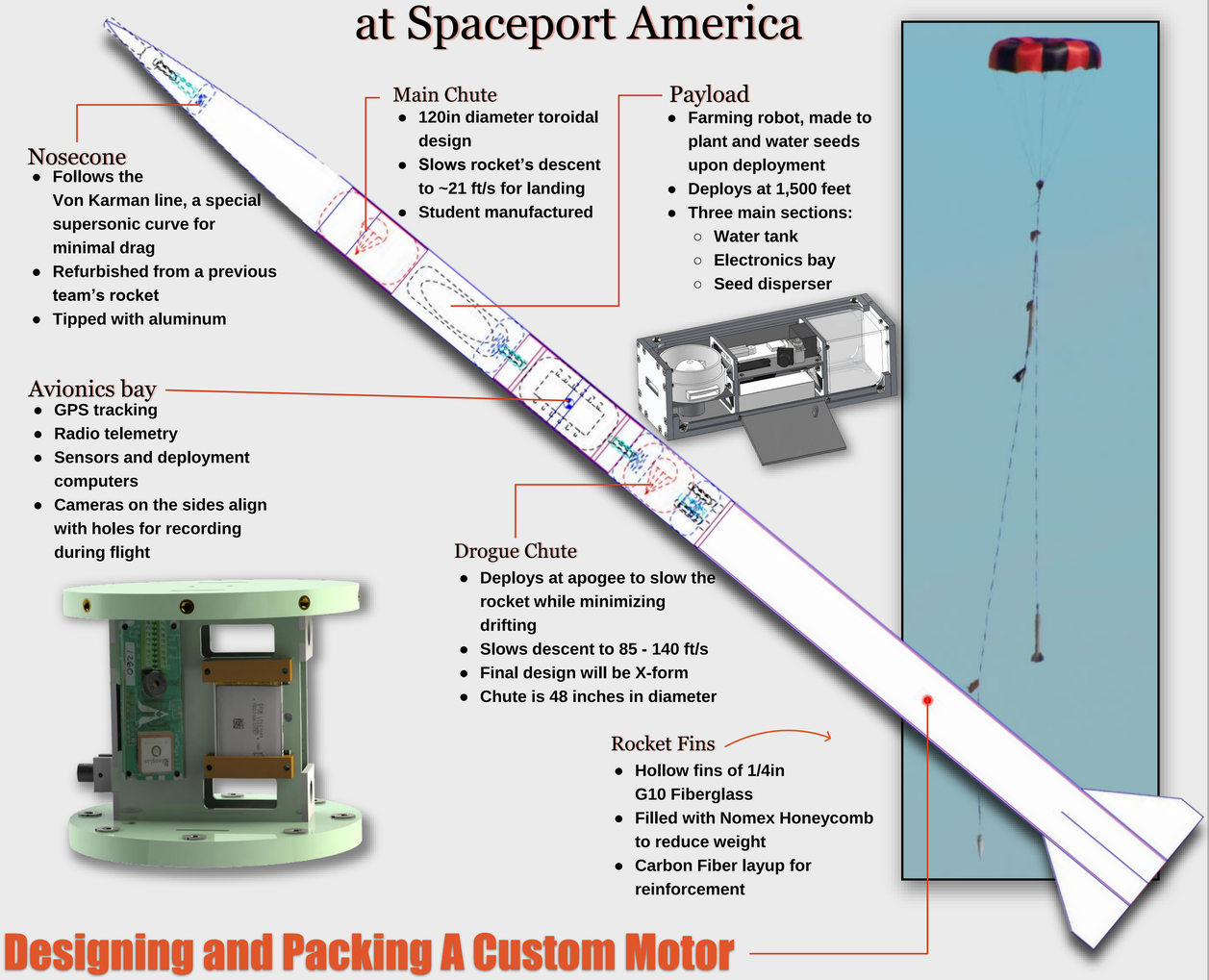
ESRA - INITIUM NOVUM
"NEW BEGINNINGS"

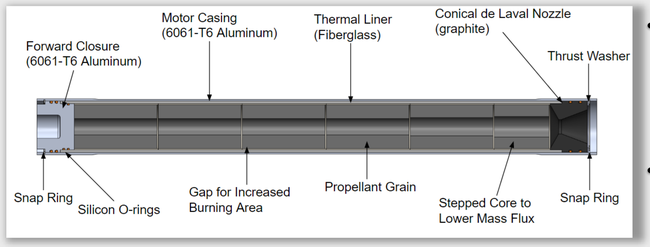
Experimental Sounding Rocket team seeking success at Spaceport America



What is ESRA, and what is our mission?

- **ESRA - Experimental Sounding Rocket Association.**
  - Non-profit organization founded in 2003 for fostering and promoting engineering knowledge and experience in rocketry
- **What's A Sounding Rocket?**
  - Effectively any rocket with a solid-fuel motor that carries a scientific payload
  - They are defined by being relatively cheap and quick to manufacture
- **The IREC Competition**
  - IREC - Intercollegiate Rocket Engineering Competition hosted by ESRA
  - The competition is held between university teams across the world, with 150 teams this year
- **Our Goals for the Competition**
  - Reach the 30,000 ft. threshold
  - Deploy a payload
  - Return successfully!
  - We have to build our whole rocket from scratch and mix our own rocket fuel too!
- **How we approached our mission**
  - Split our large team into subteams
  - Each subteam handles a specific aspect of design and manufacture
  - This helped our team to save time and work faster in their respective fields

Designing and Packing A Custom Motor



- Snap rings are used to secure all motor components in place to increase the re-usability of the motor and decrease the severity of motor destruction in the event of a Catastrophic Take-off (CATO)

- The motor case is 5 feet long and made of 6061-T6 Aluminum. The casing was designed to be thicker at the forward and aft end of the motor to accommodate the indent of the snap ring grooves.
- The fiberglass thermal liner serves as an insulator, preventing the heat of the burning propellant from weakening the aluminum case.
- O-rings on the nozzle and forward closure are used to seal the motor and prevent gas and heat from escaping around the nozzle.

Meet the Team

Propulsion

The propulsion team designed, tested, and built the custom solid rocket motor that launched the 130 lbs rocket to 30,000 feet.

Avionics & Recovery

The avionics & recovery team designed and built the flight computers, recovery harness, and parachutes for the rocket. They are responsible for tracking of the rocket and ensuring it lands safely.

Structures & Aerodynamics

The structures & aerodynamics team are responsible for designing the airframe to survive launch forces and minimize drag and weight. Parts such as the nosecone, fins, body tubes, and bulkheads are all their responsibility.

Payload

The payload team designed and built the farming robot for land rehabilitation. The 10cm x 10cm x 30cm robot utilizes a spinning plate to launch seeds and water. The payload is deployed at 1,500 feet and contains an independent recovery system.

Oregon State University