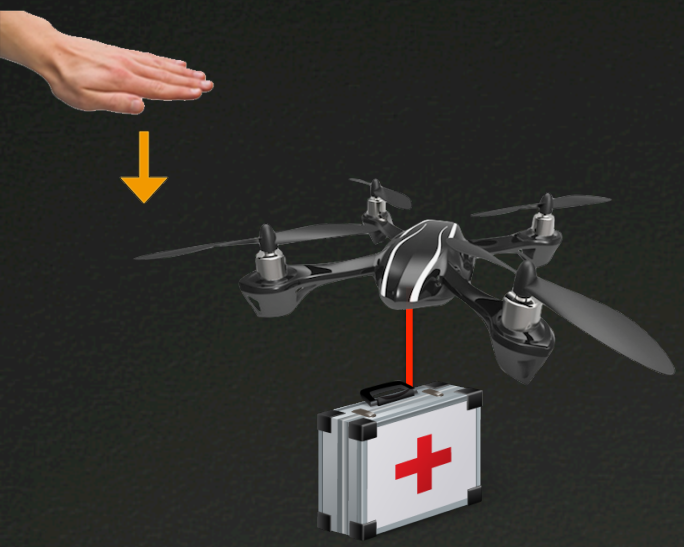
CAPSTONE PROJECT PROPOSAL



Hand Gesture Controlled Emergency Aerial Assistance Using Smartphone Based 3G Quadcopter

Team Members:

Muhammad Obaidullah – 1030313

Sifat Sultan – 1003289

Supervisor:

Dr. Mohammed Assad Ghazal

Outline

Introduction

Problem Statement

Proposed Solution

Model

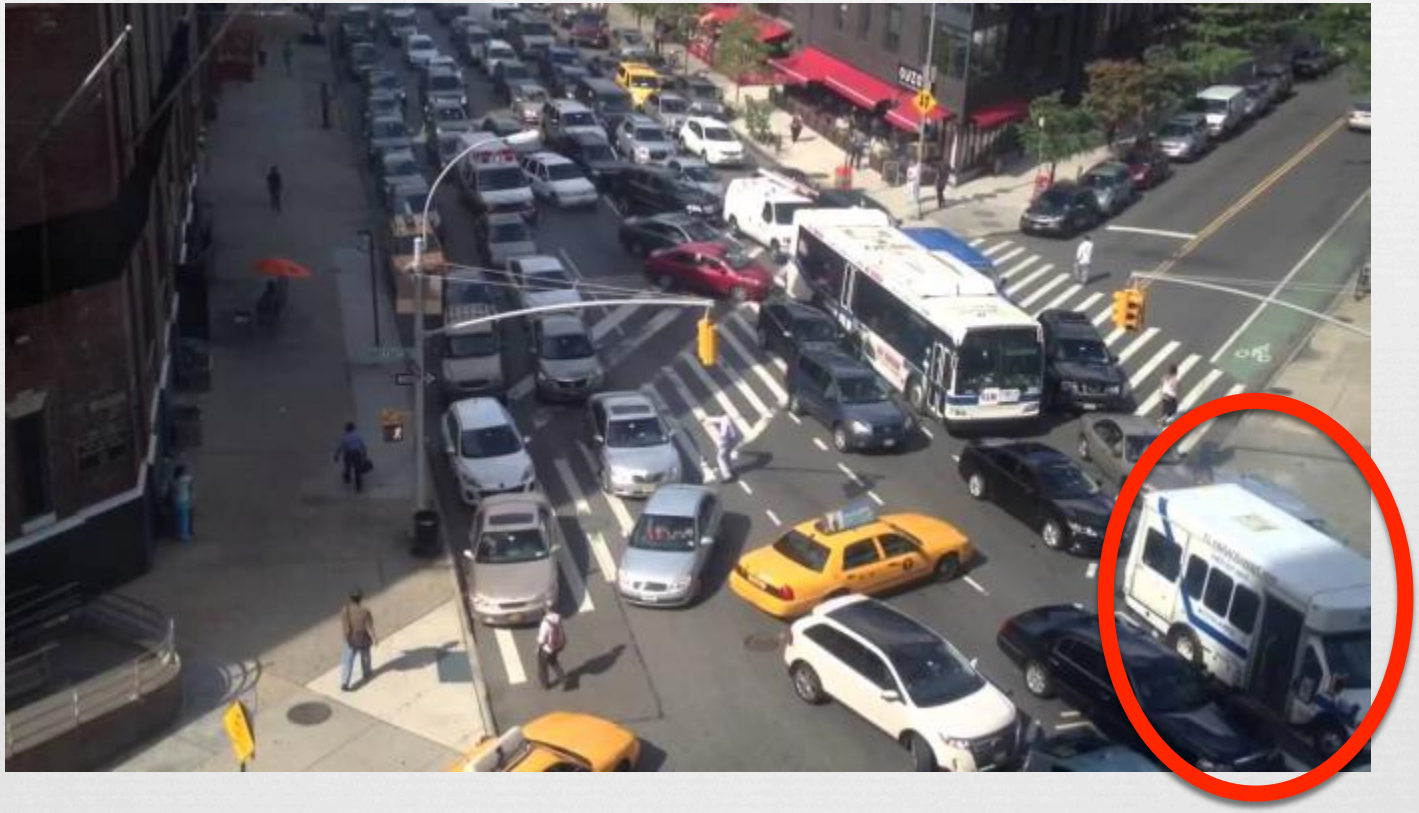
Testing Plan

Initial Results

Cost Analysis

Conclusion

INTRODUCTION



Lives are lost as fast-aids do not reach on time.

Traffic

Remote Location

PROBLEM STATEMENT

Accident Rescue Teams are Primitive and In-efficient

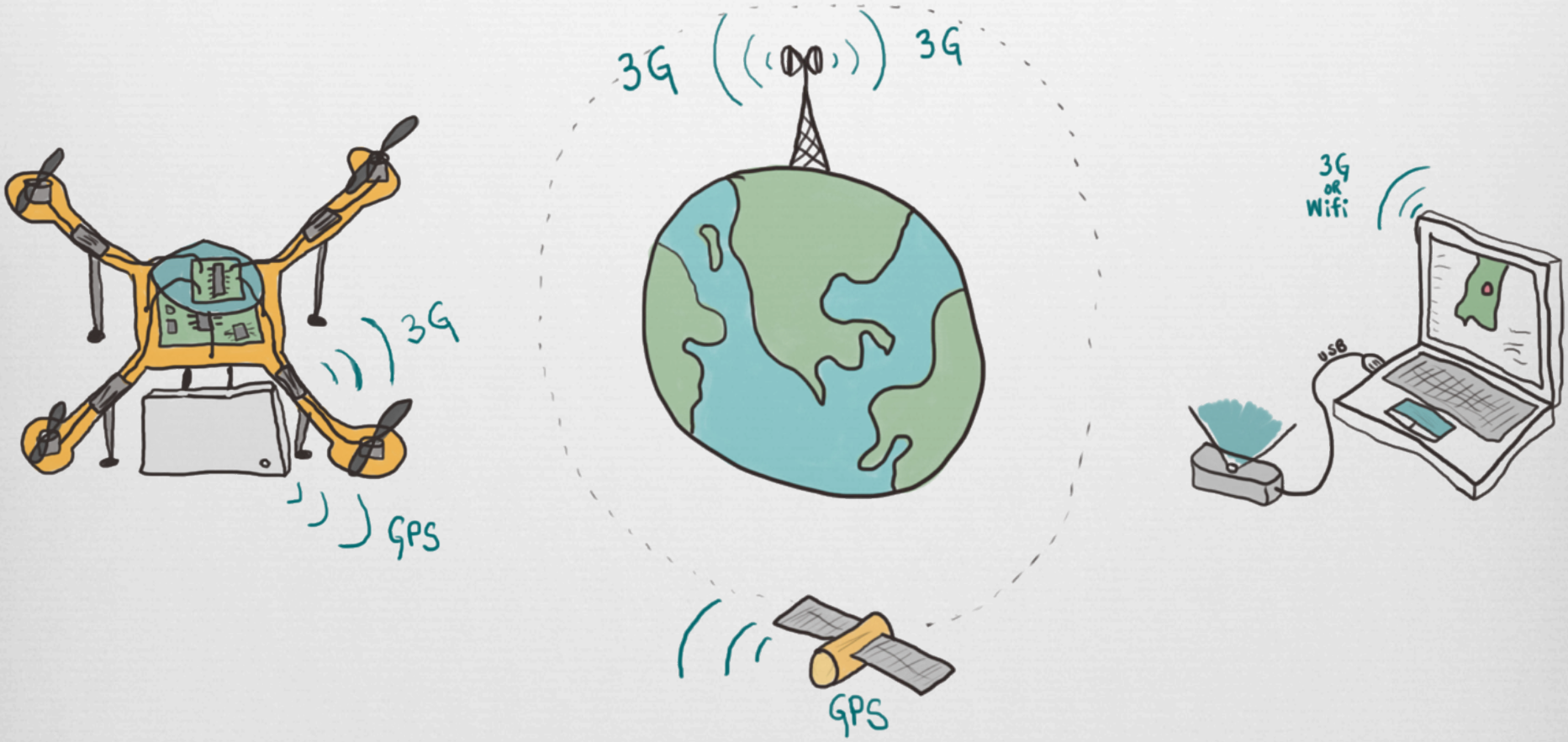
PROPOSED SOLUTION

USE OF QUADCOPTER

Deliver Aid

Instruct Victim

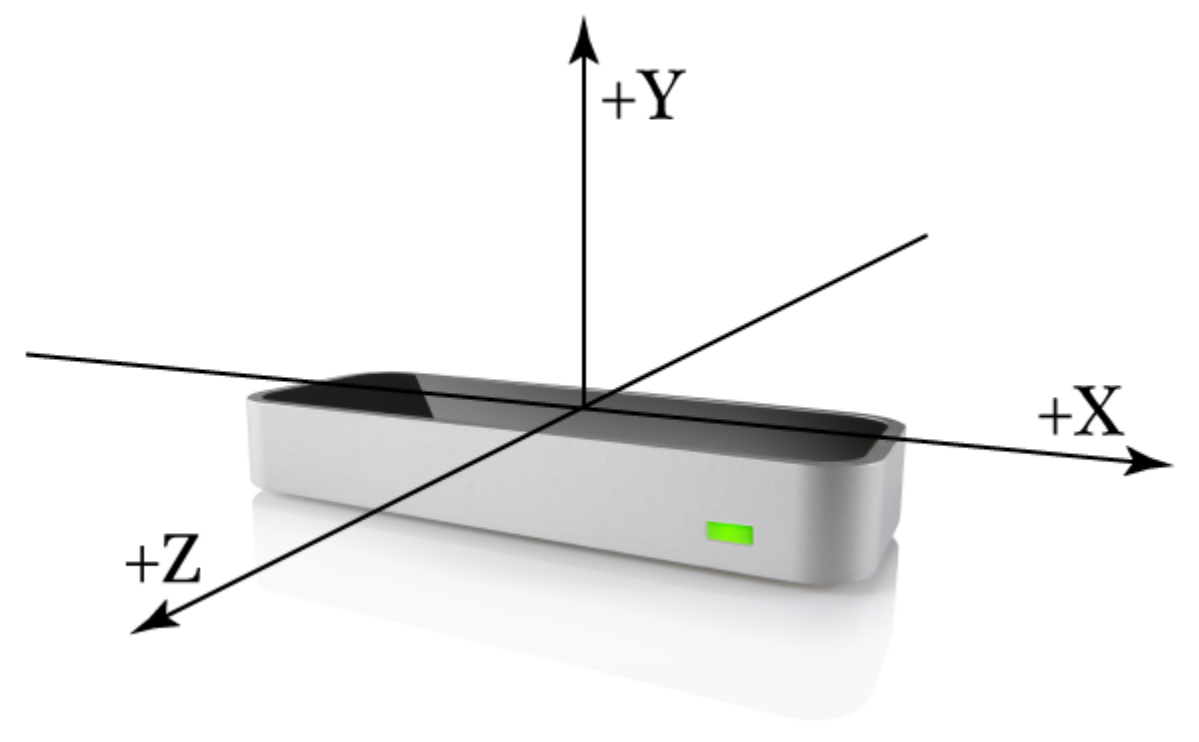
System Diagram



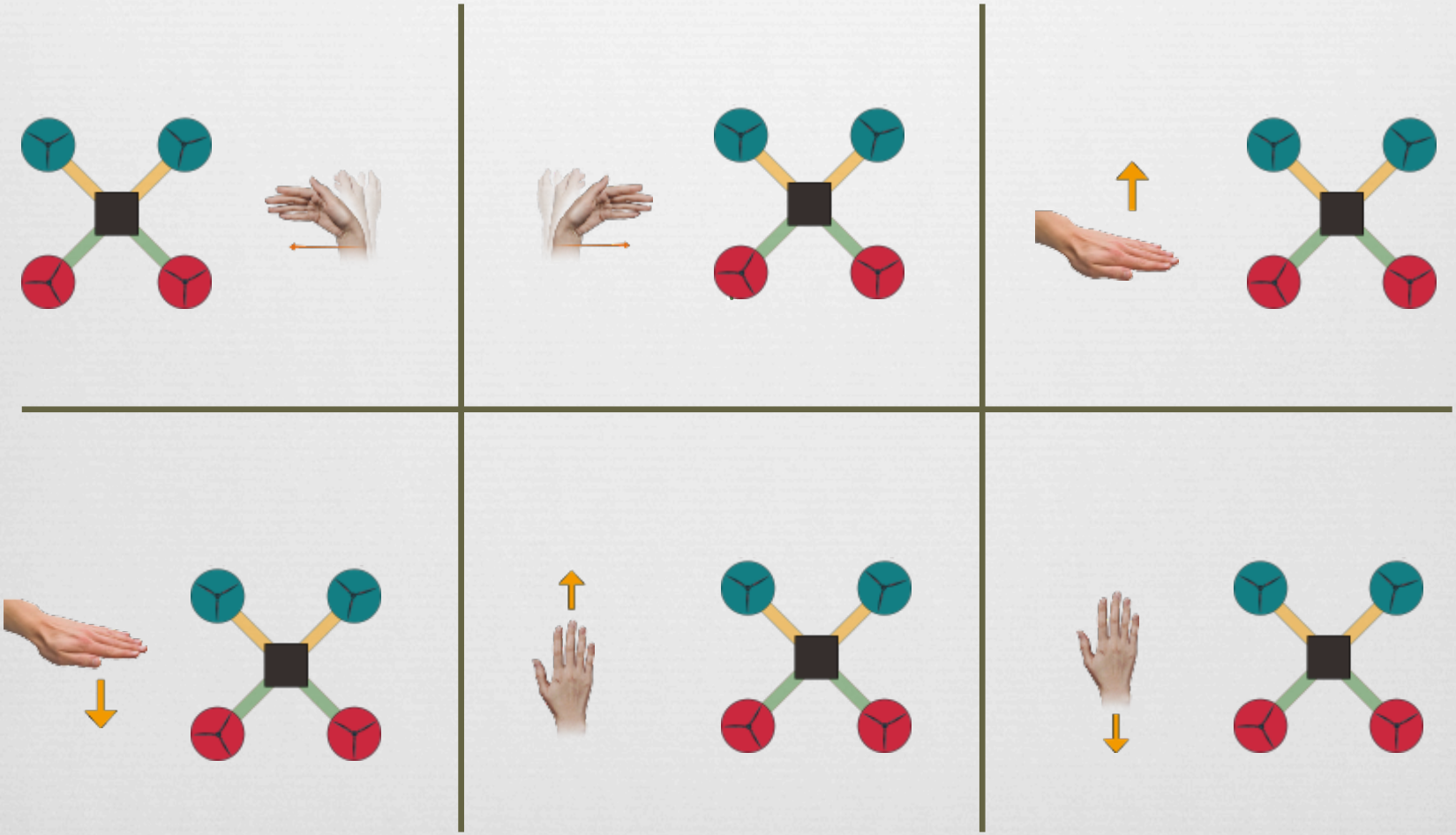
MODEL

Waypoint using GPS Location

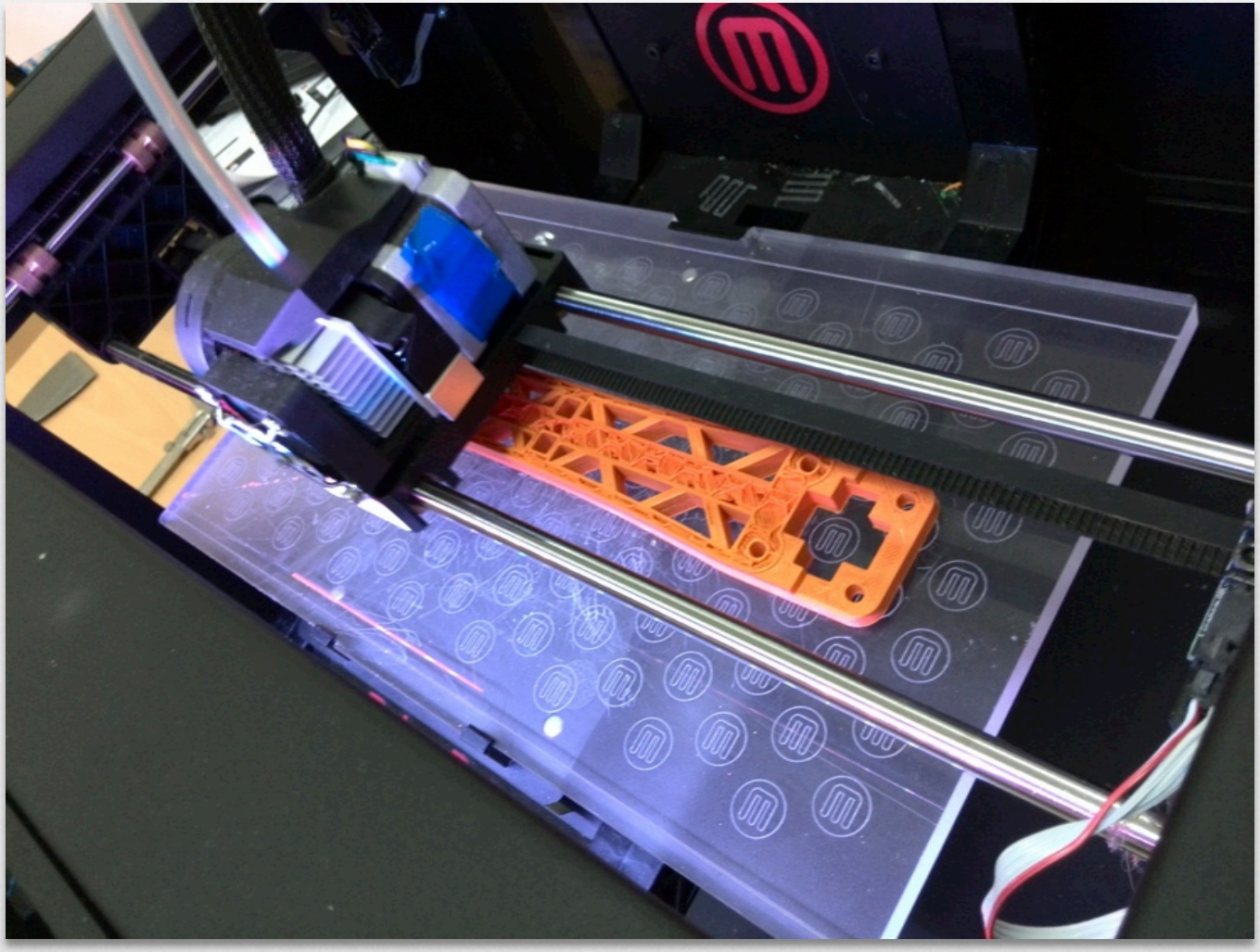
LEAP MOTION CONTROL



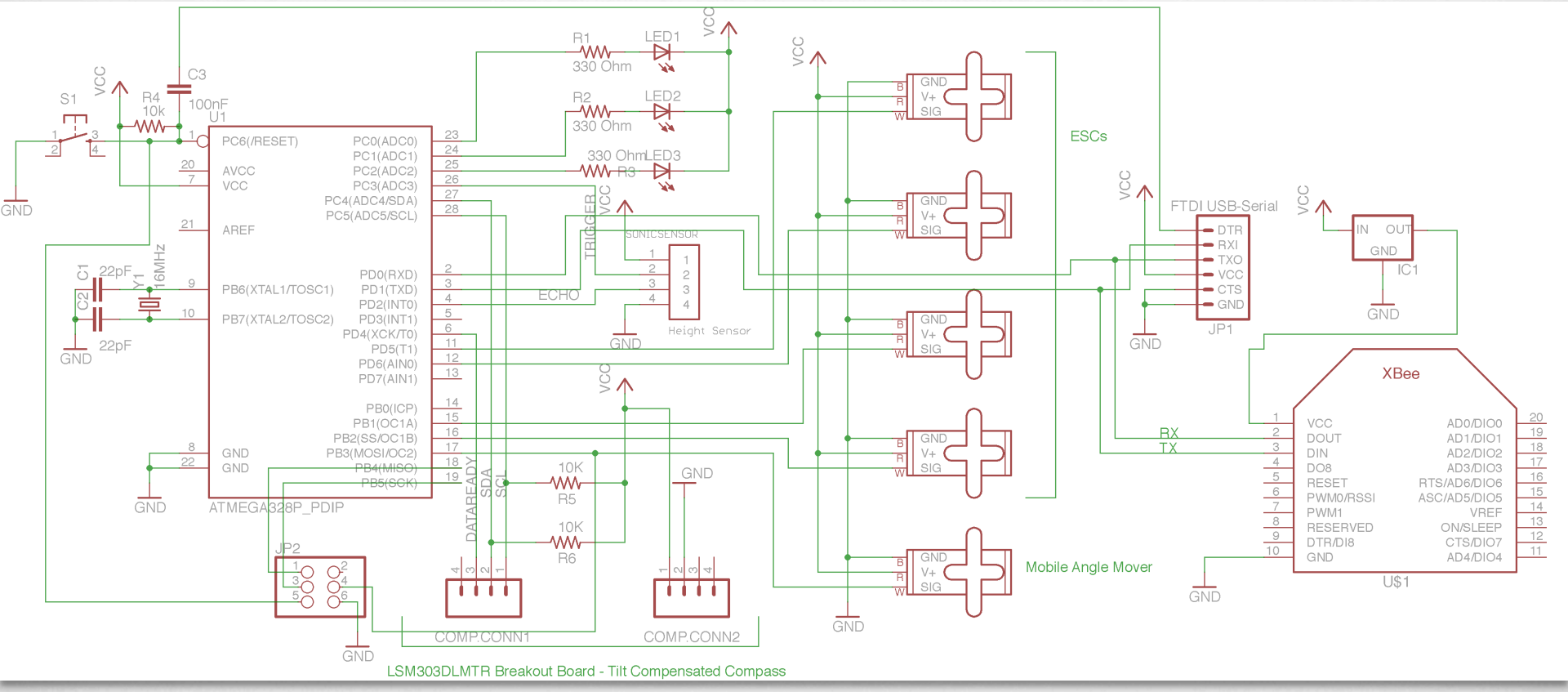
6 DOF Gesture Control



3D printing the Parts

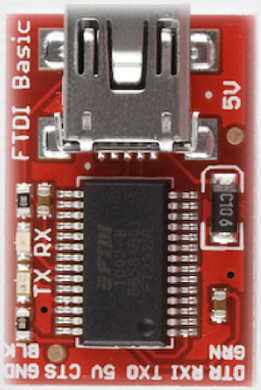


Circuit Diagram

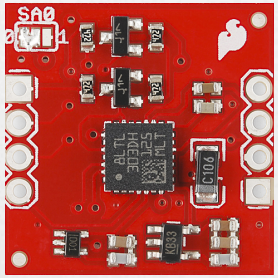


LSM303DLMTR Breakout Board - Tilt Compensated Compass

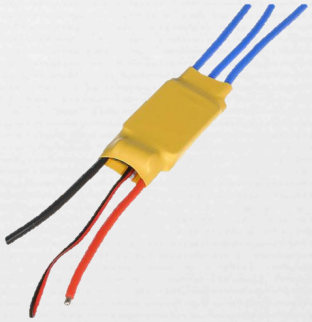
Key Components



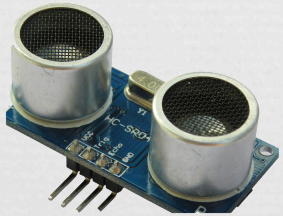
FTDI 5V Breakout



Tilt Compensated Compass



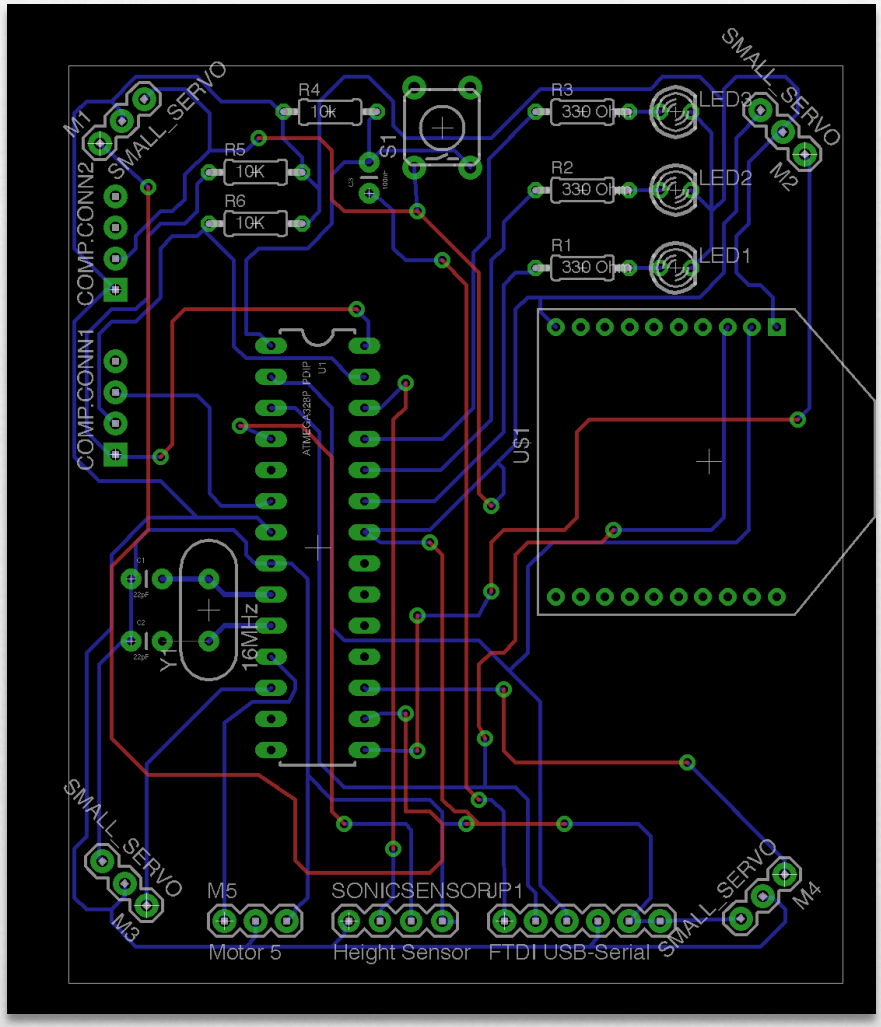
Electronic Speed Controller 30Amps

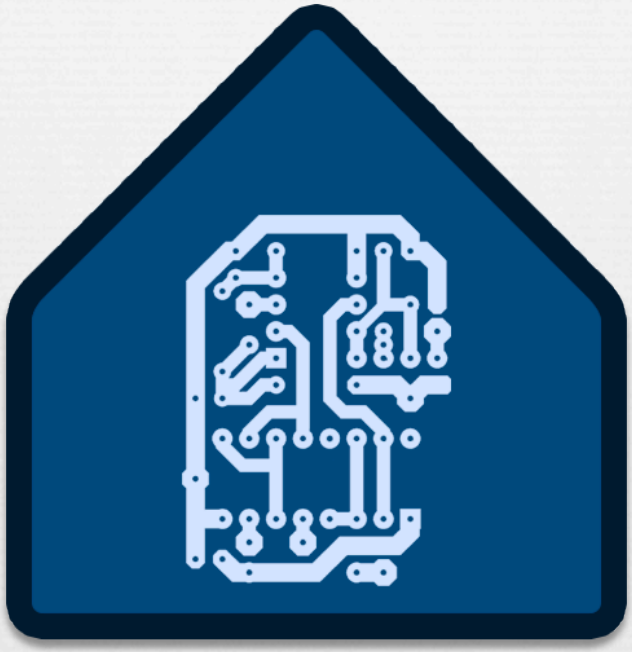


Ultra-Sonic Height Sensor

X-Bee

PCB


M1
SMALL_SERVO
COMP.CONN2
COMP.CONN1
R4
10k
R5
10K
R6
10K
S1
R3
330 Ohm
R2
330 Ohm
R1
330 Ohm
LED3
LED2
LED1
SMALL_SERVO
M2
US1
16MHz
Y1
22pF
SMALL_SERVO
M3
M5
Motor 5
SONICSENSORJP1
Height Sensor
FTDI USB-Serial
SMALL_SERVO
M4



TESTING PLAN

PHASE 1 – Getting the Quadcopter to Fly

S.No.	Task Name	Status	Estimated Completion Time
1.	Design the PCB	Complete	1st February
2.	Solder the PCB	Incomplete	3rd February
3.	Writing the Code for Xbee Communication	Complete	2nd February
4.	Fine Tuning and Testing	Incomplete	5th February

PHASE 2 – Quadcopter Stabalization

S.No.	Task Name	Status	Estimated Completion Time
1.	Buy the Controller Chip	Incomplete	15th February
2.	Finding the Control Signals for the Controller Chip	Incomplete	17th February
3.	Writing the Code for Stabilization	Incomplete	19th February
4.	Achieve effective Communication between Xbee and Controller Chip	Incomplete	23th February

PHASE 3 – Android WiFi Communication

S.No.	Task Name	Status	Estimated Completion Time
1.	Establish USB-Serial Communication between Android and Controller Chip	Incomplete	24th February
2.	Code in Java for Sending Flight Commands	Incomplete	27th February
3.	Design the 3D case for android to mount on Quadcopter	Incomplete	28th February
4.	WiFi Video Streaming	Incomplete	1st March

PHASE 3 – Full 3G Communication

S.No.	Task Name	Status	Estimated Completion Time
1.	Establish a auto-configuration 3G Communication Channel	Incomplete	6th March
2.	Intelligent Flight in case of Dropped Communication	Incomplete	8th March
3.	GPS route following	Incomplete	20th March
4.	Fine Tuning and Re-configuration	Incomplete	30th March

INITIAL RESULTS

MATLAB THRUST CALCULATION

```
% Propeller hover efficiency
eta = 0.75;
% Power of the motor Max. for our motor is 125
Power = 110;
% Propeller Radius in meters diameter = 10 inches = 0.2794
R = 0.2540;
% Usual Air Desnity kg/m^3
rho = 1.22;
Thrust = ((eta+Power)^2 * 2 * pi * R^2 * rho)^(1/3);
disp('Thrust in Newtons:');
Thrust
disp('Weight Liftable by one motor in Kg:');
Weight = Thrust/9.80665002864;
Weight
disp('Weight Liftable by all four motors in Kg:');
Weight = (Thrust/9.80665002864)*4;
Weight
```

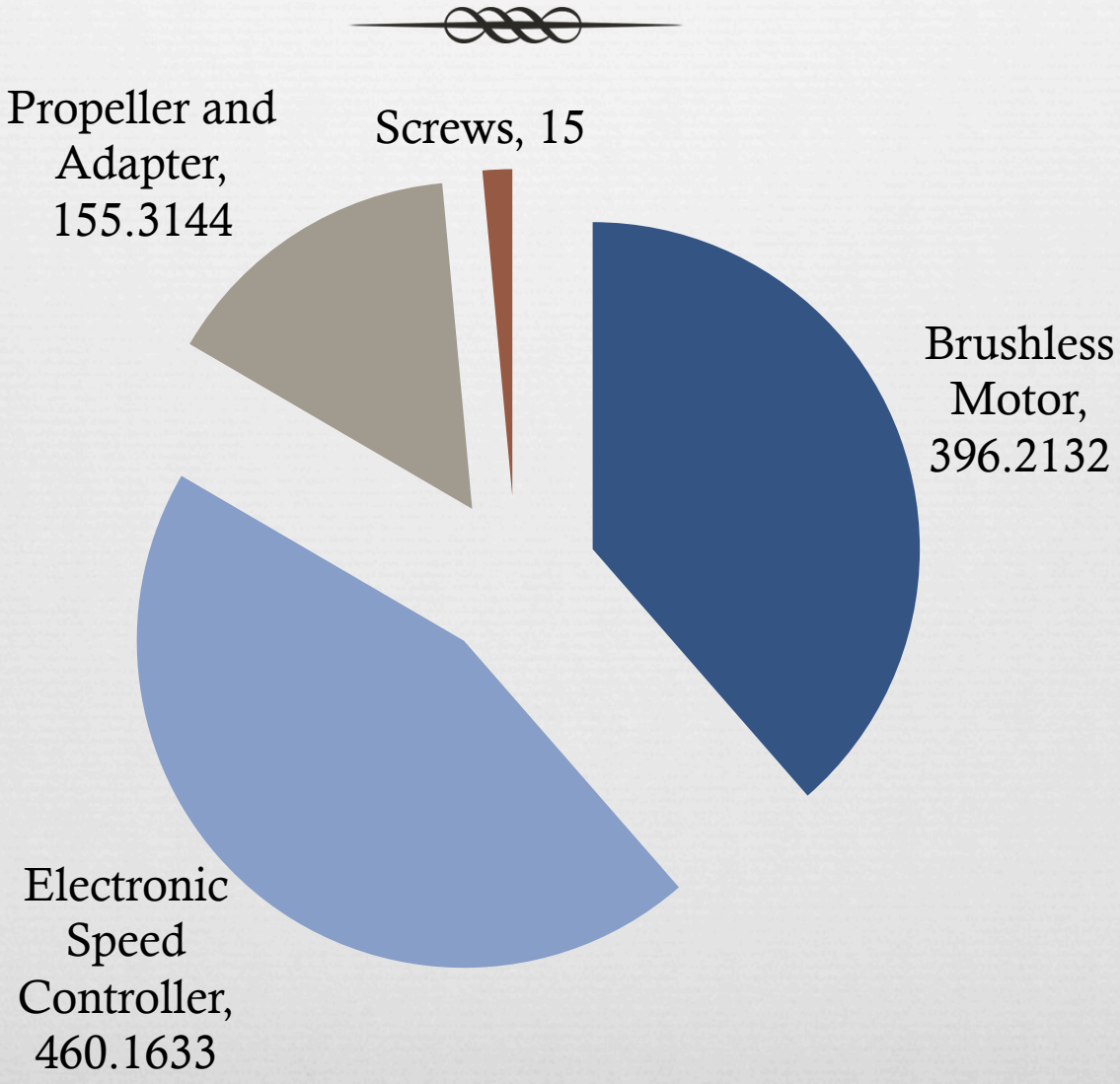
MATLAB THRUST CALCULATION

```
Thrust in Newtons:

Thrust =

   18.2375

Weight Liftable by one motor in Kg:

Weight =

    1.8597

Weight Liftable by all four motors in Kg:

Weight =

    7.4388
```

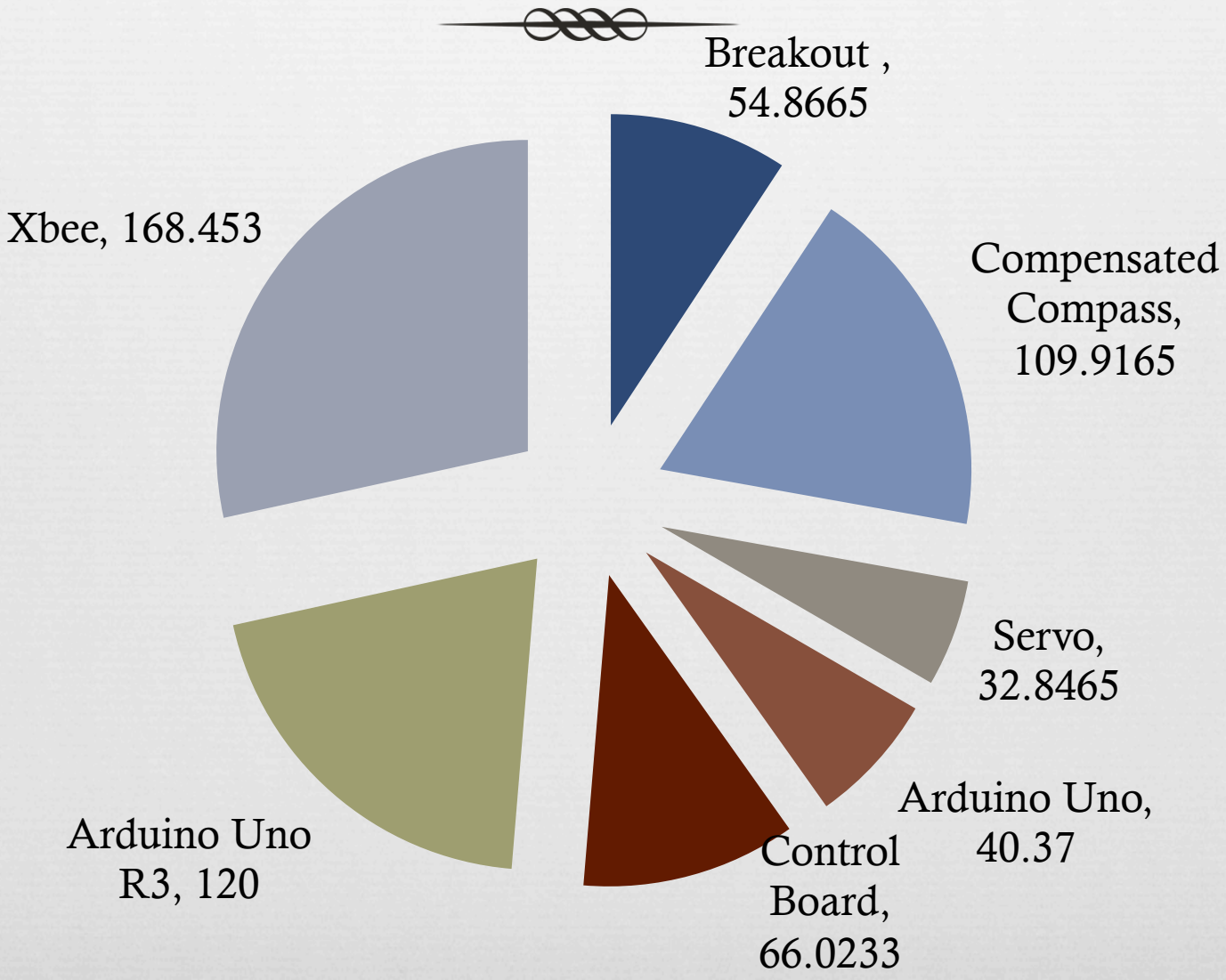
Demo

COST ANALYSIS

Cost Analysis *Bought*



Cost Analysis *To Buy*



CONCLUSION

Collaboration Required

Its Possible

Nobel Use

THANK
YOU!