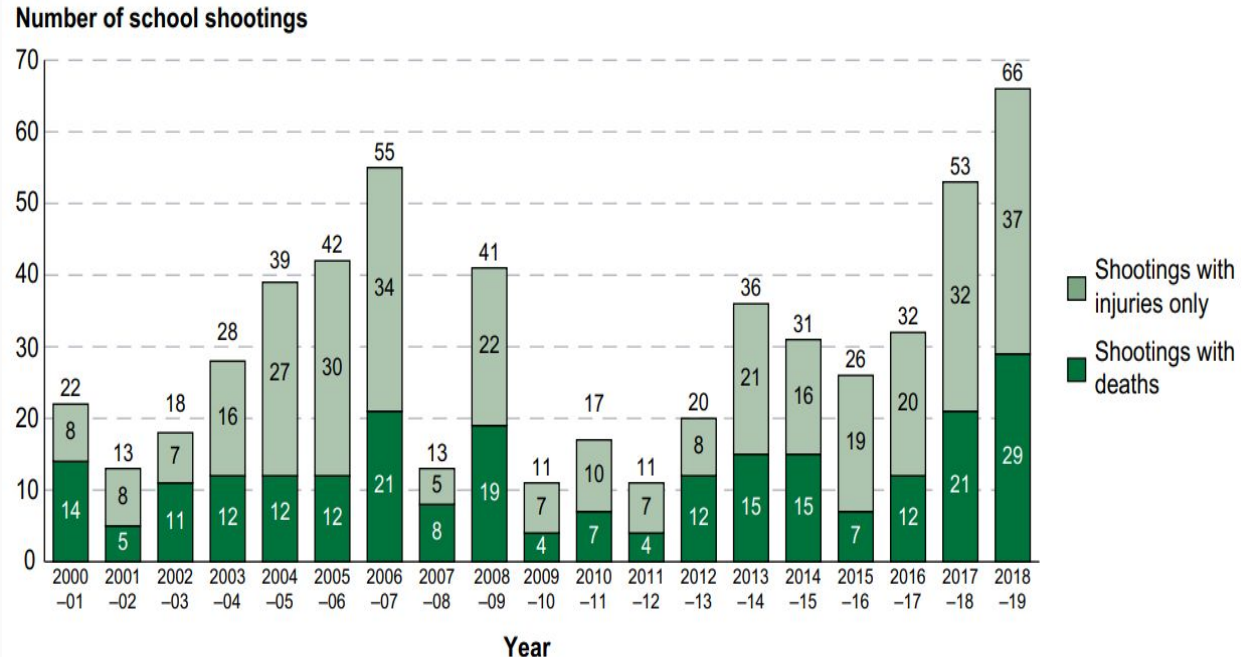


Semi-Autonomous Drone Surveillance

Sriharsha Singam (Group Leader), George Germanakos (Hardware Manager),
Jerrin Kakkanatt (Financial Manager), Zach Mathews (Web Master)

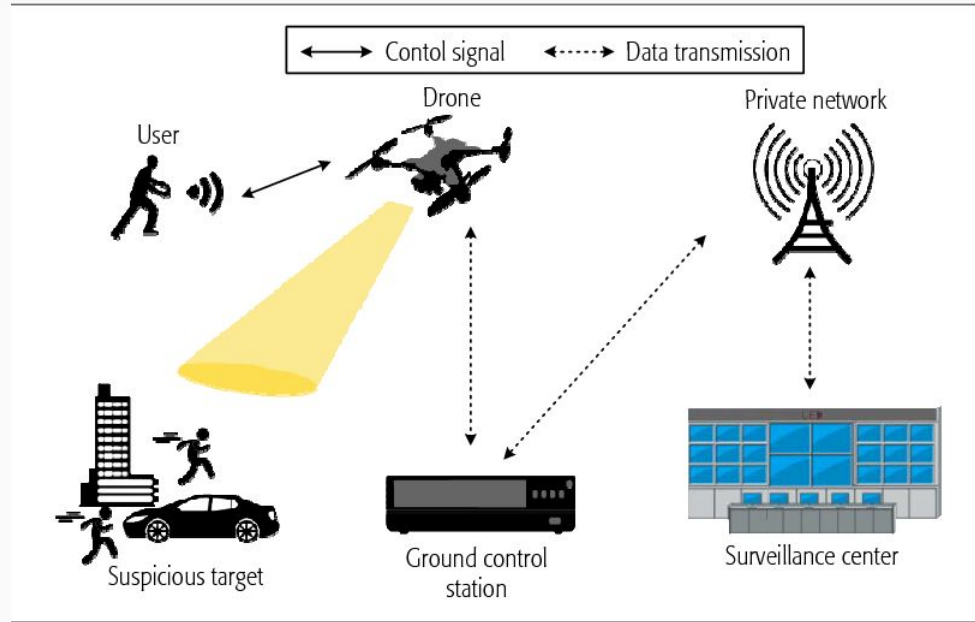
College Campus Safety

Problem:
On-campus crime
has seen an uptick
within the last 3-5
years.



DroneBuddy

Drone that accompanies students to keep them safer by providing lights, sirens and quick contact to local police.



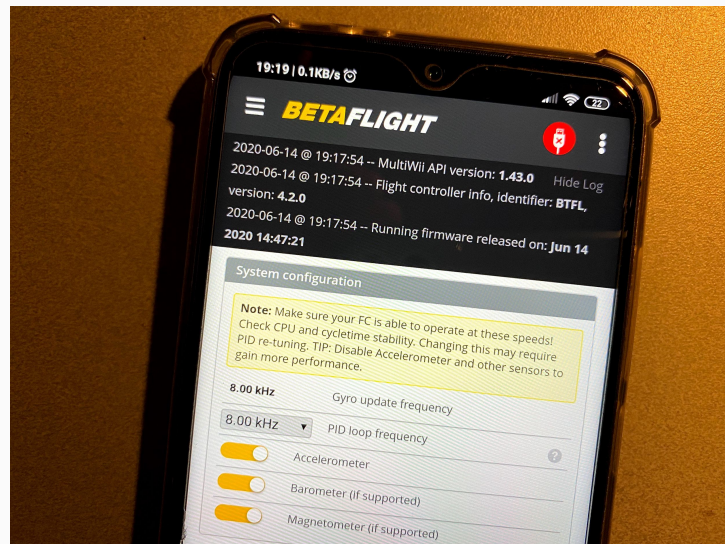
BetaFlight

Flight Controller Software

- PID tuning
- Rate adjustment
- Configurable serial ports

Controls Drones Movements using Sensor Inputs

Open Source: [github/betaflight](https://github.com/betaflight)



<https://betaflight.com/news/betaflight-4.2-released/>

Motion Detection and Tracking

OpenCV

- Open source image processing library
- Run on the drone in order to track human movements

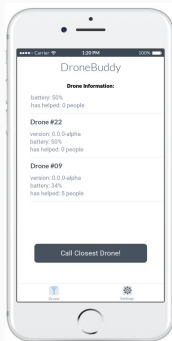


Motion Detection and Tracking Algorithms

- Motion Detection
 - Dense Inverse Search
 - Sparse Optical Flow
 - Gunnar Farneback
- Tracking
 - Kalman Filter

Surveillance Server

Use AWS to store
surveillance data for
later review and to
handle user API calls.



Amazon API
Gateway

+



Lambda
function

Drone Chassis



Battery pack will be used to power all the on board devices as well as the 4 propeller motors.

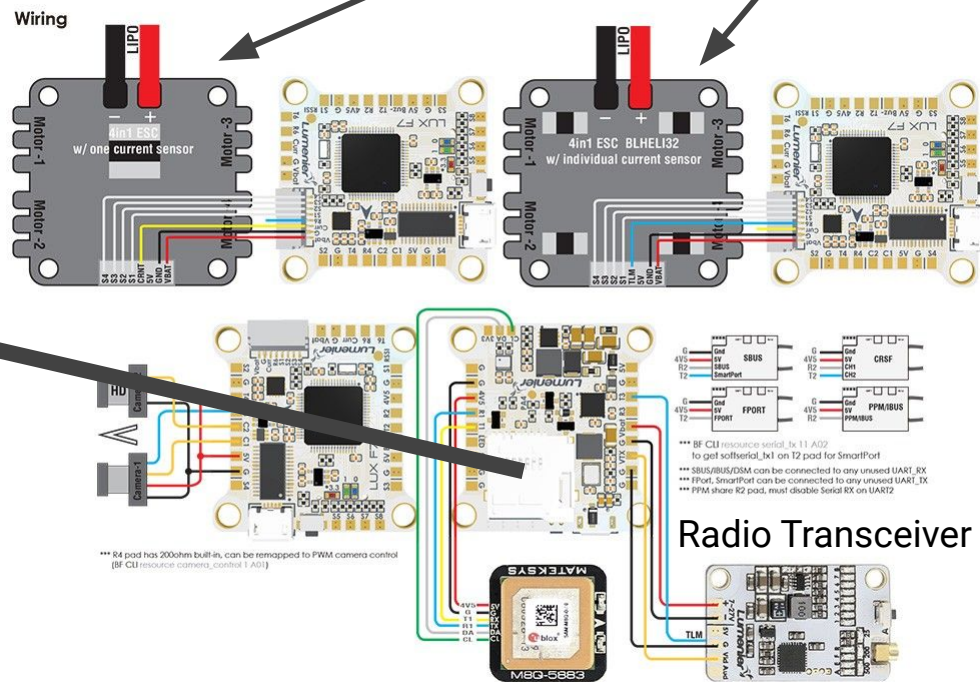
Quadcopter Configuration



Programmable Flight Controller Radio Transceiver, Electronic Speed Control



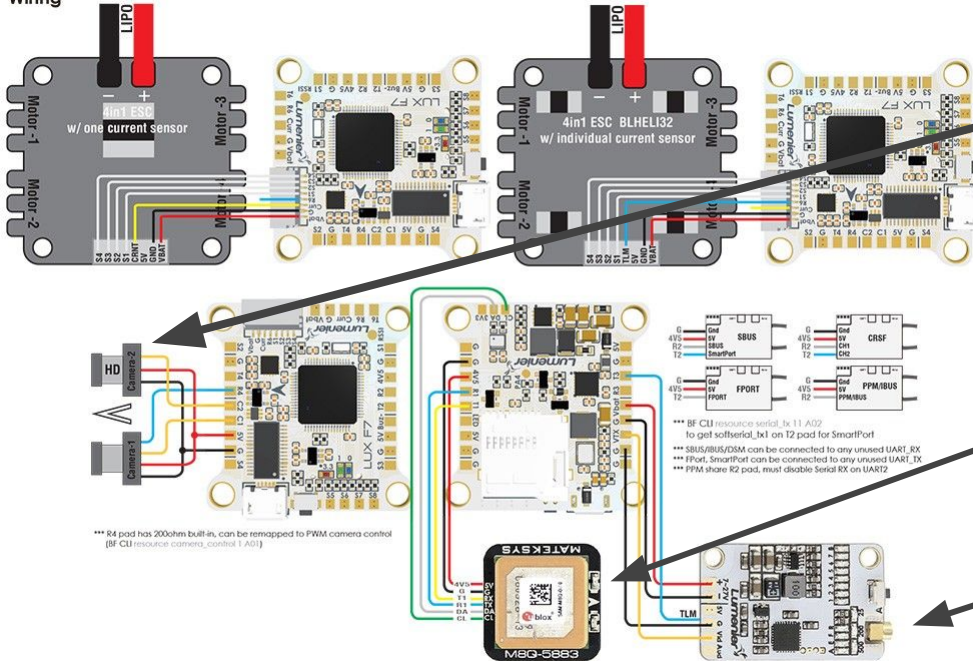
Flight Controller for ESC Motor Control, while communicating with Servers and the on board sensors.



Radio Antenna, GPS, LTE Module, Camera

Telemetry, Communication and Motion Tracking to
configure Drone's Autonomous Movements

Wiring



Camera



LTE Module



GPS



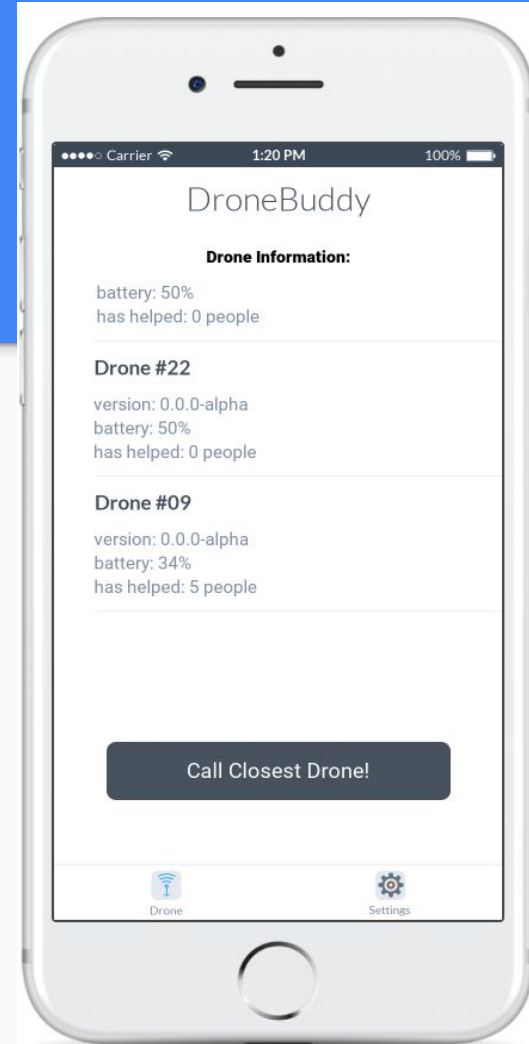
Radio Antenna



App

Allow students to call a drone when they need safety while walking.

Communicates with Servers which then redirect a Drone.



COVID19 Changes

Due to covid19:

- Buy additional parts for everyone to use
- Each team member will do a split of the work

Overview:

- Chassis Construction and Parts Assembly
- Motion Tracking using OpenCV
- Telemetry Control, Calibration, and Usage
- App, Server, and Drone communication

Drone Buddy Campus



Let's create a safer campus for all.

