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Seed Dropping UAV: Design of Seed Dropping UAV in Afforestation

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Abstract: In the modern world UAV is the most developing technology around the world. In our research, we are going to fix a seed ball sowing system inside the fuselage of the Fixed wing UAV. We are going fly the plane over the forest areas and drop the seed ball in the lower dense forest areas. We have constructed a regular fixed wing UAV with the basic calculations. The plane is initially tested manually to calculate the payload carrying capacity, durability and covering range of the plane. From the obtaining results we are going to design a seed ball sowing system with appropriate flight conditions, and it will be fixed at the point of center of gravity of the fixed wing UAV. In this report we explain how the seed ball sowing system is designed and how is going to work.

Keywords: UAV, Seeds, afforestation, drone

I. INTRODUCTION

In the modern world,RC planes (Fixed wing UAV) and multirotor drones are used in lot of agricultural purposes. The main advantages of the RC plane over the multi rotor drone is that it can capable to cover large distance within a short period of time. Nowadays many forest fires occur drastically all over the world, we could not able to control the any natural disasters, but we can able to do some action to overcame the problems. Planting trees in the large affected areas is the only solution, but practically it needs lot of human resources, huge expanses and huge time and also working in forest areas is very dangerous. We designed RC plane and a seed ball sowing system that can be fixed inside the fuselage of the plane. The seed ball sowing system is specially designed according to our RC plane dimension.

II. COMPONENTS AND SPECIFICATION

1. Seed balls
2. Seed ball carrying box
3. Transmitter and receiver
4. Servo and battery
5. Motor and propeller
6. ESC(Eletronic speed controller)

SEED BALLS :-

Seed balls is the combination seed, cow dung and soil. The seed has to be selected is Sesbania Grandiflora.

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SEED BALL CARRYING BOX:-

Initially the available space inside the fuselage is noted. Seed ball carrying box is designed according to the fuselage dimension. The box is having two cavities, one in the top and other in the bottom. The upper cavity is used for refilling the seed balls and the lower cavity is for dropping. The box is designed in a particular way, all the seeds are automatically move towards the cavity of the box because of the gravitational force.

TRANSMITTER AND RECEIVER:-

A transmitter's main function is to send out signals, as its name suggests. These signals can contain audio, video, or data as well as other types of information. A transmitter, in essence, sends signals into the air through a transmitting antenna. The receiver on a plane is an electronic device that receives radio signals from the drone controller through built-in antennas. This data is then sent to the flight control board, also known as the flight controller, which controls the drone according to the original radio signals, putting the details into action.

SERVO AND BATTERY:-

A servo motor is a miniature machine with a shaft as its output. This shaft can be rotated to different angular positions by sending a coded signal to the servo. As long as the coded signal is present on the input side, the servo will keep the had shaft's position. High energy storage ratio with a high discharge rate. For this project 8000mah battery with 3 cells (11.1v) is used for a power source.

MOTOR AND PROPELLER:-

On the outside of a brushed DC motor's structure are permanent magnets, while on the inside is a rotating armature. The propeller's job is to provide a means of propulsion for the aircraft so that it can travel forward through the air.

ESC (ELETRONIC SPEED CONTROLLER):-

An electronic speed control (ESC) is a circuit that regulates and controls the speed of a motor. It may also be capable of motor reversing and dynamic braking. Miniature electronic speed controls are used in electrically powered radio controlled models. Fullsize electric vehicles also have systems to control the speed of their drive motor.

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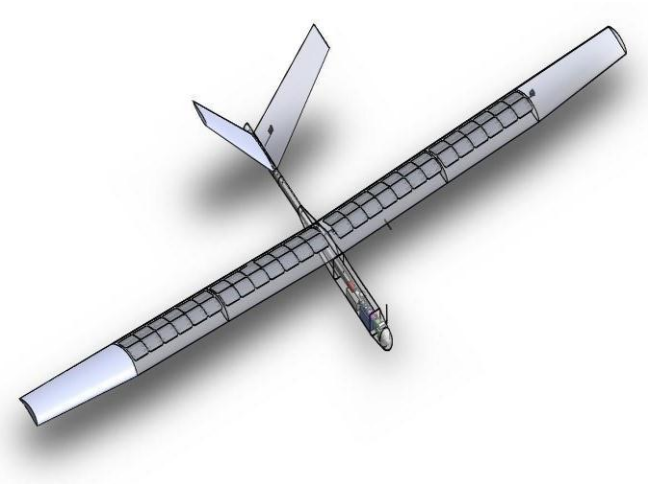
DEMO MODEL AIRCRAFT:-



DROPPING AREA:-

The UAV was tested in a remote 1 hectare demonstration dropping area in West JAVA, which is situated in a hilly area with an elevation of 800 metres.This was a barren field that had previously been used as a plantation. A mixture of grasses, bushes, and a few trees covered the land in this field.The region was first chosen using a satellite image. The current state of a 1 hectare experimental falling area. The distance between the drone's launch station and the dropping area, separated by a hill, is 400 metres.

Dropping area (low density place in forests)

MEASUREMENTS:-

- Wing length : 100 cm
- Middle wing breadth : 18 cm
- Wing edge breadth. : 8 cm
- Wing airfoil breadth : 2 cm
- Wing aileron : 18 cm
- Fuselage length :75cm
- Fuselage height. : 8 cm
- Front of fuselage : 5 cm
- End of fuselage : 3 cm
- Seed dropping box : 5 cm x 8cm
- Tail length : 40 cm
- V tail angle : 110.
- Tail ruddervator : 18 cm

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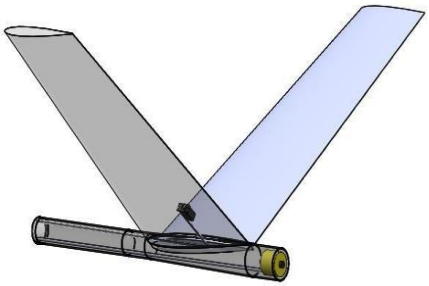
III. TAIL SPECIFICATIONS

Ruddervators are the 100-centimetre-long control surfaces on a plane with a V-tail configuration. Each of the plane's two tail airfoils has them at the trailing edge. Ruddervators work similarly to traditional control surfaces, but with a more advanced control system that synchronises the control surfaces. On an upright V tail, pushing causes yaw.



WING STRUCTURE:

1. The shape of an airplane's wing is designed to allow air to flow more quickly over the top of the wing.
2. The pressure of the air decreases as it flows faster.
3. As a result, the pressure on the top of the wing is lower than the pressure on the bottom.
4. The pressure differential acts as a force on the wing, lifting it into the air.

MODEL PICTURE:

PROCEDURE:

It seed can filled into that section the plane will be get ready to fly. Then, the plane will be fly on the forest area with seed ball.In the forest area they have very low density part of the forest. In that area, we will dropping a seed balls. In our project, we can drop the seed in low density area. So, we can't add proper timing system.

IV. CONCLUSION

In this project, we concluded that fixed wing planes are also used to do several type of operations. This project makes afforestation so much easier and cost effective. Afforestation is the only way to reduce global warming, only trees can observe the carbon dioxide from the atmosphere and produce oxygen and also to save the nature. We can be able to do tree plantation in any type of difficult dangerous places in a very safe manner in a less period of time. These types of planes are comparatively very less cost, can able fly faster, energy consumption is also very less. In the medical field, in emergency situations we can supply medicines to any places within

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a short period of time. In advancing its features, fixed wing UAV makes the instant parcel services, mini goods exchanges. In military, with the help of fixed wing UAV, we can be able to send food materials, weapons, medicinal supply for our soldiers instantly and main think is we can also able to drop granites and bombs on our enemies during the war time.

REFERENCES

[1]. Meivel s., Maheshwari s., technical design of agricultural uav frame mechanism, https://www.researchgate.net/publication/322329905_remote_sensing_of_uav_agricultural_spraying_system
[2]. Sahin, mustafa, application of fixed wing uav in reforestration of lebanon cedar, https://www.researchgate.net/profile/mustafa_sahin17/publication/320046832_application_of_a_fixed-wing_unmanned_aerial_vehicle_uav_in_reforestation_of_lebanon_cereforestation-oflebanon-cedar.pdf
[3]. Hari Krishna J; Pramoth R; Anoint Joshua Paul J; Abhishek S; Prabhu T. "Soldiers health monitoring and tracking system using IOT and UAV". International Research Journal on Advanced Science Hub, 2, Special Issue ICSTM 12S, 2020, 78-81. doi: 10.47392/irjash.2020.265
[4]. Elayadevan E; Girish S; Karthick U. "Design and Fabrication of Automatic Solar Seed Sowing Machine". International Research Journal on Advanced Science Hub, 2, 6, 2020, 131-135. doi: 10.47392/irjash.2020.50
[5]. Fortes, erico pinheiro, seed plant drone for reforeforestration https://vc.bridgew.edu/cgi/viewcontent.c gi?article=1033&context=grad_rev
[6]. Ramaraj rameshprabu, unpaprom yuwalee, modern agricultural drones – development of smart farming, 2018, https://www.researchgate.net/publication/326622288_modern_agriculture_drones_the_development_of_smart_farmers_ 2018
[7]. Puri vikram, nayyar anand, raja linesh, agriculture drones : a breakthrough in precision agriculture, 2017