



NASA Student Launch ARW Payloads

PRESENTED BY NASA Student Launch

DATE July 24, 2023

NASA STEM

A group of students in a field, wearing caps and jackets, are gathered around a table, looking at a large white cylindrical object, likely a payload. The background shows a field with a blue sky and some equipment.

SLI Payload Requirements



The launch vehicle shall carry a science or engineering payload that is designed by the team and approved by NASA personnel.

SLI (Grades 6-12 Teams) can choose to undertake the USLI (College & University) payload mission or design an engineering or scientific payload of their own

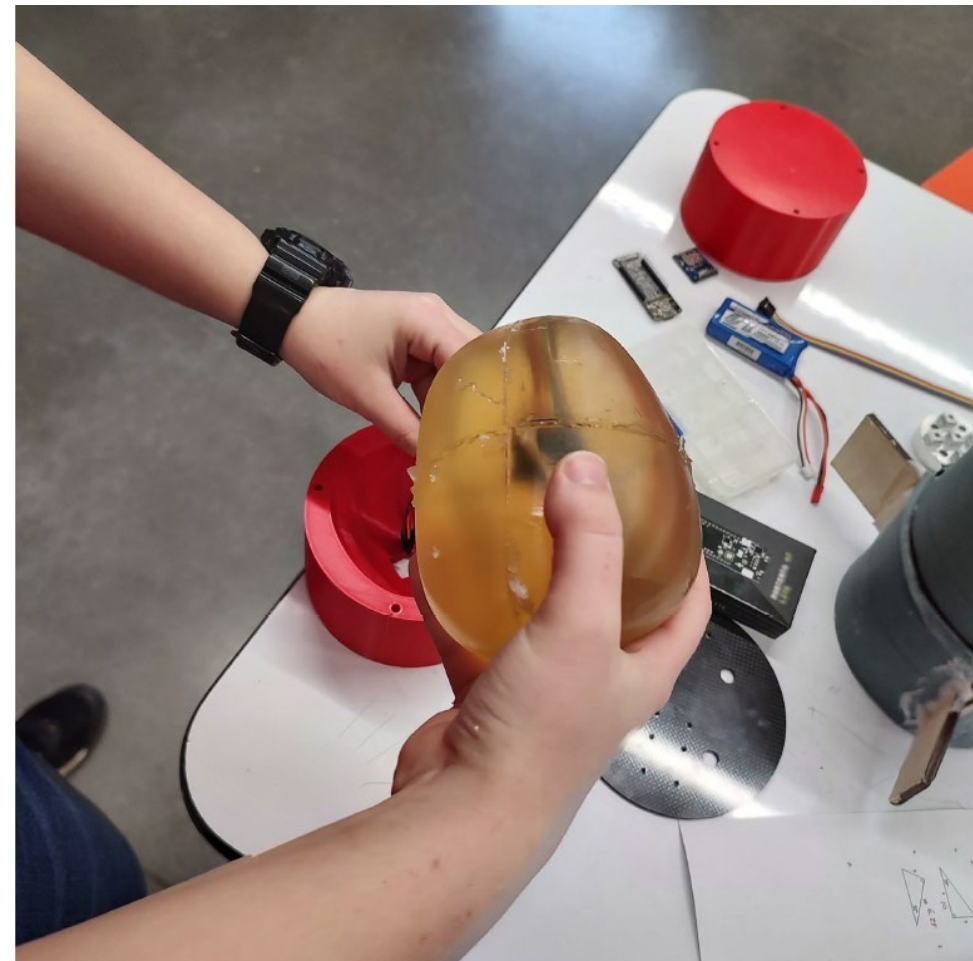
Data from the science or engineering payload shall be collected and analyzed by the team following the scientific method and reported in the team's PLAR.

Engineering: Clear goal for final product

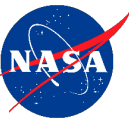
- What are we trying to do or produce?

Scientific: Clear hypothesis or experimental question

- What are we trying to find out? What do we think will happen?



Past SLI Payload Ideas



Atmospheric Science

- Temperature, pressure, humidity, etc.

Biology

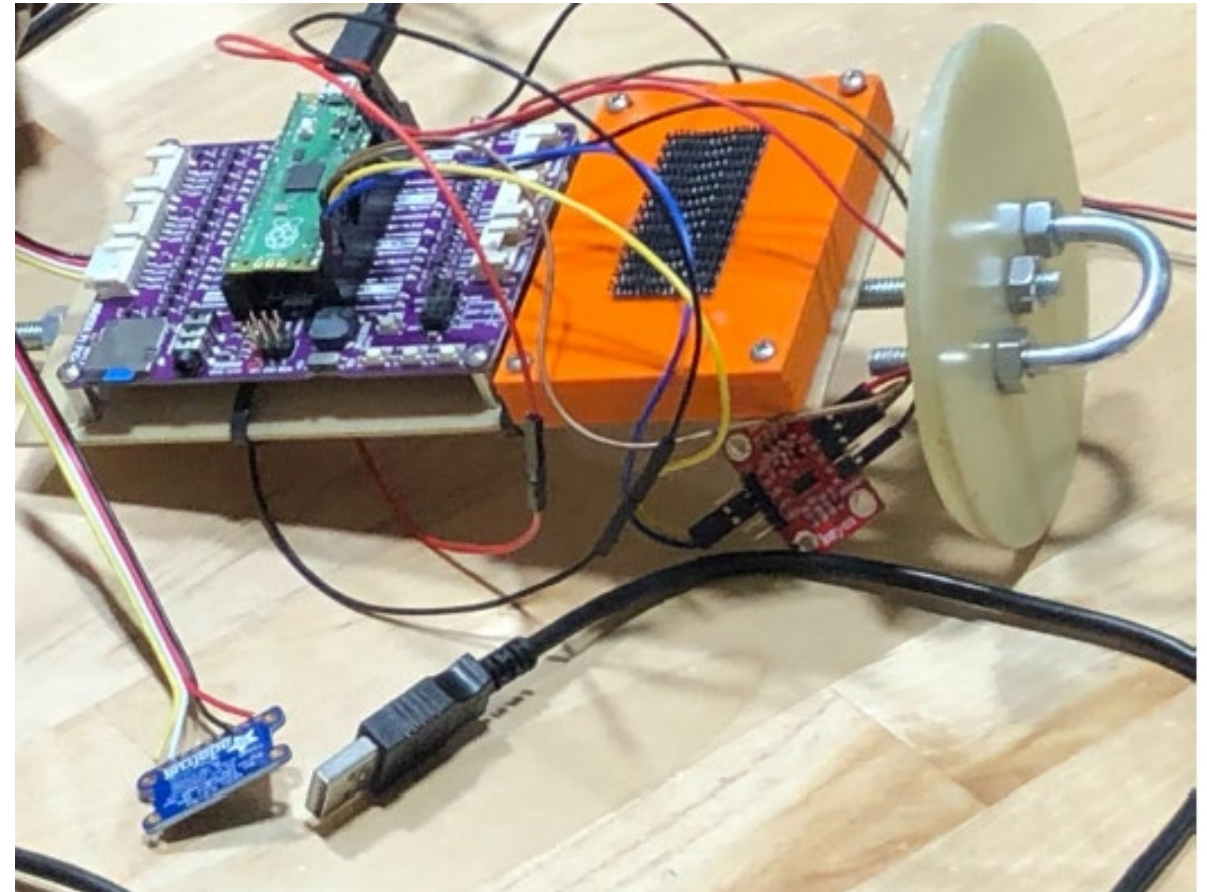
- High G effects on slime molds, ladybugs, bamboo
- Bacteria in atmosphere
- Cricket respiratory effects

Engineering

- Solar panel efficiency
- Hard drive latency
- Fly wheel for roll stability
- VR 360° rocket launch video with data overlay

UAV/Rovers

- RC airplanes, steerable parafoils, etc.
- Deployable drones to detect landing-colored objects



Past SLI Payload Example



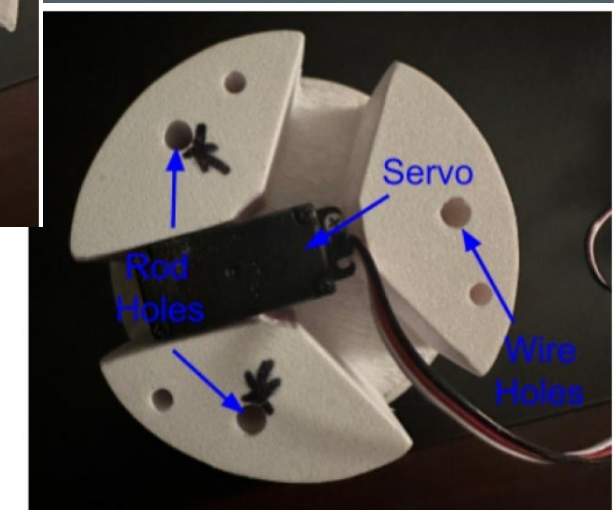
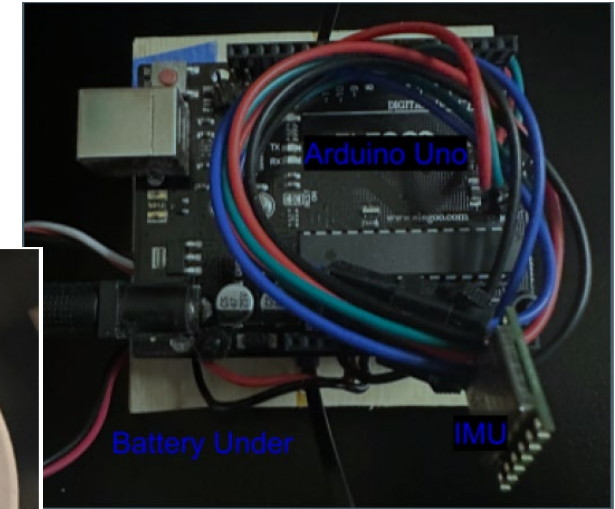
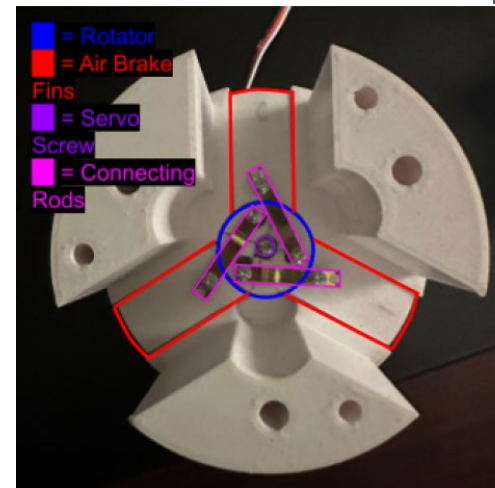
Portland Rocketry Team 2022-2023

Used IMU data to understand the position of the rocket in all 3-axis along with velocity and acceleration.

Incorporated a Kalman filter to cancel out shaking from the rocket itself and focus on data produced solely from the thrust of their launch vehicle.

They created a modular design so the flaps could extend not at all, fully, or anywhere in-between based on the real-time data their Arduino uno would receive

[Airbrake Demonstration and System Trial Video](#)



Past SLI Payload Example



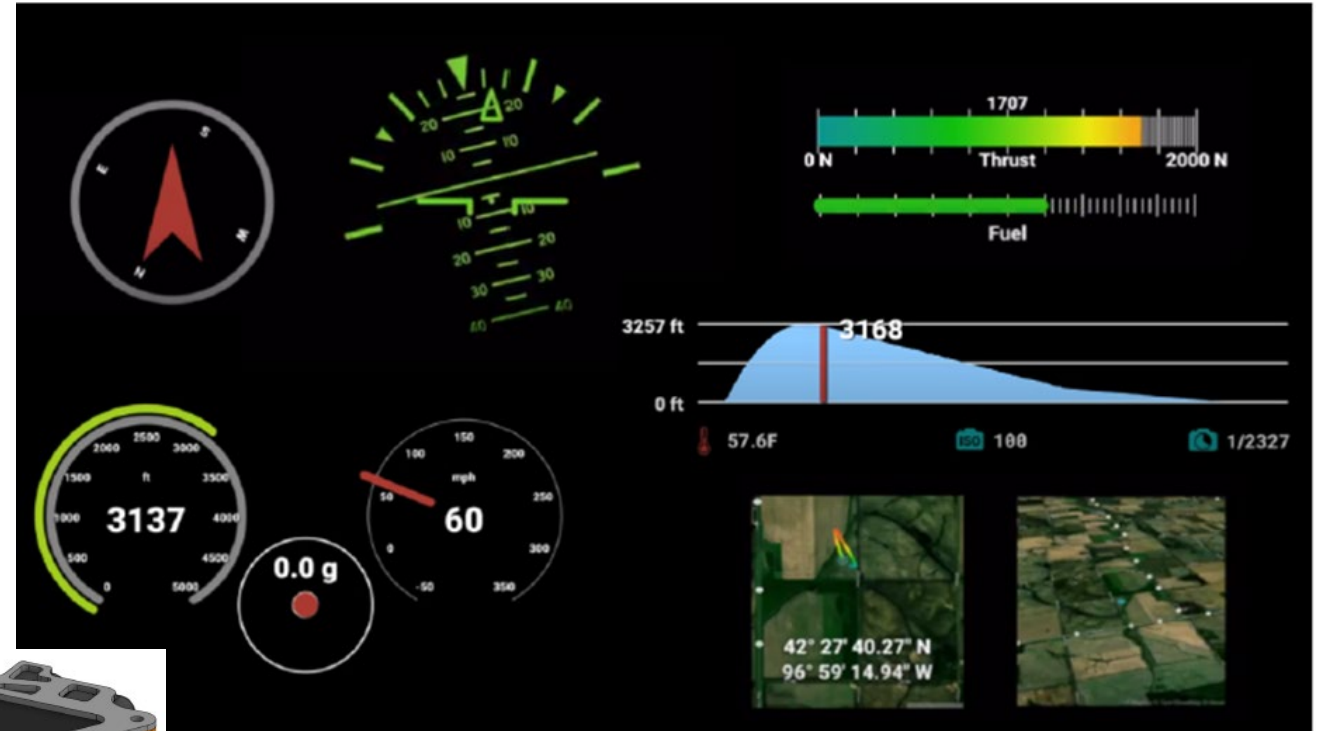
Cedar Falls Rocketry Team 2021-2022

The RVFD (Reusable Virtual Flight Display) has two systems, a camera array to record

360° video footage and a circuit board that collects orientation, accelerometer, and altitude data.

The camera array consists of 3 GoPro Hero 10s that record in the 'Super View' setting.

The cameras are mounted inside of 3 aluminum rings milled on a CNC lathe. These rings are spaced apart using ABS spacers.



[Cedar Falls Competition Flight](#)



USLI Payload Challenge 2020-2021



Design, build, and launch a planetary lander capable of landing in an upright configuration or autonomously up righting after landing.

Self-level within a five-degree tolerance from vertical.

Take a 360-degree panoramic photo of the landing site and transmit the photo to the team.

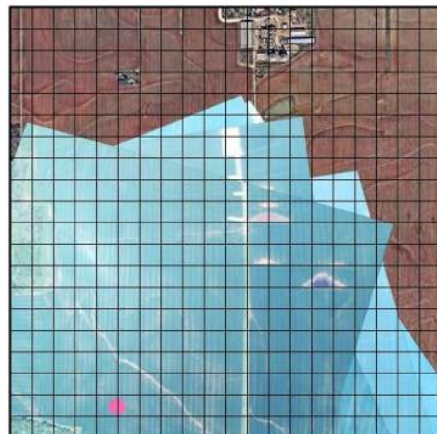
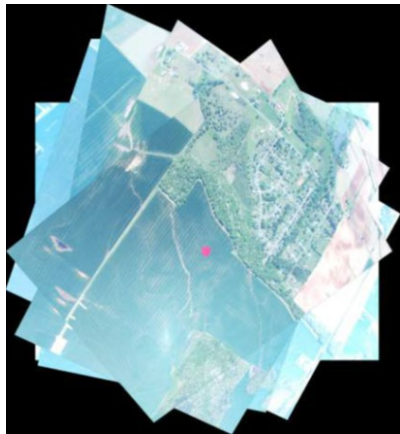


USLI Payload Challenge 2021-2022



Design a payload capable of autonomously locating the launch vehicle upon landing by identifying the launch vehicle's grid position on an aerial image of the launch site without the use of a global positioning system (GPS).

University of North Carolina at Charlotte
Autonomous Vehicle Imaging Localization (ANVIL)



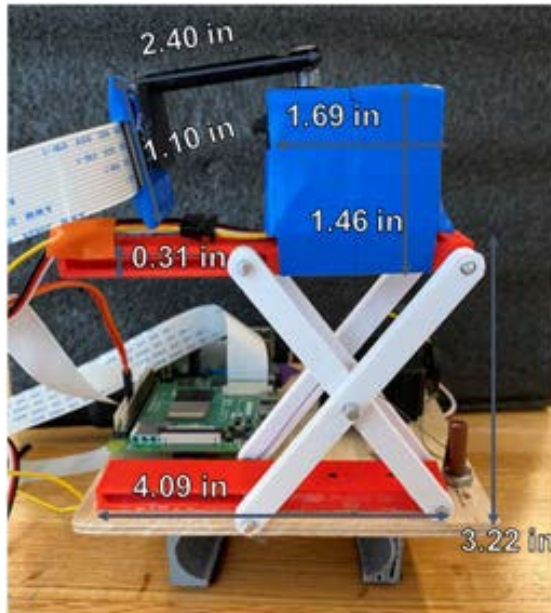
X: 5.04
Y: 18.6
Grid Position: 365



USLI Payload Challenge 2022-2023



Develop an on-board camera system capable of autonomously receiving a radio frequency command (RAFCO) and perform a series of tasks with the camera





Questions?



