Mission Statement

Our mission is to successfully build, launch, and recover a 'CUBESAT' that is capable of taking temperature readings and a picture during flight and at landing. We plan to meet these requirements by not only having pictures and internal temperature recorded, but also have external temperature and four one-minute videos.

The purpose of this project is to gain a better understanding of the atmospheric conditions at 100,000 feet including visible changes and temperature. The pictures will record the curvature of the earth, and the temperature sensor will record in-flight temperatures. We will be able to design around the parameters given, and learn engineering techniques along the way.

Technical Overview

Our design will consist of a structure made of aluminum. Inside there will be two digital cameras attached to 555-timer circuits. There will also be a small temperature data logger with an external sensor (Figure #1). The entire inside will be lined with a lightweight insulation. 100K-PATIR consists of three main systems; they are the experimental, power, and structural systems. The experimental system consists of the camera and temperature logger. The power system contains the timer circuit and the power source for 100K-PATIR. The structural system is the outer body of 100K-PATIR that has a wide base and is short to help it land upright as seen in figure #2.

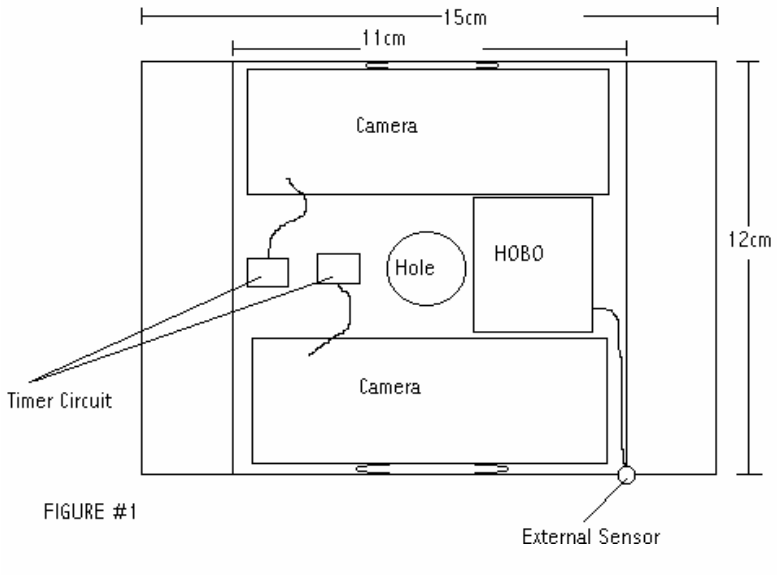


FIGURE #1

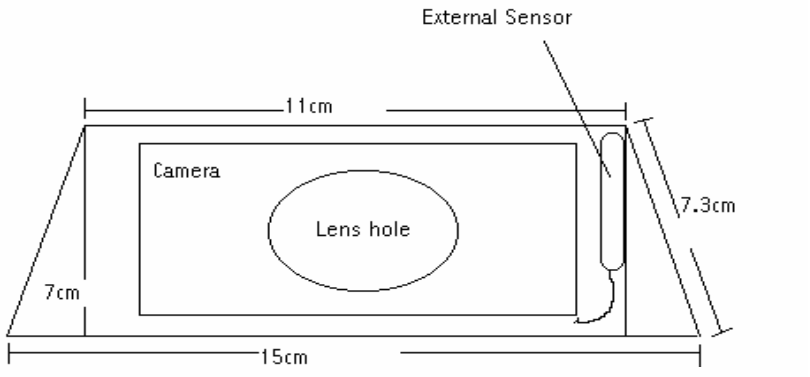
This basic design places the cameras on opposite sides of the box looking out through glass pieces inserted in cuts in the aluminum. The data logger will be in between the cameras and will record the temperature changes inside the cube. A sensor attached to the data logger and the outside of the cube will record the external temperature (Figure #1). 100K-PATIR will be attached to the balloon with an attachment cord through the middle (Figure #3). Our design will need to be able to take pictures and temperatures during flight and at landing, land upright, and weigh under 500g.

The hardware that we will need is as follows:

- 1x 56.25in^2, 1x 2" x 3", 1x 5" x 16" aluminum sheets
- 2x D-Link DSC-350 Dual-mode digital camera
- 1x J.B. weld
- 1x HOBO H8 Temperature logger
- 1x HOBO External Sensor
- 2x 15cm x 12cm x 1" Styrofoam sheets
- 2x RadioShack 555 IC Timer
- 4x Resistors/Capacitors

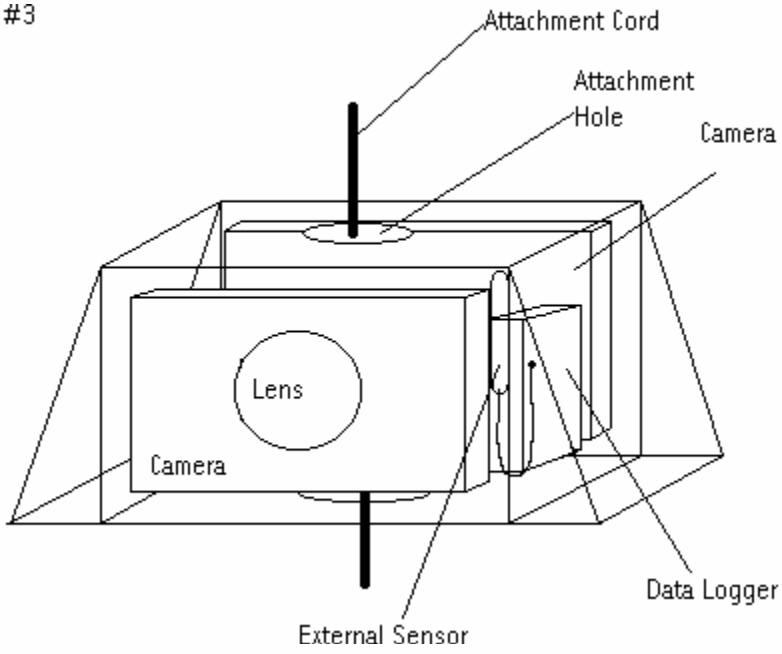
Team Volunteer will build the concept mentioned above by purchasing supplies prior to planned meetings at CSGC on Tuesdays and Thursdays. We will construct 100K-PATIR and complete any minor adjustments to our project as necessary. As for each of the member's function on the team, there are no specific tasks that will be assigned. Each member will participate in all aspects of the project.

FIGURE #2



The testing of our design will be broken down to each major component of the project on pre-determined days. Connecting wires to certain parts of the cameras will test them. Then, by giving those parts small electrical impulses through the wires the camera will take pictures at the given interval. Being a digital camera, there will be instant confirmation whether or not the camera operated properly. The other camera that will be recording videos will be a bit more complicated. A timer that is capable of being active for a minute and non-active for up to an hour will probably control it. Adding a power source to it and then checking the voltage at appropriate intervals will test the timer. Recording temperatures at our meetings and receiving the data with a computer will test the temperature logger. Our team expects to be able to display the data recorded by the logger on the computer. We will also test the logger by placing the CUBESAT in extreme temperatures, such as the freezer. The structure and integrity of 100K-PATIR will be tested by dropping the aluminum structure from altitudes of at least six feet and above. Rolling the project down a flight of stairs will also test structural durability. These tests will be performed with mass simulators and not the equipment to avoid damage. The design is anticipated to be very durable, and to withstand the temperature and structural stresses. If 100K-PATIR does not meet all of its expectations during testing, our team will refine our product to overcome any obstacles that may stop its success.

FIGURE #3



On launch day we will also check if the systems are operating or not. The structure will be looked over for any nicks in the aluminum and then be repaired as needed. A nameplate with phone number and address will also be attached in case the beacon cannot find 100K-PATIR.

We need to keep our mass under 500grams.

- Cameras -220g
- HOBO data logger -29g
- .025" thick aluminum -160g

  409g

  -500g

  91g remain
- Batteries, insulation/padding, external cable, Circuitry, misc. Less than or equal to 91g

Management and Cost

Launch day will be met by non-stop work and dedication at CSGC. All members of the team are dedicated to their fullest to complete all work on time.

July 5, 2001	Proposals due
July 10, 2001	ATP given?
July 12, 2001	Prototype completed
July 17, 2001	All hardware ordered
July 24, 2001	Frame completed
July 31, 2001	Testing
August 7, 2001	Data logger programmed
August 9, 2001	Timer circuit completed and attached to camera
August 25, 2001	Launch Date

Budget- we need to keep our budget under $400

D-Link DSC-350 Dual-mode digital cameras	-	$200
Aluminum	-	$20
Insulation	-	$20
Shipping and Handling	-	$20
Spare parts	-	$20
Timer circuit	-	$10
Total	-	$290

Lindsay Copperberg
Soon to be an Aerospace engineer

Gabe Green
No special skills

Tara Smith

Jonathan Wee
Cardboard, videography