Andrew Yankovich

Pittsburgh, PA · (724) 396-0149 · andrewjyankovich@gmail.com · ajy.cool

SUMMARY

Safety-critical embedded software engineer and technical lead for rail transit systems. Carried a SIL 4 brake assurance software program to TÜV SÜD certification as sole verifier and validator, built and shipped an onboard OT intrusion detection and prevention system to a light-rail fleet, and performs independent software assessments and supplier audits for rail OEMs. Hands-on from board bring-up and embedded Linux through procurement specifications and certification packages.

TECHNICAL SKILLS

- **Safety & Standards:** EN 50126, EN 50128 / EN 50716, EN 50129, IEC 61508; SIL 2–SIL 4 lifecycles; FTA, FMEA, RAMS, Safety Cases; requirements traceability; V&V
- **Cybersecurity & Compliance:** IEC 62443, NIST SP 800-171, OT network segmentation, penetration test procedures, Suricata IDS; ISO 9001; FRA 49 CFR Part 229
- **Embedded & Linux:** C, Assembly, Python; TI and STM32 MCUs, NXP i.MX6; RTOS; U-Boot; hardened custom Linux distributions, OTA updates
- **Hardware & Test:** Board bring-up, PCB debug, schematic review; NI DAQ, hardware-in-the-loop test benches, LabVIEW; environmental and thermal qualification
- **Rail Domain:** CBTC, PTC, driverless (GoA4) automated people movers, onboard monitoring and diagnostics

EXPERIENCE

SIL4 Systems Pittsburgh, PA
Director of Software Engineering *January 2025 – Present*
Lead Software Engineer *May 2022 – December 2024*

Safety Certification & Independent Verification

- Served as sole verifier and validator for the SIL 4 software certification of a safety-critical Brake Assurance Monitor for a major rail transit client per CENELEC EN 50128, carrying the program through TÜV SÜD Safety Case submittal and multi-round assessor comment resolution to an issued SIL 4 certificate; remain verifier for post-certification software changes
- Authored and released 78 standard-compliant documents covering the full safety lifecycle: system, hardware, and software requirements; fault tree analysis with common-cause (β-factor) scoring per IEC 61508 and FMEDA using exida OEMx; reliability and safety plans; software verification reports; configuration management plans; and the Safety Case
- Produced all software component and source code verification reports for a multi-module, RTOS-based embedded safety system assessed by TÜV SÜD
- Performed EN 50128 and IEEE software document assessments and in-process supplier audits of a railcar HVAC supplier's software lifecycle for a major U.S. heavy-rail vehicle refurbishment program (2024–2026)
- Produced phase verification reports for a vital onboard train computer; published safety documentation for an IEC 61508-compliant embedded industrial panel controller directly from code and schematics

Technical Leadership & Business

- Act as the firm's software technical authority and primary technical contact for client reviews, document releases, and troubleshooting across concurrent engagements; author most proposals and software deliverables
- Wrote vehicle procurement technical specifications for a driverless (GoA4) automated people mover fleet at a major U.S. airport, covering communications, monitoring and diagnostics, friction braking, and systems and software engineering management; resolved multi-party reviewer comments against the owner's requirements and ConOps
- Supervised and mentored four engineering interns (2024–2025), including a Carnegie Mellon graduate intern; set weekly goals and directed an AI passenger-counting prototype through on-vehicle trials
- Led the company to ISO 9001:2015 certification (2025): built the quality management system (KPIs, configuration management, management review), prepared for the registrar audit, and closed out all findings; documented the new product development process
- Wrote 15+ technical proposals, statements of capability, and cost estimates, including a SIL 4 development and certification program for a train collision-avoidance system in India and a transit agency network modernization bid
- Provided technical analysis supporting the CEO's expert-witness declarations in three USPTO inter partes reviews and related patent litigation on rail collision-avoidance patents: claim charts, prior-art chronologies, and rebuttals of opposing declarations

Cybersecurity

- Led end-to-end design, development, and delivery of an onboard intrusion detection and prevention system (IDPS) for rail transit: hardened Linux OS, cybersecurity stack, web management dashboard, and OTA updates; verified and shipped 64 production units to a light-rail fleet
- Ran an attack-detection test campaign (Metasploit, Core Impact) against Snort 3 and Suricata rule sets across 15+ configurations, producing a tuned custom ruleset and a fleet network vulnerability assessment
- Designed an acknowledged log-forwarding pipeline from onboard intrusion detection (Suricata) to a centralized log platform for a transit agency's fleet, with batched hash-matched delivery confirmation and bounded retry and dead-letter handling at ~60 MB/s per vehicle
- Scoped an onboard OT security gateway isolating vehicle control networks (doors, propulsion, braking) from wayside, CCTV, and passenger-counting networks
- Authored internal and third-party OT network penetration test procedures and topology diagrams for a major rail transit authority; developed mitigation plans for the third-party findings
- Performed NIST SP 800-171 compliance assessments for cloud hosting and email infrastructure; evaluated and briefed OT network security monitoring vendors to support customer procurement decisions
- Developing a cybersecurity implementation guide for rail transit authorities, consolidating 13 contractor plans into a standard framework of resources, actions, and timelines

Embedded Systems, Hardware & Test

- Leading hands-on bring-up of a custom NXP i.MX6 Dual board: U-Boot DDR3L configuration, PMIC power-sequencing debug, SPI NOR programming over USB, and UART bring-up
- Performed FRA 49 CFR Part 229, Appendix D crashworthiness qualification testing and reporting for crash-hardened event recorder memory modules, including a qualification report for a major locomotive event-recorder OEM; produced the thermal simulation report
- Migrated a brake controller hardware-in-the-loop test bench from LabVIEW to Python
- Designed comparative endurance and thermal stress test programs for embedded SSDs at operating temperature extremes; formal reports drove hardware qualification decisions
- Characterized an undocumented proprietary hardware platform using NI DAQ libraries, multi-threaded Python test code, and automated reporting; wrote Linux C code to measure storage read/write speed versus temperature
- Led adaptation of YOLO-based object detection models for rail transit environments; authored proposals and datasheets for AI-based passenger counting and detection products
- Took hardware and software products from requirements and datasheet through manufacturing, QA, shipping, and customer release; produced hardware diagrams, cable assembly drawings, and BOMs

PUBLICATIONS

Fail-Safe Mission Critical System Design (with Carl Conti; manuscript complete, 2026). A practitioner's guide to developing safety-critical embedded systems under EN 5012x, IEC 61508, IEC 62443, and IEC 60601, with industry case studies.

EDUCATION

California University of Pennsylvania (now PennWest California) California, PA
Bachelor of Science in Computer Engineering *May 2022*

- Honors Program · Phi Gamma Delta: 300+ hours of community service