Project Portfolio

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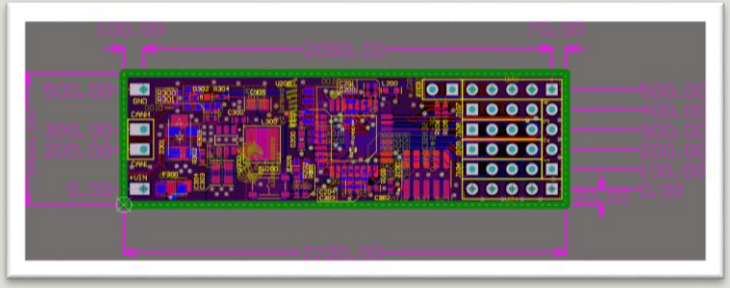
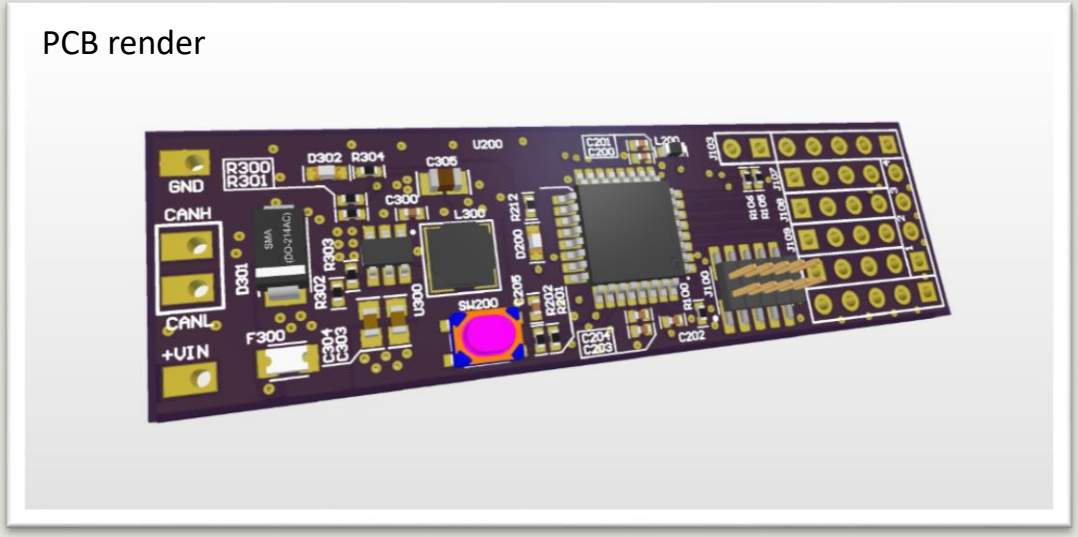
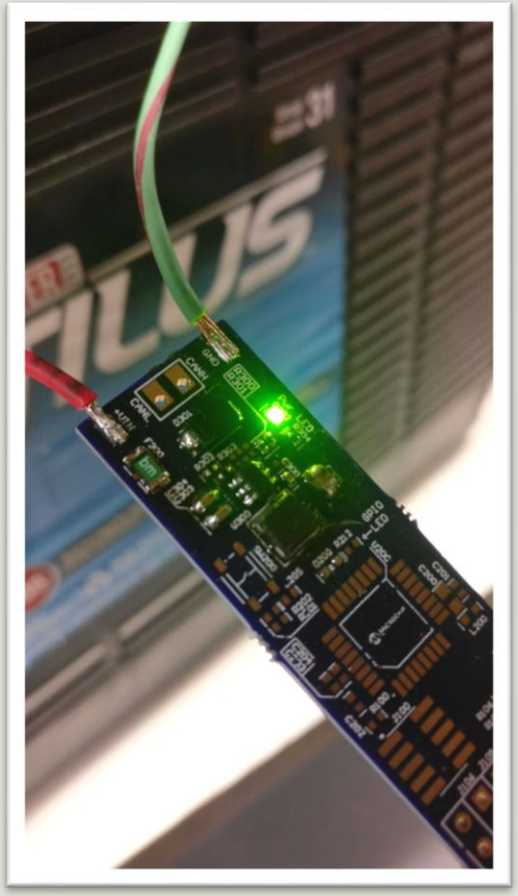
PCB design



PCB render



Partially assembled board successfully passing 5V regulator test

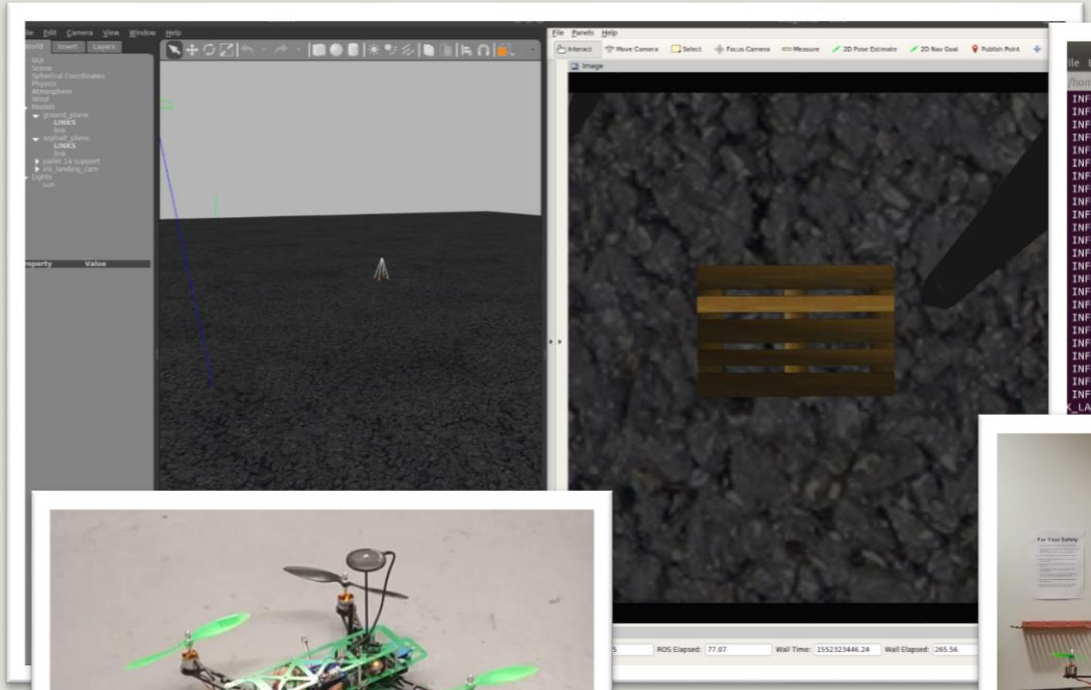


RFR: SENSE2CAN Module (2018-19)

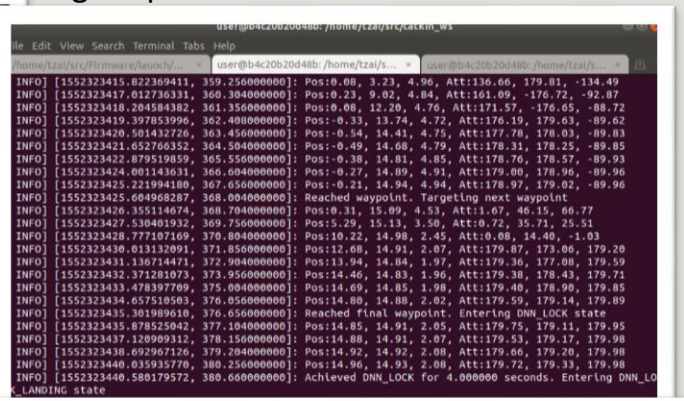
Data acquisition module for Ryerson Formula Racing's 2019 car (RF-19) that streams sensor data back to the ECU over CAN

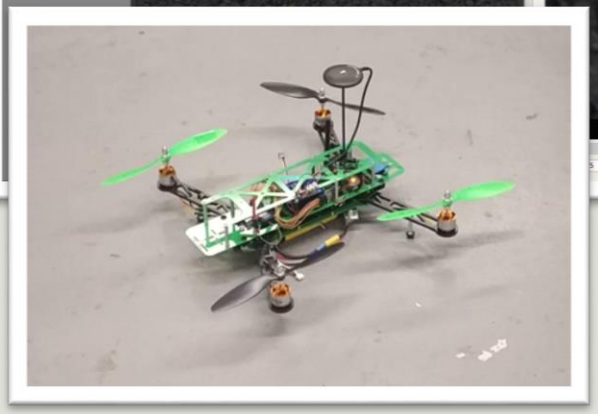
- Developed a miniaturized PCB design for a harsh automotive environment
- Programmed CAN, I2C, UART, and ADC components of the board

Simulation of autonomous navigation in Gazebo

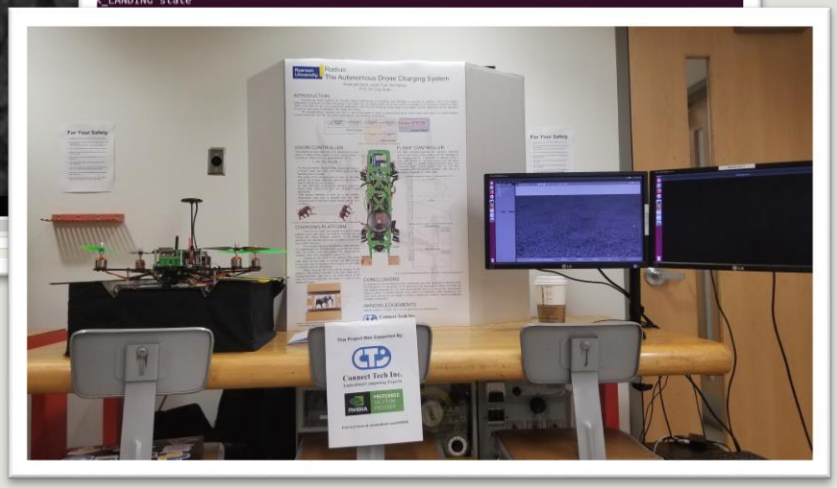


Log output of custom ROS node





Finished drone



Final demo

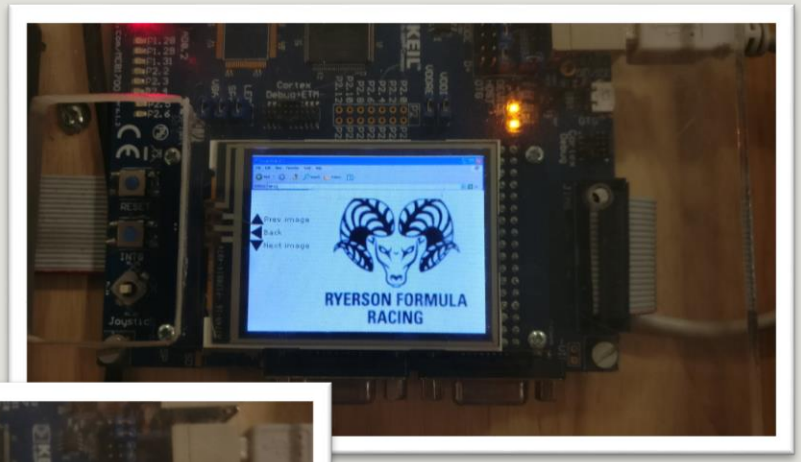
Capstone: Autonomous Drone (2018-19)

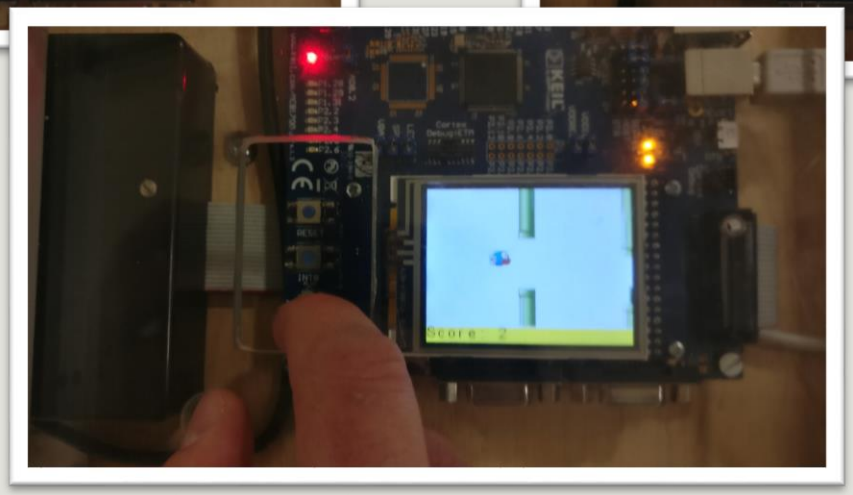
Drone that can autonomously land precisely and recharge on a custom charging platform

- Autonomous controller built on an NVIDIA Jetson TX2 using ROS, interfaced to a PX4 flight controller
- Developed custom node in C++ for navigating to landing platform, and then performing a precision landing sequence
- Project won first place across all Electrical, Computer and Biomedical Capstone projects

Main menu

Image viewer





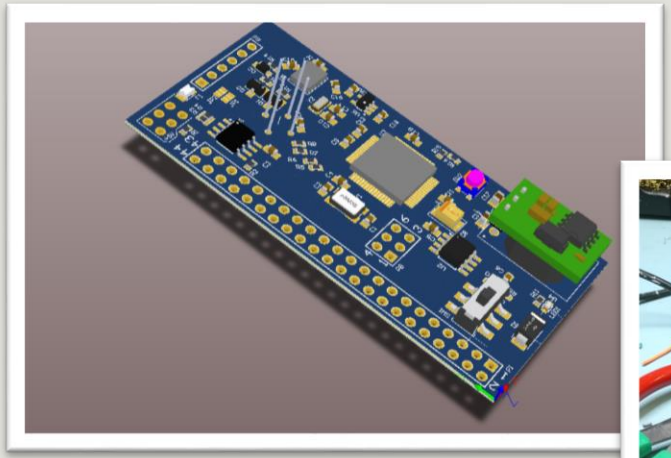
Remake of the infamous Flappy Bird Game

Embedded Media Player (2018)

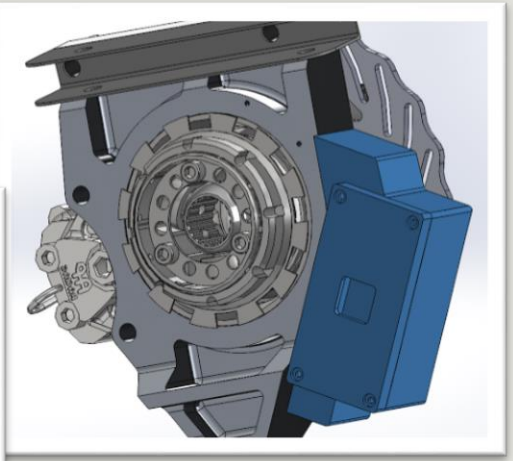
Media player programmed in C for ARM Cortex M3 based development board for Embedded Systems course

- Gained C experience, especially with designing for a resource-limited system
- Code was modular and allowed for easy integration of all media player features
- Featured Windows XP-inspired design with a graphical menu

PCB render



Final assembled modules

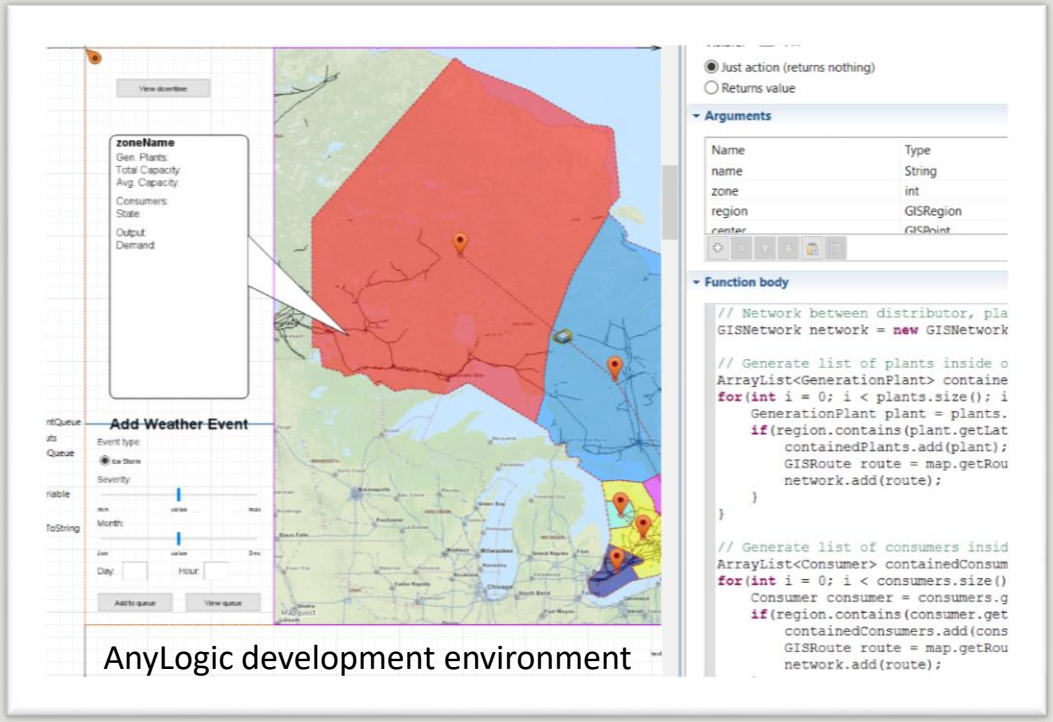


Enclosure in its proposed position on the wheel

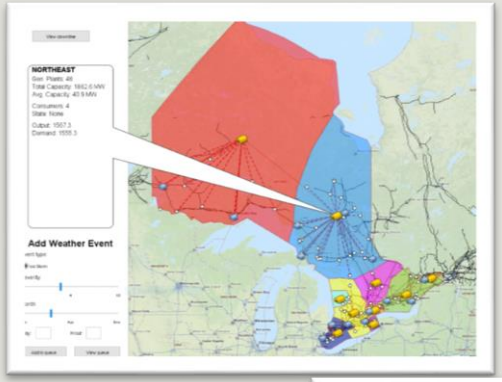
RFR: Sensor Module (2016-17)

Data acquisition system (DAQ) that expands the number of analog, PWM and digital inputs available to the ECU

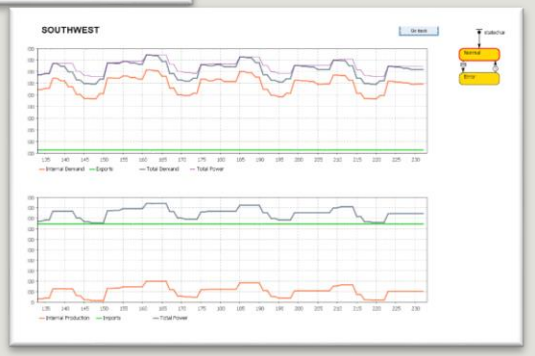
- Using dsPIC33EV Digital Signal Controller for sensor processing and CAN communication
- Variant based design that supports two designs in a single PCB, for minimizing cost



AnyLogic development environment



Running simulation

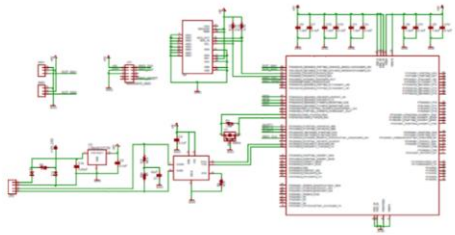


Agent Based Modeling (2016)

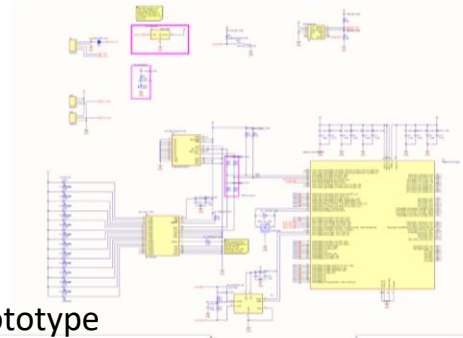
Agent-based model of how adverse weather events affect the power grid in Ontario

- Developed model for graduate student‘s research using AnyLogic

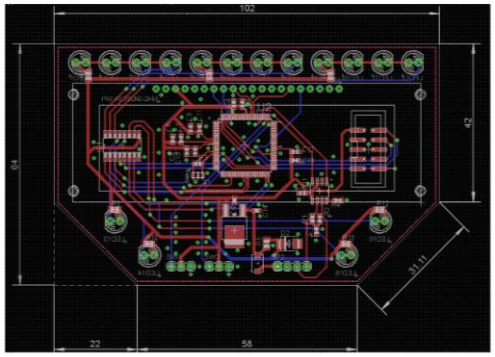
First design



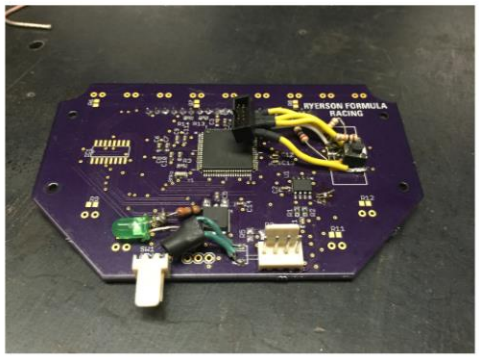
Revised design



First PCB



Revision prototype

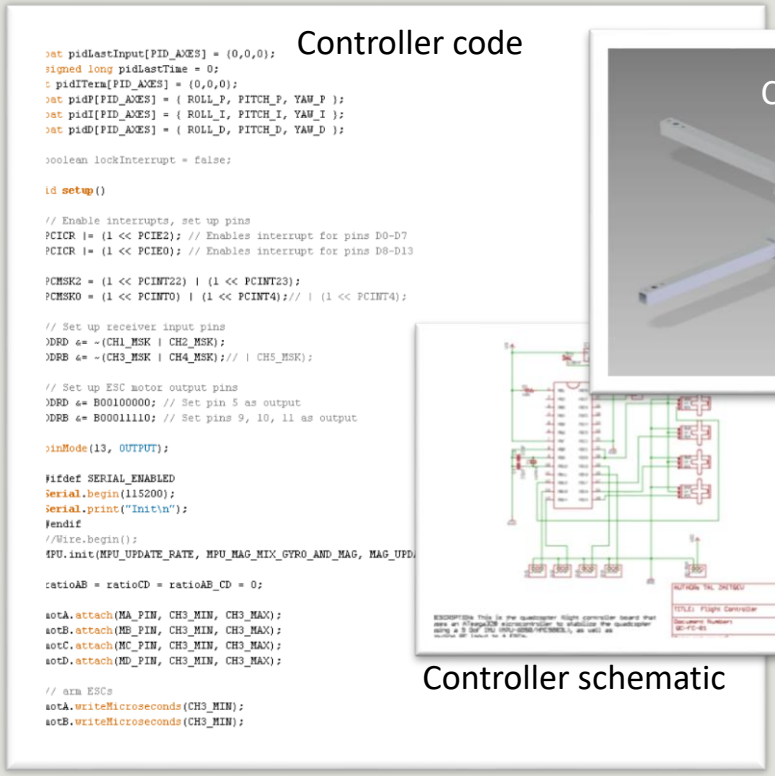


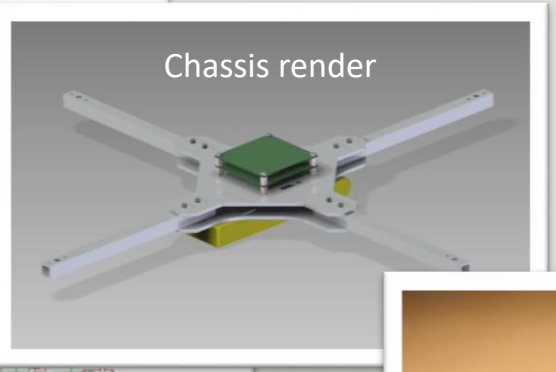
Final product

RFR: Dash Module (2014-15)

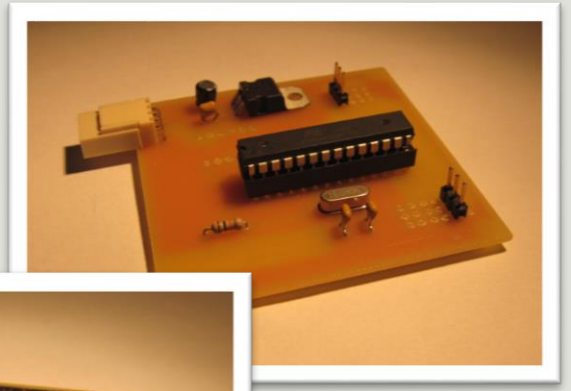
ARM-based steering wheel display module to provide the driver with information about the car mid-race

- Learned general design process, ARM development, and gained proficiency with Altium Designer





Controller schematic


Etched board

Quadcopter Flight Controller (2014)

Arduino-based quadcopter flight controller board that combines user input with inertial measurements for a smooth, stable flight

- Learned about PID, Kalman filters, and PCB design