Alan Hsu

www.alanjhsu.com alanjhsu08@gmail.com

Senior at Thomas Jefferson High School for Science and Technology with experience in engineering and programming, interested in electrical engineering and aerospace

Skills

Electrical

- Schematic design and board layout with KiCAD
- Board assembly (SMD/THT), troubleshooting, modification, and revision
- Lab equipment including power supplies, DC loads, and oscilloscopes
- DC power electronics design, including power supplies and motor drivers
- Remote Control electronics, Pixhawk/Ardupilot, and LiPo safety

Programming

- OOP, automation, and machine learning using Python
- Microcontroller programming, AVR and ARM register manipulation, and optimization using C
- PID control loops, simple signal filtering, bitwise math, and low level hardware interfacing
- OS installation, terminal usage, package management in Raspberry Pi and Linux

Mechanical

- Experience with Fusion 360 and Solidworks
- Design for and fabrication with 3D printing, laser cutting, and aluminum extrusion
- Design of mechanisms and parts, as well as assemblies
- Materials selection for CubeSats

Academics and Awards

- 4.417 GPA
- 2022 National Merit Scholarship Finalist
- 2022 AIAA YPSE Mid-Atlantic Section Best High School Presentation

Activities and Experience

TJ UAV Club

Avalon Electronics Lead September 2021 - Present

- Avalon is an autonomous aircraft with air dropped payload, imaging system, and data downlink which placed 23rd in the 2022 SUAS competition and will compete in SUAS 2023
- Designed and built two iterations of the aircraft's electronics bay, which achieves autonomous flight with a Pixhawk 2.4.8 and image processing with a Raspberry Pi 4
- Designed, fabricated, and iterated twice upon a self stabilizing camera gimbal, tuned camera settings, and developed code for automated image capture and retrieval using gphoto2
- Performed CAD, fabrication, and assembly for other parts, including wing ribs, landing gear, and fuselage covers
- Managed budgeting for hardware purchases
- Handled electronics in the pits and on the flight line at the 2022 SUAS competition
- Planned flight and meeting tasks and oversaw flight line operations at test flights

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TJ Space Program, formerly Nanosatellite Club

Senior Advisor, August 2022 - Present

- Attended the 2022 Small Satellite Conference and presented technical details about TJREVERB, the club's 2U CubeSat
- Led efforts to prepare for TJREVERB deployment and mission operations
- Designed, built, and iterated on a Raspberry Pi and Iridium based CubeSat bus using experience from TJREVERB to provide a low cost and easy to use platform for future missions

TJREVERB Technical Lead, August 2021 - July 2022

- TJREVERB is a 2U CubeSat project established in 2016 and deployed on December 29, 2022, determining the feasibility of Iridium Short Burst Data as a telemetry radio for CubeSat missions
- Wrote and tested low level hardware drivers for the electrical power system, radios, and IMU
- Brought flight computer PCB design from unfinished to flight ready
- Developed all aspects of the Iridium SBD communications system, including a hardware driver for the 9602 modem, protocol design, and ground station backend
- Designed a radio data encoding system, including custom 3 byte float encoding, to more efficiently send numerical data compared to string encoding
- Contacted hardware manufacturers for testing data on the antenna deployer, solar panels, and battery, and provided updates on safety data and bill of materials to our launch provider, Nanoracks
- Documented issues and proposed solutions in a best practices document to benefit future missions
- Performed final assembly, oversaw final testing and delivery to NASA in July

Balloon Project Electronics Team Member, September 2020 - June 2021

- Balloon project was a tethered weather balloon to measure 5G signal strength at various altitudes
- Designed the interface PCB and worked with CAD team to ensure fit

Starpath Robotics

Electrical Engineer Intern, June - August 2022

- Starpath is a San Francisco startup designing and building rovers to collect water ice on the Moon and Mars, and submitting its design to the NASA Break the Ice Challenge
- Responsible for all electronics design and assembly for third and fourth Rover iterations, including transitioning from servos to stepper motors and brushed drive motors to brushless, mechanical electronics bay design in Solidworks, cable harness assemblies, and PCB designs for power management

Personal Projects

More information about my personal projects and a few of my contributions to school teams is available at https://www.alanjhsu.com/projects