

# Michael Bonnet | Resumé

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## EDUCATION

### University of Texas at Arlington

*Bachelor of Science in Computer Science*

**Arlington, TX**

*May 2022*

### University of Texas at Arlington

*Certificate in Unmanned Vehicle Systems*

**Arlington, TX**

*May 2022*

## SKILLS & TECHNOLOGIES

- **Programming Languages:** Rust, C, C++, Python, Go, Ruby, Lua, FlightJAS, JavaScript/TypeScript
- **Software & Processes:** Embedded Software, Yocto, Amazon Web Services (AWS), Astrodynamics, SITL Simulation, MATLAB/Simulink, DevOps, Systems Tool Kit (STK), FreeFlyer, React, PostgreSQL, Git, Bash, Linux, Windows, Agile Development, Docker
- **Hardware:** Small Satellites, Spacecraft, Flatsats, HITL Simulation, Robotics, Commercial & DIY Drones, Autonomous Vehicles, Flight Controllers (Pixhawk), Raspberry Pi, Microcontrollers, Software Defined Radio (RTL-SDR)
- **Certifications:** NOAA Spacecraft Operator

## EXPERIENCE

### Apex Space

*Spacecraft Software Engineer*

**Los Angeles, CA**

*May 2024 - Present*

- Collaborated in an 8-week intensive satellite development effort to mature an ESPA Grande class satellite design from a few notional requirements to a fully fleshed-out system design, contributing as the primary author of the Software Requirements Specification and coauthor of the Software Development Plan, leading GNC integration planning for flight software on all satellite bus models. Tackled cross-functional challenges, facilitated consensus on flight software architecture, and improved communication between software and adjacent teams, culminating in a successful design review.
- Participated in trade studies, design, design reviews, and implementation of Apex Space's in-house flight software and software/hardware-in-the-loop (SITL/HITL) simulation frameworks, collaborating with systems, GNC, and HITL engineering teams to create a software suite to be flown on Apex Space's Aries and Nova satellite buses.
- Designed, developed, tested, and deployed C++ flight software for Apex's Aries satellite bus
- Built a suite of simulation and analysis tools in C++, Python, and Bash, allowing Apex to move off of vendor software and improve software stack vertical integration.
- Operated Aries spacecraft as Deputy Mission Director throughout launch and early orbit phase and standard operations

### Turion Space

*GNC and Flight Software Engineer*

**Irvine, CA**

*February 2023 - February 2024*

- Designed and tested payload software in embedded C/C++ for DROID, a spacecraft launched in June 2023
- Developed Ruby on Rails-based mission control software hosted on AWS used for on-orbit spacecraft operations
- Operated DROID.001 spacecraft as Mission Operator and Flight Director throughout launch and early orbit phase
- Built Turion Space's proprietary STARFIRE API in Go using the Echo framework and a Postgres backend database for cataloguing and distributing orbital space domain awareness data, deploying to AWS
- Developed Turion Space's internal spacecraft dynamics simulation library, enabling safe operation of a constellation of near-real-time space-to-space photoreconnaissance satellites
- Implemented astrodynamics and astronomical algorithms in a library for widespread internal company use

### Terran Orbital

*Flight Software Engineer*

**Irvine, CA**

*May 2022 - January 2023*

- Configured custom Linux operating system images for NASA Pathfinder Technology Demonstrator satellites in low-earth orbit and for customers using Terran Orbital-designed satellites for their own missions
- Wrote, tested, and flew drivers for NASA Pathfinder Technology Demonstrator 3 ("T-BIRD") and 4 ("LISA-T") emerging technology demo 6U nanosatellites
- Improved company core flight software libraries, improving flexibility and functionality for all Terran Orbital spacecraft buses
- Designed, developed, and tested performant C++ embedded software for projects totaling dozens of spacecraft
- Supported launches of company and customer payloads to low-earth orbit (LEO) and translunar trajectories with flight software troubleshooting both on-console in Mission Control and on-call

## PROJECTS

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### **Pystrodynamics**

*Python, Spacecraft Dynamics - See [GitHub](#)*

- Created open-source astrodynamics library in Python, enabling position-velocity and attitude propagation
- Built on top of Skyfield, astropy, SciPy, and NumPy

### **Python-Vallado**

*Python, Spacecraft Dynamics - See [GitHub](#)*

- Work-in-progress open-source astrodynamics library, rewriting all algorithms from David Vallado's "Fundamentals of Astrodynamics and Applications in Python"
- Built on top of SciPy and NumPy to streamline and speed up original implementations using handwritten vector math

### **Network Exploitation Drone**

*Drones, RF Engineering, Penetration Testing, Networks - See [GitHub](#)*

- Senior capstone project to build a drone that carries a Raspberry Pi sensor and networking payload that locates and identifies open Wireless Access Points before scanning the network and exploiting any vulnerabilities.
- Served as Team Leader on a six-student team that earned sponsorship from Elbit Systems of America; finishing 85% under budget and 6 months ahead of schedule