UB CANSAT COMPETITION 2017

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Mission Objective:

- Our mission objective is to create a solar powered science glider that can sample the atmospheric conditions like pressure, temperature, altitude and positioning during flight and compete in the CanSat competition.
- To model and design a solar powered glider and re-entry container.
- The glider is designed in such a way as to hold all the sensors for sampling and solar panels to power up the glider.
- To make the glider move in a circular pattern during descent with a diameter not more than 1000m.

Retractable Wing Glider:

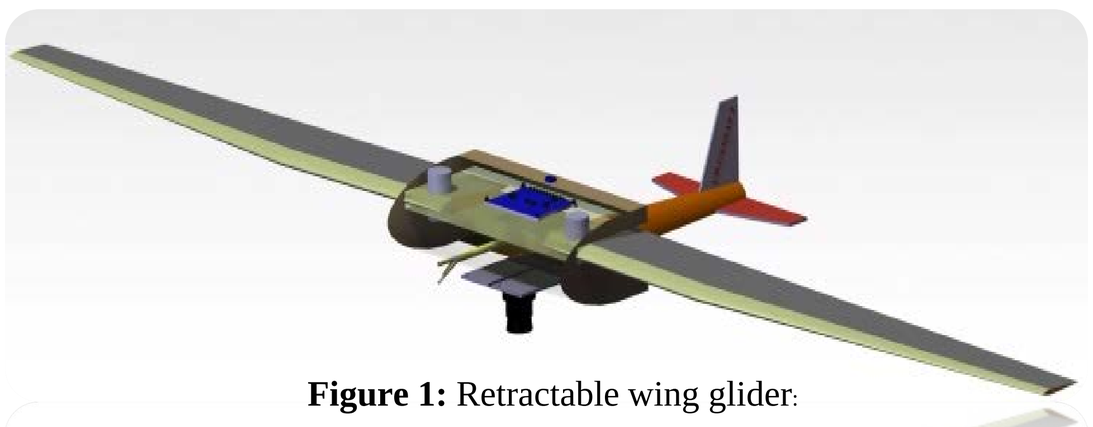

Figure 1: Retractable wing glider:

The glider configuration designed was a series of developments from its basic model. We decided to make a rigid wing; we designed the wing to be a gull wing to create maximum lift to drag ratio so that it can glide for a long time (endurance).

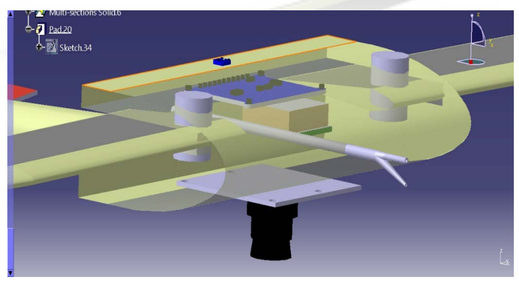

Figure 2: Internal view

Pros	Cons
➢Provide high lift to drag ratio ➢Easily fitted inside the container ➢No sharp edges to stuck during deploy	➢Complex design

System Concept of Operations:

Launch Setup | **Launch Ascent** | **Cansat Separation**

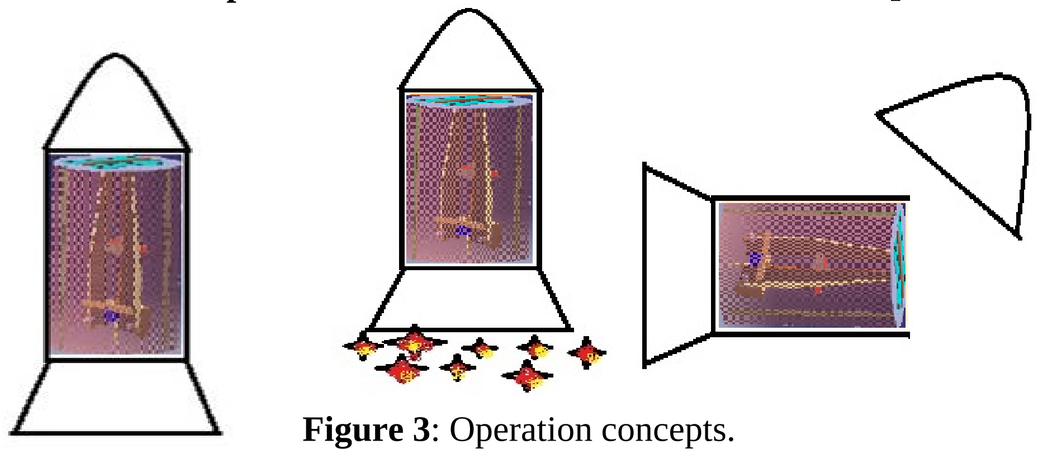

Figure 3: Operation concepts.

- After checking and analysis CanSat is placed inside the rocket and the glider and other components are ready to power up.
- Ground station is connected with container.
- Ground station will attain connection with the glider once it is deployed.
- During ascent the container system is connected to ground station.
- Control team will look for an opening mechanism of the container.

Payload Release:

- Container is split into two halves with the release mechanism.
- Glider is deployed from the container at 400 m.
- Glider powered up with the solar panel and system starts.

Glider Descent and Landing:

- Glider starts collecting the telemetry data and transmits to ground station.
- Glider maintains a circular pattern within1000 m diameter.
- Finally lands safely and starts audio bacon.

Communication and data handling:

The communication between the ground station and payload is carried using XBEE pro 900hp. The block diagram shows the data handling overview of both the payload and container.

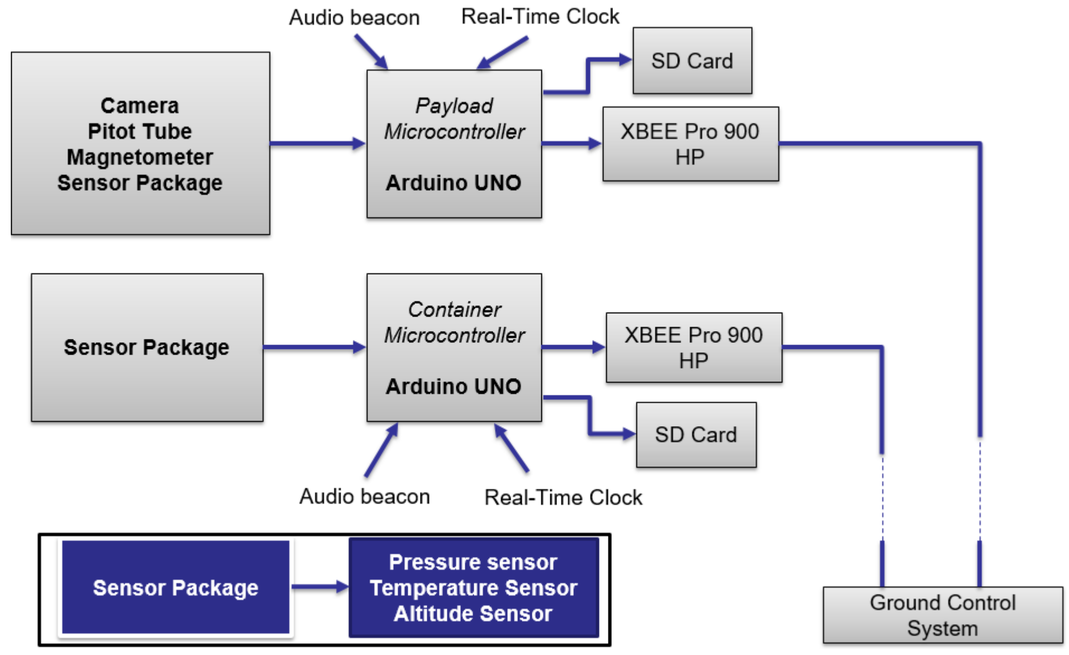

Figure 4: Communication and data handling block diagram

Flight Software Design

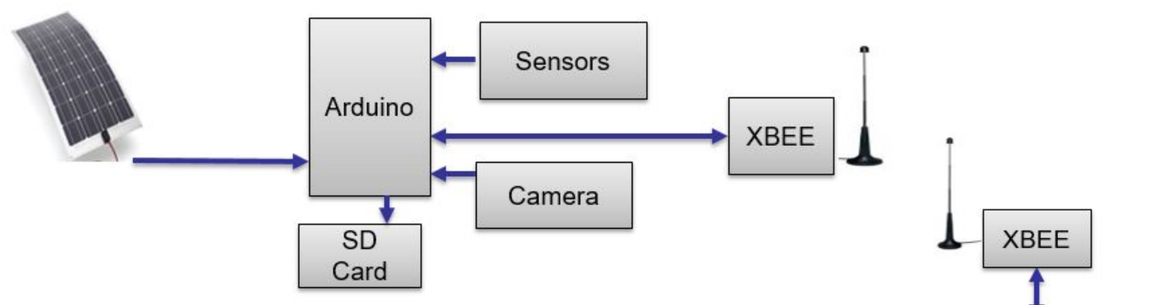

Figure 5: Flight software design block diagram

At 400 m the wing deploys and power is produced by the solar panel and the telemetry will start the process. Data transmits at a faster rate that provides quicker update in Python environment. Images will be stored in SD card.

Solar power shield is used to manage the power to the Arduino. At ground station the collected data is interpreted as graphs and charts even as 2D positioning to recover the state of payload, even after processor reset.

Testing Plans:

Sensor subsystem: sensor integration and sensor compatibility with the microcontroller will be tested. Different source of power supply is given to test sensors with battery, solar panel and laptop USB port. The parachute deployment for the container will be tested at various environments and at various angles of projection.

For the payload the drop test will be carried with various angle of projections. Varying dropping angle speed and orientation.

Conclusion:

The project has elevated to the next level, our university team cleared the Preliminary Design Review evaluation and is now working towards, the competition launch against 39 other international teams, at Texas in June 2017. By following the current schedule and always considering the requirements for the CanSat as a priority we will be able to complete the competition.

Acknowledgement:

I would like to thank Professor Dr. Jani Pallis who gave the opportunity to make this project, through which I gained a valuable knowledge and information. I would also like to thank my friends for helping and making this up to the next level.