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Advanced Command Module for Vehicles – Drones

Prof. Sudheer Hirolkar[1], Mr. Akshay Srivastava[2], Mr. Dannis Isacc[3], Mr. Sachin Narvariya[4]

Professor, Department of Automobile Engineering[1]

Students, Department of Automobile Engineering[2,3,4]

Dhole Patil College of Engineering, Pune, Maharashtra, India

Abstract: *The interest in using drones in various applications has grown significantly in recent years. The reasons are related to the continuous advance in technology, especially the advent of fast microprocessors control of survey systems. Photography, construction, monitoring, surveillance and transportation are mainly some the area in which the use of drones is being common. In this work we had focus on advancement and updating benchmarking for exclusive and intelligent UAV'S (drones) we survey and classify the existing works and we provide perspective for future research. In recent decades, aerial robots especially small UAVs and drones have witnessed tremendous improvements in terms of their structure, working methodology, flying features and navigation control. UAVs are highly utilized in a wide range of services such as photography, path planning, search and rescue, inspection of power lines and civil constructions, etc. This manuscript reports a wide overview and comprehensive survey of recent developments in commercially available UAV's and gives a brief note on the progress and research covered in last 10 years. The research presents a roadmap to understand the successive development of advanced drones/ UAVs in terms of their geometric structure, flying mechanism, sensing and vision ability, aviation quality, path planning, intelligent behaviour and adoptability. A literature survey is conducted systematically on 254 retrieved articles published in the last 10 years and scaled down to 96 relevant articles. In these shortlisted articles, path planning, neural network, artificial intelligence, inspection, surveillance, tracking and identification, etc. are the most relevant methodologies or applications presented. The current research is concerned about the growth and impact of UAVs/drones in the society and also inspires the newbies to carry research in this field and propose new methods to select or equip the flying robot for a specific application in various fields. This article also assists researchers in understanding and evaluating their research work in the context of existing solutions. It also helps newcomers and pilots/practitioners to quickly gain an overview of the existing vast literature.*

Keywords: Civil survey, Agriculture, Emergency service and Military

I. INTRODUCTION

Our project is to make every vehicle, an advanced command vehicle, we created this project to support Indian Law Enforcement, Fire and Rescue, and Health Emergency by empowering them with drones and provide them aerial supremacy. It is hoped it will help them save lives by speeding up response times to disasters. This Project is the first in the Indian Market that equips vehicles with a roof-mounted drone. A fully integrated visual system featuring self-centring and GPS enabled technology.

Nowadays drones serve various purposes ranging from monitoring climate change to carrying out search operations after natural disasters, Reconnaissance, Civil Surveys, Agricultural Surveys, Emergency Services, Landscaping, Photography, Surveillance and Entertainment, and if we attach it to a vehicle, it will convert it into a Mobile Recon Station.

Unmanned Aerial Vehicle (UAV) or pilotless aircraft operates with advanced components including a physical model, Ground Control Station (GCS), modern sensors and a platform for ease of communication between them. In the past, UAVs are used for civilian and military operations such as rescue and search, climate monitoring, surveillance, weather forecasting and mapping. Since the evolution of modern technology and innovations in internet, UAVs has completely changed. Nowadays, UAVs are also used in emergency evacuations during natural disasters like storms, floods and bush fires, etc

II. LITERATURE REVIEW

The recent increase in the integration of unmanned aerial vehicles (UAVs) in civilian usage stems mainly from modern technological advancements and the devices' abilities to accomplish civilian tasks in a quick, safe, and cost-efficient manner. One sector that witnessed tremendous UAV impact is the Architecture, Engineering, and Construction (AEC) industry. Among several AEC applications, UAV technology is currently being implemented for building and bridge inspection, progress monitoring, and urban planning. The following review aims at thoroughly classifying all AEC-related UAV applications within the past decade, extending the understanding of the current state of UAV implementation in the AEC domain, and outlining relevant research trends in this setting. The review follows a systematic literature assessment methodology in which peer-reviewed bibliographical databases were queried, based on specific search keywords, for AEC-related UAV applications. This study also discusses the technological components (flying styles, types of platforms, onboard sensors) to assist in better developing, integrating, and understanding the technology implemented in the AEC industry. Our search query yielded 228 articles, of which 86 met our inclusion criteria and were therefore analysed. Seven categories of structural and infrastructure inspection, transportation, cultural heritage conservation, city and urban planning, progress monitoring, post-disaster, and construction safety were identified and fully analysed in this study. The study revealed that UAV integration in the AEC domain might exhibit equal, if not, higher outcomes compared to conventional methods as to time, accuracy, safety, and costs. In terms of technology, the control styles reported were mostly autonomous and manual. Rotary wing vehicles were the predominant type of platforms in the literature. Of the rotary wing type, quadcopters were most commonly employed. Readily available, or "off the-shelf" video recording cameras and thermal cameras were most frequently mounted on UAVs, followed by LiDAR and laser scanning devices. Other sensors included Radio Frequency Identification and Ultrasonic Beacon System. The outcome of this study would benefit both AEC researchers and professionals to recognize the potentials of UAVs and understand the requirements and challenges for their successful integration.

III. COMPONENTS NEEDED

1.Sensor
2.Motors
3.Propellers
4.Flight control
5.Batteries
6.Camera
7.Wireless charger
8.Smart tag
9.R.C. Receiver

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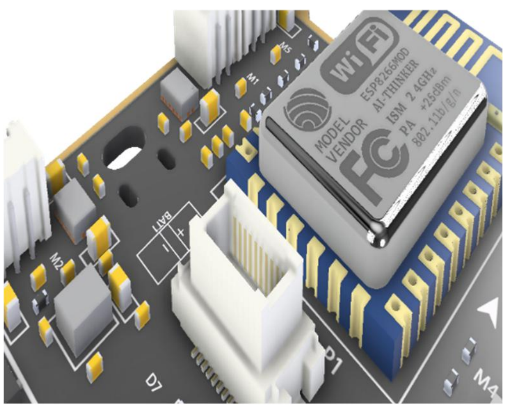
IV. METHODOLOGY

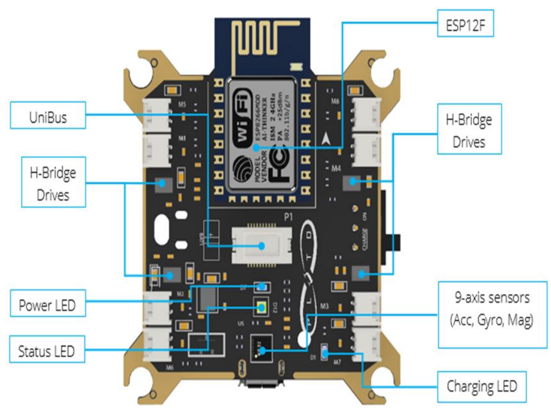
This section explains the methodology and steps carried out in the survey and the scope of research related to UAV/drones. To identify relevant articles towards the scope of research, a well-defined process is carried. The overview of published papers with the methods and concepts are explained and compared with the other types of aerial robotics.
Drone Development is divided into three sections –
Hardware can be divided into three parts:

- **Flight controllers:** Flight controllers can be thought of as the brain of the drone.
- **Parts:** These parts refer to the motor, propellers and batteries that can be used with Pluto.
- **Add-ons:** Add-ons are electronics components that you can add on your flight controller. For example, sensors, camera etc.

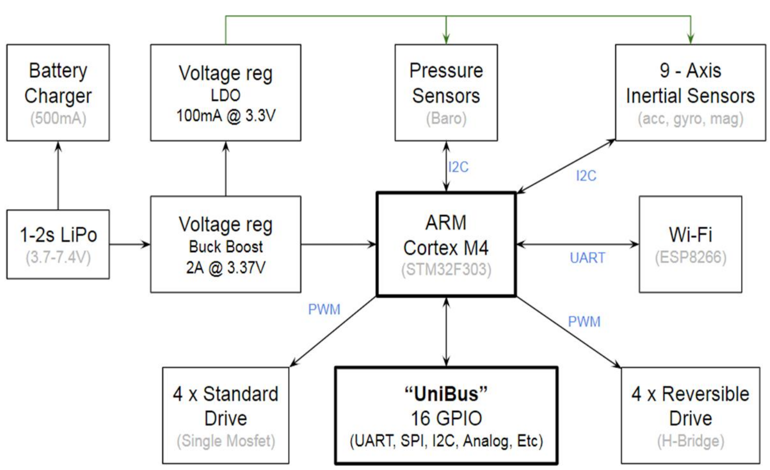
A flight controller is an electronic circuit which can be thought of as the brain of the drone. The primary function of a flight controller is to:

- Interface sensors and perform estimation
- Control Algorithms for Stability of the drone
- Motor driver (if brushed motor)
- Communication to provide commands to the drone





V. BLOCK DIAGRAM



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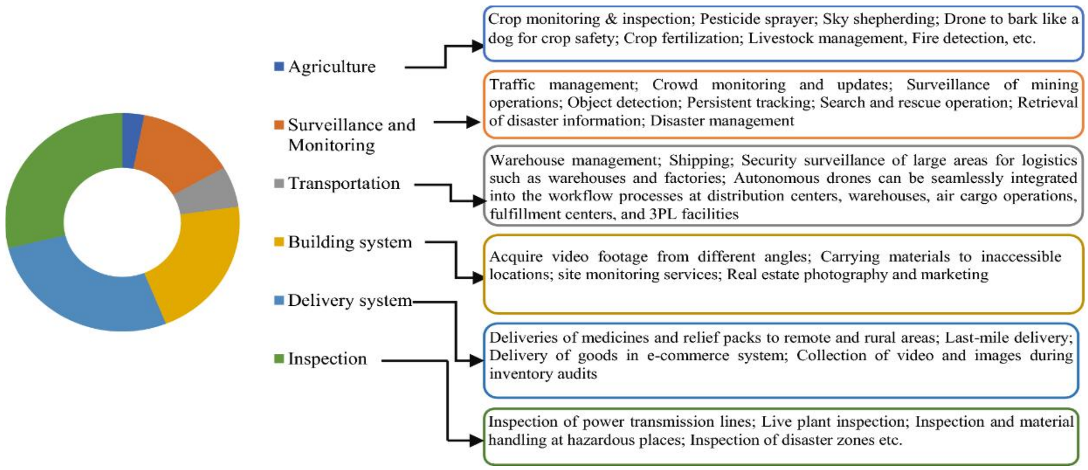
VI. APPLICATION



There are two ways program the Drone (firmware):

- Cygnus IDE – A C++ based programming interface.
- Pluto Blocks – A block-based programming software application

VII. CONCLUSION

Unmanned aerial vehicles are now being built with highly versatile technology, continually developing creative ways to provide more outstanding service. This paper provides a detailed systematic literature analysis of the context classification, UAVs specification, and applications to the respective models. The study also presents various aspects of drones such as technological requirements, drone models, parts, possible payloads and sensors. The use of UAVs is rapidly increasing in substantial civil application domains. Compared to other studies, this paper comprehensively analyses existing literature and UAV uses that accurately represented their particular civil applications while further analysing the research trends, key challenges, and potential perspectives for each category. This analysis covers the different types of drone models currently being used, their configuration and applications, and the imminent technical enhancement of UAV technology. Unmanned aerial vehicles are widely employed in precision agriculture for crop management and tracking, weed detection, irrigation scheduling, disease detection, pesticide spraying, and field sensor data collection. Artificial intelligent pollinators are a wonder in precision agriculture. In the future, UAVs will play a vital role in precision agriculture by incorporating image processing techniques such as georeferencing, mosaicking, classification algorithms, and collecting high-resolution images. The key research challenges in precision agriculture raise the opportunities and further pave the way for researchers to develop future drone applications

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