CHAPTER-1

INTRODUCTION

1.1 QUADCOPTERS

A quadcopter or a quadrotor helicopter is a multirotor copter that is lifted and propelled by four rotors. All the four arms have a motor and a propeller at their ends each. The lift is generated by a set of rotors and vertically oriented propellers; hence quadcopters are classified to rotorcrafts. They are also referred to as pre-programmed missions.

A quadcopter uses 2 sets of identical fixed pitched propellers; 2 clockwise (CW) and 2 counter-clockwise (CCW) directions. This helps the machine to hover in a stable formation. This is unlike most helicopters. Control of vehicle motion is achieved by altering the rotation rate of one or more rotor discs, thereby changing its torque load and thrust/lift characteristics. These use variation of RPM unit (revolutions per minute) to control lift and torque.

Quadcopters are known by different names, including: quadcopter, quadrotor, quad-copter, UAV (Unmanned Aerial Vehicle), UAS, or drone. There are series of bicopters (two blades), tricopters (three blades), quadcopters (four blades), hex copters (six blades), and octocopters (eight blades). The multirotor with a high number of blades is designed to carry a heavier payload, for efficient yaw smoothness and for efficient lift capacity. According to the efficiency needed for a particular task, respective series may be used.

A helicopter has one big rotor to provide all the lifting power and a little tail rotor to offset the aerodynamic torque generated by the big rotor. Without it the helicopter would spin almost as fast as the propeller. But a quadrotor all four rotors work together to produce upward thrust and only 1/4 of the weight is lifted by each rotor. So less powerful motors are used, making it cost efficient. The quadrotor movements are controlled by varying the relative thrusts of each rotor. The quadcopter allows a more stable platform, making it ideal for tasks such as surveillance and aerial photography, attributing to its uniquely designed structure.