



ESEIAAT



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Cubesat Constellation Astrea

Report

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Contents

List of Tables	iii
List of Figures	iv
1 Example	1
1.1 Example	1
1.1.1 Example	1
1.1.1.1 Example	1
2 Satellite design	2
2.1 Structure and mechanics	2
2.1.1 Solar arrays	2
2.1.2 Batteries	2
2.1.3 Power management	2
2.1.4 Study of the commercial available options	2
2.2 Electrical Power System	3
2.2.1 Solar arrays	3
2.2.2 Batteries	4
2.2.3 Power management	4
2.2.4 Study of the commercial available options	4
2.3 Communication module	4
2.4 Payload	4
2.4.1 Solar arrays	4
2.4.2 Batteries	4
2.4.3 Power management	4
2.4.4 Study of the commercial available options	5
2.5 Attitude and control systems	5
2.5.1 Solar arrays	5
2.5.2 Batteries	6
2.5.3 Power management	6
2.5.4 Study of the commercial available options	6
2.6 Subsystems	6
2.6.1 Communication	6
2.6.2 Electrical power	7
2.6.3 Thermal protection	7

CONTENTS

2.6.4	Attitude control	7
2.6.5	Propulsion?	7
2.6.6	Payload?	7

List of Tables

2.1	Options studied	3
2.2	Options studied	4
2.3	Options studied	5
2.4	Options studied	6

List of Figures

2.1	Dimensions of a 1U CubeSat [?]	2
2.2	Basic schematics of the EPS [?]	3
2.3	Dimensions of a 1U CubeSat [?]	5
2.4	Dimensions of a 1U CubeSat [?]	5

1 Example

Example

1.1 Example

Example

1.1.1 Example

Example

1.1.1.1 Example

Example

2 Satellite design

2.1 Structure and mechanics

EMPTY

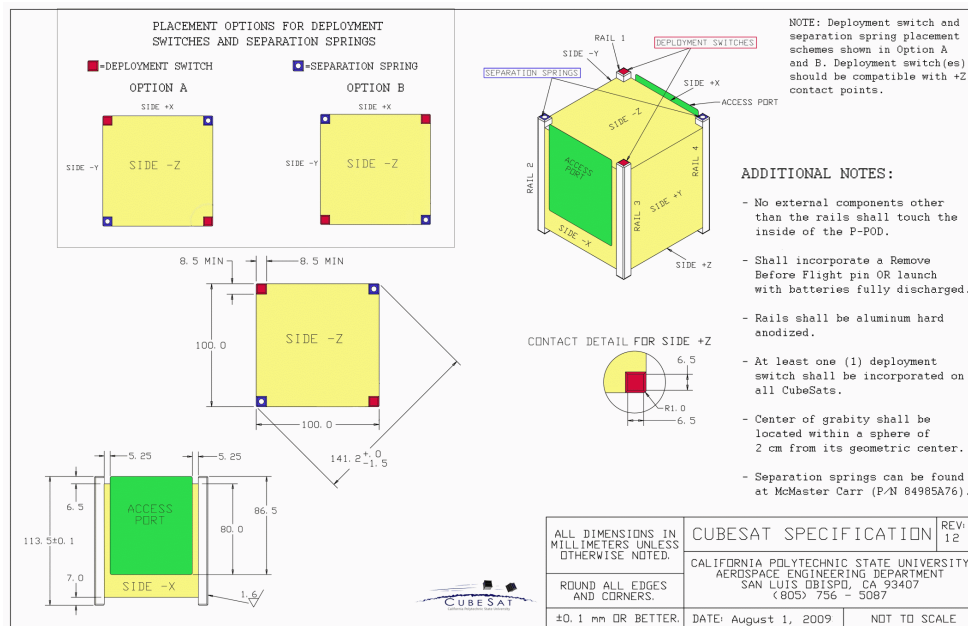


Figure 2.1: Dimensions of a 1U CubeSat [?]

2.1.1 Solar arrays

EMPTY

2.1.2 Batteries

EMPTY

2.1.3 Power management

EMPTY

2.1.4 Study of the commercial available options

EMPTY

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

2.2 Electrical Power System

Fabricant 1	Descripcio dEL BICHOOOOOO	2000000
Chuscas 1	Descripcio del BICHOOOO	20000
Truñaas 1	Descripcio del BICHOOOO	20000
Cuescas 1	Descripcio del BICHOOOO	20000

Table 2.1: Options studied

Of all the options in 2.4, 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 supply 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.

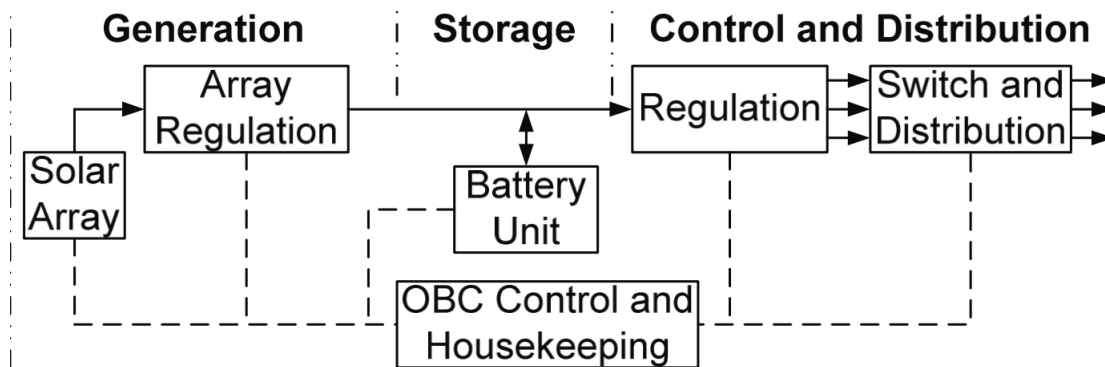


Figure 2.2: Basic schematics of the EPS [?]

2.2.1 Solar arrays

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

2.3 Communication module

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	Descripcio dEL BICHOOOOOO	2000000
Chuscas 1	Descripcio del BICHOOOO	20000
Truñaas 1	Descripcio del BICHOOOO	20000
Cuescas 1	Descripcio del BICHOOOO	20000

Table 2.2: Options studied

Of all the options in 2.4, we have chosen the following options.

2.3 Communication module

100kbps:

1mbps:

¿solo 9600bps?:

Links interesantes universidades:

2.4 Payload

EMPTY

2.4.1 Solar arrays

EMPTY

2.4.2 Batteries

EMPTY

2.4.3 Power management

EMPTY

2.5 Attitude and control systems

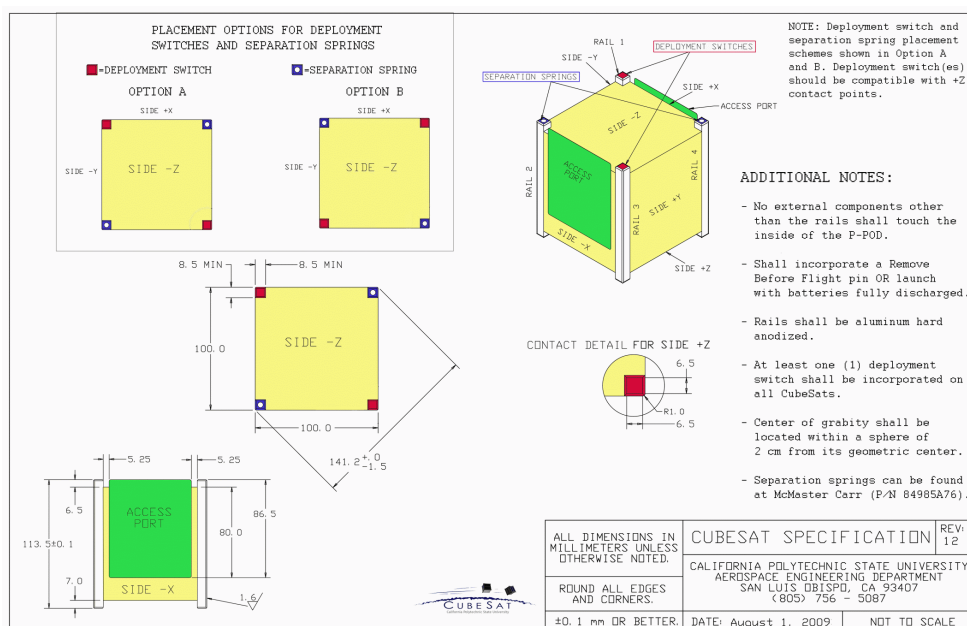


Figure 2.3: Dimensions of a 1U CubeSat [?]

2.4.4 Study of the commercial available options

EMPTY

Brand and model	Features and description	Money (€)
Solar Panels		
Fabricant 1	Descripicio dEL BICHOOOOOOO	2000000
Chuscas 1	Descripicio del BICHOOOOO	20000
Truñaas 1	Descripicio del BICHOOOOO	20000
Cuescas 1	Descripicio del BICHOOOOO	20000

Table 2.3: Options studied

Of all the options in 2.4, we have chosen the following options.

2.5 Attitude and control systems

EMPTY

2.6 Subsystems

2.5.2 Batteries

EMPTY

2.5.3 Power management

EMPTY

2.5.4 Study of the commercial available options

EMPTY

Brand and model	Features and description	Money (€)
Solar Panels		
Fabricant 1	Descripcio dEL BICHOOOOOO	2000000
Chuscas 1	Descripcio del BICHOOOO	20000
Truñaas 1	Descripcio del BICHOOOO	20000
Cuescas 1	Descripcio del BICHOOOO	20000

Table 2.4: Options studied

Of all the options in 2.4, we have chosen the following options.

2.6 Subsystems

The main subsystems required of each of our cubesat are:

2.6.1 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.

2.6 Subsystems

2.6.2 Electrical power

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

2.6.3 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.

2.6.4 Attitude and orbital

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.

2.6.5 Propulsion?

2.6.6 Payload?