

Deepak

+91-7027622481 | deepakpopli002@gmail.com
[linkedin.com/in/deepakpopli](https://www.linkedin.com/in/deepakpopli) | github.com/deepak61296

Work Experience

Firmware Engineer (Full-time)

June 2025 – Present

Airbotix Technology

On-site

- Built the drone testing software used across a 1,000+ drone show fleet, replacing the old GCS-based checks and cutting testing from 8 to 10 minutes per drone down to under 2 minutes, with test logs generated automatically.
- Contributed to the development of firmware and ground control software for a 1,000+ drone show fleet, added support for new payloads, and added advanced safety parameters to the flight firmware.
- Added parameter locking, firmware integrity checks and STM32 readout protection to the firmware for DGCA type certification, along with pre-arm checks.
- Developed Ground Control Station and embedded camera-control software for a defence aerostat UAV project, with supporting technical documentation.
- Worked across R&D on the development of new drone platforms and on improving existing platforms for reliability.
- Fixed flight performance problems on the show drones through PID tuning, vibration analysis and flight log analysis.

Robotics Engineer Intern

November 2024 – January 2025

Exobot Dynamics

On-site

- Added PID motor-control support to an existing bionic-arm codebase, using encoder feedback and filtering to improve actuator smoothness during tuning and hardware testing.
- Built serial-to-graph plotting tools to visualise PID response, encoder feedback, and motor behaviour for faster control tuning.

Summer Research Intern

June 2024 – July 2024

IIT Guwahati

On-site

- Worked under the Centre for Drone Technology, IIT Guwahati, on UAV-based foreign object detection for airport runway inspection.
- Developed the control software for ArduPilot-based inspection missions, handling mission commands, telemetry and GCS updates.
- Integrated the UAV camera feed with ground-side object detection, sending foreign-object alerts and location coordinates to the GCS.

Projects

Open Source Contributions: ArduPilot Ecosystem | *Python, C++*

Dec 2025 – Present

- Contributed 12 merged pull requests to ArduPilot, mainly SITL autotest coverage for vehicle failsafe behaviour, along with firmware fixes and documentation improvements.

mavlink-mcp: Natural-Language Flight Control for AI Agents | *Python, MAVLink, MCP, Gazebo* 2026

- Developed and published an open source MCP server that allows an AI agent to fly an ArduPilot vehicle from natural-language instructions and read its camera, with every result reported from live telemetry rather than from model output.
- Designed a backend interface between the agent layer and the vehicle that keeps the tool registry and safety layer independent of MAVLink, so adding another autopilot means writing one backend. Vehicle state and telemetry are exposed as MCP resources alongside the tools, with the autopilot and vehicle type read from the vehicle's own heartbeat rather than from configuration.
- Implemented a three-tier safety layer: invalid arguments are rejected, out-of-range arguments are clamped and reported back to the operator, and writes to the autopilot's own geofence, failsafe and arming parameters are refused by family rather than by value, since a bitmask parameter can be disabled while still passing a non-zero check.
- Moved blocking flight commands off the event loop so telemetry queries and the emergency stop stay responsive while a flight command is running, including an emergency stop that interrupts a command already in progress and returns the vehicle to launch.
- Verified the server against Claude Code, Codex and opencode, and validated complete missions in ArduPilot SITL, including fully offline operation against a locally hosted model.

Companion Computer Health Failsafe for ArduPilot | *C++, Python, ArduPilot, MAVLink* 2026

- Developed a companion-computer health monitoring and failsafe system for ArduPilot, allowing the flight controller to detect when the companion computer running onboard autonomy crashes, hangs or overheats, and to trigger a configured failsafe instead of continuing the mission.
- Developed a new MAVLink message and an ArduPilot flight-controller library to receive and evaluate it, following ArduPilot's existing failsafe conventions.
- Implemented the failsafe state machine and its trigger conditions on the flight controller, together with pre-arm checks, logging, and user-configurable parameters for the failsafe action, timeouts and monitored services.
- Developed the companion-side monitoring service and packaged it as a systemd service for Raspberry Pi and generic Linux companion computers.
- Validated the failsafe flow in SITL, extended ArduPilot's autotest suite with coverage for it, and verified the behaviour on hardware using a Raspberry Pi 4 and a Cube Orange flight controller.

Rocky, the Robot Who Dreams | *Cyberwave platform, Python, Raspberry Pi* 2026

- Developed a physical AI agent on a Raspberry Pi robot that selects and calls its own tools to navigate to saved locations, describe what it sees through its camera, and recall information stored earlier. **First place, solo category, in Cyberwave's four-week Builders Program, cohort 2.**
- Integrated multiple LLMs and vision-language models into a single AI agent, with a different model handling each type of task.
- Built a dream workflow that triggers on a schedule, passes the day's transcript to a larger model, and converts it into stored memories the agent can recall later.

DEESHA: RISC-V UAV Flight Controller Patent | *VEGA ARIES, UAV Hardware* 2024

- Granted Patent No. 550206 for a RISC-V based UAV flight-controller concept using the indigenous VEGA ARIES processor.

Education

Chandigarh University
Bachelor of Engineering in Computer Science

Punjab, India
Expected August 2026

Technical Skills

Languages & Tools: C/C++, Python, Linux, Git

Drones & Autopilot: ArduPilot, MAVLink, PyMAVLink, MAVProxy, QGroundControl, SITL/simulation, Gazebo

Embedded & Hardware: STM32, ESP32, UART, I2C, SPI, CubePilot/Pixhawk, Cube Orange, Raspberry Pi, Jetson Nano

AI: LLM integration and function calling, agentic AI tools and automation, Model Context Protocol (MCP), edge AI deployment, local LLM inference (Ollama)

Hardware portfolio: github.com/deepak61296/deepak-hw

Honors & Awards

Super Achiever Award, Chandigarh University, 2025

Patent Granted, No. 550206, DEESHA RISC-V UAV Flight Controller

1st Position, GCON-VEGATHON at IIT Guwahati, 2023

Selected among the Top 10 teams for TEP at the Indian School of Business, Mohali, 2024

Semi-finalist, Gujarat Robofest, 2024

1st Position, CGC Jhanjeri Drone Competition

1st Position, CGC Landran Drone Competition

2nd Position, Zeenovato Hackathon at Chandigarh University

Pride of CSE Award, Chandigarh University