Jeffrey Filer

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OBJECTIVE

AE Senior in 4+1 master's program seeking a summer internship or full-time role starting in May/June with a focus on systems, aerodynamics, structures, mission analysis, optimization, and/or component design for aircraft/UAVs/hypersonics. Looking to apply extensive technical and programmatic project experience from founding multiple design teams.

EDUCATION

B.S. Aerospace Engineering & Math Minor | GPA: 3.83 | Virginia Tech | Expected graduation: May 2026

Relevant Coursework Aerospace Structures, Compressibility, Optimization, Vector & Complex Analysis, Manufacturing Processes, Air-Vehicle Dynamics, Management Theory, Astromechanics

SKILLS & CERTIFICATIONS

SolidWorks	STARCCM+ CFD	FAA PART 107	L1 High Powered Rocketry Certification
Fusion 360	Python / Java / MATLAB	OpenVSP / XFLR 5	Prototyping & Shop Tools
Siemens NX	Linux / VBA / C#	Jira / Confluence / Slack	CNC Machining & 3D Printing

PROJECT EXPERIENCE

Project Manager | Launch & Recovery Lead *October 2023 – Present*

MachWorks Design Team | 70 undergraduates working to create a high-speed, jet-powered UAV

- Developed outermold line, ran stability analysis, and optimized a 220mph, jet-powered UAV design
- Organizing team structure, budget, and goals. Secured over $20k in sponsorship funding.
- Utilizing systems engineering approach to breakdown problem and create design documentation
- Led research and preliminary analysis for recovery systems for a supersonic UAV design

President | Mentor | Mechanical Team Lead *October 2022 – May 2024*

Gobble Rockets Design Team | Hands-on rocketry experience for freshman & sophomores for a competition

- Founded team. Grew club from 10 to 40 members, created schedules, and raised 10k in funding
- Managed three teams, led skill development, and ran trainings in CAD, systems engineering, and prototyping
- Led team of 10 in building a high-powered rocket under strict project and schedule limitations

WORK EXPERIENCE

Project Management Intern *Summer 2025*

Relativity Space | Building Terran R, a reusable heavy lift rocket, and expanding the future of W-DED manufacturing

- Coordinated across teams and developed automated tools to streamline feature identification, cost estimation, and information accessibility to reduce costs, expand capability, and inform business decisions.
- Engaged with WDED & space sector to gain exposure in metallography, welding, rocket structures, and project design
- Developed experience with NX part design & assemblies, C# programming, Confluence, and Jira

Hypersonic CFD Researcher *May 2024 – Present*

Virginia National Security Institute | Research for Defense & Intelligence Communities

- Utilizing STARCCM+ CFD simulations to analyze the impact of surface defects on scramjet performance
- Present weekly research updates, communicate with industry partners, and use MATLAB for data analysis
- Used Java to automate simulation process and Linux to run over 100 high memory cases
- Ran unsteady, turbulent, multi-component gas simulations with adaptive mesh refinement

Undergraduate Lab Technician *August 2023 – Present*

Virginia Tech FRITH Lab | Engineering lab open to freshman students to develop their creative projects

- Teach operation of CNC machines, laser cutters, wood-shop equipment, and 3D printers to ~60 people/year
- Utilize personal design skills and manufacturing experience to create prototypes and personal projects

Ranger *Summer 2023*

Philmont Scout Ranch | High adventure backing program in New Mexico with 140,177 acres of wilderness

- Safely led 104 participants through the backcountry, taught key skills, and trained for emergencies
- Worked with 1000 other staff to provide life changing experiences to 17k people

HONORS

Eagle Scout of the Year, 2022 (Arizona American Legion) Virginia Tech Dean's List Fall 2022 - Spring 2025

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Projects & Experiences

CFD Analysis of Manufacturing Defects in Hypersonic Flows

What

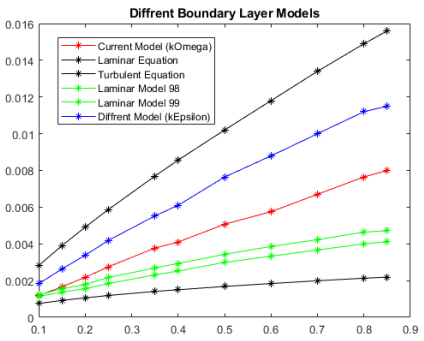
Applied CFD knowledge to investigate the impact of manufacturing tolerances within a scramjet isolator. Regularly presented results to Northrop Grumman.

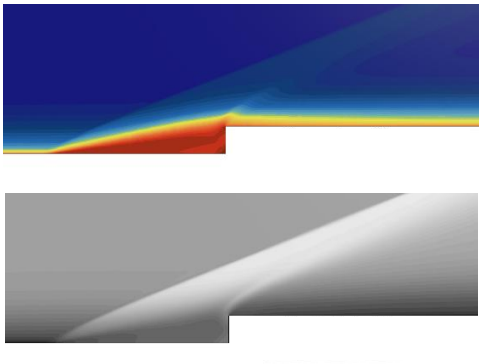
How

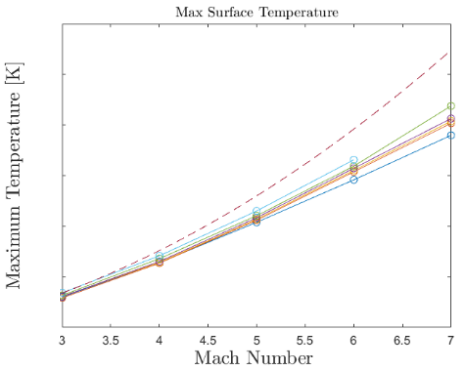
Utilized STARCCM+ to run simulations, used high-powered computing clusters to run over 100 simulations across a range of conditions, and completed data analysis using MATLAB.

Results

Identified and reported key trends in temperature, drag, and boundary layer phenomenon in a paper to the customer. Over delivered 30 data points compared to the initial 9 required. Expanding research for AIAA conference paper in January.







3D Printed Wing Structure for Robust Plane Design

What

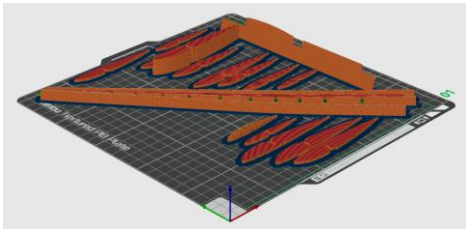
As part of a personal project to develop a robust, light-weight, 3D-printed plane, I created a prototype wing of the structure to verify strength & weight predictions.

How

Utilized beam theory calculations to develop MATLAB program to identify required I-beam height for a range of flight conditions. Used Fusion360 to create model and printed on a Bambu P1S 3D printer.

Results

The prototype structure withstood loads exceeding five times the predicted aircraft weight. Helped in identifying key areas for weight reduction to meet required margins.



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Aircraft Outermold Line Design for a High-Speed Jet Powered Aircraft

What

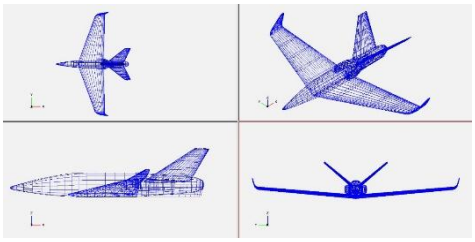
Developed an outermold line for a jet powered UAV designed to fly at 220mph, weighing ~25 lbs, with a stall speed under 30mph. Applied aircraft design fundamentals for surface sizing and airfoil choice.

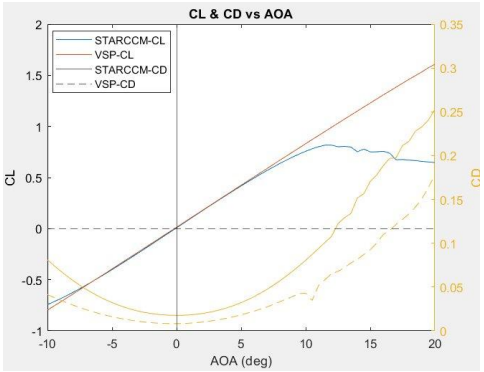
How

Utilized OpenVSP and XFLR for panel method analysis of geometry to iterate on design towards design criteria. Compared results to STARCCM+ CFD results and verified aircraft stability.

Results

Developed an optimized outermold line which met all requirements with maximized internal volume and ease of manufacturing. Geometry is the base for a new engineering team aiming to fly the design.





Engineering Team Design: MachWorks

What

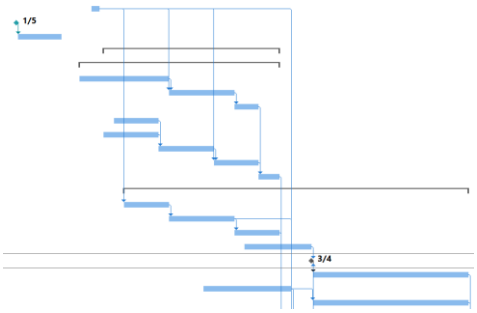
Founded aircraft design team at Virginia Tech to build high-speed, jet powered, UAVs. As Project Manager, responsibilities included scheduling, budgets, task breakdown, running meetings, and training.

How

Used MS Project to develop clear schedules, budgeted using excel, and organized task communication. Developed a strong group cohesion, motivated members, and secured more than $20k in funding.

Results

Team rapidly grew to 70 members and is concluding Critical Design Review in preparation for flight in April 2025. Developed fuel tank designs, optimization programs, and manufacturing processes.



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High-Powered Competition Rocket

What

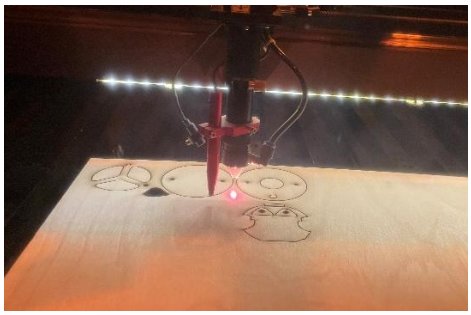
Led a 7-person team in designing, manufacturing, and flying a 6ft high-powered rocket. Designed an attitude target system and passively deploying landing legs.

How

Quickly iterated complex design using SOLIDWORKS. Used laser cutters, wood shop tools, and 3D printers to manufacture vehicle. Developed a program to predict rocket apogee with drag system.

Results

Placed 3rd during competition in Minnesota with rocket safely recovered after hitting an altitude above 1000 feet. Due to an ejection charge malfunction, landing legs were not deployed.



CNC Machined Balsa Wood Glider

What

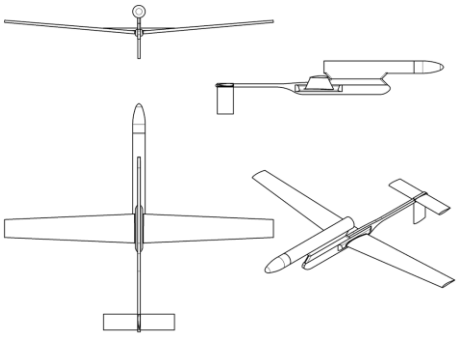
Led design and manufacturing of balsa wood glider for a class project with design goal of maximizing flight time. The glider would be boosted by a 1/2A rocket motor.

How

Used OnShape to iterate geometry, applied core aerospace principles for design, and created CNC tool paths using Fusion360. Used Tormach 1100MX CNC machine for wings and laser cutter for the body.

Results

Achieved a flight time of 13 seconds and recovered glider with no damage. The final design had high strength compared to a low weight and slow stall speed.



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Custom Genetic Optimization Code for OpenRocket

What

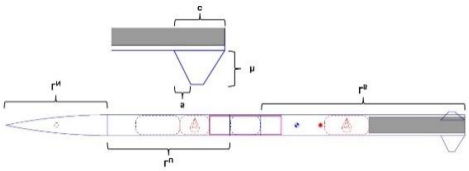
Developed custom code to integrate Python & OpenRocket to enable genetic optimization with any range of potential design variables with the purpose of joint optimizing altitude and cost.

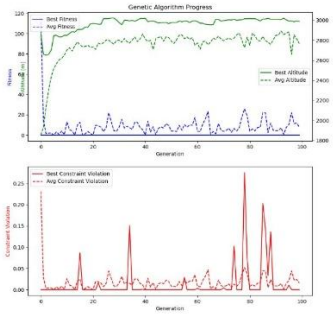
How

Wrote over 600 lines of Python to use orlab package to run simulations and edit geometry XML files. Wrote custom golden section and genetic optimization functions. Focused on program flexibility and robustness.

Results

Reached optimum design and demonstrated the program's ability to rapidly converge on a stable solution. Within the project group, the design had the highest altitude.





Ground Assisted Hypersonics MATAB Guidance Simulation

What

Completed personal project to explore high-speed vehicle dynamics, characterize vehicle performance, and write custom PID controllers.

How

Used online mesh of the X-43, the Newton Method for simplifying supersonic aerodynamics, and implemented strategies for code speed to enable optimization.

Results

Demonstrated ability for the vehicle and PID controller to track a wide range of provided guidance paths. Found limits of vehicle performance.