Mihnathul Munthaha Neerulpan (Mihna)

mihnathul.github.io | San Francisco Bay Area | mihnathul@gmail.com

Summary

Engineering leader delivering safety-critical automotive and electric aviation systems across battery systems, BMS, motor controls, and electric powertrains.

Experienced across architecture, simulation, software, integration, and validation, connecting digital models with real-world systems.

Employment

ActionFlux Labs

2026 – Present

Founder & Engineer

San Francisco Bay Area

Building digital twin frameworks for safety-critical systems.

Supernal LLC (Hyundai AAM)

2023 – 2026

Sr. Algorithm Engineer – Energy Management System (Prev: Sr. Systems Engineer – EPU)

Fremont, CA / Laguna Canyon, CA

Next-Generation Battery Management System & ESS

- Drove next-generation configurable BMS/ESS architecture for electric aviation, including HW/SW co-design and technology maturation toward CoDR.
- Spearheaded development and integration of a modular, configurable ESS simulation platform with cell ECM parameter extraction and plant modeling, supporting requirement validation, architecture evaluation and mission profile sizing, HIL verification, and algorithm maturation.
- Developed models for LV/HV power sequencing, charging coordination, power distribution, and charge control to support aircraft energy-management development; integrated BMS state estimators and diagnostics.
- Proposed S1000D-aligned ESS product breakdown structure for lifecycle data management.

eVTOL Tech Demo Vehicle Integration (EPU: PDR/CDR, ESS: Post-CDR, First Flight, Re-Arch)

- Authored 200+ SFHA-aligned EPU system requirements and ICDs; captured architecture and traceability supporting eVTOL tech demonstrator PDR/CDR.
- Proposed Speedgoat HIL architecture for propulsion motor controllers.
- Scoped and planned standardized electrical and data ICDs with EWIS traceability, unified system architecture capture, and avionics-hosted BMS app requirements.
- Captured avionics-hosted BMS app subsystem architecture aligned with DO-297.
- Drove eVTOL tech demo ESS vehicle integration, including HV distribution and charging, focusing on desktop simulation, installation checkouts, telemetry UI baseline development, and data analysis.
- Contributed to BMS controls, flight deck, Crew Alerting System (CAS), flight control, and motor control interface definition and integration.
- Reviewed and approved EWIS design data and authored system checkout procedures for aircraft integration.
- Mentored engineers on system architecture and design data, improving integration readiness, problem reporting, traceability, and lab/aircraft test coverage.
- Identified 8% of aircraft integration anomalies, including critical HW/SW design issues de-risking several integration targets.

AC Propulsion Inc.

2018 – 2022

Technical Director (Prev: SW Manager, Sr. Embedded SWE & Embedded SWE)

San Dimas, CA

Led and scaled a cross-functional engineering team (1 to 6) developing motor control platforms (PMSM/induction), including software, controls, electronics, and system integration, for electrified mobility applications, delivering production systems and customer integrations.

- Enhanced and maintained a 400V Si IGBT platform; integrated new motors and sensors; improved diagnostics and monitoring; optimized performance and quality. Deployed in 170+ production vehicles.
- Developed and integrated a new 800V SiC MOSFET platform; validated on hardware test beds and deployed to Ampaire (hybrid-electric aircraft prototype/technical demonstrator) and Designwerk (later acquired by Volvo). Adapted controllers for multiple motor designs; platforms scaled from 60–280 kW.
- Served as technical lead/contact for key customers including Designwerk; supported production scale-up as ACP's largest customer. Managed SW releases, upgrades, and issue resolution; supported sales with SOWs and technical quotations.
- Provided production and prototype support across end-of-line (EoL) validation and vehicle integration; supported manufacturing in ensuring EoL data quality and reporting; validated new changes; supported field issue resolution.
- Commissioned a new dynamometer for 800V platform development (SiC boost converter) and ported internally developed auto-characterization workflows for PMSM/induction motors; delivered HMI/UI, controls, and electronics integration.
- Developed and deployed custom UDS protocol application stack and secure CAN-UDS bootloader.
- Enhanced CI/CD and release management; improved development infrastructure and workflows.

Magneti Marelli

2017 – 2018

Embedded SW Engineer MI

Delivered model-based AUTOSAR embedded software for Harley-Davidson MY2020 body control production program, spanning requirement decomposition, RTOS bring-up, RTE design, and platform/application integration.

- Defined framework translating customer ECU specs into modular, testable SW requirements.
- Performed initial bring-up (under 6 weeks) of third-party RTOS on dual-core MCU.
- Designed and configured AUTOSAR Runtime Environment (RTE), the interface layer between application and platform software, for model-based application SW.
- Integrated and released AUTOSAR stack for ASIL-B applications; improved ASPICE Level 3 documentation and traceability.

General Motors

2014 – 2017

Sr. SW/Control System Engineer (Prev: Controller Integration Engineer) [Contract] MI

Developed and delivered production ASIL-D embedded SW for GM Super Cruise - the world's first truly hands-free highway driving system - across MY2018 and MY2020 vehicle programs. Served on the ADAS Architecture, Communications & Diagnostics Technical Review Board.

- Developed communication and diagnostics interfaces (SPI, CAN, FlexRay, UDS — DTC, DIDs/CPIDs) for Super Cruise ECUs, enabling ADAS feature integration; consistently delivered on-time SW modules supporting engineering builds and vehicle integration milestones.
- Executed V&V at unit, component, and integration levels; performed mule vehicle calibration and field troubleshooting.
- Built HIL automation for supplier controller HW/IO, reducing controller integration turnaround time.
- Mentored GM ATC Israel engineers on GM embedded development practices and diagnostics; recognized with peer award for mentorship impact and formal commendation for advancing SW content ahead of FROP milestone.

Tools & Methods

Programming	C, C++, Python, MATLAB, Git
MCU & RTOS	Altium, TI TMS570, NXP MPC5643L, Renesas RH850, AUTOSAR OS
Modeling & Systems	MATLAB/Simulink, LTSpice, MBD, MBSE
Integration & Verification	Vector toolchain, ETAS INCA, Speedgoat, dSpace, Lauterbach, PC-lint, HIL/SIL
Standards & Compliance	*Automotive:* ISO 26262, AUTOSAR, ASPICE *Aerospace:* DO-178C, DO-331, DO-254, DO-311A, ARP4754B, ARP4761

Certificates

Functional Safety Professional, TÜV SÜD	2023
Building Agentic AI Applications, Maven	2025
Algorithms for BMS Specialization, UCB	2025

Education

B.Tech, Electrical & Electronics Engineering 2013

Amrita University, India

University of California, Davis (GSP)