HEXACOPTER: A MAN CARRIER DRONE

Anirban bera1, Rumit Kumar Pandey2, Shrinkhala Verma3, Shraddha Tiwari4, prof.(Dr.)Nandita Pradhan5,Amitabh Srivastava6

United College of Engineering and Management, Naini, Allahabad Department of Electronics and communication Engineering, Dr. A.P.J Abdul Kalam Technical uiversity Lucknow Uttar Pradesh, India

Abstract: *This proposed project envisages developing a man carrier drone that can be used for the transportation purpose by drone technology in which the drone will be controlled by a remote control. In this project we are using different components that will help the drone so that it can lift up, fly at reasonable height, stable at height and also stable at ground. A HexaCopter for providing continuous and stable fly of a carrier or person includes transmission of data from the remote control and receiving of data at the HexaCopter in NAZA Board. This proposed project will lead to expeditious delivery and transport of requisite materials which are heavy in weight. There are several application of this method in transport vehicle that leads to better accuracy, design security, productivity, speed and flexibility. It may be found useful for safety, security and transportation purpose.*

Keywords- *HexaCopter, Naza Board, Remote control*

INTRODUCTION - With the growing population, transportation problem is increasing day by day. To solve this upto a certain level we come up with an idea of a HexaCopter which is an advanced technology based drone. This drone is eco-friendly and noise is less. With the emerging traffic problem sometime emergency vehicles like ambulance are not capable of reaching to their destination which may cause the life of a patient in danger. This project can give new dimension to the transportation field. Our project is about a self-stabilizing HexaCopter vehicle which can be able to lift a specific weight. In this project we are using a drone technology i.e. NAZA Board which makes this project innovative and with this project we are trying to give our effective effort for the betterment of the society.

This HexaCopter may also be known as passenger drone. Since, 1970 it has become a popular hobby for the drone creators. Many of the specialists have developed different types of multi-rotor craft. The drones have been in use since the World War II. The capabilities of the drones have expanded over the years. UAVs normally have substantial vehicle mass and rely on aerodynamic or propulsive thrust to fly.

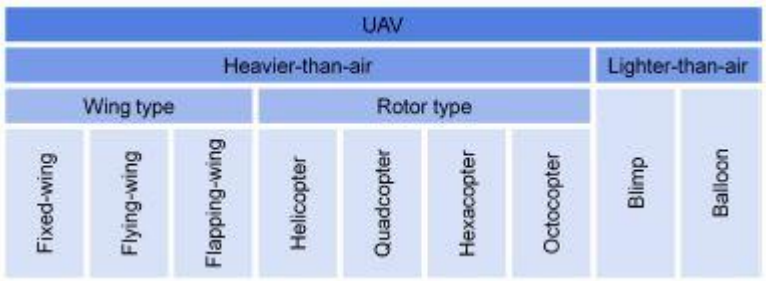


Figure 1: Categories of the UAV

Hardware Used:

I. **NAZA-M LITE**: For multi-motors, it is an auto pilot system designed for serious multi rotors enthusiasts providing excellent self-levelling and altitude holding, which completely takes the stress out of flying RC multi- rotors for both professional and hobby applications. NAZA-M LITE can be installed in a variety of models from quad-rotor to hexa-rotor.

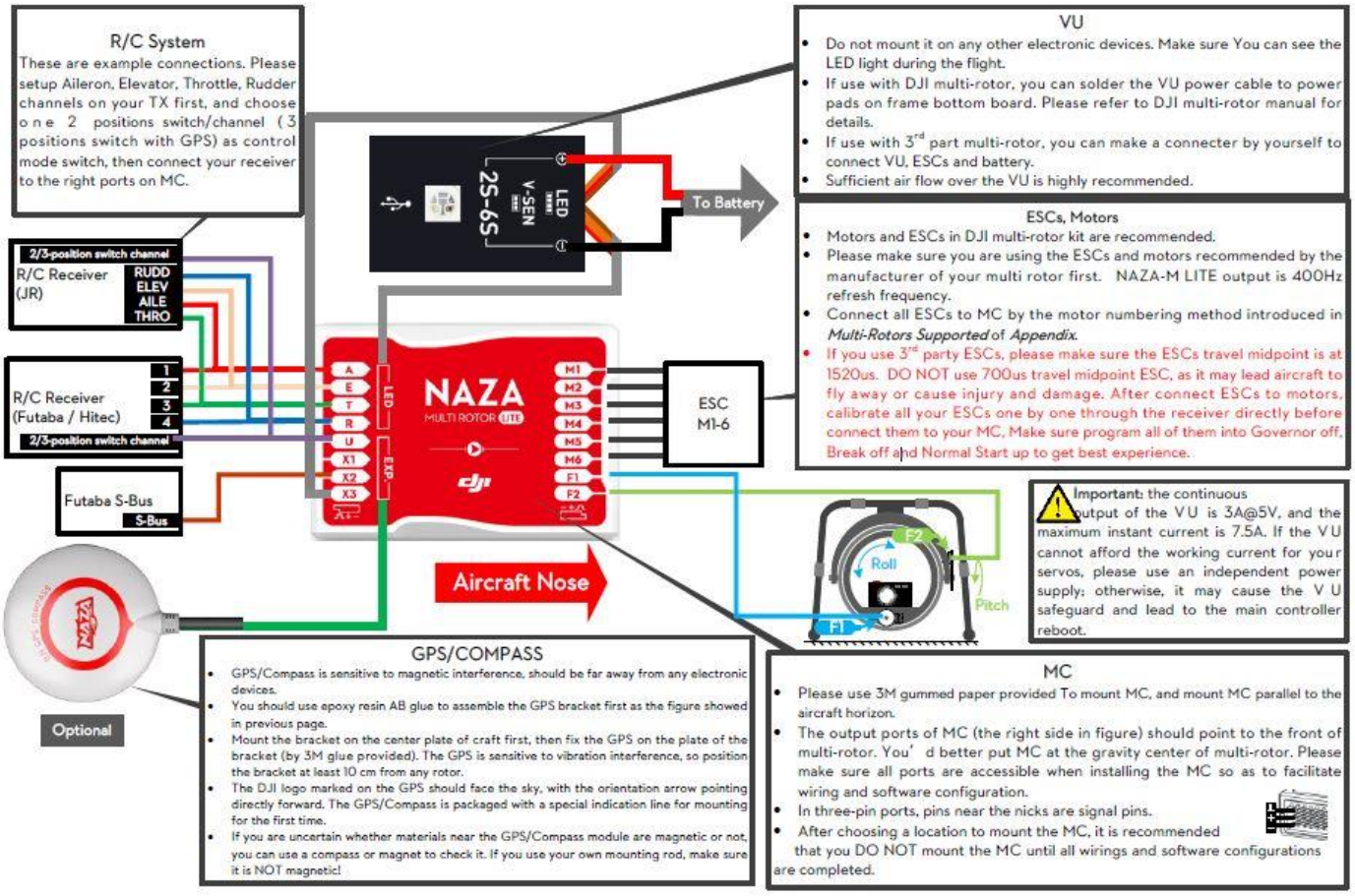


Figure 2: NAZA-M LITE ASSEMBLY

II. **MOTOR and ESCs**: The selection of an electric FPV drone motor Has an enormous influence on the flight characteristics of the multi-copter. Tiny variations in the construction of a motor result in significant impacts regarding the weight, responsiveness and total power of the multi-copter. The key concept behind the functioning of both brushed and brushless DC motors is electromagnetism. Both designs intrinsically incorporate the use of an electromagnet, as a means of converting electrical energy into kinetic energy.

An electronic speed controller or ESC is an electronic circuit with the purpose to vary an electric motor's speed, its direction and possibly also to act as a dynamic break. It converts DC battery into three phase AC for driving brushless motors. These all are essential components of modern multi-rotors that provides high power, high efficiency etc.

Fig.3 : MOTOR

Fig.4 : ESC

III. **PROPELLERS**: The design of propellers is just like fan that transmits power by converting rotation motion into thrust. The design of propeller depends upon it's diameter and pitches as well as materials such as plastic, reinforced plastic,carbon fiber and wood. In our projects we have used carbon fiber. Smaller propellers under 8 inches are used for racing and acrobatics along with smaller motors rated with a high KV. While larger propellers over 8 inches along with motors with a low KV rating are used for carrying payloads such as video equipment. Whatever material you choose there are two main specifications to consider; diameter and pitch.

Fig5: Reinforced carbon fiber based propellers

IV. **BATTERY**: LiPo batteries are now almost ubiquitous when used to power radio-controlled aircraft, radio-controlled cars and large scale model trains, where the advantages of lower weight and increased capacity and power delivery justify the price

These batteries provide higher specific energy than other lithium battery types and are used in applications where weight is a critical feature, like in radio-controlled aircraft.

LiPo packs were available in various configurations, most commonly up to 6400mAh, achieving a maximum 4.2V/cell, for powering certain R/C vehicles and helicopters or drones.

Fig 6: 8000mAh LiPo Battery

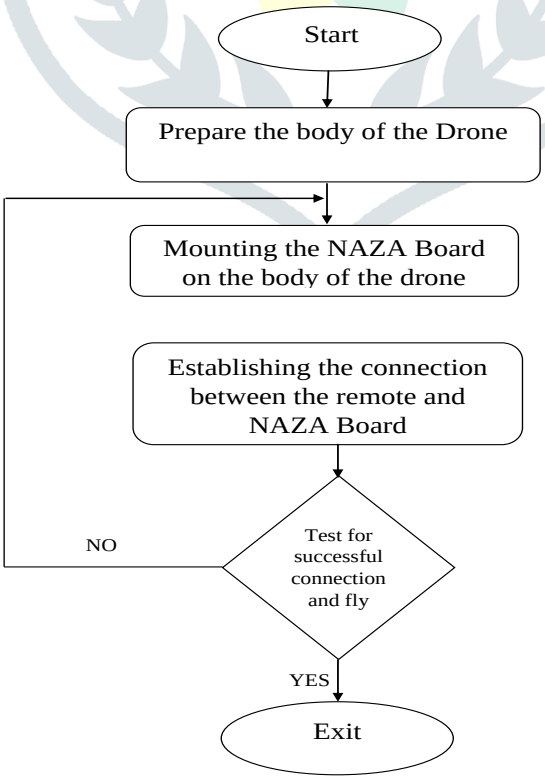
V. **Receiver/Transmitter**: A radio control system is made up of two elements, the transmitter we hold in our hands and the receiver we put inside our drone. Dramatically simplifying things here, our drone transmitter will read given stick inputs and send them through the air to the receiver in near real time. Once the receiver has this information it passes it on to the drone's flight controller which makes the drone move accordingly. A radio will have four separate channels for each direction on the sticks along with some extra ones for any auxiliary switches it may have.

Fig 7: Transmitter

METHODOLOGY:

When we apply any changes in the joystick of the remote control it transmit the signal to the receiver of the drone. At the receiver the signal is passed to the NAZA board and then the signal is passed to the appropriate ESCs to which the transmitted signal was intended to. The motors connected to the ESCs rotate according to the signal from NAZA-M Lite. On applying full throttle of the joystick the drone fly to its maximum height and on applying different signals from the transmitter we can use the drone according to our purpose.

FLOWCHART:



OBSERVATION:

Applied Voltage (From Battery) (V)	Motor RPM Rating
22.2	8436
23	8740
23.5	8930
24	9120
24.5	9310

RESULT:

The drone was successfully completed and was able to lift a weight of about 4.3kg to a height a 50ft on applied voltage of 24.2V.

APPLICATION:

- This proposed project is for the development and betterment of the society bringing new technology into public use. By this project we can develop an efficient transportation for the future generation.
- Now a day's population is one of the major problems of the country. Because of this increasing population we face traffic related problem in our respective cities. Now imagine if there is a patient in an ambulance whose condition is critical. He has to be admitted immediately in hospital. But in any case the ambulance got stuck in the traffic. This may lead to delay and dangerous situation for the patient's life. So considering this main problem of the society we have developed the idea of building a drone that can be useful in such situation.
- In case of increased traffic in cities.
- Helpful in case of floods and landslides.
- Useful in transportation.
- Increases the reachability of many places which are not easily reachable.
- Apart from this, HexaCopter can be beneficial in rescue operation during floods, landslides and many more disastrous situations. Basically we are trying to build a HexaCopter with the help of which we can make transportation more flexible.

SCOPE FOR FUTUREWORK :

This hexacopter will prove new dimensions towards the new generation of our society. This hexacopter will also help in managing security system and can be used for military purpose in future. Innovation can be done in this hexacopter further through artificial intelligence. In emergency cases such as sudden accident, hexacopter can trace that location through GPS to provide help.

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