Research

The Global Drone Revolution

Aerial Transport, Agritech, Commerce & Allied Opportunities

November 2021
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DMS Code : WORKSITE!1021837.1
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1. Introduction

The Indian legal regime’s relationship with drones has been eventful in the recent years and rather tumultuous at its best times. When the Government of India notified the revised law on drones in March 2021, the industry was taken aback by the extent of restrictions and compliance requirements that were introduced. This was despite years of consultations and negotiations with various stakeholders undertaken by the Government.

However, in August 2021, in a rather pleasantly surprising move, the Government overhauled the rules on drones for the second time in the same year, but this time liberalizing it almost entirely (”New Rules”). It is understood that the compelling potential of drones and their use would have been an important driving factor for this unprecedented legislative action.

Indeed, pandemic-induced constraints have forced all sections of the economy and polity to look at innovative solutions which do not depend on human contact. Entire workspaces have moved online, conferences no longer require travelling beyond one’s home, and even the modern credit cards are struggling to keep up with the contactless mobile phone payments. The logistics industry has not been spared either and the use of drones has emerged as a potential panacea to the conundrum of moving things without moving humans. This is not to say that drones were not around earlier. For example, the use of drones by armed forces is both well-documented and extensively criticized. Similarly, the use of drones for photography/videography is well-known to users of social media and film audience alike. Nevertheless, advances in drone technology coupled with the realities of Covid-19 has meant that drones are now a need rather than just an interesting technology to be explored by hobbyists. An important part of the drone revolution has also been the shift from operations within visual line of sight (”VLOS”) to operations beyond visual line of sight (”BVLOS”). The earlier regime on drones required the presence of a remote pilot with an unaided visual contact with the drone to undertake any flying operations. Such restrictions remain common in various jurisdictions outside India. However, under the New Rules, there has been a shift in this approach with greater relaxations being allowed for undertaking BVLOS operations. This is an important development given the obvious limitations that VLOS operations have.

From an economic perspective, the drone industry has massive potential in terms of giving a boost by attracting significant global investments in India. The Unmanned Aircraft System (”UAS”) market in India is projected to yield a turnover of USD 1.8 billion by 2026 in light of the recent government approved PLI scheme in India. This would be a massive increase, given that the drone manufacturing companies in India yield a turnover of approximately INR 80 crore (USD 10 million).

In fact, the expanding application of drones to various industries is predicted to impact markets globally, and the investment in the sector is bound to grow exponentially. Internationally, various predictions have estimated the drone market to grow from USD 13.9 billion in 2021 to USD 40.7 billion by 2026. In part, this has been enabled by a global trend towards the relaxation of drone operation restrictions earlier which prevented BVLOS operations and carriage of payloads in various countries.

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1. Drone industry will have turnover of upto Rs.15000 cr by 2026: Scindia, (September 16, 2021), Available at: https://www.business-standard.com/article/economy-policy/drone-industry-will-have-turnover-of-up-to-rs-15-000-cr-by-2026-scindia-121091600945_1.html (Last accessed on September 21, 2021).

2. Drone services market by Type Report, Marketsandmarkets, (September 2021) Available at: https://www.marketsandmarkets.com/Market-Reports/drone-services-market-80726041.html (Last accessed on September 21, 2021).
1. Introduction

In this paper, we have systematically examined the existing trends and regulatory regimes on drones in various countries. The paper provides a brief introduction to various concepts relevant to drones and delves into an extensive analysis of the current Indian regime and analysis of the on-ground impact that the new law in India will have. We have also looked at some of the potential concerns that may arise with an increase in the use of drones and legal lacunae. The concluding section provides for a way forward to ensure successful regulations which strive for a balance between drone usage and policy making.
2. Drone Variants

The word “drone” refers to an unmanned vehicle capable of operating on land, air, underwater or some combination thereof. However, colloquially, the word has come to refer to only Unmanned Aerial Vehicles (“UAV”) which, as the name suggests, operate solely in air, or a UAS which is the entire system associated with the UAV, and allows a UAV to function. In this paper, the words 'drone', 'UAV' and 'UAS' are used interchangeably. Drones may be remotely piloted by a human, or partially or fully autonomous.

There are broadly two categories of drones: fixed-wing and multi-rotor. A fixed-wing drone resembles a common commercial plane but is smaller. They are typically used for longer flights. In contrast, multi-rotor drones usually have four or more propellers (but no wings) giving them superior maneuverability. One of their primary advantages is their ability to perform vertical take-off and landing. There are also drones that use a combination of fixed wing and multi-rotor technology. Drones can be equipped with cameras, GPS and other sensor suites, as well as manipulators for picking, carrying and placing objects.

The use cases of drones are highly extensive, with newer applications coming up with advancing technologies. The military use of drones for reconnaissance, offence or defence purposes, is well-documented across the globe. Law enforcement agencies have also begun to use drones for crime prevention and search and rescue operations. The commercial use of drones has recently picked up, with one of the most popular use case being the use of drones for package deliveries and logistics. Especially due to the Covid-19 pandemic, drones are being extensively used for medical supply deliveries such as medicines, test kits, vaccines, human organs as well as blood. Many industry players are also developing drones with high-definition cameras and advanced stabilization features which can be used for construction site mapping, structural inspections and high-speed photography and videography. For instance, the popular nature documentary “Our Planet” features spectacular overhead shots of marine life filmed with a remote-controlled drone.

For regulatory purposes, different countries and international organizations have provided varied definitions of drones. In general aviation and airspace-related parlance, a “Drone” may refer to any vehicle that can operate on multiple surfaces and/or in the air without a human being on board to control it. They vary in size, shape, form, speed, and a host of other attributes. Most jurisdictions categorize and regulate them by weight. A drone could vary from a model aircraft / toy in a store to a large sized aircraft sent to a war zone.

The International Civil Aviation Organization (“ICAO”) is the international body charged with the responsibility of codification and regulation of airways. While the ICAO does not define a drone, it identifies drones to be within the ambit of UAS and has coined the term Remotely Piloted Aircraft Systems (“RPAS”) for drones that are operated with the aid of a remote pilot. RPAS belong to the wider family of UAS. UAS essentially includes (i) the unmanned aircraft; (ii) the control system(s) on the ground; (iii) the control data link(s); and (iv) other support equipment. The ICAO Circular on Unmanned Aircraft Systems, 2011 defines an RPAS as ‘a set of configurable elements consisting of a remotely-piloted aircraft, its associated remote pilot station(s), the required command and control links and any other system elements as may be required, at any point during flight operation’.

3. Available at: https://www.icao.int/meetings/uas/documents/circular%20328_en.pdf (Last accessed on September 21, 2021)
3. Global Developments in Drone usage

Over the past few years, drones have come to be used in various industries and for varied purposes. From quick deliveries at rush hour to scanning an unreachable military base, drones are proving to be extremely beneficial in places where humans cannot reach or are unable to perform operations in a timely and efficient manner. Other uses of drones include aerial photography, express shipping or delivery of goods, supplying essentials to remote places, thermal sensor drones for search and rescue operations, geographic mapping, crop monitoring, forecasting, etc. The usage of drones in urban planning, infrastructure development, construction planning, maritime procedures, manufacturing and inventory management, etc., are also notable. We have detailed some of these use cases below.

i. Agri-tech

With the use of drones, the agricultural sector is able to gather data, automate redundant processes, and improve efficiency. Drones are being developed to aid the cultivation process, including for pollination of flowers, spraying of fertilisers and even for irrigation requirements as they also enable geographic mapping. Further, drones can also be used for crop observation / monitoring along with analyses of the fields / soil which would aid in crop health. Thus, farmers can optimize the use of inputs (fertilizers, seed, water, etc) and react suitably which in turn would save / enhance crop yield.

ii. Air Mobility / Drone Taxis

With the crowding of the streets with cars and hours of traffic jams falling in the way of hassle free commute, numerous companies around the world are exploring the idea of drone taxis or passenger drones that can be summoned like the Olas and Ubbers of the world, where the latter is also in the process of enabling such air mobility through tie-ups with aircraft manufacturers. Some reports suggest that within 20 years, electric vertical take-off and landing (eVTOL) aircraft manufacturers, operators and infrastructure providers will have a market value of $318 billion.

Airbus, the multinational European aerospace company, is developing two electric Urban Air Mobility ("UAM") vehicles with the goal to offer short-time and distance flights across congested big cities. These innovations come coupled with competitive pricing to that of on road taxis in order to act as alternatives. There are numerous other companies testing and developing their autonomous vehicles for the purposes of easing mobility and transport worldwide.

iii. Outer Space

Drones are also being developed to test interplanetary environments. While NASA in 2019 announced the launch of its rotorcraft called Dragonfly meant for life-hunting on Saturn’s moon by 2026. A tiny helicopter scout has already accompanied the NASA’s Mars 2020 Perseverance Rover mission which landed on the planet in February 2021. Perseverance also carried a tiny hitchhiker to Mars — a helicopter named Ingenuity, which will attempt to make the first-ever rotorcraft flight on Mars. On the success of such rotorcraft flights, there lies immense potential for drones to be utilised in outer space to study various aspects of the planets and their environments.

7. 7 urban air mobility companies to watch, available at: https://www.greenbiz.com/article/7-urban-air-mobility-companies-watch
8. Id
9. Available at: https://mars.nasa.gov/mars2020/
10. Available at: https://www.space.com/perseverance-rover-mars-2020-mission
3. Global Developments in Drone usage

iv. Safety Inspections

Various companies are required to carry out inspections on a regular basis in order to ensure the safety of work environment and the foolproofness of the infrastructure. Drone usage has enabled these companies to eliminate human factor in such inspections and has made the process more time efficient and safe. Drones enabled with imagery technology enables companies to get a detailed output of such inspections in order to undertake improvements in the infrastructure or safety requirements.

v. Military and Defense services

Given the strategic size of drones, their use in military operations surfaced decades ago. Numerous countries (with the US, UK, China and Israel being some of the first countries)\(^1\) have already adopted drone technology for military activities. While drones have been in use by the defense forces of these countries for a few years, drones are being designed exclusively for surveillance and defence, as well as for offensive operations and bomb detection.\(^2\)

vi. Shipping and delivery

The commercial usage of drones for shipping and delivery of goods has gained momentum in the recent years as it aids the logistics chain and provides faster and efficient means of transport. The deliveries may range from that of medicines to posts, packages and even pizzas.\(^3\) While India struggled with the supply-chain disruptions during the pandemic, drones emerged as a new ray of hope in enabling such deliveries to the doorstep and to remote areas. This will not only solve logistical issues but would enable time sensitive and faster deliveries to take place around the world.

vii. Emergency Response

Drones have not only come to be utilized for commercial operations but also play a major role in weather forecasting and emergency response. Innovations in camera technology in drones enabled with thermal imaging cameras have provided emergency response teams with an ideal solution for identifying victims who are difficult to spot with the naked eye. Da-Jing Innovations (“DJI”) had partnered with fire departments in US in 2019 for such rescue operations.

In 2017, Land Rover partnered with the Austrian Red Cross to design a special operations vehicle with a roof-mounted, thermal imaging drone. The vehicle includes an integrated landing system, which allows the drone to securely land atop the vehicle while in motion. This custom Land Rover Discovery, dubbed “Project Hero” model included rescue drones which were aimed at speeding up response times.\(^4\)

The use of drones for delivering emergency response defibrillators on demand are also being reported, and such ambulance drones are being developed and tested around the world and have the potential to increase survival rates substantially given the reduced time in response.

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\(^1\) Available at: https://www.newamerica.org/international-security/reports/world-drones/introduction-how-we-became-a-world-of-drones/#:~:text=The%20United%20States%2C%20Israel%2C2%20and%20produces%20and%20sellers%20drones\). (Last accessed on October 19, 2021)


\(^3\) Fintan C. Drones for deliveries from Medicines to Post, Packages and Pizza, available at: https://www.dronezon.com/drones-for-good/drone-parcel-pizza-delivery-service/ (Last accessed on October 25, 2021)

\(^4\) Id
3. Global Developments in Drone usage

viii. Conservation of Wildlife

While drones enable the monitoring of agriculture related activities, they have also come to assist in monitoring the fauna of various regions.\(^{15}\) Wildlife monitoring is essential as it can assist in the prevention of poaching and the footage from such drones would assist in studying animal behaviour and patterns. In such a way, Drones are being utilized for geo-mapping and tracking of such animals in their natural habitats without human interference. Drones have also enabled research on ecosystems and the Ocean Alliance is an example of an organization that has used drones (such as the marine SnotBot) to collect samples — specifically, mucus from whales.\(^{16}\)

ix. Building/infrastructure inspection

Given the ease of accessibility that drones provide, they are also being used for inspecting remote/hazardous areas of various infrastructure such as chimneys, boilers, etc. The visual capability of drones is a great substitute for actual human inspection, and drones can even be equipped with thermal or multispectral sensors for specialised inspection.

Drones are also being developed for monitoring of highways and inaccessible terrains for accidents, traffic control, etc. they are coupled with an alerting system to bring attention of the officials to incidents that may not be reported otherwise.\(^{17}\)

x. Disease Control

An example of monitoring of diseases by the use of drones is the study carried out for tracking the spread of and predicting the transmission of a tropical disease caused by parasitic worms i.e. schistosomiasis.\(^{18}\) The drones are used for tracking certain types of vegetation where snails which transmit these diseases may make their habitats. Microsoft is also leveraging drone technology to capture and test mosquitoes for infectious disease. Ideally, this intelligence could be used to protect local residents, and in the future could help prevent epidemics before they begin.

xi. Healthcare

In times of the pandemic and the necessity of accessing healthcare for individuals all over the world including individuals situated in remote places, the use of drones for the last mile delivery is gain immense popularity. While medical supplies can be delivered by traditional means, certain circumstances call for quick access to drugs, blood, and medical technology, drones have expedited access to these facilities for remote regions. One of the most well-known medical delivery company is Zipline International, which offers delivery drones in rural areas throughout Africa and in numerous other countries.\(^{19}\)

xii. Thermal sensor drones for search and rescue operations

When drones are equipped with a camera and thermal or optical sensors, their usage in disaster management and rescue operations becomes especially crucial. For example, predator drones which are commonly used for

\(^{15}\) Drones help researchers manage koala populations, available at: [https://builtin.com/drones-robotics/drones-help-researchers-manage-koala-populations](https://builtin.com/drones-robotics/drones-help-researchers-manage-koala-populations) (Last accessed on October 26, 2021)

\(^{16}\) Id.

\(^{17}\) Available at: [https://www.livescience.com/28137-cool-uses-for-drones.html](https://www.livescience.com/28137-cool-uses-for-drones.html)

\(^{18}\) Available at: [https://www.pnas.org/content/116/46/23182](https://www.pnas.org/content/116/46/23182)

\(^{19}\) Available at: [https://techcrunch.com/2020/05/26/zipline-begins-us-medical-delivery-with-uav-program-honed-in-africa/](https://techcrunch.com/2020/05/26/zipline-begins-us-medical-delivery-with-uav-program-honed-in-africa/) (Last accessed on October 19, 2021)
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- military operations, were used to rescue and detect citizens in the aftermath of the hurricane Katrina in the US.\textsuperscript{20} The use of such drones enables safe navigation and efficiency in rescue operations.

xiii. Internet Beams

- Companies such as Facebook and Google are developing drones run by solar power which would beam the internet access to remote areas.\textsuperscript{21} It is a technology under discussion and may develop in the coming years with an aim of bringing more people online or providing them with greater access to internet.

With the evolving application of drone technology to various industries, the technologies allied with drones are also evolving in tandem. For e.g., 3DRobotics announced the world’s first all-in-one Smart Drone called Solo. Smart drones may contain a variety of built-in safeguards, including smart accurate sensors and self-monitoring technologies that would provide new opportunities in transport, military, logistics, and commercial sectors.\textsuperscript{22}

I. Newer allied Drone Technologies

i. BVLOS Operations

- Countries around the world are amending their drone policies so that they can allow drones to fly BVLOS for maximum efficiency since BVLOS capabilities enable a drone to cover far greater distances.\textsuperscript{23} Drones flying BVLOS are controlled through the use of data provided by on-board input equipment. Information is transmitted via a telemetry link that informs the operator about the position, altitude, speed and direction of flight and other relevant parameters of the aircraft.

ii. Unmanned Aircraft System Traffic Management (“UTM”)

- UTM is an ecosystem to enable multiple BVLOS operations to be managed in the airspace. It acts as an air traffic service for drones and is in the process of being implemented in India and other countries. Recently, the Indian Government published the UTM policy which enables both public and private entities to manage drone traffic.\textsuperscript{24} This is a critical development from a safety perspective, especially when the number of drones in the airspace are set to increase.

\textsuperscript{20.} Available at: https://www.researchgate.net/publication/256841448_Drones_to_the_Rescue_Unmanned_Aerial_Search_Missions_Based_on_Thermal_Imaging_and_Reliable_Navigation (Last accessed on October 25, 2021)

\textsuperscript{21.} Available at: https://techcrunch.com/2019/01/21/facebook-airbus-solar-drones-internet-program/?guccounter=1&guce_referrer=aHR0cHM6Ly9jdGwZ3JvcHJlbmVsb3R8&guce_referrer_sig=AQAAAJgwHVQb6AXxYh2qGUiisSRZ1yFmz0j1yhNy7Q6Gmgx1UnhRPMsY6yju6jw5vYwFmzdVKS4xXdhD68iMTuqz26GxKQ0s8DS1MXqoohKoV7neUHyAVFyKpy1t1ewH7FauzCZ1H4KZIVdIl7aXhqITeHfj8WnJ6yKdJSXDG

\textsuperscript{22.} Id

\textsuperscript{23.} Available at: https://www.geospatialworld.net/blogs/what-is-bvlos-and-why-is-it-important-for-drone-industry/ (Last accessed on October 05, 2021)

3. Global Developments in Drone usage

Drones can also be a threat if not used with due caution. In recent times, there have been many cases where drones have risked people’s lives and have breached safety and security. This has led to the evolution of counter-drone technology which is being used for tracking and intercepting drones. Mostly drones are spotted using techniques like Radio Frequency (RF) detection, Electro-Optical and Infrared and are then intercepted or neutralised with techniques like RF Jamming, GNSS Jamming, Spoofing, Laser, nets, projectile or Combined Interdiction Elements.

Counter drone technology may vary from technology being used for detecting, intercepting and shooting down drones to guns being used to catch drones by use of nets. The latter has been illustrated below.

Source: WeTalkUAV.com


3. Global Developments in Drone usage

iv. New obstacle avoidance algorithm

Drones currently on the market with 'obstacle avoidance' features are able to navigate around static objects, such as buildings, mountains, and trees without being manually piloted to do so. Sense and avoid is a major pattern for obstacle threat avoidance.\(^\text{27}\) The main idea revolving the algorithm is transforming the obstacle avoidance problem into path planning and path following, in commercial drones.

v. Multivehicle control through cloud computing

The need to manage and control multiple drones within a close proximity will be more demanding, as the number of active drones grow. Several tech conglomerates are already promoting the concept of connected drones that can be controlled via a cloud-based infrastructure. Currently, most of the data generated by drones is transferred to cloud systems for users to access and analyse, often not in real-time.

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4. Global Drone Regulation

Countries around the world have thoroughly deliberated on issues concerning the operation of UAVs and have laid down comprehensive legislations to regulate their use. This section briefly discusses some of these regulations.

I. Global Standards

In 2014, the International Organization for Standardization ("ISO") created a technical committee on UAS.\(^{28}\) The scope of the committee’s work includes, but is not limited to, standardization of “classification, design, manufacture, operation (including maintenance) and safety management of UAS operations”\(^{29}\). In 2019, the committee published a document on operational procedures for commercial UAS, detailing international best practices which serve as a recommendatory standard for UAS manufacturers, operators, etc.\(^{30}\)

In 2020, the ISO supplemented this document with a list of definitions pertaining to UAS. They also published a document titled Categorization and Classification of Civil Unmanned Aircraft Systems.\(^{31}\) This document specifies the requirements for multi-dimensional classification of civil UAS, with the goal of refining, rather than replacing any existing UAS regulatory framework. Similarly, there are various other standards, relating to UAS traffic management, training for personnel, etc., some of which have been published and some of which are under development.\(^{32}\)

II. United States of America (US)

According to the Federal Aviation Association (“FAA”) of the United States, as of September 2021, there were over 860,000 drones registered in the country, of which about 60% were for recreational purposes and 40% were for commercial purposes.\(^{33}\) US is a global leader of drone technology operation and legislation, and has been working on developing a regulatory framework for drones for about a decade.

The FAA undertook rulemaking under the authority described in the FAA Modernization and Reform Act of 2012 (Public Law 112-95). In 2021, two Bills were introduced to the US Senate. The first was the American Security Drone Act ("ASDA"), which is primarily aimed at banning federal procurement of certain drones and other UAS from foreign entities, with some exceptions.\(^{34}\) The second was the Drone Integration and Zoning Act ("DIZA"), under which the administrator of the FAA will be required to adhere to certain requirements.\(^{35}\) Notably, the requirements pertain to designating areas and routes for civil and commercial UAS, restricting UAS flight over another’s personal property and preserving state authority restrictions.\(^{36}\)

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\(^{28}\) Available at: [https://www.iso.org/committee/535624.html](https://www.iso.org/committee/535624.html) (Last accessed on September 10, 2021)

\(^{29}\) Id

\(^{30}\) Available at: [https://www.iso.org/standard/70853.html](https://www.iso.org/standard/70853.html) (Last accessed on September 10, 2021)

\(^{31}\) Available at: [https://www.iso.org/standard/72093.html](https://www.iso.org/standard/72093.html) (Last accessed on September 10, 2021)

\(^{32}\) Available at: [https://www.iso.org/committee/535624.html](https://www.iso.org/committee/535624.html) (Last accessed on September 10, 2021)

\(^{33}\) Available at: [https://www.faa.gov/uas/resources/by_the_numbers/](https://www.faa.gov/uas/resources/by_the_numbers/) (Last accessed on September 10, 2021)

\(^{34}\) American Security Act, 2021, available at: [https://www.congress.gov/bill/117th-congress/senate-bill/73/text?q=%7B%22search%22%3A%5B%22drone%22%5D%7D%26r-1%26s-1](https://www.congress.gov/bill/117th-congress/senate-bill/73/text?q=%7B%22search%22%3A%5B%22drone%22%5D%7D%26r-1%26s-1) (Last accessed on September 09, 2021)

\(^{35}\) Drone Integration and Zoning Act, 2021, available at: [https://www.congress.gov/bill/117th-congress/senate-bill/600/text?q=%7B%22search%22%3A%5B%22drone%22%5D%7D%26r-2%26s-1](https://www.congress.gov/bill/117th-congress/senate-bill/600/text?q=%7B%22search%22%3A%5B%22drone%22%5D%7D%26r-2%26s-1) (Last accessed on September 09, 2021)

\(^{36}\) Available at: [https://www.congress.gov/bill/117th-congress/senate-bill/600?q=%7B%22search%22%3A%5B%22drone%22%5D%7D%26r-2%26s-1](https://www.congress.gov/bill/117th-congress/senate-bill/600?q=%7B%22search%22%3A%5B%22drone%22%5D%7D%26r-2%26s-1) (Last accessed on September 09, 2021)
4. Global Drone Regulation

The DIZA may provide some relief to juridical questions pertaining to federal and state authority, and some freedom to states to enforce their own regulations. Since 2013, at least 44 states have introduced some form of UAV legislation.\(^{37}\) In 2019, California enacted a legislation that made it a misdemeanor offense to operate UAS in ways that may violate one’s privacy.\(^{38}\) In 2020, eight states, including Idaho, Minnesota and Massachusetts enacted a total of 11 pieces of legislation aimed at UAS regulation.\(^{39}\) Yet, historically the FAA regulations have superseded state regulations. This was seen in the landmark case of Singer v. City of Newton, where the judge confirmed the FAA authority over a state.\(^{40}\) The two bills are expected to be passed by the Senate and are expected to be adopted by the first half of 2022.

A. Small UAS Regulation (Part 107)

On June 28, 2016, the FAA released the Small Unmanned Aircraft Systems Regulation (Part 107) published under Title 14, Chapter I of the Code of Federal Regulations pertaining to Aeronautics and Space.\(^{41}\) The regulation provides guidelines for operational use of small UAS, less than 55 lbs and cover a broad spectrum of commercial and government uses for drones. Part 107 requires that the drones must remain in the Visual Line of Sight of the remote pilot in command and operate only in uncontrolled airspace.\(^{42}\) Further, the part also provides for the operational requirements including licensing requirements, conditions for safe operation, etc., to fly drones in the US airspace for professional or commercial drone services.

Drones are no longer required to pass a medical exam or file a Notice to Airmen (“NOTAM”) prior to drone operation.\(^{43}\) However, obtaining a remote pilot certification and passing an aeronautical knowledge test\(^{44}\) is still required. Remote pilots may operate a drone without these requirements, so long as they are under the supervision of a certified operator.\(^{45}\)

VLOS flight operations are covered within the ambit of Part 107.31 of the FAA and requires such flights to be undertaken only within the direct vision of the drone pilot and places certain additional requirements for compliance by such pilots. In order to undertake BVLOS operations, the pilots must obtain a waiver from Part 107.31, although the FAA does not enable a blanket waiver from restrictions to undertake BVLOS operations in US.

Part 107 was hailed as a step forward, however, it was also criticized since, among other restrictions, it did not allow flight beyond VLOS or over pedestrians and moving vehicles, and restricted flights to daytime.\(^{46}\) The Operations Over People Rule, which came into effect on April 21, 2021, provides significant relief on these fronts.\(^{47}\) This rule allows routine operations over people, moving vehicles and at night under certain circumstances. It is a big step towards integration of UAS into the National Airspace System, since it eliminates the need for waivers under Part 107 for typical operations.


\(^{38}\) Id


\(^{40}\) Singer v. City of Newton, 284 F. Supp. 3d 125 (D. Mass. 2017) available at: [https://casetext.com/case/singer-v-city-of-newton-1?__cf_chl_jschl__tk__=pmd_0e42d523b8d8a2116d8cfa6887f8b9d18121b5d631267794e7-f-gpN5ZGNaAiijvBlbQ6 (Last accessed on September 09, 2021)]


\(^{42}\) Available at: [https://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=22615 (Last accessed on September 09, 2021)]

\(^{43}\) Id

\(^{44}\) Section 73, Part 107.

\(^{45}\) Section 12, Part 107.


\(^{47}\) Available at: [https://www.faa.gov/uas/commercial_operators/operations_over_people/](https://www.faa.gov/uas/commercial_operators/operations_over_people/) (Last accessed on September 09, 2021)
4. Global Drone Regulation

In 2018, the FAA had also announced the requirement that all UAS must be equipped with a remote identification mechanism, allowing authorities to locate and identify them if required. Unfortunately, neither Part 107, nor the Remote ID requirement provide for BVLOS operations. Although, the FAA in a recent move approved automated drone operations without human pilots or BVLOS operation. A special waiver was required from the FAA under the Small UAS Regulations for undertaking such operations.

For recreational flyers, the Recreational Unmanned Aircraft Systems Safety Test ("TRUST") was introduced at the end of June 2021, a knowledge test for recreational pilots prior to undertaking drone flights. Flights in controlled airspace require a permit in USA. These can be requested through the Low Altitude Authorization and Notification Capability ("LAANC") system. In addition, there are some approved and restricted locations which are accessible through the official application B4UFLY in order to monitor the flying of the UAS in permitted areas.

B. Advanced Commercial Applications

The FAA, recognizing the tremendous potential of UAS, has permitted its usage for certain advanced applications, not covered by Part 107. Most notable on the list is the provision for Package Delivery by Drone (Part 135) through the UAS BEYOND program. The BEYOND program took effect on October 26, 2020 in partnership with a group of state authorities. The FAA highlights three key challenges for the program: (i) BVLOS operations, that would enable package delivery and other survey operations (ii) leveraging industry operations to better understand the benefits of UAS; and (iii) focusing on community engagement and addressing concerns regarding UAS.

The FAA has clearly stated that Part 135 certification is the only path for small UAS to carry the property of another for compensation beyond visual line of sight. Certification is a comprehensive five phase process involving thorough design and performance assessment. Four different types of certificates are awarded for operations. In April 2019, Wing Aviation (a subsidiary of Alphabet Inc.) became the first to receive a Part 135 Single Pilot Air Carrier Certificate for drone operation. The FAA later issued a Standard Part 135 Certificate allowing the wing to operate drone aircraft. Later in 2019, the United Postal Service received similar certification. Since then, several other drone companies, such as Amazon's Prime Air have received Part 135 certification.

50. Available at: https://www.faa.gov/uas/programs_partnerships/data_exchange/ (Last accessed on September 09, 2021)
51. Available at: https://www.faa.gov/uas/advanced_operations/ (Last accessed on September 09, 2021)
52. Available at: https://www.faa.gov/uas/advanced_operations/package_delivery_drone/ (Last accessed on September 09, 2021)
53. Available at: https://www.faa.gov/uas/advanced_operations/beyond/ (Last accessed on September 09, 2021)
54. Id
55. Available at: https://www.faa.gov/uas/advanced_operations/package_delivery_drone/ (Last accessed on September 09, 2021)
56. Available at: https://www.faa.gov/licenses_certificates/airline_certification/135_certification/cert_process/ (Last accessed on September 09, 2021)
57. Available at: https://www.faa.gov/licenses_certificates/airline_certification/135_certification/general_info/ (Last accessed on September 09, 2021)
58. Id
59. Id
60. Available at: https://www.cnbc.com/2020/08/31/amazon-prime-now-drone-delivery-fleet-gets-faa-approval.html (Last accessed on September 09, 2021)
III. Canada

The Transport Canada Civil Aviation (“TCCA”) has provided a regulatory framework for non-military drone usage. All drones are classified as aircraft and therefore all drone pilots must follow the Canadian Aviation Regulations (“CAR”). Before flying, all drones that weigh between 250g and 25kg must be registered with the TCCA.

Pilots can choose between two certifications, basic and advanced. The basic certification allows a pilot to fly drones weighing up to 25kg in uncontrolled airspace, 100 feet away from bystanders horizontally, and not over bystanders, so long as adequate distance from airports and heliports are maintained. Pilots wishing to go beyond any of these conditions must obtain an advanced certification. Micro drones (weighing less than 250g) are exempt from drone registration and pilot certification. Pilots with heavy drones (above 25kg) or wanting to fly at higher altitudes, BVLOS, or other special conditions must obtain a Special Flight Operations Certificate (“SFOC”). The commercial use of drones requires an SFOC regardless of its weight.

The TCCA, in anticipation of the increase in drone usage has outlined privacy guidelines for recreational, commercial and governmental drone operators. Regulatory work is ongoing towards two primary goals: expanding the VLOS regulations and introducing BVLOS framework, both of which would play a big part in facilitating advanced drone operations, like surveillance and delivery. In addition, the TCCA is actively working towards increasing the public trust in drones, understanding and addressing drone security risks, establishing a drone traffic management system and using drones to support economic growth.

IV. The European Union

Similar to the United States, the EU also provides a detailed set of regulations for drone operations catering to the needs of its member states. The European Aviation Safety Agency (“EASA”), in March 2017, laid down certain regulations focusing on air traffic management and navigation services. This regulation classified UAS in different categories according to the maximum take-off mass allowed for UAS distinguishing it between systems with Mass < 5 kg, between 5–25 kg and over 25 kg. In the following year, the EASA discussed the regulation of all drones irrespective of the mass.

The EASA released two important documents: "Introduction of Regulatory Framework for the Operation of Unmanned Aircraft" and "Proposed Concept of Operations for Drones." These documents provide feedback for drone operation to EASA members and other stakeholders, such as manufacturers and operators. These
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documents have since been consolidated and formulated into two EU Regulations. The European commission delegated Regulation (EU) 2019/945, which set out rules for the design and manufacture of drones and the European Commission Implementing Regulation (EU) 2019/947, which set out rules for the safe and secure use of drones. Both regulations became fully applicable as of December 31, 2020. The new regulations dictate that all drone operations, commercial and recreational, are subject to the same conditions across Europe. The latter regulation is of particular importance, because it provides a risk-based classification system, as follows:

- **Open** – These drones do not require an authorisation by an aviation authority for the flight but need to carry out their flight within defined limitations, typically low risk scenarios.

- **Specific** – These drones require an operations authorisation by an aviation authority with specific limitations adapted to the operation, typically moderate risk scenarios.

- **Certified** – These are drones with a higher risk associated with them due to the kind of operation they are used for such as carriage of hazardous goods, operations over assemblies of people and transportation of people. Such drones require certification from the relevant aviation authorities.

To be a compliant drone user, all drone owners must register their drone in the country where they reside or have their main place of business. Drones weighing less than 250g, with no camera or personal data detection sensor do not require registration. The EU regulations distinguish between drone operators (the person registered) and remote pilots (the person who flies the drone). Remote pilots are required to take the appropriate training for each of the three categories, and all drones must be insured by the operator.

In April 2021, the EU issued another noteworthy regulation, (EU) 2021/664. This regulation is a first of its kind aimed at Unmanned Aircraft Traffic Management. This regulation will complement other recent regulations passed, pertaining to more traditional manned aircrafts. Additionally, in July 2021, (EU) 2021/1166 was issued to amend (EU) 2019/947, to postpone the date of application for standard scenarios of BVLOS flight.

According to the recent EU rules, UAS operations classified in the open category are only allowed with VLOS of the remote pilot. BVLOS operations may be conducted under the Specific or Certified category of operations which require a thorough risk assessment to be undertaken after which a special permit is granted. Extensive certification of not just the drone, but the operating company, pilots, maintenance, etc. may also be required.

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76. Available at: https://www.easa.europa.eu/faq/116446 (Last accessed on September 09, 2021)
77. Available at: https://www.easa.europa.eu/newsroom-and-events/events/new-design-verification-process-authorising-drone-operations-specific (Last accessed on September 09, 2021)
78. Available at: https://www.easa.europa.eu/domains/civil-drones-rpas (Last accessed on September 09, 2021)
79. Id.
80. Available at: https://www.easa.europa.eu/faq/116444 (Last accessed on September 09, 2021)
81. Available at: https://www.easa.europa.eu/domains/civil-drones-rpas (Last accessed on September 09, 2021)
82. Id.
V. Germany

While the regulations mentioned above apply to all EU member states, the states still reserve some rights to modify them. The German Air Traffic Act uses a slightly unconventional method for categorizing UAS. According to the Act, only those drones which are used for non-recreational or commercial purposes are classified as UAS while those used for hobby or recreational purposes are termed as model aircraft. On April 7, 2017, an amendment to the Air Traffic Licensing Regulation and Air Traffic Regulation came into force, primarily focused on drones and model aircraft. Prior to the new regulations, only UAS and their operators were required to adhere to the Air Traffic Act and the Air Traffic Regulations. However, moving forward, even model aircraft must adhere to both.

All UAS and model aircraft with take-off weight of more than 250g must be marked with the name and address of the owner. A certificate of knowledge is required for operation of all drones above 2kg, and operators must be at least 16 years of age. UAS and model aircraft weighing more than 5kg, operating at night or with a combustion or rocket-powered engine usually require special permission. Drones or model aircraft weighing less than 5kgs must be kept within the operator's visual line of sight at all times. UAS and model aircraft cannot be operated above an altitude of 100m or within 100m of public gathering, disaster zones, federal highways or correctional facilities. Transport of explosive and other hazardous materials using any type of drone is strictly prohibited. The aviation authority may grant an exception to the general prohibitions in justified cases.

VI. Singapore

The Civil Aviation Authority of Singapore ("CAAS") governs operations of all UAS in the country, under the Air Navigation Regulations ("ANR"), 2019. The ANR came into operation in phases and was fully adopted by February 2021.

The CAAS requires that all UAS above 250g must be registered with the authority. Following registration, users must apply for the requisite permits. Organisations or individuals who are able to demonstrate their ability to operate UAS responsibly are granted Operator Permits. Organizations and individuals may also be granted one of two types of activity permits: Class 1 and Class 2. The former is required for commercial operations with any type of UAS, recreational activities with UAS weighing more than 25kg and educational activities with UAS weighing...
4. Global Drone Regulation

more than 7kg. It’s important to note that a Class 1 permit is not valid without an Operator permit. A Class 2 permit is required for outdoor recreational UAS weighing up to 25kg and outdoor educational UAS weighing up to 7kg. This permit is also required if any UAS will be operated at an altitude of above 200 ft above mean sea level, within 5 km of any civil aerodrome or military airbase, or within any restricted or protected area. As of February 2021, anyone operating a UAS for commercial purposes, or operating a UAS weighing more than 7kg for educational or recreational purposes must additionally obtain a UA Pilot Licence.

VII. Australia

The Civil Aviation Safety Authority of Australia (“CASA”) governs operations of all UAS and remote-controlled aircraft in the country under the Drone safety rules, also known as the standard operating conditions issued under the Civil Aviation Safety Regulations, 1998. Drones are classified into model aircrafts and remotely piloted aircrafts (RPA), on the basis of size and type of use. Model aircrafts are flown for recreational purposes while remotely piloted aircrafts are flown for commercial purposes in Australia. The Drones must be flown not higher than 120m (400 ft) above ground level and within visual line of sight during daytime while the law allows flying of drones to extended visual line of sight it does not address the use of such drones for beyond visual line of sight operations. Drones must not be flown closer than 30m to people other than being operated within the vicinity of the drone operators and not above people at any time.

The rules require drone operators to apply for additional flight authorisations for recreational use for model aircrafts weighing more than 25kg. Similarly, if the drone is being flown for work or for an employer, the operator must have an operator accreditation to fly a drone which is 2kg or less and must only fly it over his own land in addition to holding a remote pilot license. The age limit is 16 years for registering a drone and obtaining an operator accreditation in Australia.

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99. Id

100. Id


102. Available at: https://www.caas.gov.sg/public-passengers/unmanned-aircraft/ua-regulatory-requirements/ua-pilot-licence (Last accessed on September 09, 2021)


105. Available at: https://www.casa.gov.au/drones/rules/drones-types (Last accessed on September 09, 2021)
5. The Drones Rules, 2021 in India

While not ubiquitous, drones have been used in India for a considerable amount of time. However, one of the breakthroughs for drones in India was when a pizzeria in Mumbai delivered a pizza to much fanfare in May 2014. The police, realizing that there were no regulations on drones, banned their use. Ever since, drones have been a hot topic of conversation in India, in terms of their regulation, usage and operations given the huge potential they harness. Until late in 2021, drone usage in India faced restrictive laws and directions issued by the Directorate General of Civil Aviation (“DGCA”) and the Directorate General of Foreign Trade (“DGFT”) who restricted the civil use and import of drones in India, respectively.

However, in August 2021, the Government of India overhauled the civil drone regime in India and notified the Drone Rules, 2021 (for the purpose of this Section “Rules” / “New Rules”). The New Rules supersede the much criticised and highly restrictive Unmanned Aircraft System Rules, 2021 (“Earlier Rules”) which were released in March 2021. Through the New Rules, the Government has now significantly liberalised the regime on drones, removing express restrictions on foreign-owned and controlled Indian companies, and simplifying the drone registration and certification process, among other things.

I. Key features of the New Rules

A. Applicability

The New Rules defines a “drone” as an “unmanned aircraft system” (“UAS”) which has in turn been defined as “an aircraft that can operate autonomously or can be operated remotely without a pilot on board”.

The New Rules apply to:

i. UAS registered in India;

ii. all persons who own or possess, or engage in leasing, operating, transferring or maintaining a UAS in India; and

iii. UAS which are being operated in or over India for the time being.

Further, the New Rules only apply to the civil use of drones and exclude the applicability of the Aircraft Rules, 1937 for drones with an aggregate weight of up to 500 kgs. New Rules do not apply to UAS belonging to or used by the naval, military or air forces in India.

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B. Categorization and Classification of UAS

The New Rules categorize UAS into aeroplane, rotorcraft and hybrid unmanned aircraft system. These categories are further sub-categorized as follows:

i. Remotely piloted aircraft system ("RPAS"): This includes a remotely piloted aircraft, its associated remote pilot stations, the required command and control links and any other components as specified in the type design.

ii. Model RPAS: These are RPAS which have a maximum all-up weight of 25 kgs, which are used for educational, research, design, testing or recreational purpose only and operated within visual line of sight.

iii. Autonomous UAS: Unlike the Earlier Rules, the Rules do not define autonomous UAS. Hence, the degree of autonomy that would be required for a UAS to be considered as autonomous would need to be evaluated further.

Further, the classification of drones under the New Rules is similar to the Earlier Rules (i.e., weight-based classification), with one exception being that under the Earlier Rules, Nano Drones would be categorised as Micro Drones, if the Nano Drone exceeded the stipulated performance parameters based on the maximum speed, height or range attainable from the remote pilot (i.e. performance-based classification). The New Rules have done away with this performance-based reclassification of Nano Drones, which will benefit the industry at large. The classification is as follows:

i. **Nano**: Less than or equal to 250 g.

ii. **Micro**: Greater than 250 g and less than or equal to 2 kg.

iii. **Small**: Greater than 2 kg and less than or equal to 25 kg.

iv. **Medium**: Greater than 25 kg and less than or equal to 150 kg.

v. **Large**: Greater than 150 kg.

C. Authorization Framework

As against the Earlier Rules which required extensive authorisations and certifications at each stage of the life cycle of a drone, the New Rules have simplified this process to a great extent. The two primary requirements under the New Rules for a drone are the type certificate and unique identification number ("UIN").

i. **Type Certificate**

A drone is not permitted to be operated in India unless it conforms to a type certificate or is exempted from the requirement of a type certificate under the New Rules.

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108. Aeroplane has been defined under the New Rules as “any power-driven heavier than air aircraft machine deriving support for its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight”.

109. Rotorcraft has been defined under the New Rules as “a heavier than air aircraft supported in flight by the reactions of the air on one or more power driven rotors on substantially vertical axes”.

110. Hybrid unmanned aircraft system has been defined under the New Rules as “a heavier than air unmanned aircraft capable of vertical take-off and landing which depends principally on power driven lift devices or engine thrust for the lift during the flight regimes and on non-rotating airfoil for lift during horizontal flight”.

111. Nano: Less than or equal to 250 grams; Micro: Greater than 250 grams and less than or equal to 2 kg; Small: Greater than 2 kg and less than or equal to 25 kg; Medium: Greater than 25 kg and less than or equal to 150 kg; and Large: Greater than 150 kg.
The New Rules provide that the Government of India may specify the standards for obtaining a type certificate, based on the recommendations of the Quality Council of India (“QCI”). The standards may also promote Indian-made technologies and Indian regional navigation satellite system. The active involvement of the industry in standard setting is indeed a welcome move and would go a long way in ensuring that these standards align with global standards and practical considerations of the industry.

The issuing authority for the type certificate will be the DGCA, or an entity authorised by it, based on the recommendations of the QCI or any authorised testing agency (“ATA”). The application is to be made on the digital sky platform (“Platform”) which will then be examined by the QCI or ATA. Importantly, the New Rules provide a specific timeline of 60 days from the date of the application, within which the QCI / ATA must submit its recommendations to the DGCA. The DGCA is also required to issue the type certificate for the specific type of drone within 15 days of receiving the QCI / ATA report. The specific provisions regarding timelines for the relevant authorities to process the application, as we had noted in our analysis of the Earlier Rules, is crucial for interested stakeholders who would need to prepare their business plans well in advance, and therefore, is another welcome change.

Further, if a “Contracting State” has granted approval to any type of drone, the DGCA may also issue a type certificate to such a type of drone, provided that the same has been notified by the Central Government.

The previous regimes contained a high number of safety features required to be installed on all types of drones – which was another cause of worry for the industry. While the New Rules do not expressly mention these safety features, they provide that the Government may notify mandatory safety features, including no permission-no take-off hardware and firmware, real time tracking beacon and geo-fencing capability. As of today, there do not appear to be any mandatory safety features to be installed on drones. However, the specific mention of the above features suggests that the Government seeks to make at least these features mandatory in the near future. Every drone owner would subsequently have to ensure the adoption of these features within 6 months from the notification.

### ii. Exemptions from type certificates

- **a.** Nano Drones and Model RPAS have been exempted from the requirement of a type certificate for their operations.

- **b.** In addition, the New Rules also exempt the requirement of a type certificate for the manufacture and import of drones.

The said exemptions would provide much-needed relaxation when compared to the Earlier Rules where drone manufacturers and importers were also required to register themselves first, in addition to obtaining a certificate of manufacture / airworthiness for commencing the manufacturing / importing process.

### iii. Registration of drones

The New Rules further require drones to be registered on the Platform and obtain a UIN, before they can be operated. Under the application process, once the required details of the individual/organisation and the drones are submitted, the Platform will verify the details and issue a UIN to the applicant. Additionally, the transfer of a type certificate to a new owner will require registration of the drone on the Platform, as per the requirements of the New Rules.
of drones through sale, lease, gift, or otherwise, is also required to be registered with the platform. In stark contrast with the type certification process, there does not appear to be a timeline for the Platform to process the registration, and it is unclear if the Platform will physically inspect the drone and the applicant. We would recommend that these details should be clarified by the Government at the earliest.

Interestingly, no category of drones has been exempted from the requirement of obtaining a UIN, including Nano Drones except for drones being used for R&D purposes. However, a one-step and one-time procedure for registration should not be too cumbersome for drone operators and would also ensure accountability of such operators.

The UIN allotted to a drone must be connected to the “unique serial number” provided by the manufacturer and of the drone’s flight control module and remote pilot station. However, the New Rules do not clarify whether the unique serial number will be something issued by manufacturers themselves or if it will be issued by the authorities to each manufacturer. The New Rules prohibit the replacement of the flight control module and remote pilot station without updating the unique serial number thereof with the digital sky Platform within 7 days of such replacement or before operation of the drone, whichever is earlier.

A window till December 30, 2021 has been provided to drones which have been manufactured in or imported to India on or before November 30, 2021 to register on the Platform and obtain a UIN. If the drone has (i) a valid Drone Acknowledgement Number issued by the Platform before November 30, 2021; or (ii) has a Goods and Services Tax paid invoice for the drone; or (iii) is part of the list of UAS published on the platform; the Platform will issue a UIN for the drone.

**D. Insurance**

The provisions of the Motor Vehicles Act, 1988 apply mutatis mutandis to third party insurance of UAS and on compensations in case of damage to the life and property caused by such UAS.

**E. Relaxations on Foreign Companies**

The Earlier Rules contained specific restrictions on foreign entities or their majority / wholly owned Indian subsidiaries on owning / operating / manufacturing or otherwise dealing with drones in India. The Government has done away with the restrictions at least on foreign-owned and controlled Indian companies ("FOCC") to conduct drone operations in India. Therefore, for the first time since the sector has become regulated, the drone regime has been liberalised and permits FOCCs to manufacture and operate drones in India, among other things. The liberalisation is likely to bring in foreign investment, in addition to safer and more advanced technology for drones, which would otherwise have to be developed from scratch by domestic entities.

Further, FOCCs appear to have been permitted to own and operate remote pilot training organisations as well, which is another space where the know-how of more technologically advanced countries can be put to use.

**F. Operation of UAS**

The permissions required for drones has also been relaxed to a great extent. The Government will notify an interactive map by September 25, 2021 which is proposed to be accessible through a machine-readable API. The map will divide the entire Indian airspace into three zones namely:

i. **Green**: Includes (a) the airspace up to a vertical distance of 400 ft or 120 m for all zones which have not been categorised as red or yellow; and (b) the airspace up to a vertical distance of 200 ft or 60 m above the area located between a lateral distance of 8 kms and 12 kms from the perimeter of an operational airport.
ii. **Yellow:** Includes (a) the airspace above 400 ft or 120 m in the designated green zone and (b) the airspace above 200 ft or 60 m in the area located between the lateral distance of 8 km and 12 km from the perimeter of an operational airport

iii. **Red:** Will include areas notified by the Central Government and may include installations, port limits or areas beyond territorial waters of India.

The Rules do not require any permission to be obtained for drone operations in the green zone, provided that the remote pilot mandatorily self-verifies the Platform for restrictions on the intended area of operations. Operations in the green zone would therefore only require a type certificate and UIN, which will be one-time procedures. On the other hand, operations in the yellow zone and red zone require the permission of the air traffic control authority and Central Government, respectively. Therefore, the Government appears to have taken a pragmatic view which takes into account security concerns but does not contain prohibitive requirements either.

From a safety perspective, the Rules put the onus on the drone operator to ensure that the operations do not, whether directly or indirectly, endanger the safety and security of any person or property. The carriage of dangerous goods (except in compliance with the Aircraft (Carriage of Dangerous Goods) Rules, 2003 and arms, ammunitions, and explosives is prohibited. Further, the remote pilot of a drone which is involved in an accident is required to report the same to the DGCA through the digital sky platform. Interestingly, there is no such requirement for an autonomous drone. Moreover, the definition of “accident” under the Rules does not include any incident involving damage to property. Further, all drones apart from Nano Drones are required to obtain third party insurance before operations in line with the Motor Vehicles Act, 1988 and rules thereunder.

### i. Autonomous and BVLOS operations

Except in case of Model RPAS, the New Rules do not contain any express restrictions on or permissions required for BVLOS operations. Given the lack of guidance on BVLOS operations, various industry players might find it challenging to build their future course of action since any subsequent change in regulations can drastically affect R&D operations as well as business plans. Therefore, it is recommended that some guidelines be provided regarding such operations.

Further, apart from the definition of UAS, references to autonomous operations of drones is conspicuously absent from the Rules. Since autonomous drones do not involve a pilot, it is unclear if any license is required for autonomous drone operations. This appears to be a lacuna in the Rules where pilot-operated drones are subject to more security requirements than autonomous drones, which are generally perceived to involve higher risks.

### ii. Carriage of payload

There are also no guidelines on carriage of payload, except the restricted items mentioned above. This again could prove problematic for players looking at commercial use of drones for deliveries and logistics. In the absence of guidelines, there is no clarity on the kind of carriage that would be permitted, and whether it would entail BVLOS carriage as well. As a result, it is difficult for businesses to plan their operations in this regard, and further regulatory developments in this regard would have to be evaluated.

On the positive side, the Earlier Rules only permitted the carriage of goods under a specific license which could be interpreted to mean that drones cannot carry passengers (humans, animals, etc.). Given the lack of specific language in the Rules, the Government appears to have enabled the entry of drone taxis as well. In fact, the Aviation Minister Jyotiraditya Scindia has expressed that drone taxis may soon become a reality under the new
iii. Model RPAS operations

Model RPAS are limited purpose drones, which can be used only for educational, research, design, testing or recreational purposes. They must not weigh more than 25 kgs, and should only be operated within visual line of sight. As mentioned above, no type certificate is required for Model RPAS, however, a UIN is required for such drones.

G. Remote Pilots and Training Organisations

Except for operating a Micro Drone for non-commercial purposes, Nano Drones and R&D purposes, all drone operations require the pilot to be a holder of a valid remote pilot license (“RPL”). Individuals are eligible to apply for an RPL only if:

i. they are aged between 18-65 years of age;

ii. have passed grade 10th examinations or equivalent; and

iii. have completed the training specified by the DGCA from an authorised remote pilot training organisation (“RPTO”).

The individual is required to make an application to the DGCA on the Platform for any category, sub-category or class of UAS upon completion of the training within 7 days. The individual will be granted a remote pilot certificate and within 15 days of issuance of such certificate, Once granted, the license will be valid for 10 years and can be renewed for a further period of 10 years thereafter.

RPTOs are also required to obtain an authorisation from the DGCA before they impart training for remote pilots. The eligibility criteria for RPTOs to be authorised will be notified separately. The RPTO is required to apply to the DGCA through the Platform for authorisation, and once the authorisation is granted, it will be valid for a period of 10 years.

H. Research and Development

The Earlier Rules contained highly restrictive provisions relating to the conduction of research, development and testing (“R&D”) operations, requiring an authorisation even before R&D had commenced. This has also been significantly relaxed in the New Rules wherein any drone manufacturer having a GST identification number can conduct R&D without requiring a type certificate, UIN, prior permission or even a RPL. The Earlier Rules required compliance with all requirements of authorizations prior to commencing R&D operations which acted as an entry barrier to new entrants in the drone regime.

In terms of conducting R&D activities by such eligible entities, the New Rules require the R&D operations to be conducted only in green zone and either within the premises of the person conducting the operations or within an open area in a green zone under such person’s control. While the earlier rules envisioned a safety measure to hold such testing operations 50m away from uninvolved personnel, the New Rules lack this safety measure that may be adopted in the near future.

Another Notable point in light of the new regime is that, the R&D operations may include drones of any size, right up to 500 kgs since there has been no limit placed on the type of drones that may be utilized for R&D purposes. From the

perspective of the broader drone ecosystem, the authorities could consider registration requirements for drones being used for R&D to keep a track of the R&D operations which could be achieved through a UIN registration.

Given that regulatory and compliance requirements often act as entry barriers, the new relaxations will provide a significant boost especially to startups which are exploring opportunities in the drone sector.

I. Import of UAS

The New Rules provide that import of UAS shall be regulated by the Directorate General of Foreign Trade or any other entity authorised by the Central Government. The import of UAS is "Restricted" and requires prior clearance of the DGCA and an import license from the DGFT. Nano Drones which operate below 15 metres above ground level are exempted from this requirement, but they require an Equipment Type Approval from the WPC Wing of the Department of Telecommunications ("DoT") for operating in de-licensed frequency band(s) as per telecom requirements. It remains to be seen if the performance-based restriction on Nano Drones, which is a remnant of the Earlier Rules will continue in light of the New Rules. In the past, representations have been made to the DGCA given the challenges faced by importers of UAS with customs authorities, who at times have required Nano Drones to be geo-fenced prior to import which now is not mandatory under the New Rules. Hence, it will be interesting to see if the DGFT permits the import of Nano drones (which are not geo-fenced) under the said exemption.

J. Safety Concerns

While the New Rules are encouraging for various players to explore and build the drones sector, there does appear to be a general lack of framework regarding the operations of a drone from a safety and security perspective. Once a type certificate and UIN has been obtained, drones may be operated freely in green zones, which, in the absence of further guidance, may include densely populated civilian areas as well. While there is a reporting requirement for drone accidents, there could perhaps be further measures towards prevention of such accidents in the first place. For example, it is unclear if there will be a check on drone operations being conducted basis the type certificate. There are also no safety features which are required to be inbuilt into drones currently.

Moreover, with respect to carriage of payload, it is not that just specifically dangerous goods may endanger life or property during drone operations. At the height that drones operate, even relatively light objects can cause injury and damage if for some reason they get dropped from the drone.

On a similar note, while Model RPAS have been exempted from requiring type certificates, they may weigh up to 25 kgs, which is a significant size and there is no restriction on the areas (within the green zones) that they may operate. Since ‘recreational purpose’ has also not been clearly defined, this leaves scope for possible abuse of the relaxation granted to Model RPAS. It could be considered whether heavier Model RPAS should require a type certificate, since the process is one-time. This would likely go a long way in ensuring that before being deployed in common spaces, they undergo a safety check.

R&D operations have also been given an exemption from all certification and registration requirements. Notably, R&D operations may include drones of any size, right up to 500 kgs. From the perspective of the broader drone ecosystem, it would be pragmatic to keep track of the R&D operations, which could be done achieved through a UIN registration requirement of such entities based on the size of the drones they are operating. Further an “open area” in a green zone should also be defined – currently it is unclear if test flights can be conducted over areas which might be “open” but may have a significant number of civilians.

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116. DGFT Import Policy, Schedule I, Chapter 88.
Therefore, the need for further regulations regarding operations of drones, especially the carriage of payload should be further evaluated.

K. Penalties

The New Rules only criminalise the carriage of weapons and explosives and the operation of drones without permission. Moreover, it shall be a valid defence to any proceedings under the New Rules if the contravention is proved to have been caused due to factors or circumstances beyond the control of the relevant person or without the knowledge or fault of such person such as stress of weather, or any other unavoidable cause or circumstances. This does not, of course, exempt liability under other laws. For any other contravention of the New Rules, a maximum penalty of INR 1 lakh (approx. USD 1350) has been prescribed.

II. PLI Scheme for Drones

In a recent press release dated September 15, 2021, the Central Government launched a Production-linked Incentive (“PLI”) scheme for drones and drone components with the aim of making India a global drone hub by 2030. The PLI scheme comes as a follow-up to the New Rules. Under the scheme, the Government of India's projection is that the drone industry may see an investment of over INR 5000 crore or 6.8 billion USD over the next three years.

The amount allocated for the scheme is INR 120 crore spread over three financial years which may be extended or redrafted after studying its impact in the industry. The incentive for a manufacturer of drones and drone components covered under the scheme, shall be as high as 20% of the value addition made by them which is calculated as the annual sales revenue inclusive of GST minus the purchase cost (net of GST) of drone and drone components. This rate is to be kept constant at 20% in the drone industry unlike PLI rates in other sectors which reduce every year. The list of eligible components may be expanded by the Government in the future and could also include drone-related IT products. The incentive payable to a manufacturer shall be 20% of the value addition made by him, with the minimum being 40% of net sales for drones and drone components.¹¹⁷

6. Related Regulatory Framework

I. Foreign Direct Investment (“FDI”)

The erstwhile Department of Industry Policy and Promotion (now Department for Promotion of Industry and Internal Trade (“DPIIT”)) issued a Press Note No. 3 (2014 series), that classified Drones / Unmanned Aerial Vehicles (“UAV”) as a ‘defence aircraft’, hence mandating an industrial license for the manufacture of drones. This applied even if the drones were being manufactured for civil purposes. Hence, Drones were deemed to be dual list items. Although, the DPIIT through Press Note 1 (2019 series) exempted a select category of UAVs (“Exempted Drones”), from the meaning of ‘defence aircraft’, a large number of UAVs continue to fall outside the list of Exempted Drones. From an FDI perspective, drones which do not fall within the category of Exempted Drones could be classified as defence items, irrespective of their use, hence investments in such companies may be linked to the FDI conditionality’s of the defence sector. However, unlike the Earlier Rules, there are no express restrictions in the New Rules on Indian companies being owned and controlled by foreign companies.

Further, the current FDI policy is also not clear on the status of companies proposing to provide non-scheduled air transport service (delivery services via drones) and whether the same could fall under non-scheduled air transport service (for civil use) where 100% FDI is permitted under the automatic route.

II. Intellectual Property Rights

As more and more advanced drones are invented with unique utilities, it opens up avenues for protection by the grant of patents. For example, companies like Amazon and Walmart have invested in patenting drones for deliveries to customers. In fact, Amazon has now patented delivery vans which are capable of launching drones for last-mile deliveries as well.118

Under the Indian Patents Act, 1970 (“Patents Act”), although there is no express restriction on filing patent applications in relation to drone inventions, specific procedures need to be adhered to if the invention has an impact on defence or national security,119 and the grant of such patents may be subject to prior government approvals (including the Indian Ministry of Defence). Currently, it is unclear if patents for civil use drones would also require this additional approval, and this aspect will be required to be evaluated further.

III. Data protection and Privacy

The current data protection laws fall under the Information Technology (Reasonable Security Practices and Procedures and Sensitive Personal Data or Information) Rules, 2011 (“Data Protection Rules”). The Data Protection Rules mainly regulate the collection, use, storage, transfer and disclosure of personal data / sensitive personal data in India by a body corporate.

There are basically two categories of information covered under the IT Act that need to be considered with respect to data protection:

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119. See Chapter VII of the Patents Act.
6. Related Regulatory Framework

- **Personal information (PI),** which is defined as any information that relates to a natural person, which, either directly or indirectly, in combination with other information available or likely to be available with a body corporate, is capable of identifying such person.

- **Sensitive personal data or information (SPDI),** which is defined as such personal information that consists of information relating to:
  - password;
  - financial information such as bank account, credit card, debit card, or other payment instrument details;
  - physical, physiological, and mental health condition;
  - sexual orientation;
  - medical records and history;
  - biometric information.

The Data Protection Rules are applicable to any entity that is engaged in the collection, receiving, possessing, storing, dealing, or handling of SPDI using electronic media and sets out rules for protection of SPDI by such entities.

The rules include the requirement that an entity must obtain the consent of the person whose SPDI is collected, inform them of the purpose for which the SPDI is collected, as well as give them the option of withdrawing the consent given for collection of SPDI modifying the SPDI that has been provided by them to the entity. Certain additional requirements have also been specified in the Data Protection Rules.

Notably, the Data Protection Rules are applicable only to entities located within India. Further, they apply to data collected, stored, processed etc in electronic form. Thus, if SPDI of individuals is collected, received, processed, stored, dealt with, and handled outside India, the Data Protection Rules will not be applicable. However, the local data protection laws (i.e., as applicable to the FEI) may apply in relation to such individuals.

It is unlikely that the information collected by drones would qualify as SPDI, as defined above. Nevertheless, if drones do capture physiological information, or any other forms of SPDI, the relevant body corporate would be required to comply with the Data Protection Rules.

In India, the right to privacy was recognized by the Supreme Court as a fundamental right in **Justice K. S. Puttaswamy (Retd.) v. Union of India**120 (“Puttaswamy Judgment”). Pursuant to this judgment, the Ministry of Electronics & Information Technology set up a Committee of Experts. Subsequently, the process for overhaul of the data protection laws in India has been fairly active, with various draft bills having been released. The latest publicly available draft of the proposed law is similar to EU’s General Data Protection Regulation (EU GDPR) and aims towards protection of wider categories of data, regulation of cross-border data flows, data localization, and enhanced obligations on data controllers.121

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IV. Geospatial data

The Government of India, through the Department of Science and Technology ("DST"), recently issued “Guidelines for acquiring and producing geospatial data and geospatial data services including Maps” ("Guidelines")\(^{122}\) and other products and services offered by government bodies, individuals and private organisations. Under the Guidelines, the Government has considerably liberalized the collection, use and processing of Geospatial Data. Since one of the major use cases of drones is aerial photography and surveying, the data collected by drones could be categorised as Geospatial Data and be regulated by the Guidelines.

While the Guidelines liberalise the laws on Geospatial Data significantly, they also contain certain restrictions thereon. For instance, the Guidelines place certain restrictions on creation, owning and processing of certain geospatial data, most of which are imposed on entities which are not Indian Entities\(^{123}\) ("Foreign Entities"). This becomes relevant especially if data collection and processing activities are undertaken by drone companies which are not Indian Entities.

V. Tort law

While there are no significant case laws as such on drones in India, the principles of torts such as trespass, nuisance, privacy, harassment, hurt and negligence will play an instrumental role in the development of jurisprudence in this sector. For e.g., flying a drone over another individual’s land may amount to trespass and nuisance. However, nuisance requires establishing harm, which may include damage to land, interference with the easement, discomfort or inconvenience. Spying or unauthorized surveillance may also amount to nuisance, particularly when done with a deliberate attempt of causing harassment.

Similarly, injuries caused due to crash of drone or technical defaults to an individual may trigger a claim of hurt and may also involve principles of vicarious liability of the owner or the operator of the drone causing the injury under tort law. It will be interesting to see how courts will apply these principles on the functioning of drones and other new technologies, in due course of time.

VI. Tax aspects

Developments in technology, internet, cloud computing and IoT have given rise to various tax issues globally. In the Indian context, global enterprises catering to Indian customers have faced difficulties with Indian tax authorities taxing e-commerce and internet-based business models in a manner that conflict with international approaches. There has been significant litigation in this respect, especially in relation to characterization of income and withholding taxes. Another emerging area where such issues is likely to come up, is the usage of drones.

A. Direct Tax Implications

Taxation of income in India is governed by the provisions of the Income Tax Act, 1961 ("ITA"). Under the ITA, residents are subject to tax in India on their worldwide income, whereas non-residents are taxed only on income accrued or brought into India.

\(^{122}\) Our detailed analysis of the Guidelines is available at: https://www.nishithdesai.com/SectionCategory/14/TechnologyLawAnalysis/12/60/TechnologyLawAnalysis/4678/1.html.

\(^{123}\) Paragraph 7(f) of the Guidelines define an "Indian Entity" as "Any Indian citizen, Government entities, Societies registered under applicable statutes, statutory bodies, Autonomous Institutions of the Government, or any Indian company or Indian LLP owned by resident Indian citizens or any Indian company or Indian LLP controlled by resident Indian citizens (as defined in the Explanation to Rule 23 of the Foreign Exchange Management (Non-Debt Instrument) Rules, 2019)". As a corollary, Foreign Entities would include Indian companies which are not owned and controlled by resident Indian citizens. However, the definition of Indian Entity does not expressly exclude branch offices and liaison offices and this would need to be evaluated further.
6. Related Regulatory Framework

sourced in India. However, non-residents, who are resident of a country with which India has signed a tax treaty, have the option of being taxed as per the tax treaty or the ITA whichever is more beneficial.

The corporate tax rate\(^{124}\) in India is 30% (on fulfillment of certain conditions, the rate can be reduced to 22% /25% and 15% for manufacturing companies) for resident companies and 40% for non-resident companies (to the extent of income sourced in India). Further, subject to tax treaty relief, withholding tax of 10% (on a gross basis) is applicable in case of royalties and fees for technical services (“FTS”) paid to non-residents. In case of failure to withhold, the payer could be liable for the principal tax amount, interest (at 12% per annum) and penalty (up to 100% of the principal tax amount). Further, the payer could face the risk of not being allowed to claim expense deduction (for the royalty / FTS payment) while computing its taxable profits.

The use of drones could lead to risk of permanent establishment (“PE”) on account of physical presence in countries. Traditionally, a PE may be constituted if a foreign entity generates income from another country either through a fixed place of business or through employees or dependent agents located in the other country.

However, these rules were formulated in the era of brick and mortar and did not envisage the new and disruptive business models enabled by the onset of the digital economy, propelled by technological advancements, including UAVs. These unique business models have given rise to concerns that multinational enterprises may be able to rely on the existing tax rules to artificially reduce taxable income or shift profits to low-tax jurisdictions in which little or no economic activity is performed. These concerns have prompted countries around the world to come together to revise the international tax framework through the Base Erosion and Profit Shifting Action Plans (“BEPS Action Plan”) and the Multilateral Instrument (“MLI”).\(^{125}\) Among other things, the MLI proposes an expansion of the PE definition, which is hopefully aimed at business models precipitated by the digital economy.\(^{126}\)

Industries and sectors where such drones are likely to be used, specifically for commercial purposes are global in nature. It is possible that the usage of drones by these enterprises in multiple jurisdictions could potentially give rise to PE status in such jurisdictions. In such cases, the manner in which such drones are to be deployed would have a significant bearing on the level of PE risk involved.

Just one example is Amazon, which is reported to be looking at the option of using drones for delivery of goods instead of delivery executives. Owing to the nature of their global operations, their headquarters may be in one jurisdiction, but it may have a presence in other jurisdictions in the form of warehouses, branch offices, liaison offices, godowns etc. to effectively carry out business activities in each jurisdiction. The likelihood of the existence of a PE increases in such scenarios. Whether the use of drones increases the risk of a PE being constituted in any of such jurisdictions would depend greatly on the manner in which the drones are integrated into Amazon’s business model.

Patent Box Regime

India has also introduced a new patent box regime. Under the patent box regime, worldwide income derived by an Indian resident from a patent developed and registered in India is taxed on a gross basis at a concessional rate of 10%. The patent box is an attractive proposition for India-based drone developers.

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124. All tax rates mentioned in this paper are exclusive of surcharge and cess.
125. The latter is a multilateral treaty designed to simultaneously amend a majority of existing bilateral tax treaties to bring them in line with the proposals set out in the BEPS Action Plans.
126. This is not to say that foreign companies using business models involving the use of technology (including drones) do not run the risk of having a PE in another country. Rather, once in effect, the BEPS proposals substantially increase that risk.
B. Indirect Tax Implications: Goods and Service Tax

GST, effective in India since July 1, 2017, has comprehensively replaced the erstwhile indirect tax regime. India has a dual GST system with both the Central Government and the State Governments (and Union Territories) levying separate but concurrent taxes on supply of goods and services. The legislative framework of GST primarily comprises the Central Goods and Services Act, 2017 ("CGST Act") and the Integrated GST Act, 2017 ("IGST Act") enacted by the Parliament and State GST Acts ("SGST Acts") enacted by legislature of each state.

Section 7 the CGST Act provides the scope of supply to include inter-alia all forms of supply of goods or services or both made or agreed to be made for a consideration by a person in the course or furtherance of business. GST is payable as per the fixed slab rates defined by the government.

GST is levied at rates that vary between nil – 28% depending on the rate schedule applicable to the supply in question. To prevent cascading of taxes, a uniform input tax credit system is available in respect of input supplies of goods or services used or intended to be used in the provision of output supplies of goods or services or both. GST is a consumption tax and is typically passed on to the consumer of the good / service as part of the price.

As a general rule, the import of goods or services or both into India qualifies as a taxable inter-state supply chargeable to IGST, while the export of goods or services or both from India is treated as a zero-rated supply not chargeable to tax under the GST regime.
7. Concerns with Drone Use

Drones have many cutting-edge applications which are becoming increasingly mainstream. Drones are being used for the instant delivery of blood vessels, harvested organs, and other critical medical supplies worldwide. Creating the ability to deliver critical supplies without the risk of traffic delays to potentially save numerous lives makes them an important potential player in every industry in our country. They are also used for enhancing agricultural efficiency by identifying factors such as moisture content and nutrient soil availability. Many drones also have autonomous functionality, to the extent that they avoid collisions and in some instances the drones are only provided general instructions or waypoints to follow, with the rest being left up to the drone.

Concerns pertaining to privacy, including accuracy and safeguards for information collected are prominent ethical issues in relation to the enhanced data gathering capabilities of drones. Further, the absence of adequate safeguards and regulations with respect to the use of drones raise several concerns. These relate to both legal and ethical issues such as rogue drones, major airspace collision accidents, government overreach, private-party data aggregation and invasion of privacy. It is imperative that these concerns are acknowledged and addressed efficiently by adequate regulations.

Additionally, with the corporate sector's intention of using drones cost-efficiently, such as for long-distance deliveries, regulations are needed to prevent crowded skies and to address the concern of aerial trespassing.

I. Surveillance

With the advancement in camera resolution and higher altitude capabilities of drones, people may be unaware that they are under constant surveillance. By the virtue of their design and size, drones could in some cases have the capability of operating undetected, allowing the user to monitor people without their knowledge. Hence, use of drones from a surveillance perspective should always be balanced from a national security and privacy perspective.

II. Safety concerns

The opening up of national skies for the private and domestic use of UAS can potentially have globally detrimental effects at both commercial and administrative levels. There can be instances wherein a civilian drone pilot may be flying his drone in civilian airspace but accidently enters military airspace and gets access to information which the public is not allowed to see or have access to. It also increases the risk of possible accidents caused by collisions, battery failures, loss of navigational control or other equipment, etc.

Hence, it is imperative that in order to avoid such hazards, UAS should be equipped with the ability to detect and avoid other aircrafts while moving through the air. Additionally, the regulatory authorities must prescribe minimum quality and technology standards, which must be used for manufacturing of drones so as to mitigate the said risks.

As drones may not see where they are headed, there also exists a possibility of airspace collisions with aircraft, bystanders, or property in general. Such accidental harms may be caused due to loss of control or technical miscalculations. Targeted attacks can also take place, thus endangering physical safety. Given the absence of requirement pertaining to conducting drone activities away from civilians even for R&D purposes, determining the open areas which may be utilized for such activities becomes crucial in light of the New Rules.
7. Concerns with drone use

III. Need for Insurance

The damages caused by drone accidents to properties can be massive. To curb its impact, it is important for the insurance sector to catch up. The necessity of underwriting for drone liabilities cannot be undermined and, thus, relevant products should be developed and regulated to allay these concerns.

IV. Supply chain threat

As these drones are manufactured in foreign countries, the host nation may fear that they have ‘hidden backdoors’. For instance, in case of drones being manufactured in China, the US government is wary of the possibilities of illegal communication of sensitive data to the Chinese government when such drones are operated in India. This is also referred to as ‘Supply Chain threat’.127

V. Cloud Storage

Many drones immediately upload the captured data online. Cloud storage is highly susceptible to theft if the storage service has not been secured properly.128 If such data happens to be sensitive in nature, the consequences of theft can be grave.

There are similar concerns with self-driving cars – if someone is able to hack into the vehicle computer through an unsecure network, they could deliberately crash it. With drones, the danger is that a malevolent individual / entity might be able to hack into the drone and manipulate the same, and perhaps even crash it into a building, moving vehicle or pedestrian resulting in loss of life or property.

VI. BVLOS Operations

The New Rules are silent on conducting BVLOS operations which companies in present times seek to undertake given the huge potential drones bring in, to the commercial usage and reach for such companies. While the New Rules have enabled greater access to the sky for the players and has eased the process of gaining permissions and undertaking operations, it fails to supervise such BVLOS operations which may pose various concerns in the future in terms of safety of civilians, management risks, air collision liabilities, loss of control, etc.

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128. Id
8. Conclusion

Countries worldwide are looking into the regulation of drones in order to keep up with the development in technologies, while also ensuring safety and security of the citizens. Various countries such as the US, Australia, Singapore, South Africa have adopted regulations governing the management, manufacture and operation of drones while numerous others are in the process of deliberation and consultation to lay down comprehensive regulations for this technology. India too has taken a step in this direction by introducing the New Rules which enable greater flexibility for drone operations in the country to enable growth and development of numerous industries who seek to adapt drone technology for its services.

No doubt, drones are gaining importance in light of their tremendous potential in application and usage in every field in India and worldwide. Delivery by drones is becoming increasingly popular particularly for last-mile logistics in case of smaller deliverables. Drones are being used for delivery of medical supplies to remote areas and organs for transplantations in the healthcare arena. In the future, drones could substitute large logistics and be efficient in terms of energy consumption, public safety, air pollution, city noise, air traffic management, road congestion, urban planning, and goods and service consumption patterns in urban areas. Similarly, the use of drones for surveying, disaster management, search and rescue operations, etc. will all be crucial in ensuring that they can be used to save human lives (and even wildlife and resources).

While the New Rules have opened up the drone sector entirely to both domestic and global players, the work is far from finished. With the increasing number of stakeholders in the sector, new regulatory and security concerns will also arise, which will need to be evaluated by the participants. The development of public trust in drones will require considerable efforts from all stakeholders towards ensuring that drone operations are safe and welcome. Given the liberalised regime, industry players can consider detailed consultations on standards to be adopted and even a self-regulatory mechanism perhaps to ensure that the actions of one or two negligent operators do not lead to an unfavourable opinion of the public regarding drones.

That said, the time is ripe to explore the infinite possibilities that now exist in the Indian drone sector. With the New Rules in place, the sky is indeed the limit for drones.


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Research @ NDA

Research is the DNA of NDA. In early 1980s, our firm emerged from an extensive, and then pioneering, research by Nishith M. Desai on the taxation of cross-border transactions. The research book written by him provided the foundation for our international tax practice. Since then, we have relied upon research to be the cornerstone of our practice development. Today, research is fully ingrained in the firm’s culture.

Our dedication to research has been instrumental in creating thought leadership in various areas of law and public policy. Through research, we develop intellectual capital and leverage it actively for both our clients and the development of our associates. We use research to discover new thinking, approaches, skills and reflections on jurisprudence, and ultimately deliver superior value to our clients. Over time, we have embedded a culture and built processes of learning through research that give us a robust edge in providing best quality advices and services to our clients, to our fraternity and to the community at large.

Every member of the firm is required to participate in research activities. The seeds of research are typically sown in hour-long continuing education sessions conducted every day as the first thing in the morning. Free interactions in these sessions help associates identify new legal, regulatory, technological and business trends that require intellectual investigation from the legal and tax perspectives. Then, one or few associates take up an emerging trend or issue under the guidance of seniors and put it through our “Anticipate-Prepare-Deliver” research model.

As the first step, they would conduct a capsule research, which involves a quick analysis of readily available secondary data. Often such basic research provides valuable insights and creates broader understanding of the issue for the involved associates, who in turn would disseminate it to other associates through tacit and explicit knowledge exchange processes. For us, knowledge sharing is as important an attribute as knowledge acquisition.

When the issue requires further investigation, we develop an extensive research paper. Often we collect our own primary data when we feel the issue demands going deep to the root or when we find gaps in secondary data. In some cases, we have even taken up multi-year research projects to investigate every aspect of the topic and build unparalleled mastery. Our TMT practice, IP practice, Pharma & Healthcare/Med-Tech and Medical Device, practice and energy sector practice have emerged from such projects. Research in essence graduates to Knowledge, and finally to Intellectual Property.

Over the years, we have produced some outstanding research papers, articles, webinars and talks. Almost on daily basis, we analyze and offer our perspective on latest legal developments through our regular “Hotlines”, which go out to our clients and fraternity. These Hotlines provide immediate awareness and quick reference, and have been eagerly received. We also provide expanded commentary on issues through detailed articles for publication in newspapers and periodicals for dissemination to wider audience. Our Lab Reports dissect and analyze a published, distinctive legal transaction using multiple lenses and offer various perspectives, including some even overlooked by the executors of the transaction. We regularly write extensive research articles and disseminate them through our website. Our research has also contributed to public policy discourse, helped state and central governments in drafting statutes, and provided regulators with much needed comparative research for rule making. Our discourses on Taxation of eCommerce, Arbitration, and Direct Tax Code have been widely acknowledged. Although we invest heavily in terms of time and expenses in our research activities, we are happy to provide unlimited access to our research to our clients and the community for greater good.

As we continue to grow through our research-based approach, we now have established an exclusive four-acre, state-of-the-art research center, just a 45-minute ferry ride from Mumbai but in the middle of verdant hills of exclusive Alibaug Raigadh district. Imaginarium AliGunjan is a platform for creative thinking; an apolitical eco-system that connects multi-disciplinary threads of ideas, innovation and imagination. Designed to inspire ‘blue sky’ thinking, research, exploration and synthesis, reflections and communication, it aims to bring in wholeness – that leads to answers to the biggest challenges of our time and beyond. It seeks to be a bridge that connects the futuristic advancements of diverse disciplines. It offers a space, both virtually and literally, for integration and synthesis of knowhow and innovation from various streams and serves as a dais to internationally renowned professionals to share their expertise and experience with our associates and select clients.

We would love to hear your suggestions on our research reports. Please feel free to contact us at research@nishithdesai.com
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