

ANSHUMAN VYAS

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PROFESSIONAL SUMMARY

Aerospace engineer combining hands-on spacecraft/defense hardware experience with independent astrodynamics and mission design work. Built MATLAB/STK models for satellite launch, orbital transfer, and Sun-Earth L1 insertion, including orbital stability analysis and multi-frame coordinate transformations; designed and simulated a 6-DOF robotic manipulator for on-orbit debris capture (forward/inverse kinematics, dynamics, motion control). Three years of professional experience in structural/systems engineering for multi-domain EMSO and UAV hardware: trade studies, technical budgets, ICD development, and AI-assisted engineering workflows. MASc in Aerospace Engineering (Carleton University), thesis combining experimental flow characterization with CFD validation.

TECHNICAL SKILLS

Astrodynamics & Mission Design: STK, MATLAB (orbital transfer & insertion modeling, orbital stability analysis, multi-frame coordinate transformations), CoppeliaSim (manipulator dynamics & motion control), forward/inverse kinematics

Simulation & CFD: ANSYS Fluent, OpenFOAM, Simulink

Mechanical Design & Analysis: SolidWorks, Fusion 360, structural/deflection analysis, tolerance analysis, GD&T, trade studies, mass/power/thermal budgets

Programming: Python, MATLAB, C

Fabrication & Testing: 3D printing, prototype builds, test planning, sensor integration (Arduino, MATLAB), pressure/flow instrumentation

ASTRODYNAMICS & SPACE SYSTEMS PROJECTS

Satellite Launch & L1 Transfer Simulation | Carleton University

- Built MATLAB and STK models simulating launch, orbital transfer, and insertion to the Sun-Earth L1 point.
- Performed orbital stability analysis and multi-frame coordinate transformations to validate trajectory accuracy across mission phases.

6-DOF Space Debris Capture Manipulator | Carleton University

- Designed and simulated an autonomous robotic manipulator for on-orbit debris capture in MATLAB and CoppeliaSim.
- Performed forward/inverse kinematics, dynamics, and motion control analysis for the capture sequence.

PROFESSIONAL EXPERIENCE

Mechanical Engineer - Structures & Integration | D-TA Systems | Ottawa, ON

April 2025 - Present

- Led mechanical and payload integration for multi-domain EMSO trailer platforms deployed across air, land, and maritime environments, defining mechanical, power, and interface requirements for radar and electronic-warfare payloads.
- Authored interface control documents (ICDs) from high-level system architecture down to subsystem-level interconnects, covering power, RF signal, and network interfaces.
- Determined verification methods (documentation, inspection, analysis, or physical test) for system requirements including long-term reliability and environmental sealing, and developed a test rig proposal to verify an IP66 water ingress requirement.
- Conducted trade studies on structural design, thermal management, and packaging constraints for radar and electronic payloads.
- Developed technical budgets (mass, power, thermal, reliability, and availability) and evaluated supplier options for cost and performance trade-offs.
- Automated recurring engineering calculations and documentation workflows using Python, MATLAB, and AI tools, and coordinated with electrical, RF, and software teams to resolve integration paths within constrained platform geometries.

Mechanical Design Engineer - UAV Systems | Defy Aerospace | India

June 2021 - June 2022

- Designed and optimized a VTOL transition mechanism for a fixed-wing drone, collaborating with aerodynamics engineers to meet performance and integration targets between hover and forward-flight configurations.
- Developed an autonomous return-to-home failsafe triggered on signal loss, improving mission safety and reducing vehicle loss risk during flight operations.
- Led assembly and acceptance testing of the Solfox mini quadcopter from part procurement through multi-condition flight verification.

GRADUATE RESEARCH

MASc Thesis: Multiphase Flow in Venturi Aspirator Systems | Carleton University

2023-2025

- Designed and 3D-printed custom Venturi geometries with integrated instrumentation; applied dimensional analysis to build analytical performance models from single- and multiphase air-water experiments.
- Validated experimental findings against CFD simulations in ANSYS Fluent and OpenFOAM across multiple geometric configurations and operating regimes.

EDUCATION

MASc Aerospace Engineering | Carleton University, Ottawa, ON

Sept 2023 - Aug 2025

B.Tech Mechatronics Engineering | Manipal University Jaipur, India

Aug 2018 - June 2022

PUBLICATIONS

- Prajapati, C., Vyas, A., MacPhee, D. "Investigation of air bubble sizes in naturally-aspirated Venturi flows." International Journal of Multiphase Flow, Vol. 201, 2026, 105751.
- Kumar, H., Vyas, A., Kataria, S. "Design and development of smart safety and navigation system for motorbikes and two wheelers." Materials Today: Proceedings, Vol. 62, Part 3, 2022, pp. 1620–1625.