Colton Acosta

404.430.1346 • cacost12@asu.edu • US Citizen • linkedin.com/in/colton-acosta/

SUMMARY

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

EDUCATION

B.S.E, Electrical Engineering Graduating December 2022
Arizona State University, Tempe, AZ 4.00 GPA

TECHNICAL SKILLS

Design and Modeling: MATLAB/Simulink, LTspice, SOLIDWORKS, Microsoft Office, LabVIEW
Hardware: Arduino, Raspberry Pi, Soldering, Breadboarding, Multimeters, Power Supplies, 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 Arduino controllers with C++ for prototype testing of the engine's embedded systems including data acquisition, actuation, flow control, and communications functionality
- Interfacing temperature, pressure, thrust, and flow measurements with a Python graphical user interface
- Built an instrumentation amplifier circuit using operational amplifiers to boost sensor outputs to measurable ranges resulting in hardware savings upwards of $200
- 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
- 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
- Wrote a C program to encode the state of the engine's valves using bit operators for efficient serial data transmission
- Wrote, compiled, and debugged all C and C++ code using Linux command line tools such as gcc, g++, gdb, and vim
- Documented project progress in published AIAA Propulsion and Energy conference paper

PROJECTS

Flow Control Valve Actuator Control System Fall 2020

- Designed and built a closed loop control system for a valve actuator for use 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 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
- Adjusted final build to pragmatically mitigate static margin calculation error, allowing rocket to be launched on time
- Used a microcontroller breakout board with internal altimeter for parachute deployment