Alan Hsu

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Last updated 8/22/23

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Freshman at Purdue University with experience in engineering and programming, interested in electrical engineering and aerospace and passionate about rapid prototyping and fast iteration cycles

Work Experience

Starpath Robotics Electrical Engineer Intern - June 2023 - Aug 2023 (6 Weeks, San Francisco)

- Designed and manufactured motor controller interface PCB, shielded motor harnessing, and BMS system for rovers designed to collect water ice on the moon
- Used KiCAD to design PCBs and Solidworks to design dust sealing parts and to ensure mechanical compatibility

Starpath Robotics Electrical Engineer Intern - June 2022 - Aug 2022 (8 Weeks, San Francisco)

- Designed and manufactured harnessing, power electronics, and avionics PCBs for early rover designs
- Used KiCAD to design PCBs and Solidworks to design small mechanisms to be 3D printed
- Contributed technical documentation to Starpath's NASA Break the Ice Challenge technical paper submission

Teams

TJ UAV Club Team Captain / Electronics Lead - Sept 2022 - June 2023

- Oversaw overall project development for Avalon X, a fixed wing aircraft which competed in the 2023 SUAS competition.
- Led flight line operations, safety, and logistics during testing and at the 2023 SUAS competition
- 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

TJ UAV Club Electronics Lead - Sept 2021 - June 2022

- Developed wiring and avionics for Avalon Mk3.5, a fixed wing aircraft which competed in the 2022 SUAS competition
- Designed parts for 3D printing and laser cutting on the airframe

TJ Space Program Senior Advisor - Sept 2022 - June 2023

- 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
- Worked with underclassmen in the club to transfer knowledge and ensure viability of future projects

TJ Space Program TJREVERB Technical Lead - Sept 2021 - Jan 2023

- 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
- Led technical development of electrical hardware and low level programming, including hardware drivers for the electrical power system and radios, a custom flight computer PCB design, and custom communications and data encoding system for the Iridium SBD radio
- Discussed mission ConOps scope and provided technical documentation to launch providers
- Assisted in final assembly, vibration testing, and brought the satellite to Houston for final integration into the Nanoracks deployer
- Oversaw mission operations after deployment, including attempts for initial contact

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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
- Shielded wire harnessing

Programming

- OOP, automation, and machine learning using Python
- Microcontroller programming, AVR and ARM register manipulation, and optimization using C
- Basic 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, parts, and assemblies
- Vacuum materials selection for CubeSats

Education

- Graduated Thomas Jefferson High School for Science and Technology with a 4.450 weighted GPA, class of 2023
- Currently attending Purdue University for First Year Engineering
- 2022 National Merit Scholarship Recipient

Advanced Courses

- Multivariable Calculus, Linear Algebra, Differential Equations, Complex Analysis
- Artificial Intelligence, Machine Learning
- Robotics, Prototyping, Electronics, Combined Engineering Research Lab
- History of Science

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