

## APPLICATION FORM "UGRC project 2022" at NIT Silchar

Department applied for: Electronics and Communication Engineering

Name of team leader: Akash Sonowal

Details of the team leader:

Sem and Dept.	CPI up to last semester	Registration no.	Phone no.	Email Id
5 <sup>th</sup> , ECE	8.47	2014014	8811846485	akash20_ug@ece.nits.ac.in

Details of group members:

Name of the students	Sem and Dept.	CPI up to last semester	Registration no.	Phone no.	Email Id
Bhaskar Bora	5 <sup>th</sup> , ECE	8.47	2014019	6002729431	bhaskar20_ug@ece.nits.ac.in
Rahul Deka	5 <sup>th</sup> , ECE	8.48	2014046	9707126210	rahul20_ug@ece.nits.ac.in
Rijuanur Rahman	5 <sup>th</sup> , ECE	8.79	2014047	7896935552	rijuanur20_ug@ece.nits.ac.in
Lokesh Kumawat	3 <sup>rd</sup> , ECE	8.87	2114111	7002308734	lokesh21_ug@ece.nits.ac.in
Dev Vedit	3 <sup>rd</sup> , ECE	8.78	2114112	9523961952	dev21_ug@ece.nits.ac.in

**Broad Area:**

**Any Innovative Technology towards benefit of common People and Society.**

### Summary of the proposal

**Title: Indigenous design and development of spray drone for agricultural applications**

According to the statistics, agriculture sector contributes 18% of the Gross Domestic Product (GDP) and provides 50% employability in India. Our country, which is heavily reliant on agriculture. However, due to ineffective methods of monitoring crops, irrigation patterns, and pesticide applications unable to increase the crop productivity hence it has yet to realize its full potential. Among the different stages of crop production, application of pesticides is prominent. Now-a-days, there are various technologies used in agriculture to spray pesticides. However, the pesticides used to save the plant from diseases like insects, rodents, bacteria, fungi and larvae are harmful to human when manually spray. The common method of manually spraying these harmful pesticides can cause hazardous side effects such as minor skin irritation to endocrine disruption, cancers, birth defects, blood and nerve diseases, comas, and even death to the persons involved in the spraying process. According to reports, pesticides poison around 385 million people annually, causing 11,000 fatalities, primarily among farmers and agricultural workers. Nearly 60% of the fatalities, or 6,600 deaths annually, take place in India. Thus, it is necessary to use alternative technique to spray these harmful pesticides which can

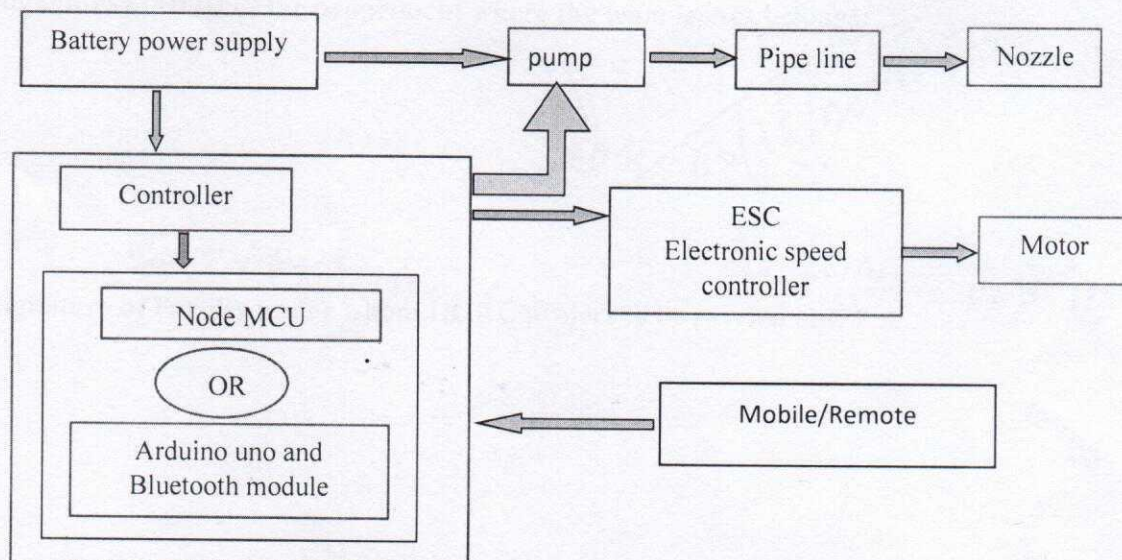


save lives, cost and time. Recently, it has been found that, one of the most emerging technologies is to employ drones to spray pesticides. Hence, in this project, we will design and develop an indigenous drone to spew pesticides in a large crop area where it is difficult to reach and cover. As per our design we have calculated the total payload capacity considering the supporting frame, landing gear, capacity of fluid tank, dc motors, battery, propeller and flight controller. In our design, we have chosen carbon fiber composite material to build the main frame of drone. At each free end of the arm, a motor will be fixed and propeller will be mechanically coupled to the motor. The outputs of each Electronic Speed Controller (ESC) will be connected to each individual four motors and the input side of the ESC will be connected to the flight controller. The other input of the ESC will be connected to the power distribution board where the power supply is provided by the Li-Po battery. Further, by altering the flow discharge of the pump, the same drones can also be used to spray disinfectants over structures, water bodies, and densely populated regions.

#### **Innovative aspects of the proposal:**

At present available drones in the market are very costly and not user friendly. Here, we are attempting to develop drones with Node MCU module. It is connected to mobile through Wi-Fi. The operating voltage of Node MCU IS 3.3 Volts which is less compared to Arduino uno and it has a high clock speed of 45 MHz. In this design, the transceiver is not required, hence this can reduce the weight and cost of the drones. An android application is to be designed to control the drone through Wi-Fi. This can be done using MIT APP Inventor. The block diagram of our design is shown in Figure 1. The complete design is done by considering the total weight of the drone-mounted sprayer, design of supporting frame, landing gear, design of the fluid tank, selection motors, battery, propeller, and flight controller keeping the total payload in mind.

#### **BLOCK DIAGRAM:**



**Figure 1: Block diagram of drone for spraying pesticides**



Importance of the proposed project in the context of current status:

**PROBLEM STATEMENTS:**

1. India's tea production has been hit with rampant pests eating away the crop, adding to the woes of the cash-strapped tea industry in the north eastern state of Assam.
2. If there is sudden outbreak of blisters on tea plants and soon the attack is spreading like wild fire to scores of gardens in eastern Assam.
3. There are chemicals to control the pests, but due to big gardens and terrain areas farmers are unable to reach. Even with an attempt reach the area may increase the cost of production and life risk.

**SOLUTION:**

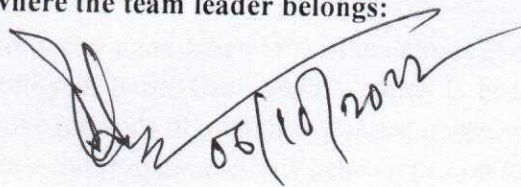
With the help of drones with spraying mechanism, we can reach places where human interventions are not possible for spraying of chemicals on crops including tea farms, rice fields and orchard crops as well as crops under terrain lands. This technology greatly helpful for small farming community in reducing the time and cost of pesticide application, but also enhances the biological efficacy of application technology.

Name of faculty under whom UGRC project to be carried out:

1. Dr. S.K. Tripathy  
Associate professor  
Dept. of ECE  
NIT Silchar  
Ph. no. 9465407913

2. DR. KAVICHARAN MUMMANENI  
Assistant professor  
Dept of ECE  
NIT Silchar  
Ph. no. 8919656541

Signature of HOD of the department where the team leader belongs:



05/10/2022

SK Tripathy  
02/10/22

Kavicharan  
02/10/2022

Signature of Faculty under whom UGRC project to be carried out: