

# **Military Surveillance Drone**

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**Abstract:** *The goal of this project is to create and deploy a military surveillance drone that can perform autonomous aerial monitoring, reconnaissance, and data collection in high-risk or sensitive locations. To record live video, identify dangers, and securely send data to a ground control station, the system combines high-resolution cameras, GPS navigation, wireless connection, and onboard sensors. Using lightweight materials and effective propulsion, the drone is designed to function with stability, extended endurance, and enhanced manoeuvrability. This project intends to help military objectives, including border monitoring, tactical planning, and disaster response, by offering continuous aerial surveillance without endangering human life. The suggested architecture offers an affordable, portable, and dependable answer for contemporary military surveillance requirements, making it appropriate for practical defensive applications as well as upcoming improvements like AI-based object identification and autonomous decision-making..*

**Keywords:** *surveillance drone*

## **I. INTRODUCTION**

Drones have been acknowledged as crucial tools in a number of recent conflicts, including the Israel-Iran conflict, the India-Pakistan War, and the Russian invasion of Ukraine. Nowadays, most combat-ready drones are operated remotely. Drones are somewhat automated, but because of ethical and technical concerns, operators are still needed. The greatest benefits of drones from a tactical standpoint are their low cost and widespread use. These two benefits, however, only apply when the drone is intelligent—that is, when it can be directed without an operator.

These military surveillance drones are Unmanned Aerial Vehicles (UAVs) that are outfitted with cutting-edge sensors to collect intelligence, deliver real-time battlefield data, and improve situational awareness without endangering human life. This drone is outfitted with cutting-edge cameras, sensors, and other technologies to assist a variety of military tasks, detect possible threats, and provide real-time situational awareness. By offering covert, affordable, and quick intelligence collection, particularly in dangerous or difficult-to-reach areas, they improve military capabilities.

## **II. LITERATURE REVIEW**

**A Review Paper on Military Surveillance Drone (2024)** - Analyzes cost-effective design and stability.

**Literature Review on Drones Used in the Surveillance Field (2021)** - Discusses surveillance velocity, autonomy, and history.

**Military Surveillance Drone - ijrpr (2023)** - Focuses on FPV drone components and real-time surveillance.

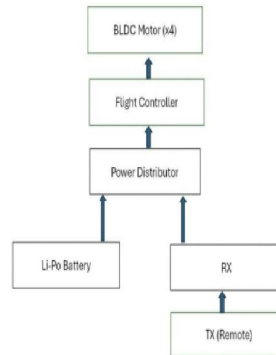
**A comprehensive literature review of autonomous-DTIC (2022)** - Evaluates autonomous capabilities for ground troop surveillance.

**Security Drone for Surveillance in Military - IJRASET (2024)** - Details the integration of flight controllers like Pixhawk.



**III. METHODOLOGY**

**A) Block diagram---**



**Fig1: block diagram of military surveillance drone**

**B) Descriptions---**To provide durability and adaptability to different mission profiles, military surveillance drones are built using a modular, ruggedised design.



**Fig2: drone frame**

An unmanned aerial vehicle (UAV) is supported structurally by a drone frame, which offers rigidity, component mounting locations, and impact resistance. In order to balance weight, strength, and aerodynamic drag for research purposes, the design usually makes use of aluminium alloys for cost-effectiveness and durability or carbon fibre for its high strength-to-weight ratio.



**Fig3: Simonk 30A ESC Controller**

A popular high-performance controller for brushless DC (BLDC) motors, the SimonK 30A ESC (Electronic Speed Controller) is designed especially for multi-rotor drones, quadcopters, and RC aircraft. It is a well-liked option for research, do-it-yourself projects, and FPV drones because of its pre-flashed open-source simonk firmware, which permits high-speed throttle response and smooth motor functioning.

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**Fig4: A2212 1400kv BLDC Brushless Motor**

Electric motors are commonly utilised in UAV drones, and their selection is contingent upon the type of drone, its intended usage, and the necessary performance attributes. These motors fall into two general categories: brushless DC motors and brushed DC motors. Because of their dependability and efficiency, brushless motors are typically utilised in the majority of UAVs.

These motors are essential parts that provide the drone the thrust it needs to launch its propellers into the air. The power rating and size of drone motors vary according to the needs of unmanned aerial vehicles (UAVs). By reducing the drone's overall weight, these motors are made small and light for optimal performance and efficiency.



**Fig5: Orange-Lipo-2200mAh-12V-Battery**

Orange's 2200mAh lithium battery pack is an inexpensive, high-power-density lithium polymer battery that offers excellent performance and dependability. These LiPo battery packs are excellent for powering do-it-yourself RC vehicles, quadcopters, drones, and other kit. The XT-60 type discharge connector and the JST-XH style balance connector are used in these batteries. These LiPo batteries feature IR-matched cells. They have heavy-duty discharge leads, which are crucial for reducing resistance and supporting large current loads.

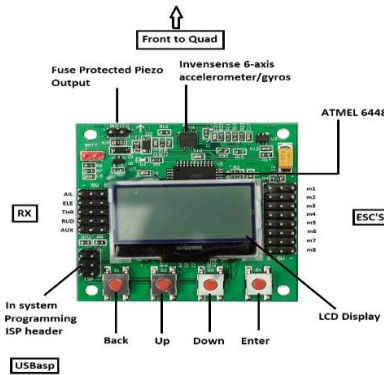


**Fig6: propellers 9 inch**

propellers for UAVs and drones. Devices called propellers convert rotational motion into linear thrust. By rotating and producing an airflow, which causes a pressure differential between the propeller's top and bottom surfaces, drone propellers give the aircraft lift. An essential component of a drone's flight system.



By creating a pressure differential between the propeller's top and bottom, propellers spin to produce lift. The air is accelerated in one direction by this pressure differential, which opposes gravity. Propellers aid in keeping the drone stable and under control. The drone can go in various directions thanks to its propellers. A drone's performance is influenced by its propellers' size, pitch, number of blades, and composition.



**Fig7: KK2 Multi-rotor LCD Flight Control Board**

**Sensor Fusion & Stabilisation:** The board calculates orientation using data from the accelerometer and 6050 MPU gyro, giving novices stable, self-levelling flight control. **PID Tuning & Control:** Proportional-Integral-Derivative (PID) parameters can be adjusted on-screen to improve stability. **Input/Output Handling:** To control motor rotational speeds and enable yaw, pitch, and roll, it receives PWM signals from conventional RC receivers and transmits commands to electronic speed controllers (ESCs). **Integrated Interface:** Instant configuration, sensor calibration, and receiver testing are made possible by the four buttons and onboard LCD screen. **Safety features** include a piezo buzzer to indicate board condition and provide low-voltage alerts, as well as a voltage sensing header.



**Fig8: ESP 32 cam**

Generally speaking, the term "ESP CAM" refers to a group of camera modules built around the ESP32 microcontroller that are especially intended to incorporate Bluetooth and Wi-Fi capabilities with a camera system. The most popular of these modules is the ESP32-CAM, a small, reasonably priced development board that integrates a camera with wifi. communication capabilities, making it appropriate for a range of Internet of Things (IoT) initiatives. Based on the ESP32, the ESP32-CAM is a compact, low-power camera module. It has an inbuilt TF card slot and an OV2640 camera. Wireless video monitoring, Wi-Fi picture upload, and other intelligent Internet of Things applications can make extensive use of the ESP32-CAM.



**Fig9: Fly Sky FS-CT6B 6 Channel Drone Remote Control**



For quadcopters and multi copters that need 6-channel operation, the CT6B FLYSKY 2.4GHZ 6CH TRANSMITTER radio is an affordable entry-level 6-channel transmitter. With two retract switches and easily accessible proportional flap knobs for channels 5 and 6, this radio has a highly lightweight and practical design.

**\C] How to construct a drone--**

Step 1: Select a frame.

Step 2: Choose the motors and propellers.

Step 3: Select a flight controller in Step Three.

Step 4: Choose the transmitter and receiver in step four.

Step 5: Select a battery and power distribution system in Step Five.

Step 6: Correctly assemble the parts on the frame.

Step 7: Put the camera and motor together on the frame.

Step 8: Verify whether the drone is prepared before connecting the batteries and propellers.

Step 9: Set up the flight controller and attach the drone's receiver.

Step 10: Complete the last test and take off.

**IV. WORKING**

Military surveillance drones are autonomous or remote-controlled aerial aircraft that use GPS, AI-powered sensors, and high-resolution cameras to collect intelligence in real time. By quickly surveying wide areas, sending data via radio frequencies to ground control systems for processing, and frequently interacting with security systems to identify anomalies and follow targets, they improve situational awareness.

**V. RESULT & DISCUSSION**

By replacing manned reconnaissance with flexible, remote, and persistent intelligence, surveillance, and reconnaissance (ISR) missions, military surveillance drones, also known as unmanned aerial vehicles (UAVs), have transformed modern warfare. These systems now offer real-time battlefield knowledge, enabling proactive threat detection while reducing hazards to ground forces, thanks to the quick deployment of artificial intelligence (AI) and sophisticated sensors.



**VI. CONCLUSION**

This project's goal is to monitor military areas. During military operations, there are certain locations where people cannot go for surveillance; there are also dangerous locations where soldiers must take risks in order to monitor the area and lessen the threat to their lives. With the help of the FVP mobile application, this project's 4K camera will produce



high-resolution images. Keep an eye on the specific locations' live video. We have ensured that the drone is lightweight for ease of handling. Although the drone was first created for military use, it has a wide range of possible uses. Crop monitoring, wildlife observation, industrial inspections, urban surveillance, media production, disaster management for search and rescue operations, and even teaching UAV technology and wireless connectivity in educational settings are all possible uses for it. Because of its modular and flexible architecture, it's an adaptive tool for several real-world situations where cost effectiveness, mobility, and real-time data collection are crucial.

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