

DESIGN DEVELOPMENT

Nose Cone

- Von Karman shape helps reach max altitude, have low coefficient of drag.

Fins

- Designed for stability in supersonic flight, and maximum altitude by minimizing drag.

Parachutes

- Selected for ease of integration, high coefficient of Drag, low packing volume, and load ratings.

Black Powder Design

- Designed to cause separation during both stages. For redundancy, each event has a stronger back-up charge if the primary does not perform as intended.

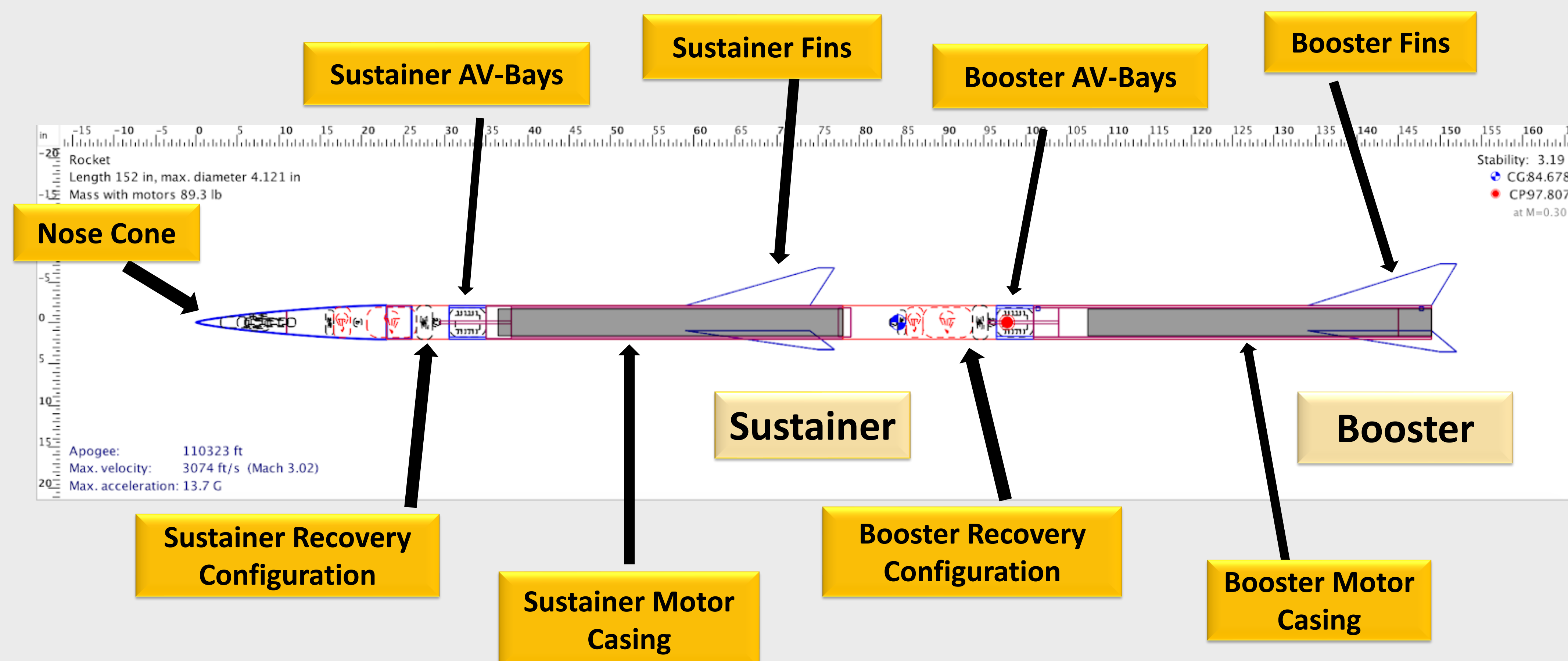
Pressure Vessel

- Designed for testing Black Powder charges to see the pressure produced and if it is enough for the specific event.



HIGH ALTITUDE ROCKET TEAM AERODYNAMICS AND RECOVERY

OSU High Altitude Rocket Team, HART, is responsible for designing a two stage demonstration rocket capable of setting a university altitude record. The **Aerodynamics and Recovery** sub-team is responsible for designing and validating the aerodynamic components through multiple simulations and design the recovery system. The 2019-2020 HART team members have made significant strides towards optimizing the rocket's performance and integration time.



DESIGN VALIDATION

OpenRocket:

Computer aided design software is useful to determine the stability of the rocket as well as the center of pressure and center of gravity.

RASAero II:

Computer aided design software is useful to determine apogee at supersonic flight.

Pressure Vessel:

A pressure vessel was developed to test black powder charges in a low pressure environment, simulating a high altitude, and then recording the resulting pressure wave after combustion.

DESIGN INNOVATION

- The 2019-2020 Hight Altitude Rocket Team has introduced unique design changes with hopes to optimize the rocket. Changing the material, shape and surface finish of aerodynamic components simulated accurate high altitudes enough to beat the school record. For the nose cone, an aluminum tip will be utilized for ease of manufacturing. Sustainer fins are swept back and the booster fins are a clipped delta profile. Toroidal main parachutes, Kevlar drogue parachutes, and tender descenders will be used for the recovery.



TEAM MEMBERS

- Jose Toledo
- Gabriel Kemling
- Theodore Gorchels

TECHNICAL ADVISOR

- Dr. Nancy Squires



Project Status

- Finalizing Simulations
- Finalizing Recovery Deployment
- Finalizing High Altitude Black Powder Charges
- Nose Cone and Fin Designs finalized