

THE HARDWARE USED IN THE STRUCTURE OF DRONES

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Abstract: The papers presents the aspects concerning the drones, as a potential solution for the inspections, as well as for the major causes of the applications in the topography and surveing an areas, environmental engineering, tourism, shipbuilding, military activities and the monitoring. Are played types of drones, component thereof, hardware equipment thereof and the components the propulsion system.

KEYWORDS: drone, control, hardware,

I. INTRODUCTION

The Quadcopter, known under the name of quadrotor, is a helicopter with four rotors. The rotors are pointing upwards and are placed in a square, an equal distance from the center of mass of the drones. The Quadcopter is controlled by adjusting the rotation speeds of the rotors, which are rotated by electric motors. It has a typical design for small vehicles without air pilot (UAV), due to the structure of the evaluation.

The drones represents a potential solution for agricultural inspections, as well as in the field of topography and surveing a areas. Unlike the satellites, they can photograph from different angles and the images captured are more detailed. The drones are used in the area of surveillance, search and rescue, construction, inspections, environmental engineering .

Aircraft without pilot are used for surveillance and recognition by the police, secret agencies and military environmental engineering and in the tasks of the search and rescue operations in the urban environment. Also, the drones can be used

and in the other areas: movies, television, commercials, videos, real estate, tourism (hotels and springs), sports events, concerts, product launches, construction, monitoring, prospect of land and agriculture.

The drones are tested in Catalonia, in the south of France and Italy, but in order to be able to be used on a large scale in the years to come we need to change the European legislation, currently being allowed to use only up to a distance of 500 meters from the operator. In Japan, drones started to be used in agriculture, to automate the process of spraying the crops with pesticides. It may also be used in investigation of accidents, as in the case for the nuclear power plant at Fukushima, where they were used in order to evaluate the safe product situations

The types of drones are the following:

- RTF: stands for "ready-to-Fly". Describe any quadcopter RC who comes with fully assembled, with all the parts and accessories needed for the flight.
- BNF: Display stands for "Bind-and-Fly". Describe any quadcopter RC which comes

fully assembled, without a transmitter (it is necessary to choose a transmitter compatible for a "link" to receiver drone).

- ATF: Display stands for "Aproape-Ready-to-Fly". These drones do not come fully assembled, and will require parts / additional accessories before it can be transported with the plane.
- Hexacoter: UAV which has six engines / propellers.
- Multirotor: any aircraft which has several rotors.
- Octocopter: UAV which has eight engines / propellers.
- Quadcopter: UAV which has four motors / propellers. Tricopter: UAV which has three motors / Propellers

A quadcopter can control the rotation by speeding up of two motors on any part of the drones and slowing down is done with the help of the other two motors remained. For example, in the case in which the quadcopter it desirable to roll to the left, it would accelerate the engines on the right side of the frame and it would slow down on the two on the left-hand side. Similarly, in the case where he wishes to be put forward in front of it speeds up the rear of the two motors and slows down in front of the two motors.

Move horizontally is to be carried out by the temporary acceleration / slow down certain engines, so that the vehicle is tilted in the desired direction of travel, increasing the tractive force of all motors, so that the vehicle moves forward. In general, the vehicle leans, the faster moves. Altitude is controlled by speeding up or slowing down all motors at the same time.

II. THE HARDWARE USED IN THE STRUCTURE OF DRONES

The drone it is synonymous with the term "quadcopter" or "UAV" (the term "Drone" is generally reserved for unmanned aerial vehicles, designed for military use).

Component of a drone is the following:

- **DIY** : stands for "Do-It-Yourself" custom-building a quadcopter
- **UAV** : stands for "unmanned aerial vehicles"
- **Size** : are measured in millimeters (for example 350 mm), "size" represents the greatest distance point to point between two engines on a who was a. The size can help to determine the "class" of a drone (mini, micro)
- **CG-ul** : stands for "Center of gravity"-point drone where weight is distributed evenly over all parts of the
- **Dampener** : small pieces of rubber, molded moisturizing used to reduce vibrations of a drone RC
- **Framework** : synonymous with human skeleton-helps bring together important components and provides protection
- **T reindeer landing** : for an RC drone to be able to land without damaging fragile hardware, it must contain the landing gear. Unlike airplanes, which have wheels on their landing gear, the drones landing train RC uses plastic, metal or rubber materials to help cushion landings.
- **Signalling LED** : to help to move towards locating a drone RC at night, it must be equipped with a "Light Emitting Diode" or LEDs.

The propulsion system of a drone consists of:

1. Propeller - aggregate that uses the pressure difference between the intradosul and the blade straight back covers and appears in the rotation of the propeller (it was invented by the Austrian Joseph Ressel 1793-1857).

Propeller Blades or fins are placed so that produce by rotation, where asymmetric air or water and pressure forces take birth and absorption, which in turn determines the formation of a current in that environment. Each propeller palette contributes to this effect of motric propulsion.

2. Prop Guards -help protect the propeller of a drone, to come into contact with the

external environment and to protect the operator.

3. The Shell -outer cover made of a variety of material and designed in aesthetic and functional purposes (showing weather protection). Depending on the shape of the shell, it can help you become more drone aerodynamics.

4. Engine -part of the drone that rotates the propeller. Larger UAVs use "brushless", while unmanned aerial vehicles engines smaller engines use "brushed" (fig. 1).



Fig. 1 a drone Engine.

5. The Sensors

a..the **accelerometer** it is designed to measure the acceleration of a line (fig.



Fig. 2. -Accelerometer sensor designed to measure line throttle

b. **Infrared Sensors** for monitoring of agricultural land (fig. 3)

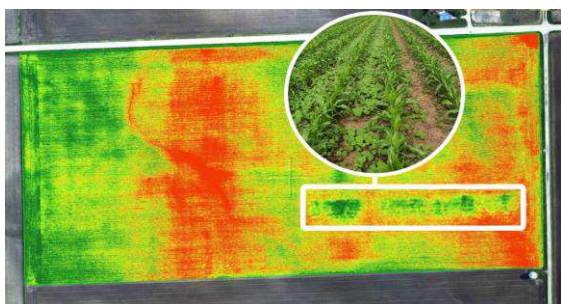


Fig. 3. Monitoring farmland using infrared sensors

This is an example of how shooting remote farmland, image captured using infrared sensors. In spectral imagery that

represents points appear areas requiring immediate attention or intervention, otherwise the plants may be lost.

c. **Barometer** it is designed to allow drones to know at what height above the ground, is located by measuring the pressure. Considering that the air pressure changes with altitude, the drone can determine its own height using the barometer.

d. **Ultrasonic sensors** are based on the fact that obstacles detection function works like a sonar equipped on a submarine, which act through a continuous momentum to eliminate accidents and for removing computer errors (fig. 4).

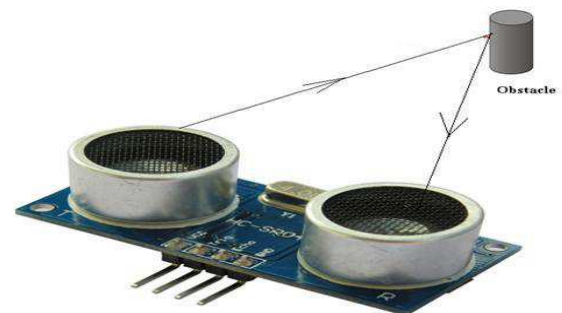


Fig. 4. Ultrasonic sensors

6. Gyro - it is designed to measure the angular acceleration axis x, y or z and is responsible to allow dronei to fly in a stable manner.

7. GPS -"Global Positioning System", a GPS sensor enables with the help of satellites, a lifting of a drone, for follow-up of some specific coordinates set to fly or to bring the drone back to its initial position even if it is not in the field.

8. remote control - it is a powerful and customizable controller, equipped with integrated technology that allows HD video stream directly from the camera. Dispose of sensitive control sticks, dedicated buttons and an ergonomic design, offering the possibility to control the vessel (fig. 5).



Fig. 5. Remote control a drone

9. ESC - "Electronic Speed Controller" connects to flight controller, motor and battery to help mediate and speed through the engines rotate to keep the altitude and to print the desired direction by changing the speed of the car (fig. 6)



Fig. 6. Electronic speed controller

10. Li-Po -Stands for "Lithium polymer" it is a battery used to power the RC drone, which is why they are lightweight and are able to release a lot of current.

11. PCBs Stands for "Printed Circuit Board" is a fiberglass board, which has many different components welded on it (fig. 7).

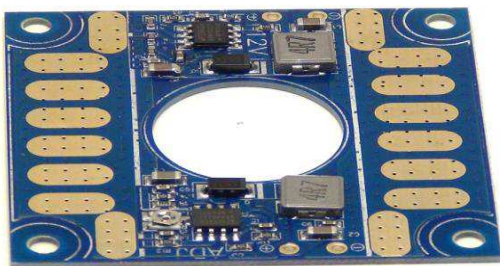


Fig. 7. Printed Circuit Board

12. Power Distribution -role of energy distribution: to feed the different parts of a quadcopter RC, power must be shared for all these different devices with a power distribution panel. It takes negative and positive landmark single dronei battery. Provides other Terminal or connection points throughout the operation dronei, so

that other devices can receive power (fig. 8).

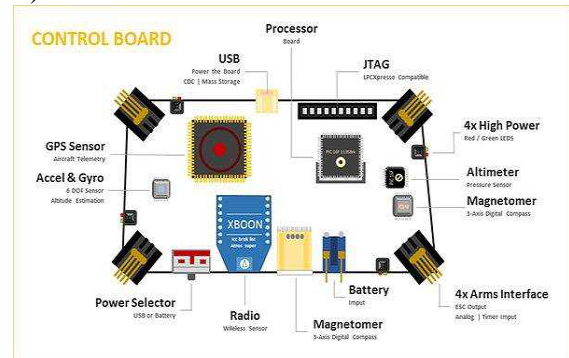


Fig. 8. Power Distribution

13. Prop Adapter -a thin adapter, used to connect the engine to the dronei screws (fig. 9)



Fig. 9. Prop adaptor

14. FPV -First Person View is the term used to describe a picture at ground level, which sees the camera on quadcopter. Current systems use different monitors to accomplish this (tablets, Iphone, Smartphone, laptop) (fig. 10).

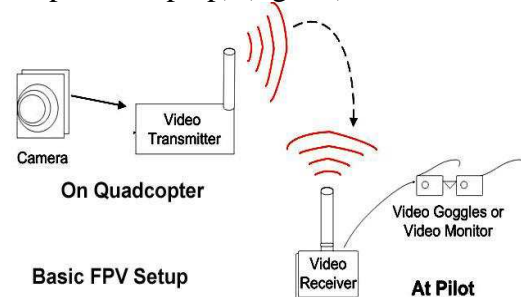


Fig. 10. First Person View

15. LCD -Stands for "Liquid Crystal Display". It is a type of display used to display an image that comes on a receiver.

16. Gimbal -Israel holding a camera during a flight and enables it to deliver stable images (fig. 11).

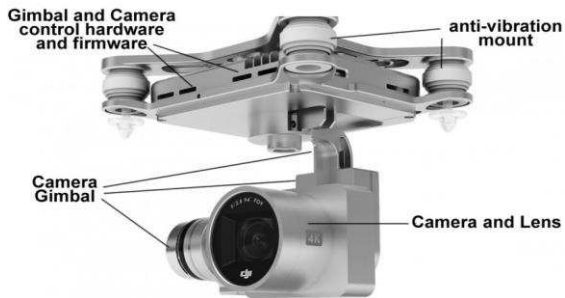


Fig. 11. Camera during the flight

III. CONCLUSIONS

- The drones are a potential solution for agricultural inspections, as well as in the field of topography and cadastre.
- Unlike satellites, pictured from different angles, and the images captured are more detailed
- The drones follow designated targets automatically using ActiveTrack system and avoiding obstacles.
- It is able to fly up to a maximum of 28 minutes with a control range of 5 Km and a top speed of 72 Km/h.
- The drones are equipped with integrated Gimbal for a high stability of the camera and showing video and photo enhancement and an optimized Visual positioning system to raise the altitude pozitionalala with up to 10 meters.

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