# Flying Eye

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**Abstract**: Indian agriculture needed production and protection materials to achieve high productivity. Agriculture fertilizer and chemical frequently needed to kill insects and growth of crops. The WHO (World Health Organization) estimates there are more than 1 million pesticide cases in every year. In that more than one lakh deaths in each year, especially in developing countries due to the pesticides sprayed by human being. The pesticide affects the nervous system of humans and also leads to disorders in body. A remote controlled UAV (Unmanned Aerial Vehicle) is used to spray the Pesticide as well as fertilizer to avoid the humans from pesticide poison. This model is used to spray the pesticide content to the areas that can't easily accessible by humans. The Universal Sprayer system is used to spray the liquid as well as solid contents which are spread by the universal nozzle.Web camera is used to capture the remote sensing images which is given input to the detector which are used to identify the shape circle for dead crops and spray pesticides on alive crops.

**Keywords**: Quadcopter, Remote Control.

## I. INTRODUCTION

The quadcopter is cost effective alternate to high cost standard rotorcrafts. UAVs are rapidly upcoming method for cultivation, production and protection processes. The quadcopter was chosen for this project because of high stability and more lifting power. The control of quadcopter is easier than the helicopter model of vehicles. Some applications of quadcopter are Search and Rescue, Police, Code Enforcement/Inspections, Emergency Management, Fire, Surveillance, Border Security, Defense, etc. The WHO (World Health Organization) estimates there are more than 1 million pesticide cases in every year. In that more than one lakh deaths in each year, especially in developing countries due to the pesticides sprayed by human being and handling of pesticides. The health effects of pesticides include asthma, allergies and hypersensitivity, and pesticide exposure to cancer, hormone disruption and problems with reproduction and fetal development. Moreover, lots of pesticides get wasted due to spraying on dead crops and grasses so to avoid this problem this project is will detect the shape as dead crop and will not spray on it.
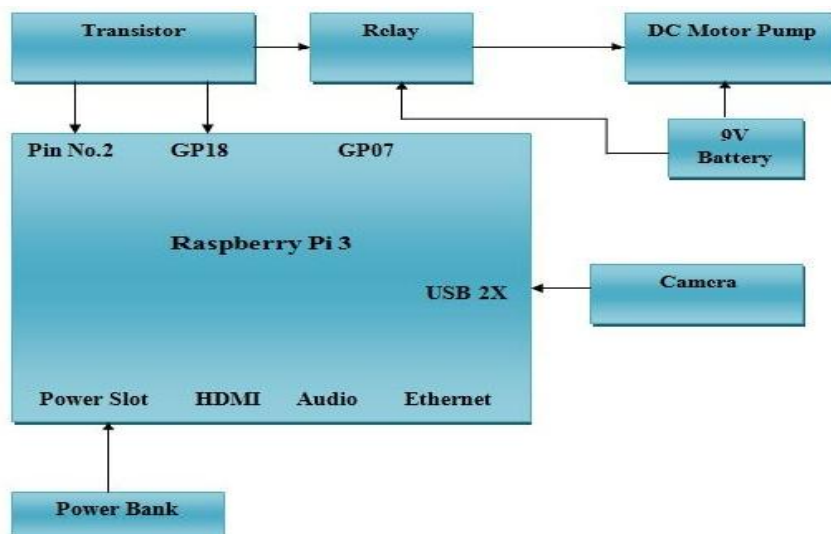
## II. BLOCK DIAGRAM AND ITS DESCRIPTION



Figure 1: Block diagram of Circle detector

**BRUSHLESS DC OUTRUNNER MOTOR**:

**Working:** Brushless DC motors (BLDC motors, BL motors) also known as electronically commutated motors (ECMs, EC motors) are synchronous electric motors powered by direct-current (DC) electricity and electronic commutation system, rather mechanical commutators and brushes.

The current-to-torque and frequency-to-speed relationships of BLDC motors are linear. BLDC motors may be described as stepper motors, with fixed permanent magnets and possibly more poles on the rotor than the stator,or reluctance motors. The latter may be without permanent magnets, just poles that are induced on the rotor then pulled into alignment by timed stator windings. Now the movement of the magnet in the center depends on the direction of flow of current in the coil. The continuous movement of the magnet is ensured by Left hand rule for the coils i.e. The left hand rule states that Grasp the coil in your left hand, with your finger wrapped around in the direction of the current. Your thumb will point towards the north pole of the coil.
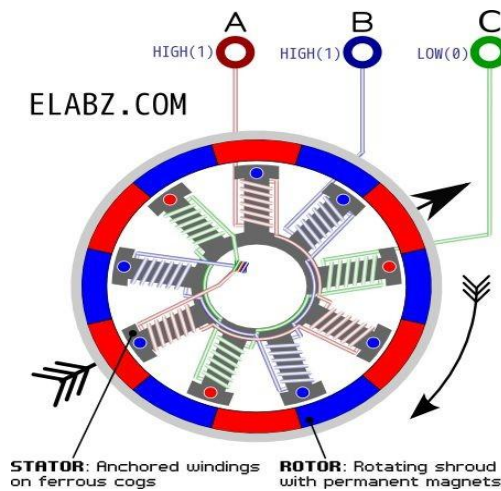


**PROPELLERS:**

A propeller is a type of fan that transmits power by converting rotational motion into thrust. A pressure difference is produced between the forward and rear surfaces of the airfoil- shaped blade, and air is accelerated behind the blade.

The principle and working of a propeller is based on Bernoulli's Principle & Newton's Third Law. Bernoulli's principle states that for an inviscid flow, an increase in the speed of the fluid occurs simultaneously with a decrease in pressure or a decrease in the fluid's potential energy. Newton's third law states that every action has an equal and opposite reaction.
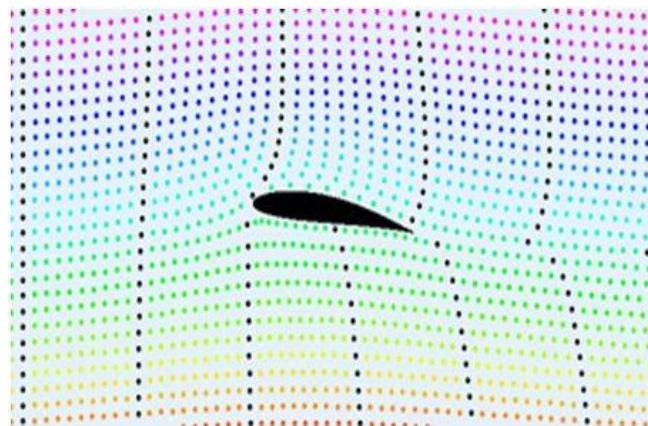


**Figure 2:** Air speed variations on an air foil

An propeller is shaped so that air flows faster over the top than under the bottom. There is, therefore, a greater pressure below the propeller than above it. This difference in pressure produces the lift. Lift coefficient is a dimensionless coefficient that relates the lift generated by an aerodynamic body such as a wing or complete aircraft.

## PITCH OF A PROPELLER

**Pitch of a propeller** is normally described as the distance travelled per rotation, assuming there is no slip.Low pitch yields good low speed acceleration (and climb rate in an aircraft) while high pitch optimizes high speed performance and economy.
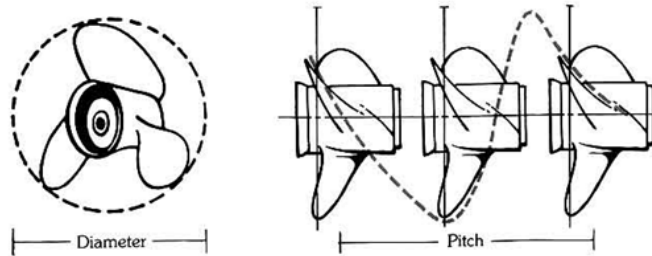


Figure3: Diameter & Pitch of a Propeller

Blade pitch or simply pitch refers to turning the angle of attack of the blades of a propeller or helicopter rotor into or out of the wind to control the production or absorption of power. Wind turbines use this to adjust the rotation speed and the generated power. A propeller of a ship uses this effect to control the ship's speed without changing the rotation of the shaft and to increase the efficiency of streaming fluids.

### Specification of Propeller used

- 10*4.5 SF Two Propellers R/H Rotation complete with shaft adaptor rings.
- 10*4.5 SF Two Propellers Standard Rotation complete with shaft adaptor rings.
- Well balanced and made from high impact resin polymer.

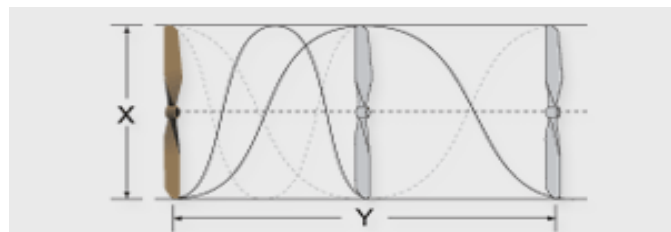| | |
|---|---|
| Length (Inch [X]) | 10 |
| Pitch (Inch [Y]) | 4.5 |



Figure 4:Dimensions of Propeller



**Figure 5:** Propellers with adaptor rings

**ESC (Electronic Speed Controller):**

The purpose of a motor speed controller is to take a signal representing the demanded speed, and to drive a motor at that speed. With the purpose to vary an electric motor's speed and direction ESCs are often used on electrically-powered radio controlled models. An ESC can be a stand-alone unit which plugs into the receiver's throttle control channel or incorporated into the receiver itself.

**Features:**
• Convenient all-in-one ESC design
•4x20Aoutput
•Adjustable low-voltage protection
• Fully programmable
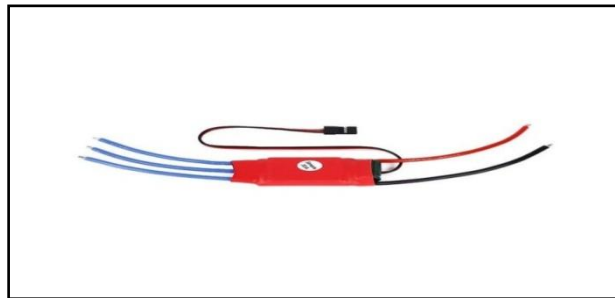


**Figure 6: Electronic Speed Controller**

Regardless of the type used, an ESC interprets control information not as mechanical motion as would be the case of a servo, but rather in a way that varies the switching rate of a network of field effect transistors, or FETs. The rapid switching of the transistors is what causes the motor itself to emit its characteristic high-pitched whine, especially noticeable at lower speeds. It also allows much smoother and more precise variation of motor speed in a far more efficient manner than the mechanical type with a resistive coil and moving arm once in common use. Most modern ESCs incorporate a battery eliminator circuit (or BEC) to regulate voltage for the receiver, removing the need for receiver batteries. BECs are usually either linear or switched mode voltage regulators.

DC ESCs in the broader sense are PWM controllers for electric motors. The ESC generally accepts a nominal 50 Hz PWM servo input signal whose pulse width varies from 1 ms to 2 ms. When supplied with a 1 ms width pulse at 50 Hz, the ESC responds by turning off the DC motor attached to its output. A 1.5 ms pulse-width input signal results in a 50% duty cycle output signal that drives the motor at approximately half-speed. When presented with 2.0 ms input signal, the motor runs at full speed due to the 100% duty cycle (on constantly) output.

**Specification of ESC used:**
- Input Voltage: **7.4~14.8V (2~4S lipoly)**
- Cont. Current: **30A x 5**
- Burst Current (10 sec): **25A x 4**
- BEC Type: **Switching**
- BEC Output: **5V@3A**
- Motor Wire Length: **250mm**
- Dimensions: **70x62x11mm**
- Weight: **112g**

**Flight controller**
**Pre-flight:**
- If the SAFE screen says ERROR, you must fix that error before you can arm it.
- You will see the actual error on the display.
- You may have to power cycle the KK2.1.X to clear an error after fixing it.
- Top right displays the profile being used (P1 or P2) or tells you which stick scaling and PI profile you are using (PI1 or PI2).
- It will tell you if Self Level is on or off.
- The Battery (Batt) voltage will be displayed if you have connected the flight battery +ve to the KK2.1.X battery
- monitor pin (pin closest to the edge of the board).

- Temp is the MPU6050 internal temperature.
- Roll and Pitch Angle will appear after arming and disarming. They display the angle of the KK2.1.X after arming and disarming.
- If you have the Alternative SAFE screen layout selected in Misc Settings 2, it displays the last Motor Layout selected (this is just a guide as you may have changed the settings in the Mixer Editor).
- Pressing button 4 takes you into the MENU.

**Post-flight:**
- If the SAFE screen says ERROR, you must pay attention.
- You will see the actual ERROR on the display. It will most likely be "Error: no yaw input" which means you had a receiver failure during flight.
- The top left corner will display a number if the KK2.1.X
- code took longer than expected to execute during flight, the number of times this happened will be displayed. This shouldn't happen. If it does, it could indicate a fault with the board.
- The Roll and Pitch Angle will appear.
- Pressing button 4 takes you into the MENU.

**BATTERY**
- NIMH (Nickel Metal Hydride - stable, toxic, less energy storage and heavy compared to Lipo): Single cell is equal to 1.1V
- NICAD (Nickel Cadmium - stable, toxic, more energy storage than NiMH but less than Lipo and heavy compared to Lipo) : Single cell is equal 1.2V
- LiPO Cell (Lithium Polymer - more prone to being flammable if punctured or over-taxed, verylight, twice the energy storage): Single cell is equal to 3.7V

| 1S | 2S | 3S | 4S | Remaining Capacity |
|----|----|----|----|----|
| | Volts | | | |
| 4.20 | 8.40 | 12.60 | 16.80 | 100% |
| 4.15 | 8.30 | 12.45 | 16.60 | 90% |
| 4.10 | 8.20 | 12.30 | 16.40 | 80% |
| 4.00 | 8.00 | 12.00 | 16.00 | 60% |
| 3.90 | 7.80 | 11.70 | 15.60 | 40% |
| 3.80 | 7.60 | 11.40 | 15.20 | 20% |
| 3.70 | 7.40 | 11.10 | 14.80 | <10% |

Table 1 Handy chart to estimate remaining capacity of a LiPO

**Specifications:**
- Capacity: 2200mAh
- Voltage: 3S1P / 3 Cell / 11.1v
- Discharge: 20C Constant / 30C Burst
- Weight: 404g (including wire, plug & shrink wrap)
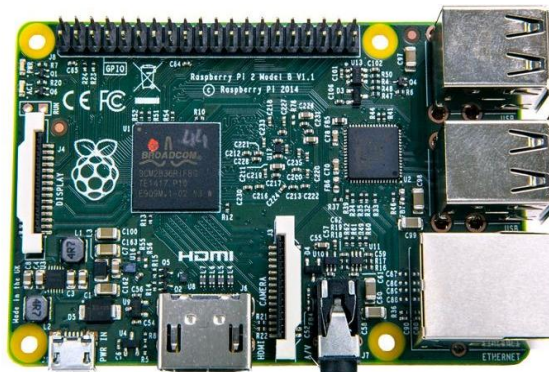- Dimensions: 145x52x25mm

**Raspberry pi 2 Model B**



**Figure 7: Raspberry pi 2 model B development board**

The Raspberry Pi 2 model B is a credit-card-sized single- board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. A group of computer scientists lead by EbenUptonat the University of Cambridge's Computer Laboratory in 2006 struck upon the idea of producing a cheap educational micro-computer geared towards the amateur computer enthusiast, budding students, and children.

## CONCLUSION

A remote controlled UAV (Unmanned Aerial Vehicle) is used to spray the Pesticide as well as fertilizer to avoid the humans from pesticide poison. This model is used to spray the pesticide content to the areas that can't easily accessible by humans. The Universal Sprayer system is used to spray the liquid as well as solid contents which are spread by the universal nozzle. Web camera is used to capture the remote sensing images which is given input to the detector which are used to identify the shape circle for dead crops and spray pesticides on alive crops.

## REFERENCES

[1] "WI- FI Based Robot Controlling By Webpage Interface And Video Monitoring" (ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume 5, Issue 4, April 2015)Mohammed Saquib Khan, AtaurRehman Khan, Altamash Khan, AkmalKalia, LochanBisne.International Journal of Emerging Technology and Advanced Engineering

[2] "Wi-Fi Robot For Video Monitoring & Surveillance System",ISSN 2229-5518, Pavan.C, Dr. B. Sivakumar. International Journal of Scientific & Engineering Research, Volume 3 ROBOT, Issue 8, August-2012.

[3] "The Raspberry Pi Controlled Multi- Environment For Surviellance And Live Streaming", International Conference on Industrial Instrumentation and Control, Pune. India, May 28-30, 2015.

[4] "Design And Implementation Of Robot Motion With Ir Wireless Camera [Review]", International Journal on Recent and Innovation Trends in Computing and Communication ISSN:2321-8169 Volume: 3 Issue: 2

[5] "BUILD AND INTERFACE INTERNET MOBILE ROBOT USINGRAPBERRY PI AND ARDIUNO". Innovative Systems Design and Engineering www.iiste.org ISSN 2222-1727 (Paper) ISSN 2222-2871 (Online)Vol.6, No.1, 2015