MATTHEW HARPER

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EXECUTIVE TECHNICAL SUMMARY

Distinguished-level engineering leader with 15+ years of experience designing, operating, and scaling mission-critical automated systems across aerospace, energy, and industrial platforms. Proven expertise in GPU-adjacent bare-metal systems, fleet lifecycle management, autonomous remediation, reliability engineering, and AI-driven operational intelligence. Demonstrated success leading cross-organizational technical strategy, defining architectures that deliver high availability, observability, utilizing transparency for complex, distributed environments. Deep background applying machine learning to real-world operational failures, predictive maintenance, and system health restoration at scale.

ARCHITECTURAL & PLATFORM LEADERSHIP

- Defined end-to-end lifecycle strategies for large-scale autonomous and distributed systems, from architecture and deployment through observability, remediation, and retirement.
- Architected self-healing systems using ML-based anomaly detection, rule generation, and closed-loop remediation workflows.
- Led cross-functional engineering teams spanning software, hardware, data science, and operations to deliver highly available platforms.
- Established telemetry, observability, and utilization frameworks enabling real-time insight into system health, performance, and resource consumption.
- Created scalable architectural standards and reusable frameworks to enable operations at scale across heterogeneous environments.

SELECTED EXPERIENCE

Surge Energy — Technical Engineering Lead (Automation & AI Platforms) | 2021–2024

- Led architectural strategy for autonomous production platforms integrating embedded intelligence, distributed learning, and real-time control across hundreds of assets.
- Designed and deployed AI-driven observability and remediation systems that reduced unplanned downtime and increased availability.
- Established fleet-wide telemetry, alerting, and health monitoring enabling proactive remediation.
- Delivered multi-million-dollar operational savings through automation, reliability engineering, and intelligent optimization.
- Managed multi-million-dollar projects developing autonomous production systems using integrated monitoring platforms and schemas aligning corporate and IT governance and strategies.

Firefly Aerospace — Lead I&C Engineering Consultant | 2021

- Architected mission-critical launch and ground support systems with predictive analytics and real-time observability.
- Delivered autonomous monitoring platforms supporting launch decision-making and system reliability.
- Value delivery provided by knowledge management for teams in the transfer of tacit and explicit knowledge.

Occidental Petroleum (Oxy) — Senior Automation Engineer | 2018–2020

- Led automation, reliability, and safety system architecture for large-scale production facilities.
- Developed autonomous AI-based artificial lift and production optimization systems.
- Improved availability, reduced spurious trips, and achieved significant ROI through reliability engineering.

Chevron Phillips Chemical — IEC Engineer | 2015–2017

- Led electrical, instrumentation, and control system design for chemical manufacturing facilities.
- Implemented alarm management, SIS, and reliability-centered maintenance strategies.

San Jacinto College — Adjunct Faculty | 2012–2016

- Developed and taught courses in control systems, PLC/DCS programming, and instrumentation.
- Prepared students for careers in automation and control engineering.

SpaceX — Electrical Engineer

- Led development of autonomous control and safety systems for rocket test and launch infrastructure.
- Designed and operated highly available electrical and control architectures supporting mission-critical systems supporting Falcon, Falcon-Heavy, Dragon, and Raptor program

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INFRASTRUCTURE & PLATFORM EXPERTISE

Bare-metal systems • Distributed platforms • Observability & telemetry • Lifecycle automation • Reliability engineering (MTBF, MTTR, SLOs) • AI/ML for operations • CI/CD for operational systems

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EDUCATION

- **MS, Data Science** – *Texas A&M University - Victoria*
- **MS, Computer Science** – *University of Houston - Victoria*
- **BS, Electrical Engineering** – *Texas A&M University*
- **AS, Mathematics** – *San Jacinto College*
- **AAS, Instrumentation Technology** – *San Jacinto College*

CERTIFICATIONS & TRAINING

UH Data Analytics & Machine Learning Certificate
ISA 84 SIS Expert
*Texas Master Electrical License (**TMEL**)*
*NFPA Certified Electrical Safety Expert (**CESP**)*
*NCCER Certified Instrument Technician (**NCIT**)*
*Certified Fieldbus Technical Specialist (**CFTS**)*
Certified Honeywell Field Device Manager Programming Associate
*DHS Industrial Cyber Emergency Response Team (**CERT**) Certificate*

HONORS & AWARDS

***2025 Top Graduate Award** - University of Houston-Victoria*
***2023 Technical Innovation Award** – Surge Energy, Smart Systems*
***2018 Thanx Award** – Innovation and Dedication – Oxy, New Mexico*
***2015 Kick Ass Award** - SpaceX, McGregor Test Site*
***Electrical Design Project** – Texas A&M University*
***Phi Theta Kappa** - Honor Society*
***Phi Kappa Phi** - Honor Society*

HIGHLIGHTS & IMPACT

- 10+ years delivering **PLC-integrated, high-reliability systems** in energy, aerospace, and AI research.
- Led teams of engineers and developers, **mentoring junior engineers into technical leaders**.
- Successfully executed projects improving **automation reliability, CI/CD processes, and system performance**.
- Deep expertise applied **AI/ML**, and large-scale engineering systems aligned with a focus on innovation in AI computing.
- **Hands-on** domain level experience in electrical, instrumentation, automation, and programming.

PROJECTS

- **Electrical** Aerospace, Data Center, Industrial, Chemical, Oil & Gas, Manufacturing

- **Aerospace** Rocket Launch and Testing design, Instrumentation, Engineering and Operations
- **Automation** CI/CD Development Testing, Commissioning, Maintenance, Operations
- **Petrochemicals** Cedar Bayou $7B US Gulf Coast (**USGC**) polyethylene
- **Multimodal** based AI vision transformer models used for process optimization and rationalization using CLIP with image and text encoders.
- **Embedded AI based** autonomous well monitoring Smart Lift gas injection optimization project.
- **Agentic AI** Smart Tank project in which autonomous monitoring and control utilized for dynamic PVT monitoring and dynamic set point and control adjusting in real-time to increase production and increase safety and reliability.
- **Intelligent Agent** development project deployed to identify product bottlenecks, abnormalities, material balancing, and self-generated or generative rule generation for pattern

CORE SKILLS

- **Automation**: Yokogawa, Rockwell RSLogix 500, Controllogix 5000, Modicon, Siemens S5, GE Fanuc, Triconex TS32, Texas Instruments C2000 Piccolo, Arduino Uno w/Ethernet card, Emerson DeltaV, Honeywell Experion & Safety Manager, OSI PI, IP21, Smartphone Google Android application programming, real-time digital watermarking.
- **Network**: TCP/UDP, APIs, Ethernet, Fieldbus, HART, Profibus, Modbus, fiber optics, Device net, DH+, DH485, RS232/422/485, Network Address Translators (NATs), MOXA NPort serial device servers, Ethernet-to-fiber converters (single/multi modes), Wireshark, Cisco Switches/Routers.
- **VFD**: Allen Bradley Power Flex, Omron, Siemens, Baker Hughes, Schneider, Toshiba, Texas Instruments Piccolo.
- **DAQ**: National Instruments SCXI, PXI, PCI, Fieldpoint modules DSP Texas Instruments C6748.
- **HMI**: Rockwell FactoryTalk, Allen Bradley PanelView, Invensys Wonderware, Modicon, DeltaV, Honeywell, National Instruments Labview, Yokogawa, PyQT, C++.
- **Programming**: C, C++, C#, R, Python, Java, Visual BASIC, VB.NET, DOS, Linux, SQL, Ladder Logic, Function Blocks, Sequential Function Chart, and Structured Text. Web Interpreters Jupyter Notebook, Colab, Visualization – Tableau, Spotfire, Matplot.
- **AI/ML Engineering**: Deep Learning Models (CNN,RNN,LSTM), Data Mining, Data Analytics, NLP and LLMs, Computer Vision, Image Recognition, Classification, Regression, Time-Series Models, ANNs, Decision Trees, Random Forest, Logistic Regression, Clustering, Predictive Analytics, Semantic Analysis, Artificial Process Control and Artificial Alarm Analysis
- **Libraries**: TensorFlow, PyTorch, Keras, Pandas, NumPy, Scikit-learn, MLflow, MLOps, AIOps, LLMs, BERT, GPT, CLIP, RAG, Nvidia NeMo toolkit for automatic speech recognition (ASR), Matplot, PySpark, Seaborn, Beautiful Soup, OpenCV, SciPy, Theano, MLflow, and Streamlit data visualization.
- **Compilers**: Texas Instruments TMS320C55x Optimizing C/C++ Compiler, NI LabView, Microsoft VisualStudio, Android Studio for Android Development. Additional Modeling and simulation experience with PSpice, Matlab Simulink. Code Composer Studio for TMS320C6748 DSP (Texas Instrument C6748), Jupyter Notebook.
- **Engineering**: exSILentia, AutoCAD, MathWorks MATLAB, SmartPlant, ETAP, SKM, PHAWorks/Pro, Altium PCB designer, CMMS, AMS.
- **Software & Cloud:** SCADA, PLC, RTU, DCS, Python, Linux, Bash, C++, SQL, cloud infrastructure (GCP, AWS, Azure), CI/CD, API design, ML/AI workflows such as Databricks MLflow, Docker, Tableau.
- **Leadership & Management:** Team leadership, talent development, mentoring junior engineers, cross-team collaboration, engineering governance, knowledge transfer and sharing.
- **Pipelines:** Apache Spark, Hadoop, Pandas, Kafka, Streamlit, Colab, Jupyter

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