

DESIGN DEVELOPMENT

Avionics Bay

- Designed to house avionics electronics in a secure and lightweight manner
- Provides for containment of black powder ejection charges
- Sufficient strength to perform as positive motor retention system

Flight Telemetry

- Measures velocity, altitude, orientation and GPS position during flight
- Controls all energetics for vehicle separation and recovery system deployment
- Provides second stage motor ignition upon verification of correct vehicle attitude

Performance data

- Record and transmit motor pressure data during flight
- Provides verification of performance under nominal flight conditions and helps identify causes of any potential motor failure.

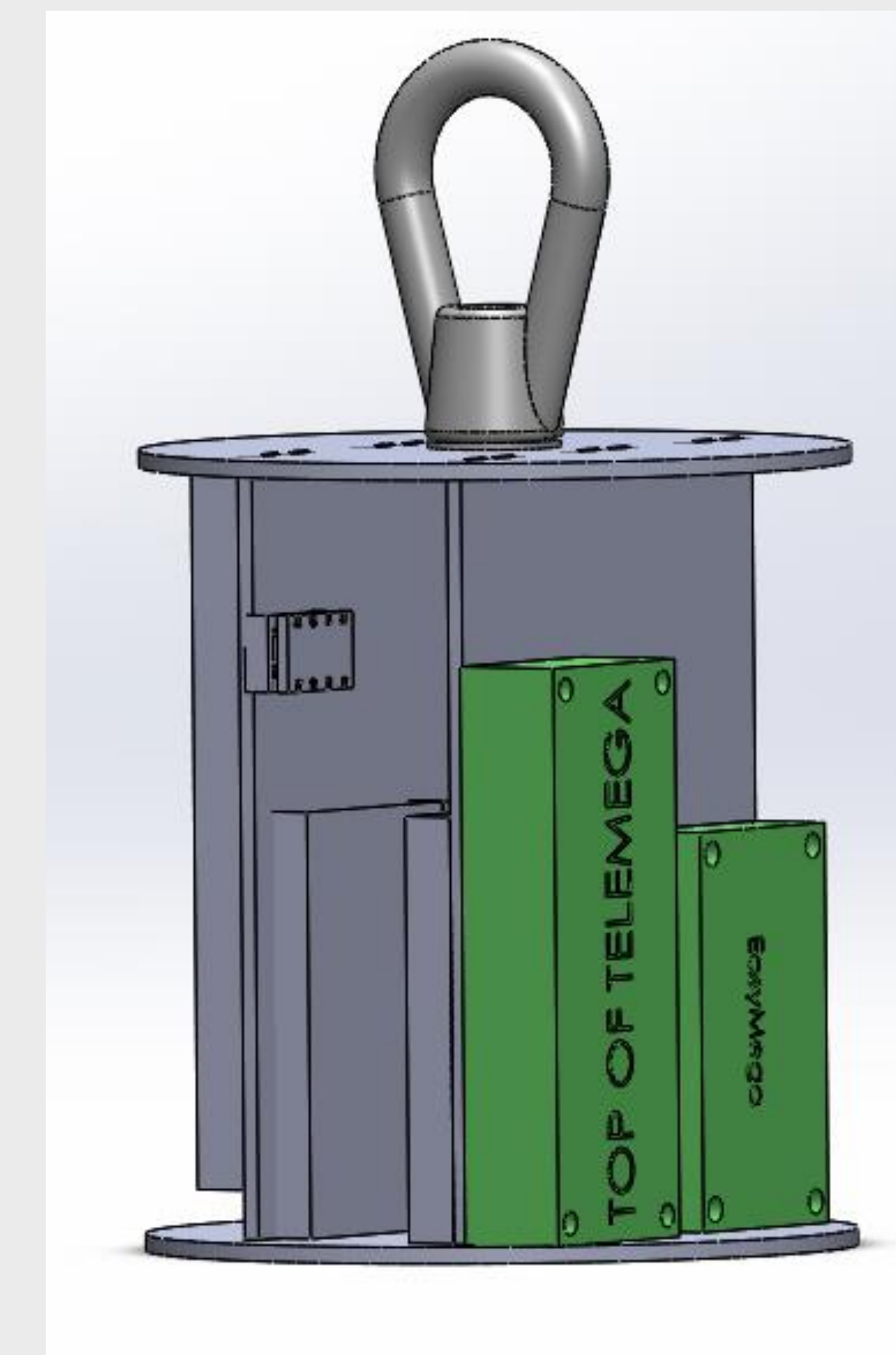
Forward ignition Shunt

- Provides for safe operation by disconnecting the 2nd stage ignitors from the electrical system prior to launch



HIGH ALTITUDE ROCKET TEAM AVIONICS

OSU High Altitude Rocket Team, HART, is responsible for designing a twin stage demonstration rocket capable of setting a university altitude record. The **Avionics** sub-team is responsible for designing the avionics bay, programming electronics and the transmission of telemetry and flight performance to the ground station. The 2019-2020 HART team members are the first team to provide for in flight performance data and have made improvements to significantly reduce the weight of the avionics bay.



DESIGN VALIDATION

Finite Element Analysis (FEA):

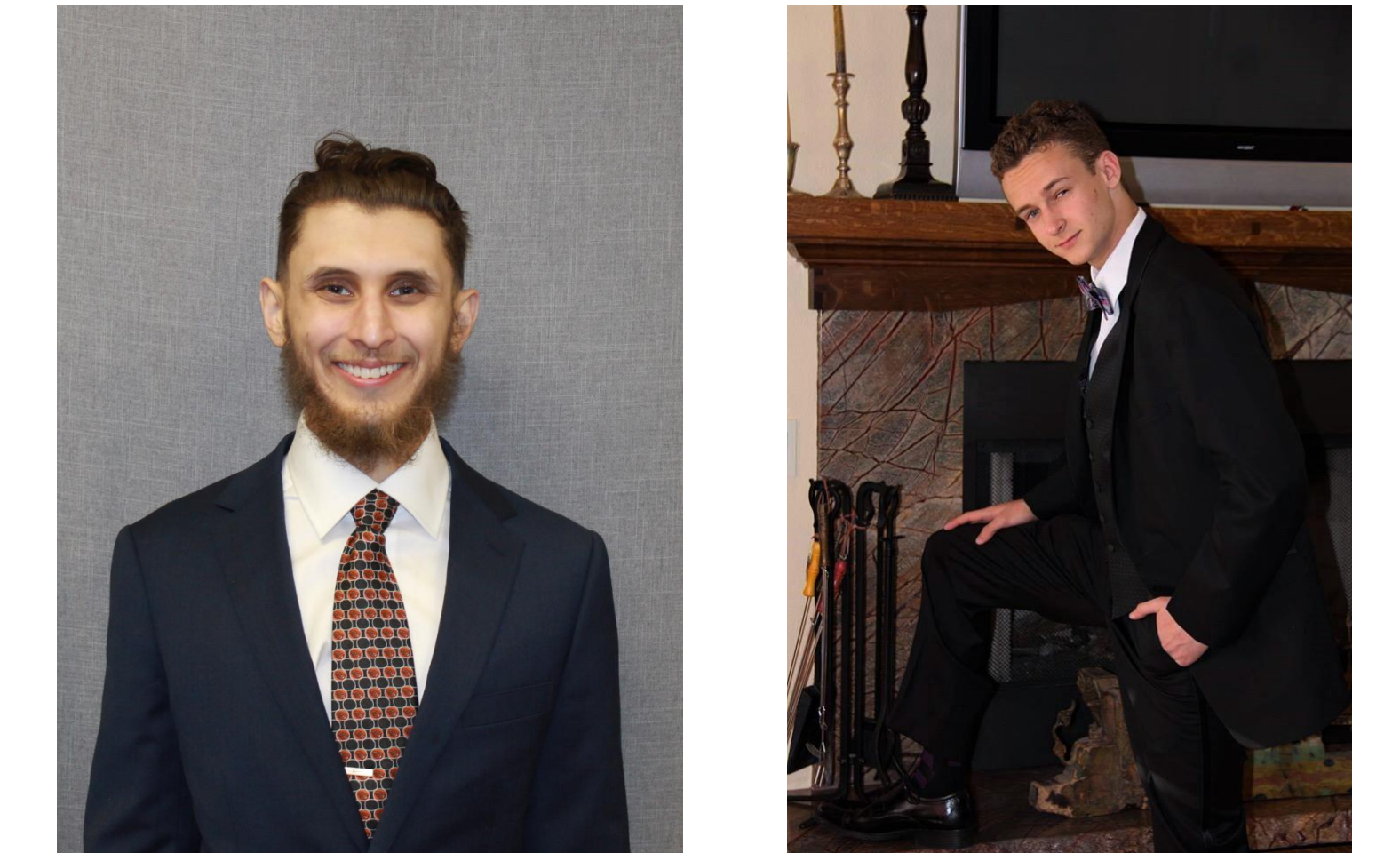
Computer aided design software has proven useful in validating designs as viable. FEA with simulated aerodynamic loads are paramount to the design process as they give estimates for structural performance without spending time building and physically testing designs.

Structural Testing:

Designs are then subject to structural testing. Structural testing is the final step in deciding whether a specific design is viable for full scale flight. Subjecting a component to the physical loading scenario is the only way to determine if a design is structurally sound.

DESIGN INNOVATION

- The 2019-2020 Hight Altitude Rocket Team has introduced design changes with hopes to optimize the rocket. Reductions in the weight of the **avionics bay** were obtained by employing lighter materials and a redesign of the motor and recovery system attachments. Prior years used a radial bolt hole pattern to retain these systems. The top of the avionics bay now serves as a bulkhead against an internal retainer and connected to the motor to create these attachments.



TEAM MEMBERS

- Sam Fishman
- Ethan Croylee
- Michael Stewart

TECHNICAL ADVISOR

Dr. Nancy Squires

PROJECT SPONSOR



Project Status

- Finalized designs
- Preliminary Manufacturing
- Physical testing to begin in next week
- Upon design validation, full scale manufacturing will begin