**Abstract for Game Of Drones Competition APOGEE**

Team Robocon BITS Pilani

To tackle the problem statement, we are building a quadcopter with an X frame and the following components-

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| **Component(s)** | **Price(in rupees)** |
| Brushless Motors(x4) | **1600/-** |
| Electronic Speed Controlllers(x4) | **1760/-** |
| Camera- 5MP Raspberry Pi camera | **590/-** |
| Propeller Pairs(x4)- 4.9-inch pitch, 5-inch diameter | **720/-** |
| Naze32 rev6 full version | **1890/-** |
| Receiver(fsia10b) +Transmitter(fsi6x) | **5490/-** |
| Raspberry Pi Zero | **990/-** |
| Lithium Polymer Battery- 3000mAh,40C, 11.1V,3-cell | **2200/-** |
| 3D printed Frame | **500/-** |
| Hinge | **20/-** |
| Servo motor(micro) | **120/-** |

# Total Cost=15900/- Hold and Drop Mechanism-

The hold and drop mechanism that we have, uses a hinge to support the package and a servo motor along with its extension to support the above(the hinge and package). Hence, the package is held. To drop it(the package), the servo motor is rotated and the hinge, and therefore, the package, are released(NOTE-The hinge just drops to allow the package to fall; it doesn’t actually drop/fall off the drone).

# Image Processing Mechanism-

To take the image input, we are using a 5MP Raspberry Pi Camera, which is sending its image output to a Raspberry Pi Zero, which processes the image to find and read the QR code in question. We have implemented the image processing with the help of the Picam library and opencv, after which we used the pyzbar library to find and read the QR code in the image. We felt that this mechanism was the easiest and the most accurate way to implement the QR code scanning. The answer obtained upon reading the QR code is sent to a laptop where the QR code’s output is visible.

# Unique Selling Point-

The drone/quadcopter that we are using is completely self-made and self- designed. It attempts to bridge the gap between expensive high-quality drones and cheaper lower quality ones by offering a middle ground. It also uses a laser guiding system to place the package at the required place in an accurate manner.

Efficiency and Capacity of device- **Efficiency(using e-calc)-** Motors@ Maximum- 79.8%

Motors@ Hover- 80.6% Device in a normal run- 65.3% **Capacity of device-**

# Minimum Flight Time- 1.3 minutes Hover Flight time- 4.8 minutes Maximum Flight Time- 7.2 minutes