IOT ENABLED DRONE FOR SMART FARMING

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TABLE OF CONTENTS

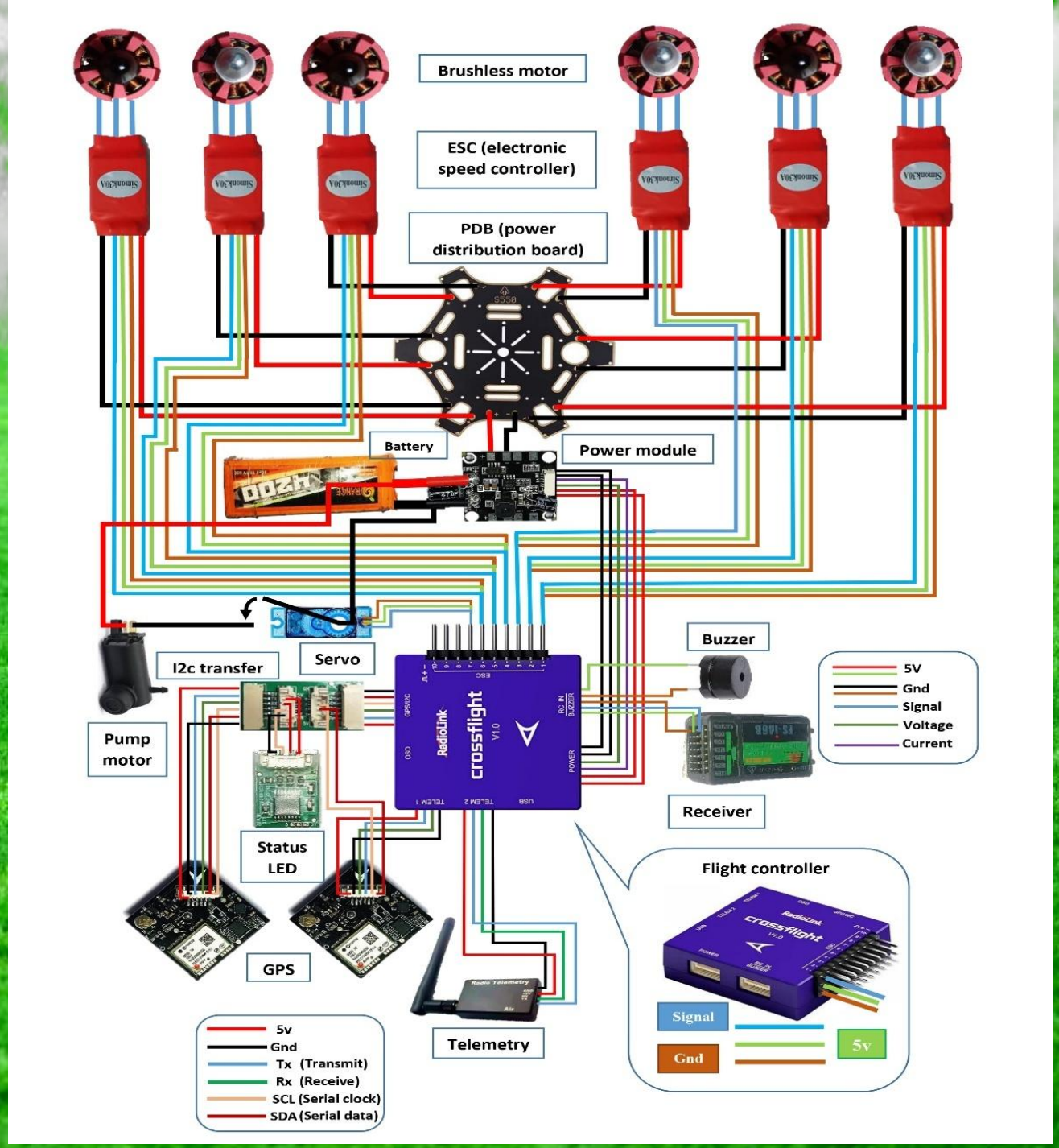
INTRODUCTION

An agricultural drone is an unmanned aerial vehicle used in agriculture operations, mostly in yield optimization and in monitoring crop growth and crop production. Agricultural drones provide information on crop growth stages, crop health, and soil variations. Multispectral sensors are used on agricultural drones to image electromagnetic radiation beyond the visible spectrum, including near-infrared and short-wave infrared.

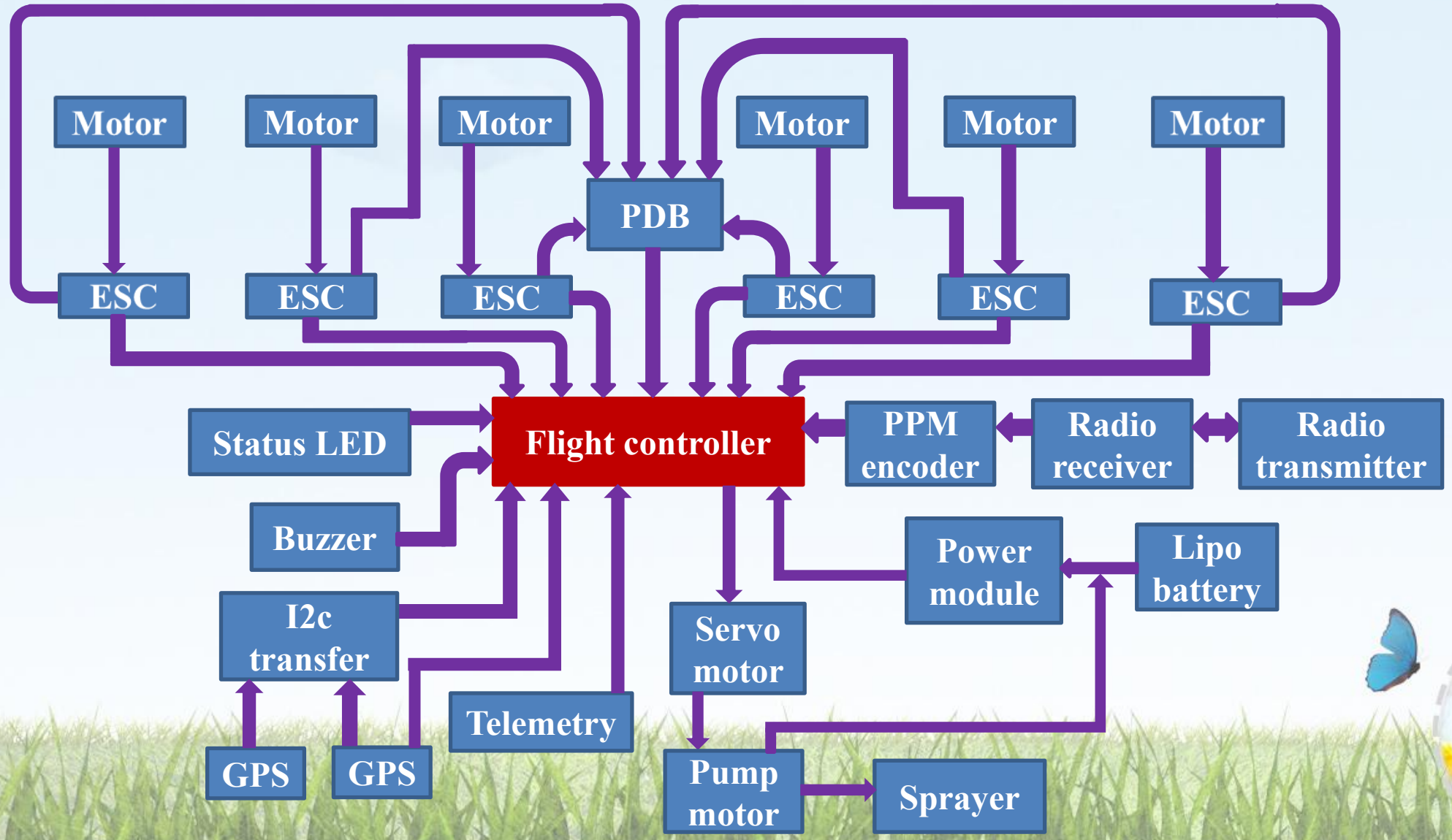
COMPONENT LIST

Sl. No.	Name of the Components	Quantity
1.	Brushless DC motors with bullet connectors	06
2.	ESC	04
3.	Hexa S550 Frame	01
4.	Lipo-Battery	01
5.	Lipo-balance charger	01
6.	Power module	03
7.	PDB board with XT60/T connector	01
8.	Flight controller	01
9.	PPM encoder/decoder	01
10.	Transmitter and receiver	01
11.	GPS	02
12.	Propellers	04
13.	Telemetry	01
14.	Buzzer	01
15.	Shock absorber	01
16.	Vero board	01
17.	Jumper wires	40
18.	Pump motor	01
19.	Pipe	1 meter
20.	5 way connector	01
21.	Nozzles	4
22.	Water tank	500 ml
23.	I2C transfer board	01
24.	Flight controller status indicator	01
25.	Servo Motor	01

CIRCUIT DIAGRAM



WORKING PRINCIPLE WITH BLOCK DIAGRAM



EFFICIENCY CALCULATION

Weight (gram)	Propeller(mm)	Battery (volt)	Ideal thrust (gram)	Voltage/ motor (volt)	Current/ motor (ampere)	Power/motor (watt) [volt*ampere]	Thrust obtained (gram)	Total thrust (gram)	Efficiency (η) Thrust/ power
60*6 =360	1045	3S= 12.6	2520	12.60	9.5	119.7	1332	2520+ 1332 =3852	3852/ (119.7*6) =5.445
60*6 =360	1045	4S= 16.8	2520	16.80	9.5	159.6	2280	2520+ 2280 =4800	4800/ (159.6*6) =5.012

PROGRAMMING AND CALIBRATION

- Install firmware
- Frame
- Accelerometer calibration
- Compass calibration
- Radio calibration
- Setup modes
- ESC calibration
- Failsafe

SENSORS

- Altitude holding
- Loitering over a certain point
- Aerial mapping
- Auto returning to launching point in case of emergency

PARAMETERS

Model	S550 Hexacopter
Max payload	3kg
Average flight time	15 minutes
Max flight time	20 minutes
Propeller size	1045
Safe operation speed	50 km/h
Max speed	90 km/h
Max range	3 km
Max height	800 meter

APPLICATION

01

Precision Spraying

- Drones can apply chemicals exactly where and when they are needed.

02

Efficiency

- Drones can cover large areas in a short amount of time, which can be up to 40 times faster than manual labor.

03

Safety

- Drone operators are not exposed to potentially hazardous chemicals.

04

Livestock Monitoring

- Drones can reach areas that are difficult or inaccessible to reach on track livestock across wide areas

05

Soil and Field Analysis

- Map topography and analyze soil nutrient levels.

06

Crop Health Monitoring

- Drone operators can monitor the drone as it detect stress, disease, and pest infestation early

ADVANTAGE & DISADVANTAGE

Advantage

- Crop Monitoring
- Plantation
- Soil and field Analysis
- Avoid Chemical Overuse
- Growth Monitor

Disadvantage

- Flight Time and Flight Area
- Connectivity
- Weather Dependent
- Heavy Cost For Good Drone
- Problem Due to the Space

FUTURE SCOPE

Precision Agriculture

IoT drones deliver crop data, guiding precise farming and reducing waste.

Seed Planting

Drones precisely plant seeds in hard-to-reach or inefficient areas.

Disaster Relief

Drones assess damage, deliver supplies, and monitor disaster-affected areas effectively.

01

02

03

04

05

06

Remote Sensing and Connectivity

Drones provide connectivity in remote farms, linking IoT devices and sensors.

Livestock Health Monitoring

Drones track livestock health, movement, and detect illness through behavior analysis.

Government Policy Support

Incentives and policies promoting drone adoption.

CONCLUSION

IoT-based agriculture drones are a game-changer for modern farming. They offer accurate, eco-friendly crop management using technologies like GPS, AI, and IoT. These drones reduce labor costs, lower chemical use, and boost sustainability. By improving efficiency and crop yield, they benefit both small and large farms.

DIFFERENT FLIGHT MODES FOR DRONE

A. AUTONOMOUS MODE

B. ALTITUDE HOLD MODE

C. RETURN TO LAUNCH MODE

D. POSITION HOLD MODE

A https://drive.google.com/file/d/1hU7NRcavsxc7jS7XaIbGVFjeeaDr9GY_/view?usp=drivesdk

B https://drive.google.com/file/d/1hV4dTM3nWw_6hpXYSzb0xmcHa5jB_YUj/view?usp=drivesdk

C https://drive.google.com/file/d/1hcz9OdjJAZrlQHVyNnifFXrrhQTKnlAe/view?usp=drivesdk

D https://drive.google.com/file/d/1hZFTHZnvAdu-7FrvMQtCn04Du2_sT6mf/view?usp=drivesdk

THANK YOU