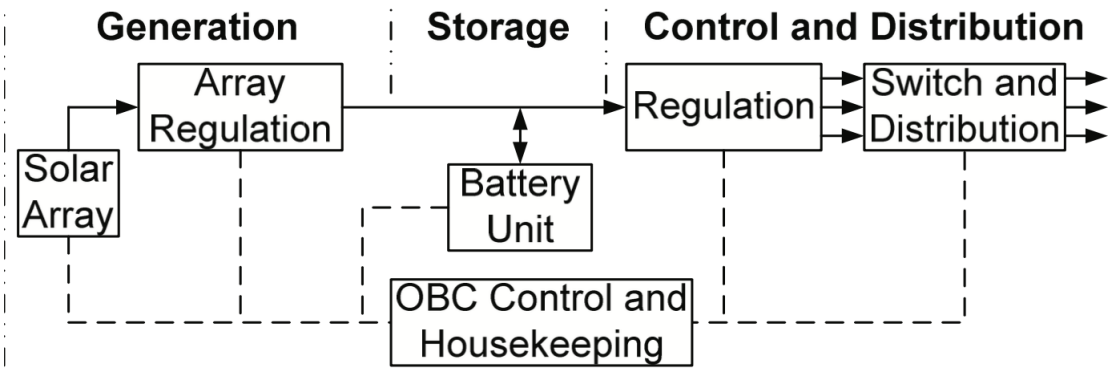

Figure 2.2: Basic schematics of the EPS [**?**]

2.2.1 Solar arrays

The primary source of electrical power has to be photovoltaic cells, given the size of the CubeSat.

2.2.2 Batteries

2.2.3 Power management

2.2.4 Study of the commercial available options

Several commercial options have to be studied. The table provided below organizes some information about the different options purchased.

Brand and model	Features and description	Money (€)
Solar Panels		
Fabricant 1	EMPTY	2000000
Chuscas 1	EMPTY	20000
Truñaas 1	EMPTY	20000
Cuescas 1	EMPTY	20000

Table 2.2: Options studied

Of all the options in 2.2, we have chosen the following options.

2.3 Propulsion Systems

EMPTY

2.3.1 Motivations

There is a Big rist jkjsd jskdjs

2.3.2 Study of the commercial available options

EMPTY

2.4 Communication module

100kbps:

1mbps:

¿solo 9600bps?:

Links interesantes universidades:

2.5 Payload

EMPTY

2.5.1 Antenna

EMPTY

2.5.2 Data Handling Systems

EMPTY

2.5.3 Study of the commercial available options

EMPTY

2.6 Attitude and control systems

EMPTY

2.6.1 EMPTY

EMPTY

2.6.2 EMPTY

EMPTY

2.7 Subsystems

The main subsystems required of each of our cubesat are:

2.7.1 Communication

The communication subsystem allows us to realize the reception and trasmission of data, voice signals, etc. It consists of a group of transponders, that are the combination of a transmitter and a receiver and whose functions are receiving, separating, amplify, process, reamplify and retransmit signals.

The telemetry subsytem analyses the information about the ground station and other sensors of the satellite in order to monitor conditions on board. It allows report to ground station about the conditions of the on board systems.

The command and control subsystem allows the ground station to control the satellite.

2.7.2 Electrical power system

The principal electrical power system goal is storing and distributing power to the different subsystems of the satellite.

Solar arrays are the principal power source of the satellite and generate a current that is used to allow the functioning the the other components of the satellite.

Batteries give power the different subsystems when solar arrays do not, due to not receiving sunlight

2.7.3 Thermal protection

The thermal protection system protect the CubeSat from thermal shocks. The satellite must remain in a optimal range of temperatures,despite the external temperature. It consists of various insulating materials and thermal conductors in order to maintain it within acceptable temperatures.

2.7.4 Attitude and orbital control system

Attitude and orbital control subsystem is needed to enable the satellite to keep a specific position within its orbit and to control the antennas in order to remain oriented to assigned area, because the satellite tends to change its orientation due to torque. The AOCS receives telecommands from the central computer and acquires measurements (satellite attitude and orbital position) from sensors.

2.7.5 Propulsion?

2.7.6 Payload?