

# New Era of Drones in India and its Future

Mohan Ramesh Mudaliar<sup>1</sup>, Sumit Ganesh Sorate<sup>2</sup>

<sup>1,2</sup>Institute of Management and Computer Studies, Thane, Maharashtra, India -400604

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**Abstract:** We are living in a 21<sup>st</sup> century and Drones have their plethora of advantages and that is the reason why Drones are getting more popularity among the people. Drones can be used for various purposes. Drones are the device full of features and functions that efficiently manage the time to complete hours of work in few minutes and with the same or even more effectiveness. Basically, this research paper emphasized on how effectively drones can be used in India and covers various aspects of their usage. We will be see how Drone can make our life easy and secure and how it can be implemented in India. Many organizations have already taken drones in use for recreational and commercial purposes. Drones represent a significant development in Robotic technology and recently private use of drones are started in media and now a day for delivery purposes too.

**Keywords:** Drones, unmanned vehicle, remote, India, wireless, aviation.

## Introduction:

What is Drone...?

Drones are unmanned aircraft controlled by remote controller and it does not requires special training to aviate them in air. Drones are available in many varieties, types and their cost are based on features, functionalities they provide. Drones uses smart computing devices for data capturing with the help of wireless technologies.

Drones or unmanned aircrafts have been around for centuries and were solely used for military purposes. The United States had begun to develop this technology during the First World War in 1916 and created the first pilotless aircraft. Drones are unmanned aircraft controlled by remote controller and it does not requires special training to aviate them in air. Drones are available in many varieties, types and their cost are based on features, functionalities they provide. Drones uses smart computing devices for data capturing with the help of wireless technologies.

Top drone manufactures like DJI (Dajiang) innovations, AeroVironment (NASDAQ: AVAV), Boing (NYSE:BA) continues to R&D to make their drones more better. The world-famous drone 'Predator' is developed in 1995 for the use US army.

In India there are few companies like Edell Systems, ideaForge, Skylark drones manufactures drones under make in India project. The first official Indian drone RUSTOM manufactured by DRDO had taken 1<sup>st</sup> flight in 2009 [16].

Sales of drones increased by 63% in 2014-15 and top industry using drone is PHOTOGRAPHY [1] followed by REAL ESTATE. 35% of the global drone market is controlled by US— And, according to KPCB's 2014 estimates, that makes America the largest drone market in the world. Europe controls 30%, China has 15% and everyone else controls the remaining 20%.

Indian drone market projected to grow 18% during 2017-23 [2]. With the demand for commercial drones is accelerating because of their increasing. Also have many useful functions that can be used in many more industries.

## Abstract:

There are over 35 drone manufacturing startups in India [3], developing software related to drones or providing some sort of drone service. DJI which is the very well-known and one of the popular drone brand used internationally and in India, has the DJI Spark, one of its smallest models, weighing 300grams which qualifying it for the mini category.

Other models such as the DJI Mavic Pro and Phantom, commonly used for recreational purposes and for aerial photography and videography.

All rules and regulation for flying drones in India are provided in this DGCA website [4].

**Keywords:** drones, Ariel vehicle, wireless technology, remote, India

## Uses of Drones:

India has large educated young population and most of them understand the new technologies like wireless technology. Hence use of drones in India is not a big deal now a day by following proper rules.

**Application of Technology in India:**

**I. Agricultural use.**

Drones allows the farmers to farm in modern way. drones can cut down the labour charge by doing work of many labours by itself alone. According to study 9% of agricultural industry all over the world already owns a drone [5]. the best feature of viewing crops from bird’s eye make it more useful in agricultural industry.

Along with that farmers can make use of drone for:

1. Pesticides spray
2. seeding/planting
3. health assessment for plants
4. soil variations and field analysis
5. farming area management etc.

There is a lot of chances for growth, with agricultural drones. Imaging of the crops will help farmers in growth of crops. With the data that drones record from the crops the farmers are able to analyze their crops and also make educated decisions on how to proceed given the accurate crop information. Which results in better yield.

In India farmers can use Drones for spraying pesticides. Which will reduce the labor and time. Most of the farmers are not much educated but trough the Indian government initiative we can teach farmers how to use drones and its operations. Some Drone companies in India already started making drones for farming.



Fig 1. agricultural drone

**II. Drone Delivery. –**

In today’s world more, companies trying to serve the orders to their customer as fast as possible. Using drone for delivering products can be faster and cost efficient that is replacing traditional courier services. Also, one can get live status of the delivery.

The shopping giant amazon has already implemented delivery by drone service named ‘Amazon Prime air’ in united states [6].



Fig 2. Amazon PrimeAir

A couple from New Zealand has become the first people in the world to have a pizza delivered by drone, Domino’s claims world’s 1<sup>st</sup> drone pizza delivery in 16 Nov 2016 within 5 minutes [7].

Recently in India, ecommerce giant Amazon Inc. has filed a patent application for the exclusive rights on multi-scale fiducials [8]. Fiducials are the black and white markers on any of the object for self-operating drones to identify them from different distance [8].

Fiducials are the optically recognized features often used in computer vision applications. Common fiducials are of fixed size includes grids of black and white blocks like pattern, which may be generated randomly and can be used in various applications, including localization, tracking and detecting the orientation of object marked [9].



Fig 3. Fiducials: Language of the Drones.

Amazon Prime Air is a delivery system which is designed to deliver packages within 30 minutes or earlier to the customers using unmanned aerial vehicles. The company has also conducting trials in United Kingdom (UK) to gather data for improving the safety and reliability of these systems [8]. But these systems are currently permitted to operate only during daylight hours when there are low

wind and clear visibility. These operations must be stooped during rainfall and in tough weather conditions.

### III. Fishing. -

Drones can be used for fishing by modifying some parts. As it is not always possible to fishing in deep sea, rocked places etc. AeroKontiki is the world's first, most advanced and most powerful drone used for fishing. Drone used to haul and deliver a 25-hook baited long line up to 1200 meters out of sea. By the help of autopilot system drone returns to its home or takeoff location after delivering the baits [10].

In India we can use fishing drones in a Big lakes as well as in a sea but in a good weather condition.

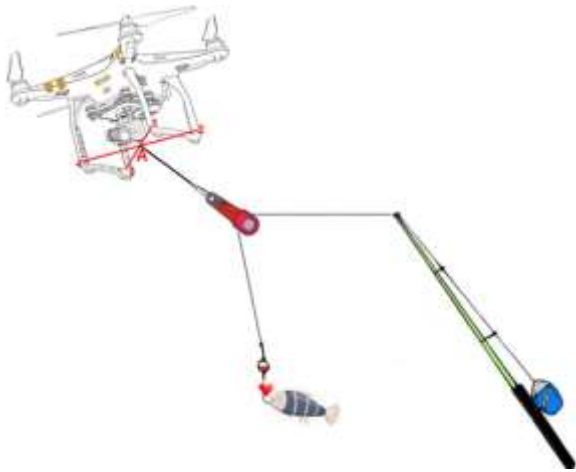


Fig 4. Structure of phishing drone

### IV. Firefighting.

Disaster management like firefighting by planes and helicopters requires extensive time and personnel training for deployment, whereas a drone can be put to work immediately, while saving valuable time in the assessment of such situations. advance technology has prograded drones to take control of such a situation. Drones that are equipped to navigate in challenging environments of solid smoke are able to locate people and exits using advances sensors, which could make a significant difference in such life and death situations [11].

These types of drone's support personnel to enter the danger zone to deal with the seriousness of the situations. Due to its capability of capturing the aerial view to get information regarding the extent of the fire, it is also possible to search for any missing persons using advanced sensors and cameras, simultaneously transferring the retrieved data wirelessly to the control room.

Drones can carry Fire hose to a certain height and can fight with fire. Drones can also carry Fire Extinguisher Ball which is used in firefighting,

Fire Extinguisher balls detect the smoke and heat in 3 seconds and effectively disperse-extinguishing chemicals. So, Drones can carry fire extinguisher balls and can drop it in fire zone were firefighter can't reach.



Fig 5. Fire fighter drones



Fig 6. Fire fighter drone holding fire extinguisher ball.

### V. Environment monitoring.

Drones have more recently begun to be used for environment monitoring including but not limited to collecting the data regarding plant and algae growth, invasive species, habitats, climate change, eco system, crop assessment and urbanization [12]. Many drones come equipped with a range of software program that help to collect data in more efficient and smarter ways. The Thermal imaging can trace rising mains and note down and detect leaks.

Photomosaics let drones cover more wider ground. Multi-spectral NDVI imaging can form accurate surveys regarding plants and vegetation [12].

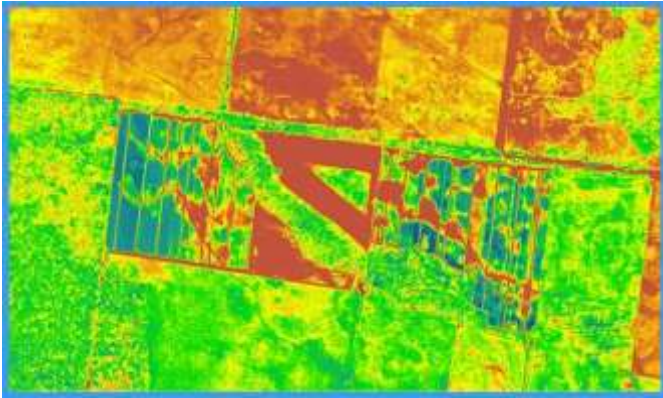


Fig 7. Thermal image captured by drone

Now, Drones can also be used to access and detect natural disasters, and may even be able to prevent and fight against the disaster. Information gathered from disaster sights can be analyzed and the best possible solution can have discovered through the data collected. In order to prevent a disaster such as a flood, a drone can make survey the defense that an area has against such occurrence in order to note down possible failures in those defenses before they happen [12].

**VI. Beach Rescue. (Baywatch) –**

A multi-rotor drone will facilitate the delivery of a flotation device that can be tethered to and released from the drone for rescue purposes. Drone can reach to the spot quickly than that of lifeguard.

Lifeguard drone will carry the lifebuoy ring and reach the place where the help is needed, it will be controlled remotely to reach the location and drop the lifebuoy ring over the drowning person who needs help. [13] This can help the person to get some support to survive till the lifeguard reaches.



Fig 8. Rescue drone

**VII. Pipeline inspection. –**

Huge pipelines made for transportation of water, gas, sewage sometimes faces a problem like blockage,

leakage, manually inspecting such an area can be dangerous and very complex. By using drones for pipeline inspection can reduce the risk and easily detect the problems. By using thermal camera which is equipped in a drone thermographic system detects to pipeline insulation and leaks the defects can be detected. The combination of visual and thermographed inspection taken using drones can discover a potentially hazardous problems before they become dangerous or financially demanding. And moreover, the system can also be used in a series of other industrial applications [14].

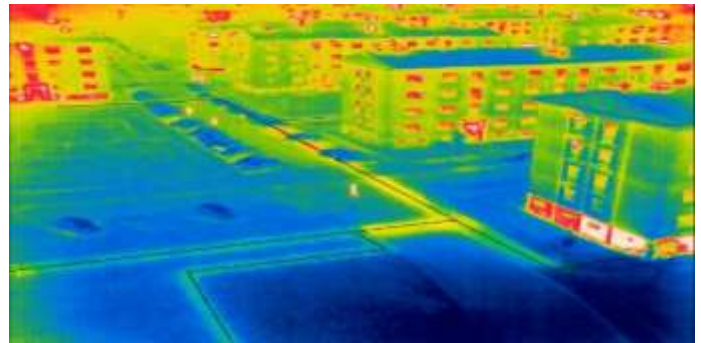


Fig 9. Thermal image taken from distance.

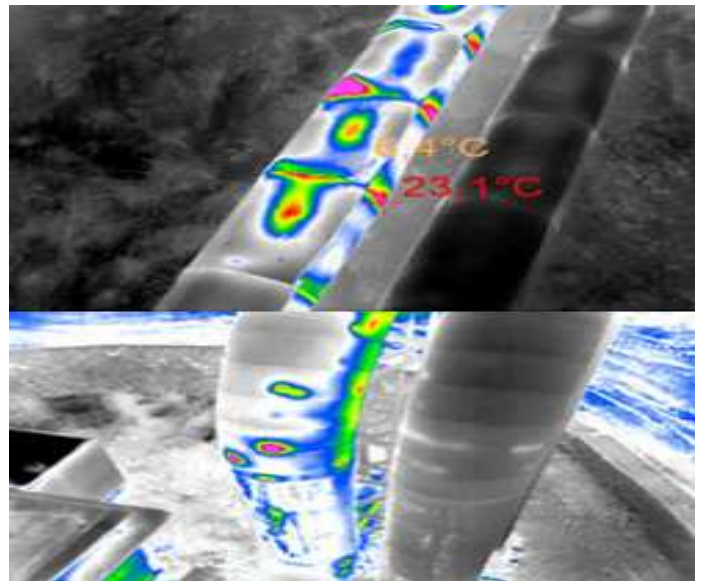


Fig 10. Thermal images of pipelines

**VII. Media/News. –**

The most common use of drone is media/news/photography industry. High definition and video stability cameras equipped in a drone provides best ever footage. Cinematographers have used the latest in camera technology to create the experience Drones! To capture those stunning panoramas and the actions, Drones

are becoming more and more popular among production companies for filming shots that require adrenalin-filled action sequences, Ariel-eye views, dramatic panoramas or 360-degree views of subjects. as of now most of the films are made with drone cameras. News agencies like CNN, CNBC and INDIA TODAY, TIMESNOW uses drone for news coverage.



Fig 11. Video shooting with drone

#### IV. Security-

Drones are primarily and mostly use for security purposes. The first drone used by US army for security surveillance [15]. Traditional methods used for observational surveillance are typically limited by the stationary nature of the camera, which is usually handled manually or by fixing in one place, Aerial surveillance can be performed using a helicopter; which is very costly. Drones are used in situations where manned flight is considered too risky or difficult. That's why most country's army make use of drone for their operations. predator drone is very famous for security surveillance. list of drones available based on their weight capacity. DRDO Netra is an Indian, lightweight and autonomous UAV for surveillance and reconnaissance operations [16].



Fig 12. predator drone

Drones used for security can carry high quality camera with a great zoom in capacity that can read a milk carton

from 60,000 feet. It can also carry less lethal weapons such as Rubber bullets or tasers. As a civilian we can also use drones for surveillance, DJI PHANTOM 3, PARROT AR. DRONE 2.0, DJI INSPIRE 1, DJI PHANTOM 3 PROFESSIONAL these are the top drones which can be used by civilians for surveillance purpose.

#### Issues Regarding Drones -

1. Drones are electronic devices that's why they cannot fly in rainy season.
2. They have a limitation of working time since they run on a battery.
3. There are chances of electrical failure and results in loss of control.
4. Since now no aviation map is available for drones there can be a chance of collision of drone with each other or with any other obstacles.
5. Relatively high cost and reduce employment.
6. Security concerns, that drones can be hackable by terrorist organization.

#### Future Implementation. -

##### Drones Courier Agency:

This idea is for a short distance courier like, with in a city with light weight parcel by drone.

There will be an Agency or a courier company which has a Drones stacked in a rack like structure, each and every drone will have its unique identity. If any person wants to courier a parcel with in a city, he/she will be contacting the courier company for drone service, he/she will be sending the location for picking the parcel and as well as the location for delivering the parcel.

The courier company will send the drone to the pickup location, there the person who wants to send the parcel will attach the parcel to the drone. Then the Drone will take off and reach the Delivery location and it will drop the parcel to that location.

All the process of this delivery system will be monitored by the Drone Courier company.

#### Conclusion.

Drones are designed to minimize time and improves quality of work. Effective use of drones or UAV can produce better results which may not be possible with normal efforts of human being. Overcoming the issues regarding drones can be a part of effective use of drones. Today's digital world and since India is big contributor of it, gives a definite better support for use of drones in everyday life.

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Sumit Ganesh Sorate  
TYMCA



Mohan Ramesh Mudaliar  
TYMCA