

Intro/Purpose

- Wanted to make a badass drone that could fly longer, and further
- Dr. Jason Karl uses drones for land surveying and 3D mapping
 - So, let's make a drone for that
- Can't you just go buy a drone?
 - Yes but...
- First Started FPGA's and balloons (concept)
 - FPGA more inputs for less power
 - Don't need fire breathing microprocessors
 - Balloons weight offset
 - Less power required by motors
- Red Frame Concept Drone Body
 - By the end of the first semester
 - Not the simple...

Body of Presentation

- FPGA
 - Why them vs Arduino(microcontroller)
 - Answer is we do both
 - Math doesn't work out, they don't have enough power to do the calculations. Even though it requires much more power to run.
 - Could use Raspberry Pi but it requires significantly more power
- ESCs
 - Custom vs off the shelf
 - Cut out the bulk, including the microprocessor
 - Using hardware vs software uses less power and is more lightweight
 - Most drones require an ESC for each motor, thus 4 microprocessors using power with an 85% efficiency
- Balloons
 - 1g of lift per 1L of helium
 - Turns out its really hard to manufacture
 - Heat sealers and heat tape
- Teeter Totter
 - Test batteries, ESCs, Control and stabilization systems
 - Safe and controlled testing
 - Two degrees of freedom

- 360 Stand
 - Allows 4 degrees of freedom (Roll, Pitch, Yaw, Altitude)
 - Testing of the simulation/remote control and motion sensing
- Simulation and remote control
 - Visualization software displays and interprets data from the sensors

Stuff for next year

- PID control
 - Allow for more faster and more accurate damping of the system
- Automation of flight patterns
- Integrate all the individual components into a functional drone
 - Balloons
 - Remote Control/Sensor System
 - FPGA's
- Testing
 - Test Stand data collection
 - Preliminary field testing (Kibbe Dome)
- Future of Project
 - Land Surveying/3D Mapping
 - Personal Taxi's
 - Mail Delivery
 - Etc