Rescue Copter

S. Prabhu Ram

Abstract_ There are many existing quadcopters in the present generation and many individuals, groups are putting their interest in these quadrotors, Y-copter etc., This proposal will be useful in this society for rescue teams. Quadcopter is used in many places like drone race, maximum thrust contest etc., and our main motive to bring it useful in the place of emergency. Nowadays the Quadcopter is also used in the field of military. It can be used to view the other country development. Still only the drone ambulance is existing in the field of medical but that also only in foreign countries specially designed for heart patients. This drone is more varied compared to our drone.

— — — — — — — — ◆ — — — — — — — — —

1.INTRODUCTION

This concept is new and unique one, fully designed on Quadcopter. Still this idea is not implemented in any quadrotors. Here the term **"RESCUE"** means **"detection of presence of humans in a disaster occurred area"**. It can save man power and time. This copter carries a sensor, high battery capacity and a smart saver device. It is the first unmanned copter to rescue humans by absorption of thermal radiation from human body. There is only one existing drone which is used in the field of medical. Its specifications are, they used Y-copter and specially designed for providing incentive pulse for heart patients when they are in need. That drone ambulance has some differences in designing and mode of use but both the drone ambulance and rescue copter is used in the same field. That drone ambulance cannot be implemented in India due to rough condition of transmission lines and this is also the reason why it is not controlled automatically. In foreign countries, the transmission lines are passed in the ground. So, they are controlled automatically via GPS. Another main drawback of that drone ambulance is it can save only one life at a time. Here we implemented new idea or concept in quadcopter when in need of emergency.

S. Prabhu Ram is currently pursuing Bachelor of Engineering Degree in Electronics and Communication in SNS College of Engineering, Coimbatore, Tamil Nadu, India. PH-   +919597949799. Email: ssprabhuias@gmail.com

2. DETAILED VIEW OF COPTER

The frame for this drone is designed and readily manufactured by China country. Another thing is that, from the search results It is found that no quadcopter used this type of frame. The stand height covers about 19cm.It is planned to get this frame because under the copter, t h e battery, light indications (used by PIR sensor),camera, servo motors, receiver module, transmitter module (video transmitter) were fixed. It is light weight stand of 400gms. The frame is made with carbon fibre and built in PCB board for soldering motor connections. It can land smoothly as the base covers the size of 500mm.The stand is foldable so it requires less space when not in use. Next moving to the BLDC motor. This motor achieves the required thrust power of 1000gms(approximately) with less consumption of current. The thrust power of motor also depends on battery power. Initially, the thrust power is less when it is idle in landed. Here the speed is controlled by ESC (Electronic Speed Control) and this drone uses 40A ESC with good heat sink. The propeller is 4.5inch which controls the stability in all weather. The net thrust power is also depending on propeller size and motor. The 4 motors use separate ESC but altogether controlled by flight controller board which is discussed later. This sensor is mainly controlled by the Arduino UNO board. It works by looping a program which has an IF condition. For example, when it exceeds the limited value (that is if condition value), both the light and buzzer indication is ON. Normally, the PIR sensor gives the less value of

voltage at output pin, when a thermal radiation is detected by the pyroelectric device, the value of output voltage gets high which is received and read by Arduino board. Here a solar panel is fitted which gives output of 5v and 200mA. It is suitable for Arduino board and some devices. When the drone is lifted in the day time, some circuits and Arduino board switches to the solar power by saving battery power. These battery power is again fed back to the motor. When the light gets dimmed, again all switches back to battery power. This concept is also new one. This is achieved by a relay circuit. Initially, the relay is in contact with NC pin. That pin is connected with battery so the battery is fed to the circuit. When the solar power starts to generate the coil in relay gets triggered and the pin moves to NO pin. Where solar power is generated and given to

Fig. 2.1. Quadcopter Frame designed and imported from china.
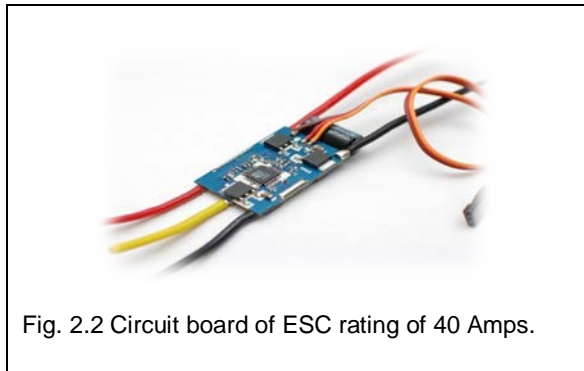
the circuit.

Fig. 2.2 Circuit board of ESC rating of 40 Amps.

The motor thrust power always varies with the load and here the drone pulling power varies depending on the supply given by the ESC. The thrust power and the supply is shown in the form of graph.
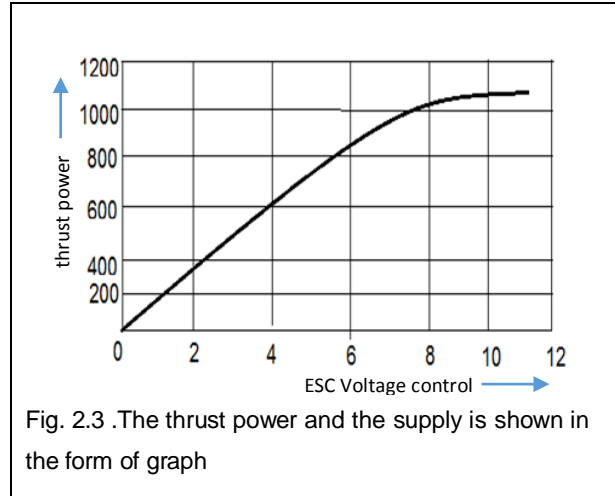

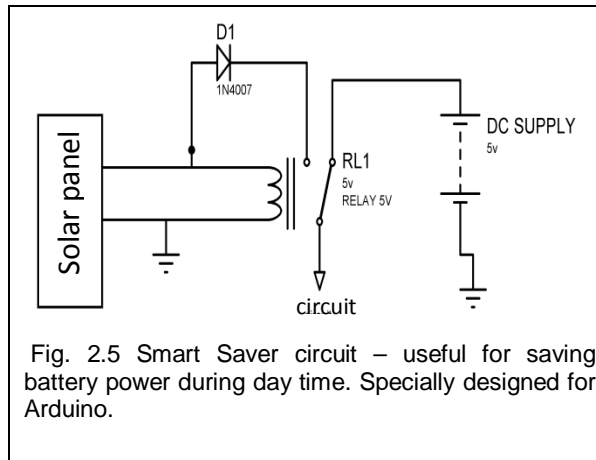Fig. 2.3 .The thrust power and the supply is shown in the form of graph

The calculations given for the work is just approximately and initially. Later, upgraded this work with all latest technologies . At the time the BLDC motor thrust power may be high and more qualified frame may be replaced with the current one. Here a spare motor of 2000kv is used when the drone lift the medical drop box or any other thing. When the high power motor is used, the battery is not enough to provide sufficient current so totally the circuit must be changed along with the ESC. Therefore, it is quite complicated one. In future , it may come with all those features which mentioned above. Generally, the Quadrotor depends on climate condition which gives better stability. When the load is added along with the rescue copter, the thrust power and stability gets decreased. The copter also useful in night time. It carries white SMD LED light which is more bright and it also helps the camera to capture in night time. The SMD light needs more voltage so it cannot be used all the time. Only it can be used in night time while seeking. The SMD light is also controlled by the Arduino board . The SMD requires minimum of 6-8V approximately

Fig. 2.4 Bright light SMD – Surface Mounted Device Helpful for camera at night time.

The relay used is 5V relay which is used in switching the circuit to solar power. When the solar panel gets
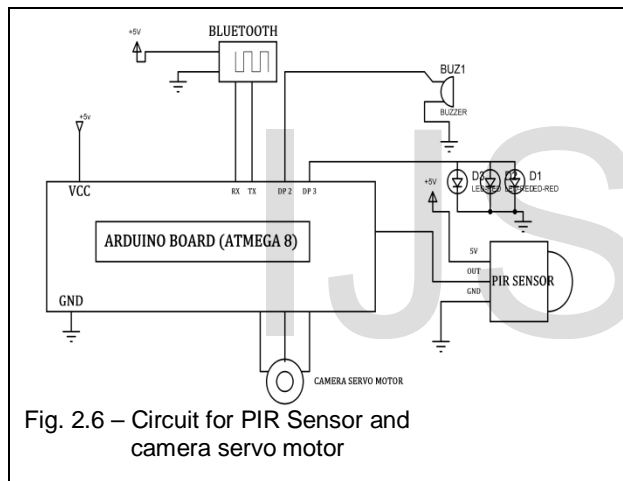
enough power, the relay switch it to the solar. The circuit diagram is shown below.

Fig. 2.5 Smart Saver circuit – useful for saving battery power during day time. Specially designed for Arduino.

Bluetooth is not that much efficient to control the device but it will be useful in open space.

3. FUTURE DEVELOPMENTS
& OUTCOMES

This is just initial of our work later we have many ideas of upgrading the copter to more than the critical limit. We have the idea to bring all the medical First Aid kit . Also the chance to alter the frame of our copter with even best quality . In future, this will be the best ambulance by enabling the auto drive feature to reach the destination on time or in advanced time but no way it can be late to the victim place. It also carries more solar panel for supplying some circuits. Even it may have the capability to charge the drone

Fig. 2.6 – Circuit for PIR Sensor and camera servo motor

Fig. 3.1 – Graphical view of future updates.

4. REFERENCES

1. About quadcopter

http://www.academia.edu/4253247/UNMANNED_AERIAL_VEHICLE_RC_QUADCOPTER

2. Things and working of BLDC motor

http://educypedia.karadimov.info/library/ems_ch12_nt.pdf

3. PIR sensor

http://learn.adafruit.com/downloads/pdf/pir-passive-infrared-proximity-motion-sensor.pdf

4. Micro controller

http://www.atmel.com/images/atmel-2486-8-bit-avr-microcontroller-atmega8_l_datasheet.pdf

The main role is taken by this Arduino board . It uses Atmega 8 micro controller. The digital pins has the ability to perform as I/O ports for adding the external peripheral device like PIR Sensor, Bluetooth HC-05, Servo motor, LED, buzzer. All the devices are connected to separate pins for various tasks. RX and TX port of the controller is connected to the Bluetooth peripheral. One of the digital pin (say DP3) connected to the buzzer. So, when the PIR starts to work and detect, some amount of voltage enters the digital pin. When it goes beyond the given IF condition value , the buzzer and the light start to intimate the user. It is compactible to connect 'n' number of LEDs. The supply for all the peripheral devices are given separately. Later, add some control options or serial data read option to the micro controller. The two servo motor is also controlled by the Arduino board. The program is also given by the user for that task. We mainly use the Bluetooth for servo control. Since

5. Functions of ESC:

http://www.sarkanyellato.hu/wp-content/uploads/2011/10/RC-Timer-10.18.30.40A-ESC-Instruction.pdf

5. CONCLUSION

Thus, we conclude that this rescue copter will be useful and needed by our society. Later ,with more features at cheaper price, we will design this copter and bring it user friendly with some automatic functions.

IJSER