



HySol

Integrated Solid Hybrid Rocket



Problem Statement

- Design a valve system for an Integrated Solid Hybrid Rocket Motor, which allows a smooth transition from a solid to hybrid stage

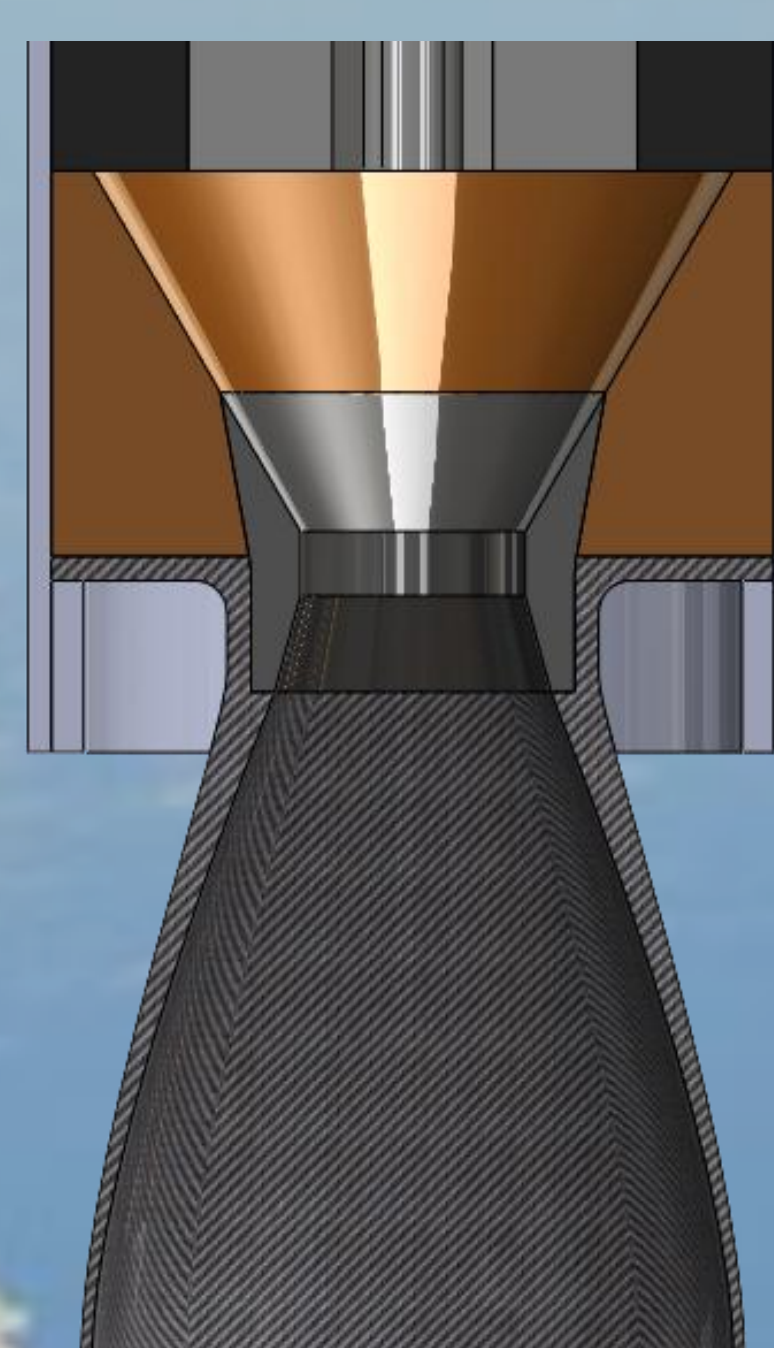
Project Motivation

- Surpass current high altitude amateur rocket record of 72 miles
- Become industry pioneers of integrated solid hybrid rocketry
- Submit technical paper to the American Institute of Aeronautics and Astronautics (AIAA)

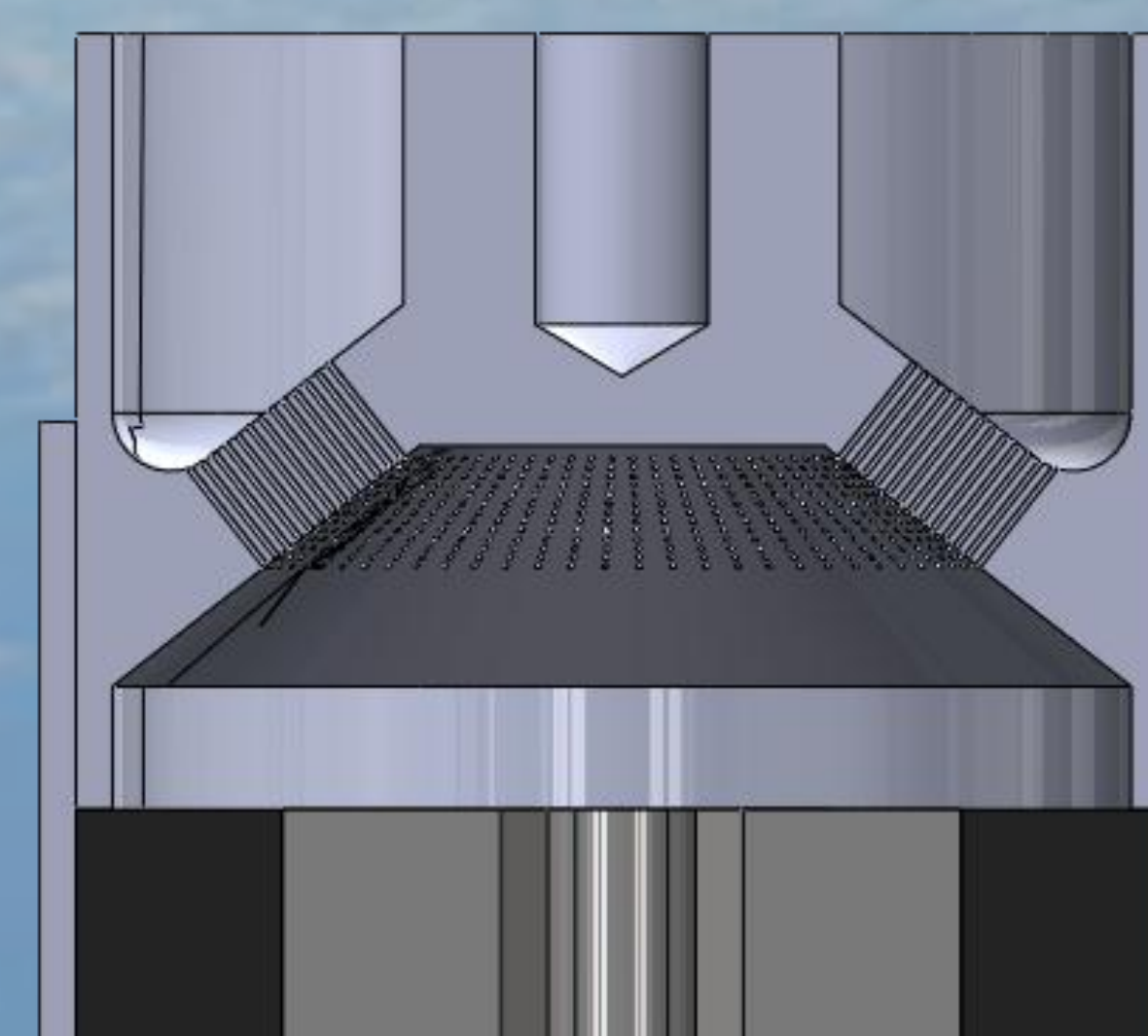
Design Objectives

- Develop an integrated injection valve
- Design a 4" diameter integrated solid hybrid rocket
- Simulate and test propellant thrust properties
- Integrate solid and hybrid fuel systems
- Scale model up to 12" diameter

Part Design



Nozzle Assembly



Injector Assembly

Analysis and Testing

- Using CFD Analysis for injector flow.
- Injector flow characterization
- Solid and Hybrid propellant characterization

Responsibilities

Pedro Serrat: Subject matter expert of oxidizer (N_2O) characteristics, Injector Valve Flow rates, SolidWorks design

Eduardo Gorrochotegui: Subject matter expert in Heat transfer on injector system Valve Flow Rates SolidWorks design.

Dennis Moreno: Subject matter expert in propellant design, Manufacturing expert, injector valve flow rates and SolidWorks Design

Time Line

#	Name	September	October	November	December	January	February	March	April
0	Milestone List								
1	Project Formulation	█							
2	Research and Development	█	█	█					
3	Conceptual Design		█	█					
4	CAD Model			█	█				
5	CFD Analysis				█	█			
6	Proof of Concept					█	█		
7	Design Iterations						█	█	
8	Scaled Prototype							█	█
9	Static Testing and Analysis								█
10	Full Scale Model								█
11	Final Report								█



Dennis Moreno



Eduardo Gorrochotegui



Pedro Serrat

Faculty Advisor: Igor Tsukanov

Industry Advisors: Korey Kline & Derek Deville