Colton Acosta

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

SUMMARY

Junior aerospace engineering student with collaborative, multidisciplinary project experience including electronic systems, hardware-software interfacing, computer-aided modeling, and programming. Interests include communications systems, electromechanical systems, and avionics. Open to relocation.

EDUCATION

B.S.E, Aerospace Engineering; Autonomous Vehicle Systems   Graduating May 2022
Arizona State University, Tempe, AZ   4.00 GPA

TECHNICAL SKILLS

Design and Modeling: MATLAB/Simulink, SOLIDWORKS, Microsoft Office, LabVIEW
Hardware: Soldering, Digital Multimeters, Oscilloscope, Operational Amplifiers, Microcontrollers
Programming: Python, C, C++, Linux (git, vim, gcc, gdb)

EXPERIENCE

Liquid Propulsion Avionics Lead, Sun Devil Rocketry   August 2019-Present

- Leading the design and development of an integrated avionics system for a liquid rocket engine with over 20 hardware components including valves, motors, sensors, microcontrollers, and signal processing circuitry
- Built an instrumentation amplifier circuit using operational amplifiers to boost sensor outputs to 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
- 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
- Programming Arduino controllers with C++ for prototype testing of the engine's embedded systems including data acquisition, actuation, flow control, and communications functionality
- Wrote a C program to encode the state of the engine's valves using bit operators for efficient serial data transmission
- Interfacing temperature, pressure, thrust, and flow measurements with a Python graphical user interface
- Conducting trade studies on electronic actuators and orifice flow meters to develop main propulsion system specifications using MATLAB for multivariate trade-off analyses and physical modeling
- 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
- 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 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.

Orbital Mechanics Trans-lunar Injection Simulation   Spring 2019

- Simulated a free-return, trans-lunar injection orbital trajectory in MATLAB with an animated solution
- Calculated the trajectory by solving the two-body problem using a numerical differential equation solver built from scratch with Apollo 11 low earth orbit initial conditions