Team Tesla

PDR Presentation

Changes Made Since Proposal

- Changes Made to Vehicle Criteria - The length of the rocket has increases from 63.75 inches to 83.25 inches. The motor size has also changed since the proposal. We decided to downgrade in motor size because we were worried about going over the one mile limit. We are now set to use a K-570 motor. The overall weight of the rocket has also increased due to the increase in length.
- Changes Made to Payload Criteria - None.
- Changes Made to Project Plan - Added sales dates and fundraising options were added in order to help reach our funding goals.

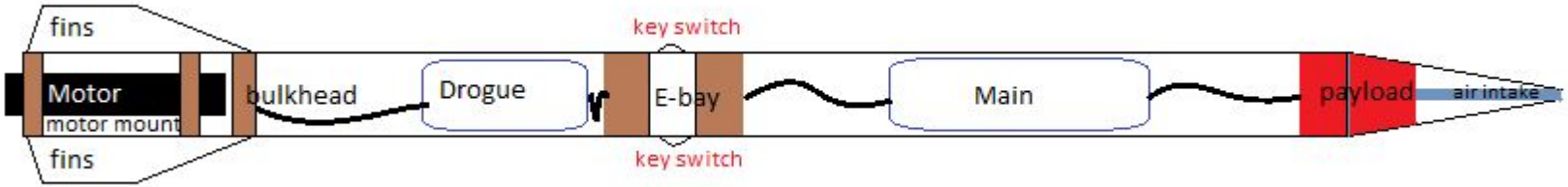
vehicle data-

- total length(in)-85.25
- diameter (in)- 4.00
- gross lift off weight(lb)- 20.61
    -estimated component weights(lb)
    -front body section- 6.8 lbs
    -payload- 3.0 lbs
    -electronics bay- 2.2 lbs
    -rear body section- 8.0 lbs

- motor selection- K-570
  - impulse(lbf-sec)-2062.9
  - max projected velocity(ft/s)- 605.49
- current predicted drag-Cd. 75 (likely to be higher due to payload)
- altimeters-two stratologger altimeters
  - manufacturer- perfectflite

Rocket design

- Nosecone and air intake
- payload
- Front Body Tube
- Ebay
- Rear Body Tub
- Motor mount
- Centering rings and motor mounts
- 3d printed Fins



Payload

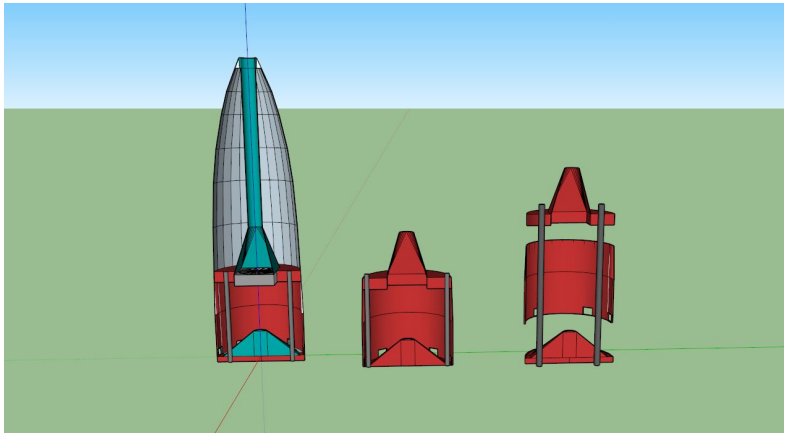
- The payload will be half in the nose cone half in the body tube.
    - This positioning will allow for the easiest access to airflow.
    - A small metal “straw” will run from the tip of the nose cone to directly above the computer fan.
- The payload is testing velocity vs. current generated.
- We will be using a small computer fan as the impeller in our payload.
- The computer fan will be wired to an ammeter to record current.

Payload

- The payload will be made partially out of coupler tube.
    - For the part that slides into the body tube.
- 3D printed parts will also be incorporated into the payload. The 3D printed parts will mostly be used to house the computer fan.
- We will use ABS plastic to 3D print the payload parts from the club’s own 3D printer.

Payload

- The first image in the payload connected, and inserted, into the nose cone.
- The second image in the main section of the payload pulled out of the nose cone. All thread will run the whole way through the payload.
- The final image is the payload parts separated for easy access to the electronics.



Recovery System

- Deploys a 36 inch drogue parachute at apogee, and a 72 inch main parachute at 600 feet
- The altimeter will record maximum altitude of rocket
- Checks for continuity within itself and its components
- Ready to set off second ejection charge if first one fails
- Outputs signal to simplify tracking
- Is capable of separating parts of the rocket without damaging any of them
- Makes the rocket recoverable and reusable!
- PerfectFlite StratoLogger altimeters can fulfill all these requirements

Recovery System (Continued)

- The propulsion/motor retention system can boost the rocket to an altitude of up to 5,280 feet
- is very easily ignited, facilitated ignition
- retains motor throughout flight, and is easy to add/remove a motor if necessary
- commercially available motor, capable of boosting rocket to precise height factoring in its design specifications

Recovery System (Continued 2)

- Rocket airframe houses all parts of rocket needed for launch, stabilizes rocket as a whole, is smooth and aerodynamically sound with little resistance
- rocket airframe provides the necessary strength for surviving landings and making the rocket reusable = functional recovery system!
- airframe also maintains intended flight path with minimal deviation
- Fiberglass-wrapped phenolic tubing from Public Missiles Ltd provides rigid stability, strength, and minimal air resistance
- ⅛ inch G10 FR4 Fiberglass fins can withstand higher velocities attained by the rocket

Electronics Bay Schematics

- Made out 4 inch PML coupler tube
- Capped off with ¼ inch bulkheads on each side of the tube
- Bulkheads use ¼ inch U-bolts to attach the nylon shock cord
- Each bulkhead contains two ejection caps, crafted from PVC piping, to achieve redundancy
- The entire electronics bay will be held together by two ¼ inch all-thread rods
- Inside the tube an ⅛ inch wooden sled rides on the inside
- Key switches mounted on the outside of the coupler tube

Electronics Bay Schematics

- The altimeters will be carried on the wooden sled
- There will be two altimeters to maintain the redundancy
- One altimeter will be wired to one charge on each end of the electronics bay
- The other altimeter will be wired to two charges on each end
- The detonation from both charges will give the necessary force to separate the rocket and drogue with main chute following

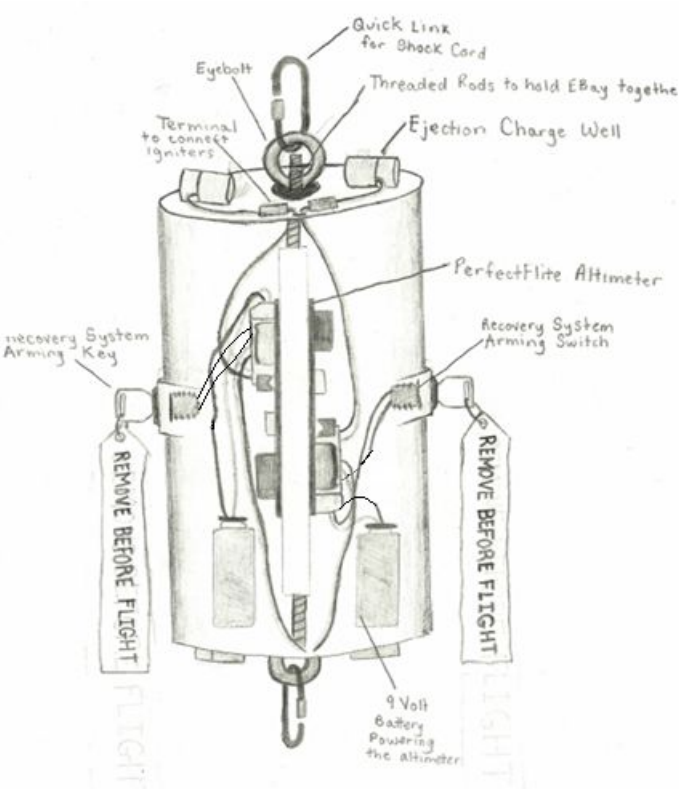
Electronics Bay Schematics

A. power in terminals.
B. Switch
C. Main chute
D. Drogue
E. PC Data Transfer port
F. Audio addon port
G. Speaker
H. Program switch

StratoLogger Altimeter that our electronics bay will hold

Electronics Bay Schematics

- This is a picture of the electronics bay
- 9 volt batteries are used to power both altimeters
- The arming switches are connected to their respective altimeters and ejection charges



Budget Plan

- Closely monitor amount(s) of money, both fundraised and spent.
- Closely monitor how well fundraisers are doing, as well as adding more when necessary.
- Keeping track of and staying under budget, making sure that we are not spending more than we are raising.
- Taking inventory of all things bought.

Funding Plan

- Yankee Candle
- Nuts About Granola
- Bonus Books
- Paint Night
- Cotton Candy Sales
  - We make and sell cotton candy at every home football game.
- Public Outreach

Timeline

- GANTT Chart

Educational Engagement

- Presentations
  - Elementary, Intermediate, Middle Schools
    - Elementary
      - based more on visuals with a basic overview of the SLI, TARC, and other STEM programs and a small launch
    - Intermediate
      - based more on the SLI, TARC, and other STEM programs with visuals and a small launch
      - spark an interest in the programs so they may be interested in joining
    - Middle
      - based mainly on the SLI team program and TARC programs with visuals and a small launch
      - includes how they can become involved in STEM programs in high school
- Middle School TARC Team
  - build two rockets and compete in the Team America Rocketry Challenge

Safety

- Our team tries to put safety as our main concern.
- All our machines we use have a risk with using them and we try to eliminate.
- Our safety officer will also look over the use of the machines to keep everyone safe.

David Williams

- David Williams is our teams student safety officer.
- He overviews the construction of the rocket to make sure all procedures are done safely.
- David will also go out and retrieve the rocket after the launch.

Environmental Concerns

- Our teams rocket is very environmentally safe.
- our toxic gases are minimal with the amount of black powder we are using.
- The only other way our rocket could be affect the environment is if the rocket is unrecoverable.
- Animals may eat the rocket parts.

Conclusion

- Improvement and progress with write-ups and the overall design and construction of the rocket
- Community support
  - education of the community and students of Spring Grove helps gain support
- Continuing to improve and make progress on the project
  - through research
  - follow safety procedures
  - fundraising, sponsorships, and grants
  - test launches