Ralph Quartiano

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Education

Penn State University — State College, PA
Bachelor of Science in Aerospace Engineering (Autonomy Focus) — *Class of 2023*
- *Relevant Coursework: Aerospace Autonomy, Aircraft Stability & Controls, Orbital Mechanics*

Georgia Institute of Technology — Atlanta, GA (Remote)
Masters of Science in Computer Science (Perception & Robotics Focus) — *Expected Grad. 2027*
- *Relevant Coursework: Bayesian State Estimation, Kalman Filters, Motion Planning*

Experience

Modeling & Simulation Engineer III (Wargaming) — June 2025 – Present
True Anomaly — *Long Beach, CA*
- Built and deployed geostationary rendezvous-proximity operation (RPO) **wargame simulation environment** to drive **tactics, payload**, and **platform** development in **ISR**, target prosecution, and space domain awareness applications
- Architected and executed both **parametrized operational analyses** and **human-in-the-loop exercises** with USSF operators to validate strategies and theories of victory, derive figures of merit, and ideate new products
- Implemented a low-fidelity, compute-efficient **attitude dynamics model** which enabled mission analysts to simulate ISR operations against a **non-cooperative target** performing evasive slews and maneuvers
- Designed and integrated an image quality estimation system with realistic geometric constraints, target illumination, and performance of various **EOIR** payloads for evaluation and optimization of inspection trajectories
- Responsible engineer for **event-based imaging** and orbit determination payload; developed software CONOPs and wrote post-processing algorithms; conducted radiation testing to flight-qualify for mission environment

Software Engineer for Advanced Computing (AI Division) — July 2023 – June 2025
Carnegie Mellon University Software Engineering Institute — *Pittsburgh, PA*
- Profiled & benchmarked **signal intelligence** ML application on NVIDIA Orin GPU to identify algorithms with acceleration potential and develop test harness
- Designed, trained, and synthesized neural network for **RF modulation classification** on FPGA using PyTorch, ONNX, and open-source HLS tooling, speeding up inference by 25% at reduced power consumption
- Refactored PyTorch convolutions into overlap-add FFTs for 3x speedup on **digital signal processing** ASICs
- Utilized neural network optimization and **quantization** tools in TensorRT to reduce size of YOLO **object-detection** models by over 4x and convert algorithms from Python scripts into C++ executables

GNC Engineering Intern (ADCS, Starshield) — May 2023 – July 2023
SpaceX — *Hawthorne, CA*
- Performed single & multi-component **fault tolerance testing** of satellite attitude determination & control systems (ADCS) using **Monte Carlo** techniques in **6-DoF C++ simulations**
- Identified attitudes in which **magnetorquer**-based angular momentum desaturation system is underactuated and orbital trajectories in which **star tracker** attitude determination system has severely reduced visibility
- Analyzed torque envelopes of various reaction wheel failure modes to update safety thresholds in MATLAB

Autonomy Engineering Intern — May 2022 – August 2022
Palski & Associates Satellite Engineering — *Colorado Springs, CO*
- Trained **collaborative, autonomous** satellite agents for RPOs in geostationary orbits with several **reinforcement learning** techniques including Proximal Policy Optimization, Deep Q-Learning, and actor-critic methods in **Julia**
- Developed 6-DoF simulation environment with realistic orbital mechanics and satellite performance, allowing agents to autonomously find desired orbit trajectories and calculate thruster burns required to enter them
- Combined Julia's **multiprocessing** capabilities with Linux virtual machines running on company servers to reduce training times by over 50% and allow for longer training runs while out of the office

Systems Engineer — November 2019 – January 2021
NASA (Oasis Project, 2020 BIG Idea Challenge Finalist) — *State College, PA*
- Led development & testing of laser spectroscopy instrument for lunar rover with 20+ engineers and $145K budget
- Utilized **systems-engineering** methodology throughout design life cycle while adhering to NASA requirements

Technical Skills

Languages (Libraries): Python (PyTorch, Tensorflow, ONNX) , C/C++ (OpenCV), Matlab (Simulink), Julia
Developer Tools: Git, Docker, Linux, CMake/Bazel
Hardware: GPU Programming, HLS for FPGAs, Multiprocessing