



QUADCOPTER

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Abstract : This study has been undertaken to investigate the determinants of Unmanned Aerial Vehicles (UAVs) like drones and quadcopters have revolutionized flight. They help humans to take to the air in new, profound ways. The military use of larger size UAVs has grown because of their ability to operate in dangerous locations while keeping their human operators at a safe distance. Here quadcopter as a small UAV is discussed. It is the unmanned air vehicles and playing a predominant role in different areas like surveillance, military operations, fire sensing, traffic control and commercial and industrial applications. The main objective of the paper is to learn the design, construction and testing procedure of quadcopter. In the proposed system, design is based on the approximate payload carry by quadcopter and weight of individual components which gives corresponding electronic components selection. The selection of materials for the structure is based on weight, forces acting on them, mechanical properties and cost. Quadcopter is an unmanned aerial vehicle, which can be implemented in different applications. In paper it will be represented a development of a quadcopter system and potential application in which it can be implemented.

I. INTRODUCTION

A quadcopter also called a quadrotor helicopter or quadrotor, is a multicolor helicopter that is lifted and propelled by four rotors. Although quadrotor helicopters and convertiplanes have long been flown experimentally, the configuration remained a curiosity until the arrival of the modern UAV or drone. The small size and low inertia of drones allows use of a particularly simple flight control system, which has greatly increased the practicality of the small quadrotor in this application. Quadcopters are classified as rotorcraft, as against fixed-wing aircraft, because their lift is generated by a group of rotors (vertically oriented propellers). Quadcopters generally use two pairs of identical fixed pitched propellers two clockwise (CW) and two counterclockwise (CCW). These use independent variations of the speed of every rotor to realize control. By changing the speed of every rotor it's possible to specifically generate a desired total thrust; locate for the middle of thrust both laterally and longitudinally, and to create a desired total torque, or turning force.

II. PROJECT DESCRIPTION & GOALS

The goal of this project is to build an UAV in structure of quad rotor that houses a camera with a wireless transmission system. This unmanned aerial vehicle will be used for campus surveillance. Quad rotor must hover in place, take off and land vertically, maintain stable flight, and perform flight attributes (like roll, pitch and yaw). These attributes are essential for surveillance. To do these above-mentioned flight traits, PID control system was utilized.

The project has been divided into b following broad areas to achieve the targeted functionality:

- o Maintain the stable flight and perform flight attributes (like roll, pitch and yaw).
- o Develop a wireless transmission system provides a live feed from camera to the ground station.

The final quadcopter design had to meet the following specifications:

1. The quadcopter must be capable of flying and landing in stable manner.
2. The quadcopter must be capable of determining its current location using GPS data.
3. The quadcopter must be capable of storing and logging data.
4. The quadcopter must be capable of perform the command like
 - Auto Landing
 - Auto Move
 - Auto homing
 - Hold Position

III. LITERATURE SURVEY

A quad copter uses four different propellers, powered by four different motors on four different arms. Each spinning propellers creates its own torque. Newton, third law states, "to every action there is always equal opposite reaction". So, if the propellers are spinning, the arm holding it will spin in opposite direction. This is the law of torque reaction. This is why the traditional helicopter has tail rotor, to compensate for the fuselage torque. In quad copter, we don't need a tail rotor. Because we can combat that per propeller torque with an equal and opposite torque (the propeller opposite it). Notice in the picture how the opposite propellers are spinning in the same direction. They cancel out each other's torque effect.

IV. APPLICATIONS

This awesome shoot of Ultron for Marvel's Avengers: Age of Ultron: - Apparently, the Hollywood movie industry has making good use of these commercial license for drone uses it was granted because Marvel posted on their official Twitter news feed that this awesome shoot of Ultron was made using a drone. Being in the drone business, we are so excited that UAVs are being used for projects such as The Avengers. Here's hoping that next time they employ a Flavors APP! Quadcopters have been used, are being used or are actively being considered for different applications all over the world. They have range of potential environmental or commercial applications. Quadcopters have variety of applications in the field of research, military and many more. Some of Applications are given as follows:

1. Using A Drone Emergency Situations
2. Chasing Down Criminals
3. For Survivor
4. Aerial Photography
5. Shipping And Delivery
6. Geographic Mapping
7. Disaster Management
8. Precision Agriculture
9. Search And Rescue
10. Weather Forecast
11. Wildlife Monitoring
12. Law Enforcement
13. Entertainment

V. DESIGN AND FABRICATION

Part List:

- 3DR Pixhawk flight controller
- Motor
- Propeller
- Electronics Speed Controller
- Wireless Camera
- Aluminium Frame
- D. C. Servo Motor
- Transmitter & Receiver
- Battery
- Solenoid
- Pistol Gun

Uses of Parts:

SR. NO.	NAME OF PARTS	USES
1	3DR Pixhawk Flight Controller	Control Flight Operations
2	Motor – Qty 4	Produce Thrust
3	Transmitter	Transmit And Receive Operating Signals
4	Electronic Speed Controller (ESC) – Qty 4	Control Speed of Motors
5	Propellers – Qty 4	Achieve Lift
6	Steel Frame	To Hold Other Components
7	DC Servo Motor – Qty 1	To Give Degree Inclination to Weapon
8	Wireless Camera – Qty 2	To Provide Live Footage to Controller
9	Battery (3000 Mah)	To Supply Voltage
10	Solenoid	To Trigger Weapon Trigger

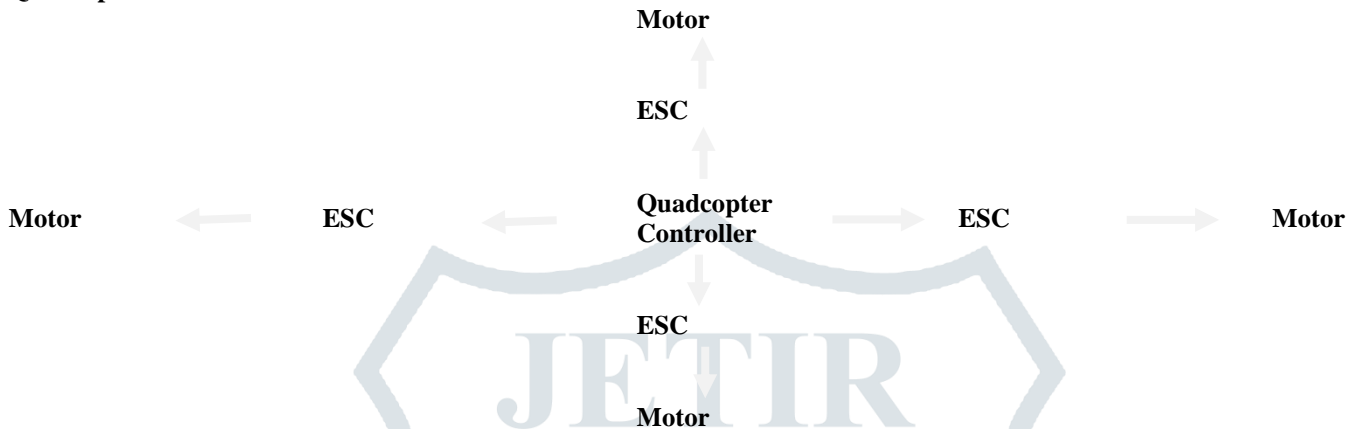
Advantages Of Quadcopter

1. They can save lives
2. They can support law enforcement
3. They can contribute to safe infrastructure maintenance and management
4. They can streamline agriculture management
5. They can give media access to hard-to-reach place

Disadvantages Of Quadcopter

1. One disadvantage of drones is that they can be considered an invasion of privacy in the sense that they are constantly shrivelling.
2. Drones can carry high power zoom lenses, night vision and see through imaging. Many people see drones flying over our homes as spying on us while we conduct our everyday lives.
3. Another disadvantage of drone is that they many cause people to become desensitized to war and killing in general.
4. When it comes to drones the losers are pilots who used to fly military aircraft.
5. It has specific limit if weight. Only one weapons can fitted. The weapon loaded only one time.

Quadcopter Architecture:



VI. CONCLUSION

Quadcopter is a special kind of vehicle, which can be implemented in different applications. In the future applications, quadcopter could be used for a variety of new policing functions. Quadcopter could be used for safety inspections, perimeter patrols around prisons and thermal imaging to check for cannabis being grown in roof lofts and other not easy to access locations. The police could use them to capture number plates of speeding drivers, for detecting theft from cash machines, railway monitoring, combat flyposting, fly-tipping, abandoned vehicles, waste management.

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