

Matthew Harper

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Summary

Innovative engineering leader with 15+ years leading cross-functional teams delivering impactful engineering, automation, and autonomous solutions. Proven track record in leading teams, implementing transformative solutions, while applying novel practices to improve reliability, scalability, and feature delivery. Strong background in AI/ML, data analytics, and large-scale system integration with expertise in end-to-end project execution, operations, maintenance, and mentoring future engineering leaders. Experienced in research, development, and exploration of new artificial intelligence techniques and applications which bridge the gap between theoretical AI concepts and practical, real-world solutions.

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, Matplotlib.
- **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), Matplotlib, 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.
- **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

PROFESSIONAL EXPERIENCE

University of Houston-Victoria | Artificial Intelligence Researcher

Aug 2024 – Feb 2025

- Developed and trained machine learning models such as XGBoost, LSTM, RAG, Predictive, and Clustering for rule generation in real-world applications including energy, healthcare, finance, and industrial reliability.

- Built end-to-end ML workflows including data acquisition, preprocessing, training, deployment, and optimization.
- Collaborated with cross-disciplinary teams of researchers and engineers, producing actionable AI solutions bridging theory and practice.

Surge Energy | Technical Engineering Lead (Automation, Data, Electrical, Instrument)

Aug 2021 – Mar 2024

- Managed MM projects developing autonomous production systems using integrated monitoring platforms and schemas aligning corporate and IT governance and strategies.
- Led the development and implementation of data-driven solutions to optimize production and reduce process alarms, improve facility performance, and enhance operational decision-making.
- Led a team of 15+ implementing ML-based optimization projects for real-time dashboards, predictive analytics, and alarm reduction, improving decision-making and efficiency.
- Directed CI/CD software projects for autonomous control systems (Smart Lift, Smart Tank, Smart Level) increasing production efficiency while reducing downtime.
- Governance and knowledge management provided for teams in the transfer of tacit and explicit knowledge.
- Automated measurement and material balancing at production and custody transfer points, documentation of meter factors, and compliance with API MPMS and TRRC Title 16.

Firefly Aerospace | Instrument & Control Engineering Lead (Consultant)

Feb 2021 – Jul 2021

- Led the design and implementation of mission-critical area warning systems and control systems for ground support and space vehicle launch operations at Vandenberg AFB.
- Developed predictive analytics dashboards integrating ML algorithms for real-time launch insights and resource optimization.
- Managed strategic alignment of resources with cross-functional teams ensuring designs met project scheduling, costs, safety, reliability, and operational requirements.
- Led the design and development of critical safety systems for space vehicle launch and testing, including the Area Warning System and network communication systems.
- Provided technical guidance for projects involving instrumentation, controls, and automation systems, ensuring compliance with safety standards and operational requirements.
- Successfully developed and implemented data network systems, including a triple redundant PTP satellite timing network.
- Utilized machine learning techniques to predict launch anomalies and enhance system reliability.

Oxy | Sr. Automation Engineer

Oct 2018 – Jun 2020

- Designed autonomous artificial lift and well production systems leveraging stochastic optimization and ML-based decision-making.
- Led the development and implementation of advanced automation systems to optimize well production, improve facility reliability, and enhance safety.
- Electrical UPS battery design and specification with on-demand time calculator for evaluation, testing, and validation.
- Electrical specifications for well site locations including one lines, electrical switch rack designs, underground, cable schedules, arc flash studies and equipment labeling.
- Electrical, Instrument, and Software FAT/SAT testing procedures and reports developed for quality assurance to reduce cost and installation time while increasing reliability and operability.
- Utilized data science and machine learning techniques to analyze operational data, identify trends, and optimize processes, resulting in increased process availability and production, reduced alarm rates, and improved safety.
- Provided technical leadership for electrical engineering and instrumentation projects, ensuring compliance with safety standards and operational requirements with consideration for maintenance and operation.

- Developed autonomous control systems to detect and safely react to process deviations extending operation time and reducing inherent hazardous operations created by initiating and intermediate events.
- Safety systems analysis, design and specification of safety functions, IPLs and ITP development, and Toxic and flammable gas monitoring systems in hazardous areas including H₂S and high LEL gas concentrations.
- Managed project life cycles, from requirements to FAT/SAT testing, commissioning, mechanical integrity, and operational handover.

Invista | E&I Reliability Engineering Lead

Jun 2017 – Jun 2018

- Led engineering resources for electrical, instrumentation, and control systems, including Reliability Centered Maintenance, SIS, PLC/DCS, substations, MCCs, and analyzers.
- Expertise in PHA/LOPA reviews, SIL assessments, root cause analysis, and ALARP risk reduction to ensure safe and reliable operations.
- Proven leader in electrical safety, project/turnaround planning, and technician training, while driving up time, compliance, and with enhanced production and safety performance.

ChevronPhillips | Electrical | IEC Engineer

Sep 2015 – May 2017

- Lead project engineer for electrical, instrumentation, and control system design, operational readiness, SOPs, and training development on USGC 1594 Ethane Cracker \$7B project.
- Project management provided for contract exhibit interpretation and assurance. Design of real-time monitoring, condition-based maintenance systems for reliability centered maintenance implementation.
- Electrical power load flow, short circuit, arc flash, and motor trip characteristic studies performed with ETAP.
- Motor and power relay setting and programming scheme development with acSElerator software for SEL relays for zones of protection, motor start protection schemes, Power Management System remote monitoring (TCP/Modbus over Fiber optic mediums), and reporting. Electrical switchgear testing (ANSI/NETA), maintenance, and switching procedures.
- Lead participant for ID and FD fan operational safety requirements and interlock requirements in SRS and control and interlock narratives based on NFPA 85/ANSI/ISA77.
- Led the Mechanical Integrity Program (MIP) implementation for instrumentation and electrical functional areas and enhanced the evaluation process and increased process reliability. Developed and created an enhanced Reliability Centered Maintenance (RCM) program complete with selective adaptive maintenance strategy selection matrices based on conditions including criticality, FMEA, RCA, and input from a predictive data collection asset database.
- SME in alarm management, SIS diagnostics, IPL/SIF identification, and compliance with NFPA 85/ANSI/ISA77 for boiler, furnace, and burner safety systems.
- Delivered advanced reliability solutions through real-time monitoring, condition-based maintenance, and intelligent device management.
- Testing and commissioning of major DCS/PLC platforms (ControlLogix, Yokogawa Centum VP, Triconex, SEL, Honeywell, Foundation Fieldbus) with proven success in QA, loop checks, and unit operational readiness.

SpaceX | Electrical Engineer

Mar 2014 – Jul 2015

- Led the development of novel autonomous automation systems for rocket test stands, including cryogenic rocket fuel conditioning systems, test stand architecture and control, reactor pressure and level, and dynamic autonomous safety systems.
- Led development, operations, and maintenance of automation, power distribution, and control systems at the McGregor Rocket Test Facility.
- Ensured compliance with NASA and Space Launch range standards for strategic alignment.
- Developed and integrated instrumentation and control systems for mission-critical applications, enhancing system performance and safety.

- Designed and installed mission critical electrical power distribution systems, including generators, automatic transfer switching, UPS, and dynamic load analysis.
- Managed capital projects for Falcon Heavy, Raptor, Crew Dragon, and Merlin S1/S2 test stands.
- Developed software for SCADA systems, PLC programming, and HMI/GUI interfaces and specified, selected, and integrated instrumentation and control systems for various applications.
- Championed implementation of reliability techniques for mechanical/electrical integrity and engineering design based on NASA RCM quality and reliability requirements for improved performance

EDUCATION

- **MS, Data Science (2025)** – *Texas A&M University*
- **MS, Computer Science** – *University of Houston*
- **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
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, 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 recognition .