

# Future of Drone Technology in India

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**Abstract**— This paper gives an overview about the future of drone technology in India. For the development of the society in every aspect, new technologies need to be adopted. Starting from agriculture to military applications, everywhere, new technologies are implemented to increase their work capability efficiently. Human being can work limited hours per day whereas the machines with advanced technology can work 24 hours per day which helps for the increase in productivity. The drone technology is one of the emerging technologies which is rapidly increasing in the whole world. It is basically an unmanned vehicle which can fly in the sky and controlled remotely from the ground. So risk factor on human life is negligible. Anyone can transfer any objects from one place to another without taking much more time and it doesn't depend on traditional courier systems. Drone technology has many applications and due to its low cost, everyone can avail it. In India, its popularity is increasing day by day and people are accepting this as it doesn't require any advanced training to operate it. Its operation is so simple that people can control it by using mobile app. A thorough survey has been done about the various usability of drones and what its future in Indian market. The different parts and technology involved in the drones are explained. The different rules and regulations provided by government of India regarding the use of drones are also explained. The various potential manufacturers which are already established their market in India are provided. The areas which are not explored and how drone technology can be implemented there also discussed here.

**Keywords**— Technology, Industry, Unmanned Aerial Vehicle (UAV), Drone,

## I. INTRODUCTION

The technological advancement and its use in day to day activities have made the human life easier. In every field, the human being alone can't able to achieve the goal without the support of technology. The technologies are implemented in various sectors like health, education, automobiles industries, all types of manufacturing industries, emergency services, agriculture, engineering services, entertainment industry, military applications, energy industry, e-commerce, weather forecasting, environmental monitoring and so on [1]. As the human needs increase, the approach to the technology also changes. In the busy life of today's society, people try to minimize the time effect and want more work to be done with short period of time which helps in economic growth [2]. It is impossible for the human being to deliver the services at multiple places. To overcome this, various technologies are used which reduce the time burden. The drone technology is one of them which is recently adopted by various service sectors to fulfill the target easily and effectively. Usually, the drone also called as the unmanned aerial vehicle (UAV) which can fly in the sky is remotely controlled by the ground operator with the help of controller and communication systems [3]. The energy storage i.e. battery is the main source of energy to drive the drone. The solar energy is also one of the power source which is used to enhance its driving duration. The first UAV is used in 1849 which is officially registered. By seeing their popularity and with the development in technology, the updated and more efficient UAV are gradually developed. Today's UAV uses artificial intelligence (AI) technology which provides excellent performance in wider applications. There are different types of drones available based on their applications and their performances. In each and every sector, it is going to be necessary to get a position in this competitive world. It can be used both in commercial sector and also for personal use. It helps in various industries to increase the productivity, reduce the work load, strengthen the customer relations, and increase the work efficiency [4]. The technology is so advanced that it can be controlled and monitored by mobile app. Due to less expensive, the small industries can invest money on it to get a higher profit and can connect to the customers easily and efficiently. This paper explains about the various types of drones and its components. A detailed list of drone manufacturing company in India is provided. The various application areas of drone are explained and how the use of it in India can be maximized is explained.

## II. LITERATURE REVIEW

Drone technology is an emerging technology in the field of aviation. Its uses started from World War I and now it is one of the leading industries. There are different classifications of drones which are available in the market and can be differentiated in terms of the type, size, weight, power source and the degree of autonomy [5]. The drone specifications are important for its range, duration of flight, and the loading capacity. The drone needs wireless communications for control with an operator on the ground. In drone there are different system used such as fixed-wing systems, multirotor systems and other systems such as hybrid systems, ornithopters drones that use turbo fans. There are different technologies used to keep the drone flying which helps to defines the drone types. The drone characteristic is one of the determining factor in the shape level of autonomy and appearance of the drone. The autonomy of a drone can vary from full autonomous operation to fully control by a remote pilot. The size of a drone varies from the small size like an insect to the big size like a commercial airplane. Its weight varies from milligrams to kilograms. The main characteristic is its different source of energies like battery cells, solar cells etc.

An example of a drone is shown in Fig.1. There are various components used in a drone. Those components are dc motor and its controller, battery for its power, propellers, power distribution unit, flight controller and its sensor, transceiver, camera and memory card [6]. The motor is used to rotate the propellers. The electronics speed controller is required for the motor so that the drone movement can be controlled. The dc motor requires the dc power where battery helps to supply that power. The advanced rechargeable Li-ion battery is used and it can be charged during flight also with the help of solar cells mounted on the drone. The motor helps to rotate the propeller which converts rotational motion into thrust helps to move the drone. The different electronic components used in drone require power where power distribution unit helps to supply power to them. The drone motion, height and range are needed to be controlled with the help of fight controller and its sensor. The transceiver is required for the controller to send and receive the commands. The camera is also required for the different observations. The videos are stored in a memory card.



Fig. 1 Example of a drone.

## III. APPLICATIONS OF DRONE

The drone is used in various applications such as aerial photography, e-commerce shipping and delivery, geographical mapping, disaster management control, precision agriculture, search and rescue, weather forecast, wildlife monitoring, law enforcement, entertainment, public safety, civil security, traffic and crowd management, various types of surveys, data generation and so on. There is no limitation of using this technology.

Drone photography is one the interesting photography which gives beautiful images from the sky. Now a day in every occasion, photographers are using drone to take videos and photos. In e-commerce, for delivering and shipping, drones are used. So you can get anything in the same day delivery and there is fear of traffics. You can get you order within time. For geographical mapping, the use of drone is widely accepted. It makes the job easier and takes very less time for it. To control and monitor of any disaster, it is used. In such time, the area and location may not be accessible by person. It helps to locate the life which is in danger. In case of farming, drones are used for inspection of plants, thermal imaging, spreading of waters and pesticides which help in the increase of crop production. For search and rescue of life, it helps a lot during any unusual situation. In military applications also, it is used to prevent any unwanted event.

In 2014, India had imposed ban on the use of civil drones. By looking into so many applications, in 2018, the government of India has removed the restrictions about its use and came up with some regulatory policies. But still some area wise restrictions are there because of safety issues. Indians can fly the drone in India but foreigners are not allowed to use it in India.

Drone laws in India come under Ministry of Civil Aviation. The government gives some guidelines for flying a drone in India [7-9]. Those are

- All Drones except those in the Nano category must be registered and issued a Unique Identification Number (UIN).
- GPS, return to home facility, anti-collision light, ID plate, flight controller with flight data logging capability, RFID technology must be included except Nano Drone.
- A permit is required for commercial drone operations (except for those in the Nano category flown below 50 feet and those in the Micro category flown below 200 feet).
- The pilot of Drone must maintain a direct visual line of sight at all times while flying.
- Drones are not allowed to flow more than 400 feet vertically.
- No Fly Zones is defined for the Drones where no drones are allowed in that area. Those areas are airports, international borders, Vijay Chowk in Delhi, State Secretariat Complex in State Capitals, strategic locations, and military installations.
- It is mandatory to take permission to fly the drone which can be obtained by filing a flight plan and obtaining a unique Air Defense Clearance (ADC)/Flight Information Center (FIC) number.

The drones are categorized based on their weight such as:

- Nano Drone:  $\leq 250$  grams.
- Micro Drone: 250 grams to 2kg.
- Small: 2kg to 25kg.
- Medium: 25kg to 150kg.
- Large:  $> 150$ kg.

Till March 2019, the Ministry of Civil Aviation (MOCA) has registered 19,553 for fly in Indian sky.

#### IV. DRONE INDUSTRY IN INDIA

By looking into Indian market, a lot of company has stated for manufacturing the drone. Till now, around more the 40 manufactures are making drone in India [10]. Some of them are explained.

➤ Aarav Unmanned Systems

This manufacturer started in Bengaluru in 2013. It is specialized in image processing, 3D mapping and precision agriculture.

➤ Cron Systems

This manufacturer started in New Delhi in 2016. It is a border defence manufacturer. Cron leverages IoT technology in building intrusion detection systems.

➤ Detect Technology

This company has started in 2014 in Chennai. A completely automated remote control system is developed and manufactured by this company. It raised \$3.30 Mn Series A from SAIF Partners, Bharat Fund and others.

➤ Drones Tech Lab

It started manufacturing in 2016 in Kolkata. It handles both manufacturer and distributor of surveillance drones and drone camera.

➤ IdeaForge

It started its manufacturing in 2007 in Mumbai. It designs and develops its own drone. Its main focus is on surveillance and security based drone. This drone manufacturer is one of the oldest startups in India.

➤ Indrones Solution

It is also a Mumbai-based drone manufacturer. It focuses on aerial photography and videography and based on the demand, it customises its own product.

➤ Indshine

This startup company started in 2016 in Gurugram. This company focuses on visualisation in 2D and 3D in online platform.

➤ Pigeon Innovative Solutions

This company started in Mumbai in 2016. Its drone focuses on aerial photography. It is specialized in the areas of surveying, 3D models, drone inspection etc.

➤ Quidich Innovation Labs

This company started in Mumbai in 2015. It uses drones for developing end products and customises the based on the clients demand.

➤ Redwing Aerospace Laboratories

It is started in Bengaluru in 2018. Its drone technology focuses on the application of data analytics and aerial robotics.

➤ Skylark Drones

It is started in Bengaluru in 2014. It is a solutions provider for the drone applications. It provides solutions to improve productivity, safety for the mining, infrastructure and utilities.

➤ TechEagle Innovations

It is started in Lucknow in 2017. It focuses on developing drones for last-mile delivery. Zomato has taken this company in December 2019.

➤ Thanos Technologies

It is started in Hyderabad in 2016. This startup company provides drones for the application of aerial surveys and geographical mapping.

➤ The ePlane Company

Chennai-based ePlane Company leverages its deeptech platform to provide industrial drone solutions.

➤ Vizzbee Robotic Solutions

This startup company is started in in 2008. This company is oriented to provide solutions to autonomous section which helps in search and rescue missions in areas where it is difficult to for human being.

## V. CONCLUSIONS

The future of drone technology in India is explained in this paper. Its use in different applications is explained. The components required to develop a drone is explained. The rules and regulations provided by government of India are provided. A list of different statup companies in India is provided. It is an emerging technology which takes the whole market because of its usability. A further study is required to improve its range and duration of flight time. The advanced battery technology need to be used and other source of power need to be studied which can further enhance its use.

## REFERENCES

- [1] H. Thohari, P. Ayu, T. Indria and Sueb, "The Development of Technology for Human Civilization", *Third Basic Science International Conference*, pp. 1-5, 2013.
- [2] A. Naikoo, S. Thakur, T. Guroo, and A. Altaf, "Development of Society under the Modern Technology - A Review", *Scholedge international journal of business policy and governance*, vol. 5, issue 1, pp. 1-8, 2018.
- [3] [https://en.wikipedia.org/wiki/Unmanned\\_aerial\\_vehicle](https://en.wikipedia.org/wiki/Unmanned_aerial_vehicle)
- [4] <https://www.businessinsider.in/tech/news/drone-technology-uses-and-applications-for-commercial-industrial-and-military-drones-in-2019-and-the-future/articleshow/72874958.cms>
- [5] B. Vergouw, H. Nagel, G. Bondt and B. Custers, "Drone Technology: Types, Payloads, Applications, Frequency Spectrum Issues and Future Developments", Book Chapter 2, T.M.C. Asser press, 2016.
- [6] Saurav Kumar and E.Kanniga, "Literature Survey On Unmanned Aerial Vehicle", *International Journal of Pure and Applied Mathematics*, vol. 119 no. 12, 2018.
- [7] <https://uavcoach.com/drone-laws-in-india/>
- [8] <https://inc42.com/datalab/lagging-drone-policy-in-india-leaves-commercial-drone-usage-in-limbo/>
- [9] <https://www.allerin.com/blog/10-stunning-applications-of-drone-technology>
- [10] <https://inc42.com/features/these-15-drone-startups-are-flying-high-in-indias-digital-sky/>