Mansoor Ahmed Rind

UAV Autonomy & Robotics Engineer

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SUMMARY

Electrical and Electronics Engineering student at NUST (Rector's Gold Medalist, class of 2027) and UAV autonomy researcher. I build decentralized swarm control, precision landing and GPS-denied navigation with ROS 2, PX4/ArduPilot and Gazebo, taking them from simulation to real flight. Author of three 2026 papers and preprints, and captain of teams with national and international UAV competition results.

EDUCATION

National University of Sciences and Technology (NUST), Islamabad Sep 2023 – Aug 2027 (expected)

Bachelor of Engineering, Electrical and Electronics Engineering

- Rector's Gold Medalist
- Research Student, CSN Lab, SEECS

EXPERIENCE

Founder and Team Captain, Team Aero Mavericks Nov 2025 – Present

- Lead a student team building autonomous UAVs end to end: electronics, embedded programming, integration and flight-ready prototypes on ROS, ArduPilot and MAVLink.
- Captained the National Aerothon '25 entry, an autonomous disaster-relief UAV with computer vision, GPS navigation and precision landing for medical sample collection: 3rd overall and the "Swift Wing" title.
- Team Captain, IMechE Pakistan UAS Challenge (Oct 2025 – Oct 2026).

Freelance Robotics and Automation Consultant, Fiverr (Remote) Nov 2025 – Present

- Deliver UAV autonomy, embedded systems and automation projects for international clients; 5.0 rating across 5 reviews.
- Built a WebODM/OpenDroneMap drone-mapping workflow with mission orchestration, path planning and Raspberry Pi variants.

Drone Swarm Engineer, Intelgency IT Solutions, Islamabad Feb 2026 – Jun 2026

- Engineered multi-UAV swarm architectures and autonomy workflows for industrial aerial robotics.
- Optimized distributed multi-agent communication latency across radio mesh links.

Research Student, UAV Autonomy and Swarm Systems, CSN Lab, SEECS, NUST Jun 2025 – Jan 2026

- Developed precision static and dynamic landing, and drone-to-drone radio telemetry for decentralized coordination without a ground control station.
- Built multi-UAV swarm coordination algorithms, tested in Gazebo and validated in real flights, with onboard computer vision for GPS-denied navigation.

Vice Captain and Lead, Electronics and Automation, Team Vitesse (Teknofest Turkey) Feb 2025 – Sep 2025

- Led electronics and automation for autonomous UAV landing on a moving unmanned surface vehicle (USV); finalist among 160+ international teams.

Robotics Engineer Intern, Aerial Robotics Lab, SINES, NUST Jul 2024 – Sep 2024

- Built ROS/MAVROS autonomy workflows for GPS-based missions using Mission Planner, QGroundControl and MAVProxy.
- Integrated electronics and flight stack for an ML-enabled pothole-detection UAV with onboard processing and server-side data transfer.

Competition teams: Electronics Lead, Team NUST, International Design-Build-Fly 2026 (Oct – Nov 2025); Electronics Lead, Team Dohat, NERC 2025; Automation and Electronics, IMechE Pakistan UAS Challenge 2024.

Other roles: Marketing and Promotions Intern / Ambassador, IDP Education Pakistan (Sep – Oct 2026); Summer Intern, Korea EHT Co. (AutoCAD heat-tracing layouts, 2024); Research Intern, My EV Academy (2024); Web Developer, One International Services (2024).

PROJECTS

Resilient Decentralized Swarm Formation Oct 2026

ROS 2 Jazzy, Gazebo Harmonic, Python, CBF-QP, EKF | github.com/UnknownEng/resilient-swarm-formation

- Leaderless formation control for 5 robots: relative sensing, EKF localization and a control-barrier-function safety filter; no GPS or central coordinator.
- Converged in 5/5 Gazebo runs with 15% packet loss, 80 ± 40 ms delay and a robot failure (10.8 s, 0.18 m shape error); all 500 headless runs with the safety filter were collision-free.

Layered ROS 2 / Nav2 Fail-Safe Indoor UAV Navigation Sep 2026

ROS 2 Jazzy, Nav2, LiDAR, ArduPilot SITL | github.com/UnknownEng/Layered-ROS-2-Nav2-Architecture

- Separated Nav2 navigation from a safety layer (collision monitor between Nav2 and ArduPilot) for deterministic dynamic-obstacle braking; companion code to my preprint.

Interceptor UAV Guidance Jan 2026

Python, proportional navigation, MPC, reinforcement learning

- Guidance for a 4 kg winged quadcopter (80 N thrust, 640×512 thermal camera, no GPS or LiDAR) to intercept a target flying about 40 m/s at 500–600 m; compared PN, augmented PN, MPC and RL.

LawerAI (Qanoon Sahayak) Sep 2026

React, Vite, FastAPI, PostgreSQL, hybrid BM25 + dense retrieval | lawerai-alpha.vercel.app

- Open-source legal intake and statute-reasoning assistant for Pakistani law in English, Urdu and Roman Urdu, with citation-grounded answers and OCR for FIRs and cheques.

Also: 2D rotating LiDAR model and simulation (Sep 2026); GPS-denied navigation with a depth camera (Apr 2026); Sasta Dawa Finder, an offline medicine-price finder (Sep 2026).

PUBLICATIONS

1. "Resilient Decentralized Shape Formation of Multi-Robot Swarms Under Adversarial Real-World Faults in High-Complexity Disaster Environments," article, Oct 2026.
2. "A Review of Visual and Visual-Inertial SLAM Techniques for Dynamic-Environment Localization and Mapping in Autonomous UAVs," conference paper, Sep 2026.
3. "A Layered ROS 2/Nav2 Architecture for Fail-Safe Indoor UAV Navigation with Deterministic Dynamic-Obstacle Braking," preprint, Sep 2026.

AWARDS AND COMPETITIONS

- Rector's Gold Medalist, NUST
- 3rd Overall and "Swift Wing" title, National Aerothon '25 (Team Captain)
- Finalist, Teknofest Turkey 2025, UAV landing on a moving USV (among 160+ international teams)
- Finalist, National Design, Build & Fly Competition 2024, GIKI
- Ranked 112 of 200, International Design-Build-Fly Competition

TECHNICAL SKILLS

Robotics and UAV: autonomous navigation and mission planning, swarm robotics, formation control, control barrier functions, precision landing, GPS-denied vision navigation, SLAM, motion planning, proportional-navigation guidance, inter-UAV telemetry

Frameworks and tools: ROS 2 (Jazzy), Nav2, ROS 1 (Noetic), MAVROS, MAVLink, PyMAVLink, PX4, ArduPilot (SITL, Mission Planner, QGroundControl, MAVProxy), Gazebo (Harmonic), DroneKit, DJI Tello SDK, WebODM/OpenDroneMap

Programming: Python, C, C++, JavaScript, TypeScript; OpenCV, YOLOv8

Embedded and hardware: Pixhawk, Raspberry Pi, Arduino, ESP32, RF modules, LiDAR, UAV electronics and power distribution, CAD, 3D printing

Web and tools: React, Vite, Tailwind CSS, Express, FastAPI, PostgreSQL, Vercel, Git/GitHub, Linux (Ubuntu, Kali, Raspbian)

Languages: English (professional working), Urdu (native), Sindhi (native)

CERTIFICATIONS

UAS Remote Pilot, Open Category (A1+A3); Mastering ROS 2 for Robotics Programming (Packt); Autonomous Vehicle Engineering Specialization (University of Naples Federico II); Programming the Internet of Things Specialization (UC Irvine); Introduction to Nephio, LFS179 (The Linux Foundation)

LEADERSHIP

- President, TABA Youth Force, NUST Chapter (Aug 2026 – Present)
- President, NYSEP and Vice President, NIPIS'26, NUST Placement Office (Jun – Jul 2026): 51 international interns from 15+ countries
- Coordinator, NUST Career Connect 2026 (Dec 2025 – Feb 2026): career fair with 150+ companies
- General Secretary / VP Operations, NUST Digital Club (Sep 2025 – Jun 2026); Vice President, NUST Entrepreneurs Club (Sep – Oct 2025)
- Also: director, organizer and volunteer roles across NUST societies, including Hult Prize Campus Director and NUST Orientation 2025 (3,000+ students)