



## Launch Vehicle Design for the FAR-Mars Competition

## **FAR-Mars Competition**

- . Hosted by the Friends of Amateur Rocketry (FAR) and the Mars Society.
- . Undergraduate teams must design, build and launch a liquid bi-propellant rocket.
- . Target altitude of 45,000 feet above ground level.





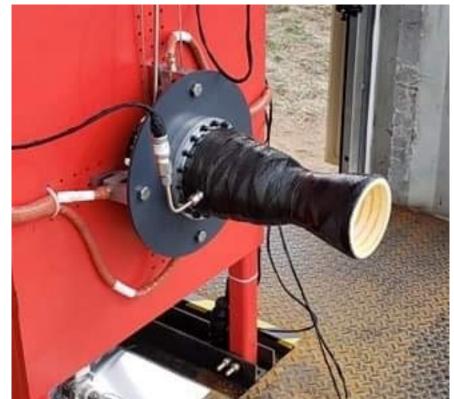
Janus Overview		
Nominal Thrust	1000 lbf	
Fuel	Jet-A (kerosene)	
Oxidizer	Liquid Oxygen	
Injector	Ox-Centered Pintle	
Cooling Methods	Ablative & Fuel Film	
Manufacturing	100% In-House	

Competition Overview		
Qualification Altitude	30k-50k ft	
Max Total Impulse	9,208 lbf-sec	
Payload Mass	2.2 lbm	
Prize	\$50,000	
Vertical Test Date	February 1, 2020	
Launch Window	April-May 2020	

## Janus Rocket Engine

- Designed and tested by capstone team Tiber Designs in 2018-2019.
- . Built along with Test Cell 3, a liquid rocket engine testing facility.
- . Janus will propel the vehicle designed by Zenith Propulsion







## Altair Launch Vehicle

- . Designed by the Zenith Propulsion team.
- . Aluminum internal skeleton provides support for tanks, feed system, payload and recovery system.
- . Composite aeroshell provides bending strength, protects internal components from in-flight environment and resists aerodynamic loading.

Altair Overview		
Loaded Mass	169 lbm	
Propellant Mass	45.7 lbm	
Length	21 ft	
Boost Duration	10 seconds	
Simulated Apogee	30,090 feet	
Max Velocity	Mach 1.7	

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