Alex Fraley

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Summary

Robotics engineer specializing in **UAV testing, AI-driven perception, and autonomous systems**. Expert in robotic standards, AI/ML for robotics, flight testing, simulation modeling, and test method development. Proven track record in **federal, military, and emergency response robotics applications**.

Professional Experience

National Institute of Standards and Technology (NIST)

📅 *Dec 2023 – Present* | **Robotics Research Engineer**
📅 *Sept 2022 – Dec 2023* | **Federal Intern, Pathways Program**
📅 *June 2020 – Aug 2022* | **Associate, Professional Research Experience Program (PREP)**

- Developed **standard test methods** for aerial, ground, and aquatic robots.
- Led a **30+ agency collaboration** on bulk drone purchase agreements.
- Designed and validated **wildfire suppression UAV tests** for XPRIZE Wildfire.
- Built a **drone carrier release system** for UAV drop testing.
- Developed AI-enhanced UAV **thermal imaging analysis** (YOLO-OCR).
- Managed NIST's UAV fleet, ensuring compliance with **RID & Blue/Green UAS** standards.
- Conducted **UAV flight testing** for LiDAR accuracy, thermal sensor validation, and obstacle avoidance.
- Created **3D CAD models** of UAV test environments and integrated them into simulators.

Education

🎓 **University of Maryland, College Park**
B.S. Aerospace Engineering *(2023)*

- Team VULCAN – Drone Design Team (2021)
- NASA Artemis Astronaut VR Interface Project (2021)
- Terps Racing – Electronics Team (Formula EV)
- NASA Goddard Space Flight Center: Team O.U.T.L.I.E.R. (2023)

🎓 **Montgomery College**
A.S. Aerospace Engineering *(2020)*

Publications & Research

📝 **Research Papers**

- [Adapting NIST Aerial Drone Tests for Thermal Identification, Inspection, and Suppression](#)

- *Evaluating 3D Indoor Mapping Capabilities of UAS for First Responder Applications (upcoming)*

- *Outdoor sUAS Drop Tests: Assessing Dynamics, Velocity and Impact Forces of Falling Drones (upcoming, NIST IR)*

📰 **In the News**

- *Drones in Disaster Zones: How Advanced 3D Mapping Technology Can Help First Responders Save Lives*

- *Congress Meets Robots: CRA Co-hosts Senate Robotics Showcase and Demo Day*

- *ICRA 2023 & IROS 2024 Autonomous Quadruped Robot Challenges*

- *Texas Public Safety Robotics Summit*

- *UTAC & RoboCup Rescue Reports*

Technical Skills

- 🔹 **Flight Testing & Robotics**: UAV & sUAS Test Development, Sensor Calibration, Robot Dexterity & Performance Testing
- 🔹 **Software & AI Development**: Python, C++, MATLAB, ROS 2, Unity, Machine Learning (YOLO, OpenCV, OCR)
- 🔹 **Hardware & Embedded Systems**: NVIDIA Jetson Nano & Orin Nano, DJI Drones, Legged Robotics (Unitree GO2)
- 🔹 **CAD & Engineering**: SolidWorks, Google SketchUp, 3D Printing & Rapid Prototyping
- 🔹 **Collaboration & Documentation**: Technical Writing (SOPs, JHAs, Research Papers)

Certifications & Awards

✅ **FAA Part 107 Certified Drone Pilot**
🏆 **Gilman Scholar** (U.S. Department of State, May 2022)
🥇 **Dean's List – A. James Clark School of Engineering** (Feb 2021)
📜 **Robot Localization with Python and Particle Filters** *(Coursera, Sep 2024)*
🧑‍🏫 **Advanced sUAS Course Proctor**

Additional Experience

🚁 **Drone Pilot – DroneASAP** *(Freelance, 2020 – Present)* – Conducted aerial surveying, inspections, and real-time UAV data collection.

🔋 **Electric Vehicle LV Team Member – Terps Racing** *(2023 – 2024)* – Designed & integrated low-voltage electrical systems for Formula EV race car.

📏 **Land Surveyor – Snider and Associates** *(2019 – 2020)* – Performed geospatial mapping and surveying.