# Rotationally Stabilized Multi-Sensor Package for a Sounding Rocket

## Objectives / Goals

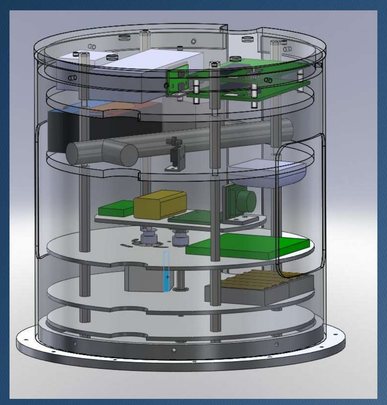
- Measure rocket speed and spin rate
- Determine the rocket's motion and flight path
- Design a stable platform to achieve clear images during flight
- Successfully retrieve the flight data wirelessly
- Obtain basic knowledge and understanding of the design requirements and obstacles in real world applications

## Benefits

- Provide future groups:
  - Stabilization system for future experiments
  - Accurate data of flight parameters
  - High quality clear images for future flights
- Allow expansion for wireless transmission data post-flight

## Rocket Canister Specifications

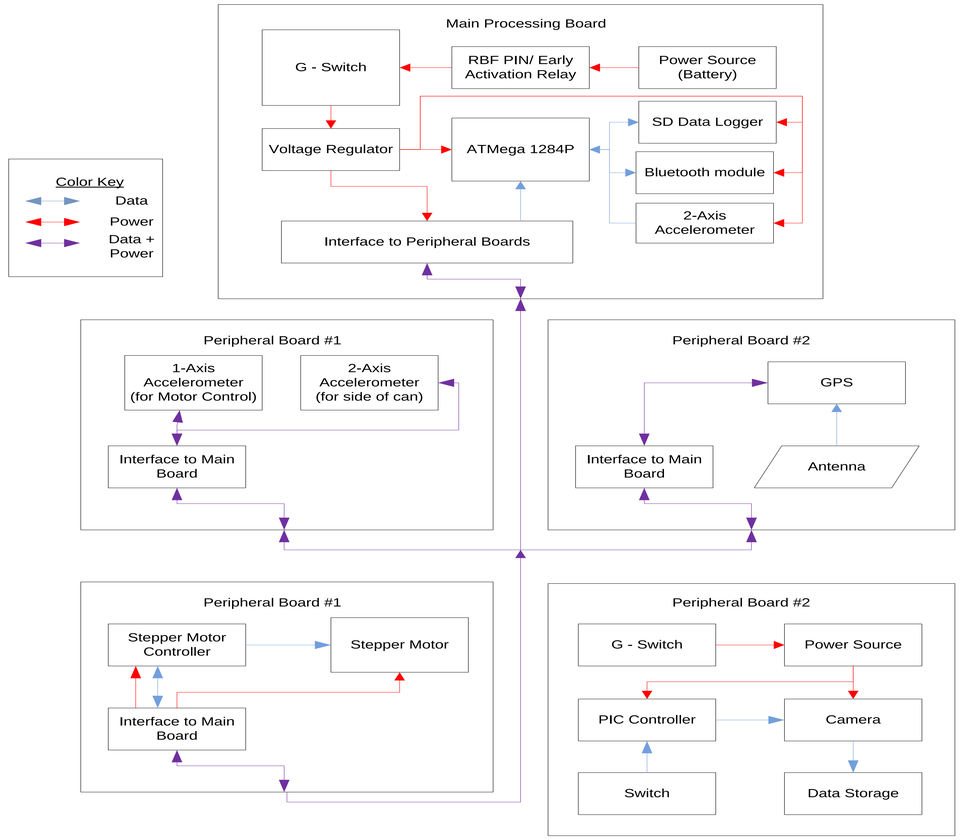
| Type | Quantitative Constraint |
|---|---|
| Physical Envelope | Cylindrical:<br>Diameter: 9.3 inches<br>Height: 4.75 inches |
| Mass | Canister + Payload = 10±0.1 lbf |
| Center of Gravity | Lies within a 1x1x1 inch envelope of the RockSat payload canister's geometric centroid. |
| Ports | Customer shall provide drop down tubing for atmospheric plumbing. Plumbing must terminate with a male ¼" NPT connector. Additionally, the customer shall design in a redundant valve to protect the payload at splash down. |



## Our Mission

Wyo Galactic is committed to creating flexible, task oriented, and advanced payload subsystems for future teams who require high quality products for their forward-thinking applications. We will accomplish this by: Creating a payload providing a stabilized platform which will be utilized to deliver images for analysis by University of Wyoming and University of Minnesota; Tracking the flight of the rocket using a GPS module; Wirelessly retrieving payload data post flight before obtaining the physical payload; While ensuring all systems are easy to use, understand and integrate into any future payload system or application.

## Final Design




## Members

Charles Galey (Team Leader)- Programming, Data Analysis, Testing

Peter Jay- Structural Analysis/Model Testing

Nicholas Roder- Camera Board, Bread board, Systems Testing

William Ryan- PCB Layout, Bread boarding, Circuitry

Harish M- Programming and Circuitry

Staff

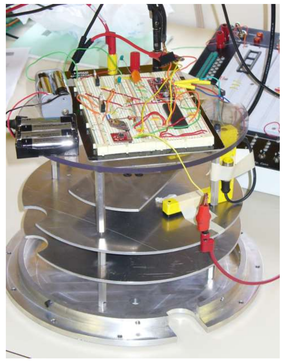
Dr. Paul Johnson (Physics Dept.)
Dr. David Walrath (ME Dept.)
Dr. Barrett (EE Dept)

## Funding


WYOMING NASA Space Grant Consortium

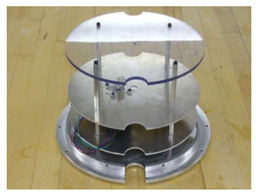
College of Engineering and Applied Science
Mechanical Engineering

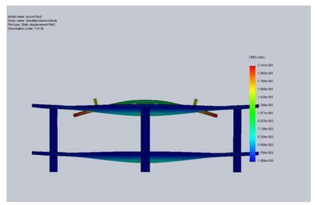
CEAS Engineering Shop

## Potential Points of Failure

- Electrical:
  - Electrical connection breakage during high G's
  - Unforeseen code interruption due to interference
  - Creating own circuit board and PCB's
- Mechanical:
  - Vertical supports buckling
  - Platter or camera platform malfunction





## Final Analysis/Conclusion

- What did we learn from this experience:
  - Do not procrastinate
  - Contact is key for a smooth payload integration
- Words of wisdom :
  - Start early
  - Keep constant communication with other group(s) in canister to clarify ideas and models
- Hardest parts:
  - Presentations and reports for both groups
  - Programming
  - Integrating systems together
- What would we change:
  - Less electrical integration