TYLER G. ROSE

ELECTRO-MECHANICAL-SPACE SYSTEMS ENGINEER

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Updated: 2016-01-09 | US Citizen

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EXECUTIVE SUMMARY

I am a motivated multidisciplinary engineer with experience developed over many years working on small satellites. Serving as Chief Engineer on four flight unit spacecraft from concept through delivery (and operations) has provided me with leadership, research, communication, and management skills. Designing and testing structures, mechanisms, and various electrical systems has led me to develop expertise across all aspects of spacecraft at a low-level. Through my project experience, I've come to realize that I enjoy the entire engineering process from concept all the way through production and operation.

TECHNICAL EXPERTISE

Embedded Systems	RPi, Arduino, MSP430 programming/debugging, I2C, UART, SPI interfaces, circuit board test automation
Electrical Systems	Component selections, circuit design, schematic entry, PCB layout, fabrication, SMT soldering, testing
Mechanical Systems	Material selections, laser cut, 3-D printing, machining setup + DFM experience, CAD rendered images
Comm. Systems	Link budgets, antenna design, HFSS simulations, ground station operation, radio interfaces
Power Systems	Solar panel design, power budgets, battery protection and charging, power management
Attitude Systems	Star & sun sensor design for small satellite attitude knowledge application, magnetic torque coil/rod design
S/C Environment	ESA's SPENVIS, SRIM/TRIM, AGI STK, NASA Approved Space Flight materials (structural and outgassing req'ts)
S/C Integration	Class 10,000 and 1,000 clean rooms, staking and conformal coat experience (5753 and 5750 A/B (LV))
Management	Systems engineering, design reviews, gantt charts, trade studies, risk analyses, proposals, VCS (SVN/Git)
Software	C++, C, Python, Batch, Bash, Excel VBA, Solidworks VBA; Editors - vi, vim, sublime text; IDE - Eclipse, Crossworks

EDUCATION

University of Michigan
MSE Electrical Engineering
Sept 2014 - ??? (ongoing.) | *(3.86/4.0)*

- Analog Circuits
- Integrated microsystems
- Microfabrication tech.
- Wafer processing techniques
- MEMS Sensors
- Stress compensation

University of Michigan
MEng Space Engineering
Sept 2012 - Apr. 2014 | *(3.49/4.0)*

- Spacecraft first order sizing
- Space systems management
- Space instrumentation
- High altitude balloons
- DC/DC Converters
- Comm link analysis
- Antenna element/array design
- Orbit determination methods
- Power Sys Transfer functions
- AC/DC Inverters
- Opportunity analysis
- Risk analysis
- Project management
- Requirements definition
- Science traceability

Morehead State University
BS Space Science
Aug 2008 - May 2012 | *(3.72/4.0)*

- Mission analysis and design
- Space environment
- Satellite communications
- Digital control systems
- Systems engineering
- Flight hardware fabrication
- PCB Standards
- Embedded programming
- Microwave systems

EQUIPMENT EXPERIENCE

Rigol, Agilent, Tektronix Oscilloscopes; HP8753 Network Analyzer; HP8561A and similar Spectrum Analyzers; Agilent FieldFox; DMMs; logic analyzers (saleae); USB-UART adapters (FTDI); Agilent, HP, B&K power supplies; DC Electronic loads, Metcal and Hakko soldering stations; ESD monitoring equipment; solar illumination test beds; vibration testing (Unholtz-Dickie systems); thermal vacuum testing

SOFTWARE EXPERTISE

Solidworks	Altium Designer	MATLAB	MS Office Suite	Adobe Suite
Detailed spacecraft models, ECAD interfacing, housings & mechanisms design	2D/3D design, MCAD-ECAD, multi-layer PCBs, multi-channel (hierarchical) design	Sensor data recording and plotting, vibration test bed interface, RF simulation suite	Highly proficient in Excel, Word, Powerpoint, Visio, Project	Illustrator, Photoshop, Dreamweaver, InDesign, Lightroom, Flash experience

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EXPERIENCE

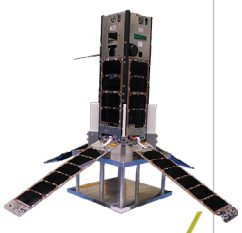
Michigan eXploration Laboratory
2012 - Present

Graduate Student Research Assistant + Lab Manager

In addition to spacecraft engineering-related tasks, I also serve as the lab manager for MXL. I am responsible for maintaining the lab and overseeing projects. I have specified and purchased laboratory upgrades such as a class 1,000 clean room, ESD monitor workstations, and bench-top test equipment alongside testing electrical systems (like power regulation and distribution boards) for CubeSat and high-altitude balloon platforms. I've hosted harness building, soldering, and various other training sessions for future generation MXL'ers. I've advanced the lab through various acts such as improved inventory systems for solar and battery cells, a revamped PCB realization process, automation of electronic parts procurement, and much more.

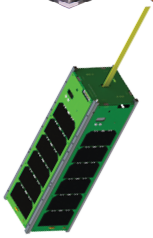
Shields-1 Battery Pack *Battery Pack Engineer*

Shields-1 is a NASA Langley CubeSat mission featuring power and processing systems from MXL. For the Shields-1 project, I designed a next-generation battery pack from requirements definition through assembly and testing of the pack. I first designed the pack in Solidworks, then shipped the MCAD files into Altium Designer, where I performed PCB layout. Further, I drafted a checkout procedure before populating and testing the circuit board before integrating the batter pack. Then, I built the Lithium-ion battery pack and completed checkout of the entire system including burn in testing before delivery of hardware.



Cubesat investigating Atmospheric Density Response to Extreme driving (CADRE) *Chief Engineer + Project Manager*

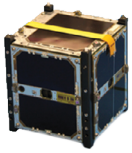
I served as the Chief Engineer for CADRE from the subsystem design phase through flight unit delivery. Aside from managerial tasks (leading meetings, revising designs across every subsystem, drafting design documentation, and maintaining schedules) I also contributed to numerous low-level engineering aspects of the mission. These tasks included, but were certainly not limited to: two-sided deployable solar panel mechanical & electrical design/layout, design and implementation of circuit board test automation platforms, population and checkout of power systems, antenna design & simulation, design of deployment mechanism, MCAD for ~80% of the satellite, and qualification of mechanisms for flight. CADRE represents one of the most technologically advanced CubeSats constructed by a university, featuring 3-axis control to an accuracy of +/- 1 degree.



GRIFEX (GEO-Cape ROIC In-Flight performance EXperiment) *Chief Engineer + Project Manager*

At MXL, I worked as Chief Engineer for the GRIFEX CubeSat mission. Aside from managing the team, I engineered the solar panels and the power integration board, developed the custom structure and entire satellite's mechanical features in CAD, and led the antenna design and fabrication for the mission. Upon ejection into orbit, I also helped the operations team with initial passes and health checks. The flight unit successfully completed its mission on-orbit and daily operations continue at U of M.

MCUBED-2 (Michigan Multipurpose Minisat-2) *Chief Engineer + Project Manager*



I was granted the Chief Engineer for the MCubed-2 mission shortly after arriving to U of M. My responsibilities as Chief Engineer included detailed subsystem-level work in addition to project management that complemented my graduate course work. I designed the entire spacecraft in Solidworks, serving as the team's mechanical-electrical CAD interface specialist. I also worked with teammates to integrate and test the command and data handling, communications, power, and attitude determination and control systems for the satellite. Further, I held a prominent role fabricating and testing flight solar panels and sensors. Last, as the Chief Engineer, I led the integration effort for the flight model in the Michigan eXploration Laboratory's clean room. I delivered MCubed-2 for integration into its launcher in June 2013; MCubed-2 successfully completed its mission in LEO.

Astronautical Development, LLC
2010 - 2012

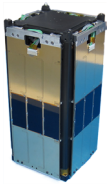
Intern

At AstroDev, I worked on various high-end solutions for the small-satellite industry including radios, structures and mechanisms, and power management and distribution systems. I fabricated and configured radios for space flight; this fabrication of next-generation hardware necessitated the development and maintenance of support materials for customers as well. I also engineered deployment mechanisms for solar panels and antennas.

Astronautics Systems Laboratory
2009 - 2012

Student Engineering Team Lead

While at Morehead State, I worked on two spacecraft missions in conjunction with the University of Rome in Italy. The missions unified many classes of satellites (femto- through micro-). The resulting experience was in power regulation (switching and linear converters), and distribution electronics, as well as spacecraft deployment (ejection) systems.



CXBN (Cosmic X-ray Background Nanosatellite) *(Student) Chief Engineer + Project Manager*

For the scientific 2U CubeSat, CXBN, I served as project manager and lead student engineer. I designed and developed custom structures and mechanisms, power systems (solar panels, power management board, and batteries), and novel CubeSat attitude determination and control systems from scratch. CXBN signifies the state of Kentucky's first orbital spacecraft.

PERSONAL

Hiking	Photography	Computers	Fishing	Digital Media
Travel	Architecture	Networks/Infrastructure	Watercraft	Amateur Radio Technician
Water skiing	Basketball	Fourwheeling	Print Media	Class License: KK4OMH