Journal of Fundamental and Applied Sciences

ISSN 1112-9867

Available online at http://www.jfas.info

Research Article

Special Issue

DEVELOPMENT OF HYBRID DRONE (HyDro) FOR SURVEILLANCE APPLICATION

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Published online: 15 January 2018

ABSTRACT

Drone has become a well-known technology with many different names such as Unpiloted Aerial System, Unpiloted Aerial Vehicle, Remote Piloted Aerial System but the most commonly called name is drone. The maneuver of flight is controlled either autonomously by onboard computers or the remote control of a pilot on the ground / another vehicle. The typical launch and recovery method of an unmanned aircraft is using function of an automatic system or an external operator on the ground. UAVs are simple remotely piloted aircraft, but autonomous control is increasingly being employed. The drones commonly used in military surveillance, search and rescue mission, aerial combat strike and etc. The project is more focusing on civilian usage with mounted of camera for surveillance purpose.

Keywords: drone; UAV; propeller; hybrid; civilian.

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doi: http://dx.doi.org/10.4314/jfas.v10i1s.60

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1. INTRODUCTION

Known as an Unmanned Aircraft System (UAS) or Unmanned Aerial Vehicle (UAV), a drone is basically any aircraft flying in the sky without a pilot, whether it be flying autonomously or with a remote control on the ground. Recently, the development and usage of UAS/UAV/drone are increasing commonly as the technology rapidly advances. In fact, the demand of drones is expected to rise from 2.5 million in 2016 to 7 million in 2020, a staggering 180% increase. This means newer and more varied versions of them are constantly hitting the market, making it difficult to keep up with the different types of models.

Recently, research on drone offers many benefits in wide applications. For examples, study on auto patrol drone development for safety management [1], hybrid and adaptive drone identification through motion actuation and vision feature matching [2], ambulance for outdoor sports [3], interdisciplinary unmanned aerial vehicles course with practical applications [4], conception and manufacturing of a projectile-drone hybrid system [5], autonomous control of a drone in the context of situated robotics [6], situational awareness based flight control of a drone [7], hybrid control for large swarms of aquatic drones [8], KinecDrone: Enhancing somatic sensation to fly in the sky with Kinect and AR [9], design of a hybrid drone with multi-rotor control system [10], etc.

This paper presents a development of hybrid drone which also known as HyDro for surveillance purpose. The typical launch and recovery method of an unmanned aircraft is by the function of an automatic [11, 13-14] system or an external operator on the ground. UAVs were simple remotely piloted aircraft, but autonomous control is increasingly being employed.

2. METHODOLOGY

2.1. Flow Chart

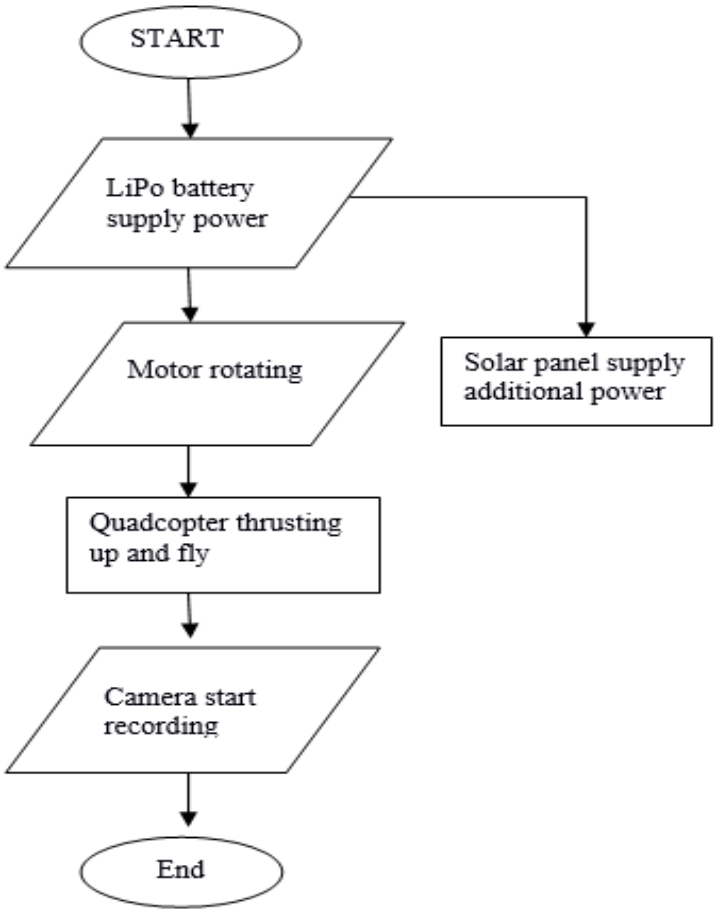

Fig.1. Flowchart of process operation of hybrid drone

The flowchart in Fig. 1 shows the process operation of hybrid drone. At the first place, the drone is controlled by remote control when the switch is on. It can be controlled [15-18] the drone to fly up into the air and recoding of the image can be saved in memory card.

2.2. Schematic Diagram

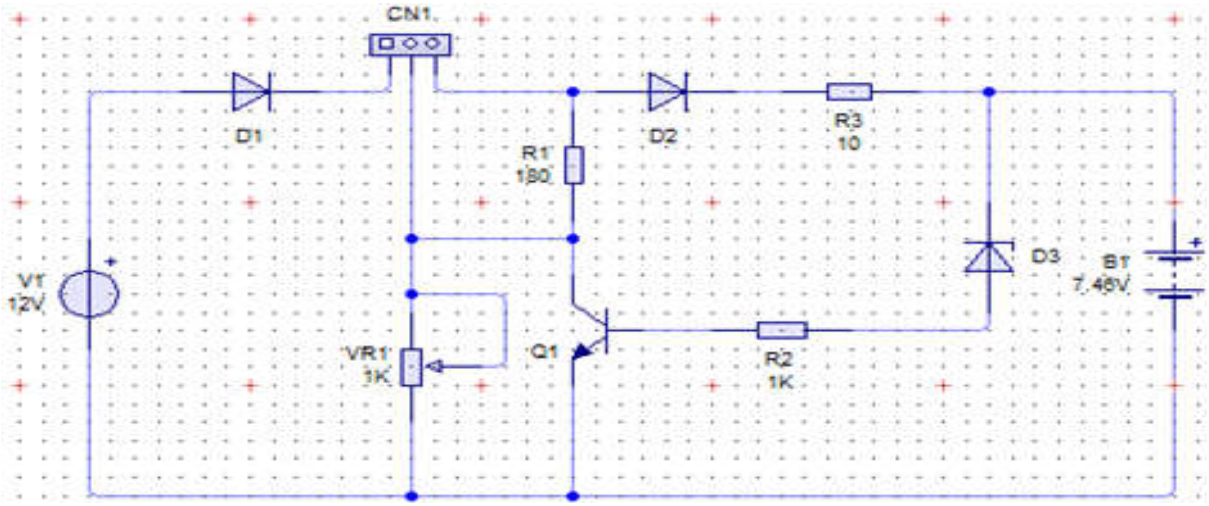

Fig.2. Schematic diagram

Fig. 2 shows the schematic diagram for hybrid drone. The circuit used 9V battery as a power supply to the circuit. The circuit contain one integrated circuit (IC) and the rotation of the motors [12] as the output.

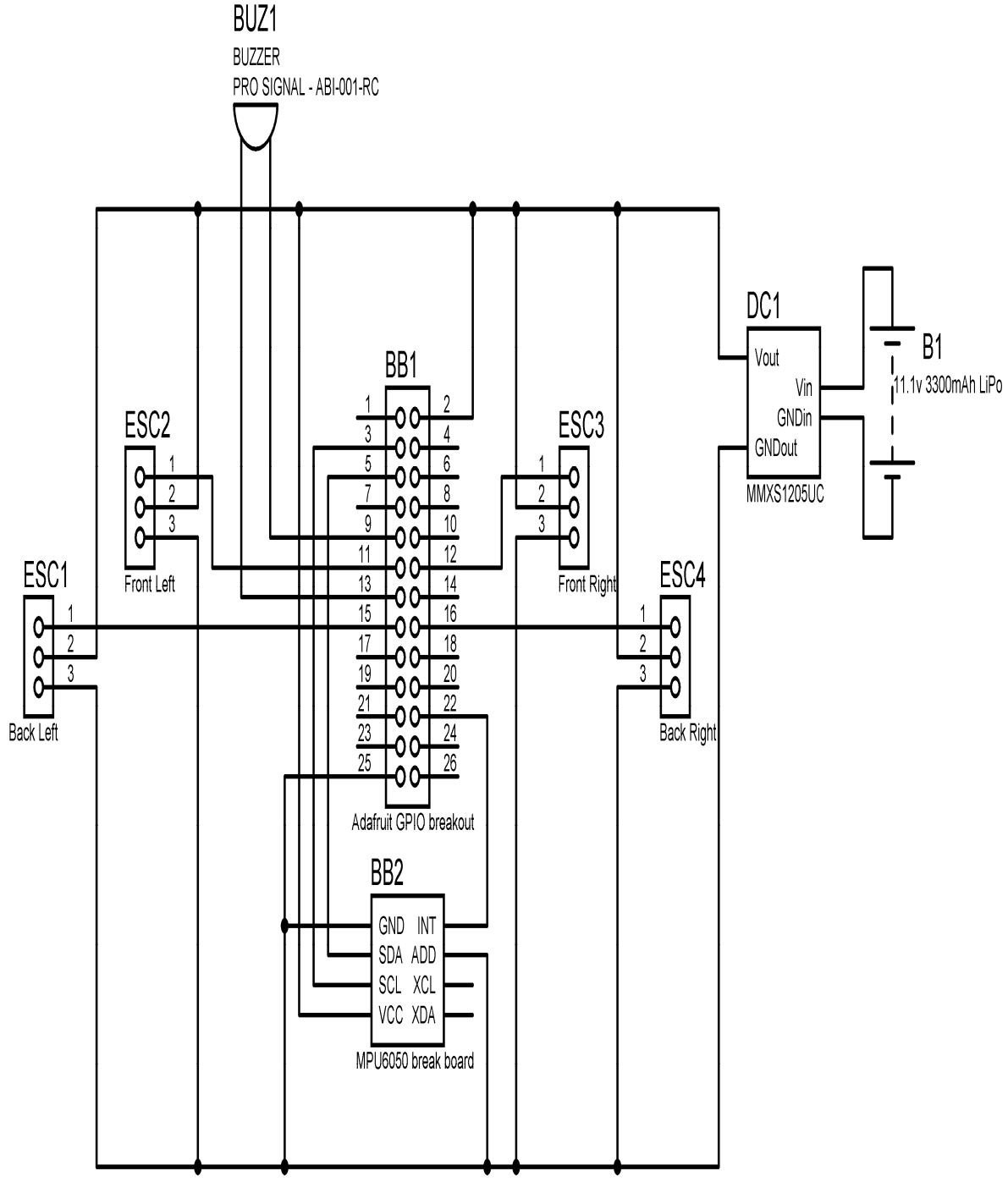

Fig.3. Circuit diagram of drone

3. RESULTS AND DISCUSSION

Fig. 4 shows the simulation circuit of the project using Proteus.

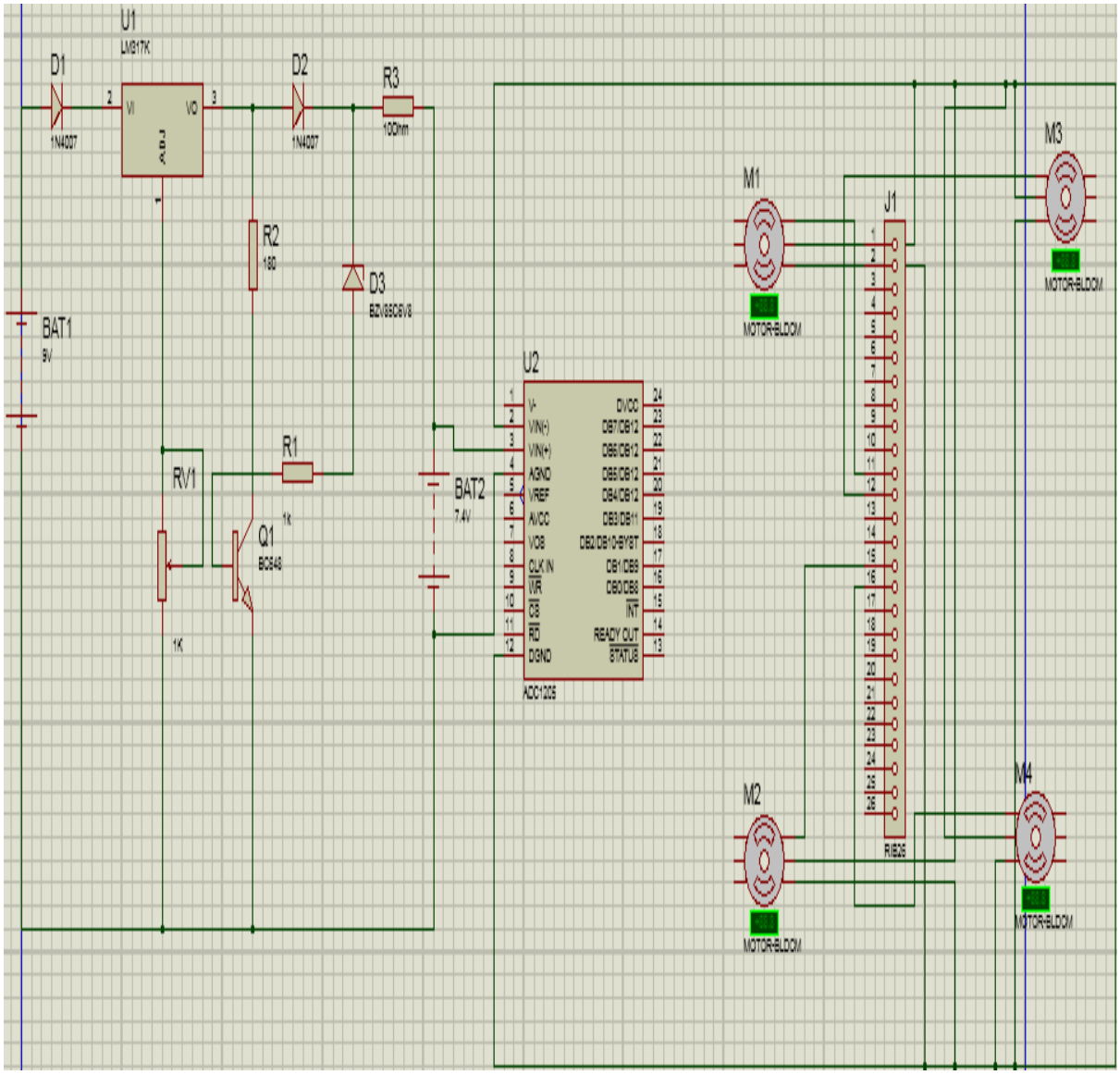

Fig.4. Simulation circuit

The simulation circuit is designed in order to make sure all the connection and component are suitable before the hardware parts is designed. After the simulation is successfully done, then the circuit is connected to breadboard.

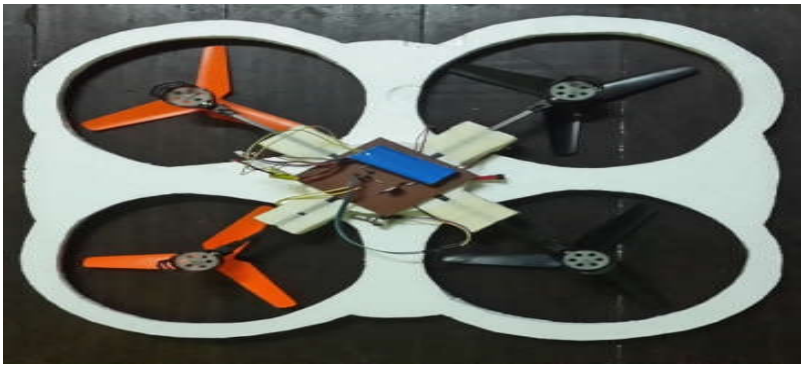

Fig.5. Drone prototype

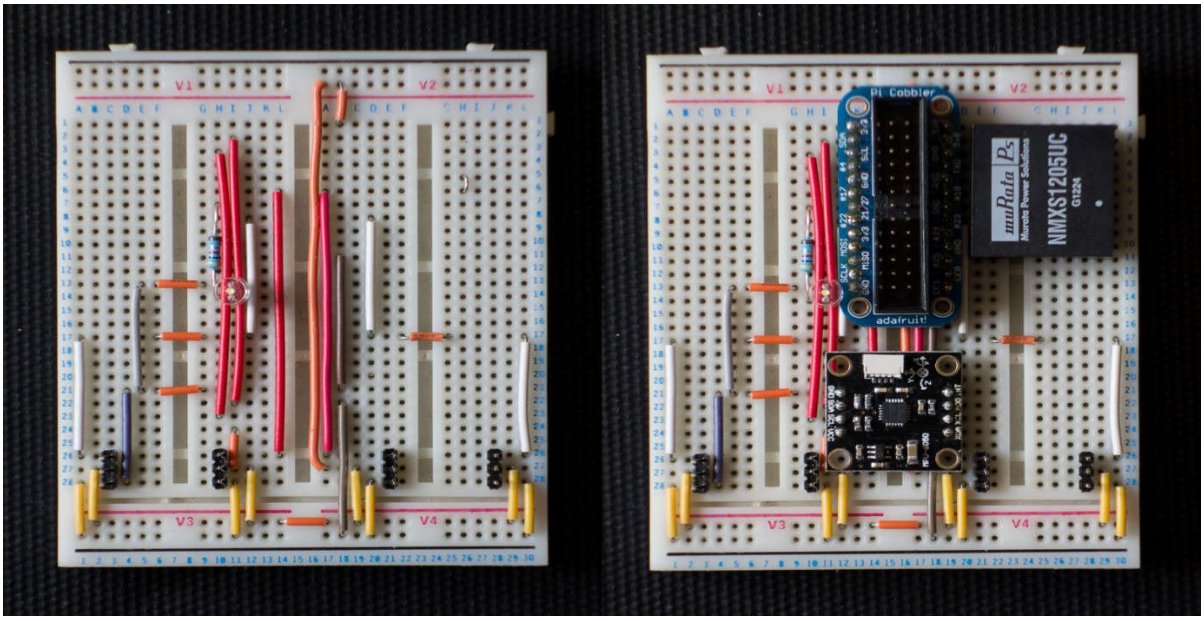

Fig.6. Drone breadboard

4. CONCLUSION

The project is strongly can be developed and can be expose its function to the civilian community and how it can be implemented for the future use. We add solar panel to support the battery to supply power to the drone.

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How to cite this article:
Rizman ZI, Adnan J, Hashim FR, Yassin IM, Zabidi A, Zaman FK, Yeap KH. Development of hybrid drone (hydro) for surveillance application. J. Fundam. Appl. Sci., 2018, *10(1S), 816-823.*