Michael Sweatt

Senior Systems Engineer | Requirements Engineering & System Safety Assurance | Safety-Critical Software Platforms
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Requirements engineering and system safety leader with experience on certified, safety-critical platforms across rail, automotive, and locomotive domains. Currently lead requirements engineering for the rail industry's first cloud-based safety-critical train dispatch platform, authoring and governing a 500+ requirement subsystem specification with lifecycle traceability in Polarion. Prior decade at GM spanning ISO 26262 hazard analysis, FTA/SEFA, DFMEA, and fail-operational design across the BEV propulsion portfolio. Published empirical researcher on AI evaluation reliability in engineering workflows. Proven leading cross-functional teams of 30–50 engineers.

PROFESSIONAL EXPERIENCE

Senior Systems Engineer | Siemens Mobility | Pittsburgh, PA **Apr 2025 – Present**

Requirements engineering lead for a cloud-based, safety-critical train dispatch platform, the first migration of safety-critical rail dispatch to the cloud, governed by BS EN 62267 (safeguards for driverless and unattended train operation) and GERT8000.

- Author and own the Subsystem Requirements Specification (SSRS), 500+ requirements decomposed from the system-level SRS and defining how the dispatch platform manages trains, consumed downstream by the subsystem design specification, UI/UX specification, and customer-facing ICD.
- Govern bidirectional traceability in Polarion from operational hazards through software-level safety requirements to verification: 400+ requirements refined from the system-level SRS, 300+ linked to test cases to date on the active program.
- Decompose system hazards into software safety requirements for a distributed cloud architecture, working daily with software developers, the safety assurance team, testers, and the customer.
- Validate operational requirements directly with customer dispatch stakeholders through interactive prototype demonstrations; reduced requirement validation cycles by 80% (weeks to days).
- Design and govern AI-augmented requirements workflows (Claude Code, MCP-integrated Polarion auditing) under documented operational rules and evaluation criteria; reduced prototype development time by 95% (months to days).

Lead Systems Technical Specialist | General Motors | Warren, MI **Jun 2021 – Apr 2025**

- Provided technical leadership to 40+ propulsion system architects and engineers across GM's BEV portfolio (Cadillac Lyriq, Optiq, Silverado EV, Hummer EV).
- Conducted hazard analyses, Fault Tree Analyses (FTA), and Single Element Failure Analyses (SEFA) feeding SFMEAs and system safety assessments for high-voltage propulsion under ISO 26262.
- Authored and decomposed safety requirements for fail-operational and degraded-mode strategies; single-motor limp-home for dual-motor configurations, half-pack operation under battery cell faults, and active discharge (HV bus below 60 V within 300 ms of key-off).
- Led cross-functional NACS charging diagnostic investigation (20+ SMEs, 8-week sprint) to root cause of fleet-wide charging failures traced to a stale legacy requirement, avoiding a potential recall across four nameplates; block and sequence diagrams adopted as standard DFMEA artifacts.
- Reduced critical system failures in BEV propulsion to the 48 IPTV target through structured DFMEA methodology; mentored systems engineers in requirements development and DFMEA analysis.

Advanced Battery Algorithm Engineer | General Motors | Warren, MI **Sep 2020 – Jun 2021**

- Led team implementing battery diagnostics and prognostics enabling preemptive recalls of vehicles with potential fire hazards; developed and validated battery life metric algorithms for dual-pack architectures in MATLAB/Simulink; accelerated software development 25% via SIL methodology.

BEV Lead Systems Engineer | General Motors | Pontiac, MI **Jun 2017 – Sep 2020**

- Authored Propulsion Subsystem Specifications and interface control documents for the EV portfolio; led 15+ member integration teams and 50+ member product development forums; drove design decisions through system DFMEAs and program reviews.

Hybrid Systems Engineer | General Motors | Pontiac, MI **Aug 2015 – Jun 2017**

- Spearheaded migration of requirement specifications from Excel to IBM DOORS, designing a requirements management process adopted by subsequent propulsion programs — foundational requirements-at-scale infrastructure work.
- Led European BEV feasibility study coordinating GM Europe and Streetscooter third-party vehicle integration.

Auxiliary Power Subsystem Team Lead | GE Transportation | Erie, PA **Sep 2011 – Aug 2015**

- Directed auxiliary power distribution and battery charging systems for locomotives; integral contributor to GE Evolution Series Tier 4 launch (65–85% emissions reduction); developed charging control strategies in C and MATLAB/Simulink.

Edison Engineering Development Program | GE Transportation | Erie, PA **Oct 2009 – Sep 2011**

- Competitive two-year rotational program: four engineering assignments plus graduate coursework applied toward M.S. at Georgia Tech.

SELECTED TECHNICAL PROJECTS & RESEARCH

- **AI-Assisted Requirements Decomposition System**: Built multi-agent system automating requirements decomposition workflows, achieving 34% quality improvement over manual baseline with 100% output consistency across 110 tests; presented to Siemens engineering leadership as a proof of concept for AI-augmented requirements engineering.
- **"The Meter and the Judge"**: Pre-registered empirical study (~4,000 measured API calls) on cost governance and LLM-as-judge reliability in AI-augmented engineering workflows. Key finding: task cost is stable and bandable, but judge–human agreement on quality was 54.9%, with 83% of disagreement traced to underspecified quality criteria, directly relevant to ML evaluation V&V and safety argumentation. mikescorner.io | GitHub repo
- **Requirements Engineering Evals**: Ongoing pre-registered evaluation framework for AI detection of requirement defects in safety-critical corpora, with frozen corpus and human-only seed authorship protocols.

EDUCATION

M.S. Electrical Engineering — Georgia Institute of Technology **December 2013**
B.S. Electrical Engineering — University of Maryland, College Park **May 2009**

SKILLS & CERTIFICATIONS

Requirements Engineering: Requirements authorship & decomposition at scale (system → subsystem → software), safety requirements traceability, Polarion (daily, MCP-integrated), IBM DOORS/DNG, Enterprise Architect, UML/SysML, requirements process design

Functional Safety: ISO 26262 (Parts 3–6: HARA-adjacent hazard analysis, FSR/TSR decomposition, software safety requirements), BS EN 62267, GERT8000, FTA, SEFA/SFMEA, DFMEA, fail-operational & degraded-mode design

AI-Augmented Engineering: Claude Code, MCP integrations, RAG architectures, LLM evaluation design (pre-registered evals, judge calibration), token-economics governance, prompt engineering

Languages & Tools: Python, MATLAB/Simulink, C/C++ (familiar), Git, Docker, Linux, SIL/HIL testing, CI/CD

Certifications: PMP | DFSS Black Belt | Deep Learning Specialization (Stanford) | Machine Learning Specialization (Stanford)