PROJECT PROPOSAL

TEAM PUSK:
PROJECT HASK:
High Altitude Strato Kamera

March 12, 2001
15:04

Pusk Project HASK: High Altitude Strato Kamera (HASK)

Team Members:

Mark Gurevich

Major: Computer Science

Special Skills: Software Development

Blair Harness

Major: Electrical Engineering

Special Skills: Electric and Circuit Knowledge

Donna Hodgson

Major: Electrical Engineering

Special Skills: Circuit design and construction, soldering

Sara Lewandowski

Major: Aerospace Engineering

Special Skills: Soldering, circuit construction, Powerpoint

Stephen Nauman

Major: Aerospace Engineering

Special Skills: Structure Expert

Conner Lowrey

Major: Aerospace Engineering

Special Skills: AutoCad, Machine Shop Certified

Steven Pfau

Major: Aerospace Engineering

Special Skills: Building Expert, moral

John Qiu

Major: Mechanical Engineering

Special Skills: Building Expert

Mission Statement: We plan to build a satellite that will be able to record images at a range of altitudes during flight.

Design:

Schedule:

Proposal Date: March 12
Final Brainstorming: March 15
St. Patrick's Day Party: March 17
Price Check: March 18
Buy all the Supplies by: March 21
Spring Break: March 24-April 1
Build Circuit by: April 2
Team Presentation: April 2
Build Cube Structure by: April 6
Complete all Building by: April 9
Testing Process: April 9-15
Team Presentation: April 11
Easter Relaxation Day: April 15
Team Readiness Review Practice: April 16
Team Readiness Review Practice: April 18
Launch Date: April 21
Back up Launch Date: April 22
Data Analysis: April 22-25
Video Reports Due: April 25

Team Duties:

All team members will work together to complete required presentations, cube testing, data analysis and the final video report.
Mark Gurevich:
Blair Harness: Circuit building and other electrical requirements
Sara Lewandowski:
Stephen Nauman:
Conner Owrew:
Steven Pfau:
Donna: Circuit building and other electrical requirements
John Qiu:

Cost Management: We plan to keep our total project cost under $300.

Capacitor and resistors ····· $4.00
Circuit board ····· $6.00
Solder ····· $2.00
Wires ····· $6.00
1/8th inch Aluminum ····· $35.00
Camera ····· $150.00
Foam core ·····$5.00
Solenoid ····· $20.00
Mist protector ····· $5.00

Picture Prints ·····$10.00
Gas Money ····· $20.00
Lunch and Dinner ····· $40.00
Picture at 100,000 feet ····· priceless
For everything else there is Mastercard
Total cost ····· $243.00

On all of the costs listed above, the maximum possible amount that could be spent was written so that any unexpected expenses don't exceed the $300 budget. Even with maximum cost estimations we ended up under our budget by $57.

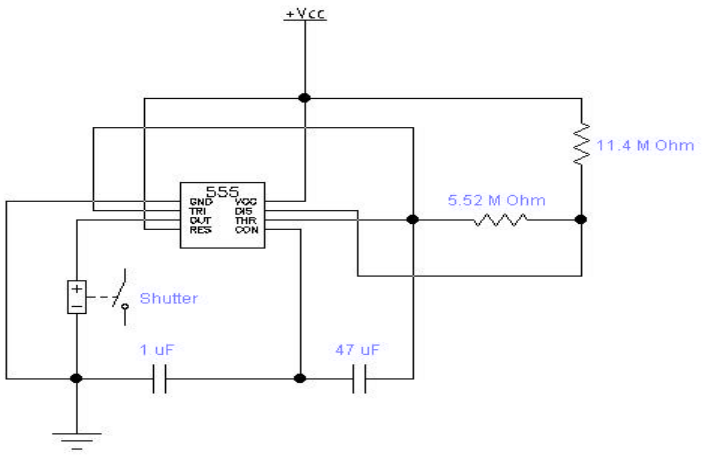
Mission Statement

Our mission in this experiment consists of creating digital photographs from high altitudes. The exposures will be taken at exact intervals a set amount of time the duration of the flight. Following a successful landing and retrieval of our exposures, we plan to distribute these high quality images to the public at no cost.

Technical Overview

The entire apparatus will consist of a timing device that will supervise the image taking process. The shutter will be controlled by a 555 timer.

Time between pictures = Time in flight / Number of pictures (1)



The entire satellite will be enclosed within a 1/8” thick aluminum frame of a 10cm cube. Rails will be attached to the cube for later compatibility with the space launch guidelines. The inside of the cube will be insulated with foamcore to prevent sharp temperature differences and to protect the temperature sensitive electronic equipment inside. The aperture of the camera will be facing a specially cut out hole in the wall of the cube frame. This opening will be covered with clear material to prevent excessive condensation and temperature exchange.

The images will be taken with a digital camera using 1 megapixel resolution and stored onto a SmartMedia 64MB card for adequate storage capacity. Upon successful completion of the mission, the pictures will be transferred to a standard PC using a USB connection. At this point the pictures will be evaluated for quality, and relevance of content, stored onto a Compact Disk (possibly printed using internet services) and presented for evaluation by Space Grant.

Another possibly for image storage, which has not yet been completely considered by the group, is to use a normal 35mm camera. This will produce a smaller amount of exposures but will also have higher image quality then a simple digital camera.

Taking multiple pictures within short amounts of time using an external will test the entire design. We will also drop the entire cube from a flight of stairs in the engineering complex to test stability and ability of the camera to survive landing. We will use a cooler filled with CO2 ice to test temperature survival.

A loophole will be attached to the side of the cube in order to attach to the balloon. Within 1 minute before the launch the camera will be turned on in order to preserve internal power.

We expect to have no injures during this experiment. An experienced machinist will be in charge of preparing the structure of the cube. There are no high voltage currents that will be used in the design to produce any shock related injury. An if we are not stupid no one will get the cube dropped on his or her head.

Preliminary CUBESAT design: