

Perry's Résumé - Embedded Firmware and Controls

Perry Kundert <perry@kundert.ca> +1-780-970-8148

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Abstract

Hands-on engineer with 30+ years building embedded and real-time systems that stay in service: solid-state RTU firmware for pipeline control, real-time signal processing on commodity hardware, and partition-tolerant distributed systems. Strong C and C++ (25+ years), Rust (5+ years), RTOS and microcontroller work, hardware bring-up, and industrial protocols (DNP3, EtherNet/IP, CIP, Modbus, SCADA). Trusted to own the technical direction of mission-critical firmware and to guide the engineers building it. (PDF, Text)

Skills

- **Embedded and firmware:** C, C++ (25+ years), Rust (5+ years), RTOS, microcontrollers, assembly optimization, hardware bring-up, PCB debug, solid-state RTU firmware
- **Industrial and mission-critical:** SCADA, PLCs, HMIs, DNP3, EtherNet/IP, CIP, Modbus, data diodes and unidirectional gateways, multi-route fault-tolerant communications, Reed-Solomon FEC
- **Real-time and edge:** sustained multi-Msps signal processing, SIMD (AVX, NEON), lock-free concurrency, systems that run unattended for years on degraded and satellite links
- **How the work gets done:** Linux, Docker, CI/CD, code review and mentorship, Scrum/Agile, reproducible builds

Experience

IT/OT Solutions Engineer, Vantage Engineering — Spruce Grove, AB, 2026–present

Designing the boundary between field equipment and the systems that use its data, for electrical automation work.

- Built a secure DNP3 data diode that supplies real-time field data to IT systems while leaving OT field equipment unreachable from the IT side, at a fraction of the cost of commercial diode products, without relaxing the unidirectional guarantee.
- Stood up dev, staging, and production deployment for Ignition SCADA, including automated regression testing of Ignition Python scripting, so script changes are validated before they reach production.
- Working with the teams delivering electrical automation on large projects, on the OT side of that boundary.

R&D Consultant, Dominion R&D Corp. — Remote, 2009–present

Integration, telemetry, and field systems for energy and industrial clients. Remote systems that run unattended for years.

- Created cppo, a Python EtherNet/IP and CIP library used as the integration layer between analytics and PLCs on the plant floor.
- Built datasim, a large-scale PLC simulation environment (dozens to hundreds of concurrent simulated PLCs) used to measure a SCADA vendor's polling behaviour against degraded WAN and satellite routes before cutover.
- Delivered ruggedized satellite-connected monitoring, communications, and video systems across Alberta oilfields, field-serviceable and diagnosable from hundreds of kilometres away.
- Guide client development teams through cryptographic, distributed-systems, and industrial integration architecture.

Software Engineer, clearGRID Ltd. — Kelowna, BC, 2017–2022

Replaced expensive proprietary radio telemetry with commodity computers and SDR, including integration with flight-approved hardware, power, and communications.

- Built an end-to-end real-time receiver decoding many concurrent channels from a 25 Msps I/Q stream on commodity x86 and ARMv8, sustained, with no dropped samples.
- Designed the polyphase filterbank and window/DFT chain, with hot paths hand-optimized in AVX and NEON.
- Reached agreement on readings across lossy RF channels without a central coordinator.
- Built a recorded-signal regression harness so algorithm changes were measured against captured field data.

Distributed Systems R&D, Holo Ltd. — Kelowna, BC, 2018–2020

Architected and tested prototypes of HoloFuel's partition-tolerant transaction engine in Rust, on Holochain's agent-centric framework.

- Designed the system so each agent holds its own signed state, and settlement continues through network partitions instead of waiting on global consensus.
- Validated simultaneous atomic transactions under simulated network partitions.

Senior IT Advisor, Enbridge Pipelines — Edmonton, AB, 2002–2009

Custom RTUs and communications for hydrocarbon pipeline control. The protocol is still in operation.

- Developed solid-state RTU firmware for continuous 24/7 control in remote locations. Sustained fewer than 1 defect per 10,000 lines of code, measured in the field, not the lab.
- Deployed hundreds of ruggedized units across critical infrastructure sites.
- Architected LiveWIRE, a cryptographically secure, Reed-Solomon encoded, multi-route protocol for real-time SCADA telemetry over marginal and intermittent links, including across untrusted network segments.

Software Developer, Hewlett-Packard — Calgary, AB, 1989–1996

- Re-engineered the core alarm engine of the RTAP SCADA platform around DFA state machines, so end users could configure geographically distributed, safety-critical workflows.
- Still deployed in pipeline SCADA systems continent-wide, 30+ years on.

Education

B.Sc. Computer Science, University of Calgary, Calgary, AB, 1984–1989