

Michael Ferrell

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Education

University of California, Los Angeles

BS, Aerospace Engineering
UCLA Alumni Scholar

Sept 2022 - June 2026

GPA: 3.71

Experience

Rocket Project at UCLA

Liquid Ground Systems Lead Engineer

July 2023 - Present

- Led a team of 5 student engineers to design ground electronics systems for a LOx/Ethanol liquid bipropellant rocket.
- Designed and manufactured the DAQ subsystem which collects real-time fill, pressure, temperature, and thrust data that is uploaded to a local server and backed up on microSD cards.
- Developed PCBs that interface with load cells, thermocouples, and pressure transducers. Utilized decoupling capacitors and op amps to reduce noise and get clean data from the ADCs.
- Programmed the microcontroller on each PCB to receive data from the ADCs, save the data to a microSD card, and transmit the data via RS485 to a Raspberry Pi that uploads the data to the local server.
- Designed and built the Controls subsystem which receives commands to actuate solenoid valves and ignite e-matches to perform fill, launch, and abort procedures.
- Developed a PCB that confirms the solenoid states at the pad by utilizing optocouplers to bring down the 24V solenoid signals to 5V signals that can be processed and transmitted by the board's microcontroller.
- Programmed an auto-abort feature that safe-states each solenoid if communication between the pad and bunker is lost for over 30 seconds.
- Oversaw extensive testing of the Controls and Switchbox subsystems to ensure they consistently communicated and reliably controlled the Propulsion team's systems over several hour durations.

Hybrid Avionics Engineer

Jan 2023 - June 2023

- Contributed to the construction of an avionics system housed inside the nose cone that provided real-time GPS, altitude, temperature, and acceleration data.
- Designed and assembled a compact low-power PCB responsible for in-flight data collection and transmission through LoRa.
- Increased power conservation by building a pull-pin switch into the nose cone that could power on and off the avionics system after the rocket had been fully integrated.
- Wrote the transmission code of the main microcontroller, solving an interference issue between the GPS and transceiver by programming them to operate in offsetting intervals.
- Performed extensive testing to validate sensor readings, verify LoRa transmission range through noisy environments, and determine battery efficiency.

Skills

Design & Manufacturing

- SolidWorks to design parts for 3D printing.
- Autodesk Eagle and Fusion 360 to design electrical schematics and PCBs.
- PCB assembly involving SMD components.
- Manual lathe and mill.

Programming

- C++ and Java for large scale program development utilizing data structures and algorithms.
- Python for simulations and data analysis of propulsion tests and flight data.
- MATLAB for modeling and simulation of a variety of model rocket designs.