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Regulation and Operation of Drones: A Threat to Privacy

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ABSTRACT

In the present paper, the authors seek to analyze the impact of the increased use of the drones in today's economy. Drones in technical sense refers to an unarmed aircraft or formally known as the unmanned Aerial Vehicles (UAV) or unmanned Aircraft Systems. It may also be defined as a flying robot which is monitored or controlled by with the help of a remote control or through the help of downloaded software and works in coordination with the onboard sensors and the GPS. Drones are being used for a variety of purposes depending upon the type of the drone being used, the drone can be used either for military use, commercial use or even for general civil purposes by the common public. It is this increased use of drones which has raised fears regarding the privacy of the citizens of the world and along with this there have been numerous incidents of drones causing interference in Air-traffic or there are also cases of cyber-fraud being committed through the help of drones. Privacy of individuals, being now declared as a fundamental right of the individuals across the globe, has risen as the most important concern to be solved in the modern economy. This in all and all has necessitated the need of stricter regulations being imposed on the use of drones, and countries across the world have come up with different legislations to control the disturbance created due to the use of drones. The present paper studies the extent of interference caused by drones in the context of right to privacy of the individuals in both national and international spheres. Through the scope of this paper we will try to understand the basics of drones, the uses to which it can be put, the problems with the increased use of drones, the legislations National and International and the possible way forward to manage all the activities.

Keywords: UAVs, Drones, Military, Commercial, Privacy, Cyber-Fraud, Air-traffic, Fundamental Right, Legislations, National and International Spheres.

I. INTRODUCTION

Meaning of Drones:

A drone in layman language refers to an aircraft without a human pilot on board and thus, it is

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an unmanned vehicle. It may also be known as the uncrewed aerial vehicle. The term drone was first coined in the 1920s for the Fairey Queens target aircraft. In earlier times the term drone was used to refer to the remotely flown target aircraft used by the general public to practice firing of battleship's gun. Nowadays, a drone uses aerodynamic forces to provide vehicle lift, and as a result of which it can be flied autonomously or can be flied remotely flied as well. UAV is an important component of unmanned aircraft systems, along with a ground-based controller and a system of communication between the two is established for effective functioning³. It is important to recognise the other parts of drones at this stage:

1. Standard Propellers;
2. Pusher Propellers;
3. Brushless Motors;
4. Landing Gear;
5. Electronic Speed Controllers;
6. Flight Controller;
7. Receiver;
8. Transmitter;
9. GPS Module;
10. Battery;
11. Camera.

Types of Drones⁴:

Drones as discussed above are an unmanned aerial vehicle, and it can be classified into different categories on the basis of usage, like the drones used for the purpose of photography, aerial mapping or surveillance or any other purpose. Though, for this paper we consider it best to classify them on basis of aerial platforms. There are mainly 4 types of drones on basis of aerial platforms used:

- a. Multi Rotor Drones:

³ Divya Joshi, *Drone technology uses and applications for commercial, industrial and military drones in 2020 and the future*, BUSINESS INSIDER INDIA, (May 3, 2020, 10:00 AM), <https://www.businessinsider.in/tech/news/drone-technology-uses-and-applications-for-commercial-industrial-and-military-drones-in-2020-and-the-future/articleshow/72874958.cms>.

⁴ Jojo, *Types of drones- Exploring the different models of UAVs*, CIRCUITS TODAY, (May 3, 2020, 10:30 AM), <http://www.circuitstoday.com/types-of-drones>.

These are the most common drones available and as well as used for both professional reasons and hobby reasons alike. They can be used for purposes such as Surveillance, Mapping or photography, leisure flying and the features which make them most feasible out of 4 are that they are easily manufactured and cheapest as well. They can be further be classified on basis of number of rotors, such as 3,4,6 or 8. Though, all of this they suffer from limitations such as limited flying time, speed or endurance and are unsuitable for long term projects as well.

b. Fixed Wing Drones:

These are considered as entirely different from the Multi Rotor Drones; in fact, these are built on model similar to that of an aircraft. These do not use energy as a source to increase the flying time of the drone. The downside with these types of drones is the increase expenditure, requirement of runways or a catapult launcher in addition to higher skills of flying drones as well.

c. Single Rotor Drones:

These drones are similar to the helicopters, with one large rotor and one small rotor on the tail of the drone. These are considered as more efficient than Multi Rotor Drones and take help of gas engines to increase flying time. In aerodynamics, the lesser number of rotors results in lesser spin of object as well. Despite, of this it suffers from limitations such as the higher complexity, operational risks and increased costs as well. They are more prone to fatal accidents than the rest of the drones.

d. Hybrid VTOL:

These are considered as hybrid versions, which combine the benefits of Fixed Wing Models and of the Rotor Based Models. These have been used since the 1960s but not much success had been achieved till the time of new generation sensors. They are a play of automation and manual gliding combined.

Use of Drones⁵:

The drones are being used by defense organisations and consumers for a number of years, but the use of drones is not restricted to merely these uses. Drones with increased accessibility, costs saving mechanisms, safe usage in process of data collection to delivery have emerged as a more feasible option to do high risks job or job with high payment. The emerging global market for business services using drones is valued at over \$127B according to Pwc. Thus, the various industries to which the drones are being put to use are as follows:

⁵ Ibid.

1. Defense:

Drones have been used in aerial military operations from decades, but now the ground military forces have begun use of drones extensively. They use of drones for a variety of purposes such as the surveillance or tactical operations, offensive operations or various other purposes as well. This use of drones has increased the expenditure of military on the technology from \$4B to \$9B since 2014.

2. Emergency Response:

The innovations in the camera technology can be considered as a reason for increase in use of Drones, the UAVs with thermal imaging cameras have enabled the authorities to reach and provide help to the people who otherwise would not be visible through naked eyes. There have been continuous innovations made in this particular field, which gives us all hope that through use of drones the survival rates in both rural and urban areas could be increased around the world.

3. Security:

Drones do act as further enhancer of the available security mechanisms all around the world. The security companies all around the world are trying to inculcate drones in their schemes, as the camera technology enables the customers to keep a check on their house in any event of alarm going off in their absence. Sunflower Labs a company in this field is preparing a drone system which would be capable of scanning any suspicious activity and alerting the householders or even file a police report.

4. Education:

It is true that it is not very far that drones would be a topic in school student's curriculum. They would be taught technology of drones, how to build and repair them and all other essential details. In fact, some universities in western countries are using drones as a mean to keep a check on ongoing lectures and are even using them in examination to act as invigilator.

5. Journalism and News Coverage:

The field of news coverage is another field which has been enriched with the use of drones in the purpose. There have been change in the regulations regarding coverage of news which has enabled the channels to discover and present those facts of the story which were earlier not possible due to any kind of reason such as the safety issues, high costs, physical barriers or etc. The use of drones has made the world more aware about the events happening all around the world.

6. Air Travel:

This is a field which has suffered both advantages and disadvantages from the increased use of drones. The advantage is that they have allowed the authorities to regularly inspect the condition of their planes, it has helped them to locate planes in time of crash. However, it has suffered from disadvantages such as the situation of Gatwick Airport which had to be closed for 36 hours due to interference caused deliberately by drones flying near the airport.

Thus, though the drones are being progressively used in various sectors of the industry, there are certain inherent problems caused with the increase flying of drones, which we will study later on in the paper.

II. INTERNATIONAL COMMERCIAL DRONE REGULATIONS

With the evolution of the UAVs, countries across the world are struggling to keep up with new uses, capabilities and technology. Approaches to regulation differ dramatically countries, but the elements of regulation are largely the uniform with imposing restrictions on drone mass, drone altitude, drone use, and pilot license. Regulations in a country are often dictated by whether a country favors the promotion of new technology or a safety-first approach.⁶

The International Civil Aviation Organization (ICAO), the United Nation's aviation agency is the lead platform in the international sphere of governance of drones. In 2011, the ICAO issued Circular 328 and subsequently developed the Remotely Piloted Aircraft Systems (PRAS) Manual. In the Circular 328, the ICAO called upon the states to provide comments with respect to drone applications and usefulness to develop fundamental international regulatory framework through Standards and Recommended Practices (SARPs) with supporting Procedures for Air Navigation Services (PANS) and guidance material, to underpin routine operation of UAS throughout the world in a safe, harmonized and seamless manner comparable to that of manned 33 operations.⁷ Further, drones are actively being used by the United Nations, for example the United Nations Children's Fund partnered with the Malawian government and launched Africa's first humanitarian drone testing corridor to test the utility of UAVs in generating maps to monitor disasters, extend internet services or cell phone signals and assist in transport of important supplies. In addition to delivery of essential commodities, drones are also being used to monitor crises by capturing images and videos from the skies. This newly obtained data is then given to various organisations to help them find safe routes

⁶ Therese Jones, INTERNATIONAL COMMERCIAL DRONES AND DRONE DELIVERY SERVICES, (RAND Corporation 2017).

⁷ *Regulation of drones*, LIBRARY OF CONGRESS, (6 May 2020, 1:00 PM). <https://www.loc.gov/law/help/r-regulation-ofdrones/regulation-ofdrones.pdf>.

for disaster evacuation and to design effective developmental policies.⁸

1. United States of America

The USA practically dominates the world usage and manufacturing of drones. The legislature passed the Federal Aviation Authority Modernization and Reform Act, 2012 to develop a comprehensive plan to safely accelerate the integration of civil unmanned aircraft systems into the national airspace system.⁹ Therefore, at present the operation of drones in the USA is regulated by the Federal Aviation Authority (FAA). Any federal, state or local agency wanting to operate a drone in national airspace needs a certificate of authorization from the FAA, whereas the commercial use of drones is prohibited except in case of compliance with FAA regulations and guidelines for private commercial use and the state-specific guidelines.¹⁰

For commercial flying of drones, Part 107 of the Code of Federal Regulations provides that it is mandatory for an operator to obtain a Remote pilot certificate from the FAA and register their UAV. The UAV should weigh less than 55 lbs at the time of take-off and must fly at or below 400 feet during daylight¹¹ at a speed of maximum 100 mph. It is also obligatory for such drones to give way to manned aircrafts. The remote pilot is prohibited from flying over people unless the human being is directly participating in the operation of the UAV or located under a covered structure or inside a stationary vehicle that can provide a reasonable protection from a falling UAV.¹² No drone shall be flown over a moving vehicle, unless it is in a sparsely populated area.¹³ Further, § 107.31 provides that the UAV must be kept within the vision of sight of the drone operator. This restriction on beyond visual range operations rules out implementation of drone deliveries since up to several kilometers to the frustration of companies like Amazon and Google, and delivery is specifically left out of the ambit of possible waiver under Part 107.¹⁴ Although the conditions are mandatory in nature, the FAA has discretion to grant certificate of waiver, allowing a deviation from the requirements, upon application of the drone operator as given in Part 107.

2. Germany

In German law, drones fall under the term aircraft according to the German Air Traffic Act

⁸ Anne Rosenthal, *Drones for development: How UAVs are supporting global goals*, UNITED NATIONS FOUNDATION, (6 May 2020, 1:30 PM), <https://unfoundation.org/blog/post/drones-for-development-how-uavs-are-supporting-the-global-goals/>.

⁹ Melanie Reid, *Grounding drones: Big brother's toolbox needs regulation not elimination*, Vol. 20 No. 9 RICHMOND JOURNAL OF LAW AND TECHNOLOGY (2014).

¹⁰ Ibid.

¹¹ Part 107, § 107.29.

¹² Part 107, § 107.39.

¹³ Part 107, § 107.25.

¹⁴ Peter Sachs, *Commercial drone law*, DRONE LAW JOURNAL (2016).

(Luftverkehrsgesetz or LuftVG). Consequently, the provisions of general aviation law like the Air Traffic Regulation (LuftVO), the Air Traffic Act (LuftVG) and the Air Traffic Approval Regulation (LuftVZO) apply to the civil use of drones. The German Federal Aviation Authority (LBA) is responsible for monitoring and ensuring compliance with the laws and regulations concerning UAVs.

Drones are exempted from type certification and, therefore, are not identified through a marking system used for manned aircraft. Although it is required for the owner of a drone with a maximum take-off weight (MTOW) of 0.25 kilogram or more to affix to the drone a permanent and fireproof badge with details of their names and address at a conspicuous place before it is operated for the first time to ensure that in the event of damage caused by a crash or a collision with other aircraft the person responsible can be prosecuted.¹⁵ The remote pilot must obtain permission from the LBA in the following situations:

- i. If the take-off mass exceeds 5 kilograms;
- ii. for rocket-powered drones, if the mass of the propellant exceeds 20 grams;
- iii. for internal combustion engine-powered drones operated at a distance of less than 1.5 kilometers from residential areas;
- iv. for drones taking off at a distance of less than 1.5 kilometer from the perimeter of aerodromes. At aerodromes, the operation of unmanned aviation systems and flight models also requires the approval of the air traffic control (ATC) authority and the aerodrome management; or
- v. for the operation of drones at night¹⁶

The following types of drone operations are prohibited:

- i. beyond the sight of the operator if the MTOW of the drone is 5 kilogram or less;
- ii. at a height and lateral distance of 100 meters from crowds, accident scenes, disaster areas and other operation sites of authorities and organisations with safety or security missions as well as mobile establishments and troops of the army;
- iii. at a height and lateral distance of 100 meters from the outer boundaries of industrial facilities, prisons, military facilities, energy production facilities;

¹⁵ Air Traffic Approval Regulation (LuftVZO), Art 19.

¹⁶ Air Traffic regulation (LuftVO), Art 21a.

- iv. at a height and lateral distance of 100 meters from governmental authorities, embassies and consulates and police facilities;
- v. at a height and lateral distance of 100 meters from federal highways and railway facilities;
- vi. over certain nature reserves;
- vii. over residential estates if the MTOW of the drone exceeds 0.25kg or if the device or its equipment is able to receive, transfer or record optical, acoustic or radio signals, unless the owner of the premises or the resident has expressly consented to the overflight; and
- viii. at a height and lateral distance of 100 meters from the boundaries of a hospital.¹⁷

On 24 May 2019, the European Commission adopted Implemented Regulation 2019/947 on the rules and procedures for the operation of unmanned aircraft with effect from 1 July 2020. This regulation intends to harmonise the regulations on unmanned aircraft throughout the European Union. According to the Implementing Regulation (EU) 2019/947, there will be a subdivision of drones into the operating categories ‘open’, ‘special’ and ‘certified’, on the basis of which the permit requirements will be determined.¹⁸

3. China

The Civil Aviation Administration of China (CAAC) is vested with the authority to regulate operation of UAVs in China. On May 16 2017, the CAAC promulgated the Regulations on the Registration of Unmanned Aircraft Real-Name System, which stipulates that the any UAV with the maximum take-off weight of 250 grams must be registered. All drones weighing between 7 kilograms to 116 kilograms are required to obtain a license from the CAAC. If an operator wishes to employ drones for commercial purposes, he is compulsorily required to attain a license from the Authority. UAVs weighing over 116 kilograms shall be operated upon receiving a license and certificate for operation.¹⁹

Additionally, the Regulations provide that the remote pilot must not fly beyond the visual line of sight or above 394 feet. Flight in densely populated areas or around airports, military installations or other sensitive areas such as police checkpoints or sub-stations is not allowed without prior approval from the CAAC. All drone operations are subject to no-fly-zones

¹⁷ Air Traffic Regulation (LuftVO), Art 21b.

¹⁸ Urwantschky Dangel Borst, *Drone regulation in Germany*, LEXOLOGY (May 9, 12:00 AM), <https://www.lexology.com/library/detail.aspx?g=cfc3615a-37a8-45f3-892e-a46f0ce10865>.

¹⁹ Gaundong Provincial Public Security Department, *Interpretation of several issues in the circular for strengthening the safety of unmanned aerial vehicles*, GUANDONG PROVINCIAL PUBLIC SECURITY DEPARTMENT, (May 9, 2020, 10:00 PM), http://gdga.gd.gov.cn/xxgk/zcjd/wjjd/content/post_1089094.html.

(NFZs) as designated, including Beijing. In 2019, the Shenzhen DJI Technology created NFZs in areas around airports in about 32 European countries including Estonia, Croatia, Greece, Germany, United Kingdom and France.²⁰

4. Canada

Transport Canada is the authority responsible for the regulation of all drone operations other than military operations. All drone pilots are required to abide by the Canadian Aviation Regulations (CAR). All drones having MTOW between 250 grams and 25 kilograms must be registered, drones weighing less than 25 grams are not required to be registered. Drone pilots must carry a valid drone pilot certificate and only fly drones that are marked and registered.²¹

Pilots must fly drones within their visual line of sight below 400 feet in the air. There shall be a minimum horizontal distance of 30 metres for basic operations, away from the bystanders. Drones must be flown 5.6 kilometres away from the airport and 1.9 kilometres from the heliports. No drone operations are allowed in uncontrolled areas or near airplanes, helicopters and other drones.²²

III. LEGISLATIONS IN INDIA REGARDING USE OF DRONES²³

It has been observed that with the progressive use of drones in all the industries of the world, there is a need of regulating the flying of drones. The first regulation which came into force was in 2013 in Florida, Texas, Virginia, North Carolina, Montana and etc. The aim of a legislation is to restrict the use of drone's technology by government but at same time allowing the government to conduct surveillance without use of drone technology. The need of the legislation has also been recognized due to the need of protecting the privacy of the Individuals, which is considered as a Fundamental Right of Individuals. The regulations regarding flying Drones in India was announced by the Ministry of Civil Aviation on 27th August, 2018, which was to go into effect from 1st December, 2018.

The regulations legalize flying of drones in India by the Indian Citizens but after complying with the provided regulations. The regulations have categorized the Drones into the following categories:

²⁰ Chloe Taylor, *Chinese drone maker creates no-fly zones around airports in 32 European countries*, CNBC (May 10, 11:00 AM), <https://www.cnbc.com/2019/02/13/no-fly-zones-for-drones-in-32-european-countries.html>.

²¹ Paul D M Holden, *Flying Robots and Privacy in Canada*, CANADIAN JOURNAL OF LAW AND TECHNOLOGY, (2016).

²² Transport Canada, *Flying your drone safely and legally*, TRANSPORT CANADA (May 10, 1:30 PM), <https://www.tc.gc.ca/en/services/aviation/drone-safety/flying-drone-safely-legally.html#legal>.

²³ UAV Coach, *Drone laws in India*, UAV COACH (May 7 2020, 12:30 PM), <https://uavcoach.com/drone-laws-in-india/>.

- a. Nano Category: Less than or equal to 250 grams;
- b. Micro Category: From 250 grams to 2 kilograms;
- c. Small Category: From 2 kilograms to 25 kilograms;
- d. Medium Category: From 25 kilograms to 150 kilograms;
- e. Large Category: Greater than 150 kilograms.

The regulations according to this classification require registration of all the drones except drones falling under Nano Category. After registration of the drones a Unique Identification Number would be provided. The regulation next provides that permission is required to fly drones for commercial operations, except for drones under Nano Category and Micro Category flying under 50 and 200 feet. There is a condition imposed on the drone pilot that he/she must maintain a direct visual line of sight at all the times while flying and also that drone must not be flown more than 400 feet vertically.

The regulations have next provided for a 'No Fly Zones' which comprise of areas near the Airport, International Borders, Vijay Chowk in Delhi, State Secretariat Complex in State Capitals, Strategic Locations and Military Installations.

There has been an exception provided to fly drones in the controlled airspace by filing a flight plan and by obtaining a unique Air Defense Clearance/ Flight Information Center Number (FICN).

The regulations have also specified the essential features or components that a drone must have to fly in India:

- a. GPS;
- b. Return-to-home-(RTH);
- c. Anti-Collision Light;
- d. ID Plate;
- e. A flight controller with flight data logging capability;
- f. RF ID and SIM/No Permission No Takeoff

India's No Permission, No Takeoff Policy

The regulations have specified that the pilot of every drone needs to take permission at time of takeoff or to fly from a phone app, which will automatically grant or reject the permission. It has also been ensured that a pilot trying to fly without permission from the Digital Sky

Platform, will not succeed in the take off. This fulfils the purpose of keeping a regulation on the activity of the drone holder by the appropriate authority.

Penalty:

It has been stated under the regulations that in case of any violation of the regulations the offender would be held guilty under the sections of the Indian Penal Code. The respective sections under the code are as follows:

- a. Section 287: Negligent Conduct with respect to machinery; it carries maximum imprisonment of 6 months or a fine that may extend to Rs. 10,000.
- b. Section 336: Act endangering life or personal safety of others; The penalty stated for this offence is maximum imprisonment of 3 months or fine of Rs.250.
- c. Section 337: Causing hurt by an act endangering life or personal liberty of Individual; The penalty stated for this offence is maximum imprisonment of 6 months and fine of Rs.500.
- d. Section 338: Causing grievous hurt by an act endangering life or personal safety of others; The penalty stated for this offence is maximum imprisonment of 2 years or fine of Rs. 10,000.

IV. SECURITY AND PRIVACY CONCERNS WITH THE USE OF DRONES

With the advancement of technology, drones have transcended into the public sphere by offering versatile civilian uses. The uses of unmanned aerial vehicles raise a wide variety of issues relating to collection, retention, use, disclosure and eventual safe destruction of personal information.²⁴ There seems to exist a lacuna in the laws governing the use of drones with respect to protection of individual concerns for breach of security and privacy. The data that can be acquired by these UAVs can be correlated with information from mobile devices and smart meters and will become an important component of the growing digital record of individual activities.²⁵ A significant part of such data would fall within the legal definition of sensitive personal information. Drones are largely used by the State to carry mass surveillance. Highly advanced drones can penetrate test networks and collect unencrypted data and even establish fake access points. Such unwarranted surveillance violates an individual's liberty and their right to privacy. Such surveillance is carried out not only by the State, but also by private

²⁴ Anne Cavoukian, *Privacy and drones: Unmanned aerial vehicles*, p.10 INFORMATION AND PRIVACY COMMISSIONER, ONTARIO, CANADA (2012).

²⁵ John Villansenor, *High-altitude drones: Coming to a sky near you*, SCIENTIFIC AMERICAN (10 May 2020, 11:00 AM)

entities to gather information and generate income from the sale of such information. The collected data is often combined with other personal data categories like social media behaviour, financial data, biometric information gathered from different sources. The use of drones has the potential to cause gross privacy harms by invading people's private space, and accidentally exposing them by processing personal data against their will. Additionally, privacy violations can occur through the unsuspecting collection of information concerning random citizens without any purpose, simply due to constant video recording while flying.²⁶ It is evident that the capability of UAVs to collect information on individuals tantamount to impingement of the right to privacy of individuals and questions the protection of personal data. Despite an apparent threat to personal information, the challenge of data protection and the right to privacy is not being adequately addressed in any of the national and international UAV regulations.

Being both low cost in operation and small in size, UAVs are now becoming a popular choice for both, State and non-State actors making it difficult to control and track them to ensure lawful use and to hinder targeted observations and surveillance by individuals. Moreover, data collection by UAVs remains unnoticed in most of the cases and the data subject is rarely aware of the fact that their data is being collected.²⁷ Without knowledge about the operator or purpose of the flight, there remains a challenge for the individuals in enforcing their rights.²⁸

In India, it is now an established law that the personal rights of every person entail within their ambit the right to privacy. In Justice KS Puttaswamy (retd.) v The Union of India²⁹, the Supreme Court expressly declared right to privacy as an integral aspect of the fundamental right to life and personal liberty as guaranteed by Article 21 of the Constitution of India. In the present scenario the RPAS regulations do not provide any guidelines to ensure that the privacy norms of an entity are not compromised in any manner. These regulations merely state the liability to protect privacy of persons, nonetheless no procedure or guidelines have been incorporated to safeguard the same. There is no effective established mechanism to prevent the breach of right to privacy of individuals and it is required that legislators adopt policies that are centric to rights of persons and impose limitations on persistent surveillance and data retention procedures. It is also important to develop transparency and accountability measures in cases

²⁶ P. Blank, S. Kirrane and S. Spiekermann, Vol. 16 IEEE SECURITY AND PRIVACY, p. 70-79 (2018).

²⁷ Finn, R.L., Wright, D., *Unmanned aircraft systems: Surveillance, ethics and privacy in civil applications*, COMPUT LAW SECUR REV. (2012).

²⁸ Finn, R.L.; Wright, D., *Study on Privacy, Data Protection and Ethical Risks in Civil Remotely Piloted Aircraft Systems Operations Final Report*; European Commission: Brussels, Belgium (2014).

²⁹ Justice KS Puttaswamy (retd.) v. Union of India, (2017) 10 SCC 1.

of violation.

V. INTERFERENCE CAUSED BY DRONES³⁰

The number of instances of interference caused by the drones in the daily life have increased alarmingly. The most common incident which comes to the mind is the interference caused by the drones on the Gatwick Airport. The facts were that it happened between 19 and 21 December 2018, that hundreds of flights were disrupted due to reports of drone sightings close to the runway. The drones caused disruption to 1,40,000 passengers and 1,000 flights. This was the biggest disruption since the situation of Icelandic Volcano shutting the airport in 2010. The police considered it as an intentional act on the part of the persons as whenever the flights were about to be resumed the drones were sighted again. This was not considered as an act of terrorism by the local police. It was later on evening of 21st December that the Gatwick Airport was able to resume normal activity. There have been similar incidents reported in India as well similar to that of the incident in London.

The first such incident was reported in the year of 2015, when a man was spotted flying a drone near the Rashtrapati Bhavana and then the Parliament as well. Though, at that particular time the police and authorities were unprepared for this type of situation, and the result was total chaos. In the end it was a media person who approached the person and then the person went away on his accord. The person has not been recognized since and thus no arrest has been made.

Similar to this another incident in the year of 2015 was reported in the city of Bhopal, when an UAV with Hanuman Idols was spotted flying over the city for some period of time, which was considered as an act which could violate the religious sentiments of a religious community. In response to this act no police action was taken, but a FIR was filed by an activist requesting the action to be taken in this particular regard. The local police were unable to take any action despite a letter being delivered to the DGCA, requesting the same. The reason behind the non-action was the lack of coordination between the appropriate authorities to take a suitable and efficient action in this regard. The only response from this incident was formation of a Standard Operating Procedure to deal with respective incidents similar to this.

Another incident regarding the use of drones was recorded in Mumbai when Francesco's Pizza of Mumbai made a test delivery from a branch in Lower Parel to the roof of a building in the Worli. The investigation was launched against the Pizza shop as no permission was taken by

³⁰ Matt McFarland, Airports scramble to handle drone incidents, CNN BUSINESS (May 4, 2020, 1:00PM), <https://edition.cnn.com/2019/03/05/tech/airports-drones/index.html>.

the shop in advance from the required authorities.

The major defect recognized in this regard is the lack of the initiative on the part of the authorities and the civilians to tap into the knowledge of the military authorities who have been using the drones from a long period of time. The military have also been successful in setting up a robust operation to ensure smooth operation of drones even in harsh circumstances and as a result accumulated knowledge in this regard as well.

Thus, it is high time that the civilians start to involve the military operations in the use of drones as it would enable more smooth drone's operations with less instances of accidents or injury.

VI. CONCLUSION

It is quite clear from the above discussion that though the use of drones was first limited mainly to the extent of military but with advent of time it has expanded its scope in all the sectors of the economy of modern world. The spreading of the drones to other sectors of economy has resulted in the expenditure of various sectors on drones reaching in billion US dollars and the expenditure increasing nearly double times in the last five years. The use of drones has also widened from merely military operations to commercial or general operations. The drones as studied are now being used for a variety of purposes such as in defense, emergency response, education, agriculture, security and etc. Despite these and other advantages there are certain disadvantages which are to be considered while understanding the concept of drones. The disadvantages of drones are such as the risk to the privacy of the Individuals, the interference caused by the Drones in Air-traffic, the risk of terrorist attack, the issue of trespass on instance of encroachment by person through the drones and also the issue of legal liability of the responsible person. One major problem with the use of drones is the absence of a Standard Operation Procedure, i.e. the action to be taken in respect of the incidents of the drone interference, like seen all around the world including India where when these incidents took place the police had no idea the action to be taken immediately and there was complete lack of coordination or communication between the authorities. Thus, in order to overcome this limitation, the legislature has to look into several aspects such as the present laws, the use to which the drones are being put to use, the changing dynamics of the society and other factors as well. Thus, all in all if the legislatures are able to overcome the limitations the drones can really become a boon for the society in future, which is possible only by minimizing the side effects or disadvantages of the drone.
