TRUMAN DEWALCH

Conjunction Analysis, Transfer Planning, and Mission Software

Aerospace Engineering Ph.D. Candidate

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PROFILE

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

SELECTED EXPERIENCE

May 2023 – Nov 2025

MTS Graduate Intern

The Aerospace Corporation • Northern Virginia / Remote

- 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.

Sept 2023 – Present

Graduate Research Assistant — Just-In-Time Collision Avoidance

Virginia Tech • Blacksburg, VA

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

Sept 2022 – Oct 2023

Graduate Research Assistant — Eclipse Transient OD

Virginia Tech • Blacksburg, VA

- Designed a modular Python simulation architecture for eclipse-based autonomous navigation studies.
- Built a statistical atmospheric model from real climate data and presented the resulting approach at AIAA SciTech 2024.

TECHNICAL SNAPSHOT

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

EDUCATION

Aug 2022 – May 2026 (Expected)

Ph.D., Aerospace Engineering

Virginia Tech — Blacksburg, VA

Focus: high-fidelity orbit determination, conjunction risk modeling, and statistical atmospheres.

Aug 2018 – May 2022

B.S., Aerospace Engineering

Virginia Tech — Blacksburg, VA

SELECTED PUBLICATIONS

FIRST AUTHOR

2026 *Stochastic Optimization Techniques for the Design of JCA Constellations* (AIAA 2026-2595).

2024 *Dispersion of Targeted Orbital Dust Clouds: Applications to JCA* (AAS 24-496).

2024 *Enhancing Eclipse Transient Orbit Determination Methods with Statistical Atmospheric Models* (AIAA-2024-0429).

SECOND AUTHOR

2025 *Statistical Evaluation of Dust-Based JCA Systems and Policies* (AAS 25-770).

2023 *Orbit Determination via Eclipse Transient Timing: Improved Methods and Intensity Models* (AAS/AIAA SFM).