Alexander Burns

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EDUCATION

University of California, San Diego   **San Diego, CA**
B.S. Aerospace Engineering – Double Specialization: Astrodynamics, Controls | Cumulative GPA: 3.95/4.00   *Expected June 2026*
Relevant Coursework: Aerodynamics, Aerospace Structures, Computational Fluid Dynamics, Controls, Fluid Mechanics, GNC, Heat Transfer, Material Science, Orbital Mechanics, Propulsion, Space Propulsion, Solid Mechanics, Thermodynamics, Vibrations

PROFESSIONAL EXPERIENCE

Planet Labs   **San Francisco, CA**
Intern, Spacecraft Systems Engineer   *June 2025 – September 2025*
- Shifted spacecraft risk posture from assumption-driven to data-driven by implementing a new risk tracking workflow dependent on continuous verification and validation, enabling earlier decisions and tighter design margins across the Pelican Block II program.
- Validated that previously un-characterized ferromagnetic materials on the Block II payload had insignificant impact on GNC control authority and satellite pointing by modeling theoretical fields in **FEMM** and computing an equivalent magnetic dipole moment.
- Supported the SQM build campaign by performing root-cause corrective analysis (RCCA) during vibration and TVAC tests, identifying root causes of response shifts and modeling system behavior in **MATLAB** and **Python** to validate design margins.
- Developed a spacecraft power and drag simulation framework to evaluate generation and consumption profiles for LEO imaging satellites, accounting for sun fraction, attitude slews, operations, and GEO relay pointing constraints. Integrated results with Monte Carlo derived drag parameters from **OpenFOAM** to evaluate GEO pointing implications on lifetime prop consumption.

Viasat   **Carlsbad, CA**
Intern, Satellite Operations Specialist   *June 2023 – June 2025*
- Designed a Python-based operations tool to mitigate TT&C RF disruptions by automatically detecting potential frequency interferences, alerting operators, and generating corrective slew procedures to maintain reliable satellite command and control.
- Performed trajectory optimization with the Flight Dynamics team to maintain orbital drift by predicting GEO perturbations and calculating station-keeping maneuvers to minimize prop consumption during station keeping and transfer orbits.

ORGANIZATIONS

Large-Scale Design Optimization Laboratory   *March 2025 - Present*
- Optimizing **quadrotor design** concurrently with **Guidance, Navigation, and Control** algorithms to reduce design margin by creating a holistic vehicle and trajectory model which integrates system performance, mission requirements, and control law constraints.
- Conducted preliminary aircraft design for a Blended Wing Body (BWB) concept by generating initial configuration parameters, validating mission requirements through **OpenVSP**, and preforming low-fidelity single-point aerodynamic optimization

Yonder Dynamics | *URC Mechanical Team Member*   *October 2023 – April 2025*
- Led design reviews within the mechanical team, using **SolidWorks** assemblies to ensure seamless integration with electrical and software requirements, promoting cross-disciplinary collaboration and ensuring optimal rover performance.
- Designed, tested, and manufactured an improved rover elbow joint through **Ansys Mechanical**, achieving a 15% weight reduction by optimizing stress distributions and removing excess material, resulting in minimal backlash and improved load-bearing capacity.

Triton Racing | *FSAE Aerodynamics Team Member*   *February 2023 - July 2023*
- Developed team's first full-car aero package, combing carbon fiber with a foam core, using **SolidWorks** and **Ansys Fluent** to leverage the composite manufacturing processes and achieving minimal weight and maximum aerodynamic efficiency.
- Designed and tested a rapid-detachment system for the aero kit using **Ansys FEA**, integrating breakaway mounts and quick-release fasteners calibrated to disengage at predefined stress thresholds, preventing secondary structural damage during failure.

PROJECTS

Vortex-Cooled Rocket Engine Cold-Flow Simulation   *March 2025 – June 2025*
- Led a mesh refinement study through **Ansys Fluent CFD** for Mach 2.54 compressible, turbulent-flow conditions to evaluate nozzle performance, achieving convergence within 0.2% of extrapolated theoretical values for velocity flux through engine exit.
- Applied uncertainty quantification measures - Richardson Extrapolation and Grid Convergence Index - to confirm asymptotic convergence, asses discretization error, and validate grid independence for the engine's objective output parameters.

Cessna 172 Multi-Cell Wing Structure Analysis   *January 2025 – March 2025*
- Analyzed spar and skin response using **MATLAB** under simulated concentrated and distributed loads across the operational envelope to evaluate margin-of-safety curves across wing surfaces and design for minimal induced drag and turbulent wake.

SKILLS

Software: MATLAB/Simulink, Python, SolidWorks, Ansys Fluent (Certified)/Mechanical, C++, JavaScript, Linux, Office, JIRA, Git