

Madison Urquhart - Avionics & Test Engineer

(817) 751-5135 | maddie@maddiebuilds.space | Costa Mesa, CA 92626

Portfolio - <https://maddiebuilds.space/>

California State University, Long Beach - Aerospace Engineering '28

Third-Year Aerospace Engineering student and [Award-Winning Photographer](#) who believes with enough effort & the right mindset anything is possible. She designs, assembles, and troubleshoots avionics, ground-support systems, and liquid rockets.

Experience:

- **Product Management Intern - Tom Sawyer Software** (May 2024 to Present):
 - Developed aerospace-related use case demonstrations for Tom Sawyer Perspectives, the company's graph and data visualization platform.
 - *One of my demonstrations was accepted to present at the INCOSE International Symposium 2025 (IS 2025).*
- **Club Officer - CSULB Beach Launch Team** (2024 to Present):
 - Led Mach Pumpkin, a world-record setting flight using an O3400 motor, launched at the Friends of Amateur Rocketry test site.
 - Built Peregrine A1, an analog broadcast onboard camera system for live in-flight video in the span of a month.
 - Managed club outreach & sponsorship acquisitions.
 - Documented the vehicle & associated test setups via photography & videography.

Projects:

- **Stardust - Personal Liquid Rocket** (Summer 2026 to Present):
 - Developed custom modular avionics, DAQ systems and designed recovery systems with current and future needs in mind.
 - Expected apogee of 25,000 ft & maximum velocity of Mach 1.4 using IPA/N2O.
 - Manufactured Composite Components and developed a plan for anodizing custom aluminum fins
 - Future flights will demonstrate throttling & active control capability.
- **Nerve - Modular Avionics PCB Family using CAN & Ethernet** (Fall 2026 to Present):
 - Designed motherboard with core flight functions (LoRa Telemetry, GPS, IMUs, Barometers, Magnetometer, Pyro, Ground Umbilical Connection) linked over CAN to expandable daughterboards for Valve Control, Pressure Sensing, Thermal Sensing, and Strain/Load Cell Sensing.
- **Wingin' It - Custom Avionics & DAQ PCB** (Summer 2026):
 - Designed and hand-assembled my first PCB: an ESP32-S3-based flight computer with LoRa telemetry, redundant IMUs/GPS/barometers, and PT, Thermocouple, and load cell inputs.
 - Traced USB enumeration failure to non-differential D+/D- routing and an off-nominal pressure-reading ceiling to under-rated clamping diodes; the fixed PT circuit behaved nominally during hydrostatic testing at Stardust's MEOP. Diagnosed hardware-fatal ESD issue. Lessons feed into Nerve.
- **Firebird - Vehicle Control & Data Acquisition Interface** (Summer 2026 to Present):
 - Designed a custom vehicle avionics interface that controls all vehicle functions via Ethernet pre-launch & LoRa in-flight to communicate with the Nerve system.
- **Peregrine A2 - Onboard Flight Camera** (Summer 2026 to Present):
 - Built system 4K30 local recording with simultaneous live NTSC analog broadcast built upon lessons learnt from previous work.

Skills:

- **Electronics:** PCB design (EasyEDA Pro, KiCad), fine-pitch SMD assembly & rework, board bring-up, ESP32, STM32, LoRa, I2C/SPI/CAN, DAQ, Avionics, Custom Connector Design, Root Cause Analysis.
- **Software & CAD:** Onshape (including FeatureScript), OpenRocket, Embedded C++ (Arduino), Python.
- **Manufacturing:** Composites (Fiberglass and Carbon Fiber), 3D Printing, Aluminum Polishing and Anodizing.
- **Other:** Project Management. 35mm & Medium Format Film Photography, Digital Photography, Portraiture.

Education and Relevant Coursework

B.S. Aerospace Engineering, California State University, Long Beach. Expected 2028

- **Coursework:** Flight Mechanics, Mechanics of Deformable Bodies, Aerostructures I, Statics, Engineering Dynamics, Differential Equations, Calculus II, Solidworks, Matlab, Kinematics, Electricity & Magnetism, General Chemistry, Economics, Public Speaking, Native American Studies, Intro to Theatre.