ALL YOU CAN FLY: 2nd International CanSat Competition LEEM-UPM
Madrid, 8-11th April, 2010

Preliminary Design Review Document Outline

Submit to fly@leem.es before 28th February

A – Introduction

1- **Team members**, including full name, email address, age and studies. In this section, any external support (professor, industry adviser) should be mentioned. Please remark how many of the team members/accompanying people expect to attend the event in Madrid, as to make it easier for lunch reservations.

2 - **Mission Objectives,** in this section a brief description of the mission should be included, remarking the objectives pursued by the team. For the technical objectives, it should be described the solutions designed for achieving them. A conceptual block diagram of the mission and operations should be sketched.

Please remark the chosen category of the Competition (Come-Back, Telemetry or Scientific Experimentation) and the modality (350 grams CanSat or 1.050 grams OpenClass).

B - CanSat Subsystems

1 – **Structure**, a diagram of the CanSat's main structure layout should be sketched, indicating the main dimensions and paying special attention to any protruding part. Include a list of the main components of the device and the materials to be used.

> 1.1 – **Mass Budget**, list all the components of the CanSat (may be grouped by subsystems) specifying its mass. Be sure the total is equal or less than 350 grams or 1.050 grams, depending to the chosen modality.

2 – **Recovery Subsystem**, in this section the selected recovery system should be described, paying special attention to the method used to fix it to the CanSat's main structure. Describe how it will be packed within the Rocket Cargo Bay and how it is expected to deploy.

Make a brief description of the test that will be conducted to ensure its correct deployment and to verify the fixation to the main structure withstands a 20G deceleration.

3 – **Electrical Subsystem**, describe the elements of the electrical subsystem and sketch a diagram of the components' interconnections. Make an estimation of the power consumption and the foreseen duration of the batteries. Be sure all the onboard equipment will have autonomous power supply for an hour at least.

Include a list description of the main components selected (sensors, processor, actuators, etc)

4 – **Communication Subsystem**, list the frequencies to be used for data transmission/reception between the CanSat and its Ground Station. Be sure to specify the maximum emission levels (watts) and maximum bandwidth (-6dB) used. Attach the Technical Datasheets of the selected transmission hardware. Describe the selected transmission protocol.

5 – **Flight Software**, in this section include just a brief overview of the flight software algorithm and programming language.

List the total amount of data to be stored on the CanSat during the mission and the data to be transmitted to the Ground Station. Describe the raw data collected by the sensors and where it will be analyzed (onboard processor or ground station laptop).

6 – **Ground Support Equipment (GSE)**, describe all the Ground Support Equipment needed for the CanSat operation, indicating its measures, weight and power consumption. Mention any special requirement needed for its setup on the flight line.

7 – **Dangerous and Harmful materials,** specify all the dangerous, harmful or explosive materials used on the CanSat, paying special attention to the quantities and preventive measures (both personal harmful or representing potential damage to the device or rocket). Attach Material Safety Data Sheets (MSDS) for all the materials listed.

C - Test & Certification campaign

This section should be used to describe all the tests performed on the device to ensure its correct operation. Results and graphic material will be welcomed (pictures, internet videos, etc).

D – Operations

1 – **Mission timeline**, a foreseen timeline for the Launch day should be sketched, specifying the role of each team member during the CanSat preparation, integration, GSE setup, operation and recovery.

2 – **Data Analysis**, in this section only a rough estimation of the time needed for Data Analysis and Mission Debriefing preparation should be included. When possible, start to prepare the post-mission presentation before the launch day!

E – Cost Estimation

List all the foreseen costs for both the CanSat and GSE. Make sure the total budget of the CanSat device remains under one thousand (1.000) Euros. The costs of the GSE are not limited but must be described.

Include an estimation of man-hours needed to fully develop and test the CanSat, specifying the man-hours cost of each subsystem