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DRONE DELIVERY SERVICES: A COMPARATIVE STUDY IN THE USA AND INDIA, ITS LEGAL IMPLICATIONS AND PRIVACY CONCERNS.

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ABSTRACT:

The advent of drone technology has revolutionized the logistics and transportation industries, with drone delivery services gaining significant traction globally. This legal research paper conducts a comparative analysis of drone delivery services in two prominent jurisdictions, the United States and India, and explores the associated legal implications, with a specific focus on privacy concerns. Privacy concerns, a critical aspect of drone delivery services, are examined through a comparative lens. Both jurisdictions grapple with similar issues, such as data collection, surveillance, and the protection of individuals' personal information. In the United States, drone delivery services have evolved under a complex regulatory framework, primarily governed by the Federal Aviation Administration (FAA). This paper examines the evolving landscape of drone regulations, discussing topics such as airspace management, certification requirements, and pilot licensing. It also delves into the Federal Trade Commission's role in safeguarding consumer privacy and data protection in the context of drone deliveries. In contrast, India has embarked on its journey towards integrating drone technology into its logistics sector, with the Directorate General of Civil Aviation (DGCA) taking the lead in shaping drone regulations. This study explores the evolving Indian regulatory landscape, including drone certification and registration requirements, no-fly zones, and privacy considerations under the proposed Personal Data Protection Bill. Ultimately, this comparative analysis aims to provide valuable insights into the legal challenges and opportunities surrounding drone delivery services in the USA and India, shedding light on the importance of striking a balance between technological advancement and safeguarding privacy rights in an increasingly drone-centric world.

KEYWORDS: Drone delivery services, privacy concerns, regulatory framework, pilot licensing, logistics

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INTRODUCTION:

Unmanned aircraft are revolutionizing various sectors, revolutionizing military reconnaissance, law enforcement, and commerce. They offer accurate, safer alternatives to manned planes, providing bird's-eye views at lower costs and better visibility than helicopters. Amazon has announced "Prime Air," a drone-based service that allows online customers to order products and have them delivered to their doorsteps in just minutes.[1] Although not yet operational in the US, Amazon plans to expand its "Hives" business and shipping centres to facilitate easy entry and exit of drones.[2] Amazon Hives in the US is not yet using shipping drones due to property law concerns. To ship by drone, Amazon would need to navigate low-altitude airspace, unlike shipping trucks and planes which can fly at high altitudes within FAA jurisdiction. Most drones would travel within 500 feet of the ground, making it unclear who owns this airspace.[3] The success of drone shipping in the US depends on the federal government's ability to regulate low-altitude airspace usage through the FAA. Amazon, for example, would only need permission to fly drones in specific altitude zones if the FAA owns low-altitude airspace. Amazon has already leased a proposal for "drone zoning," which divides airspace by altitude levels and regulates drone usage.[4] Surface landowners owning low-altitude airspace would require companies like Amazon to navigate more hurdles. They could obtain easements of passage through all airspace they want to fly, which would require contracting with every individual landowner. Alternatively, the local, state, or federal government could require private landowners to keep the space open for certain uses.[5] However, the first option has cost and individual drawbacks, while the second option may violate the Takings Clause of the Fifth Amendment, potentially requiring government compensation for property taken. This argues that landowners have a strong constitutional claim if governments authorize low-altitude commercial shipping drone flights over their land. The common law of navigable airspace and the Supreme Court's takings jurisprudence provide a solid constitutional claim. The FAA has not substantially asserted jurisdiction over airspace above 500 feet, and no outside party has the right to fly within the land's immediate reaches.[6] If the FAA were to assert jurisdiction over such airspace and allow private entities to fly drones, it could potentially orchestrate one of the largest uncompensated transfers of property interests in US

[1] BUSINESS INSIDER, https://www.businessinsider.in/retail/amazon-unveils-a-new-prime-air-drone-it-says-will-deliver-packages-within-months/articleshow/69667692.cms, (last visited Mar. 15, 2024)
[2] CNN BUSINESS, https://money.cnn.com/2017/06/23/technology/amazon-drone- , (last visited Mar. 15, 2024)
[3] Brian M. Miller, Drone Delivery and the Takings Clause, 6 TEX. A&M J. PROP. L. 139 (2020).
[4] *Id.*
[5] *Supra* note 4.
[6] Troy A. Rule, *Airspace in an Age of Drones*, *95* B.U.L. REV. 155, 158-59, 208 *(*2015).

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history.[7] The state of the law on drone shipping and land development will impact both small-scale residential and large-scale commercial land development. Companies like Amazon may hesitate to invest in drone shipping due to the cost of individual easements and eminent do-main proceedings. Prospective landowners may be less willing to pay top dollar for land if they know the airspace above their land will be buzzing with drones. The impact of these issues will be felt by both businesses and landowners.[8]

Necessity is the mother of invention, and Americans have developed and regulated various infrastructures for various forms of transportation.[9] However, sharing airspace with regulated manned aircraft presents new challenges for policymakers and businesses. The Federal Aviation Administration (FAA) was tasked with regulating commercial drones in 2012, but its recent attempt to regulate drones has restricted businesses from fully launching an operational commercial drone delivery service.[10] The FAA's top priority is safety, and drones that carry over fifty-five pounds, fly over humans, or break visual line of sight are paralyzed on the ground.[11] The FAA faces a significant challenge in regulating drones due to the increasing volume of drones entering unoccupied infrastructure.[12] With drone sales expected to surpass $12 billion in 2021, there are concerns about the integration of drones into airspace designed for manned aircraft. Businesses like Amazon have proposed segregated airspace systems, while a California lawyer has proposed a drone highway above railroads.[13] The challenge lies in dividing existing airspace to create an infrastructure capable of integrating drones, rather than just making room for them in the airspace. Drone delivery companies are advocating for new laws and regulations to expedite package delivery. This Note suggests that they should also develop a workable drone infrastructure above highways, utilizing existing laws and regulations to create a more efficient and expansive drone delivery system. The integration of drone infrastructure above highways faces challenges in harmonising federal, state, and local airspace property laws. Interstate

[7] Troy A. Rule, *Drone Zoning, 95* N.C.L. REV. 133, 171 (2016).
[8] Juliet Kostritsky, *Uncertainty, Reliance, Preliminary Negotiations and the Holdup Problem,*61 SMU L. REV. 1377, 1378 (2008).
[9] Chad D. Emerson, *All Sprawled Out: How the Federal Regulatory System Has Driven Unsustainable Growth, 75* TENN. L. REV. 411, 430- 37 (2008).
[10] FAA Modernization and Reform Act, 2012, § 332(a)(3), 126 Stat. 11, 73 (codified at 49 U.S.C. § 44802(a)(3) (2018)(US) .
[11] Roderick O'Dorisio, *The Current State of Drone Law and the FutureofDrone Delivery,* 94 DENV. L. REv. ONLINE *59,* 61-64 (2016).
[12] Andrew Meola, *Drone Market Shows Positive Outlook with Strong Industry Growth and Trends,* Bus. INSIDER (2017).
[13] Jonathan Kathrein, *The Future of Dronesis the Railroad,*21 INTELL. PROP. & TECH. L.J. 127 (2017).

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highways are the primary area for drone delivery, as they provide a substantial drone infrastructure. Drone delivery companies must navigate state and local roads to operate, but securing airspace rights above interstate highways could significantly aid in developing a long-term super drone highway, as interstates have established connections and direct routes to the most populated areas in America.

In today's culture, many enjoy the convenience of delivery services. Whether it is food that is brought to your door when you do not feel like leaving your house, flowers given to someone at their office for a special occasion, or clothes you ordered off the Internet which are placed in your mailbox the next day, people are selecting delivery services that alleviate the need to go into a store to buy the items they need. With the delivery industry flourishing, each business attempts to find better ways to deliver items in a faster and more profitable way. One such proposal for a more efficient system of getting ordered items to the consumer is by the use of drones. Amazon, one of the leaders lobbying for the use of drones for deliveries, has already begun trials to begin this new form of package distribution. Amazon created sophisticated drones that have been able to complete delivery within thirty minutes of the customer's order. The hopes of Amazon and other businesses that desire this form of delivery is to cut costs and create more profit because it would require fewer employees, lower costs due to vehicle use, and increase consumer use because of the convenience and speed offered **by** such a delivery service. Currently, the Federal Aviation Administration **(FAA)** severely restricts the use of drones for delivery purposes; the current guidelines require that all operators must maintain visual line of sight with the drone. Amazon and other companies are lobbying the agency to permit widespread use of delivery drones **by** creating a complex proposal that differentiates between drone capability and airspace. The Amazon proposal, though, contains minimal safeguards designed to protect the public from the multitude of risks to public safety posed **by** drones. In this, the ***FAA*** should not, as Amazon urges, open up a portion of the airspace to delivery drones because it is impossible to provide sufficient public protections against the great risks of this technology.[14]This paper discusses the regulatory mechanisms needed to ensure safe and secure drone operations in India, focusing on civil/commercial sectors. It examines the evolving policy framework, including the draft Director General of Civil Aviation (DGCA) Guidelines, and identifies major policy gaps. The paper argues that India must fill these gaps to address issues such as quality control, incident response mechanisms, privacy, trespass, air traffic, terrorist threat management, and legal

[14] Jamie Busby, *Drone Delivery: The Danger of Opening the Air as a Commercial Highway*, 18 LOY. MAR. L.J. 287(2019).

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liability. The paper also examines global governance of drones to draw lessons for India as it develops its own regulatory and legal framework. The paper calls for India to play a more proactive role in shaping global norms and regulations, as the evolution of drone technologies can impact India's security and protect its interests.

EVOLUTION OF DRONE DELIVERY SYSTEMS:

Drone use has evolved from a military weapon delivery system to a versatile tool in various sectors, with over 300 drones granted permission to operate in the National Airspace System (NAS).[15] This includes drones found in backyards, living rooms, and local TGI Fridays, demonstrating the growing use of UAS technology.[16]The drone industry, currently worth $14 billion annually, is experiencing significant growth due to the "boom" and is expected to continue expanding. The FAA predicts that drone use in the U.S. will reach 30,000 in the National Aeronautics and Space Administration (NAS) by 2020, with the initial capability of UASs set to increase annually.[17] This growth is expected to significantly improve routine access to the NAS, creating the potential for the unmanned aircraft industry to become both financially lucrative and a source of new jobs, estimated to be $90 billion in the next decade. The popularity of drones has significantly increased since their early days, primarily due to their accessibility and affordability. As drones become more mainstream, they are being used in various ways, highlighting the growing popularity of UAS technology.[18] Modern drones have numerous applications in law enforcement, film, animal and environmental protection, agriculture, oil and gas companies, disaster response, and hobbyists. They are also used in agriculture, oil and gas, and disaster response.[19] The range of drones' uses has expanded to include delivery, further expanding their popularity in various industries. Amazon Air, an e-commerce platform, is introducing a drone delivery service that could significantly increase commercial drone use in both the marketplace and the airspace.[20] Amazon announced the Amazon Air plan in December 2013, aiming to provide customers with "nearly instant order fulfilment" using octocopter aerial drones to deliver packages up to five pounds within ten miles of a fulfilment centre. However, due to the lack of sufficient fulfilment centres, 86% of Amazon's orders would meet the drones' weight

[15] EPIC.ORG, http://epic.org/privacy/drones (last visited March 20,2024**)**
[16] Jeanette Settembre, *TGI Fridays Launches Flying Mistletoe Dronesfor the Holidays*, N.Y. DAILY NEWS (2014).
[17] Shaun Waterman, *Drones Over US. Get OK by Congress, WASH.* TIMES (2012)
[18] John F. Keane & Stephen S. Carr, *A Brief History of Early Unmanned Aircraft*, 32 Johns Hopkins APL Technical Dig., *558, 559-61* (2013)
[19] Pax Dickinson, *EntrepreneursAt SXSW Give Us Our Drones!* Bus. Insider (2013)
[20] Forbes, http://www.forbes.com/sites/matthickey/2013/12/01/meet-amazon-prime-air-amazons-delivery-by-aerial-drone-project/. (last visited 4 March 2024)

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restrictions.[21] The final stages of The Roadmap, Integration and Evolution, aim to decrease case-by-case exemptions as routine operations grow with policy and design maturity. This transition requires achieving objectives from the Accommodation phase, as success and progress at the Accommodation phase are crucial for the transition. The long-term focus for UAS Operations is the refinement and updating of regulation, policy, and standards. Priorities include seamless operations of certified UAS and crew members in the evolving National Airspace System (NAS), published FAA Technical Standard Orders based on minimum operational performance standards, and certified Sense and Avoid algorithms for collision avoidance and self-separation interoperable with NextGen ATC systems and manned collision avoidance systems. However, overcoming hurdles is crucial for this final stage. The Roadmap emphasizes the importance of R&D and creating rules for UASs for Amazon Air's integration. Delivery-type operations or testing are required for integration. The proposed sUAS Rule demonstrates that the FAA has excluded delivery from its integration into the National Airspace System (NAS).

Drones have numerous applications in India, including mapping, information gathering, and surveillance. However, their use has been a challenge due to lack of established standards, regulations, and operating procedures. In 2014, India's Civil Aviation Regulatory Office (DGCA) issued a Public Notice informing potential operators that civil operation of UAS will require approval from the Air Navigation Service provider, defence, Ministry of Home Affairs, and other security agencies. The DGCA is currently formulating regulations for certification and operation of UAS in the Indian Civil Airspace, aiming to harmonize global regulations.[22] The DGCA released draft guidelines on the use of UAVs for civilian or recreational purposes in 2016 and has since released a new set of guidelines in October 2017. The guidelines aim to be finalized by 31 December 2017. However, they lack foresight and are based on dire necessity. Despite a near-blanket ban on drones, there have been numerous incidents highlighting the dangers of unregulated drone use. The high number of sightings of UAVs across the country highlights the need for effective regulations. A more nuanced regulatory framework with appropriate recommendations is needed, including addressing issues such as

[21] Amazon in North America, http://www.amazonfulfillmentcareers.com/amazon-fulfillment/locations/ (last visited 15 March 2024)
[22] Government of India, Office of the Director General of Civil Aviation, "Public Notice – Use of Unmanned Aerial Vehicle (UAV)/ Unmanned Aircraft Systems (UAS) for Civil Applications," October 7, 2014,

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liability in case of mid-air collisions. India must establish a policy framework that addresses regulatory, legal, operational, licensing, and liability issues related to drone use.[23]

RULEMAKING AND GUIDELINES:

Section 332(b) of The Act mandates the Secretary of Transportation to publish a final rule on sUAS 18 months after the Plan is submitted to Congress. This rule will allow civil crafts not granted access to the NAS through section 333 to operate in the NAS. The new timeline is late 2016, early 2017, due to the notice and comment process, which will produce extensive industry group comments.[24]The proposed rule for Amazon Air, released on February 15, 2015, faced a 60-day comment period and a review period by the FAA before being published. The delay was a significant threat to Amazon Air's operations, as it would prevent regular operational entry into the NAS. However, the rule's content proved more problematic than the delay. The proposed rule for Amazon Air's delivery drone operations is not sufficient to regulate commercial drone operations. Industry members feared that the rule would only allow operations within the remote operator's visual line of sight and require continuous command and control throughout the flight. The Government Affairs Office confirmed this, confirming the concerns of industry members. The rule's release raised concerns about the regulation of commercial drone operations. The NPRM Operation and Certification of Small Unmanned Aircraft Systems restricts the use of Small Civil UASs, requiring operators to maintain visual line-of-sight throughout the flight. This restriction could limit Amazon's operational capabilities, as they cannot maintain visual line-of-site with all delivery drones, potentially compromising Amazon Air's purposed plan.[25] The Notice of Proposed Rulemaking (NPRM) outlines regulations for operation limitations, including a weight limit of 55 pounds, visual line-of-sight requirements, see and avoid technology, maximum air speeds, altitudes, minimum weather conditions, airspace class operations limitations, prohibition on reckless or careless operations, one pilot to one UAS rule, and preflight inspection by the operator. Amazon Air's proposed new rules, outlined by the FAA, would prohibit small unmanned aircraft from operating over individuals not directly involved in the operation, a restriction that Amazon Vice President for Global Policy Paul Misener stated would prevent Prime Air from operating in the United States.[26] The Small UAV Coalition's executive director,

[23] Government of India, Office of the Director General of Civil Aviation, "Requirements for Operations of Remotely Piloted Aircraft Systems (RPAS),
[24] FAA Modernization and Reform Act of 2012, Pub. L. No. *112-95*, § 332(b), 126 Stat. 11, 74. (2012).
[25] FAA Overview of small UAS notice of proposed rulemaking, http://www.faa.gov/regulationspolicies/rulemaking/media/021515 (2015).
[26] USA TODAY, http://www.usatoday.com/story/techl2015/02/15/amazon-cool-to-drone- rules/23473791/. (last visited 5 March 2024)

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Michael E. Drobac, has criticized the rule's visual line-of-sight requirement, stating that it makes UASs "person-centric," defeating the purpose of the rule. Drobac believes the FAA's NPRM may not provide the opportunity for delivery. The FAA's initial rules are commendable, but need further refinement. The requirement for drones to be flown within the operator's line of sight is a concerning restriction on commercial usage, and the author urges the FAA to modify this rule.[35] The FAA has introduced Section 333, known as "Special Rules for Certain Unmanned aircraft systems," to allow commercial operations in low-risk, controlled environments for civil UAS in the National Aeronautics and Space Administration (NAS). This rule will be applicable until the finalization of the Special Unmanned Aircraft Systems (sUAS) rule, which will only be open to civil UAS operations for a limited time.[27] Section 333 allows the Secretary of Transportation to grant exemptions from certification for civil drones that do not pose a hazard to users or national security, and those that do not require other certification.[28] This exemption would allow entities to use civil drones in the National Airspace System without a case-by-case certification, ensuring safety and security in the NAS.[29] As of December 4, 2014, seven exceptions have been granted under section 333 for drone use in the film industry. The FAA has over 140 applications waiting for review, which is time-consuming. Amazon Air's delivery system does not align with these exemptions, as its operations are not "low risk, controlled environments," making it unlikely to utilize this exemption.

In India, the Directorate General of Civil Aviation (DGCA) develops the guidelines:

The DGCA released draft regulations for the use of UAVs in civilian airspace on 30 October 2017, following a year and a half after the last set of regulations. The regulations incorporate articles from the April 2016 circular and some additions. Although the hope is to remove the blanket ban, the track record is not promising. The DGCA has not significantly changed its stance on civilian drone use, with the new draft guidelines failing to address key topics left out in the 2016 guidelines. Issues such as legal liability and import controls remain unaddressed, and the guidelines appear to be a temporary measure to address criticism of the ban on UAVs for civilians and lobbying efforts by e-commerce brands. Privacy and trespass remain unaddressed, and the guidelines fail to anticipate the rapid developments in drone technology, such as Artificial Intelligence, miniaturisation, and robotics.[30] The guidelines aim to prevent

[27]FAA, https://www.faa.gov/uas/legislative_programs/ (last visited 10 March 2024)
[28] Petitioning for Exemption under Section, https://www.faa.gov/uas/legislativeprograms/section333/how-to-file ajpetition / (last visited 6 January 2024)
[29] FAA Modernization and Reform Act § 333, 126 Stat. at 75.
[30] FAA Modernization and Reform Act § 333, 126 Stat. at 75-76

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disturbances to commercial aircraft operations due to UAVs, ensuring smooth operations without interference. However, they do not address potential threats such as collisions between two UAVs or potential loss of life and property due to accidents between drones. The guidelines lack mechanisms for safe drone operation at low altitudes and prevent interference between drones. As the number of drones in Indian skies increases, this gap will become increasingly significant and must be addressed soon. Drone operators must obtain a Unique Identification Number (UIN) and security clearance from the Ministry of Home Affairs (MHA) before they can fly their drone. This UIN must be obtained through submitting documents such as the drone's purpose of operation, specifications, and flight manual. The MHA also requires verification proofs. The UIN must be physically present on the drone, without electronic or digital identification. The clearance is subject to a "case-to-case basis," and the basis of the clearance is not specified. This makes it easier for authorities to trace the drone's ownership and recover it in case of an accident. The UIN will be assigned subject to security clearance. Operators flying UAVs over 200 feet above ground level must obtain an Unmanned Aircraft Operator Permit (UAOP) from the DGCA. This comprehensive permit ensures operators are aware of all restrictions on their use, protecting users from potential violations. However, for operators flying drones below 200 feet in controlled airspace, permission must be sought from local administration. Implementing this permit effectively can be effective in ensuring compliance with regulations. The 2017 regulations have regressively increased the requirement for Visual Line of Sight (VLOS) operations for all UAVs, regardless of weight category. This blanket imposition of VLOS is likely to stifle various drone uses, as regulators are uncomfortable with operators relying on visual aids for drone operation. While visual aids are already advanced and reliable, they are expected to become more advanced and reliable in the near future, making it unfair to clamp down on their use entirely.[31] The Aeronautical Information Publication (DGCA) has updated its guidelines for UAVs, reducing the no-fly zone area around Rashtrapati Bhavan, New Delhi from 30 km to five km in 2017 and the radius of no-fly zones around strategic locations and military installations to 500 meters. These changes are seen as a positive step by the DGCA in the 2017 guidelines.

Policy Gaps:

[31] Hindustan Times, https://www.hindustantimes.com/business/flipkart-plans-drones-for-rural-delivery-wants-to-persuade-govt/story-EZZighpDgU27uwKitVEiNN.html (last visited 7 Jan 2024)

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The Act has significantly limited Amazon Air's ability to operate in the National Airspace System, with all commercial drones not granted exceptions banned. The three methods for routine access to the NAS are a Special Airworthiness Certificate, a section 333 exemption, or qualification under the sUAS Rule. Amazon Air's delivery drones cannot qualify for these exemptions. Amazon Air will be unable to obtain an experimental certification due to the exemption allowing UAS operations for civil aircraft research, development, crew training, and market surveys, but prohibiting carrying persons or property for compensation or hire.[32]Amazon's proposed exemption under section 333 is unlikely due to the complexity of its application. The Secretary of Transportation must determine that the UAS operation won't pose safety issues between the exemption and an established final rule. Amazon Air's proposed operation would necessitate UASs to travel miles, potentially over homes and busy roads, carrying detachable packages, a complex and high-risk operation compared to exemptions. This is inconsistent with the current trend of exemptions, making it unsuitable for Amazon Air's desired operation.[33]The film industry uses drones within its controlled location, maintaining visual line-of-sight with the UAS. This aligns with FAA guidelines, while Amazon Air's operation does not. Amazon Air plans to use autonomous drones for package delivery, but FAA regulations explicitly reject such plans. The film industry's use of UASs aligns with FAA guidelines.[34] Amazon Air would be prohibited from operating under the Small UAS Rule, which prohibits drone use over people not involved in the operation. This would make it impossible for Amazon to operate across the National Airspace System (NAS), as it would need to navigate state legislation, privacy, and safety concerns. The requirement for visual line-of-sight also hinders the feasibility of Amazon Air's plan, as it intends its drones to operate autonomously, which is inconsistent with the Small UAS Rule.

POLICY GAPS IN INDIA:

The DGCA has initiated draft guidelines for UAV use, but there are still gaps to be filled, ensuring a balance between security concerns and legitimate drone use in various civilian sectors.

Quality control

[32] Civil Operations (Non-Governmental), FAA, https://www.faa.gov/uas/civil operations (last visited 7 March 2024)
[33] ibid.
[34] *Supra* note 30.

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The DGCA has not passed legislation addressing import standardisation for drones, despite a significant percentage of India's drone imports. The Department of Customs has made drones dutiable items, but the ban on civilian use by non-governmental entities remains unclear. This highlights the lack of coherence in policy between state authorities and the DGCA, as drones continue to be imported despite being banned for civilian use. The lack of policy on quality control for indigenously-manufactured and built drones contributes to the failure to address import quality standardisation. There is no focused regulation for domestically-produced drones, leaving the industry to set its own standards and lack of guidelines for determining the airworthiness of UAVs. The lack of quality control and standardization policies for both domestically manufactured and imported drones poses significant challenges. Legal liability for drone malfunctions is unclear, and import guidelines pose a threat to national security. Air accidents due to drone malfunctions are also a risk, posing risks to life and property. Furthermore, drones are vulnerable to hacking, as malicious software and spyware can be easily implanted. Quality control is crucial for testing digital security mechanisms, ensuring a secure link between operator and vehicle. The DGCA needs to urgently address these security gaps to prevent untoward incidents and ensure the safety of drone users.

Standard Operating Protocols for Incidents

The Indian authorities have not established any guidelines or protocol for incident management in the event of an accident. In 2015, an unidentified man was spotted flying a drone near the President's residence and the Indian Parliament.[35] The police responded ineffectively, leading to the man's disappearance. The Delhi Police issued standard instructions for similar situations, making the Indira Gandhi International Airport a no-fly zone and allowing police officers to shoot down any UAVs sighted in its vicinity.[36] In 2015, UAVs carrying Hanuman idols flew over Bhopal without provoking a police response, causing a safety hazard and potentially causing religious tensions. An FIR was filed by an activist with Madhya Pradesh Police, but no progress has been made. The MP Police claims they are forming a Standard Operating Procedure (SOP) to handle such incidents. However, there is a lack of coordination and coherence among authorities in responding to such situations. There is also a lack of dialogue between regulators and enforcers in developing SOPs to ensure the safety of the skies without hindering the use of these vehicles. The lack of clarity and coherence in authorities' reactions

[35] The Indian Express, https://indianexpress.com/article/india/india-news-india/unidentified-foreigner-spotted-using-drone-near-parliament/ (last visited 8 March 2024).
[36] Times of India, https://timesofindia.indiatimes.com/city/delhi/Police-can-shoot-down-unidentified-flying-objects/articleshow/50763996.cms (last visited 8 March 2024)

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to such incidents is concerning.[37] Despite the Armed Forces' extensive experience in drone operation, maintenance, and regulation, potential operators and regulators are hesitant to seek their advice. The Armed Forces have established robust procedures for safe drone operation in harsh conditions, and their vast knowledge in drone safety is valuable. It is a waste for civilian authorities to not engage the Armed Forces in developing better informed policies on UAVs, as they have accumulated valuable knowledge in this area.

Air Traffic Management

Drones are revolutionizing air traffic management due to their ease of tracking and communication. The question remains whether existing infrastructure can handle drone traffic, if authorities are equipped to monitor drone movement and flight paths, and if low-flying UAVs need tracking. The effectiveness of tracking drones and ensuring existing infrastructure is crucial for efficient air traffic management. In 2014, an Air India flight nearly collided with a UAV at Leh airport, causing a dangerous situation. The Indian Air Force's Air Traffic Control (ATC) had no information about the drone, which was undetected on radars. In another incident, a drone flying close to IGI Airport in New Delhi was seen by ATC personnel, but no radars detected it.[38] The drone was flying at 1,500 meters above ground level, within radar range. UK investigators reported 56 near-miss incidents involving UAVs in 2016. This highlights the need for serious upgrades to current equipment and infrastructure to manage air traffic effectively.[39] The Indian government has formed a committee to upgrade Air Traffic Control (ATC) units to accommodate Unmanned Aerial Vehicles (UAVs) in the country's airspace. The DGCA is working on solutions by tweaking existing systems and equipment. NASA, in collaboration with the Federal Aviation Administration (FAA) and private corporations, is developing the Low Altitude Tracking and Avoidance System (LATAS), a small, resource-efficient system that monitors drone flight and aids in collision avoidance. LATAS is currently in prototype stage and will undergo testing for several years before becoming fully operational.[40] Another concept is a collision avoidance system for drones, which allows them to sense an object in front and change their flight path without operator intervention. While this technology already

[37] Times of India, https://timesofindia.indiatimes.com/city/bhopal/Who-allowed-Hanuman-drones-to-hover-over-city/articleshow/54400065.cms (last visited 9 March 2024)
[38] Daily Mail UK, https://www.dailymail.co.uk/indiahome/indianews/article-3338561/Delhi-Police-stumped-mystery-drone-IGI-Airport.html (last visited 10 March 2024)
[39] BBC, https://www.bbc.com/news/technology-38103891 (last visited 10 March 2024)
[40] The Guardian, https://www.theguardian.com/technology/2015/nov/26/drone-regulations-united-states-testing-air-traffic-control-system-precisionhawk (last visited 12 March 2024)

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exists, there is limited effort to prevent collisions between UAVs, which could result in property loss and human life risks.[41]

Legal Liability

The draft DGCA Guidelines assign legal responsibility for UAVs to their operators, assuming they ensure the vehicle is airworthy and functioning as expected. However, not all operators have the technical expertise to judge the condition of their UAV. In case of an accident due to malfunctioning the vehicle, it would be unfair to hold the operator responsible and carry out legal proceedings against them. Third-party liability mechanisms are used in other vehicular accidents, limiting liability of either party. The DGCA circular has not addressed aspects of third-party liability in drone cases. Provisions for third-party liability in drone cases will be necessary, and third-party insurance mechanisms will be introduced to simplify liability cases. The Rome Convention of 1952, which aimed to limit liability for unintentional damage caused by aircraft, could be applied to drones. India never ratified the Convention after signing it in 1955. The principles could be adapted for drones, as the liability for intentional damage is unlimited. This principle could be incorporated into legal provisions for UAV operation with adapted parameters.

Issue of Trespass

The DGCA circular raises questions about the legal liability for drone trespass on private property, particularly regarding factors determining whether drone operation constitutes trespassing. The circular also raises the question of when a citizen can claim a nuisance on private property due to drone operations. British common law used the Latin dictum "ad coelom et ad infernos" to describe the extent of private property underground and in the sky. With advancements in aviation, society recognized the limit to private property both above and below ground, but no definitive legislation exists to determine this extent above the ground. The 1946 US Supreme Court case of United States v Causby involved the Causbys' chickens dying from fright caused by low-altitude US Air Force aircraft. The Causbys sued the US government for direct and measurable monetary damage. The court noted that airspace above a safe altitude is considered public highway and part of the public domain. This case highlights the need to establish parameters for determining private "airspace" over private property to avoid Causby-like cases.[56] A minimum flying height for drones can be determined to establish the "airspace"

[41] Wired, https://www.wired.com/2014/10/skyspecs/ (last visited 11 February 2024)

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of private properties. This method considers various complications, such as whether it's calculated from ground level or from the top of a constructed property. Choosing a suitable height ensures drones don't cause privacy breaches or nuisances, ensuring they don't pose a threat to private property. The drone operator's intent can be used to determine trespass, providing a moral basis for determining cases. Clear cases of trespass are those where the breach of privacy was intentional, despite the difficulty in judging such cases.

Concerns about privacy and safety:

Amazon Air's high-volume access to UAS will raise worries about safety, particularly during everyday operations. Drones colliding with people or property, interfering with other aircraft,[57] packages falling from delivery drones, and drones being hijacked and used to harm the public are all common concerns.[42] The limited introduction of drones to the National Airspace System (NAS) has raised concerns about their safety. Close calls have been reported where drones fly too close to other aircraft, violating FAA guidelines.[43] Small UASs are often undetectable by radar, making it difficult for pilots to detect and prevent collisions. A major airline training captain emphasized the importance of preventing aircraft and drone collisions.[44] The Act, Plan, and Roadmap aims to develop a "sense-and-avoid" drone application, while a private crowd-sourced fundraiser has created "Drone Shield," which uses drones' acoustic noise to detect their proximity, offering an alternative solution to the issue of drone noise. Both initiatives aim to address the drone noise problem.[45] The FAA has implemented safety measures for Unmanned Aerial Systems (UASs) by requiring "see-and-avoid" and "visual-line-of-sight" until "sense-and-avoid" software becomes available. This means that UAS operators must maintain visual contact with the UAS to avoid potential collisions with aircraft, buildings, roads, and people. However, this requirement hinders Amazon Air's plans, as it does not yet enable UASs to see and avoid other aircraft in the same manner as a pilot. The FAA proposed rule is addressing potential UAS collisions, which are avoidable and mitigated by The Act and private developers. The Class G altitude zone in the NAS reduces collision likelihood with traditional aircraft. Airport distance

[42] United States v. Causby 328 U.S. 256 (1946).
[43] FOX News, http://www.foxnews.com/tech/2014/06/20/report-reveals- 418-military-drone-crashes/ (last visited 12 February 2024)
[44] Joan Lowy, Drone Use Takes Off Despite Safety Concerns, Restrictions, INS. J. http://www.insurancejoumal.com/news/nationaV2014/11/17/346974.htm
[45] Bryant Jordan, *Hacker Releases Software to Hijack Commercial Drones,* Defensetech (2013) http://defensetech.org/2013/12/09/hacker- releases-software-to-hijack-commercial-drones/

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limitations and airport parameters, along with see-and-avoid requirements or sense-and-avoid technology, strengthen the improbability of collisions.

Contrasting the above:

The debate of privacy in UAVs is complex, with drones from non-governmental agencies posing a significant threat to privacy laws. With constantly-transmitting cameras, drones can easily infringe on privacy, but unintended invasions can also occur, making it difficult to determine infringement under existing laws in India. Drones have revolutionized privacy concerns, with advancements in sound recording and data capture enabling more invasive snooping. Hovering UAVs can record sound even at normal conversational levels and can be used as network jammers to block wireless communication. With drones now smaller than a small bird, it is easy to overhear private conversations and block wireless communication from enclosed spaces. This presents a complex issue as drones can be used for invasive snooping and overhear private conversations. The Indian government has not addressed privacy concerns by drones, with the Draft Guidelines of the DGCA being vague and inadequate. The US, like the US, acknowledged the importance of privacy by urging agencies to explore solutions while allowing drones to operate freely. The Australian Parliament has also considered the issue and advocated for the application of existing laws, suggesting that Australia's model could be adapted for India. The Indian government is considering revising sections of the Information Technologies Act, which covers privacy and technology issues, including data protection and distribution. Article 21 of the Indian Constitution, which covers the Right to Privacy, can be applied to the UAV case. However, these laws cannot directly apply to the UAV case. The government needs to open a dialogue on defining privacy parameters related to UAVs to avoid complicating the prosecution of privacy breaches. Government agencies, including India, are considering using drones for surveillance, traffic monitoring, and security during crowded events. The Mumbai Police used drones to monitor processions during a major festival, aiming to maintain law and order.[46] Privacy considerations are crucial, as law enforcement agencies must ensure a culture that respects privacy while using technology that makes breaches convenient and almost untraceable. The use of drones raises questions about the regulation of such practices in the country. The debate on surveillance law in the US has grown in recent years, with a key point being the concept of "reasonable" breaches of privacy. Every UAV takes snapshots of specific areas as a surveillance mechanism, which may be considered a reasonable

[46] NY Times, http://bits.blogs.nytimes.com/2014/11/26/new-f-a-a-report-tallies-drone-sightings- highlighting-safety-issues/ (last visited 12 March 2024)

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breach to maintain security. However, an amalgamation of these snapshots can map a "pattern of life," which refers to the routine behaviour of humans on a normal day.

CONCLUSION:

Finally, the comparative analysis of drone delivery services in the United States and India provided light on the many facets of this growing technological innovation. As drone technology continues to revolutionise logistics and transportation, it has become clear that the legal ramifications and privacy issues associated with these services are critical. This study uncovered numerous noteworthy facts and gave useful insights into the environment of drone delivery services in both nations. First and foremost, it is clear that the regulatory frameworks governing drone operations in the United States and India differ greatly. While both nations share the objective of guaranteeing the safe and responsible use of drones, their methodologies and particular rules differ due to differences in legislative traditions, technological infrastructure, and geographical concerns. Understanding these distinctions is critical for firms and operators interested in offering drone delivery services in any nation. Furthermore, worries about privacy have surfaced as a major subject in this study. Drones' capacity to record photographs, collect data, and potentially infringe on personal privacy rights has prompted significant ethical and legal concerns. Both the United States and India have responded to these concerns by enacting legislation requiring operators to respect individual privacy and desist from unauthorised surveillance. Nonetheless, the ever-changing nature of drone technology necessitates constant attention and adaptation of these restrictions to maintain their effectiveness in protecting personal privacy. This study has important practical ramifications. Businesses that offer drone delivery services must traverse a complicated regulatory framework, and they must be diligent in preserving individuals' privacy rights. This study emphasises the importance of striking a fine balance between obtaining the benefits of drone delivery services, such as increased efficiency and accessibility, and protecting individual privacy and security. In the end, the comparative study of drone delivery services in the United States and India not only provided valuable insights into the legal implications and privacy concerns associated with these services, but also highlighted the importance of global cooperation and innovation in striking the right balance between technological progress and the protection of fundamental human rights. Drone delivery services have a bright future, and their responsible growth is dependent on our combined efforts to handle these complex and ever-changing difficulties.