

Noel Joyce Varghese

noeljoyce6@gmail.com | +91 8590607872 | linkedin.com/in/noel-joyce-varghese | github.com/noeljoyce6 | Portfolio | Bengaluru, India

PROFESSIONAL SUMMARY

Avionics and Embedded Hardware Design Engineer specialising in multilayer PCB design, embedded firmware, and UAV/avionics system integration. Delivered 8+ production hardware platforms across aerospace, robotics, and defence — from schematic capture and PCB layout through board bring-up, DFM/DFA, prototype validation, and MAVLink-based flight-system integration.

KEY ACHIEVEMENTS

- Delivered 8+ production-grade embedded PCB designs for aerospace and UAV platforms at a bootstrapped defence startup.
- Developed full MAVLink avionics stack — hardware, firmware, and GUI — deployed and tested on Pixhawk/Cube Orange UAV platforms.
- Identified and corrected a voltage-regulator feedback-divider error (7.3 V output vs. required 5 V) before PCB fabrication, preventing a costly respin.
- Led hands-on PCB Design Workshop for 40+ ECE students covering schematic, KiCad layout, fabrication, and live soldering assembly.

PROFESSIONAL EXPERIENCE

Avionics Design Engineer

PSYC Aerospace and Defence Industries Pvt. Ltd.

Nov 2025 – Aug 2026

Bengaluru, India

- Owned end-to-end development of 8+ embedded avionics platforms: schematic capture, multilayer PCB layout, BOM generation, DFM/DFA review, board bring-up, and fabrication release.
- Designed ESP32 avionics controllers for Pixhawk 2.4.8 and Cube Orange flight controllers.
- Implemented MAVLink UART telemetry, AUX-triggered payload actuation, and RC-preset release logic.
- Configured full RC control chains using Mission Planner, RadioMaster Pocket, and FlySky for mission-mode ground testing.
- Developed PlatformIO firmware with WiFi provisioning, browser OTA updates, and custom web GUI — independent of Mission Planner.
- Integrated 8+ SPI/I2C/UART/CAN peripherals across multiple platforms; executed hardware debugging and prototype validation.

Analog Design Intern

IIIT Kottayam

Jun 2025

Kerala, India

- Simulated a 5 GHz current-starved CMOS VCO in LTspice and Cadence Virtuoso; analysed transistor-level RF and oscillator design fundamentals.

EDUCATION

B.Tech in Electronics and Communication Engineering

Amal Jyothi College of Engineering (Autonomous)

2022 – 2026

Kerala, India

SKILLS

- Avionics & UAV:** Pixhawk 2.4.8, Cube Orange, ArduPilot, Mission Planner, MAVLink, RadioMaster, FlySky, AUX/RC Integration
- PCB Design:** Multilayer, Mixed-Signal, High-Current Routing, Controlled Impedance, Differential Pair, PCB Stack-up, Ground Plane Design, High-Speed Design, DFM/DFA, Signal & Power Integrity, EMI Mitigation, Gerber Release
- Firmware:** ESP32, STM32, PlatformIO, WiFi OTA, I2C Expansion (PCA9685, PCF8574T), Web GUI Dashboards
- EDA Tools:** Altium Designer, KiCad, OrCAD, Cadence Virtuoso,
- LTspice
- Interfaces:** SPI, I2C, UART, CAN, USB, ADC/DAC
- Power Electronics:** DC-DC Buck/Boost, LDOs, Gate Drivers, Motor Drivers, BEC Architecture, Protection Circuits
- Validation:** Board Bring-Up, Oscilloscope, Logic Analyser, Design Verification, Hardware Debugging, Prototype Validation; IPC-2221, IPC-7351, EMC/EMI Awareness, MIL-STD-810, MIL-STD-461
- Programming:** C, C++, Python, Git

SELECTED PROJECTS

APEX – Intelligent UAV Payload Interface Four-Channel [Demo Video]

ESP32-C3 · TPS54302 · TXS0102 · PCA9685 · MAVLink · KiCad

- Designed 2-layer avionics PCB with selectable on-board/external BEC servo power rail, I2C level-shifted PCA9685 expansion, and Pixhawk Serial5 telemetry interface.
- Developed full firmware and web GUI: MAVLink MAV_CMD_DO_SET_SERVO control, RadioMaster RC-preset payload release, WiFi AP, and browser OTA.

SKYHOOK – Precision UAV Payload Winch Controller [Demo Video]

ESP32-C3 · BTS7960 · AS5600 · PCF8574T · 74AHCT125 · MAVLink · KiCad

- Designed winch control PCB interfacing external BTS7960 motor driver, AS5600 magnetic encoder (I2C), PCF8574T I/O expander, and 74AHCT125 3.3 V-to-5 V logic buffer.
- Developed complete ESP32 firmware: MAVLink command decoding, direction/PWM safety interlocks, encoder-based cable-length tracking, and UART telemetry reporting.

VECTOR – High-Performance FOC Motor Controller

STM32G431 · DRV8353R · CAN · 4-layer 50×50 mm PCB · Altium Designer

- Architected 4-layer 50 × 50 mm BLDC motor controller with STM32G431, DRV8353R gate driver, 3-phase current sensing, active braking, and CAN-based closed-loop control interface.
- Hardware Revision 2 under development with optimised component placement and power-stage routing improvements.

Minima – CM5 UAV Companion Computer Board (Ongoing)

CM5 · 6-layer PCB · MAVLink · NVMe · PCIe/M.2 · KiCad

- Architecting compact 6-layer UAV companion computer PCB around CM5 – interfaces Pixhawk over MAVLink via dedicated FC/Telemetry/CRSF UARTs; designed for onboard autonomy, SLAM, precision landing, NVMe high-bandwidth logging, and PCIe AI accelerator integration (Hailo-8 class).

Wireless 4-Channel EEG Acquisition System

AD623 · BLE · Mixed-Signal PCB · KiCad

- Designed low-noise mixed-signal EEG acquisition PCB: AD623 instrumentation amp front-end, electrostatic shielding, and BLE wireless streaming.

LEADERSHIP & TECHNICAL ACTIVITIES

- PCB Design Workshop Lead** – Conducted hands-on workshop for 40+ ECE students: schematic capture, KiCad layout, fabrication pipeline, and live soldering/assembly.
- NASA Space Apps Challenge** – Core Team Member; technical planning and execution across 2 annual editions.
- IEDC / Kerala Startup Mission** – Active volunteer; hardware workshops and innovation-driven technical initiatives.