

# The Modernization of Agriculture using UAV

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**Abstract**— Drones which is also known as UAV (unmanned aerial vehicles) are associated with the military industry and many others fields but nowadays UAV (unmanned aerial vehicle) play an important role in agriculture purpose for forestation and many others purpose such as to monitoring the fields, for spraying and for weather conditions to check the atmosphere condition whether it will be suitable for sowing the seeds or not. Climate change is having an impact on agriculture. In the last two decades the use of drones in agriculture purpose has been increase. The unmanned Aerial vehicles are used for reforestation and all the system required an underlying platform or unmanned Aerial vehicles (UAV) These system are highly specialized depending upon the particular goals of the farmers the modern management in sustainable agriculture requires the fast information about condition of cultivated plants and the quick response to undesirable occurrences. Basic purpose of the use of drones for spraying plants could be allowing for rapid applications of plants protection agents on the growing areas. For production is widely growing. Agricultural unmanned aerial vehicles (UAVs) are becoming a new force in the fields of precision agricultural. This drone has autopilot system that it follows the GPS path which we have to select for the destination

**Keywords**— Unmanned aerial vehicles, Brushless motors, Remote Control, Lipo Battery GPS, Flight Controller

## Introduction

Nowadays drones are used in many fields such as agriculture, military, mining, medical and many others. A drone is also called as quadcopter because that is lifted and propelled by four rotors. There are mainly four types of drones such as Multi-Rotor, Fixed-Wing, Single-Rotor Helicopter, Fixed-Wing Hybrid VTOL. An unmanned aerial vehicles (UAV) is an aircraft without a human pilot onboard and a type of unmanned vehicles. Quadcopter usually used two pairs of similar fixed propellers of which two are clockwise (CW) and two are counter-clockwise (CCW) it is possible to specifically generate a design total thrust; to locate for the center of thrust both laterally and longitudinally, and to create a desire total torque, or turning force. The basic principle is that the drone moves vertically and uses the rotor to advanced and stop. The relative nature means that when the rotor pushes the air, the also pushes the rotor back. this means it uses Newton Law (for every action there is an equal and opposite reaction) that the drone can go up and down. GPS module is

an advanced technology that a drone to autonomously fly to pre-programmed points.

## COMPONENTS OF DRONES

### FRAME :

The **frame** is the basic layout on which the rest of the structure is built. It is considered as the skeleton of the UAV. It is must be light in weight as much as possible to save power while flying but strong enough to tolerate accidents and crashes and to increase the payload of the UAV.

### PROPELLER:

A propeller is a fan is with a large number of blades. The purpose of your quadcopter is to generate thrust and torque to keep your drone flying, and to manoeuvre. The upward thrust force generated by the propellers is usually measured in pounds or grams. To keep your drone flying at a constant place in air, the upward thrust needs to equal the weight of your drone. The thrust to weight ratio TWR (thrust divided by weight), indicates how much thrust your drone generates relative to its weight. A good rule of thumb is to design the TWR to be at least a value of two. They are also influenced by the flight dynamics of your quadcopter. Some propellers produce much more thrust when the drone is stationary, as opposed to when it is flying. Other props perform much better at higher speeds. Torque is generated when the propellers accelerate up or down. This force is responsible for the ability of the drone to rotate on the yaw axis. Torque is an effect of Newton's third law, where every action has an equal and opposite reaction. As the propeller rotates, and pushes through the air, the air pushes back and causes a counter-rotation on the body of the drone. This is why all of the propellers on multirotor drones do NOT rotate in the same direction.

### Transmitter

A radio transmitter is a device used in electronics and telecommunication field which produces radio waves with the help of an antenna. The transmitter which is applied to an antenna generates a radio frequency an alternating current (AC). The antenna radiates radio waves when excited by this alternating current. All electronic devices that communicate by radio have a transmitter which is a necessary part of all electronic devices such as radio and television broadcasting stations, cell phones, walkie-talkies,

wireless computer networks, Bluetooth enabled devices, two-way radios in aircraft, ships, spacecraft, radar sets, and navigational beacons.

### **BRUSHLESS MOTOR:**

In an electric motor the torque is developed by alternating the polarity of rotating magnets that are attached to the rotor, the rotating part of the machine, and stationary magnets on the stator which surrounds the rotor. Either one or both the sets of the magnets are electromagnets, made of a coil of wire wound around an iron article. DC running across the wire coil creates the magnetic field, which provides the current that runs the motor. The position of the north and south poles on the rotor is reversed each time when the rotor rotates by 180° (a half-turn). A reversal of the torque on the rotor each half-turn, and the average torque would be zero and the rotor would not turn if the magnetic field of the poles remained the same, this would be caused. Hence, in a DC motor to create torque in one direction, the direction of electric current through the windings must be reversed with every 180° turn of the rotor (or turned off during the time that it is in the wrong direction). The torque on the rotor is always in the same direction because the reverses in the direction of the magnetic field so the rotor turns.

### **ESC:**

Electronic Speed Controllers or ESC is an electronic circuit that controls and regulates the speed of an electronic motor. The variable speed of the motors driving the propellers entirely depends on this craft. Nowadays ESCs protocols can communicate at speeds of 37.5KHz or greater, with DSHOT2400 frame only taking 6.5µs. A variety of ESC protocols beyond PWM are utilized for modern-day multirotor, including, Oneshot42, Oneshot125, Multishot, and DShot.

### **Flight Controllers:**

In the world of R/C hobbyists multi-rotors are unique. Has absolute, the precise control over the motor is of the pilot when it comes to controlling a model boat or plane. A proportional increase in RPM is translated by a nudge of the throttle. This is also true for the input of the rudders, ailerons, flaps, and other parts involved in changing speed or its direction.

A flight controller (FC) is a small circuit board that has varying complexity. Its mechanism is to direct the RPM of each motor in response to its input. A command from the pilot to the multi-rotor i.e., to move forward is fed into the flight controller, which determines how to manipulate the motors accordingly.

The majority of flight controllers also employ the sensors for the supplementation of their calculations. This ranges from simple gyroscopes for orientation to the barometers

for automatically holding altitudes. GPS also can be used for auto-pilot or fail-safe purposes. Many flight controllers use different flight modes, selectable using a transmitter switch. For example:- a three-position setup can be a GPS lock mode, a self-leveling mode, and a manual mode.

### **About DJI NAZA M Lite Flight controller:**

The DJI is arguably the dominant player in multi-rotors, which produces two models. The first one is the Naza-M Lite which is a high-quality, easy-to-set-up unit with GPS and fail-safe capacities. The second is the Naza-M V2 which is virtually identical but includes a handful of additional features, such as the ability of expansions of daisy chain DJI (a Bluetooth module, for example). Also, it allows up to eight motors, rather than that of the six.

Multiple flight modes are also available such as GPS lock, altitude lock, orientation, and a non-stabilized manual mode.

The NASA's are the supercool hobby flight controllers, with a multitude of features, optimized ease of use, and relatively straightforward setup. They may not be the best choice for every multi-rotor but they may be the best choice.

### **Sensors used**

#### **Temperature/ Humidity Sensor DHT11:**

This sensor is used to measure humidity and temperature. humidity sensors are low cost-sensitive electronic devices used to measure the humidity of the air .these are also known as Hygrometer. humidity can be measured as relative humidity, absolute humidity DTH11 sensor consist of a capacitive humidity sensing element and a thermistor for sensing temperature. The humidity sensing has two electrodes

#### **Gas Sensor MQ3:**

A gas sensor is a device that is used to detect the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces corresponding potential deference by changing the resistance of the material inside the sensors. Based on the voltage value the type and concentration of the gas can be estimated.

#### **Features**

- Stable and long life
- Fast response and high sensitivity
- Power Supply: 5 Volts
- Interface Type: Analog & Digital

#### **Battery**

Is 18650 battery with a capacity of 2000mAh. It is Lithium-Inn based and a rechargeable battery in cylindrical shape .18650 battery has become very popular nowadays, many

power bank is using it as storage and power source. Even electrical vehicle such as Tesla is using 18650 battery particularly to build their battery pack.

**Features**

- Rechargeable Lithium-Ion battery 3.7V 2000mAh
- Diameter 18mm, height 65mm
- Lightweight 45gm

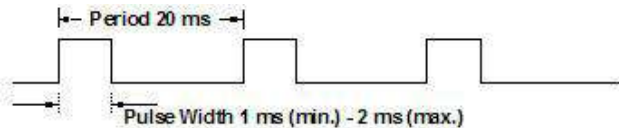
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**EXPERIMENTAL PROCEDURE**

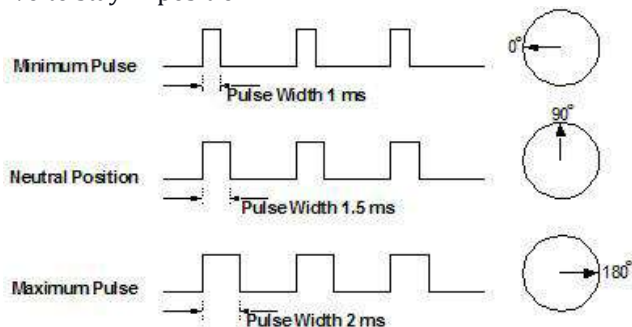
**SEED DROP MECHANISM:**

Servos are controlled by sending a pulse of variable width to them. The control wires are used to send this pulse. The parameters or the pulses are that it has a minimum pulse, a maximum pulse, and a repetition rate. When the position of the servo has the same amount of potential rotation in the clockwise direction it is defined as neutral, as it does in the counterclockwise their rotation but they all have a neutral position, and that position is always in to be 1.5 milliseconds (ms)



The angle is determined by the duration of the pulse that is applied to the control wire. It is known as pulse width modulation. Every 20ms the servo expects to receive a pulse. How far will the motor turns will be determined by the length of the pulse?

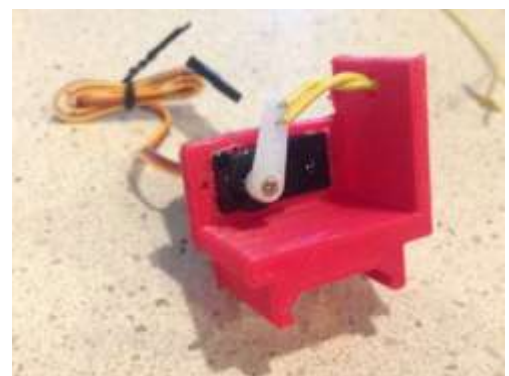
When these servos are instructed to move they will move to the position and grasp that position. The servo will resist moving from a position if the external force is against the servo while the servo is holding a position. The torque rating of the servo is the maximum amount of force exerted by the servo. The servo will hold their position forever though, the position pulse must be repeated to instruct the servo to stay in position.



If the pulse is sent to a servo is less than 1.5ms the servo will rotate to apposition and grasp its output shaft fewq number of degrees counter-clockwise and if the pulse is more than 1.5ms the opposite of its occurrence. Each servo has a function like creating a maximum width of the pulse and the minimum width of the pulse which will command the servo to turn to a valid point. Different brands, and still different servos of the same brand, will have different maximum pulse will be 2 ms broad.

The turn rate is another parameter that varies from a servo to another servo. This is the time it takes from the servo to change from one position to another position. When the servo is holding at a minimum rotation and if it is commanded to go to maximum rotation the worst-case turning timing occurs. The torque rotating of the servo is the maximum amount of force exerted by the servo.

**HOW SEED DROPPING BOX WORKS :**



Seed dropping box is mounted on the bottom of the drones. The box contains a servo mechanism and the seeds of the selected plants inside it. The servo is to be connected with the receiver and when the signal is given by the transmitter the servo will be turned on the seed will get drop, how much times the switch and the dropping hatch will on the number of seeds for dropping directly depend on it. This is how the seeds dropping mechanism will going to be work.

**CONCLUSION**

It is true that drone technology is an important part of future warfare and is said to be a big commercial industry. The drone's capability and the ability pose a threat to the liberties of people around the world. The restriction must be put where the line between effective drones use and excessive drone use this will be difficult due to the novelty of drone technology. Because the technology is so cutting-edge, it is hard for lawmakers to know where to curb its use. The inability and unwillingness of the government to regulate drone use stem from both its success in warfare and its growing necessity in other fields. To overcome this confusion everyone must be more educated on the use and potential of drones. There is a need for transparency on drone use in warfare, so that citizens may be better informed on the consequences of the technology. The laws that are on place protecting Americans from domestic drone pilots are not enforced well enough.

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