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RESEARCH ARTICLE OPEN ACCESS

Automated Unmanned Aerial Vehicle for Afforestation

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Abstract:

We are making this project to plant seeds in afforested area where humans are not able to plant each and every seed by hands. Hence to reduce this fact we are making a drone (AUAVFA) which has a capability of plant seed very fast as compare to human. Buyer of the drone only need to set a path via using mobile application then it will go on to that location and drop one seed it is very quick process. Our drone will come back to our location after all dropping of all seed and in case of failure by any reason buyer can get an alert and drone will automatically land itself. This is our AUAVFA.

Keywords: Unmanned Arial Vehicle, Afforestation device, Automated vehicle.

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I. INTRODUCTION

In this rapidly growing modern era trees are being cut down on a large scale. As per to survey in 2017, every year around 3.5 billion to 7 billion trees

are cut down for industrial, commercial purposes and expansion of human colony. These reasons have led to rapid growth in deforestation.

The ratio of deforestation and afforestation is 3:1 to overcome such all issues AUVAFA was designed. AUAVFA flies to specified location and drops seeds and returns back to its particular location.

II Literature survey

When our team studied about the amount of deforested land in this world, we realized planting more seeds has become must. The topic decided was about drone, after thinking about different innovative ideas we decided to use the drone for afforestation process. First the drone was decided to be of four propellers with a seed box underneath it. Since the drone was hard to fly and control, we decided to fly the drone automatically by using mission planner.The drone was capable of carrying 3 kg of weight. When we used the algorithm to calculate the flight time of our drone, we found it will give only 10 minutes of flight time. So to overcome this problem we decided to change drone design to hex copter. With this design we

realized that the drone can lift more flight load as compared to quadcopter. After the drone assembly, seed box had to be made. To make the seed box to drop seeds one at a time one DC motor was used. To code the DC motor to perform its function Arduino was used. During flight time motor would start after reaching a particular altitude. To measure the altitude, ultrasonic sensor was used.

III System Architecture

Diagram below replicate the system architecture of drone.

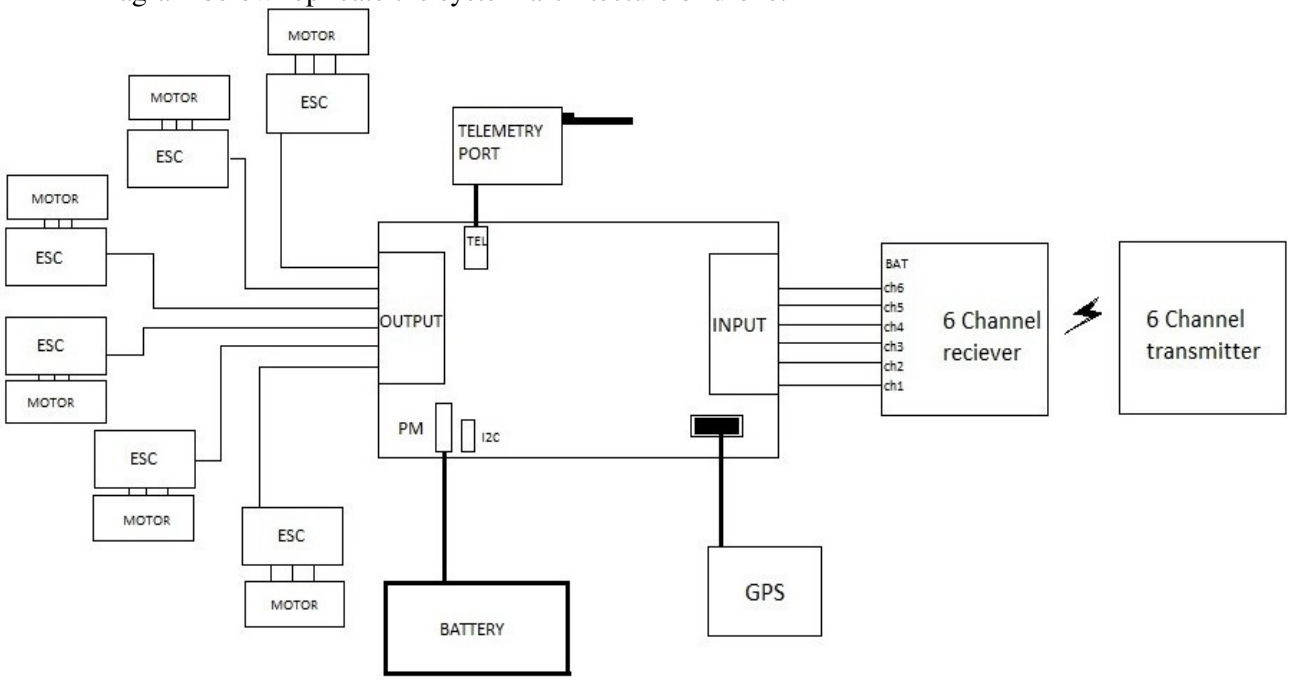
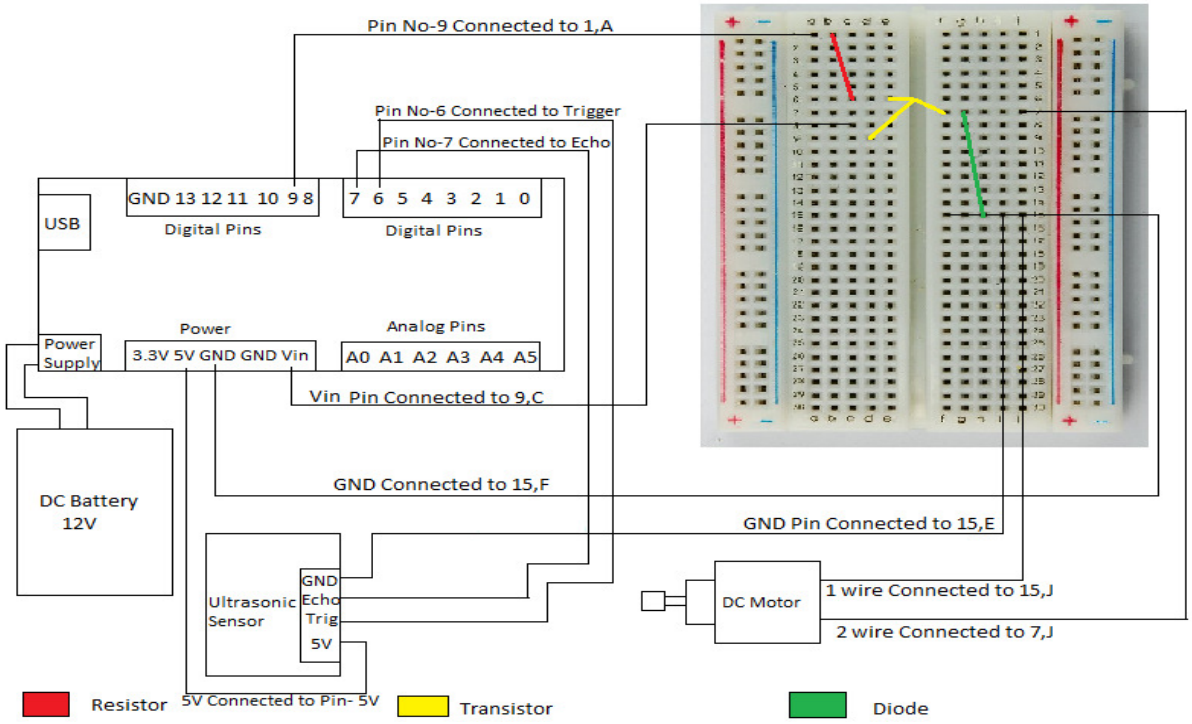


Diagram below replicates architecture of seed box.



IV. COMPONENT DESCRIPTION

1) **Ardupilot (flight controller)**: ***ArduPilot*** is an open source, unmanned vehicle Autopilot Software Suite, capable of controlling and hardware engineers, and a Common section regrouping ***information*** common to all vehicle types is shared within the first four sections.

2) **Brushless motor :** We are using brushless motor of 1800kv. It rotates with its whole shaft. The speed of this motor is higher than a normal DC motor.

3) **F550 drone chassis** : Frame Arms made of ultra-strength material to provide better crash-worthiness. Uses a high strength compound PCB frame board, which makes wiring ESCs and batteries safer and easier. Optimized frame design, which provides abundant assemble space for autopilot systems.frame weight is only 478gm . It can lift weight upto 1200g-2400g

4) **ESC**: An **electronic speed control** or ESC is an **electronic** circuit that controls and regulates the **speed** of an **electric motor**. It may also provide reversing of the **motor** and dynamic braking. Miniature **electronic speed** controls are used in electrically powered radio controlled models

5) **Battery :** We are using 2200v battery which gives 7 min of flight time but we are working on this problem to increase the flight time.

6) **Arduino :** We are using Arduino UNO R3 version for the purpose of seed box which contain the seed. For the mechanism of seed dropping. Actually Arduino is a name of company in Italy which provides microprocessors and microcontroller.

7) **Power module :** It is a module which is use to convert 11v power supply into 5v. it will also gives the battery health information to aurdupoilet (flight controller).

8) **Propellers:** We are used carbon fiber 8inch propeller with the pair of 6. We used this because of its flexibility and good quality material.

9) **Transmitter :** We are used flysky radio transmitter which gives 1.5 km range.

10) **Receiver :** We are used receiver to receive the range of transmitter it will also use to calibrate the ESC.

11) **GPSModule**: It is use to locate the auavfa and it will also use to give the initial point to drop seed.

V. ALGORITHMIC APPROACH

Step 1: Load the seed balls in the seed box.

Step 2: Check that battery is fully charged and the drone is armed and ready to fly.

Step 3: Set the GPS coordinates for the drone through mission planner.

Step 4: The drone will reach at certain height and move forward to its given coordinates.

Step 5: As the drone reach the specific height, the rotor inside the box starts moving.

Step 6: After the drone completes dropping seeds, it comes back to its starting position and lands automatically.

VI Conclusion

Conclusion of our project is that it will help us to plant more amount trees than it can be planted by human.AUAVFA will help us to plant 100,000 trees per day. It will avoid human hard work and make the process faster. Since it is electricity powered it makes AUAVFA nature friendly. Using multiple Hex copters at a time we can cover larger area knowing that it will need only few crew members. Making it easy to carry and easy to load the seed box it makes AUAVFA reliable and easy to carry.

VIIFuture scope

The team plans to enhance the GPS system and improve flight time for better usage. In future we plan to setup HD live stream first person view for enhanced user experience. Improvement in seed box mechanism for accurate functioning and extreme usage. Object avoidance system will be seen in next version of our project for safety of vehicle and surroundings.

VIII Acknowledgment

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unwavering support during the entire course of this project work.
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