Truman DeWalch

Conjunction Analysis, Transfer Planning, and Mission Software
Aerospace Engineering Ph.D. Candidate
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SUMMARY

Aerospace Engineering Ph.D. candidate building Python, Rust, and C++ software for conjunction analysis, transfer planning, and mission design.

SELECTED EXPERIENCE

MTS Graduate Intern | The Aerospace Corporation | Northern Virginia / Remote | May 2023 – Nov 2025

- Built a bistatic radar sensor model for an enterprise mission-analysis environment.
- Led a 5-person systems engineering sub-team across mission architecture research deliverables.
- Connected legacy tools so analysts could run high-level trade studies in one workflow.

Graduate Research Assistant — Just-In-Time Collision Avoidance | Virginia Tech | Blacksburg, VA | Sept 2023 – Present

- Built Python, Rust, and C++ software for orbit determination and conjunction analysis across 30+ satellite scenarios.
- Developed a mixed-fidelity workflow and reproducible 1,000-event LEO conjunction bank for evaluation, benchmarking, and publications.
- Compared optimizer families and deployer constellations under matched budgets, shared event evidence, and common scoring rules.

Graduate Research Assistant — Eclipse Transient OD | Virginia Tech | Blacksburg, VA | Sept 2022 – Oct 2023

- Designed a modular Python simulation architecture for eclipse-based autonomous navigation studies.
- Built a statistical atmospheric model from real climate data and applied Unscented Kalman Filters to estimate orbital state from eclipse-transient measurements.

Graduate Student Intern | TrustPoint GNSS | Northern Virginia | May 2022 – Dec 2022

- Created high-fidelity models of satellites, ground stations, and onboard clocks for GNSS simulation.
- Implemented EKF and Batch Least Squares methods and integrated TDOA, FDOA, and geometric-range measurements.

TECHNICAL SKILLS

Programming: Python, Rust, C++, C, MATLAB, Fortran, Julia
Technical Areas: Orbit determination, Kalman filters (UKF, EKF), conjunction analysis, optimization, Monte Carlo simulation, statistical atmospheres
Core Tools: Git, Linux/Unix, STK, Jira, Confluence, LaTeX

EDUCATION

Ph.D., Aerospace Engineering | Virginia Tech | Blacksburg, VA | Aug 2022 – May 2026 (Expected)
Focus: High-fidelity orbit determination, conjunction risk modeling, and statistical atmospheres.
B.S., Aerospace Engineering | Virginia Tech | Blacksburg, VA | Aug 2018 – May 2022

PUBLICATIONS

5 conference papers, 3 first-author. Selected first-author publications:

- Stochastic Optimization Techniques for the Design of JCA Constellations (AIAA 2026-2595)
- Dispersion of Targeted Orbital Dust Clouds: Applications to JCA (AAS 24-496)
- Enhancing Eclipse Transient Orbit Determination Methods with Statistical Atmospheric Models (AIAA-2024-0429)