PSat: An Affordable CanSat Design

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Abstract

As we are going through one of the most preoperative times in space science, Cheaper, affordable and sophisticated designs of technologies are becoming very demandable day by day. In this study, we will represent how to design a full working can sat model using limited and affordable resources which can give us real time data. As students can't afford expensive technological configuration. CanSats are utilized to educate space innovation, since of their cheap cost and little volume. A cansat can be utilized in a size of a soda can. Because of its lightweight it can be launched into our atmosphere with just a high altitude balloon. The cansat is also has a parachute base subsystem by which we can recover it without damaging the components. While roaming into our atmosphere it will collect and provide us with real time parameters like altitude, longitude, temperature and also capturing, storing imagery for further research purpose.

Keywords: cansat, aerospace, satellite

1. Introduction

Can Sats are mainly the small[1] projectile version of a satellite which can perform in various mission purposes. Depending on the design it can resolve both telemetry and comeback missions 3.The cansat are actually built on the basis of that, the students will learn about the space[2] technology on hand. As for their performance has similar result speculation as cubesats. In this paper we are gonna see the process of building a cansat with all the advantages. As for the cansat manufacture the students' needs to have a clear understanding of the circuit theorem. The cansat[3] will contain several sensors, conductor, op-amps, transmitter etc. which will require a certain skill set of students in the field of circuit build up. As for the satellite, it will be in the size of a soda can, which and why it is called cansat.

2. Experiments and Methods

Firmware Development

6]Using embed cookbook we can easily implement various codes in order of the performance of the sensors. for like:

1. Accessing the GPS Data
2. for interacting with Interfacing Gyro, Acceleration, Pressure and Temperature Sensors
3. During Data Transmission 3 using XBee Module
4. Controlling and navigation the cansat model

Flight software state diagram:

After probe is launched if at altitude is less than 670 then its backward to launch. After initialize subsystem if initialize failed its back to previous one. After stored data in SD card if at altitude is not 300 meters its back to previous one. And lastly if at altitude is greater than 1 meter it's always save on SD card.

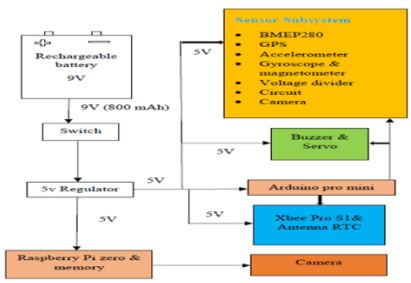


Fig 1. Methodology

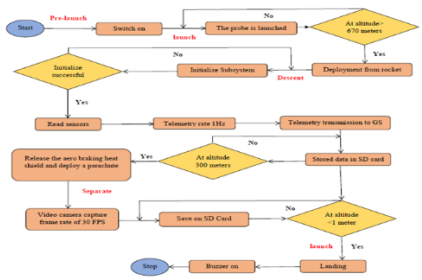
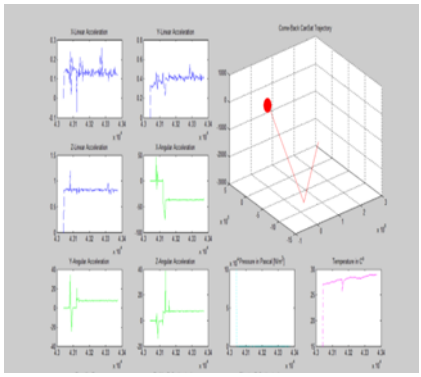
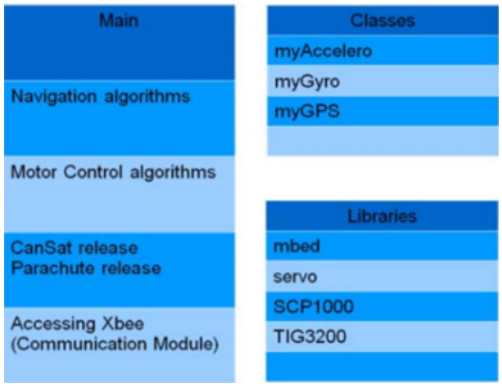


Fig 2. Electrical block diagram

Results

The software of ground station[5] can be developed using Matlab. By which, The Real-time data from different sensors and actuators status as well as the trajectory data which is passed on the processed GPS data can be visualized on the ground station interface screen





(a) (b)

Figure 4. The figure (a) actually represents the come back cansat trajectory of various axis and point view and the second figure contains the main, class and library functions of cansats various projectiles.

Discussion

Cansat will have the attachment of two parachutes of 50cm of length, one for direct mission 3 purpose and one for backup. And it will also have a heat shield developed to overlap the process of it reaching the desired destination, which is 670-750m above the earth surface. But it will start to perform on gathering important data's at the height of 450-500m.Then it will store the data[4] in SD card for later decoding. The main purpose of building such cansats are to collect data about the pollution in the ozone layer of our earth. Due to the air pollution has increased in day-by-day time, the ozone layer our earth is now vulnerable than ever. Because of this circumstance the shield that protects our human bodies from the sun's ultraviolet rays are now at disposal. These kinds of low budget satellites can gather data's about our eco crisis with optimal results.

Conclusions

The overall performance of the CanSat[7] depends on its main base structure. The GUI was unique web-based. It is actually affordable for the students to study with this CanSat project and if anyone wants to

contribute in the study of aerospace research, he/she can work on this version for further development. Making it easy and affordable for the students was the primary goal and it was a success. The future goal is to make an affordable launching rocket and a low-cost long-range radio frequency- (RF) communication module so that students can launch at higher altitudes and get more variants of data.

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