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A People-oriented Study of China's Legal System for the Low-altitude Economy: Insights from U.S. Public Governance Experience

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Abstract. The low-altitude economy, as a strategic emerging industry, is increasingly integrating into public service systems through the efficient use of airspace resources and innovative contextual technologies, showcasing significant potential for enhancing public well-being. Currently, the development of China's low-altitude economy is characterized by trends toward legalization, efficiency, and regional collaboration, gradually shifting from expansion in scale to improvement in quality. However, existing legal frameworks still have gaps in addressing public rights, emergency priority mechanisms, and public participation processes. By examining U.S. experiences in dynamic airspace management, airworthiness certification, and social co-governance, it becomes clear that diverse collaboration and legal flexibility are crucial for aligning technological advancement with public interests. Thus, this study proposes measures focused on establishing clear rights boundaries, institutionalizing priority pathways for public welfare, and standardizing public participation processes to build a legal system for the low-altitude economy that is tailored to national conditions and balances public welfare inclusiveness.

Keywords: Low-altitude economy; People-oriented; Legal system; U.S. airspace governance; Public governance experience.

1. Introduction

The low-altitude economy refers to an emerging economic model that utilizes both manned and unmanned aircraft to conduct various flight activities (such as passenger transport, cargo delivery, and specialized operations) within airspace below 1,000 meters (extendable to 3,000 meters) above ground. Its core idea is to transform low-altitude airspace from a traditionally regulated zone into a valuable "three-dimensional resource" through technological innovation and resource integration, thereby enhancing both airspace utilization efficiency and the effectiveness of social services.

This study focuses on public welfare needs and aims to systematically review the achievements and challenges of China's legal framework for the low-altitude economy. By incorporating practices from the U.S. in areas such as layered airspace management, regulatory oversight of technological innovation, and social co-governance mechanisms, it seeks to propose a legal framework for the low-altitude economy that emphasizes systematic legislation and flexible enforcement while aligning with China's national context. The goal is to strike a balance between safety regulation and public welfare efficiency.

2. Overview of Low-altitude Economy Development in China

2.1 Development History of the Low-altitude Economy in China

Overall, the development of China's low-altitude economy is characterized by increasing legalization, efficiency, and regional collaboration. The country is transitioning from "scale expansion" to "quality enhancement", aiming to establish a global industrial hub driven by technological innovation, robust safety measures, and efficient allocation of airspace resources. The development of China's low-altitude economy dates back to the early stages of aircraft technology exploration. Prior to 2010, activities in this sector primarily focused on military reconnaissance, with civilian drone technology remaining underdeveloped and market applications limited. The concept of

"low-altitude economy" was introduced in 2010, after which technological breakthroughs became the central driving force. Improvements in key technologies, such as drone endurance and payload capacity, spurred the commercialization of applications like aerial photography and agricultural protection. After 2021, collaborative innovation across the industry chain accelerated, with new aircraft, such as eVTOL, achieving test flights across seas and cities. Breakthroughs in upstream technologies facilitated the implementation of logistics and urban transportation scenarios. By 2024, the number of registered drones exceeded 1.987 million, and companies like Meituan and SF Express were achieving daily low-altitude logistics deliveries in the tens of thousands. The feasibility of urban air traffic was validated along the Shenzhen-Zhuhai route. Presently, China has established a comprehensive ecosystem for the low-altitude economy that encompasses the entire chain of "manufacturing-application-support". In the R&D and manufacturing sectors, companies like DJI and Volant are internationally competitive. The application landscape has resulted in an innovative matrix of "5+X", covering areas such as logistics and urban transportation. Meituan's drones achieve an average of 10,000 daily operations, while companies like Peakview Aviation and EHang have made significant strides internationally with "air taxis". In terms of infrastructure, 28 interconnected low-altitude flight service stations and 13 testing zones, along with a comprehensive regulatory platform, have been established.

2.2 Dual Dimensions of the Low-altitude Economy Empowering Public Welfare: Direct Services and Indirect Efficiency Enhancement

The low-altitude economy, which utilises low-altitude airspace, provides diverse public welfare services through technological innovation and scenario integration. From a demand-oriented perspective, it can be divided into two categories: direct service fields that address immediate public needs, and enabling fields that indirectly enhance quality of life. Together, these dimensions establish a public welfare service system that encompasses survival assurance, developmental promotion, and quality improvement.

2.2.1 Direct Service Fields that Precisely Meet Immediate Public Needs

As the most direct link between the low-altitude economy and public welfare, direct service fields focus on addressing public needs by building a comprehensive support network through the implementation of technology. Key components include low-altitude logistics delivery and emergency rescue, which aim to tackle the challenges of the final but critical transportation and life-saving in extreme scenarios, thus becoming essential supplements to the modern public welfare system. The service model functions like a precision irrigation system, efficiently delivering services to the endpoints of public demand and genuinely improving people's lives.

In logistics delivery, technological applications significantly enhance the accessibility of supplies in remote areas and special circumstances. For example, in Nujiang Prefecture, Yunnan Province, a drone delivery network reduced the delivery time for emergency medical supplies from four hours to just 20 minutes. During the pandemic, drones in Jinshan District, Shanghai, completed 12,000 deliveries of epidemic prevention materials, acting as a "lifeline" for lockdown areas. These practices highlight how low-altitude logistics play a crucial role in supporting basic supply transport in remote regions and serve as a backup channel for ground logistics in urban emergency scenarios, ensuring stable supply during critical times. Their core value lies in overcoming geographical limitations and enhancing the reach of public welfare.

In the emergency rescue sector, the low-altitude economy revolutionizes traditional rescue systems through dynamic airspace resource allocation. Shenzhen's "Air 120" service reduced the transportation time for chest pain patients to 15 minutes, increasing the success rate of heart attack rescues by 25%. These examples illustrate the substantial potential of low-altitude emergency rescue as a foundational support for modern safety assurance systems.

The practices within the direct service fields of the low-altitude economy demonstrate that its value goes beyond mere technological application, becoming a key force in reshaping public welfare paradigms. Together, they reveal that the low-altitude economy is not simply an industrial innovation

but a foundational technological infrastructure deeply embedded in public welfare. Its significance lies not only in addressing efficiency issues in specific scenarios but also in systematically filling structural gaps in traditional public welfare regarding geographic coverage, response times, and the management of extreme situations. This approach enhances not just the efficiency of individual sectors, but also the resilience and reach of the overall public welfare system.

2.2.2 Indirectly Enabling Fields: Systematically Enhancing the Quality of Public Welfare Development

The low-altitude economy empowers public welfare through technological integration, systematically improving quality of life by reshaping production models, enriching living environments, and optimizing public services. This creates a positive cycle that progresses from technology to industry and ultimately to society. At its core, this empowerment involves reconstructing production relationships and social interactions to build an inclusive ecosystem for public welfare development. Rather than relying solely on immediate material supply, it injects sustainable momentum into welfare improvement through the deep integration of technology and industry.

The fusion of low-altitude technology with the cultural and tourism sectors creates innovative cultural platforms. For example, helicopter tours and drone light shows at Chongqing's Hongya Cave transform natural landscapes and urban landmarks into symbols of technological art, expanding profit models in the cultural tourism industry and redefining the interaction between people and the environment. This innovation transcends industrial boundaries, resulting in public welfare experiences that deliver both economic and social value.

These two types of fields collaboratively establish a dual-layered public welfare service system: direct services provide a solid foundation through immediate support, while enabling fields enhance quality through innovation, addressing needs that range from survival to development. This integration fundamentally transforms low-altitude resources into inclusive development assets, providing continuous momentum for public welfare.

3. Current Legal Framework for the Low-altitude Economy in China

3.1 Legal and Institutional Framework for the Low-altitude Economy in China

China's legal framework for the low-altitude economy has evolved alongside technological and industrial advancements, forming a system anchored by the Civil Aviation Law, supplemented by administrative regulations, departmental rules, and local policies. This system is characterized by "layered legislation and classified management". The law establishes fundamental rules for airspace management and airworthiness standards, while administrative regulations refine classifications for drones and specific operational scenarios (such as the Interim Regulations on the Flight Management of Unmanned Aerial Vehicles). Departmental rules and local policies provide additional operational guidelines.

At the implementation level, measures such as weight classification and airspace categorization facilitate the application of these regulations, forming a governance framework that integrates core laws, regulatory collections, and practical oversight.

3.1.1 Foundational Laws: Establishing Airspace Management and Safety Standards for the Low-altitude Economy

The Civil Aviation Law of the People's Republic of China (revised in 2021) serves as the foundational legal framework for the aviation sector, establishing a basic regulatory system for low-altitude economic activities from three key perspectives: national sovereignty, airworthiness standards, and liability allocation.

Article 7 clearly states that airspace is owned by the state, which exercises unified management over it, thereby establishing the principle of sovereignty for the development and utilization of low-

altitude resources. Article 35 mandates a system for the airworthiness management of civil aircraft, requiring all aircraft to undergo inspections and obtain airworthiness certificates before flying, thus ensuring the safety of low-altitude vehicles from the outset. Articles 157 to 161 outline the rules for liability in flight accidents, specifying responsible parties and principles of liability in cases where civil aircraft cause injury or property damage on the ground, thereby setting clear boundaries for accountability in low-altitude economic activities. These provisions form the legal foundation for the development of the low-altitude economy, ensuring that technological innovation operates within a safe and controlled framework.

3.1.2 Administrative Regulations: Establishing a Legal Framework for Low-altitude Drone Management

Effective from 2024, the Interim Regulations on the Flight Management of Unmanned Aerial Vehicles represent China's first set of administrative regulations specifically governing low-altitude drone management. This transition marks a shift in regulatory oversight of the low-altitude economy from policy guidance to a structured legal framework. The regulations introduce an innovative "five-category dynamic regulatory system". Based on weight and technical capabilities (such as airspace maintenance and reliable monitoring), drones are classified into five categories, which are micro, light, small, medium, and large. Differentiated rules are established for each category: light drones operating below 120 meters in uncontrolled airspace do not require approval (although controlled airspace necessitates an application), while medium and larger drones must undergo rigorous airworthiness certification.

Among the provisions related to public welfare, Article 38 introduces noise control measures, mandating that drone flights comply with the Noise Pollution Prevention Law. Article 39 establishes the principle of "privacy protection", prohibiting the capture of high-definition images below 30 meters in residential areas, thereby providing legal support for applications such as low-altitude logistics and agricultural protection.

Notably, Article 28 addresses "special passage rights for emergency rescue", permitting emergency drones to temporarily bypass flight restrictions in urgent situations. This provision was practically tested in December 2024 during a search and rescue operation on Ma'er Mountain in Jiangmen, Guangdong. The Emergency Management Bureau deployed a small drone (weighing 4-15 kg) to conduct nighttime searches in airspace below 120 meters. Utilizing infrared thermal imaging technology, the drone successfully located missing persons within three hours. The command center simultaneously applied for temporary passage rights across military-controlled zones under Article 28, ensuring the legality of the operation. This real-world application demonstrated the advantages of categorized management and emergency collaboration within the regulatory framework.

3.1.3 Departmental Rules and Local Policies: Refining Scenario-based Regulation and Regional Pilot Innovations

The Civil Aviation Administration has issued departmental rules, including the Management Measures for Commercial Flight Activities of Civil Unmanned Aerial Vehicles and the Management Measures for the Construction and Operation of Low-altitude Flight Service Stations. These regulations further delineate operational guidelines, such as entry requirements for commercial operations and construction standards for flight service stations. For example, the management measures for commercial flight activities stipulate that commercial drone operations must obtain a business license and establish safety management protocols and qualifications for flight personnel. This promotes the standardized development of commercial activities like low-altitude logistics and tourism. According to the Management Measures for Low-altitude Flight Service Stations, China has created a nationwide low-altitude flight service network, with 28 interconnected service stations established by 2024. These stations offer one-stop services, including flight plan submissions, weather information and safety monitoring. In this way, the airspace utilization efficiency can be improved.

At the local level, Shenzhen, Chengdu, and Hainan, as pilot regions for the low-altitude economy, have developed specialized policies tailored to local practices, forming distinct governance experiences. Shenzhen's Implementation Plan for the Innovative Development of the Low-altitude Economy emphasizes a "people-first" service principle, mandating that the planning of drone logistics routes fully incorporates community input to balance industrial development with residents' needs; Chengdu's Regulations on the Safety Management of Unmanned Aerial Vehicles establish a priority airspace usage mechanism for medical rescue drones, allowing emergency flights to access priority airspace and streamlining approval processes, thus exploring pathways for institutional cross-departmental emergency collaboration.

3.2 Institutional Gaps from a Public Welfare Perspective

While China's existing legal framework for the low-altitude economy plays a foundational role in ensuring airspace safety and guiding orderly industrial development, it has not sufficiently addressed the public welfare needs arising from the growth of this sector. There are notable gaps and shortcomings in areas such as rights protection, multi-dimensional governance, and adaptation to new scenarios.

First, the current system primarily relies on administrative regulation and lacks regular channels for public participation, resulting in ineffective mechanisms for balancing interests in the development of the low-altitude economy. In critical processes such as route planning and project approval, the Interim Regulations on the Flight Management of Unmanned Aerial Vehicles state only that activities "must not harm the public interest" (Article 14), without establishing procedural rules for public disclosure or hearings. For instance, when planning drone logistics routes in densely populated areas in Nanjing in 2023, the absence of prior notification or hearings led to collective concerns among residents regarding noise pollution and privacy violations, ultimately forcing a route adjustment. Such incidents expose procedural gaps in the public's rights to information and participation, reflecting a lack of public involvement mechanisms in the legal framework.

Second, the technological characteristics of the low-altitude economy have created new rights demands related to privacy protection, noise control, and data security, but the existing legal system has not kept pace with these needs. For example, while Article 40 of the Interim Regulations prohibits "illegal photography", it fails to define reasonable boundaries for data collection in low-altitude scenarios. The lag in data security regulations reflects an imbalance between the technological empowerment of the low-altitude economy and risk prevention measures. If technological applications continue to diverge from data regulations, it could lead to dual risks of geographic information security breaches and violations of citizen privacy, undermining public trust in the low-altitude economy.

In summary, the multi-scenario applications of the low-altitude economy represent a collaborative, evolutionary process spanning technology, institutions, and society. However, the current system has not transcended traditional hierarchical management barriers, resulting in significant erosion of public welfare due to departmental fragmentation. This fragmentation has, to some extent, led to the failure of cross-sectoral collaborative mechanisms.

4. Analysis of U.S. Public Governance Experience in the Low-altitude Economy

4.1 Legal Framework for the Low-altitude Economy in the United States

The legal framework for the low-altitude economy in the United States is characterized by a blend of federal oversight and local flexibility. This governance system successfully balances national uniformity with regional diversity. A central feature of this framework is its capacity to provide institutional support for aligning technological applications with public welfare needs, while also prioritizing the balance between safety standards and opportunities for innovation.

4.1.1 Federal Legislation

At the federal level, the Federal Aviation Act establishes the principle of national sovereignty over airspace, granting the Federal Aviation Administration (FAA) exclusive jurisdiction over the entire national airspace system. It clearly asserts that the United States possesses "exclusive sovereignty" over its airspace and empowers the FAA to uniformly plan, allocate, and manage airspace resources. This legislative framework effectively designates the airspace system as a national public asset.

Furthermore, the FAA defines the National Airspace System (NAS) as a comprehensive network that encompasses airspace, navigation facilities, airports, regulatory procedures, technical standards, and operational personnel, all constructed and managed at the federal level. Under the authority of the Federal Aviation Act, the FAA exercises macro-control over airspace operations by establishing technical standards, implementing airspace classification management, and enforcing aircraft airworthiness certification.

4.1.2 State Legislation

In the United States, state legislation regulating drones primarily focuses on specific application scenarios, refining and supplementing the basic framework established by federal law. For example, Texas's Privacy Act extends the regulatory emphasis to the protection of private rights while respecting the federal principle of exclusive sovereignty over national airspace. This Act explicitly prohibits drone surveillance or data collection within a certain altitude above residential areas, thereby addressing the federal gap in privacy rights protection.

The operational logic of this vertical complementary mechanism is that the federal government maintains the generality and forward-looking nature of the legal system through principles of technological neutrality and dynamic adjustment. In contrast, state governments develop supplementary regulations that are more contextually relevant based on regional characteristics and local governance needs. For instance, California imposes a "prior permission" requirement for drone photography, while New York establishes flight bans over sensitive infrastructure areas. These local legislations not only reflect a contextual adaptation of federal principles but also enrich the multi-layered legal framework governing drones.

4.1.3 Boundaries of Federal and State Authority

The boundaries of authority between federal and state governments are further clarified through judicial precedents. The 2015 Raphael Pirker case established the principle that "commercial drone operations are governed by federal aviation regulations", emphasizing that state legislation must not substantively conflict with federal airspace sovereignty. However, in the 2024 controversy regarding New Jersey's drone flight ban, the U.S. Supreme Court recognized that state governments possess "limited emergency legislative authority" in matters of public safety, allowing them to implement temporary airspace control measures within the framework authorized by the FAA.

This judicial practice embodies the principle of "sovereignty first, with exceptions granted", ensuring the cohesion of the national airspace management system while also allowing space for local governance innovation. Through this dynamic balancing mechanism, the fundamental principle that airspace resources are nationally owned is upheld, while also providing a legal basis for local governments to conduct emergency or specialized governance as needed.

4.2 Key Measures of Public Governance in the U.S. Low-altitude Economy

Public governance of the low-altitude economy in the United States relies on multi-stakeholder collaboration and flexible policy design, striking a balance between safety and the promotion of technological innovation and regulation.

In terms of airspace management, the FAA has established a tiered control system under the Federal Aviation Act, categorizing airspace into classes A through G. Class G airspace (below 1,200 feet) is open to civil drones, while classes B and C are managed dynamically. The "National Airspace System", led by NASA, integrates data-sharing mechanisms, resulting in a 42% reduction in aircraft conflict rates by 2024 and enhancing overall airspace capacity. Regarding regulatory oversight of

technological innovation, the FAA employs a “sandbox regulation + co-development of standards” model. This approach allows for experimental airworthiness certificates that utilize safety equivalence assessments instead of traditional certifications. For example, the certification period for Joby Aviation’s S4 model was reduced from 18 months to just 7 months, significantly accelerating its path to commercialization. On the policy front, the FAA has partnered with industry to develop a Drone Traffic Management (UTM) system, which is projected to cover 85% of low-altitude airspace across the U.S. by 2025, creating a governance loop that interlinks policy, industry, and standards.

These policy practices demonstrate that the FAA, through guidance and collaboration, offers flexible regulatory space for technological innovation while achieving a dynamic balance in governance effectiveness through multi-stakeholder engagement.

The governance model for the low-altitude economy in the U.S. exemplifies a strong mechanism for social co-governance, emphasizing the constructive interaction among the legal framework, government management, and industry self-regulation. The rapid development of the low-altitude economy requires a comprehensive governance system that depends not only on government oversight but also on the active participation and collaboration of all stakeholders, including government, industry, and the public, to effectively balance regulation and innovation.

First, the legal framework not only ensures the regulated development of the low-altitude economy but also enhances public participation. Under the National Environmental Policy Act (NEPA), major infrastructure projects are required to undergo environmental impact assessments and hold public hearings, ensuring that community voices are integrated into project decision-making. Second, government administrative management fosters innovation and development in the low-altitude economy through flexible regulatory measures. The FAA manages flight regulations under the Federal Aviation Act and employs a regulatory sandbox mechanism that provides a testing ground for new technologies while ensuring airspace safety. This adaptable management approach strikes a balance between technological advancement and public safety. Finally, industry self-regulation plays a critical role in areas where regulations are still developing. Industry organizations, such as the Association for Unmanned Vehicle Systems International (AUVSI), issue guiding documents to help companies self-regulate in aspects like flight operations and data recording, thereby filling regulatory gaps and promoting industry self-management.

Overall, U.S. governance practices are characterized by legal flexibility, open standards, and diverse stakeholder engagement. The layered approach to airspace utilization, innovation in airworthiness certification, and mechanisms for social co-governance provide valuable insights for the development of China’s low-altitude economy.

5. Constructing a People-oriented Legal System for the Low-altitude Economy

The practices of low-altitude economy in China, especially its significant effectiveness in critical public welfare areas such as medical emergency, remote logistics, agricultural modernization, and disaster response, have profoundly confirmed its great potential in serving public welfare and improving well-being. However, as analyzed earlier, the existing legal framework of low-altitude economy has structural shortcomings in terms of people-oriented orientation: on the one hand, the protection rules for new public welfare rights such as privacy protection, noise control, and data security are still principled and vague, which are prone to disputes and concerns in practice; on the other hand, there is a lack of specific legal priority response mechanisms for public welfare needs with high timeliness requirements (such as emergency medical transportation and emergency rescue), and the legal path for cross-departmental collaboration is not smooth; moreover, the substantial participation of the public in rule-making and project planning is absent, leading to tension between industrial development and community well-being. These institutional bottlenecks not only restrict the full release of the public welfare value of the low-altitude economy but also may weaken the public's trust in technological applications.

5.1 Defining the Boundaries Between Legal Usage Rights and Public Interests

Establishing the boundaries between the legal usage rights of the low-altitude economy and public interests is fundamental to constructing a people-oriented legal system. This involves precisely defining through legislation the limits of technological applications and public rights, thereby transforming abstract principles of rights protection into actionable legal rules. Such an approach aims to address current institutional challenges in the low-altitude economy, including vague privacy protections, inadequate noise control, and data security risks.

Privacy protection is a significant challenge. A useful reference is found in Texas's Drone Privacy Protection Act, which establishes clear altitude limits for drone flights over residential areas, ensuring that drones do not enter sensitive zones such as neighborhoods, schools, or hospitals for image collection. In contrast, similar provisions in China's legal framework are often vague and typically limited to general statements like "no illegal photography". Therefore, legislation should specify these regulations by designating a concrete no-fly altitude, such as 50 meters, and clearly prohibiting data collection in specific sensitive areas, along with establishing appropriate penalties. This not only protects privacy rights but also creates a clear legal framework for the application of low-altitude economy technologies, preventing abuses that could infringe on citizens' privacy.

By clearly defining privacy protection measures with specific no-fly altitudes, legislation establishes a clear boundary for the technological applications of the low-altitude economy. This legislative approach offers dual benefits: on one hand, it safeguards the privacy rights of the public through explicit legal provisions; on the other hand, it provides clear legal guidance for the rapid development of the low-altitude economy. This ensures that technological applications proceed in an orderly manner within the regulatory framework, alleviating public concerns about potential misuse of technology. By delineating the boundaries between legal usage rights and public interests in this manner, we can effectively avoid legal vacuums in technological innovation, ensuring the public's right to information and choice while establishing necessary legal safeguards for technological applications. This not only enhances the social acceptance of the low-altitude economy but also provides a more stable legal foundation for future technological applications and developments.

5.2 Standardizing Priority Pathways for Public Welfare

Standardizing priority pathways for public welfare is a crucial institutional innovation aimed at addressing the delayed response to demands within the low-altitude economy. The essence of this approach lies in establishing a comprehensive legal framework through legislation that spans from demand initiation to inter-departmental collaboration, thereby granting legal priority to scenarios such as medical emergencies and disaster response. While Article 28 of China's Interim Regulations on the Management of Unmanned Aircraft Flight has established temporary passage rights for emergency rescue drones, as exemplified in the December 2024 search and rescue operation in Ma'er Mountain, Jiangmen, Guangdong, where the Emergency Management Bureau applied for passage rights across military-controlled zones under this article and successfully completed the rescue within three hours using infrared thermal imaging technology, routine public services still encounter structural obstacles. These include lengthy inter-departmental approvals and imbalanced resource allocation, leading to delayed responses in medical emergencies and remote logistics.

To tackle these challenges, China can draw inspiration from the dynamic coordination practices of the FAA in the U.S. while adapting the system design to fit national circumstances. This could involve legislating the establishment of a National Low-altitude Emergency Command Center, led by the State Council's emergency management department, to integrate data interfaces from civil aviation, public security, and other relevant departments. A real-time shared low-altitude emergency dispatch platform should be created, clearly defining unified command responsibilities during emergencies. For instance, if air traffic control fails to complete route confirmations within the stipulated timeframe, they should face administrative accountability; if military-controlled airspace cannot be opened, an alternative solution must be provided within five minutes. Additionally, a new section titled "Priority Passage Rights for Public Welfare" should be added to the Civil Aviation Law,

explicitly granting low-altitude flights for medical emergencies the "hard priority" rights to use airspace. This would involve designating a unified national low-altitude medical emergency corridor with dedicated pathways below 1,000 meters, allowing emergency drones to operate around the clock while requiring other aircraft to yield. Furthermore, a "three-tier emergency response approval mechanism" should be established: for top-level responses (e.g. cardiac emergencies), prior approval would not be required, and air traffic control must complete route confirmations within 10 minutes; for first-level responses (e.g. remote drug deliveries), the approval time should be reduced to within one hour, with a streamlined application process facilitated through national low-altitude flight service stations.

5.3 Standardizing Public Participation Procedures

Standardizing public participation procedures is a crucial institutional innovation aimed at addressing the inefficiencies of one-way government management in the low-altitude economy. The objective is to transform the public from passive recipients of policy into active participants in governance, involving them throughout the decision-making, implementation, and oversight processes. This creates a governance framework characterized by clear stakeholder rights, legally established participation pathways, and effective feedback mechanisms. The pilot program in Shenzhen, which prioritizes community input in public service planning, offers valuable insights for public participation in the low-altitude economy. In urban construction projects, Shenzhen actively solicits feedback from residents and incorporates this input into decision-making, ensuring fairness and reasonableness in public services. A similar approach can be applied in the low-altitude economy, particularly regarding drone flight paths, altitudes, and timings that may impact residents' quality of life. By legislating public participation rights and feedback mechanisms, decision-making transparency can be enhanced, potential community resistance can be minimized, and public trust in low-altitude economic applications can be strengthened.

California's community hearing system for drone logistics projects also serves as a useful model. The state mandates that infrastructure projects involving low-altitude flights undergo a "two-stage hearing process". Drawing from this, China could introduce a dedicated chapter on public participation in the Civil Aviation Law and its supporting regulations to establish comprehensive procedural norms. During the decision-making phase, low-altitude projects affecting sensitive areas, such as residential neighborhoods and schools, would be required to follow the "three-tier" participatory process outlined in the Interim Regulations on Major Administrative Decision-Making: a 30-day public notice of technical proposals, discussions with experts and resident representatives, and a formal public hearing. In the execution phase, a public oversight system could allow resident representatives to participate in flight testing and provide feedback for improvements. During the oversight phase, an online complaint platform could be established, requiring authorities to investigate complaints regarding noise disturbances or privacy violations within seven working days and to publicly disclose the outcomes in accordance with the Government Information Disclosure Regulations. This design empowers participants through procedural involvement, enhances process oversight, and provides avenues for rights relief. It ensures that the development of the low-altitude economy aligns with the legislative intent of the Civil Code to "protect public interests", while stimulating collaborative governance and achieving a dynamic balance between technological innovation and public welfare.

6. Conclusion

The development of the low-altitude economy represents not only a platform for technological innovation but also a vital area for enhancing public welfare. Given the structural shortcomings of the existing legal framework, systematic institutional innovations can effectively resolve conflicts between technological applications and public welfare protections. These institutional designs are rooted in China's national context, integrating insights from local pilot programs while also drawing

on advanced international practices. This approach achieves a harmonious balance between legal rigidity and governance flexibility. Looking ahead, as the legal system for the low-altitude economy continues to evolve, it will play a crucial role in safeguarding public rights, promoting industrial development, and enhancing governance efficiency. Ultimately, the low-altitude economy is poised to become a new engine for advancing public welfare and supporting high-quality social development.

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