

Colton Acosta

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SUMMARY

Junior electrical engineering student with leadership and collaborative project experience including work in computer-aided design and modeling, electronics, hardware-software interfacing, and programming. Interests include embedded systems, control systems, signal processing, and communication systems. Open to relocation.

EDUCATION

B.S.E, Electrical Engineering
Arizona State University, Tempe, AZ

Graduating December 2022
4.00 GPA

TECHNICAL SKILLS

Design and Modeling: MATLAB/Simulink, SOLIDWORKS, Microsoft Office, LabVIEW

Hardware: Microcontrollers, Operational Amplifiers, Soldering, Digital Multimeters, Oscilloscopes

Programming: C, C++, Python, Linux (git, vim, gcc, gdb)

EXPERIENCE

Liquid Propulsion Avionics Lead, Sun Devil Rocketry

August 2019-Present

- Leading the design and development of an avionics system for a liquid rocket engine with over 20 hardware components including valves, transducers, thermocouples, load cells, controllers, and signal processing circuitry
- Programming AVR microcontrollers with C for prototype testing of the engine's embedded systems including data acquisition, actuation, flow control, and communications functionality
- Built an instrumentation amplifier using operational amplifiers to boost sensor outputs to easily measurable ranges resulting in hardware savings upwards of \$200
- Designed and built a second order, active low-pass filter and tested the filter's noise reduction and signal reproduction by adding noise to a measured signal with a voltage summing circuit
- Wrote a C++ program to generate Gaussian noise for hardware filter testing by writing an algorithm for computing values of an inverse Gaussian cumulative distribution function
- Building a central telemetry system using RS-485 electrical interfaces for long distance and noise insensitive serial communications between data acquisition, valve control, and main controllers
- Interfacing temperature, pressure, thrust, and flow measurements with a Python graphical user interface
- Wrote a C program to encode the state of the engine's valves using bit operators for efficient serial data transmission
- Documented project progress in published AIAA Propulsion and Energy conference paper
- Wrote a development plan for the 2020-2021 academic year consisting of 42 deliverables to document project milestones, cultivate a results-oriented work environment, and delegate workloads among new talent

PROJECTS

Electronic Valve Actuator Flow Control System

Fall 2020

- Designed and built a closed loop control system for valve actuation in flow throttling applications
- Examined the relationship between pulse width modulation duty cycle and steady state shaft speed to derive a controller output signal with a linear transfer function from controller output to shaft position
- Characterized the plant transfer function with a series of step response experiments
- Designed and simulated a saturated PI controller with integrator clamping using Simulink with performance specifications of zero steady state error of step inputs and complete rejection of step disturbances.
- Built the actuator control system using a brushed DC motor, coupling shaft, Arduino controller, and quadrature rotary encoder for feedback.

5280 Team Member, Sun Devil Rocketry

Fall 2018-Spring 2019

- Collaborated with a group of 12 students to launch an amateur rocket to an altitude of 5280 feet
- Determined build specifications, apogee altitude, and static margin with OpenRocket software
- Constructed rocket with phenolic tubing wrapped with epoxied fiberglass fabric and laser-cut fins
- Used a microcontroller breakout board with internal altimeter for parachute deployment