DESIGN AND DEVELOPMENT OF AGRI-COPTER

Project Reference Number: 42S_BE_0556

College : Mangalore Institute Of Technology & Engineering, Moodbidri
Branch : Department of Mechanical Engineering
Guide : Mr. Rueben D'souza
Students : Mr. Ashrith
          Mr. Bhargava K
          Mr. Kadabageri Manjunath
          Mr. Sathwik

Keywords:
   Drone, Pesticide Tank, Portable Power Sprayer, Pressure Controller, Pipe and Nozzle.

Introduction:
   Agriculture is the backbone of Indian economy as said by Mahatma Gandhi seven decades ago. Even today in the new millennium the situation is still the same with the almost the entire economy being sustained by agriculture which is the primary strength of the country. As our country is agriculture based country, it is very important to develop new mechanisms and machineries in the field of agriculture which helps in the development of the country.

   We want to eliminate the labour problem and energy crisis in this field so that cost of production will be reduced. Conventional method used for spraying pesticides to plants is by carrying loaded sprayer by the labour. Since it is takes much time to cover the required amount of field. By using drone sprayer, we are able to minimize human effort which is a common problem in the current scenario. This system helps in overcoming the non-availability of labors, excess labour cost, which is the major problem in agricultural sector and this project is to mainly overcome the ill-effect of pesticides on human beings that may occur using the manual sprayer and It also helps to cover large areas of fields while spraying pesticides in a short span of time when compared to a manual sprayer. Since in this system is compact, it can be carried to remote places, Carrying the loaded sprayer needs a skilled labor and it also harmful to the labour under certain circumstance so there is need to design the sprayer to overcome these disadvantages of the agricopter sprayer.

Objectives:
1. To reduce number of labor required for spraying.
2. To reduce human effort.
3. Manual method of spraying requires large muscle power and skills.
4. To make the system compact.
5. To adopt the latest technology for spraying with easy.
6. To cover large areas of fields while spraying pesticides in a short span of time.

Methodology:
   Agricopter is a device with intense mixture of electronics, mechanical and works mainly on the principle of aviation. The agricopter has 4 motors which is connected to battery, the speed of rotation and the direction of rotation changes according to the user’s desire to move the device in a particular direction.

   The tank consists of pesticide is placed at the ground level and suction of pesticide is done using a 2 stroke petrol portable petrol pump through a larger diameter pipe and passes to a smaller diameter pipe which is connected to the nozzle placed at the bottom of the drone. A pressure regulator is placed in between two pipes to regulate the pressure of fluid. The fluid then flows through the nozzle and spraying of fluid takes place.
**Results:**

1. Avoid human contact with harmful pesticides.
2. It is possible to spray pesticides on tall trees like areca nut, coconut etc.
3. The UAV is portable and hence can be carried to remote places.
4. UAV can be controlled from far places and also can be automated to spray on specific waypoints.
5. UAV can lift a payload of 2kg i.e. approximately 1.5 kg of pesticide.
6. Upon using a high storage capacity up to 1 hour of flight time can be achieved covering roughly 1 square km of area.
7. This system brings modern technology to age old agricultural techniques thus bringing youth to the agricultural sector.

**Conclusion:**

We have designed a system which can eliminate human exposure completely and also can partially reduce human intervention. This system can be made autonomous thus completely eliminating human intervention. It can be also used in places where labourers are hard to find Since they are sprayed from lower altitude, consuming a spraying time of span is less and environmental pollution can be reduced.

While fabricating this project we have noticed that even though the system is costly, it has an ample amount of scope in fast growing world. A fully autonomous UAV can effectively eliminate human intervention and can also speed up the process of spraying pesticides. Further research in the field can make UAV’s faster, smarter and more efficient in many fields like aerial photography, surveillance, security, weather report, prediction of natural anomalies, swift product delivery etc.

**Scope For Further Work:**

1. Currently a UAV with 5200mah battery will have an estimated flight time of 20 minutes. This can be improved by discharge efficiency of batteries.
2. High automation can be achieved by using GPS. Civilian grade GPS has an accuracy within 200 meters whereas military grade GPS has accuracy within 2 feet.
3. Weight balancing is a major issue in designing of UAV with pesticide sprayer. Addition of dynamic weight balancing equipment can be used to overcome this issue.
4. Nozzle can be made to tilt in various directions and can be controlled remotely using anextra channel on the transmitter.