

SAPTAK DAS

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EDUCATION

Georgia Institute of Technology | Atlanta, Georgia

August 2024 – May 2027

Bachelor of Science in Aerospace Engineering | Dean's List | Sidney Goldin Scholarship | BSMS Honors Program GPA: 3.96/4.00

Relevant Coursework: Avionics Integration, Circuits and Electronics Lab, Control System Analysis and Design

RELEVANT EXPERIENCE

Georgia Tech Experimental Rocketry (GTXR)

Atlanta, Georgia

Avionics Engineer – Flight Hardware & PCB Design

August 2024 – May 2026

All avionics flew flawlessly on their first flight aboard Mach 'N' Roll, GTXR's 17-ft, 283-lb, two-stage rocket (July 2026; club-record 31,850-ft apogee).

- Designed the **6-layer** Attitude Determination and Control Systems (ADCS) PCB around an **STM32H6** with onboard IMU, barometer, NAND flash, LoRa, GPS, microSD, JTAG, high-speed oscillator, and connector ESD protection in a **PC104** form factor
- Designed a custom **DAQ PCB** with safety-inhibit, reverse-polarity protection, and high-current DPAK MOSFET switching for pyrotechnic elements, integrating pressure transducers and e-match ignition with the **NI CompactDAQ**; designed a flight DAQ PCB for chamber-pressure and thermocouple acquisition with SD storage and bulk transfer to the ADCS
- Designed **Altium** pyro/ignitor daughterboards for continuity monitoring and ignition, integrated with the flight computer over I2C/UART with **CRC16 packet checking** to reduce EMI-related data corruption
- Built power/pyro shunt circuitry and umbilical harnessing for safe avionics handling during integration per FAR requirements
- Manufactured and validated **two complete harness sets** through subsystem-to-system integration testing, balancing strain relief, routing, and signal integrity; reflow-soldered PCBs **20+ times**, debugging with oscilloscopes and logic analyzers

Avionics Engineer – Firmware, Telemetry & Ground Software

August 2024 – May 2026

- Developed **bare-metal drivers** and sensor-management software for IMUs, barometers, SD cards, ADCs, GPS, and XBee radios (UART, SPI, I2C, CAN, DMA, interrupts); validated a **quaternion strapdown attitude estimator** that gates sustainer ignition
- Designed a modular **telemetry packet format** (services, subservices, CRC16) for bidirectional rocket communications and optimized **RF link budgets** for XBee and LoRa 915 MHz downlinks to hold the link to mission control throughout flight
- Built an ESD-safe **flatsat test fixture** to isolate and validate avionics before vehicle integration
- Designed modular **Python mission-control software** (backend, middleware, multiple frontends) that processes radio serial data and distributes telemetry via server-sent events; validated endpoints with Postman and the integrated flight stack

Data Acquisition System Lead

January 2025 – May 2025

- Operated DAQ hardware and software for thrust-curve measurement during rocket-motor static fires; streamlined ignition, sensor acquisition, and post-test analysis through a centralized **PyQt6** dashboard (NumPy, Pandas, SciPy, Matplotlib)

Georgia Tech Ramblin' Rocketry – Guidance, Navigation, and Controls

Atlanta, Georgia

Control Systems Engineer

August 2024 – May 2025

- Developed and closed-loop simulated LQR controllers in MATLAB; implemented in C on an **STM32** flight microcontroller, translating control-law design into flight software
- Developed a static **QUEST** launch-pad attitude estimator; prototyped an **Extended Kalman Filter (EKF)** in simulation

VEX Robotics – VEXMEN (Teams 91G and 91H)

Downingtown, Pennsylvania

Software Developer

August 2021 – May 2023

- Developed C++ driver-control and autonomous software for VEX V5 robots using PROS, including **PID-tuned** point-turn/drive control and custom encoder-based odometry; qualified for the state championship in both seasons

PROJECTS & PUBLICATION

DHC-2 Beaver Multi-Loop Autopilot | Simulink, MATLAB

Avionics Integration Class Project

- Developed a **multi-loop Simulink autopilot** (speed, bank angle, sideslip suppression, altitude hold) with nested **PID** channels using anti-windup and saturation, plus an **ILS glide-slope** controller holding a 2.5-degree descent
- Built a **quadruplex sensor-voting** algorithm in MATLAB with dynamic outlier detection and automated disconnect thresholds for hard-over, soft-over, and oscillatory sensor failures

Design and Implementation of a Data Acquisition System for Rocket Motor Testing and Performance Analysis

August 2025

AIAA Aerospace Research Central – Published August 12, 2025

- Documented a rocket-motor DAQ architecture for real-time acquisition, transmission, storage, and analysis of pressure, load, and temperature data; used thrust variation and chamber-pressure anomalies to flag reliability issues before launch

SKILLS

Embedded & Firmware: Bare-metal C, STM32 (H6 and L4), UART, SPI, I2C, CAN, JTAG, DMA, interrupts, sensor drivers, CRC16

Hardware Design: Altium, 6-layer PCB layout, PC104, ESD/reverse-polarity protection, pyro/ignition circuits, harness design

RF, Telemetry & Software: LoRa, XBee, GPS, link budgets, packet design, Python, PyQt6, NI CompactDAQ, MATLAB/Simulink

Test & Debug: DMM, power supplies, oscilloscopes, logic analyzers, reflow/hand soldering, flatsat integration, Postman