

MULTI-PURPOSE QUADCOPTER

KITHINJI A. MURIUNGI
EC/09/14



SUPERVISOR: MR. S. B. KIFALU

ECE 590: ENGINEERING PROJECT II



30th April, 2019

EC/09/14

ECE 590: Engineering Project II

1



Quadcopter at a Glance

- Terms:
 - ✓ UAV (Unmanned Aerial Vehicle)
 - ✓ Aerial Robots
 - ✓ RPV (Remotely Piloted Vehicle)
 - ✓ copter/ rotor
 - ✓ Drones
- Complex Robotics (6 Degrees of Freedom)
- Regulations: (**By KCAA**)
 - ✓ Safety
 - ✓ Privacy (Cameras)
 - ✓ Security (Manipulation of sensors and Control Systems)

About the Project

Mechanics & System Design

- Basic Mechanics (6D of Freedom)
- Design Considerations (Weight, Power, Energy, Mass Distribution)
- Agility (Efficiency and Optimization)
- Components Selection (Frame, Motors & Propellers, Controllers, etc)
- Controls : PID (Height, Thrust)
- Effect of Size and mass
- Applications: IoT-Based





Problems & Aims

- Surveillance and Border Patrol
- Search and Rescue
- First and fast respondent (Danger)
- Access to the most remote and harsh areas
- Expensive and Specific purposed quadcopters
- Manipulation of the existing designs



Architecture

Hardware

- Frame
- Battery
- Motors
- Propellers
- IMU (Sensors) – MPU6050
- Controller (Arduino)
- ESP8266
- MQ2
- LED
- Resistors
- Connectors
- Zip-ties
- ESC (Electronic Speed Controller)
- PDB (Power Distribution Board)
- Transmitter
- Receiver

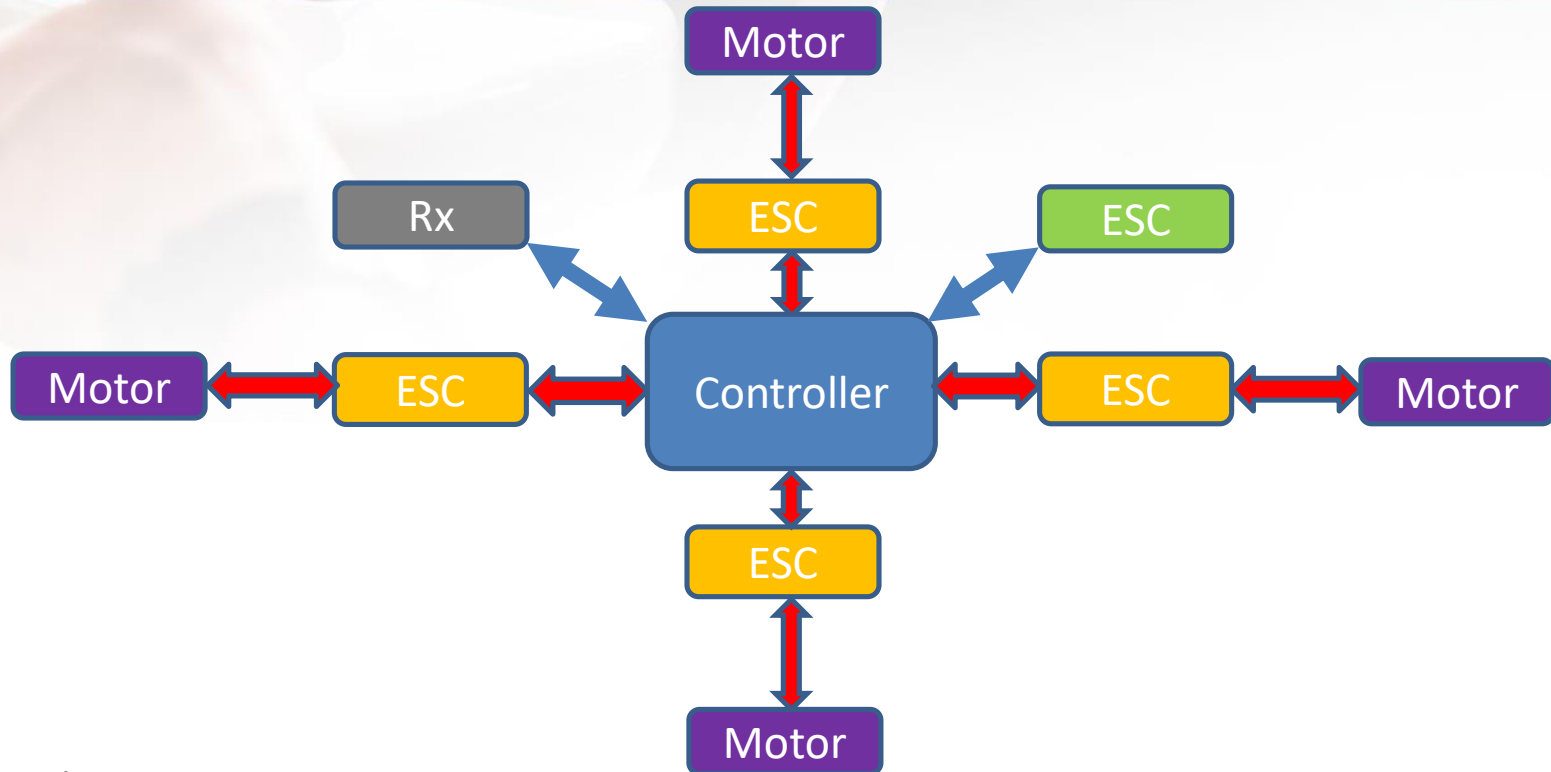
Software

- Arduino IDE
- Fritz
- Android Studio

Others

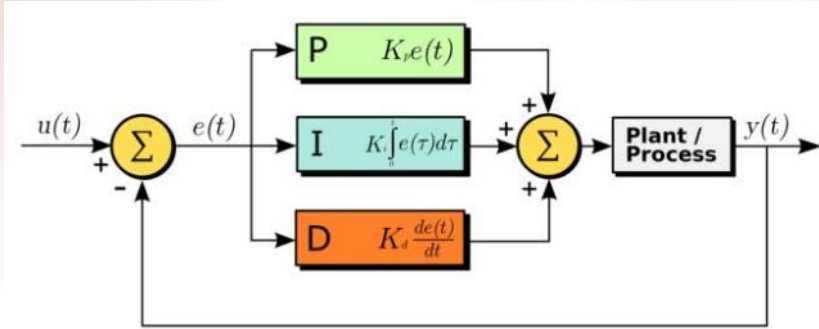
- Firebase :
Google
Cloud
Platform

GENERAL BLOCK DIAGRAM



KEY TASKS

1. Implementation of the PID in a Quadcopter



2. Application: IoT Based Solution

Market Opportunity

- Design Manipulation.
- Precision Building.
- Complex Design Controls.





Challenges

- Delay of the project.
- Faulty IMU makes it hard in controls.
- Power Problems.
- Obtaining a precise Balanced System.
- Very expensive project.
- Big Scope for one person.

DEMO

30th April, 2019

EC/09/14

ECE 590: Engineering
Project II

10



Conclusion

In a Quadcopter Project:

- Design is Simple.
- Build requires Precision.
- Developing Electronics and Software under Control is the Ultimate Challenge.



