

Professional Summary

Senior Embedded & Wireless Software Engineer with 6+ years of hands-on experience architecting production-grade firmware, low-latency software, and local-first Edge AI architectures. Specialized in multi-role BLE, low-power optimization, and systems-level programming in C/C++ and Rust. Co-inventor of a patented maritime wireless link integrity system. Proven track record of delivering up to 50% power reduction across 5,000+ deployed commercial units. Eligible for immediate US employment under the TN/T-MEC visa framework.

Technical Skills

Languages & Core: C, C++, Rust, Go, Python, Dart, JavaScript, Shell Scripting
Embedded & RTOS: Zephyr RTOS, Bare-Metal, Custom RTOS, Bootloaders, Cross-compilers, Linux Kernel Modules
Wireless & Protocols: Bluetooth Low Energy (Multi-role), WebSockets (Async), Custom Protocols, CAN (NMEA 2000), SPI, I2C, UART
AI & Edge Computing: Local Inference, ONNX Runtime, llama.cpp, Vulkan acceleration, VAD (Voice Activity Detection), Audio Streams
DevOps & Tooling: Git, CI/CD, GitHub Actions, Docker, Tauri v2, Flutter, eframe, Renode, Logic Analyzers, Oscilloscopes

Professional Experience

Senior R&D Engineer – Embedded & Wireless Software

Jun 2022 – Present

Navico Group

- **Co-developed and shipped** production-grade firmware for the Lowrance RECON trolling motor, resulting in **5,000+ commercially deployed units**.
- **Achieved a 50% reduction in power consumption** and **optimized firmware memory footprint by 33%** through targeted bare-metal and software optimizations.
- **Architected a multi-role BLE subsystem** supporting up to 5 simultaneous peripherals and 1 mobile master device using TI BLE stack and Zephyr RTOS.
- **Designed and implemented a custom BLE application-layer protocol** from scratch, standardizing communication for production devices.
- **Co-designed an Over-the-Air (OAD/OTA) firmware update architecture**, ensuring secure and reliable field updates.
- **Led technical code reviews** for over 100 pull requests in the Bluetooth subsystem and authored 80% of official wireless documentation.
- **Collaborated in a distributed international engineering team** across 3 cities and 2 countries, integrating NMEA 2000 CAN-based marine networks.

Engineering Services – Satellite Ground Station Deployment

Mar 2019 – Aug 2019

CICESE

- **Led end-to-end commissioning** of a ground station from legacy hardware, developing custom Python/C automation for Gpredict-integrated antenna tracking and signal decoding.
- **Orchestrated global tracking efforts** via SatNOGS network integration, securing critical telemetry after initial mission-critical contact failures.
- **Implemented a high-gain signal recovery strategy** leveraging the Dwingeloo radio telescope and custom command scripts to successfully establish stable communication.
- **Maintained full operational control** throughout the mission, facilitating remote camera operations, payload management, and continuous telemetry acquisition until end-of-life.

Professional Internship – Telecommunications Systems

Aug 2018 – Dec 2018

CICESE

- **Co-inventor of Mexican Patent No. 430014**, featuring an automatic link integrity compensation system under dynamic wave-induced motion.
- **Designed and validated a custom long-range radio protocol** for oceanographic buoy telemetry under real-world maritime field tests.

Featured Open Source Projects

Babilo: Local-First Multimodal AI Language Tutor

[GitHub]

Lead Developer — Rust, Tauri v2, Vulkan, C++ (llama.cpp)

- **Architected a privacy-focused AI language tutor** enabling unlimited, real-time conversational practice with customizable roles and immersive learning modes.
- **Implemented runtime pedagogical assessment**, providing immediate feedback on language proficiency during active sessions without internet dependency.
- **Integrated Vulkan-accelerated local inference** to run 9B parameter multimodal models, ensuring high-performance voice interaction on commodity edge hardware.
- **Engineered a low-latency multimodal pipeline**

Speech → LLM Engine → TTS

tailored for linguistic rhythm and high-fidelity interaction.

Sinsajó: Real-Time Local Audio Transcription System

[GitHub]

Lead Developer — Rust, Dart (Flutter), ONNX Runtime, Tokio, WebSockets

- **Designed and built a private, client-server MVP** for ultra-low latency (<200ms) local audio transcription.
- **Developed an async Rust backend** via Tokio using an Int8 quantized Canary 180M model, capping memory usage at 500MB RAM.
- **Coded a custom mathematical VAD (Voice Activity Detection)** filter inside a background Dart Isolate to offload the main UI thread.
- **Engineered a binary WebSocket stream protocol** transmitting raw 16-bit PCM chunks only during active speech segments.

SerialGUI-rs: Cross-Platform Graphical Serial Terminal

[GitHub]

Lead Developer — Rust, eframe, serialport-rs

- **Developed a lightweight, native GUI tool** for real-world hardware engineering workflows and serial port telemetry monitoring.
- **Leveraged Rust's memory safety guarantees** to implement stable, real-time, cross-platform serial communication handling.

Education

M.Sc. in Electronics and Telecommunications

Aug 2019 — Mar 2022

CICESE

- **Thesis:** Evaluated security-performance trade-offs in IoMT networks by benchmarking 8 NIST Lightweight Cryptography candidates against AES-128.
- **Systems Engineering:** Architected a multi-node IoMT testbed using **Contiki-NG** OS, cross-validating results across **Cooja/Renode** simulators and **TI CC2650** hardware.
- **Key Findings:** Quantified the impact of cryptographic overhead on network latency and power efficiency, providing actionable data for securing resource-constrained edge devices.

B.Sc. in Electronic Engineering

Aug 2014 — Aug 2018

Instituto Tecnológico de Oaxaca

- **Robotics & Leadership:** Active member of the Robotics Club; organized and competed in regional Sumobot tournaments, focusing on rapid prototyping and firmware development.
- **Teaching:** Mentored students in embedded systems development through structured Arduino workshops and practical lab sessions.