

Team 20: Andromeda-2

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Prototype System Architecture



Background

The central focus of the Andromeda Project progression is to concentrate on developing small hybrid rocket engines that utilize Nitrous Oxide as the oxidizer and paraffin wax as the fuel.

Objective Statement

Andromeda-2's objective is to design a hybrid rocket engine of end-burning configuration along with a test stand capable of performing static firings so that data can be measured and recorded.

System Specifications

Combustion Chamber

Diameter: 3"
Length: 2.25"
Injector Port Diameter: 0.12"

Nozzle

Throat Diameter: 0.5"

Supply System:

Supply Tank Weight: 20 lbs
Run Tank Weight: 2 lbs

Fuel Grain

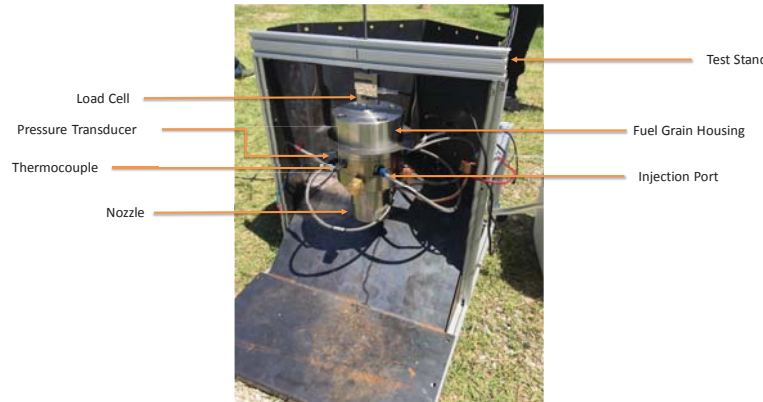
Weight: 0.5 lbs

Rocket Assembly

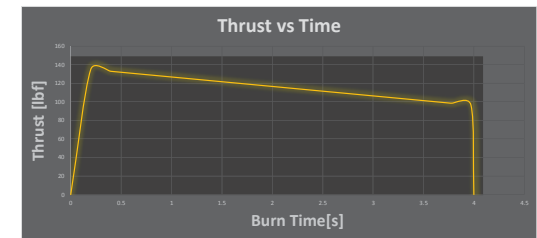
Total Weight: 40 lbs

System Operational Safety

- Remote operation of test stand at 200ft distance
- Kill Switches to have quick shutoff of valves
- Burst discs in Chamber and Tank as additional failure mode
- Cleanliness of plumbing to avoid contamination

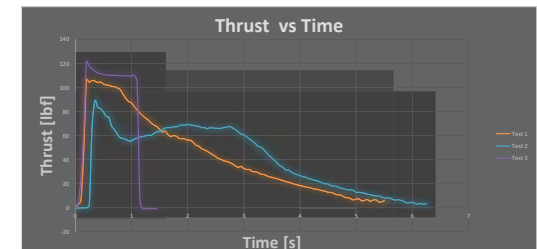


Expected Performance



- Expected Peak Thrust: 131 lbf
- Mid-Burn Chamber Pressure: 480 psi
- Estimated Burn Time: 4s

Measured Performance



- Measured Max Thrust: 121 lbf
- Measured Chamber Pressure: 435 psi
- Measure Burn Time: 8s

September

October

November

December

January

February

March

April

- Project Definition
- Develop E-Spec

- Concept Generation & Selection
- Preliminary Analysis

- Analysis
- Develop Embodiment

- Re-Evaluate design

- Manufacturing
- Electrical Systems

- Manufacturing
- Preliminary Tests
- Safety Tests

- System Calibration
- Integrate Sub-Systems
- Begin Tests

- Finish tests
- Data analysis
- Final Presentation