

DRONE: A NEW NECESSITY IN MODERN LIFE

¹Dr. Shiv Kumar Goel, ²Jyoti Chauhan, ³Anjali Dhalani

¹Deputy Head of the Master of Computer Application(MCA) Department Vivekanand Education Society's Institute Of Technology(VESIT), Chembur Mumbai Maharashtra

²Master of Computer Application(MCA)
Vivekanand Education Society's Institute Of Technology(VESIT), Chembur Mumbai Maharashtra

³Master of Computer Application(MCA)
Vivekanand Education Society's Institute Of Technology(VESIT), Chembur Mumbai Maharashtra

Abstracts: Research is on Unmanned Aerial Vehicle (UAV) commonly called 'Drone'. UAV is a small compact flying device which is an autopilot, depending upon its necessity it works on different software. What revolution it had brought and will bring in the security of the nation. What are the list of advantages in every sector, what significant role it is playing now, and its positive impact. Why it is better and more efficient than other measures and why the world is looking forward to it.

Keywords: Drone, Unmanned Aerial Vehicle (UAV), Autopilot, Revolution.

1. INTRODUCTION

A drone, in a technological terms, is an unmanned aircraft. Drones are more formally known as unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UAS'es). Drone is also named as flying robot. The aircrafts are remotely controlled or can fly autonomously through software-controlled flight plans in their embedded systems working in coexistence with sensors and GPS. The aim of developing Drone is to bring change in the method of national security and surveillance. UAVs were most often associated and planned for the military use, and it was used primarily for anti-aircraft target practice, intelligence gathering and then, more controversially, as weapons platforms. Drones are now used in a wide range of civilian operations ranging from search and rescue, traffic monitoring, surveillance, fire fighting, weather monitoring and personal drones, business drone based photography and videography, agriculture and now even for delivery services.



Figure 1: Drone

2. COMPONENTS USED IN DRONES

Serial No	Parts	Materials
1	Frame	Thermacol Foam Frame
2	Motors x4	18,500 rpm
3	Flight Control Board	Circuit plate
4	Radio transmitter and receiver	Electrical remote
5	Propeller x4	Flexible plastic material
6	Battery, Charger, Microcontroller	

Table 1: Materials used on Drone

3. SOFTWARE USED IN DRONES

UAV software called the flight stack or autopilot. UAVs are real-time and dynamic systems that require instantaneous response to changing sensor data. Examples include Raspberry-Pis, Beagle boards, etc. shielded with NavIO, PXFMini, etc or designed from scratch suchas Nuttx, preemptive-RT Linux, Xenomai, Orocros- Robot Operating System or DDS-ROS 2.0.

Flight stack overview			
Layer	Requirement	Operations	Example
Firmware	Time-critical	From machine code to processor execution, memory access...	ArduCopter- v1.px4
Middleware	Time-critical	Flight control, navigation, radio management...	Clean flight, ArduPilot
Operating system	Computer-intensive	Optic flow, obstacle avoidance, SLAM, decision-making...	ROS, Nuttx, Linux distributions, Microsoft IOT

Table 2: Software used on Drone.

4. HOW DO THEY WORK?

A typical drone is made of light composite materials to reduce weight and increase movability. Also, the composite materials strength allows it to cruise at extremely high altitude .They are equipped with state of the art infra-red-cameras, Global Positioning System (GPS), GPS guided missiles and other top critical systems. They can be either controlled by remote or a ground cockpit

.Drone come in a wide variety of sizes, some which can be launched by hand to some which require short runways. A UAV system has two main parts, the drone itself and the control system. This drone plane is usually controlled from the ground by experts(trained combat pilots or programmers). The data from drone is sent to satellites from which it is received by the ground forces to form the strategies and know vulnerable areas in the enemy's camp. Drone can fly at extremely high altitudes to avoid detections. Along with all these features it is costly too.

5. USES OF DRONES

a. MILITARY USES OF DRONES

Drones have found their way towards number of applications in the military and defense world. This is especially true in the case of the defense of the United States of America. In fact, the US Government was first known to start its experiments with the unmanned aerial vehicles way back in 1917.

1. BOMB DETECTION

By applying small size of the drones, they can usually penetrate in constricted spaces. Adding to that, effective and powerful cameras makes the drones more suitable for purposes of bomb detection. Hence, these aerial vehicles are appointed for making us aware of unexploded bombs and save lives.

For instance, In India Harshwardhan Zala, the young man referred to as India's drone whizz, who is 15 years building drones to detect and diffuse land mine. He has made 3 prototypes of drones. The drone has been armed with infrared, RGB sensor and thermal meter along with a camera of 21- megapixel with a mechanical shutter that can take high resolution pictures. The drone can also carries a bomb weighing 50gram that can be used to wipe out the landmine



Figure 2: Bomb detector Drone.

2. SURVEILLANCE

Usually defense of any country tends to conduct survey on regular bases to ensure protection of people and places. Using drones, in this case, could be an interesting idea. This reduces manual labor and you get a wider field of view. This also does not hamper the



normal lives of the people making it easier for them. In India, Indian Army team has created the drone which is known as **Quadcopter** which is used for carrying out day and night surveillance and dropping grenade on target.

Figure 3: Surveillance Drone

3. AIR STRIKES

These unmanned aerial vehicles are also used for the purpose of air strikes. It had once been confirmed by President Obama that they used drones regularly to attack militants in the tribal areas of Pakistan. They float around suspected areas, as controlled by the defense personnel or expertise, they are operated in specific areas in order to accomplish military operations. In India, on 29 September 2016 Surgical Strike was carried out by Indian Army in POK(Pakistan occupied Kashmir) that had destroyed the various terror camp and killed 38 terrorists. Drones played the most import part in this. Indian Air Force dropped 1000kgs of bombs on Jaish-e-Mohammed terror camp. Drones used by Indian Army mainly are HERON, HARPY, AEW&C, NISHNAT,RUSTOM.



Figure 4: Unmanned Aerial Vehicle

b. NON-MILITARY USES OF DRONES

1. FILMING AND JOURNALISM

The world of media has really expanded their ideas of using drones to their fullest extent. A lot of movies these days are shot using drones and other drones. This technology has given the film industry a completely new perspective and some of the movie names that come up when we talk about filmography with drones are James Bond's Sky fall, the well-acclaimed Leonard Di Caprio's The Wolf of Wall Street, the evergreen Harry Potter and the Chamber of Secrets, the popular television series Game of Thrones and the likes.



Figure 5: Drone used for filming

Journalist now has ability to reach places Where reporters cannot reach has heightened their use in the world of journalism. Aerial footage for live broadcast is nowadays in trending and blessing for filming.

In India drones are booming in film industry and as well journalism. Film like Uri:The surgical Strike(2019) movie that is based on Surgical strike that was carried out by Indian Army in 2016.In this movie filmmaker used drones to shoot the movies and as well how drones played important role during surgical strike is shown.

News agencies like India Today, CNN, Times Now uses drones for news coverage.

2. SHIPPING AND DELIVERY

The shipping and delivery applications of the drones are under process, this unique and creative idea could be revolutionary for the world. This could remarkably improve delivery times and reduce manual work. It can include delivering pizzas, couriers, or even small parcels, these programmed drones could do the work for you.



Figure 6: Delivery Drone



Figure 7 : Shipping Drone

The shopping giant company Amazon has already developed delivery services using drones names **Amazon Prime Air** in United States.

Amazon Prime Air is designed to deliver package in minimum 30-minute by use of drones. These system are currently authorize to operate during daylight hours only. And it is not allowed to use during heavy rainfall and tough weather conditions.

Lately in India, ecommerce giant Amazon Inc. filed a patent application for multi-scale fiducial. It will allow Amazon deliver drones to identify objects from diverge distance to avoid collisions and navigate better.

Fiducial are black and white marker on any objects so that self operating drones can identify that object from diverge distance.

3. DISASTER MANAGEMENT

One of the important applications for these UAV lies in disaster management. It is often seen that there is confusion and misgovern of resources shortly after a disaster, be it a man- made or a natural calamity. Drones could help you significantly here.

With modernized and powerful cameras, these devices can collect information and pictures of the debris working in a specific area.

We could get very clear footages of the accident site without having to spend a lot of money on helicopters. Adding to it, because of their small size, they are able to penetrate into places that would be difficult previously, otherwise be difficult for helicopters to enter and provide close-up views.

In India, on 2018 there was flood happened in Kerala which costed 300 people's lives. During this period drones played the crucial role like surveillance to find locating and identifying people stranded in inaccessible areas. Likewise for supply drops refer to airdropping medicines, foods, and other necessary needs. This way drones can helpin disaster management in many ways.

4. RESCUE OPERATIONS & HEALTHCARE

Normally, a rescue operation is a fight against time and life. You need to get the work done fast and smoothly. This is where drones is convenient to use. With the help of thermal sensors, drones can detect lost persons and are especially useful at night or even in challenging situations.



Figure 8 & 9 : Rescue Drones

These can be used quickly and can pass through small spaces. Not only this, but these aerial vehicles are also very useful for sending food or medical supplies to unreachable locations before the rescue team comes to help. So, drones can be the first to arrive and collect information for rescue operations and send alert rapidly.

In January Indian Railways has determined to deploy drone cameras for various railways activities that includes maintenance and monitoring of tracks and other rail infrastructure.

Recently in healthcare department, drone used for transporting blood from Remote Health Center in Nandgaon to Tehri hospital which is 32km away and it takes 50 to 60 minutes but using drone it was done within 18 minutes. So using drones we can save time.

5. ARCHEOLOGICAL SURVEYS

Over the years, a different people have spent a lots of time and energy towards archeological surveys. Drones have made work easier as they can bring important footage and essential details about these archeological sites.

This has significantly helped the archeologists in their mission of discovery.

In India, Rajasthan state is using drones for archeological survey spotted above the Amber Fort and Kumbalgarh Fort on the westerly range of Aavalli Hills. This drones circle the area around 2 historic monuments and record every details of information which is not visible to human eyes. This way information collected helps Rajasthan Government can create a complete 3D replica of monuments.

6. GEOGRAPHIC MAPPING

Drones have had also impacted areas of 3D geographic mapping. There are regions on the earth that are not easily accessible to humans. This might include some dangerous coastlines or unattainable mountain tops. But for the purpose of studying the land, preparing 3D maps and drones have been put to use.

This technology is available to everyone to capture imagery for mapping such locations. Thus, geologists now find it easier to collect data from these sites to pursue mapping processes.

7. LAW ENFORCEMENT

Drones have a lot of potential in terms of law enforcement – these devices have the basic ability of floating around places without getting much attention from the people. Thus, this can be used for surveillance or for public safety. Crowds of people can be monitored and criminal activity can be detected in case there is an emergency. These can also be used for law enforcement officials for crime scenes where a more detailed view can give us more information about the situation.



Figure 10 & 11: Police Drones

Besides, situations of fire outbreak could also be strategies by the help of drones. It is always better to send drones first in a fire places to see the situations and alert before humans get inside. Drones are used by border patrol officials who monitor criminal activity at the border especially the transport with drugs of suspected people. Uses of drones for traffic monitoring could also be another idea which will cause for rare traffic on roads. Traffic surveillance with drones could be one of the biggest applications as this keeps the police alert.

8. SAFETY INSPECTIONS

Companies have to carry out regular inspections in order to ensure security and safety of companies infrastructure. This includes oil and gas pipelines, surveying power lines, wind turbines, bridges and buildings under construction. Drones are being prepared to use

for these purposes.



Figure 12 : Safety Check Drone

Regularly monitoring can lead to improvements in constructing infrastructure leading to improved performances. Besides, if the drones are small enough, they are capable of getting close and clear imagery capturing that can show us a more detailed idea of the construction.

Honeywell is launching its drone for data analytics and inspection services in India. Using these drones oil and gas companies, can improve and modernize critical structural inspections. By these there will be reduce in manual work done by employees which increase the safety by eliminating the dangerous processes done by drones.

9. AGRICULTURE

Drones have found operations in the field of agriculture. This is especially true for large scale farmers who have reported significant improvements in crop yields with the uses of drones, farmers can detect their crops closely. Regular aerial monitoring of agricultural lands can provide us with a more in depth analysis of crop performance.



Figure 13 : Drone used in agriculture

With the help of the near infrared sensors, one could study the health of these crops and farmers could act accordingly. Moreover, drones can perform this analysis at low costs with no impacts on the fields or the surrounding areas. This not only leads to healthy crop growth, but also increases their yield.

In India, to increase agriculture production with the help of farming technologies Maharashtra state is turning to drones. Using drones we can predict crop yield as it gets the high resolution multi spectrum images which can be used with machine learning and artificial intelligence to get insight into crop health and soil condition. Data collected by drones can be combined with satellite based remote sensing data from which we can take timely action to prevent loss from crop diseases or can reduce the impact of weather changes.

10. WILDLIFE MONITORING

Just like drones are working on agricultural lands to improve their yields, these are nowadays also striving towards monitoring the fauna of the regions.



Figure 14 : Drone used for wildlife monitoring

There are two specific advantages of this. Firstly, wildlife monitoring could lead to the prevention of poaching, which is one of the reasons why animals are endangered. Secondly, the footage from the aerial devices could be helpful for students to know about their favorite wild animal's life style and behavior by analyzing their patterns. The best thing about drones using for these services is that animals do not affect or disturb wildlife and drone can immediately note their location and find any animal if such case arise. Besides, Drones also be used at mid night time with thermal camera sensors to monitor them at all times. Conservation parks and wildlife sanctuaries are thus resorting to drones to ensure safety and scope for life enhancement of animals and by continuous monitoring of health.

Nation Parks in India is trying to fully adopt the conservation drones to monitor forest mapping and animal population. As some of the national park were already tested like Assam and Madhya Pradesh, which were considered beneficial. Using drones in wildlife we can get visual data on habit of species and behavior of wild animals. We can also get the animal movement on real time basis elephants, tigers, etc. where poaching activities are likely to occur.

11. WEATHER FORECASTING

The important uses of drones lies in weather forecasting. This has, once again, given new light to the concept of predicting the weather conditions. With exceptionally powerful cameras and effective sensors, these drones are essential to collect important information that could aid in weather forecasts.



Figure 15: Drone used for weather forecasting

For example, sending drones into the hurricanes, tornadoes could bring us important footages to study their patterns and occurrences. These can focus in on detailed weather parameters and are also apt for the job owing to their unmanned nature.

In India, there are more than 300 weather, satellite and aggrotech startups which consume the consume weather data or producer of weather related information services, these weather information could be used for the airline. Using the drones IBM and SkyMet claim

that they have spotted the cyclone Fani that hits the Odisha in May at least fortnight before in made landfall.

12. AERIAL PHOTOGRAPHY

This is one first known applications of drones. By the power of improved technology, drones are now well equipped to carry heavy cameras that is really help enthusiasts in delivering views of the specific regions.



Figure 16: Drone used for Aerial Photography

Besides, the drones, these days, are stable and can give you crisp and clear images. With the features of live Wi-Fi streaming, you are also entitled to get First Person Views of the drone's movements. If you can add a gimbal, it stabilizes the camera to get you better pictures. Besides, you can control what the camera sees and captures right from your smartphone and get HD video recording for best results.

In India, now every photographer are using drones for the capturing of images or for video.

6. LEGAL, ETHICAL & SECURITY

With this increasing usage of drones, a major concern is generating in many people. Many people believe that with drone technology is in the government's hand, we will begin to lose our privacy. With no restrictions on drones, governments have the power to monitor its citizens invading precious privacy. If there would be no restrictions on drone technology, it can be expected that no one will have any privacy.

In response to the lack of restrictions on the U.S. Government and other individuals, "U.S. Representative Cynthia Lummis

(R-Wyo) joined 22 of her colleagues in introducing H.R. 6199, the Preserving American Privacy Act, which is designed to protect individual citizen's privacy from the increasing domestic use of Unmanned Aerial Vehicles (UAV)" (Lummis, 2012, P1). The Preserving American Privacy Act would protect an individual citizen's privacy through several ways. The act would "prohibit the FAA from issuing a drone permit for law enforcement or surveillance purposes unless the activity is pursuant to a warrant and in the investigation of a felony" (Lummis, 2012, P1). The FAA would also be prohibited in issuing a permit "to any private individual for person or property surveillance unless the person under surveillance has consented or the owner of the property has consented" (Lummis, 2012, P1). The bill goes further into limiting the power of the government by stating that any evidence that drones have acquired cannot be used by "federal agencies in administrative hearings" (Lummis, 2012, P1).

Beside these privacy concerns, there are also great areas of concern in the subject of security and drones. Drones can be risky because of hacking in drone system therefore making them possible security risks. In a recent talk on National Public Radio, the topic of hacking of drones was brought up. One of the people in the discussion called Raz spoke on how he was able to hack a drone that he saw flying overhead. He called this method "spoofing". Spoofing is basically matching the signal of the official controller and then increasing the strength of hackers signal allowing hacker to get control. It is not as simple as it sounds, but it is still very possible for someone to do (Hacking, 2012, P1).

Taking into consideration what Raz was able to do, what can terrorist do with this technology? Is it even safe to have this type of technology if our very own drones can be used against us? Is it even ethical to risk such a security breach in order to develop new technology? If all that would stop the government from monitoring us is a set of rules, what will stop a terrorist from monitoring us and making us become a human guinea pig? According to John Villasenor, "a senior fellow at Washington's Brookings Institution" claims that despite these several downfalls the benefits are far greater (Solash, 2012, P1). "Any new technology shakes things up a bit in terms of regulation and legislation and managing it and balancing what are usually the overwhelming benefits against a very less number of positive uses. We've notice that with the Internet, for example," Villasenor says. "I think UAVs will be similar in the sense that the overwhelming majority of applications will be beneficial"(Solash 2012, P1).

7. FUTURE OF DRONES

Recently **India** has also become the part by releasing its own drones. We can use our drone attached with camera for surveillance and parcel facilities in short distance through drone.

The new “helicopter drone” released by the US army carries a 1.8 gig pixel camera to provide crystal clear ground images even from heights. **India** is also moving forwards drone adaptation in multiple areas. The sensors inside the drones are being made sharper to provide higher aerial surveillance. In **India** FILMING AND JOURNALISM

AERIAL PHOTOGRAPHY such fields had enhanced there use of drone and many such fields in few years would also join the list. Programming software of the drone is developed in such a way that they can take its

own decision in circumstances where human error is probable. The USA uses their fleet of drones over Pakistan and Afghanistan against terrorism.

Drones have always raised the bar of the occasion whenever they were needed. They are truly an engineering masterpiece, containing the best of mechanical, electronics and software technology.

8. CONCLUSION

Drastic increasing in presence of drone technology in today’s society is quite evident and powerful. We had experienced the benefits that drone provide for us. Whenever we listen to weather there is a possibly information is received from any drone by weather forecasting. Despite the many different types of benefits drones has, drones still has some serious security and privacy risk. In consideration of these both, one must decide whether the privacy and security risks outweigh the benefits. Today’s digital world and since India is big contributor of it, gives absolute better support for use of drones in everyday life.

9. REFERENCE

- [1] https://en.m.wikipedia.org/wiki/Unmanned_aerial_vehicle
- [2] <https://www.dronezon.com/learn-about- drones-quadcopters/what-is-drone- technology-or-how-does-drone-technology-work/>
- [3] <https://sites.google.com/site/dronesrese archpaperit103008/>
- [4] www.draganfly.com/blog/introduction-to- unmanned-aerial-vehicles-uavs/
- [5] <https://www.medianama.com/2017/10/22 3-amazon-drone-patent-india/>
- [6] <https://www.bgr.in/features/karnataka- floods-2018-exclusive-look-drone- technology-helped-rescue-efforts-coorg-kodagu-august-netra-drones-ankit-mehta/>
- [7] <https://www.news18.com/news/india/in- a-first-drone-used-to-transport-blood-from- remote-health-center-in-uttarakhand-to-tehri-district-hospital-2176669.html>
- [8] <https://www.thehindubusinessline.com/news/drones-bring-new-dimension-to- archaeology/article9733675.ece>
- [9] <https://aerospace.honeywell.com/en/press-release-listing/2018/november/honeywell- launches-commercial-unmanned-aerial-vehicle-inspection-and-data-analytics- service-in-india>
- [10] <https://www.futurefarming.com/Machinery/Articles/2019/4/Indian-state-turns-to- drones-to-modernise-agriculture-413234E/>
- [11] <https://www.ranthamborenationalpark.com/blog/drones-human-cry-safeguarding- wild/>
- [12] <https://economictimes.indiatimes.com/news/politics-and-nation/weather-forecasting- in-times-of-extreme-weather-events/article show/69805112.cms>