TRISTAN ALDERSON

Work Authorization: Dual US & Canadian Citizen

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EDUCATION

Bachelor of Applied Science in Electrical and Computer Engineering — Kingston, ON, Canada
Queen's University • *Dean's Scholar* — 05/2026

SYSTEMS FOCUS

Embedded Linux platform engineer focused on **C/C++ control services**, **SOM image bring-up**, **device trees/Buildroot/U-Boot**, **Linux-to-microcontroller interfaces**, telemetry/logging, networking, and dependable field behavior across hardware-backed control systems.

WORK EXPERIENCE

Avionics Lead — 05/2025 – Present
Queen's Rocket Engineering Team (QRET) — Kingston, ON, Canada

- Lead a 5-person avionics team building a distributed control network for a rocket engine, spanning **STM32** valve-control nodes, **ESP32** telemetry, shared **C/C++** firmware libraries, power electronics, and launch-ops ground-station tooling.
- Architected **AimNetwork**, a fixed-format **CAN** protocol with 64-bit payloads, strict 3-bit addressing, heartbeat health checks, time synchronization, and telemetry forwarding over WiFi/LoRa.
- Wrote low-level **STM32 CAN** drivers against HAL with zero dynamic memory, fixed 16-frame TX/RX queues, and a bounded poll loop so bus handling remains predictable under fault or flooded-bus conditions.
- Drove board bring-up and **failure analysis** across custom power/control hardware, including power-rail isolation for solenoid loads and rework after diagnosing an overheated zener shunt from a missing current-limiting resistor.

Embedded Software Engineer Intern — 05/2024 – 08/2025
Evertz Microsystems — Burlington, ON, Canada

- Built **C++ Linux control services** for a multi-node 1RU embedded platform, using **gRPC**, **REST APIs**, and **Redis-backed configuration** to coordinate health, telemetry, and device control across ARM Linux nodes.
- Brought up an embedded observability stack on an **x86 COM Express** module by extending **Buildroot** with **Prometheus**, **Grafana**, **Fluent Bit**, and **lighttpd**; adapted Go/Grafana behavior for constrained deployment.
- Designed hardware-facing protocols for **UDP stream telemetry**, grouped **gRPC** operations, reboot-safe GNSS binary storage, and synchronized control updates across multiple embedded nodes in the same chassis.
- Debugged 1G/10G/100G **SFP/QSFP** paths, multicast forwarding, TLS/OpenSSL failures, and Marvell switch behavior using vendor tooling, **GDB**, logs, board traces, and custom **ACL** rules.
- Maintained Linux build and deployment tooling across **Jenkins**, **Buildroot**, libssl/OpenSSL, Go, Node.js dependency issues, and scripted hardware upload flows for faster validation.

AI Engineer & Avionics Developer — 10/2023 – 08/2024
Queen's Rocket Engineering Team (QRET) — Kingston, ON, Canada

- Designed and flew a custom **SAM-M10Q GPS** daughter board with I2C breakout, physical separation from comms electronics, and enlarged ground plane to reduce RF interference and maintain GPS lock during flight/recovery.
- Secured **2nd Place at Launch Canada** by implementing YOLOv8 rocket tracking with dual-axis PID control and **Matlab** simulation; owned 18650 battery, altimeter, and GPS configuration during launch operations.

PROJECTS

LiteLM: FPGA-backed LLM Inference on ARM Linux — 08/2025 – 03/2026
Queen's University — Kingston, ON, Canada

- Built the Linux control layer for a GPT-2 inference accelerator on an **AMD Xilinx Kria KV260**, using FPGA fabric for bulk matrix operations and **ARM Cortex-A53 Linux** firmware for numerically sensitive operations.
- Implemented **C/C++** accelerator interfaces using **AXI DMA**, DDR memory maps, device trees, U-Boot boot files, hardware overlay loading, and low-level register access between PS and PL.
- Earned **3rd Place for Top Computer Engineering Project** at the Queen's ECE Showcase.

SKILLS

Languages: C, C++, Python, Bash, Matlab, Verilog/SystemVerilog
Embedded Linux: Buildroot, U-Boot, device trees, rootfs/image integration, GDB, Jenkins, Git, shell automation
Control & telemetry: gRPC, REST APIs, Redis, Prometheus, Grafana, Fluentbit, lighttpd, logging, metrics, event pipelines
Interfaces: TCP/IP, UDP, Ethernet, CAN, SPI/I2C, LoRa, NTP/PTP, SNMP, TLS/OpenSSL, 1G/10G/100G SFP/QSFP
Platforms: ARM Linux, x86 COM Express, STM32, ESP32, Zynq UltraScale+, AXI4, AXI DMA, Marvell switch SDKs