Cedar Falls STARS PDR

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Vehicle Information

An image of fiberglass body tubes, such as the ones we shall use

Dimensions:

- 6’ long body tube
- 4.5” diameter body tube and nose cone
- 24” nosecone

Material:

- Fiberglass body, fins and nose cone

Justifications

- Strength, weight, drag, and price

Rocket Stability Info

Center of Pressure:

- 79.67” from the nose cone (RockSim)

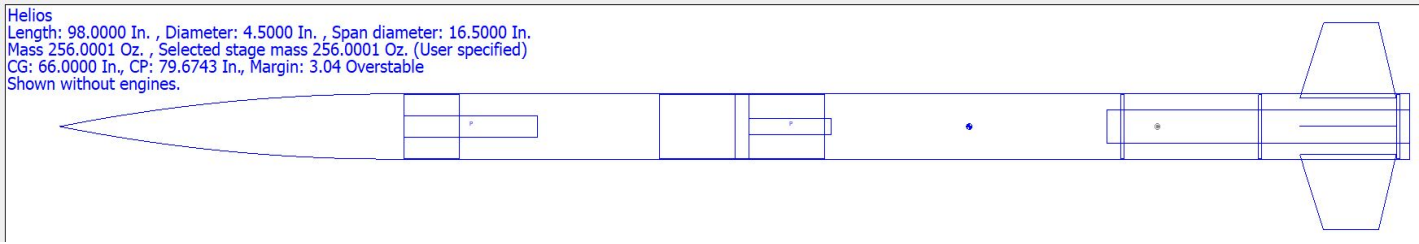
Center of Gravity

- 70.47” from the nose cone (RockSim)

Stability Margin

- 2.04 (RockSim)

This is an image of our rocket design, showing CP and CG



Motor Choice

An image of Cesaroni brand motors

Cesaroni K590 Motor

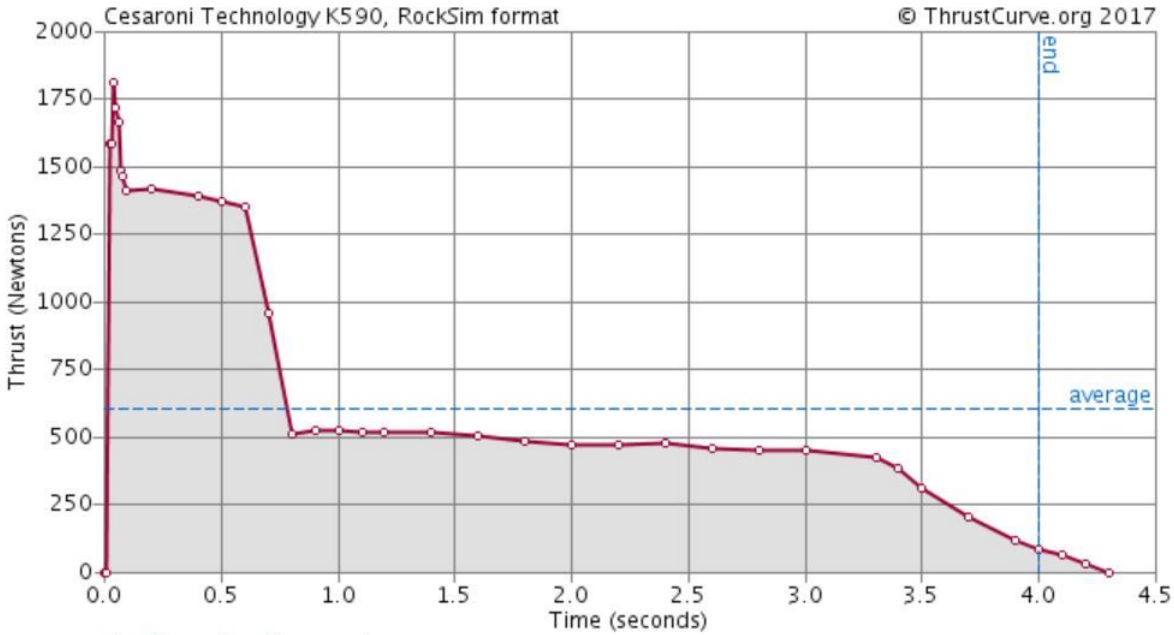
- Ease of use from Cesaroni
- Dual burning motor
- Achieves both altitude and rail exit velocity in simulations

Cesaroni K300 Motor

- Ease of use
- Achieve altitude in simulations
- Does not achieve rail exit velocity in simulations

CTI - K590 Thrust Curve

Data Graph



Alternates: in Pounds large size

Rocket Speed and Power

Thrust-to-weight ratio:

- 8.04:1

Rail Exit Velocity

- 70.14 ft/s (RockSim)

This image shows a rocket launch

Major Components

Body:

- 6’ Fiberglass
- 4.5” diameter

Recovery

- Ejection charges
- 15” Drogue
- 108” Main

Nose Cone

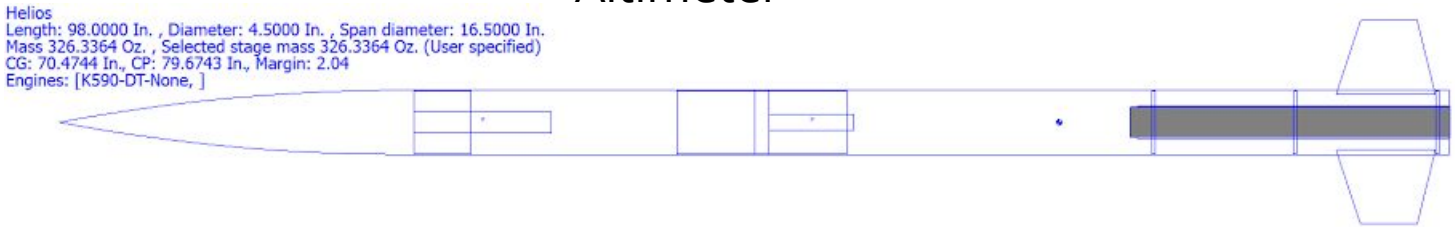
- Ogive 24”

Fins:

- 3 fins
- Trapezoidal shape
- Subsonic aerofoil fin shape
- Fiberglass

Electronics:

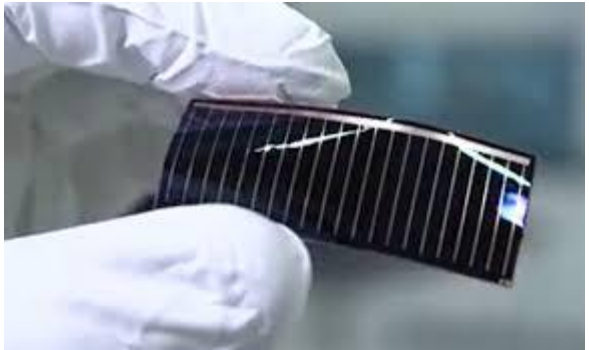
- Duracell battery and backup
- Wiring
- Altimeter



Preliminary Payload Design

Main objectives

- Voltage Readings
  - Raspberry Pi Zero
  - Arduino Uno
- Transmitters
  - Ham Radio
  - Zigbee



An image of the solar panel we plan to use

- Altimeters
  - Raven3
  - Perfectflite StratologgerCF
  - Telemetrum
- SolarPanels
  - Microlinks
  - Miasolé
  - Alta devices
- Gyroscopes
  - Adafruit
  - Sparkfun IMU Breakout MPU-9250

Requirement Compliance Plan

- General Requirements
  - Deadlines met on time
  - Educational Engagement once a month
  - Team Website
- Vehicle Requirements
  - Apogee and Altimeter
  - Rocket recovery and reusability
- Recovery System Requirements
  - Parachutes
  - Recovery Radius
- Experiment Requirements
  - Solar Panels
  - Onboard electronics
  - Onboard gyroscope
  - Ground model
- Safety Requirements
  - Safety Officer
  - Safety checklist
  - No NAR/TRA codes violated