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DESIGN AND DEVELOPMENT OF SURVEILLANCE DRONE

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Abstract - *Drones/Quadcopter is a flying robot which is unmanned aerial vehicle (UAV), controlling from ground with wireless remote controller. To fly or operate drone controller is used and camera is used to capture or record its audio-video visuals. We can used drones in various sectors like disaster rescue, in industries for fast deliveries, for surveillance, for farming operation and the military use drones to operate in critical operation while keeping operator safe.*

***Key Words*: Drone/Quadcopter, Propellers, BLDC (brushless DC) motor, Transmitter & Receiver, Remote Controller, Gas Sensor.**

1. INTRODUCTION

An Unmanned Aerial Vehicle (UAV) is an aircraft without a human pilot on board & a type of unmanned vehicle. UAVs are a component of an unmanned aircraft system (UAS); which include a UAV, a ground-based controller, and a system of communications between the two. The flight of UAVs may operate with various degrees of autonomy, either under remote control by human operator or autonomously by onboard computers.[6]

Compared to crewed aircraft, UAV were originally used for missions too "dull, dirty or dangerous" for humans. While they originated in mostly military applications, their use is rapidly expanding to commercial, scientific, recreational, agricultural, and other applications such as policing and surveillance, product deliveries, aerial photography, smuggling and drone racing. Civilian UAVs now vastly outnumber military UAVs, with estimates of over a million sold by 2015.[6]

This project utilizes the ground-breaking research and technological advancement to make a Co-Axial rotor with an Improved Blade Design to increase the Lift, Thrust and Efficiency of the air screws alongside diminishing the sound of the blades cutting through the atmosphere by a BERP design rotor tip extension inspired by the fins of Blue Whale.[6]

A four-blade propeller is attached at the tail boom of the drone thus, pushing the drone at the phenomenal speed. The Axial holder along with the swash plates of the Co-Axial rotor is directly imported from the X-2 Design by the Sikorsky Aircraft Corporation, America Inc. to provide extreme agility and maneuverability to the drone in hostile situation and rough climate.[6]This drone can be easily modified for procurement of goods, emergency services, surveillance and War time usage.[6]

2. LITERATURE REVIEW

UAVs are often preferred for missions that are too dangerous for manned aircraft. They have been and are mostly found in military and special operation applications, though UAVs are increasingly finding uses in civil and recreational applications, such as policing and surveillance, aerial filming, and drone racing. Conventional helicopters endure of many disadvantages such as intensified weight and cost, restriction of aero dynamic structure, and displacement of Centre of gravity. A coaxial helicopter overcomes most of the disadvantages of a single rotor helicopter with a better dynamic stability. The purposes of the drones have been exemplified by the rising advent of technology.[1]

Camera fitted drones are now easily affordable to the public. The resulting proliferation of the aerial gaze raises a series of critical issues, ranging from the changing regimes of visibility across the urban and rural space to novel the risks and dynamics of control implied by current drone developments. Drone technology has become smaller and much more affordable. Originally developed for the military purposes, drones now have manifold civil applications and can be flown with little or no training. This development gained momentum especially since the start of 21st century.[2]

Keeping in view of these facts, a crop monitoring and pesticide spraying UAVs are developed consisting of an automated drone system and sprinkling system with multi spectral camera. The sprinkling system is attached to the lower region of the UAV which has a nozzle beneath the pesticide tank to sprinkle the pesticide towards downstream. First monitoring is done by multi spectral camera, the

camera scans the whole crop field and generates a spatial map.[3]

SR NO	LITERATURE SURVEY	DATE OF PUBLICATION	AUTHOR NAME	STUDY TOPIC
1	Surveillance Drone	10th Oct 2015	Ravi Jangir, Dr A D Desai, H S Bawisker	We have studied various advantages of drone.
2	An innovative design and development of surveillance drone.	8th oct 2015	S.Pedroz o, F.Klauser	We have studied the concept of surveillance drone.
3	Review on application of drone system in precision agriculture	2015	U M Rao Mogili, B B V L Deepak	The important significance of drone in agriculture

3. PROBLEM DEFINATION

Today we are facing some problems regarding security of people and how we can be more responsive and quicker towards any problem or disaster. Some problems are mentioned below:

1. Surveillance:

In cities like Mumbai, many crowded and narrow streets exist, as sometimes it becomes difficult for patrolling the area for the police. Surveillance becomes hard when there are obstacles and when narrow streets are present.

2.To minimize robbery cases:

Nowadays police rely heavily on CCTV cameras as a proof of crime. Sometimes even observing the CCTV footage doesn't help the police and identity of thief is not known. It delays the further process.

3. Maximum Drones don't alert the situation:

If there is a case of fire in a nearby area or smoke has been detected, maximum drones don't alert the pilot about the fire. Thus, a situation can be avoided when the fire is less.

4. OBJECTIVES

The main purpose of this project is to overcome the above problems and make improvements in the surveillance.

1. It uses Wi-Fi direct camera so that it can record videos and capture images.

2. To easily identify the thief because of good quality camera installation.

3. A good quality sensor like smoke sensor can be installed on the drones to overcome the problem of smoke detection.

5. WORKING AND COMPONANT SPECIFICATION

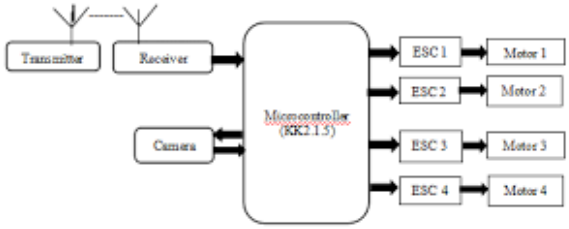

Fig-1: Block Diagram

A Quadcopter is made up of four arms on which four motors are fitted which lifts the drone. Motors are connected to the ESC (Electronic Speed Controller) for speed controlling. The ESC is connected to KK2.1.5 controller board which is connected to the fly sky receiver. The fly sky receiver is connected to flight controller which gets signal from RC Transmitter the controller can be manually controlled.

KK2.1.5 board comes with ATMEL mega 664PA, 8bit AVR architectures primarily based microcontroller with memory of 64K, for activating or deactivating the KK2.1.5 board there is associated degree audio warning from the piezo buzzer. The board has eight motor outputs, five management inputs, polarity protected voltage device inputs, six axis accelerometer or gyroscope, associate degree liquid crystal display, ISP header, and a fuse protected piezo output.

The KK2.1.5 controller is a flight control board for multi rotor aircraft like Tri-copter, Quadcopter and Hexa-copter. The Atmega644PA IC unit then process these signal according to users macrocodes and passes the signal to the electronic speed controllers (ESCs).These signals instruct the ESCs to make fine adjustment to the brushless dc motors rotational speed which in turn stabilizes quadcopter.

The KK2.1.5 multi rotor panel to boot uses signals from your radio systems receiver and passes the signals to the Atmega644PA IC via the surface throttle and rudder inputs. Once this info has been processed the IC can send varied signal to the ESCs that successively regulate the movement speed of every BLDC motor to induce controlled flight (up, down, forward, backward, left, right). ESCs module is the interface between BLDC motor and the controller. Remote transmitter is connected wirelessly using radio frequency of range 2.40 to 2.47 GHz. Receiver receives the wireless signal and the flight is controlled.

The gas sensor is fitted on the frame which can sense gas or smoke and alert to the operator by a buggering sound in order to avoid the disaster. Wireless camera is used to capture the image and live video streaming while flying. Camera transmitter and receiver are connected by a Wi-Fi module.

Table-1: Component Specification

Sr No	Parts	Specification
1.	Frame	450 mm
2.	DC motor	1400kv
3.	KK2.1.5 Board	IC:ATmega644PA
4.	Propeller	10x4.5"
5.	ESC	30A
6.	Li-Po Battery	2200mah, 25C
7.	RC Transmitter	Flysky FS-i6
8.	Gas Sensor	10-1000ppm

6. RESULTS

With an inbuilt wireless camera attached to the system we can use it for better surveillance. It has a gas sensor attached on it can sense any leak gas molecules and alert the operator on ground so the disaster can be avoided.

7. CONCLUSIONS

There are many places like mines, industries, radiation places were human has to risk their life. They have to face high degree temperature, heavy radiation, change in climate condition, toxic gases which can harm their life's. The use of remote controlled surveillance drone is the solution to this problems.

8. FUTURE SCOPE

- Drone technology is developing continuously, Quadcopter are used for fast deliveries, surveillance, Crops Fertilization and in military operation.

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BIOGRAPHIES

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