

A Novel Approach to Space Systems Engineering Education Through the Construction of High Altitude Balloons

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Who are We?

The UC CubeCats is a student organization from the University of Cincinnati dedicated to the education of its members through the development and launch of CubeSats. While we are predominately an undergraduate organization, we accept university students of every level and major.

[]³CubeCats



Universal Challenges?

- Funding
- Administrative Barriers
- New Member Retention and Education

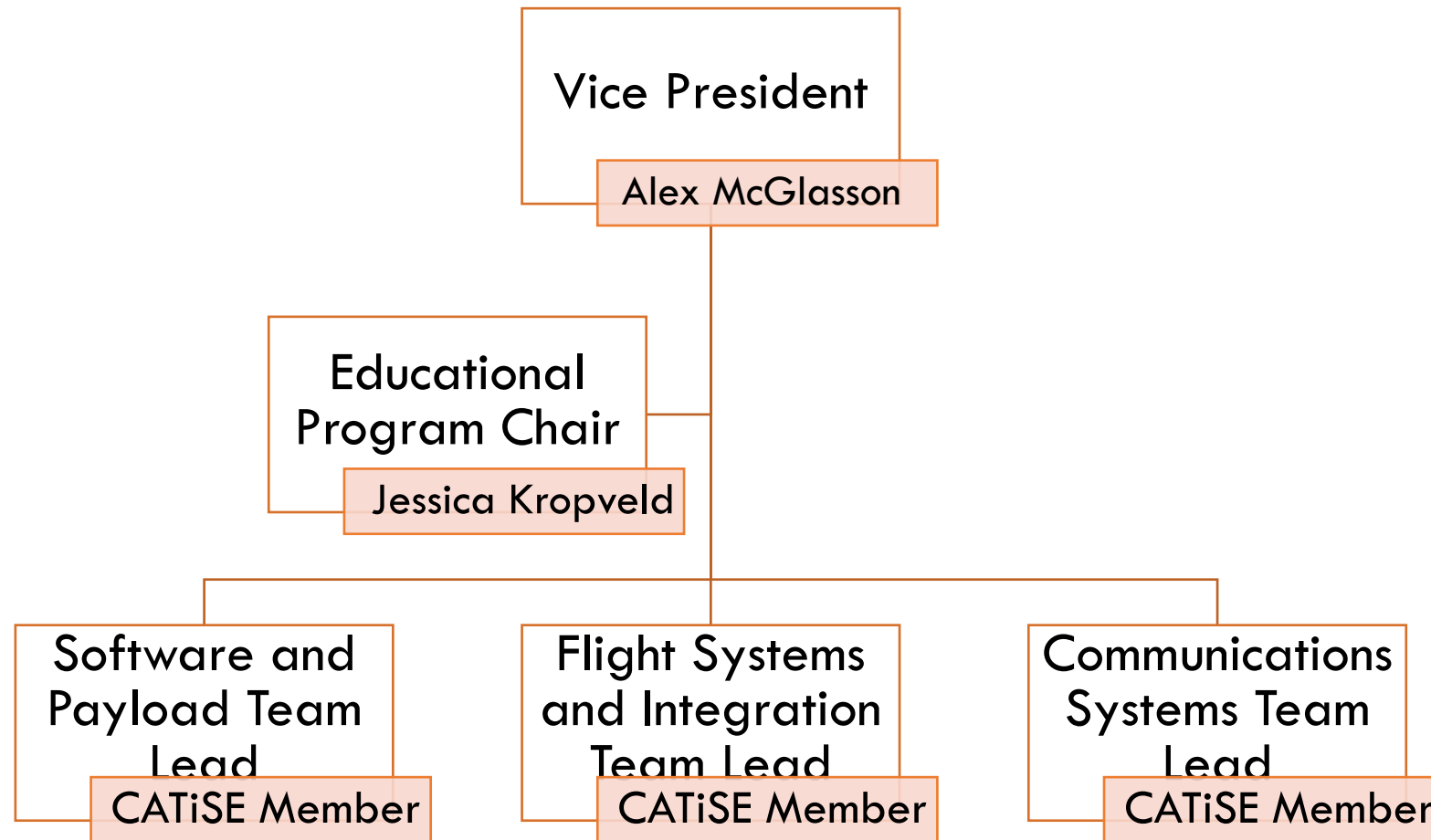
New Member Recruitment and Retention

- Pulling mostly from first year engineering and science students
- Issues with recruiting first year students
 - Intimidation of knowledge
 - Lack of knowledge
- These two issues make retention of new members especially difficult
- Trouble retaining students who leave for internships

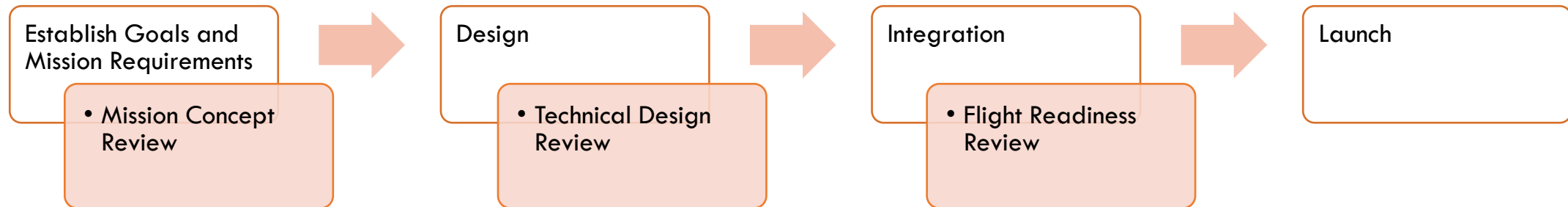
CATiSE Program

- CubeCats Applied Training in Space Exploration (CATiSE) Program
- Gives incoming members a chance to better learn and understand the systems engineering process through the construction of High Altitude Balloons (HABs)
- Advantages
 - Low cost
 - Faster turnover time
 - Engineering a system in a near space environment
 - Team based learning

Program Structure



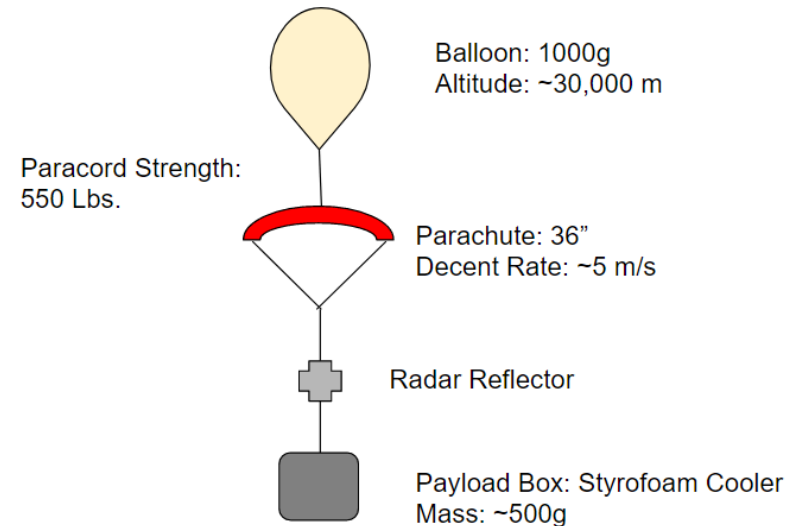
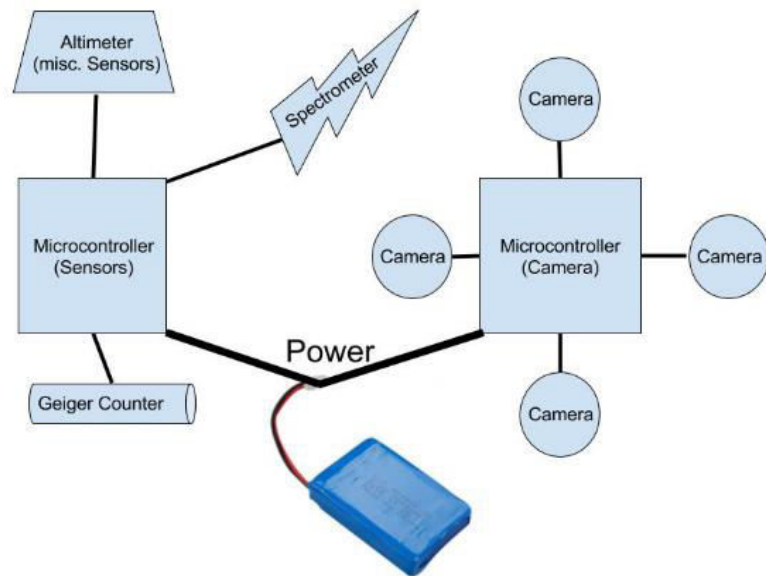
Program Structure



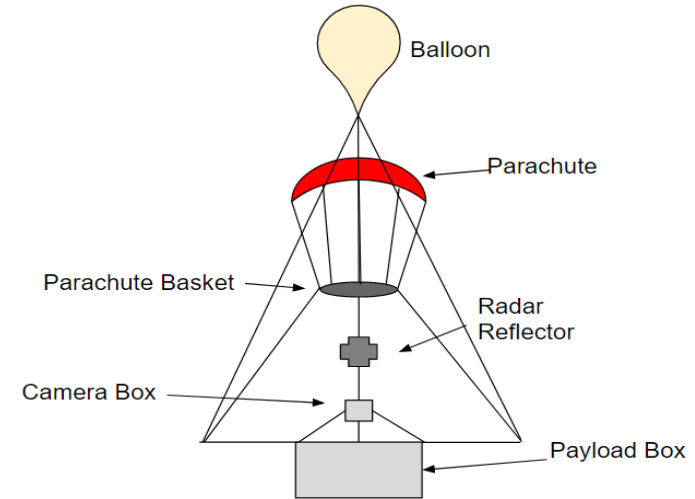
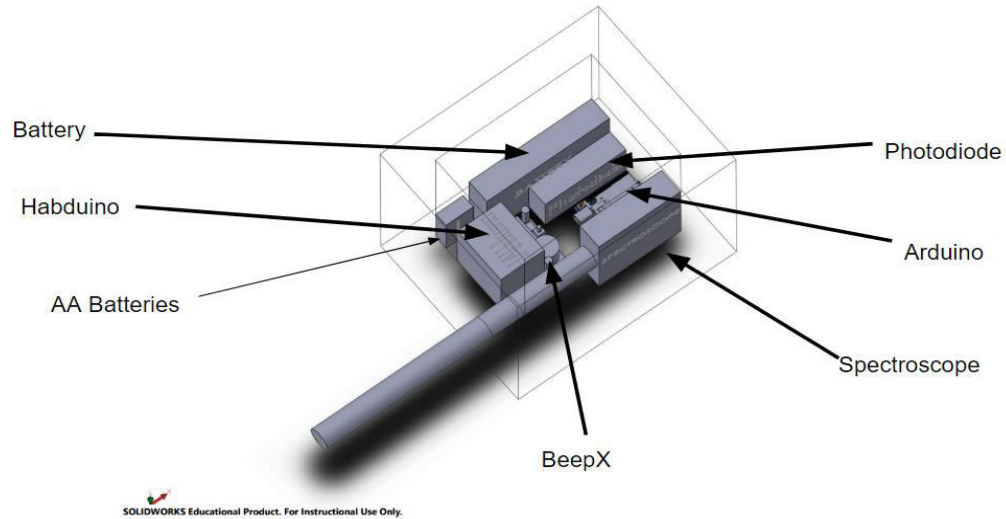
Project TOYGER

Project Goals

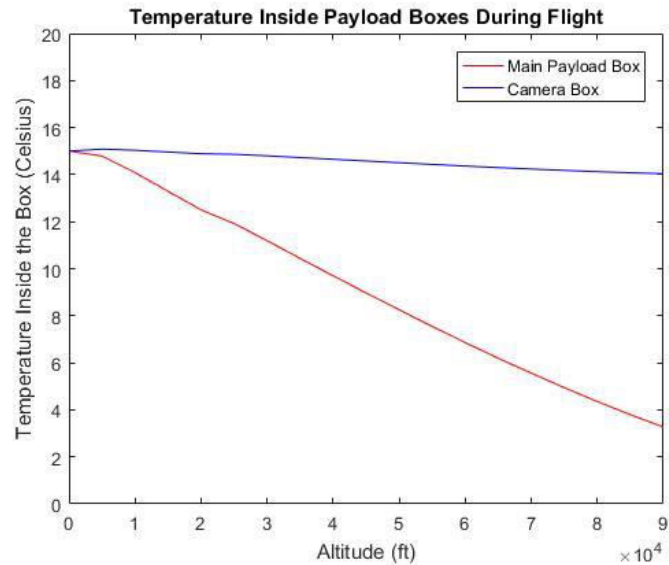
- Take 360 degree photos at a determined frequency and create a time-lapse video of at least 1 minute in length at 30fps
- Take spectrometer light readings through the whole flight
- Take radiation measurements with a Geiger counter throughout the whole flight



Design



SOLIDWORKS Educational Product. For Instructional Use Only.

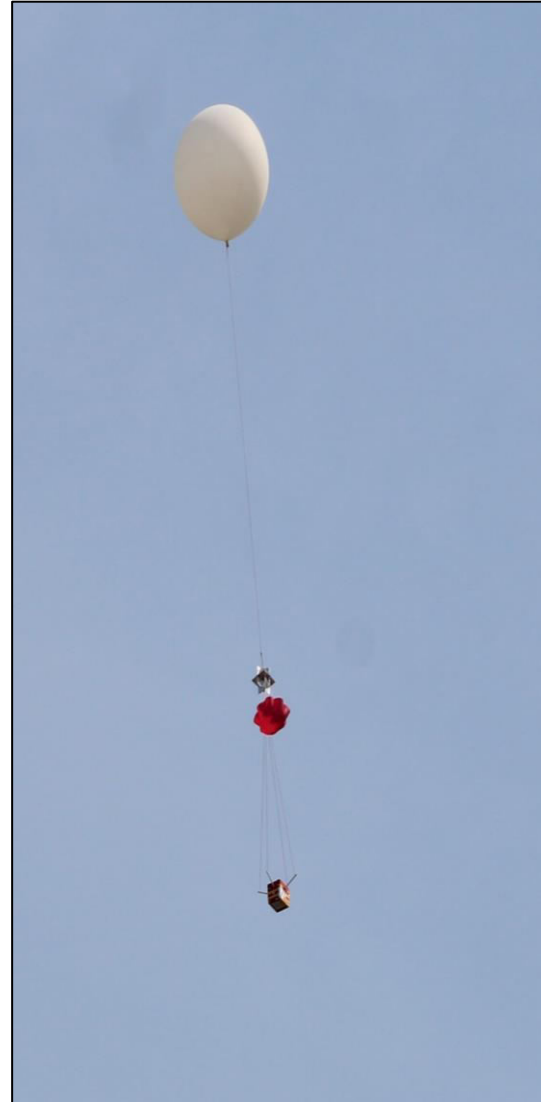


Type of Risk	Component Failure	GPS loses connection with Payload	Unable to Locate Payload	Loss of Power	Payload Damaged on Launch/Landing
Impact	Severe	Severe	Severe	Severe	Severe (depends on damage done)
Chance of Occurring	Possible	Possible	Possible	Unlikely	Unlikely
Risk	Medium High	Medium High	Medium High	Medium	Medium

Integration



Launch



Results and Final Conclusions



Lessons Learned

- Ordering parts in advance in order to make sure we can get all the parts we need in on time in order to meet all mission goals
- Edit the packet based off of feedback from the students this year to optimize its use
- Have a more formal documentation process for documentation and record keeping



Questions?