

H E Drone

Hyperd Emergency Drone

Ahmed El-Sayed SaaOr, Khaled Refaat Ali Oqda.

Delta Higher Institute for Engineering and Technology, Mansoura, Egypt

a7mdsq@gmail.com, Khaled.oqda20@gmail.com.

Abstract— (It is a highly maneuverable vertical take-off Quadcopter aircraft) that operates with artificial intelligence (AI) in multiple emergencies and individually (Autonomous) automatically programmed and intelligent

It has two dynamic remote-controlled arms to perform several specialized tasks such as neutralizing explosives, extinguishing fires, and assisting civil defense in land and sea rescue operations.

Keywords-- GPS, Components, Control, Modeling, Multi-rotor drone, Sensor.

I. INTRODUCTION

There are many technical difficulties faced by rescuers and civil defense during their work, the most important of which is access to the effective geographic space through which they can perform the tasks completely. Examples of difficult geographic space are tall buildings and large-scale fires such as forest fires, marine rescue and fireworks located in critical places, so this innovation It is a quadcopter drone, smart and dynamic, with manually controlled arms and accurate live imaging that will greatly help in performin various tasks.

1. Intelligent and graceful extinguishing of fires in hard-to-reach places, bad at high altitudes or wide places.
2. Emergency medical aid supply process.
3. The process of detecting and dismantling explosives and mines in record time without the need for a human factor, especially in high places where it is difficult for the robots responsible for this to reach.

II. SYSTEM ARCHITECTURE

The drone consists of

1. Lightweight and durable aluminum frame covered with carbon fiber to avoid radar detection and designed for aerodynamic winds at each end of the chassis

2. 4 brushless motors

This is due to its high torque for vertical take-off

With a power of 400 kv, each motor is able to carry 8 kilograms, with a total value of 32 kilograms, and is small in size, which allows greater ability to maneuver heavy loads, and is equipped to take high-precision commands from the micro controller.

3. The hope wing motor driver has high precision voltage distribution for drones

4. Flight control, programmed in c and python languages, as it is a combination of programming parts for circuits

5. GPS positioning model in order to direct the drone to the specified location and connected with the satellites.

7. Live transmission camera to enable manual work such as explosive detonation

It works with a highly intelligent system, with an antenna with a range of up to 3 km, and it gives an accurate picture to allow the performance of a variety of tasks completely.

8. Arms for performing manual tasks, which are two mechanical arms connected to a motor stepper and programmed with each other to perform tasks as if they were a human hand in controlling them.

It plays a key role in throwing and directing aid and dismantling explosives in an accurate, effective and safe manner

9. Broadband aerial transmitting and receiving antenna containing 16 channels to create a wide range of drone movement to work accurately

This is to receive and send commands without distortion or reflection of the directed rays from the wave generator and give them a fast and complete propagation.

How do the parts of the drone work together?

The take-off starts when the command is given through the ether, so it distributes the power to the motors after giving the commands from the microcontroller, then it distributes the voltage to the motors according to the feedback from the different sensors for wind speed, weight, pressure and GPS. by control

The motors rotate and during flight, the system gives a live image to follow up on the control and gives commands to the arms to move according to the control remote control.

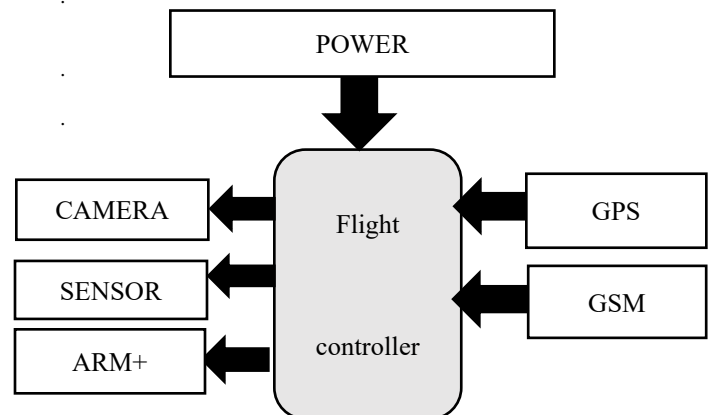


Fig. 1: System Architecture

III. TECHNICS

1-robotic arm is a type of mechanical arm, usually programmable, with similar functions

There are two arms, one of them is a holder that can be opened and closed and can be changed to a cutter used in the work of neutralizing explosives, and the other arm is a multi-sided air holder. 3 motors are used in each arm, 2 stepper motors and one servo motor, which are among the specialized motors

These engines allow the rotation of the 3D arm and have special equations and algorithms that make them smart in interacting with targets and programming codes that make agile arms work.

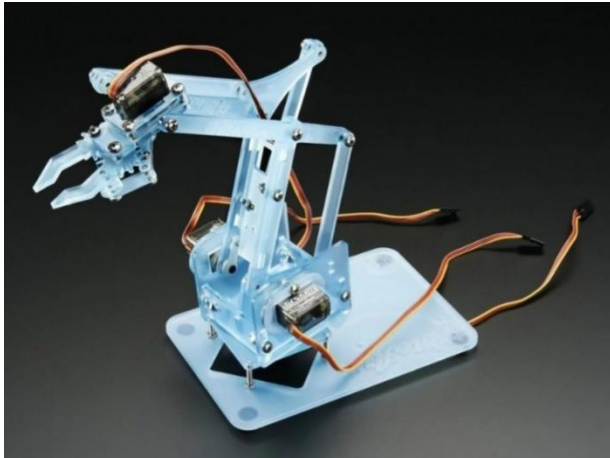


Fig.2 Robotic Arm

2- Motor PDB-XT60 in fig. 3 accepting more commands from the flight controller and its processors, and this is the data sheet of the power distributor after the modifications

PDB-XT60 with BEC 5V and 12V Power Distribution Board have been engineered to provide the highest possible performance and reliability in a 36x50mm, 4-layer PCB. It comes with an XT60 for easy connection to LiPo batteries.

Using BECs it distributes power from 3~4S LiPo packs to 6 ESCs, as well as providing synchronized and regulated DC 5V outputs for RC Receivers, Flight controllers, OSD, and Servos.

It also provides linear regulated DC 12V for powering Cameras, Servos, RC receiver, Flight Controllers, Video Transmitters, LEDs, etc. It offers an XT60 socket to connect the LiPo pack conveniently.

Features:

4-layers and 1.6mm PCB

Built-in XT60 Socket

Total 6 pairs ESC solder tabs are fit for H or X type frame

5V and 12V Output LED indicators

Regulated 5V and 12V outputs

BEC 5V output:5V/2A (Max.2.5A 10s/minute)

Output Ripple:40mV (Vin= 16V, VOut= 5V@2A load)

Short-circuit tolerant:4.5 seconds/minute

BEC 10V output (4S LiPoly, 13~18V DC):10V/500mA (Max.0.8A 5s/minute)

BEC=10V.

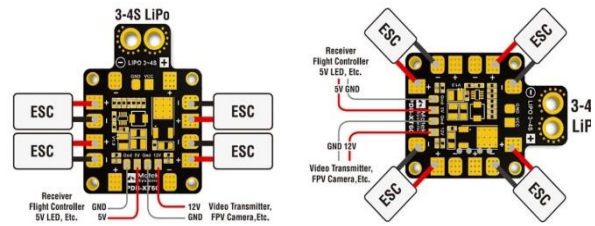


Fig.3 PDB-XT60

3- ANTENNAwave which sender compound alarm works to detect long-range targets at long distances and provide tracking and guidance radars and command rooms with information about the target.

Early warning antenna are of a type VHF (Very high frequency.)

Very high frequencies capable of sending a wave capable of traveling through distant atmospheres to reach very distant targets

It has the effect of full azimuth and full azimuth rotation This means that it provides the largest possible area for the angular measurement

The angular measure is in a spherical coordinate system. It is the vector from the observer to the point of interest projected vertically upward

Signal; The angle between the projected vector and the reference vector on it is called

This is because its antennas are able to rotate a full revolution, making it a statement for a semi sphere. Important, influential and highly sensitive modifications have been made to the TDX60 power distribution that allows ensuring stability for the plane.



Fig. 5 Antenna

4- The programming codes and simulation programs used to structure the commands of the microcontroller for the dynamic arms and the equilibrium of the drone is the first of its kind, as the programming of the arms in many innovations depends on limiting the work of the stepping motors to certain dimensions that they are intended to work in, but when programming all the step motors to work in all dimensions, they work The god is like a human being who moves, feels everything around him, and is able to distribute his

arms in all directions, thanks to the integration of the software codes for balance and based on feedback, the different sensors of the aircraft with the work of the arms, which gives it the advantage of work.

```

ProgrammableArduinoRe

#include <Servo.h>
#include <OLED_I2C.h>

//define the servos
Servo servo1;
Servo servo2;
Servo servo3;
Servo servo4;

OLED myOLED(SDA, SCL);
extern uint8_t SmallFont[];

//define the buttons
const int button1 = 12;
const int button2 = 13;

//define variable for values of the butto
int button1Pressed = 0;
boolean button2Pressed = false;

//define potentiometers

```

Fig. 6 coding by Arduino

IV. CONCLUSION

Finally, with more technological, software and technical capabilities, we can increase the effectiveness of the aircraft and it can also accept armament systems to work and serve with police devices

The developed system effectively provides an application of connected devices or internet of things in vehicle anti-theft. The system includes a Combined GPS+GSM Module which can track the location of the vehicle via the GPS antenna implanted in the vehicle. Thus, this system is an integration of several modern embedded and communication technologies.

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