

The Hybrid Copter

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Abstract- This project describes the development of “THE HYBRID COPTER” which is a combination of Automobile and Aeronautical Engineering. CarCopter is the combination the copter and car having the mixture of two technology Automobile technology and Aeronautical Engineering. Car means something mobility. On land and copter means having rotational motion in form of propeller. Its really cool to make the combo of car and copter. Something we call as hybrid technology which is which annully disadvantage of two individual mode by adding the technology. A hybrid copter is a type of personal air vehicle or roadable aircraft that provides door-to-door transportation by both ground and air. The term "flying car" is also sometimes used to include hover cars..

{The hybrid copter is based with the drone technology and Bluetooth controlled rc car. It is the prime utilization in the uav.}

I. INTRODUCTION

Unmanned aerial vehicles (UAV) are more properly known as Drone. Basically, drone is a flying robot . Working in combination with GPS, the flying machine may be remotely controlled or can fly autonomously by software controlled flight plans in their embedded systems. Drones are most often used in military services. However, it is also used for weather monitoring, firefighting, search and rescue, surveillance and traffic monitoring etc. In recent years, the drone have come into attention for a number of commercial uses. In late 2013, Amazon announced a plan to use unmanned aerial vehicles for delivery in the nearby areas future . It is known as Amazon Prime Air, it is estimated to deliver the orders within 30 minutes inside 10 miles of distance . So it is clear that domestic usage of UAV has vast future possibility in different fields rather than military usage. Drones for military use were started in the mid-1990s with the High-Altitude Endurance Unmanned Aerial Vehicle Advanced Concept Technology

Demonstrator (HAE UAV ACTD) program managed by the Defense Advanced Research Projects Agency (DARPA) and Defense Airborne Reconnaissance Office (DARO) . This ACTD placed the base for the improvement of the Global Hawk. The Global Hawk hovers at heights up to 65,000 feet and flying duration is up to 35 hours at speeds

approaching 340 knots and it costs approximately 200 million dollars . The wingspan is 116 feet and it can fly 13.8094 miles which is significant distance . Motherland security and drug prohibition are the main needs Global Hawk was designed for . Another very successful drone is the Predator which was also built in the mid-1990s but has since been improved with Hellfire **11** missiles. “Named by Smithsonian’s Air & Space magazine as one of the top ten aircraft that changed the world, Predator is the most combat-proven Unmanned Aircraft System (UAS) in the world” . The original version of the Predator, built by General Atomics, can fly at 25,000 feet for 40 hours at a maximum airspeed of 120.

II. WORKING PRINCIPLE

Multi-Rotor works on relative nature of force, that means when the rotor pushes the air, the air also pushes the rotor back. This is the basic principle that the Multi-Rotor can go up and down. Furthermore, the faster the rotor rotates, the greater the lift, and vice versa.

Hover Still – To hover, the net thrust of the four rotors push the drone up and must be exactly equal to the gravitational force pulling it down.

Climb Ascend – By increasing the thrust (speed) of the four quadcopter rotors so that the upward force is greater than the weight and pull of gravity.

Vertical Descend – Dropping back down requires doing the exact opposite of the climb. Decrease the rotor thrust(speed) so the net force is downward.

Yaw – This is the rotating or swiveling of the head of the quadcopter either to right or left. It is the basic movement to spin the quadcopter. On most drones, it is the achieved by using the left throttle stick either to the left or right.

Pitch – This is the movement of quadcopter either forward and backward. Forward Pitch is achieved generally by pushing the throttle stick forward, which makes the quadcopter tilt and move forward, away from you. Backward pitch is achieved by moving the throttle stick backwards.

Roll – Most people get confused with Roll and Yaw. Roll is making the quadcopter fly sideways, either to left or right. Roll is controlled by the right throttle stick, making it fly either left of right.

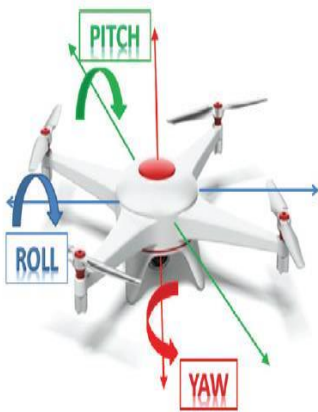


Figure.1.

III. BLUETOOTH CONTROLLED CAR INTEGRATED DRONE

Command received **via Bluetooth** is forwarded to **Arduino Uno** board using UART serial communication protocol. **Arduino** code checks the commands received. Whenever the command is a matching string, **Arduino** controls the movements of the **robot** accordingly in forward, backward, Turning Right, Turning Left & Stop. Step 2: Compile the code given below in the **Arduino-IDE** and hit upload, but before that **make** sure you **have** disconnected RX of **Arduino** from TX of **Bluetooth** Module (HC-05). Step 3: Install the application on your Android device through a link provided below. Step 4: Pair your Android device and HC- 05 over **Bluetooth**.

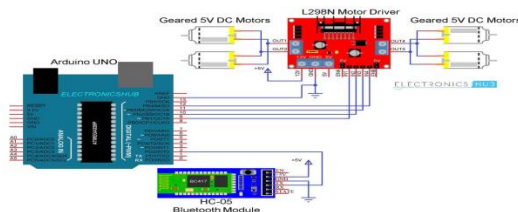


Figure.2.

Now in our project of the Hybrid Copter. We have to add the Bluetooth controlled car as the basement for our drone. The Bluetooth controlled car gets fitted into the frame of the drone. With the stability of the drone the car can travel in land and then the drone gets takes off.

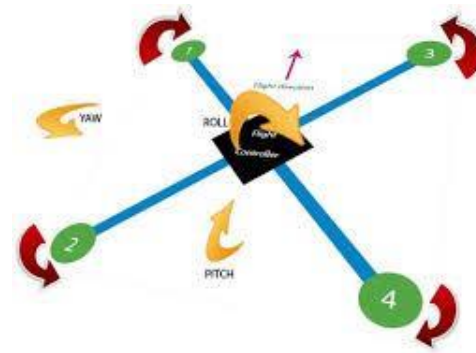


Figure.3.

IV. CONCLUSION

Although we built a working quadcopter, there is much room for many improvements. First of all, we can make it much more stable so that we could let it fly freely in an open place even with spectators around. We can improve the accuracy of our wireless protocol to make it possible to fly the quadcopter wirelessly from quite a distance. Quadcopter is a special kind of vehicle, which can be implemented in different applications. In this paper basic principles of quadcopter design as well as current applications are represented. 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 fly-posting, fly-tipping, abandoned vehicles, waste management. Future research will be in field of search and rescue. In future an effort will be directed to development of a system for defining evacuation/safe path in case of natural disasters and accidents.

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