Alexander Precella

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Aspiring Electronics and Propulsion Test Engineer: Driven to support defense and aerospace innovation through rigorous system testing. Experienced in fluid control systems, sensor integration, and data acquisition using Python, C++, and NI based platforms. Focused on delivering reliable, flight ready hardware\e by bridging electronics, software, and propulsion subsystems.

EXPERIENCE

Longhorn Rocketry Association (LRA) – *Propulsion Team* **May 23' - Present**

- Designed multiple hybrid rocket engine components using SolidWorks, including a high performance nozzle enhanced for efficiency.
- Conducted thermal simulations in ANSYS to evaluate heat transfer and material limits.
- Developed Python and C++ scripts to model pre and post combustion chamber dynamics, enhancing combustion efficiency and engine performance.
- Performed propellant analysis for solid and liquid fuels, studying ignition, stability, and thrust behaviors using Python based data analysis.
- Used Matlab, Python, and Simulink to model rocket trajectory, stability, and landing accuracy.

ENGINEERING PROJECTS

Fluid System Design (Propellant P&ID Development) - Python, C++ **Austin, TX**

- Designed a propellant feed and pressurization P&ID using a 5000 psi nitrogen source for hybrid propulsion applications.
- Simulated flow and pressure drop in Python to size tubing, orifices, and accumulator volume for accurate mass flow control.
- Modeled system thermodynamics over time (T, P, enthalpy, entropy) and verified feasibility under isentropic assumptions.

Custom Shuttle Valve Design - Python, C++ **Austin, TX**

- Designed a nitrogen regulating shuttle valve with a poppet mechanism for pressure based flow switching.
- Calculated cracking pressure, spring force, and CdA values through detailed Python based derivations.
- Sized valve components including inlets, outlets, and seals to meet specified flow and sealing tolerances.

Tank Pressure Controller Design for Propellant Pressurization - Python, C++ **Austin, Tx**

- Developed Python based controller to regulate ullage pressure in a cryogenic tank using real time helium pressurization.
- Simulated pressure, temperature, and flow dynamics to maintain 35-45 psia during a 200 second engine burn.
- Validated system performance against requirements ensuring <36 psid drop and accurate LOX mass delivery.

EDUCATION

University of Texas at Austin | GPA : 3.8/4.0 **Austin, TX**
Bachelor of Science in Aerospace Engineering (Space Flight) **May 2026**

- **Relative Coursework -** Electromechanical Systems, Feedback Control Systems, Linear Systems Analysis, Thermodynamics, Compressible Flow, Low Speed Aerodynamics, Spacecraft Dynamics, Physics 1&2, Mechanics of Solids.

TECHNICAL SKILLS

- **Software:** Python, C++, MATLAB, Simulink, SolidWorks, Microsoft Office, Aerolab, Linux, OverLeaf, GitHub
- **Hardware**: 3-D printing, Laser Cutting, Mill, Lathe, CNC