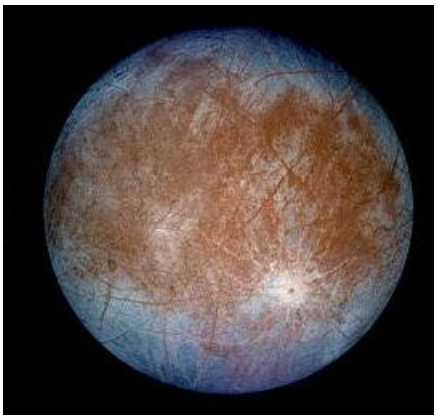
Team Europa



Request for Proposal

RFP# 2519F01

DATE:
October 22, 2001

TIME:
4:30 PM MST

LOCATION:
Integrated Teaching & Learning Laboratory
Room 1B50

ATTENTION:
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I. Mission Statement

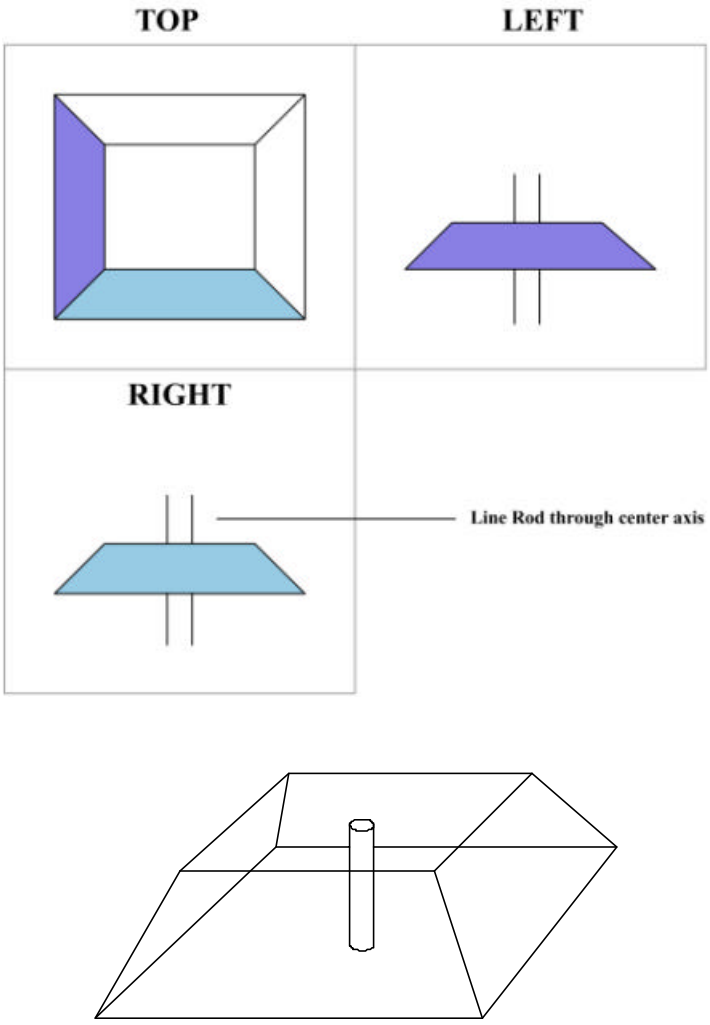
In the ever-growing field of weather analysis, we will endeavor to show excellence in our project design, deployment, and data collection. Team Europa intends to have a couple of core components, which will include a hand held altimeter, barometer and temperature combination unit, in cooperation with a small digital camera. Our aim is to not only to show the correlation between the values returned, but more of an understanding of the rate at which pressure drops in a logarithmic scale, as well as to what degree the temperature will fluctuate as the unit ascends through the Troposphere, Stratosphere, Mesosphere and finally into the fringes of the Thermosphere. Our camera will record any weather phenomena such as clouds, snow, and / or possibly wind, which can be seen by the degree to which the picture taken is off center. More importantly this will give us real world standards by which to strive for, with a very minimal weight limit, as well as insight into a small-scale industry project.

II. Technical Overview

a. *Structure Analysis*

Design

Rather than using the traditional cube shaped satellite shell, our team has decided on a trapezoidal pyramid shape. Our satellite shell will be made of foam-core board, having a bottom of larger surface area than its top. This shape will provide a more rigid and durable shape, such that our unit will have a higher chance of remaining intact through experiencing large impacts.



Design Illustrations

Hardware

We will be utilizing a multi function data logger, and either one or two small, hand-held digital cameras. Our data logger will consist of a temperature, altimeter and barometer recorder. The logger can be taken apart, and separated into its individual components to minimize weight. The unit will powered by 2 watch style batteries, and possibly a 9 volt battery.

The outer casing and shell of the unit will be primarily designed and created by Ian and Loretta. The timer switch for the camera(s) will be designed, and created by Mark. The testing of the unit will be done as a group function, so that all can be involved in any decision-making that might arise from any complications or technical difficulties that may arise.

Special Features

- The overall shape and design of the unit would make it unique from the other groups.
- Also the inclusion of two digital cameras to get a wide-angle view of the earth would be a feature that would stand out.

Pen Cam

Digital Sensor

Testing

Our team will build our satellite through experimentation with different variations of trapezoidal dimensions, which in-turn help us find the possibilities of different weight distributions. We will use hot-glue or silicon for a sealant around the final design to maintain an airtight testing environment. Our unit will be crash tested through brute force, which will

contain some of the following – kicking it down stairs and throwing it from a significant height. We will subject the final crash certified design to extreme temperature testing, which will be achieved through the use of dry-ice and room temperature as that should be the be the warmest part of the journey.

Testing of the final design will be performed by subjecting our shell, insulation and caulking materials to impacts from extreme heights and to freezing temperatures, achieved by placing the satellite with dry ice in a large cooler. All tests will be repeated several times on various models in order to find the best combination of materials.

b. *Launch Program & Safety Precautions*

We have contracted with Edge Of Space Sciences to launch our CUBESAT. Their program will dictate much of the schedule and we will work around it.

Launch Site Summery of Events

- The objective of the set up team is to be up and operating at a minimum one hour prior to launch in accordance with the ground station.
- At approximately T-15 minutes the main payload starts to record data and video. We will be able to verify this at the ground station.
- Prior to launch a cut down altitude is determined depending on the days weather conditions. When the balloon approaches that cut altitude, the ground team goes into "serious" mode.
- After the ground team sends the cut signal at maximum altitude the system will release the payload from the balloon. Soon after the parachute inflates and its on its descent.
- During descent phase, ground station will continue to monitor and relay tracking information to the field teams.
- Once loss of signal (LOS) occurs at approximately 3,000 meters the ground station will hand over primary control to the field teams.
- Ground station will then begin to pack up except for any other assistance need by the field teams.

Safety Precautions

In order for our team and those around us to remain safe, we will have to stick to the guidelines set for us and above all us common sense. When in doubt consult those who are more experienced then us.

III. Management and Cost Overview

a. *Schedule of Events*

In order to meet our launch date we will have to adhere to strict time management and follow the schedule we have laid out for ourselves. This will entail individual, as well as, team management both on and off campus. We will pull together as a team and cover for each other when needed.

Project / Goal	Work Dates
Order Data logger, camera(s) and other materials	26-Oct
Build and Design several models from Foam Core of varied dimensions	31-Oct
Testing of Shells begin	2-Nov
Team Presentations	5-Nov
Strip Data logger to meet weight requirements. Discuss possible insulation materials	9-Nov
Begin testing different insulation and caulking materials for durability and resistance to extreme cold	12-Nov
Final testing	21-Nov
Team Readiness Review	28-Nov
Launch Day	1-Dec
Final reports	10-Dec

b. *Budget*

As you will see budget management at this point does not seem to be an issue. Our costs are relatively low and we should be able to easily come under the 400$ limit. However, there are several weight issues we will have to address in order to come under the 410g mark.

Item	Quantity	Amount	Sub-Total
Data Logger	1	$149.99	$149.99
Foam Core Sheet - 3/16"	1	$4.00	$4.00
Spray Paint	1	$2.00	$2.00
Sealant	1	$2.00	$2.00
Video Camera ?	1	$100.00	$100.00
Memory Card	1	$0.00	$0.00
Line Tube	1	$0.50	$0.50
Line Bumpers	2	$0.50	$1.00
Hot Glue Stick	1	$2.50	$2.50
Insulation Sheets	1	$5.00	$5.00
Internal Braces	2	$1.00	$2.00
Tax Percentage	0.080		
Sub-Total		**$267.49**	**$268.99**
Total Cash		**$400.00**	**-$400.00**
TOTAL w/tax		**$288.86**	**$290.48**
Cash			$109.52

c. *Team Members*

Mark Baudat

baud19@hotmail.com

I am a freshman studying Aerospace Engineering and hope to double major with Business Management. I have a great deal of experience with mechanical and electrical systems, along with various tools and machines. I've had a lot of experience working in AutoCad, ProCad, and Mastercam. I hope to focus mainly on the actual building of the Cubesat and making sure everything we want to happen inside works properly.

Matt Chojnacki

choj@csi.com

I am a 27 year old retired U.S. Ski Team Member / Olympian pursuing a Physics degree with an Astro-Physics minor here at the University of Colorado. With very little engineering background I hope to contribute more on the science aspect of the flight. Throughout design and production I will attempt to interject when

necessary and help in data analysis after the flight. I aspire to further my education after graduation and specialize in planetary science.

Loretta Fisher

loretta.fisher@colorado.edu

I am 18 years old, and a freshman at CU Boulder. I am majoring in Aerospace Engineering, and am debating between minoring in astrophysics, or picking up a second major in Applied Mathematics. As an aerospace student, I hope to contribute my basic knowledge of aero-design and structure to our satellite flight. I plan on eventually achieving my bachelor's degree in aerospace, and pursuing graduate level education in applied mathematics or aerospace engineering.

Josh McGeehon

josh@islefx.com

I am a sophomore in Computer Science. I will contribute to design, research and any proposal layout, and multimedia functions of the group. I have knowledge of many Operating system Platforms including UNIX, as well as knowledge of a great deal of Multimedia and Art packages. I can program in C++ and partially in Assembler.

Ian Orzechowski

Ian.Orzechowski@Colorado.EDU

As a 18 year old Aerospace Engineering major I hope to contribute to the team by offering advice on various aspects of the mission ranging from structural logistics to cost management. Hopefully with our combined skills we can make a great looking and functional satellite.

Seth William Russell

swr5@hotmail.com

Being a 19 year old Aerospace Engineering I will bring my experience in model Building, Leadership as a Eagle Scout, Leadership as a soldier of the United States Army, Skills in working in teams, Future Plans - Minor in Mechanical Engineering, Spanish, or Religious Studies.