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## Engineering Experience

### California Aerospace - System Architect (Contract)

2019 - Present

- Writing simulator and performing trade studies for a wildland fire detection drone swarm
- Developing concepts and requirements for system, trading against a large design space for first prototype definition.

### Arrivo - Lead Project Engineer / Infrastructure Group Manager

2017- 2018

- Built and led terrestrial robotics infrastructure group, to design and develop high speed, low cost, rapidly deployable infrastructure and automated tooling equipment.
- Recruited team via network, bringing in expert welders, technicians, machinists and engineers (team of 8)
- Proposed and set up machine shop (CNC Mill, lathe, saws, weld shop, tool cage), implemented work order and inventory process, trained machinist on CNC controller
- Designed a steel- polyurethane composite track span technology demonstrator, led fabrication effort
- Delivered 3 internally fabricated maglev test rigs (propulsion, levitation, vehicle retention) for first investor demo.

### Hyperloop-One - Senior Design Engineer / Engineering Manager

2015-2017

- Architected the first Hyperloop Development system, Designed the core structure of the vacuum tube, support structure and the tooling framework, performed trade studies towards a production system
- Built and managed the hyperstructures and tooling group (6 engineers and director of tooling, shop staff) through the detailed design process, buildout of the shop, and production of first articles, resolution of issues and completion of the build, transitioning into testing.
- Developed requirements, concept, and system models, hired the team, and directed work through concept phase and into construction of first system.
- Spearheaded initial deployment to test site and receiving of first tube articles, trained and led laser tracker inspection team to characterize product, worked with supplier to improve quality control practices at tube production facility in SLRC Mexico.
- Pitched CEO, designed and implemented a ~100,000 sq ft state of the art manufacturing facility in North Las Vegas, from concept to operational in 6 months. Purchased machines, hired staff, developed layout, workflows, and process.
- Led the shop through the first ~300 parts for the development system, coordinating with engineers and supervising machinists, fabricators and inspection personnel fabricating machined parts, waterjet parts, and weldments.
- Development and ownership of the company wide engineering and manufacturing processes, identified need and deployed tools for facilitating a large team to generate a quality product, such as a custom work order system, issue tracker, design workflow, release process, modeling and drafting practices, design tools and spreadsheet calculators.
- Led an internal effort to determine the root cause of failing welds (longitudinal and transverse cracking), isolated technical issues and resolved via hands on approach. Worked with site staff to increase rate ~2x despite more complex process.
- Advised leads on procedures and risk mitigation for system commissioning, performed final inspections and oversaw initial system tests, achieved negligible leak rate on first test, deflections remained within simulated bounds.
- Owned Top Level CAD model and configuration for Devloop Project, consisting of over 2600 unique released parts, and ~40,000 solid bodies. Modeled, drafted and released multiple high level assemblies defining alignment of tube, track, and stator system, as well as sitewide layouts of support equipment, buildings, roads.

### Space Exploration Technologies (SpaceX.com) - Launch Operations Engineer

2011-2013

Responsible engineer for Falcon Heavy rocket lift system, the largest operational lift system in the world (at the time), at Vandenberg CA. Duties include: concept, trade studies, design, analysis, drawings, reviews, production planning, material selection, oversight of manufacturing, procedure development, and oversight of pad operations. Specifically:

- Investigated launch pad system level conceptual trade studies, created full system FEA, and CAD models for comparison.
- Optimized pad structural assembly to meet cost, range, and NASA requirements for fault tolerant systems.
- Designed support equipment for Falcon 9 and Falcon Heavy rockets with hardware in use for Falcon 9.
- Built optimization and analysis tools to increase efficiency, facilitate rapid prototyping, and reduce design cycle time.
- Reduced design timeline by ~50% on the lift linkage project by implementing scripts to reduce iteration time.
- Drafted drawing packages and coordinated with tooling, vendors, and welders to ensure proper documentation.
- Analyzed as built laser tracker data to ensure system functionality despite out of tolerance features. .
- Designed the Falcon 9 engine droop tool to support merlin engines during hangar operations.
- Designed launch crown auto-pinner mechanism to hold down Falcon Heavy during static fire testing and constrain the vehicle in vertical orientation prior to launch.
- Served as responsible engineer for the lift system during first transport erector test campaign.
- Developed procedures and baselines for lift system operations.
- On console in mission control providing real time anomaly resolution and data monitoring during initial raise operations.

## Startups

### Treau - Director of Engineering

2018-2019

- Built and led a team at a small startup to develop a novel heat exchanger incorporated in a mini split AC.
- Developed requirements and concepts based on identified customer needs, market research and industry standards
- Mentored junior engineers through prototype design and build, providing mentoring, documenting best practices, reviewing technical work and helping with fabrication.
- Saw first functional prototype design build through to in place testing.

### Elarm - Lead Mechanical Engineer

2014-2015

- Developed a consumer focused wireless sensor network for home security.
- Designed a series of form factor and functional prototypes for testing and performance analysis.
- Performed thermal analysis, design, and testing to achieve passive cooling by free convection.
- Developed a closed loop control peltier heating and cooling system for testing product thermal performance.
- Wrote scripts for monitoring 3D printers and logging temperature sensor data.

### Freefly Systems - Mechanical Engineer

2013-2014

- Designed, prototyped and brought to market professional grade handheld camera gimbals and drone systems for the film industry
- Developed internal rapid prototyping capability with SLA and FDM printers, CNC equipment, procedures, best practices.
- Built a high performance video editing server

## Education

BS Mechanical Engineering, Virginia Tech 2010

### Virginia Tech, Robotics and Mechanisms Lab - Humanoid Robot Development

2009-2010

- Led a group of engineers to build the first full size autonomous humanoid robot in the US, CHARLI, subsequently won the robocup robot soccer adult size competition in 2011, 2012. Cover of Pop Sci August 2010,

## Software Tools

Teamcenter, NX CAD/CAM, Onshape, Fusion CAM, Solidworks, Catia Trac, Git, FEMAP, ANSYS, NASTRAN, VBA, Embedded systems (cortex M0, arduino, mbed platform),VIM, Bash, Python, Dash, Pandas, HTML & CSS, basic javascript

## Hardware Tools

CNC mill & router (tormach, okuma, Haas), programmable & manual saws (Marvel),Lathes (Engine bed and monarch 10EE), 3D printers ( FDM, SLA, SLS, DMLS ), Laser cutters, Waterjet (Flow, tilt and 5 axis), Welding (stick/MIG, DC TIG), Forklift, boom-lift, aerial platform certified,heavy lifting and rigging, Faro Laser Tracker, parts inspection, GD&T per ASME Y14.5