

Joon Bauer

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SUMMARY

Senior autonomy systems engineering specialist with 13 years of experience integrating robotics, **autonomous** machines, sensing, **controls**, and embedded hardware and software systems for construction and off highway applications. Leads architecture, requirements, systems integration, verification, validation, troubleshooting, and **release readiness** from concept through machine testing. Hands on work spans laboratory development, hardware in the loop testing, field testing, and proving ground demonstrations. Deep knowledge of Planning, Perception, Positioning, Controls, **artificial intelligence**, LIDAR, GNSS, GPS, Radar, and camera sensors supports practical decisions across complex machine programs. Resolves cross domain failures through code, logs, diagnostics, sensor evidence, and structured root cause analysis. Facilitates design reviews, mentors engineers, and communicates evidence based risk, quality, cost, and readiness decisions to technical teams and leaders.

EXPERIENCE

Principal Systems Integration Engineer

March 2023 - Present

ForgePath Autonomy

Madison, WI

Leads autonomy integration work across machine architecture, requirements, hardware and software coordination, validation, issue resolution, and release readiness. Supports multidisciplinary delivery with hands on laboratory and proving ground work while mentoring engineers and balancing product quality, schedule, cost, and risk.

- Directed excavator autonomy **architecture** reviews using requirements evidence and machine constraints.
- Integrated LIDAR, GNSS, GPS, Radar, and **camera sensors** through structured interface analysis.
- Validated planning, perception, **positioning**, and controls behavior through **HIL** and machine testing.
- Resolved software and hardware faults using **code**, logs, **diagnostics**, and sensor evidence.
- Prepared field release decisions through risk reviews, test results, and stakeholder alignment.

Senior Autonomy Systems Engineer

January 2020 - February 2023

IronPeak Robotics

Milwaukee, WI

Owned systems engineering for autonomous construction machines, connecting architecture, implementation, integration, testing, and field readiness. Guided design tradeoffs, coordinated cross functional teams, and converted machine evidence into practical release decisions for robotics programs.

- Defined autonomous loader requirements from operating scenarios, safety needs, and stakeholder feedback.
- Coordinated **base machine hardware** and **software integration** for articulated truck demonstrations.
- Built **verification** plans linking functional tests, HIL results, field evidence, and release criteria.
- Investigated intermittent positioning faults through diagnostics, **logs**, and controlled proving ground tests.
- Mentored engineers through design reviews, **troubleshooting** sessions, and evidence based **risk** decisions.

Systems Design Engineer

June 2016 - December 2019

Northstar Mobile Systems

Green Bay, WI

Developed system designs for mobile machine controls and autonomy functions, translating product goals into interfaces, requirements, test methods, and integration evidence. Worked closely with software, hardware, and validation teams during laboratory and machine based development.

- Mapped **perception** and controls interfaces for mobile equipment autonomy prototypes.
- Introduced **GNSS** and camera sensor checks within repeatable laboratory **validation** procedures.
- Supported **functional testing** by connecting requirements, diagnostics, test cases, and machine evidence.
- Diagnosed hardware and application failures through code review and signal trace analysis.
- Presented **architecture** tradeoffs and readiness findings during cross functional technical reviews.

Systems Engineer

June 2013 - May 2016

VectorWorks Engineering

Appleton, WI

Supported early systems engineering activities for embedded mobile equipment, building practical experience in requirements, integration, verification, and technical troubleshooting. Partnered with senior engineers on design reviews, laboratory testing, and customer focused demonstrations.

- Captured control system requirements from machine behavior and operator workflow observations.
- Created interface documentation supporting embedded hardware and **software integration** activities.
- Executed verification procedures for sensor inputs, control responses, and fault handling.
- Used logs and diagnostics to isolate repeatable defects during laboratory testing.
- Supported customer demonstrations with test preparation, issue tracking, and evidence packages.

Junior Systems Engineer

June 2013 - May 2014

Axis Mobile Controls

Oshkosh, WI

Built foundational experience in systems engineering for mobile controls through supervised requirements work, integration support, laboratory testing, and troubleshooting. Contributed clear technical evidence that helped senior engineers make sound design and validation decisions.

- Documented system requirements and interface assumptions under senior **engineering** supervision.
- Assisted hardware bring up for embedded control and machine sensor assemblies.
- Ran scripted functional tests and recorded results for verification review.
- Collected logs and diagnostic evidence during controlled fault reproduction sessions.
- Prepared concise test summaries for design reviews and project handoffs.

PROJECTS

Autonomous Loader Site Demonstration 📅 2024

Connected shared goals across autonomy, machine, and validation teams through a loader demonstration. Combined sensor evidence, controls testing, and proving ground feedback into a practical readiness story for technical stakeholders.

Integrated Machine Validation Framework 📅 2022

Built stronger working connections among systems, software, and test engineers by organizing requirements, HIL results, field observations, and release evidence into one repeatable validation approach.

LEADERSHIP & AWARDS

- Systems Engineering Technical Mentor, 2022 - Present. Guides engineers through architecture reviews, troubleshooting, and practical growth milestones.
- INCOSE Certified Systems Engineering Professional, 2021. Recognition reflects sustained systems practice across complex engineering programs.

EDUCATION

Bachelor of Science in Electrical Engineering

2013

University of Wisconsin Platteville GPA: 3.5

Platteville, WI

Coursework: Systems engineering, control systems, robotics, embedded systems

CERTIFICATIONS

- INCOSE Certified Systems Engineering Professional 📅 2021
- Systems Engineering Technical Mentor Recognition 📅 2022

TECHNICAL SKILLS

- **Autonomy Engineering:** Autonomous machines, semi autonomous systems, robotics
- **Systems Engineering:** Requirements, architecture, design reviews
- **Machine Platforms:** Excavators, wheel loaders, articulated trucks
- **Perception Systems:** LIDAR, Radar, camera sensors
- **Positioning Systems:** GNSS, GPS, positioning
- **Controls Engineering:** Planning, controls, machine behavior
- **Verification Methods:** Verification, functional testing, test cases
- **Validation Methods:** Validation, field testing, machine testing
- **Simulation Testing:** HIL, hardware in the loop, laboratory testing
- **Release Engineering:** Release readiness, certification, proving ground support
- **Diagnostics:** Code analysis, logs, diagnostics
- **Project Leadership:** Time management, cost management, risk management

SKILLS

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|-----------------------|----------------|---------------------------|------------------|
| • Autonomy systems | • Requirements | • Controls | • GPS |
| • Robotics | • Planning | • Artificial intelligence | • Radar |
| • Systems integration | • Perception | • LIDAR | • Camera sensors |
| • Architecture | • Positioning | • GNSS | |

PROFESSIONAL AFFILIATIONS

- International Council on Systems Engineering, professional member and systems engineering contributor.
- Systems Engineering Technical Mentor, supporting peer development through reviews, coaching, and shared problem solving.

LANGUAGES

- English (Native)
- Spanish (Intermediate)

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST