# RICHARD LOURETTE

**Principal Embedded Systems Architect | IoT Platform Leader | Technical Innovation Leader**

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## PRINCIPAL EMBEDDED SYSTEMS ARCHITECT SUMMARY

Visionary Embedded Systems Architect with 30+ years designing robust, scalable architectures for mission-critical systems across medical devices, IoT platforms, and safety-critical applications. Expert in end-to-end system architecture, hardware-software integration, and wireless connectivity solutions. Proven track record transforming complex requirements into production-ready embedded platforms that scale from proof-of-concept to millions of deployed devices.

**Core Architecture Expertise:**

* **System Architecture Design:** 30+ years architecting embedded systems from bare-metal to full Linux platforms
* **Medical & Healthcare IoT:** Clinical blood analyzers, wearable biometric devices, remote monitoring systems
* **Wireless Protocol Architecture:** BLE, Wi-Fi, Proprietary UHF, LoRa, NFC implementations for connected ecosystems
* **Hardware-Software Integration:** ARM Cortex processors, board bring-up, system-level debugging
* **Performance Optimization:** Power-efficient designs for battery-operated devices, real-time constraints

## PROFESSIONAL EXPERIENCE

### \*\*RL Tech Solutions LLC\*\* — President & Chief Technology Officer | Embedded Systems Architecture Consultant

**October 2022 – Present | Rochester, NY**

Leading embedded systems architecture consulting for cutting-edge technology companies, specializing in scalable IoT platforms and connected device ecosystems.

**Key Architecture Achievements:**

* Architected next-generation Linux-based embedded platforms supporting multiple wireless protocols (Wi-Fi, BLE)
* Designed modular system architectures enabling rapid product development and feature expansion
* Established embedded development best practices including coding standards, testing frameworks, and CI/CD pipelines
* Led architecture reviews ensuring compliance with industry standards and regulatory requirements

**Client Engagements:**

* **Topcon Positioning Systems** — *Senior Embedded Software Consultant*
  Oct 2023 – Apr 2025
  \* Architected and developed critical Linux C++ subsystems for next-generation GNSS receivers using embedded ARM A9 TI processors
  \* Implemented high-performance multi-threaded applications optimized for battery-powered, resource-constrained embedded devices
  \* Delivered 150,000+ lines of production C++ code with comprehensive test coverage using Python, pytest, and Google Test frameworks
  \* Implemented advanced white box testing strategies with systematic source code analysis for comprehensive test plan generation
  \* Achieved 40% performance improvement through CPU profiling using perf and flame graph analysis
  \* Developed custom loopback filesystem and Python curses monitoring applications for real-time thread CPU utilization debugging
  \* Established Git-based version control workflows and CI/CD pipelines following industry best practices
* **D3 Engineering / L3Harris Aerospace** — *Chief Engineer Consultant*
  Oct 2022 – Dec 2023
   *Spacecraft Payload Architecture:*\* Architected complex spacecraft payload systems integrating 5 radiation-hardened MCUs via SpaceWire/SpaceFibre communication for distributed high-performance embedded computing applications
   *High-Performance Embedded Computing:*\* Designed heterogeneous CPU/FPGA computing architectures running NASA Core Flight System (cFS) framework on RTEMs RTOS for onboard processing
   *CCSDS C\&DH Systems:*\* Implemented CCSDS Command & Data Handling protocols and high-speed downlink architectures for spacecraft payload data processing
   *Software Architecture:*\* Implemented microservices architecture with fault-tolerant design principles for enhanced reliability and maintainability in space environments
   *Requirements Analysis:*\* Decomposed high-level satellite system requirements into detailed hardware, software, and firmware specifications
   *Radiation Hardening:*\* Implemented error correction codes, redundancy schemes, and radiation mitigation techniques for space-qualified embedded systems
   *Business Impact:*\* Contributed to winning \$50M+ aerospace contract through technical architecture presentation and system design including multi-Terabyte data recorder architecture for mission data management

### \*\*Panasonic Industrial IoT Division\*\* — Engineering Group Manager

**February 2021 – October 2022 | Rochester, NY**

* Managed cross-functional engineering teams spanning RF Engineering, protocol design, antenna development, mesh networking, and embedded firmware
* Directed development of industrial IoT devices with integrated RESTful interfaces for enterprise system integration
* Resolved critical RF communication protocol issues for 2000+ device customer deployment during COVID-19 constraints
* Transformed testing processes from manual to fully automated, reducing test cycle time from weeks to 3 days
* Led technology roadmap development for next-generation industrial IoT product portfolio

### \*\*Tokenize Inc.\*\* — Vice President of Engineering

**September 2015 – February 2021 | Rochester, NY**

* Spearheaded R\&D for biometric wearable devices incorporating NFC technology and capacitive fingerprint scanning
* Designed ultra-low-power embedded electronics meeting strict battery life requirements for wearable applications
* Developed real-time signal processing algorithms and visualization tools for capacitive sensing systems
* Collaborated with hardware teams on power optimization strategies for resource-constrained wearable devices

### \*\*L3Harris Geospatial Systems\*\* — Chief Scientist / Principal Investigator

**May 2002 – September 2015 | Rochester, NY**

* Developed advanced in-situ telescope wavefront correction algorithms using Python for space-based optical systems
* Served as lead architect for GPS-III satellite program test equipment, defining system requirements and FPGA-based hardware architecture
* Designed onboard payload processing electronics for Wide Area Airborne Surveillance (WAAS) systems
* Led development of 7-slot high-altitude VPX supercomputing cluster for Advanced Geospatial Processing applications
* Architected electronic payload systems for visual and infrared sensor platforms

### \*\*Eastman Kodak Company\*\* — Chief Firmware Architect

**1995 – 2002 | Rochester, NY**

* Led international firmware development teams for hybrid consumer digital camera products
* Integrated emerging sensor technologies and wireless capabilities (Bluetooth) into embedded camera systems
* Designed application frameworks and device drivers for memory-constrained embedded systems
* Co-architected USB device drivers and PIMA 15740 application layer protocol implementation
* Developed real-time image processing algorithms for laser printer marking systems
* Created calibration algorithms for non-linear laser marking engine components

## TECHNICAL SKILLS

### Programming Languages & Tools

* **Languages:** C/C++ (30+ years), Python, JavaScript, Java, HTML/CSS, Forth, Assembly (ARM, x86)
* **Build Systems:** CMake, Make, Yocto, Buildroot
* **Version Control:** Git, GitHub, GitLab
* **Testing:** Google Test, Unity, Hardware-in-the-Loop testing

### Embedded Operating Systems

* **Embedded RT Linux:** Embedded Linux kernel configuration, device drivers, BSP development
* **RTOS:** FreeRTOS, RTEMs, Nucleus RTOS, bare-metal programming
* **Development:** Cross-compilation, remote debugging, JTAG/SWD

### Hardware Platforms & Processors

* **Microcontrollers:** ARM Cortex-M/A series, TI MSP430, STM32
* **SoCs:** NXP i.MX, TI Sitara, Broadcom
* **Interfaces:** I2C, SPI, UART, USB, Ethernet

### Wireless Technologies & IoT

* **Protocols:** Bluetooth Low Energy (BLE), Ethernet, Wi-Fi, NFC
* **IoT Platforms:** MQTT, CoAP, RESTful APIs
* **Edge Computing:** Local data processing, sensor fusion
* **Security:** TLS/SSL, secure boot

### System Architecture & Design

* **Architecture Patterns:** Layered architecture, event-driven systems, pub-sub
* **Performance:** Power optimization, real-time constraints, memory management
* **Documentation:** System specifications, architectural diagrams, API design

### Development Methodologies

* **Agile/Scrum:** Sprint planning, backlog management, continuous integration
* **Code Reviews:** Design reviews, peer programming, best practices enforcement
* **Mentoring:** Technical leadership, knowledge transfer, team development

## RELEVANT PROJECTS & ACHIEVEMENTS

### Distributed Satellite Systems Architecture

* Architected distributed satellite payload processing system based on NASA CFS (Core Flight System) middleware
* Designed fault-tolerant architecture enabling real-time payload data processing across multiple spacecraft nodes
* Implemented modular software architecture supporting mission-specific payload configurations

### Heterogeneous Computing Platform Architecture

* Created distributed heterogeneous architectures integrating CPUs and FPGAs for airborne and space platforms
* Designed high-performance data processing pipelines leveraging FPGA acceleration for signal processing
* Architected system-level integration enabling seamless CPU-FPGA communication and workload distribution

### Object-Oriented Embedded Framework

* Created comprehensive OO software framework for Kodak Digital Cameras product line
* Designed reusable component architecture supporting multiple camera models from single codebase
* Established design patterns enabling rapid feature development and product variants

## PATENTS & PUBLICATIONS

* 20+ US Patents in embedded systems, signal processing, and IoT architectures.
* Co-authored paper titled ["Real-time airborne data management system"](https://www.spiedigitallibrary.org/conference-proceedings-of-spie/7307/73070Q/Real-time-airborne-data-management-system/10.1117/12.828236.short).
* Published articles on modern C++ for embedded systems and functional safety.
* White paper: "C++26 Reflection - Revolutionizing Memory-Constrained Embedded Systems".
* Technical article: "Functional Safety Standards Hierarchy for ProfiSafe Implementation".

## EDUCATION

**Bachelor of Science in Electrical Engineering**
University of Dayton | Dayton, Ohio

## LEADERSHIP PHILOSOPHY

I believe embedded systems architects must balance technical excellence with practical delivery. My approach combines hands-on technical leadership with strategic platform thinking, ensuring systems not only meet today's requirements but scale for tomorrow's challenges. I'm passionate about creating reliable, maintainable architectures that empower development teams to innovate rapidly while maintaining the highest standards for safety and reliability.

## CLEARANCE

Previously held DoD Top Secret clearance with SSBI for SCI access (available for reinstatement)

## PROFESSIONAL CREDENTIALS

**FCC Amateur Extra Class License Holder (AB2MD)** - Highest level amateur radio license demonstrating advanced RF and electronics expertise