THE RESUME OF

TOM SWANSON

CONTACT

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EDUCATION

B.S., Electrical Engineering
University of Minnesota, Twin Cities
August 2008 - May 2012
High Honors (3.98 GPA out of 4.0)

Licensed Professional Engineer
Minnesota Board of AELSLAGID
Licensee ID 54245

SKILLS

Circuit Design, Product Design, Schematic Capture, PCB Layout, Component Selection, Firmware Development, Requirements Definition, Testing, Documentation, Manufacturing, Vendor Management, Project Management, Customer Support, Sales Support, Hiring, People Managment

TECHNOLOGIES

Broad experience with software technologies, including C, C++, Python, PHP, Javascript, SQL, shell scripting, HTML, CSS, JSON, Linux, FreeRTOS, Node.js, MQTT, Angular, Google Cloud, AWS.

Experience with hardware design software including Altium, Orcad, PLM systems, and LTspice

Senior Hardware Engineer

Tidal (an Alphabet Google X project) x.company/projects/tidal **Mountain View, CA** **April 2020 - Present**

- Worked as lead electrical engineer on a small team to improve, manufacture, and deploy an ML stereo-camera system for monitoring salmon in off-shore fish farms
- Revised electronics hardware designs (schematics and layouts) to resolve reliability issues and feature requests
- Debugged reliability and manufacturing issues, including soldering problems, LED failures, Ethernet failures, and more
- Supported DVT manufacturing builds (both remote and on-site) and modified test software (C++, Python, bash, REST)
- Designed and built hardware-in-the-loop (HIL) test racks for Tidal camera system and supporting products
- Wrote HIL tests (Python), stood up nightly and presubmit automation, and connected these with internal Google tools
- Modified embedded software (C++ on Linux) to add more telemetry for remote monitoring and debugging
- Modified microcontroller firmware (C++ on ChibiOS RTOS) to support new ICs and features
- Participated in 24/7 software on-call rotation to support international field operations with 15-minute SLO
- Stood up Prometheus alerting (Kubernetes cluster in Google Cloud) and wrote alerts to automate field monitoring
- Received patent for a technique to verify synchronization of our lighting controller: US11582397B2

Contract Hardware Design Engineer

Independent Contractor for Muon Space, Inc muonspace.com **Mountain View, CA** **May - August 2022**

- Designed two PCBAs for MuSat-1 which launched June 12, 2023 on SpaceX Transporter-8
- Board #1 was a battery-management PCBA for LiFePO4 cells to protect and monitor packs during flight
- Board #2 was an RF-frontend PCBA to mix, filter, and amplify signals in the S (2GHz) and X (8GHz) bands
- Worked with electrical, firmware, mechanical, and RF engineers on design and then implemented schematics and layout
- Participated in radiation testing with the cyclotron at UC Davis' Crocker Nuclear Laboratory

Senior Hardware Engineer, Avionics Group

Loon, LLC (an Alphabet Google X project) loon.com **Mountain View, CA** **June 2017 - April 2020**

- Worked as an Avionics hardware design engineer to build safe and reliable flight-vehicle electronics
- Designed, built, tested, and owned rollout of many PCBAs and subassemblies for actuation and monitoring
- Became manager of 3 Avionics hardware engineers; coordinated all avionics hardware development
- Led cross-functional program to diagnose and resolve in-flight failures due to storms and nearby lightning strikes
- Supported comprehensive test programs to ensure reliability at flight temperatures (-70 degC) and pressures (10 kPa)
- Designed new power-system PCBAs for solar power conversion, battery charging, and power distribution
- Designed new safety-system PCBAs for squib-firing, satellite comms, VFR flashers, and ADSB transponding
- Coordinated with many groups, including firmware, reliability, mechanical, supply, manufacturing, and flight engineering
- Participated in 24/7 emergency on-call rotation to support global flight operations with 5-minute SLO
- Led connector evaluation to overhaul cable systems and add TPA + CPA for improved reliability
- Participated in DFMEAs at the flight vehicle level, subsystem level, and PCBA level
- Performed in-flight debugging and failure analysis of both avionics and communications subsystems
- Applied for storm-related patents (not fully pursued due to Loon shutdown): US20220033101A1 and US20210242931A1

Electrical Engineer, Hardware Development Group

MultiTech Systems, Inc multitech.com **St Paul, MN** **June 2016 - June 2017**

- Worked as a hardware design engineer with team members to develop RF products
- Designed, built, and tested circuit boards that used WiFi, Cellular, GPS, and LoRa transceiver modules
- Tuned and matched RF antenna networks to maximize output power and receive sensitivity for ISM-band products
- Performed EMC testing (emissions and immunity for FCC and CE) on-site and at local test labs
- Involved with all aspects of the product life cycle, from brainstorming to end-of-life
- Worked with certifications group to certify products in the United States, the EU, and Australia
- Coordinated with other groups, including software, product test, CAD, product management, and manufacturing

Hardware Design Engineer

Open Systems International, Inc osii.com **Minneapolis, MN** **May 2012 - May 2016**

- Worked as a hardware design engineer to develop communications products
- Designed and maintained circuits, schematics, layouts, and BOMs for several products
- Drafted mechanical designs and worked with contract engineer to create product enclosures
- Programmed embedded firmware to assist embedded software group
- Collaborated with many groups, including purchasing, marketing, sales, support, and legal
- Managed several projects; responsible for budgets, schedules, reporting, and effort allocation
- Managed a variety of vendors during product design, manufacturing, and testing

Student Engineer Intern

Trane Company (Ingersoll Rand) trane.com **La Crosse, WI and Minneapolis, MN** **May 2010 - May 2012**

- Worked as an intern to test climate control system hardware and software
- Debugged and adapted testing hardware to meet test requirements
- Wrote test scripts and software (Python, Visual Basic) based on software and hardware design requirements

ENTREPRENEURIAL VENTURES

Co-Founder and Engineer

SensorForge, LLC **Minneapolis, MN** **January 2016 - June 2017**

- Designed cloud-connected IO modules to collect data and improve business decisions
- Developed backend systems, including RESTful API in Node.js to authenticate and interface with sensor data
- Developed dashboard using AngularJS and Firebase to visualize sensor data
- Developed embedded microcontroller firmware to do over-the-air upgrades and connect to PubNub and Amazon AWS

Co-Founder and Developer

KickSize, LLC **Minneapolis, MN** **January 2015 - December 2015**

- Developed kicksize.com website and Magento E-Commerce plugin to recommend shoe sizes for online shoe buyers
- Coordinated efforts of three co-founders to identify need, build strategy, and implement solution
- Programmed in PHP, Javascript, HTML, and CSS; implemented MySQL database

CONTINUING EDUCATION

- Global Impact: Business Ethics. Coursera, Unversity of Illinois Urbana-Champaign. 2021.
- Machine Learning. Coursera, Stanford. 2020.
- Lightning Protection of Avionics. NTS Lightning Technologies. 2017.