# Final Project - Can Satellite (CanSat)

Introduction:

In November 1998, at the University Space Systems Symposium (USSS) held in Hawaii, Prof. Bob Twiggs (Stanford University Space Development Laboratory) proposed the "CanSat" concept. CanSat is a 350-ml can-sized small satellite for educational purposes, which is launched into high altitude by rockets, balloons, and/or model aircraft, and experiments are performed during descent by parachute, simulating the satellite operations in space.

CanSat provides an affordable opportunity to acquire basic knowledge of space engineering and experience engineering challenges in building a satellite. The CanSat will be launched by a rocket or balloon and released into the air. It performs its designated mission (i.e., taking pictures and transmitting telemetry). By analyzing the data recorded by the CanSat, participants investigate the reasons for its success and/or failure.
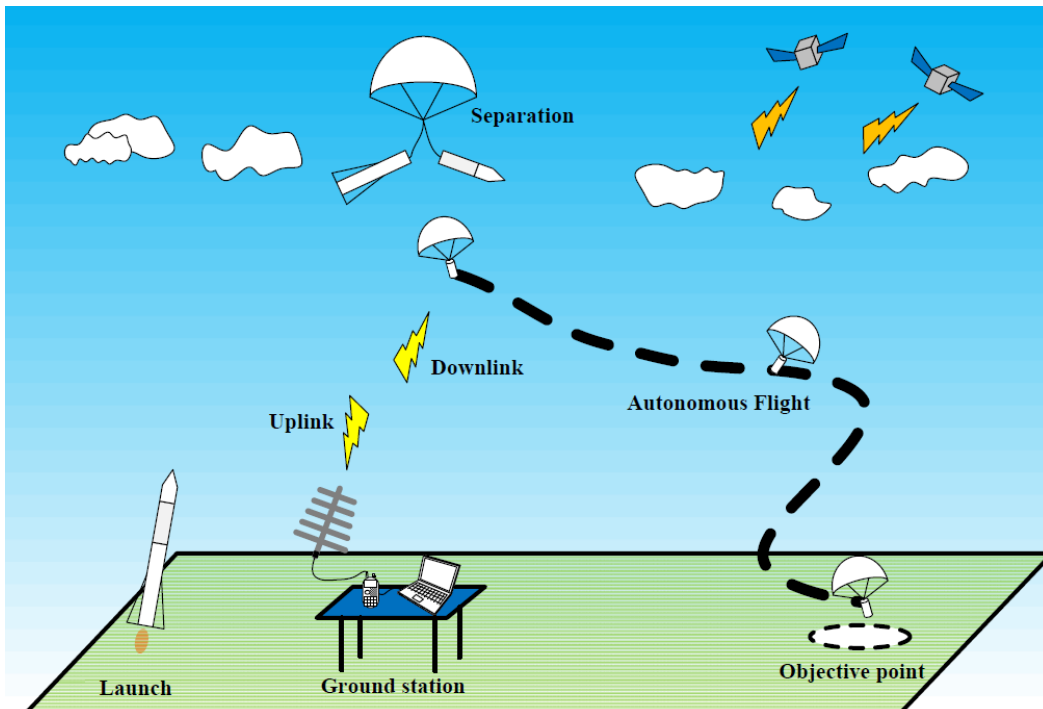
In this project, you will develop CanSat embedded system and test its functionality in a real-life scenario by launching it using a parachute from a window. Here is the list of deliverables

a) In a table, identify the inputs and outputs and briefly describe their meaning and possible values.
b) Define the CanSat mission, Identify the requirement and specifications.
c) Provide the list of sensors you used in the implementation and its functions.
d) Provide the list of peripherals you used in the implementation, for example, I2C, SPI, ADC, etc. Describe each one in detail.
e) Draw the necessary state machine, flow-graph, call-graph describing the *CanSat*.
f) Provide the main function sequence.
g) Design the software code by providing the flowchart and the required functions mentioning the declarations and the descriptions.
h) Develop CanSat Code in C language for the AVR microcontroller.
i) Develop Base-station Code in your preferred language and run it on your laptop to get the readings from the CanSat.
j) In a table, propose a test strategy to verify the operation of the CanSat. Carefully select an appropriate set of test cases that test various design aspects.

Hints

a) An accelerometer is used to track the CanSat flight to earth.
b) Wi-Fi may be used to send Sensors' readings.
c) Weather station is a good application for CanSat.
d) Camera may be used to get pictures while CanSat going down to earth.