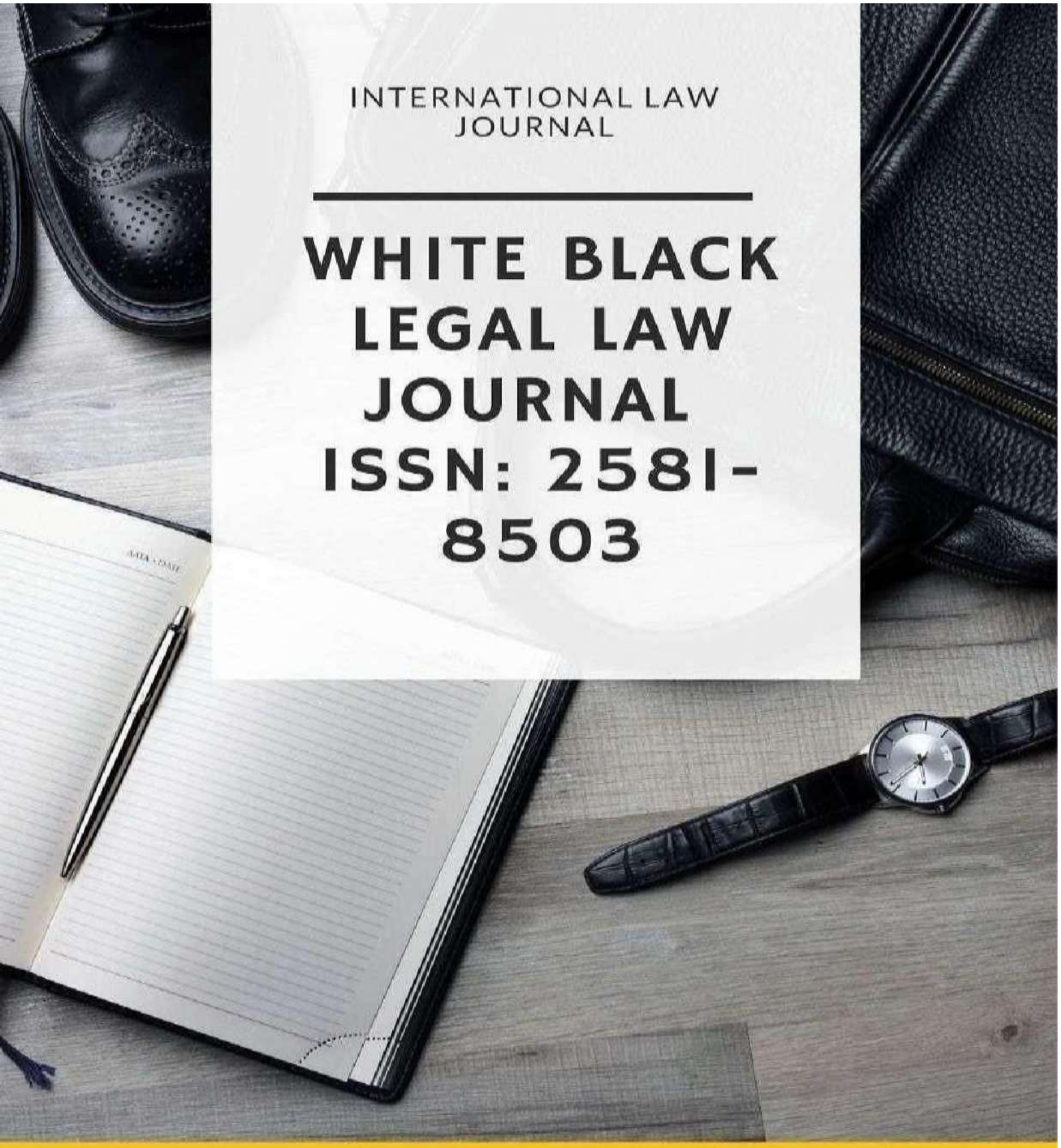

INTERNATIONAL LAW JOURNAL

WHITE BLACK LEGAL LAW JOURNAL

ISSN: 2581-8503

Peer - Reviewed & Refereed Journal

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www.whiteblacklegal.co.in
Volume 3 Issue 1 | May 2025 ISSN: 2581-8503

"ISSUES AND CHALLENGES OF REGULATION OF DRONES IN COCHIN"

AUTHORED BY - ANSHA.V.P

ABSTRACT

Drone law in India has evolved significantly over the past few years to match the rapid growth of unmanned aerial vehicles (UAVs) in various industries. Majorly regulated by controlled policies, the judicial system saw a significant change with the promulgation of the Unmanned Aircraft System (UAS) Rules, 2021, and subsequently the liberalized Drone Rules, 2021. It sought to make the balanced ecosystems that fosters innovation without compromising on safety, security, and responsibility. The Digital Sky platform is a one-stop system of drone registration and permission for flight, and it is an example of the government's support to ease of doing business and creating a drone friendly environment. Cochin is faced with distinct challenges such as proximity to Cochin International Airport and naval facilities, endangering public privacy, low public awareness, weak enforcement provisions, and the potential for misuse of drones in crowded or sensitive regions like the backwaters and port areas.

Main challenges are the danger of clandestine drone flight close to no-fly areas, insufficiency of technical skill on the part of local police forces, concerns of privacy within areas of residency and tourism, and the lack of clear guidelines of zoning regarding flight by drones. The lack of a well demarcated mechanism of grievance redressal and lack of significant public input further muddle the policy arena. Cochin's coastal and vulnerable ecological nature is another complicating factor, and the blanket imposition of natural laws is not sufficient. The challenges are to be recognized by stronger coordination between central and state governments, capacity building exercises, and context-specific guidelines that consider the city's geographic and social and financial conditions.

Keywords: Drones Regulation, Drone Rules, 2021, Cochin

INTRODUCTION

The fast-paced development of drone technology has brought about deep changes in numerous industries around the globe, and Cochin is no exception to this trend. Unmanned Aerial Vehicles (UAVs), or drones, are being used more and more in various industries such as agriculture, logistics, surveillance, and defense. Although their origins are in war-fighting technologies, drones have come a long way, diversifying their applications and uses. Now, drones are revolutionary tools that disrupt traditional methods and allow more innovation and efficiency. Their primary benefits – such as reducing costs, accelerating operations, enhancing accuracy, and versatility – have led to their application across industries. From improving agriculture to supporting emerging services, delivering medical supplies, and supporting urban planning, drones have emerged as powerful tools with the potential to revolutionize the operation of cities and industries.[1]

Despite progress being achieved at the regulatory front, there are still significant challenges. The biggest challenge is integrating drones into Cochin's already congested airspace. Cochin is one of the most congested airspaces worldwide with thousands of commercial flights daily. Integrating drones into this airspace is serious with the potential for collision with manned aircraft, interference with air traffic control systems, and security compromises. Furthermore, the extensions of drone operations increase the threat of invasion of privacy as drones can be used for surveillance without the knowledge or even permission of the people involved. This is particularly important in a city like Cochin, where privacy law remains in its infancy stages and the risk of unauthorized collection of data is high.

The misuse of drones, particularly the matter of national security, is another grave reason for alarm. Drones have been used to conduct cross-border infiltration, illegal surveillance, and smuggling operations. The threat of using drones as platforms for terrorism or espionage hangs over us, further heightening the need for a strong framework of regulation covering not just drone operations but compliance with standards of safety and security. The aforementioned problems only serve to underscore the fact that current regulation of drones is still not sufficient to meet the sophistications of the use of drones and the dangers that it presents.

[1]Mehrotra, K. (2024). Drone Regulations: The Indian Scenario. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4817307

Another urgent concern is the absence of public awareness and legal literacy regarding the use of drones. Although drones are increasingly found in different sectors, the majority of the population, both operators and citizens, is not aware of the legal limitations and safety measures that regulate their use. This lack of awareness leads to mass non-compliance and illegal use of drones, which subsequently creates public safety and privacy concerns.

RESEARCH OBJECTIVES

- To evaluate the efficacy of existing drone regulatory framework in India in establishing the particular requirements and issues of Cochin.
- To identify key enforcement problems and municipal government operational issues in keeping drone operations within sensitive and high-risk areas.
- To advise practical and context-relevant legal recommendations that ensure safe, secure, and responsible operation of drones.

STATEMENT OF PROBLEM

The governance of drones in Cochin is a complicated issue because of the city's unique geographical, infrastructural, and security-sensitive contexts. Even though national guidelines are available in the Drone Rules, 2021, enforcement at the local level is rare and irregular. The proximity of Cochin to security-sensitive locations like Cochin International Airport, naval facilities, and environmentally sensitive backwaters enhances the risk of airspace encroachment, environmental disturbances, and security threat. In addition, the lack of awareness among drone users, inadequate monitoring infrastructure, and insufficient local-central coordination further complicate effective drone regulation. These issues reaffirm the imperative need for a context-specific regulatory approach balancing innovation, public safety, and environmental safety.

LITERATURE REVIEW

Sharma et al. (2021)[2] delivered an extensive breakdown of the ways in which laws governing aviation in Cochin have come to embrace unmanned aerial vehicles. They placed these against their counterparts in other emerging economies, where even as the framework remains visionary, there is still laggardly enforcement and incorporation across industries. Drone laws

[2]S, S. (2021). Privacy Concerns in drone Surveillance: A legal analysis. *International Journal of Privacy and Data Protection*, 11 – 25.

in India remain ineffectual due to enforcement gaps, low rates of public consciousness, and the challenge of matching the rapid rates of evolution of drone technology.

Joshi and Iyer (2021)[3] explained that drone surveillance can potentially conflict with privacy laws, and they advocated for the enforcement of stricter data protection legislation. They suggested that the deployment of drones in urban areas must find a balance between public safety and individual privacy in India's drone regulations were the focus of an article, which highlighted the challenge of ensuring safe drone use while maintaining citizen's privacy. While the current regulatory framework accommodates safety, it falls short of taking complete steps to avoid privacy infringement, particularly in urban areas where drone surveillance becomes more prevalent.

Singh and Kapoor (2023)[4] addressed the moral concerns of the application of drones in war, particularly in areas of internal war. The study centered on the need for international legal principles to regulate the application of drones in war and prevent abuse. The study highlighted the ability of drones to infringe on human rights and the need for strict regulation to ensure ethical compliance.

Pragati Singh and Vaibhav (2024)[5] sought to examine issues of traceability, operational security, and national security that are relevant to the use of drones and concluded the challenges that have been faced in drafting and implementing the applicable legislation. Through a critical analysis of existing regulation paradigms, the study seeks to assess how far such legislation is in a position to balance the stimulation of technological progress with the safeguarding of the public interest and citizen's privacy.

LEGAL FRAMEWORK

Drone Rules, 2021

The Drone Rules, 2021, are a complete legal framework for the operation and regulation of drones in India. They are applicable to: (a) any person or entity owning, possessing, leasing, exporting, transferring, or having a drone in India; (b) all unmanned aircraft systems registered

[3]Joshi, R. & Iyer, P. (2021). Drone surveillance: Ethical and legal challenges in Indian cities. *Urban Policy Quarterly*, *19(2)*, 70 – 85.
[4]Singh, P., & Kapoor, A. (2023). The use of drones in military operations: Legal and ethical considerations. *Defense Technology Journal*, *12(2)*, 130 – 145.
[5]Pragati Singh and Vaibhav. (2024). Laws related to use of drone in India – A critical analysis. *DMEJL*.

in India; and (c) any unmanned aircraft systems operating in Indian airspace or over Indian territory [Rule 2(1)].

The Drone Rules, 2021, replacing the UAS Rules, 2021, are the key regulations that oversee drone flights, registration, and procedural compliance. The key highlights of the rules are as follows:

Section 2 prescribes the range of applicability of the rules in terms of weight classes subject to the condition that they shall be applicable to all drones with an all-up weight not more than 500 kilograms registered in India or operating in Indian airspace. Section 5 also establishes the sub-categories of unmanned aircraft systems, which can operate in an autonomous or remotely piloted manner, based solely on their weight. All drones have to obtain a "Type Certificate," for which one must submit an application on the Digital Sky portal, along with the payment of fees. The Type Certificate must be issued within 75 days of the filing of application. Though, the procedure for obtaining this certificate is yet to be prescribed by the Quality Council of India. Rules 6, 7, 8, 9, and 13 of the regulations are addressing the procedure for obtaining Type Certificates.[6]

The Aircraft Act, 1934

The Aircraft Act, 1934 is a fundamental piece of legislation which was enacted to regulate the manufacture, ownership, use, operation, and export and import of aircraft in India. It provides the legal framework for civil aviation in India and empowers the central government to make rules in relation to the safety, control, and administration of all aircraft activities. The Act also empowers the government to license pilots, aircraft maintenance, and air traffic services and to inquire into accidents and impose safety conditions. The government has made a series of rules under this Act, the most important of which is the Aircraft Rules, 1937, which regulate several aspects of civil aviation like registration, airworthiness, air routes, and airport management. The Act has been amended from time to time to include modern day aviation requirements, like regulation of drones and unmanned aircraft systems. The Directorate General of Civil Aviation (DGCA) functions under the authority given by this Act, and it is thus a pillar of aviation law and safety in India.[7]

[6]Jennifer, G. (2022). Drones in Indian sky: When minimalistic regulatory paradigm meets constitutional liberty of citizens. *SSRN*.
[7]LexQuest. (2021, September 20). *Drone Rules: A human rights perspective*. LexQuest Foundation. https://www.lexquest.in/drone-rules-a-human-rights-perspective/

Civil Aviation Requirement (CAR)

According to these regulations, registration of each drone with the DGCA is mandatory, and a UIN must be assigned to each drone. Operators of drones must also acquire UAOPs to operate drones legally. These regulations also lay down operational limitations, like restrictions on the maximum flight altitude, visual line-of-sight operation, and prohibitions on flying near airports or in restricted zones. Furthermore, drones must comply with some safety requirements laid down by the DGCA, like periodic maintenance and inspection at intervals to ensure airworthiness and safe operation.

The Motor Vehicles Act, 1988

With the growing use of drones (unmanned aerial vehicles) for commercial, recreational, and surveillance purposes, there has been controversy over whether they fall within the jurisdiction of the Motor Vehicles Act. While, drones are not explicitly covered under MVA, as the Act specifically deals with vehicles plying on roads. Drones are governed by the UAS Rules, 2021, enacted under the Aircraft Act, 1934. These rules govern the operation, registration, and safety of drones in Indian airspace. There is controversy over the extent to which legal frameworks, like the Motor Vehicles Act, need to evolve to keep pace with the growing convergence of land-based and aerial mobility technologies.

In Mathew Thomas v. State of Kerala.,[8] the Court considered a petition against unlawful use of drones by government officers for surveillance of people and sensitive areas. The court reiterated the significance of the right to privacy under the Indian Constitution and mandated that operations with the use of drones must follow norms strictly in order to avoid abuse. The case highlighted the requirement to strike a balance in the establishment of security and safeguarding individual privacy, reaffirming the necessity of clear guidelines of operation and regulation to avoid illegal surveillance.

In XYZ Pvt. Ltd. v. Government of NCT of Delhi,[9] the Court held XYZ Pvt. Ltd. liable for negligence in operating a drone that crashed and caused damage to public property. The case emphasized the necessity for operators to exercise caution and adhere to safety protocols to avoid legal liability for any damage caused by accidents involving drones.

[8]Mathew Thomas v State of Kerala (Supreme Court 2020).
[9]XYZ Pvt Ltd v Government of NCT of Delhi (Supreme Court 2019).

In ABC Corporation v. Directorate General of Civil Aviation,[10] the Madras High Court dealt with issues of drone flight in restricted airspace in the vicinity of an airport. The petition was regarding unauthorised drone flying in spaces where their operation may be hazardous to aviation safety. The court ordered aviation authorities to keep a strict vigil on regulations so that the like cases do not recur, with a focus on regulatory adherence and the implementation of strict enforcement to ensure airspace security and safety.

ISSUES AND CHALLENGES OF DRONE REGULATIONS

Privacy Issues

Cameras and sensors on drones pose significant privacy concerns, particularly where there are high densities of population like Cochin. Unauthorized monitoring is becoming a cause for concern, and although the Right to Privacy enjoys protection under Article 21 of the Indian Constitution, there are no specific legal provisions safeguarding against privacy invasions by drones.

Safety and Airspace Management

Cochin's air space is communally shared by civilian, military, and flight operations, and integrating drones becomes problematic. Threats from drones encroaching on manned aircraft, especially around Cochin International Airport, are major safety issues. Flight prohibitions, including height restrictions and no-fly areas, are weakly enforced.

Regulatory Compliance and Enforcement

Most drone operators are not aware of such legal mandates as registration, pilot licensing, and the NPNT mechanism. Additionally, local government and DGCA enforcement is lacking, and the Digital Sky portal has not been maximally optimized to deliver real-time detection and compliance.

Environmental Concerns

Drone operation around Cochin's ecologically vulnerable zones – like backwaters and wetlands – can agitate wildlife and destroy biodiversity. Lack of strict environmental regulations for drone operation in such areas heightens the possibility of ecological disruption.

[10]ABC Corporation v Directorate General of Civil Aviation (Madras High Court 2018).

Security Risks

Drones can be used for illicit smuggling, espionage, or terrorist operations, especially considering Cochin's strategic location as a port city. There is an urgent need for stringent security measures around sensitive locations such as naval bases, ports, and government offices.

Technological and Infrastructure Gaps

Cochin does not have sophisticated systems for real-time drone tracking, including geo-fencing and radar integration. Furthermore, integrating drones into congested urban airspace demands high-end air traffic management solutions, which are in the process of development.

Gaps in Legal Framework

Even though there are national regulations such as the Drone Rules, 2021, Cochin does not have city-level regulations to deal with local issues. Legal ambiguities regarding liability, insurance, and compensation for accidents are also not clarified, which discourages effective enforcement.

WAY FORWARD

To deal with the multiple issues and challenges of drone operations in Cochin, a multi-pronged strategy is required. This strategy must be aimed at strengthening regulatory mechanisms, enhancing enforcement, protecting public safety and privacy, and developing technological infrastructure, Some of the major recommendations for proceeding are as follows:

1. Strengthening Local Legal and Regulatory Framework

   State-Specific Laws: Although the Drone Rules, 2021, provide a uniform national standard, Cochin, being a major city with particular issues (e.g., close proximity to an international airport, sensitive areas of environment, etc.), would be better served by state-level drone laws more suited to its individual requirements. The state government, in consultation with the DGCA, could bring in more region-centered legislation dealing with privacy issues, environmental safeguards, and safety regulations for drone flights.[11]

   Clear Privacy Legislation for Drones: Privacy protection must be the primary concern, given the use of drones for surveillance. The government must create explicit laws to

[11]S, S. (2022). Drone Laws of India: Off to a flying start? *Ijpiel*.

safeguard citizen's rights against illegal surveillance using drones. These laws must specify clear penalties against misuse and ensure that drones are used only for proper purposes with valid permissions.

2. Enhancing Enforcement and Monitoring Mechanisms

   Effective Utilization of Technology for Monitoring: In order to ensure compliance, Cochin can invest in real-time tracking and monitoring infrastructure for drones. The use of technologies such as geo-fencing, drone identification technologies (such as Remote ID), and centralized drone monitoring platforms will enable authorities to track drone activity and enforce the No-Permission-No-Takeoff (NPNT) system more effectively. Collaboration with Airports and Aviation Authorities: Since Cochin is close to an international airport, proper communication and coordination among local authorities and the Cochin International Airport must be ensured. Airspace management procedures must be optimized to blend manned and unmanned aviation harmoniously, avoiding probable accidents and encroachments.

3. Awareness Campaigns and Training Programs

   Public Awareness Programs: Raising public consciousness regarding drone regulations and safety measures is essential. Local authorities must regularly hold workshops, seminars, and awareness campaigns for drone operators, both commercial and recreational, enlightening them on the legal requirements, safety regulations, and privacy safeguards.

   Drone Pilot Training and Certification: The state government, together with approved training centers, must open specialized drone pilot training facilities to make the operators knowledgeable about the legal, security, and operational standards. This would provide only competent pilots to operate the drones, thus minimizing accidents and increasing accountability.

4. Encouraging Safe and Sustainable Drone Use

   Protection and Conservation of the Environment: Cochin also harbors sensitive ecosystems, including wetlands and wildlife habitats, where drones could be disturbing if they are not properly regulated.

   Use of Drones in Disaster Management: Cochin, being prone to flooding and other natural disasters, would be well-served by having drones included in disaster

management planning. However, proper guidelines need to be framed so that drones are used responsibly during disasters so as not to interfere with rescue efforts or undertake unauthorized surveillance.

5. Data Protection and Security

   Protecting Data Privacy: There must be stringent policies governing the collection, storage, and use of data collected by drones.

   Cybersecurity Precautions: With increasing interconnectivity and integration of drones with digital platforms, cybersecurity becomes an emerging issue. Cochin needs to take care that drone systems and platforms, such as the Digital Sky platform, remain secure from hacking or unauthorized entry. [12]

6. Stakeholder Collaboration

   Private Sector Engagement: Government-private sector collaboration will assist in setting industry standards for safety, privacy, and protection of the environment. Some initiatives involve collaborating with drone manufacturers to support conformity with national standards as well as building safer, more energy-efficient drones that can operate in sensitive areas.

   Involvement of Stakeholders: Local communities, environmental activists, and the aviation sector must be engaged in policy formulation.

7. Handling Liability and Insurance

   Clear Liability Structure: The legal structure of liability in the event of drone crashes or damage needs to be made clear. Having well-defined rules of liability for property damage, injury, or environmental destruction will make the operators responsible and minimize the chances of legal conflicts.

Compulsory Insurance for Drones: Although third-party insurance has been made mandatory under the Drone Rules, 2021, there must be proper enforcement and surveillance to check that all operators of drones are properly insured before flight. Municipal authorities must liaise with insurance companies to provide affordable insurance products for drone operators.

[12]Duggal, P. (2016). *Data protection law in India*. Universal Publications.

In conclusion, the future of drone regulation in Cochin needs to be balanced and visionary. By enhancing local regulations, enhancing enforcement, prioritizing privacy and safety, and upgrading technological infrastructure, Cochin can set the stage for responsible and effective use of drones. Cooperation between authorities, industry stakeholders, and local communities will be essential in making sure that drone technology can be utilized for the good of the city while reducing risks and challenges.

CONCLUSION

In conclusion, although the regulatory framework for drones in India, especially through the Drone Rules, 2021, has come a long way, the urban-specific challenges of Cochin need more localized regulations and stricter enforcement. Securing the Digital Sky Platform, improving privacy safeguards, and incorporating drones into current air traffic management infrastructure will be essential for the safe and efficient operation of drones in Cochin. In addition, sustained interaction between the government, industry players, and local regulators will be important in ascertaining that drone technology can be maximally leveraged to drive innovation while not undermining safety, privacy, and security.

India has made excellent progress in putting in place a drone regulation framework. While, as cities such as Cochin adopt drone technology, there is an evident necessity for localized regulations that balance innovation with safety. Strengthening enforcement mechanisms, privacy concerns, and investment in improved airspace management systems will be crucial in making Cochin a model for safe drone operations.

In order to tackle the challenges and problems of regulation of drones in Cochin, it is crucial to build a local regulatory framework that supplements national legislation but with consideration of the city's geographical and strategic vulnerabilities, There should be increased awareness among drone operators in terms of training and public awareness among drone operators in terms of training and public awareness with an aim to ensure compliance with regulations like registration, NPNT, and no-fly zones. Enhancing enforcement measures by providing local agencies with real-time monitoring equipment such as geo-fencing and radar systems is essential. Specific guidelines must be laid down for the use of drones around sensitive areas like airports, naval bases, and ecological regions.

In addition, implementing city-specific environmental and security procedures, making insurance coverage mandatory, and establishing liability for accidents involving drones can enhance operational responsibility. A concerted effort among central regulators, local government, and stakeholders will be essential in ensuring safe, secure, and sustainable use of drones in Cochin.

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