MASON W. DUNSMUIR

AEROSPACE ENGINEERING

EDUCATION

Embry-Riddle Aeronautical University — Daytona Beach, FL
Bachelor of Science, Aerospace Engineering — 2020 – 2025
Minor: Computational Mathematics — GPA: 3.21/4.00
Concentration: Rocket Propulsion

SKILLS & CERTIFICATIONS

CATIA V5 Specialist – Mechanical Designer (Dassault Systèmes) — Credential ID: C-U6FH7JM9BP — Mar 2025 – Present
CATIA V5 Specialist – Mechanical Surface Designer (Dassault Systèmes) — Credential ID: C-ERMX2F6SLU — Mar 2025 – Present

Engineering Software: MATLAB 2025a, Simulink, Python, C++, CATIA V5, NX Siemens, NASTRAN, ANSYS
Sensor & Connector Systems: Pressure Transducers, Signal Conditioning, DAQ, CFRP/Nylon, PEEK
Modeling & Simulation: GNC Simulations, Monte Carlo Analysis, HIL, STK
Data Analysis & Illustration: Gantt Charts, Power BI, Tableau, Signal Processing, FMEA
Flight Software & Embedded Systems: C, C++, MATLAB/Simulink, Control Algorithm, Avionics Interface
Fabrication: CNC Machining, Manual Lathe, Laser Cutting, NDT&E, Composite Prototyping, Lost PLA Vacuum Casting

RELEVANT WORK EXPERIENCE

Federal Aviation Administration - Aviation Safety (AVS) Student Intern — Aug 2024 – Dec 2024
Assisted in robotic process automation (RPA) implementation for AIR-951 to maintain efficient certification processes. Supported in the implementation of a cloud-based database for tracking certification compliance and operational procedures. Shadowed activities in the Workforce Development Branch AIR-940 to expand skillset and understanding of federal workflows and procedures.

PROJECT EXPERIENCE

Shock Tube Optimization – "Design Build Test" Data Acquisition & Analysis | Shockwave Development — Jan 2025 – Apr 2025
Designed and integrated pressure transducers and data acquisition systems for shockwave measurement. Collaborated with machinists to resolve CAD-to-CNC compatibility issues, price quoting, and delivery estimates during shock tube test section fabrication. Adapted CATIA models and design tolerances with manufacturing constraints. Conducted signal processing analysis for data extraction.

Senior Capstone: RCS (Reaction Control System) Lead | GNC & Thruster Configuration — Jan 2025 – Apr 2025
Led thruster placement, CATIA V5 subsystem design, and control optimization for the Reaction Control System (RCS) on a multi-stage Mars mission. Conducted orbital mechanics simulations to ensure precise maneuverability and docking capabilities. Integrated feedback control algorithms and assessed sensor placement for optimal attitude determination.

Advanced Engine Assembly & CAD Optimization – CATIA V5 Specialist | Model-Based Systems — Jan 2025 – Apr 2025
Designed and modeled parametric components for a four-cylinder combustion engine, utilizing Generative Shape Design (GSD). Implemented assembly optimization techniques to improve ease of manufacturing and design flexibility. Conducted FEA analysis on components to verify structural performance under varying loads and kinematic scenarios.

TECHNICAL LAB EXPERIENCE

AE 443L – Dynamics and Controls | Embedded Systems — Jan 2025 – Apr 2025
Toolchain: MATLAB, Simulink
Focus: GNC system modeling and control law development
Tuned linear controllers for aerospace systems, verified response with root locus and Bode plots. Modeled state-space form and applied compensation techniques relevant to GNC.

AE 316L – Aerospace Materials and Manufacturing Applications — Aug 2024 – Dec 2024
Toolchain: MATLAB, Instron Testing System
Focus: Structural and thermal analysis of aerospace components
Evaluated aerospace-grade composites under fatigue, vibration, and thermal loading. Applied NDE/NDT methods including VT, PT, UT, and IR to assess material behavior under aerospace loading conditions.

AE 315L – Experimental Aerodynamics — Aug 2023 – Dec 2023
Toolchain: MATLAB, Transonic Wind Tunnel Instrumentation
Focus: Subsonic pressure distribution and aerodynamic loading
Collected wind tunnel data across airfoil geometries. Used MATLAB to generate Cp plots and identify boundary layer behavior.

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INDEPENDENT ENGINEERING PROJECTS

Additive Manufacturing & Functional Prototyping Dec 2024 – Present

Designed and fabricated tolerance-sensitive components using CATIA-driven STL workflows and FDM printing. Projects include annealed frames, epoxy-impregnated lattice structures, and casting-ready geometries. Focused on thermal deformation, moisture behavior, and adhesion in PLA Pro, with research-based analysis of PLA+, CF Nylon, and composite polymers. Integrated lost PLA and vacuum casting workflows and applied material science principles to evaluate Inconel 625 for nozzle backing applications.

LEADERSHIP & INVOLVEMENT

Phi Delta Theta Fraternity Fall 2024 – Present

Actively participated in chapter events, philanthropy for ALS, and student leadership development. Supported campus service initiatives and promoted the Fraternity's core values of friendship, sound learning, and rectitude. Advised newer students of opportunities and challenges in their upcoming semesters.

STEM Outreach Club ERAU – Public Relations & Community Engagement Fall 2022 – Present

Led public relations for STEM engagement events at Embry-Riddle and Volusia County schools. Supported outreach through presentations, hands-on demos, and student-coordinated STEM initiatives.

CFBAA & NBAA YoPro – Business Aviation Engagement Fall 2022 – Present

Attended networking events, safety symposiums, and professional development sessions with A&P technicians, engineers, pilots, and Gulfstream operations teams. Participated in NBAA YoPro activities focused on connecting young professionals with industry leaders in business aviation.

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