

# Colton Acosta

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## SUMMARY

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Junior aerospace engineering student with leadership and collaborative project experience including electronics, hardware-software interfacing, computer-aided modeling, and programming. Interests include controls, signal processing electronics, avionics and propulsion. Open to relocation.

## EDUCATION

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**B.S.E, Aerospace Engineering;** Autonomous Vehicle Systems  
Arizona State University, Tempe, AZ

Graduating May 2022  
4.00 GPA

## TECHNICAL SKILLS

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**Presentation and Organization:** Microsoft Office, L<sup>A</sup>T<sub>E</sub>X  
**Design and Modeling:** MATLAB/Simulink, SOLIDWORKS, LabVIEW  
**Programming:** Python, C/C++, Linux (git, vim, gcc)

## EXPERIENCE

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### 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, sensors, controllers, and signal processing circuitry
- 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
- Programming Arduino controllers for prototype testing of data acquisition and flow control embedded systems
- 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
- 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

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### Flow Control Valve Actuator 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
- 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

### 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