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Professional Experience

N2L Inc. Blast and Debris Test Engineer January 2024 to April 2025

N2L was a company supporting the Liquid Oxygen and Methane assessment for launch vehicle safety and recording blast probe and high-speed video using phantom cameras of explosive events.

- Interpreted various government Pressure Vessel and Blast Specification in the testing of a 100lb Confined detonation of liquid oxygen and methane vessels mixture for launch vehicle safety assessment.
- Supported team at Air Force Radiation Laboratory in Edwards Air Force Base by cataloging unburnt solid rocket propellant and other debris from the Northrop Grumman Graphite Epoxy Moter (GEM) composite solid rocket motor, setting up high-speed cameras for practice runs and troubleshooting of blast probe data acquisition system.
- Led construction and test of a 25lb Confine By Missile (CBM) test article constructed from polycarbonate that demonstrated the impact of a slow leak mixing of liquid oxygen and liquid natural gas detonation.
- Led construction of various nonexplosive test articles and supporting hardware during the pathfinding phase of the Marshall Space Flight Center Confine by Missile 100 lb test program
- Provide support during the build up at Redstone Test Area in preparation for the 100lb test program
- Created a remote-controlled system using raspberry-pi and telescope tripod that allow for the remote operation of the phantom highspeed cameras using LabVIEW
- Created a backup system that could be installed using an Opta Programable Logic Controller (PLC) controlled remotely using LabVIEW and Modbus TCP communication protocol.
- Reviewed previous blast pressure data of peak over pressure and TNT yield to determine safety radii.
- Updated Safety Hazard Assessment for Confine By Missile (CBM) test for review by Marshall Space Flight Center Safety Officer
- Wrote, reviewed engineering documents, and provide expert opinion on hazard analysis, test procedures and genic drawings need for 45% design review of test article, cryogenic fill system, and test readiness review for 100 lb Confine for liquid oxygen and methane mixtures.

- **NASA Marshall Space Flight Center (MSFC)** December 2019 to November 2023
  - Set up and documented review and loading procedure for the propellant carts for Lunar Flashlight propellant system.
  - Designed fixturing for a commercially available valve testing for the NASA Green Propellant Dual Mode AF-315E propellant demonstration mission.
  - Provided support in setup of a vacuum chamber facility to run a long duration test of MIT Electrospray Thrusters at MSFC.
  - Conducted the testing of Hall thruster on the VAHPER thrust stand.
  - Supervised and aided in the repair and maintenance of the VAHPER thrust stand.
  - Preformed calibrations required for testing the VAHPER thrust stand.
  - Was part of the Cryogenic Fluid Management Insite team for NASA Human Landing System (HLS) program preforming such duties as verification and validation testing against the specifications and requirements.
  - Represented the Cryogenic Fluid Management and Propulsion Team for the internal NASA integration team for Human Landing System Program.
  - Identified watch items and offered technical suggestions in fluids, power, avionics, and instrumentation in Cryogenic Fluid Management and Cryogenic Propellant Feed Systems for Human Landing System for Artimis and Moon to Mars Program.
  - Created a COMSOL model to predicted the stress stain in test sample simulating due to thermal cycling of weld sample of Mars environment Test of the vacuum shell

- Supervised the buildup of the test rig designed to transfer cryogenic fluids to dip test samples and heat up wish bone samples of different welds that to used in the vacuum shell for oxygen liquefaction on Mars.
- Maintained and operated various vacuum systems to perform boil off and small chemical and electric thruster testing.
- Created high level and detailed designs for Vacuum systems and pressure systems components including high voltage vacuum feed throughs required for testing of an arc jet running on AF-315E and DC pre-heater for Nuclear Thermal Rocket Elements Environmental Simulator (NTREES) test articles
- Determined specifications and requirements for the high-power DC system for NTREES upgrade and Cryogenic tank used in the NASA Two Stage Cooling Demonstration
- Created test procedures and safety assessment for various Green Propellant and Cryogenic testing.
- Operated console for various Cryogenic and thruster testing and determined when testing had concluded.
- Resolved programing and hardware problems in LabVIEW Realtime OS, LabVIEW Window Applications, NI-PXI Systems, and instrumentation.
- Researched pulsed power and green propellant based electrical and chemical detonation thrusters for use in space propulsion systems.

University of Alabama in Huntsville - Propulsion Research Center Research Associate II, S3 June 2015 to December 2019

- Preformed Engineering duties and testing duties on project to produce 3D printing concept that use pulse power system to produce composite refractory material part while also centering them.
- Assessed Linear Transformer Drivers for use in alternative propulsion devices such as pulse inductive thrusters or non-nuclear pulsed z-pinch thruster.
- Investigated alternative uses for Linear Transformer Driver such as for use in electromagnet component harding testing.
- Designed and CAD high voltage components for NASA Linear Transformer Drivers Program.
- Manufactured and tested high voltage components for NASA Linear Transformer Drivers Program
- Designed a high voltage low jitter switch that will be used in NASA Linear Transformer Drivers
- Determined the high frequency characteristics of dielectrics to determine their use in Linear Transformer Driver and compact transient timing lines.
- Conducted experiment to determine response of spark gap switches at various gas pressure and compositions to add in the design of switches for Linear Transformer Drivers.
- Trained and Supervised an Intern on how to conduct experiments that involved high voltage
- Coached an Intern in creating blueprints and evaluating if a part is manufacturable.

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Viper Research Solutions LLC Co-Owner and Chief Operations Officer April 2005 to December 2019

VRS is a small company that specializes in manufacturing of prototypes, reverse engineering, CAD work, and outsourcing. As Founder, Chief Engineer, and Production Manager, I was responsible for the manufacturing and engineering departments.

- Reversed Engineered jet pumps components for oil wells for a customer to modernize and replace components on system that were outdated and no longer being produced
- Supported customers' efforts in applying for patents such as a small company that was developing a multipurpose tool for fire fighting by providing CAD models, 3D rendered videos, and drawing using various cad packages.
- Support Customers by interpreting a verity of MIL spec and find appropriate subcontractor to carry out the work and making sure the documentation packet where assembled.
- Created 3D models that customers used to 3D print parts for rapid prototyping cyclical to later be produced using plastic injection molding.
- Interpret customer blueprints using different drafting standards such as ASME Y14.5M-1994 and prints using GD&T to produce quality part for them.
- Conducted literature searches to help customer evaluate their design or to assist in designing their products.
- Conducted searches for material and specialized manufacturing processes in order help customers meet the design and budgetary requirement.
- Supervised the outsourcing of manufacturing process to reduce customer costs and reduce delivery time on products.
- Design and machine fixtures and custom tooling used to reduce manufacturing time and maximize profits.

- Train and Supervise employees that work in the machine shop.
- interface with customers to determine how to best meet their requirement for a given project.
- Process jobs and implement scheduling to make sure that design and manufacturing meet customer expectations.
- Set up & operate manual mills, lathes and B&S automatic screw machines to minimize production time.
- Set up & operate CNC machines using G-code and CAD-CAM to minimize production time.
- Inspect parts, develop quality control procedures, and interface with customers quality control departments to deliver quality parts.

Education

University of Alabama in Huntsville

- Master of Science Aerospace Systems Engineering — December 2015
- Bachelor of Science Mechanical Aerospace Engineering — December 2010

Wallace State Community College

- Associate Degree Machine Tool Technology & Computer Numerical Control — December 2005
  (Magna Cume Laude)
- Technical Certificate Machine Tool Technology & Computer Numerical Control — May 2005

Certifications

- Engineer in Training Certificate
- Cryogenic Handling Certificate from Marshall Space Flight Center
- Oxygen Safety Certificate from Marshall Space Flight Center
- Explosive Handler Certificate from Marshall Space Flight Center

Specialized Computer Skills

- **General:** MathCAD, Matlab, Microsoft Word, Excel, Visio, Power Point & Outlook, C++, LabVIEW
- **CAD Based:** AutoCAD, Inventor, Fusion 360, Solid Edge, PTC Creo, SolidWorks, Patran/Nastran, COSMOS, BobCad, Surfcam.

Conference Papers/Presentations

- Giddens, P., Dr. Cassibry, J., Cortez, R., and Dr. Seidler, W. "Fast Z-pinch Thruster for Space Tugs," 64th IAC, IAC-13,C4.8,3x18442
- Giddens, P., Dr. Cassibry, J., and Dr. Seidler, W. "LTD Driven Z-pinch for Propulsion" 2013 IEEE PPPS, Poster Presentation
- Giddens, P., and Dr. Cassibry, J. "Analysis of Stacked Linear Transformer Drivers for Application in Nuclear Fusion Propulsion," 63rd IAC, IAC-12.C4.7-C3.5.7.
- Adam, R., Allen, M., Demonceaux, A., Doughty, G., Giddens, P., Gonzalez, K., Kuczek, J., Lloyd, K., Williams, R., Cassibry, J., Schillining, N., Winterling, B., "The pulsed fission-fusion (Puff) engine: Development status" 2020 Accelerating Space Commerce, Exploration, and New Discovery Conference, ASCEND 2020, ISBN 9781624106088
- Johnson, W., Dimston, A., Smith, J., Stalker, A., Giddens, P., Tesny, E., "Cryogenic Insulation Solutions for the Surface of Mars withIts Unique Environments" 2021 Virtual Symposium on Performance, Properties and Resiliency of Thermal Insulations
- Johnson, W., Grotenrath, R., Balasubramaniam, R., Smith, J., and Giddens, P. "Transient Liquefaction on the Lunar Martian Surface Operational Demonstration," 2023, 30th Space Cryogenics Workshop and Cryogenic Engineering Conference
- Johnson, W., Grotenrath, R., Balasubramaniam, R., Smith, J., and Giddens, P. "Liquefaction Testing of Oxygen for Lunar and Martian Surface Operational Demonstration," 2023, 30th Space Cryogenics Workshop
- Belcher, T., Giddens, P., Grotenrath, R., Hamill, B., Pedersen, K., Smith, J., Stephens, J., Valenzuela, J., and Witbrodt, R., "Development of a Test Article to Demonstrate the Long Duration Storage of Liquid Hydrogen via a Two-Stage Active Cooling Approach," 2023, AIAA SCITECH 2023 Forum
- Johnson, W., Grotenrath, R., Balasubramaniam, R., Chan, H., Smith, J., and Giddens, P., "Cryogenic Fluid In-Situ Liquefaction for Landers: Prototype Demonstration," 2023 AIAA ASCEND (Accelerating Space Commerce, Exploration, and New Discovery)

- Giddens, P., Smith, J., Tashakkor, S., Stephens, J., Valenzuela, J., Pedersen, K., Hamill, B., Nguyen, S., Witbrodt, W., Belcher, T., Grotenrath, R., Forrester, C., Black, M., Burtts, H., Furby, J., Control System Development for A Zero Boil-Off Hydrogen Storage Demonstration With Two-Stage Active Cooling," 2023, 30th Space Cryogenics Workshop