

Alec Letsinger

Active Secret Clearance

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Experience

Hardware-in-the-loop Engineer, Air Force Research Labs – Eglin AFB, FL August 2022 – Present

- Led the development of critical test technologies to support current customer test requirements such as celestial and magnetic navigation.
- Supported various hardware-in-the-loop test efforts including real-time embedded software development, system interfacing, and hardware instrumentation.
- Rapidly prototyped and delivered software with a team to support numerous mission essential projects.
- Mentored multiple young engineers including both high school students and college professionals.

Graduate Researcher, Bio-Inspired Perception/Robotics Laboratory– Boulder, CO August 2023–Dec 2024

- Developed Python framework to leverage neural networks to optimize open-loop system sensing architectures to complement system dynamics leading to increased robustness and closed-loop performance.
- Integrated this framework on robotic systems in simulation to validate results.

Mechanical Engineering Intern, Air Force Research Labs – Eglin AFB, FL June 2020 – August 2021

- Developed a digital twin of novel optical steering system to aid in control scheme development and verification before hardware integration.
- Aided in the integration of a passive radar system on ARM processors using software defined radio.

Undergraduate Research Assistant, GAVLAB – Auburn, AL January 2019 – May 2020

- Developed deep neural network architectures using Python to forecast flight motion trajectories in real time to supplement forward dynamics model in Kalman filter for state estimation.

Education

University of Colorado Boulder, MS in Mechanical Engineering: Robotics focus Aug 2023 – Dec 2024

- GPA: 4.0/4.0
- Coursework: Statistical State Estimation, Advanced Robotics, Decision Making under Uncertainty, Machine Learning/AI

Auburn University, BS in Mechanical Engineering, Minor in Computer Science Aug 2018 – May 2022

- GPA: 3.9/4.0

Projects

Pokemon Red Reinforcement Learning

- Implemented a PPO Reinforcement Learning Algorithm to learn to play Pokemon Red using Pytorch (Python) and Tensorboard. Best performing agent learned to progress significantly through the game.

Autonomous Remote Control Car

- Developed an autonomy stack for AWS DeepRacer RC Car using ROS2. Used an extended Kalman filter and OpenCV image processing for state estimation to perform SLAM, informing navigation decisions.

Skills

Languages: Java, Python, C++ , C, MATLAB, Julia

Software: Unix, Git, MySQL, Robot Operating System (ROS), Simulink, TensorFlow, OpenCV, NI Multisim, LabView, Solidworks, Docker, Microsoft Office

Additional Skills: bash scripting, computer networking, machining, programming language acquisition, state estimation, perception, algorithmic decision making, AI/ML, soft skills

Publications

- Cartesian blind spot correction using two non-equal Risley elements** 2021
Joshua K. Lentz, *Alec W. Letsinger*
Appl. Opt. 60, G49-G54
- Reflexive Actuation Technology for Robust Autonomous Flight Control** 2024
Rhoe A. Thompson, Paul R. Mackin, Alec W. Letsinger, J. Sean Humbert