MANISH TAJPURIYA

Portfolio: manishtajpuriya.com.np
Email: tajpuriyamanish777@gmail.com
LinkedIn: https://www.linkedin.com/in/manish-tajpuriya-a17315227
Phone: +91 9740967377

Summary

An aspiring aerospace engineer with hands-on experience across Aerodynamics, Flight Control, Propulsion Systems, Avionics , Control System and CFD Simulations. Experiencecd with MATLAB, Simulink, Python programming and modern libraries for data analysis, automation, and AI/ML (PINNs). Proven track record in leading multidisciplinary projects, from rocket system integration and satellite avionics to high-altitude platforms. Passionate about solving real-world aerospace challenges through continuous learning and contributing in making a real impact.

Education

Pulchowk Engineering Campus, IOE *April 2021 - April 2025*
Bachelor in Aerospace Engineering (80.51%)

Skills

Programming Languages: Python, MATLAB, C, C++, LaTeX, html
Aerospace Software: MATLAB Simulink, XFLR5, OpenRocket, Planemaker (X-plane)
CFD: ANSYS Fluent, ANSYS Structure, OpenFOAM(sonicFoam, icoFoam, buoyantPimpleFoam)
CAD/CAM: CATIA, SolidWorks, Fusion360
AI/ML: Physics Informed Neural Network(PINN)
Electronic Design: PCB Designing & Fabrication, Circuit Design, Data Acquisition and Long-Range Communication
Soft skills: Leadership, Teamwork, Communication, Time Management, Event Management

Experience

System Test Engineer – Internship *Jul 2025 – Present*
Airbus India Privated Limited, Bengaluru
Worked in the Integration, Test, and Analytics division as part of the Autoflight and Maintenance Systems team.

- Analysed defects in the new Flight Management System (nFMS)
- Authored and executed Test procedures and reviewed VVOs
- Built automation utilities to support defect analysis workflows for the FMS team.

Internship – Physics-Informed Neural Network for Thermal Stress Analysis *Sep 2024 – Nov 2024*
AnK (Accelerated Komputing)
Applied AI/ML-based simulation using PINNs to study thermal stress propagation in aerospace structures.

- Programmed physics-informed models with Python using the Modulus framework to simulate transient heat transfer and thermal stress fields in 2D plates.
- Incorporated Neumann boundary conditions using 'DiffusionInterface', animated time-evolution of temperature/stress, and validated results with other commerical solvers.

Projects

Final Year Project – Integrated Control System for Active Fins Controlled Rocket Stabilization and Guidance *Mar 2024 – Feb 2025*
Designed and tested a closed-loop control system using actively actuated fins for rocket attitude stabilization.

- Designed and tuned PID-based flight control laws for pitch and roll axes in MATLAB/Simulink, achieving stable response characteristics across varying aerodynamic conditions.
- Implemented embedded guidance and control algorithms for real-time fin actuation using IMU-derived attitude and angular rate feedback.
- Executed Hardware-in-the-Loop (HIL) testing, validated actuator response and control loop performance, and documented system behavior for qualification.

Project Trishul – Design, Fabrication, and Launch of a 3km Altitude-Class Rocket *Oct 2023 – Jan 2025*
Led the team with special focus on avionics and embedded systems development for a high-powered rocket with autonomous deployment and telemetry.

- Developed a custom avionics module using Teensy 4.1, interfaced with IMU, barometer, and RA-02 LoRa module for real-time data transmission and acquisition.
- Designed and verified a dual parachute deployment system triggered via altitude decrement logic and timer-based redundancy using MOSFET-based actuation.
- Executed system-level testing, verified data accuracy, and documented comprehensive launch and performance reports.

Flying Fox — Preliminary Design of a Combat Aircraft *2024*

Conceptual and preliminary design of an unmanned combat aerial vehicle (UCAV) intended to operate as a loyal wingman for next-generation fighter aircraft.

- Defined mission requirements and translated them into design constraints, including payload, range, combat profile, and propulsion considerations.
- Conducted aerodynamic sizing, lift distribution analysis, and stability assessment for various control surface configurations (wing planform, V-tail geometry, and fuselage layout).
- Performed static and dynamic stability evaluations using X-Plane simulation, validated handling qualities, and determined control authority margins.
- Calculated center-of-gravity envelope, neutral point, and design points for cruise, dash, and loiter phases, ensuring compliance with stability and maneuverability criteria.
- Developed detailed CAD geometry and surface models, integrating aerodynamic, structural, and avionics provisions into the airframe architecture.

Conference Paper — Optimization and Comparison of Subsonic and Hypersonic Control Surfaces of Rockets *SAROD 2024*

Presented a paper optimizing the EXOCET subsonic cruise missile for hypersonic regimes. The study focused on control surface redesign and aerodynamic response across Mach numbers using simulations. Provided insights into control dynamics for avionics-driven actuators in hypersonic environments.

Computational Fluid Dynamics Case Studies *2023 – 2025*

Conducted a series of CFD simulations in OpenFOAM and ANSYS to study aerodynamic and thermal phenomena relevant to aerospace systems.

- Simulated reattachment lengths in laminar and turbulent flows through a backward-facing step using transient solvers and the k–ε turbulence model using OPENFOAM.
- Analyzed natural convection inside a closed cavity with buoyantPimpleFoam to assess gravity and heat source effects on flow and temperature distributions.
- Evaluated aerodynamic lift and drag characteristics for variable-sweep canard fins using ANSYS.

Aircraft Manufacturing — CAD Design of a Biplane Structural Skeleton *2024*

Designed detailed internal structures (ribs, spars, longerons) of a biplane's wings and fuselage. Fabricated a model using laser-cutting tools. Project provided insights into structural integration and weight distribution for aerospace applications.

CUBESAT — QuantaCube *2024*

Analysed and assembled a 1U CubeSat as part of ORION Space's satellite training program. Integrated long-range communication (LoRa RA-02), power management (PMM), and onboard computing (OBC) modules. Involved in telemetry testing, sensor integration, and debugging for system-level validation.

High-Altitude Balloon Project (HAB) — Project Co-Leader *SEDS Nepal — Apr. 2022 – Incomplete*

Led a 14-member team in designing, assembling, and testing a high-altitude probe aimed at reaching near-space (30 km). The probe was supposed to carry 3 student-built CubeSats. Contributed to electronics design, telemetry integration, sensor testing, and real-time data acquisition.

Solid Rocket Booster (SRB) — Team Member *Pulchowk Campus, IOE — 2021 – 2025*

Founding member of Team SRB with hands-on experience in avionics, recovery, propulsion, composites, and machining. Specialized in vehicle system integration and avionics, including microcontroller programming, telemetry setup, and onboard sensor data testing. Developed and validated complete subsystems during static and flight tests.

CANSAT — On-Board Computer and Power Module Design *SEDS-Pulchowk — 2022*

Worked on designing the OBC and PMM for a student-developed CanSat. Built and tested electronic circuitry and embedded code, laying the foundation for larger CubeSat and HAB systems.

Achievements

- **National Astronomy Olympiad:** Got selected for the final round of the Olympiad held in 2021 and participated in a closed camp with brilliant minds.
- **National Science Olympiad:** Got selected among top 40 students around the country and participated in the final round.
- **IOE Scholarship:** Got the competitive regular scholarship in Pulchowk Campus, top engineering college of Nepal.
- **International Astronomy Conference (IAC) 2023:** Abstract got selected for the conference.
- **Symposium on Applied Aerodynamics and Design of Aerospace Vehicles:** Presented the paper in the conference.

Volunteer Experience

SEDS Nepal — Event Manager and Vice-President *April 2021 - August 2023*
As vice-president, planned and implemented strategic policy, changed the structure of the organization, expanded membership, and chapter affiliation outside Kathmandu valley. As an Event Manager, planned and executed a yearly calendar including different event hosting such as SpaceTalk, General Assembly, Sky watching, etc.