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Research on Legal Regulation and Optimization Path of Unmanned Aerial Vehicles in the Context of Low-Altitude Economy

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Abstract: With China's low-altitude economy booming, unmanned aerial vehicles (UAVs) as its core carrier have achieved rapid commercialization (2023 civil UAV sales over 80 billion yuan) but face rising safety and legal issues due to "technology leading, regulation lagging". Taking the *Civil Aviation Law of the People's Republic of China (Revised Draft)* (Feb 2024) as the core, this paper analyzes the Draft's roles in airspace management, industrial foundation, etc., examines remaining legal dilemmas (unclear market access, safety liability, etc.), and puts forward targeted optimization paths to support UAV industry compliance and low-altitude economy development.

Keywords: Low-Altitude Economy; Unmanned Aerial Vehicle (UAV); Legal Regulation; Civil Aviation Law (Revised Draft); Airspace Management; Safety Supervision

I. INTRODUCTION

Amid the wave of economic structure upgrading driven by new-quality productive forces, the low-altitude economy has become a crucial growth engine in China's strategic emerging sectors. As the most representative application carrier of the low-altitude economy, unmanned aerial vehicles (hereinafter referred to as "UAVs") have their technological iteration and commercial implementation speed directly determining the development depth of the low-altitude economy. In 2023, the sales volume of China's civil UAVs exceeded 80 billion yuan, with an annual growth rate of over 20%, and they were widely applied in fields such as agricultural protection, inspection, and logistics. For instance, Meituan's UAVs in Shanghai achieved an average daily delivery volume of over 300 orders, and SF Express reached a 65% coverage rate in material transportation in remote areas. However, accompanied by this development, the number of safety accidents and legal disputes caused by UAVs also increased by 18% year-on-year, highlighting the practical contradiction of "technology leading while regulation lags behind".

At the policy level, the Chinese government attaches great importance to the development of the low-altitude economy. The Outline of the National Comprehensive Multi - Dimensional Transportation Network Planning proposes to improve the general aviation facility system; Guangdong Province has issued relevant action plans, aiming to make the scale of the province's low-altitude economy exceed 300 billion yuan by 2025; and the General Office of the State Council has also issued guiding opinions to build a general aviation industrial cluster.

Nevertheless, the development of China's low-altitude economy still faces numerous legal predicaments. For example, in the market access link, there is a lack of clear and unified standards, resulting in high costs for enterprises; in airspace management, the division of low-altitude flight airspace is not detailed enough; in terms of safety supervision, the definition of legal liabilities is vague; and there are also legal issues in fields such as infringement, insurance, and UAV search and rescue as well as accident investigation. To sum up, while China's low-altitude economy is developing rapidly, the imperfection of the legal system has become a significant factor restricting its further development. In-depth research and resolution of these legal issues are of great practical significance for promoting the high-quality development of China's low-altitude economy.

Compared with mature international experiences, the United States has realized the classified supervision of UAVs through the Small Unmanned Aircraft Rule (Part 107), and the European Union has established a unified airworthiness and airspace management system relying on the UAV Regulation (EU 2019/947). However, China's previous regulations mostly relied on departmental rules and local pilots, lacking the support of high-level laws. Against this backdrop, the Civil Aviation Law of the People's Republic of China (Revised Draft) (hereinafter referred to as the "Revised Draft"), which was submitted to the Standing Committee of the National People's Congress for deliberation on February 24, 2024, incorporates UAVs into the core scope of civil aviation legal regulation for the first time. Through systematic revisions covering 15 chapters and 255 articles, it clarifies key provisions such as UAV airspace delineation, airworthiness management, and safety responsibilities. Based on this legislative development, this paper focuses on the pain points of legal regulation of UAVs in the low-altitude economy, analyzes the breakthrough value and existing deficiencies of the Revised Draft, and finally puts forward targeted optimization paths, so as to provide references for the compliant development of the UAV industry and the legal construction of the low-altitude economy.

II. ANALYSIS OF THE ROLE AND IMPACT OF THE CIVIL AVIATION LAW OF THE PEOPLE'S REPUBLIC OF CHINA (REVISED DRAFT) ON THE DEVELOPMENT OF THE LOW-ALTITUDE ECONOMY

A. Optimizing Airspace Management: Unlocking Low-Altitude Resources and Clarifying the Boundaries of UAV Activities

The Revised Draft improves airspace rules from the dual dimensions of "overall management" and "special control". On the one hand, it proposes that "the national air traffic management leading body shall uniformly manage the national airspace, and take into account the needs of the low-altitude economy when dividing the airspace". This breaks the traditional barriers of airspace division, provides airspace resource guarantee for emerging business forms such as UAV logistics and low-altitude tourism, and solves the problems of

low utilization rate of low-altitude airspace and frequent demand conflicts in the past. On the other hand, it clearly stipulates that "UAV controlled airspace shall be delineated around civil airports, and airports shall be equipped with detection and countermeasure equipment". Drawing lessons from the community concerns caused by ambiguous airspace faced by Australia's Wing Company, this provision not only delineates no-fly zones for UAV activities and avoids civil aviation safety risks but also clears the compliance obstacles for the commercial application of UAVs (such as Meituan's delivery business in Shanghai).

B. Consolidating the Industrial Foundation: Simplifying Access, Improving Supporting Facilities, and Promoting the Coordination between General Aviation and UAVs

The Draft lays a foundation for the low-altitude economy from three aspects: infrastructure, market access, and risk guarantee. In terms of general airport construction, it requires "promoting the construction in accordance with local conditions and implementing classified and hierarchical management", which helps to solve the problems of a small number of general airports and scattered layouts in China and provides take-off and landing support for low-altitude flights. In terms of market access, it implements a licensing system for operational general aviation enterprises, while non-operational activities only require filing, which greatly reduces the industry threshold. At the same time, it clarifies that regular general aviation transportation shall comply with public aviation rules, balancing openness and standardization. In terms of risk guarantee, it compulsorily requires general aviation enterprises to purchase third-party liability insurance and adds special liability insurance for regular transportation. This not only provides compensation guarantees for accident victims but also enhances the confidence of social capital in investing in low-altitude projects.

C. Strengthening Safety and Innovation: Regulating UAV Applications and Building a Low-Altitude Economic Ecosystem

The Draft balances safety and innovation from three aspects: technical standards, liability mechanisms, and supervision models. At the technical level, it requires standardizing the standards of UAV communication and navigation equipment and implementing airworthiness management throughout the whole process of design, production, and maintenance of civil aircraft (including UAVs and eVTOLs), so as to promote the standardization of low-altitude aircraft and avoid safety hazards caused by product differences. At the liability level, it establishes a hierarchical aircraft accident investigation mechanism and a third-party damage compensation system, solving the problems of responsibility shirking and difficulties for victims in safeguarding their rights in previous UAV crash injury incidents. At the supervision level, it implements classified and hierarchical supervision according to enterprise credit and business types, reducing interference with compliant enterprises. Meanwhile, it promotes the construction of a digital supervision platform, and improves the efficiency of airspace utilization through real-time monitoring of operational data, reserving development space for innovative UAV applications (such as emergency rescue and urban logistics).

D. Connecting with International Rules: Helping the Low-Altitude Economy Integrate into the Global Industrial Chain

The Draft has made breakthroughs in foreign-related regulations. Firstly, it clarifies the applicable rules of law for the ownership and mortgage rights of foreign-related aircraft, solving the problem of frequent legal disputes in cross-border cooperation in the past and reducing the risks of international cooperation. Secondly, it recognizes airworthiness certificates and personnel qualifications that meet international standards, which not only facilitates the entry of foreign low-altitude equipment and talents into the Chinese market but also clears the certification obstacles for domestic UAVs and general aviation equipment to "go global", enhancing the international competitiveness of China's low-altitude economy industry.

II. LEGAL DILEMMAS FACED BY THE DEVELOPMENT OF THE LOW-ALTITUDE ECONOMY AND RELATED CASE ANALYSIS

A. Market Access Link

At present, China's legal provisions on the market access of the low-altitude economy are relatively general. There are differences in standards among different regions, and some regions require enterprises to have complex qualifications, with cumbersome handling procedures. Taking UAV logistics enterprises as an example, in addition to the qualifications of ordinary logistics enterprises, they also need to apply for a number of UAV-related permits, involving multiple departments, resulting in a long handling cycle and high costs, which restricts the development of the industry.

Currently, China's low-altitude economy enterprises present a "pyramid" structure. At the top are leading enterprises represented by large UAV manufacturers and comprehensive operation service providers; in the middle are regional professional operation and technical service enterprises; and at the bottom are a large number of start-ups and small and medium-sized micro-enterprises. However, the current complex and inconsistent market access mechanism actually constitutes an "invisible threshold" for the development of enterprises in the lower and middle levels of the pyramid, which is particularly unfavorable to the incubation and growth of small and medium-sized enterprises. If legislation is not used to unify standards, simplify approval procedures, and clarify the supervision subject, it will lead to limited innovation vitality and difficulty in forming a multi-level and coordinated industrial ecosystem. Therefore, it is urgent to improve the market access system of the low-altitude economy at the national level, promote the mutual recognition of qualifications, optimize the approval mechanism, smooth the "last mile" for enterprises from registration to operation, and consolidate the institutional foundation for the sustainable development of the low-altitude economy.

To more intuitively show the differences in qualification application faced by different types of low-altitude economy enterprises during market access, the following table is presented:

Enterprise Type	General Qualification Requirements	Specific qualification requirements	Involved Approval Departments	Average Handling Time (Months)	Average Cost (10,000 RMB)
UAV Logistics Enterprises	Business license, road transportation permit, etc.	Airspace use permit, UAV airworthiness certification, operator qualification certification, etc.	Civil aviation administration departments, transportation departments, public security departments, etc.	6-Dec	50-100
Low-Altitude Tourism Enterprises	Business license, tourism operation permit, etc.	Airspace use permit, aircraft airworthiness certification, crew qualification	Civil aviation administration departments, culture and tourism departments,	5-Oct	30-80

		certification, etc.	public security departments, etc		
UAV Surveying and Mapping Enterprises	Business license, surveying and mapping qualification certificate, etc.	Airspace use permit, UAV airworthiness certification, surveying and mapping personnel qualification certification, etc.	Civil aviation administration departments, natural resources departments, public security departments, etc.	4-Sep	20-60

B. Airspace Management Aspect

The current laws and regulations do not divide the low-altitude flight airspace in sufficient detail. In the suburban - urban fringe areas, some regions are classified as restricted flight areas. Enterprises need to apply for temporary permits in advance for flight, but the approval rate is low and the approval time is long, which affects the operation efficiency. The airspace around tourist attractions partially overlaps with civil aviation routes, and there is a lack of a coordination mechanism. As a result, the flight time and routes of helicopters are restricted, hindering the development of low-altitude tourism projects. The restricted airspace scope in the city center is large, which restricts non-emergency low-altitude flight activities and affects the application of urban low-altitude logistics and emergency rescue. The current situation and problems of low-altitude flight airspace management in different scenarios are shown in the following table:

Scenario	Current Situation of Airspace Division	Flight Restriction Situation	Impact on Low-Altitude Economy
Suburban - Urban Fringe Areas	Most are classified as restricted flight areas	Need to apply for temporary flight permits in advance, with low approval rate and long approval time	Low enterprise operation efficiency, and it is difficult to give play to the advantages of UAVs
Tourist Attractions	The surrounding airspace partially overlaps with civil aviation routes	Strict restrictions on flight time and routes	The development of low-altitude tourism projects is hindered, affecting industrial development
City Center Areas	Large scope of restricted airspace	Strict restrictions on non-emergency low-altitude flight activities	Restricting the application of urban low-altitude logistics and emergency rescue

C. Safety Supervision Aspect

The vague definition of legal liabilities is the main problem in safety supervision. In an incident in 2023 where a UAV crashed and injured a pedestrian, the manufacturer claimed that the UAV passed the factory inspection and the responsibility lay with the operator; the operator, on the other hand, argued that it was due to product design defects. The two parties shirked responsibility, making it difficult to protect the rights and interests of the victim. The dispute points of liability among different subjects in low-altitude economy safety accidents are shown in the following table:

Accident Scenario	Liability Claim of Manufacturer	Liability Claim of Operator	Dilemma in Defining Legal Liabilities
UAV Crash Injuring Pedestrians	Passed factory inspection, and the problem lies in the operator's use and maintenance	There are design defects in the product leading to malfunctions	Lack of clear standards for liability division, and difficulties in coordination among multiple departments
UAV Colliding with Buildings	Compliant with design standards, and the accident is caused by improper operation	Failure to prompt potential risks, and insufficient product stability	stability Unclear basis for liability determination, and great difficulty in investigation
Emergency Landing of General Aircraft Due to Malfunctions	Poor maintenance and upkeep	Quality defects of parts	Difficult to determine the main cause of the malfunction, and it is hard to identify the liability subject

D. Infringement Issues

The noise generated by UAV flights interferes with the normal life of surrounding residents, and the camera equipment carried by UAVs may infringe on residents' right to privacy. In some UAV logistics distribution pilot areas, residents have repeatedly complained about noise problems, but due to the lack of clear standards and punishment bases, the problem has not been solved; a UAV enthusiast took photos in a residential area and uploaded content involving privacy, causing dissatisfaction, but it was difficult to pursue accountability due to unclear relevant legal provisions. The issues related to UAV infringement are shown in the following table:

Infringement Type	Specific Case	Current Situation of Legal Provisions	Handling Result and Impact
Noise Infringement	Noise disturbance from UAV logistics stations near residential areas	Lack of clear noise pollution standards and punishment bases	Residents repeatedly complain, the problem is not solved, affecting residents' lives and their acceptance of the low-altitude economy
Privacy Infringement	A UAV enthusiast took photos of the private areas of residents and uploaded them to the Internet	Provisions on the protection of privacy in UAV photography are unclear	Causing dissatisfaction among residents, unable to effectively pursue accountability, and reducing the public's trust in UAV activities

E. Insurance Aspect

The existing insurance clauses are difficult to cover the complex risk scenarios of UAVs, and the compensation efficiency is low. UAVs may face various risks during flight, such as collision, crash, and electronic equipment failure, and may also cause personal injury and property losses to third

parties. However, the current UAV insurance products on the market are relatively single, and the coverage of risks by insurance clauses is limited. For example, after a UAV logistics enterprise purchased insurance, the UAV crashed due to sudden bad weather, causing losses to a third party. The insurance company refused to compensate on the grounds that the weather was an exemption clause, leading to a dispute between the two parties. In addition, even if the insurance clauses cover the relevant risks, the compensation process is relatively cumbersome and inefficient, resulting in the losses of enterprises and victims not being compensated in a timely manner.

F. UAV Search and Rescue and Accident Investigation

The lack of clear legal norms for UAV search and rescue and accident investigation leads to non-standard investigations and difficulties in identifying liabilities. When a UAV goes missing or an accident occurs, it is necessary to conduct search and rescue and investigation in a timely manner to determine the cause of the accident and the liable party. However, due to the absence of clear legal provisions, the responsible subject, process, and standards of search and rescue work are not clear, and the coordination and cooperation among various departments are not smooth, resulting in low search and rescue efficiency. In terms of accident investigation, there is a lack of professional investigation institutions and personnel, and the investigation methods and technical means are relatively backward, making it difficult to accurately find out the cause of the accident, thereby affecting the determination and pursuit of liabilities. For example, a UAV went missing while performing a task. Due to the lack of clear division of search and rescue responsibilities, the enterprise's independent search and rescue was fruitless, and the relevant departments did not provide timely assistance; in the investigation of another UAV accident, it was difficult to find out the cause due to the lack of professional institutions, personnel, and scientific methods, making it impossible to pursue the liability of the responsible party and learn lessons from it. The following table sorts out the issues related to UAV search and rescue and accident investigation:

Item	Description of Current Situation	Existing Problems	Impact and Consequence
UAV Search and Rescue	The responsible subject, process, and standards are not clear, and the coordination among departments is not smooth	Low search and rescue efficiency, consuming a large amount of resources	Unable to locate the missing UAV in a timely manner, affecting subsequent disposal
Accident Investigation	Lack of professional institutions and personnel, backward methods and technologies	Difficult to accurately find out the cause, and hard to determine liabilities	Unable to effectively pursue liabilities and prevent similar accidents

III. SUGGESTIONS FOR IMPROVING THE LEGAL SYSTEM OF THE LOW-ALTITUDE ECONOMY

A. Improving the Legal System for Market Access

To address the current problems of general legal provisions and inconsistent standards in the market access link, unified and clear market access standards and norms for the low-altitude economy should be formulated. Relevant departments should take the lead, combine the characteristics of different low-altitude economy business forms, formulate specific access conditions and approval procedures, simplify links, reduce unnecessary qualification requirements, and improve efficiency. A national unified market access information platform should be established to realize information sharing and coordinated approval, reduce enterprise costs, and promote fair competition.

B. Optimizing the Legal Norms for Airspace Management

Drawing on mature foreign experiences and combining with China's actual situation, the division of low-altitude flight airspace should be refined. The scope of use, flight rules, and management responsibilities of different airspaces should be clarified, and a flexible airspace use mechanism should be established. For example, special low-altitude economy flight airspaces should be divided to provide stable flight channels for business forms such as UAV logistics and low-altitude tourism, and the use rights of airspaces should be dynamically adjusted according to flight demands at different time periods. An information platform should be established to simplify the application process and improve the efficiency of airspace use. The coordination and cooperation among airspace management departments should be strengthened, and a normalized communication mechanism should be established to solve the conflict problems in airspace use. At the same time, the supervision and management of airspace use should be strengthened to ensure that all market entities strictly abide by the airspace use regulations and maintain the order of low-altitude flights.

C. Clarifying the Legal Liabilities for Safety Supervision

Detailed legal provisions for safety supervision should be formulated to clarify the safety responsibilities of all parties. For UAV manufacturers, they should be required to bear the responsibilities for product quality and safety performance, and a strict product recall system and quality traceability system should be established. For operators, their safety responsibilities in UAV operation, maintenance, and flight plan formulation should be clarified, and they should be required to establish and improve safety management systems and strengthen the training and management of operators. For users, their use behaviors should be standardized, and the use of UAVs in no-fly zones and dangerous environments should be prohibited. A sound mechanism for investigating safety responsibilities should be established, and severe penalties should be imposed on violations of safety regulations. For example, for the responsible party causing an accident, its civil compensation liability, administrative liability, and even criminal liability should be pursued according to the severity of the accident. At the same time, the cooperation among safety supervision departments should be strengthened to form a joint supervision force and improve the effectiveness of safety supervision.

In recent years, the total number of authorized patents of national low-altitude economy enterprises has shown a continuous upward trend, reflecting the continuous enhancement of technological innovation vitality and the increasing investment in technological research and development in the industry. Against this background, clarifying the legal liabilities for safety supervision is not only conducive to standardizing market behaviors and preventing safety risks caused by the abuse of technology but also can provide a clear compliance boundary for technological innovation. By promoting safety responsibilities and

technological development in sync, enterprises are guided to actively integrate safety design into the R&D process, improve the intrinsic safety level of products, and promote the transformation of patent achievements in the direction of safety, reliability, and compliance, so as to realize the benign interaction between technological innovation and safety supervision and lay a solid safety foundation for the high-quality development of the low-altitude economy.

D. Improving the Legal Protection Mechanism for Infringement

In view of the problems of noise pollution and infringement of the right to privacy caused by UAV flights, it is suggested to formulate special legal provisions for regulation. Clear noise emission standards should be defined, and noise-restricted areas and time periods should be delineated. For example, in sensitive areas such as residential areas and schools, UAV flights at night should be restricted or the maximum noise decibel should be specified. The regulation of UAV photography behavior should be strengthened, the areas and contents that are prohibited from being photographed should be clarified, and citizens' right to privacy should be protected. A compensation mechanism for infringement should be established. When UAV flights cause noise interference or infringement of the right to privacy to residents, the victims can claim compensation from the relevant responsible parties in accordance with the law. At the same time, the supervision and management of UAV use should be strengthened, the public should be encouraged to report illegal acts, and infringement acts should be investigated and dealt with in a timely manner.

E. Optimizing the Legal System for Insurance

The insurance industry should be promoted to develop diversified and personalized insurance products for the low-altitude economy. The specific content and interpretation standards of insurance clauses should be clarified to avoid disputes caused by ambiguous clauses. A unified insurance claim standard and process should be established to improve the compensation efficiency. For example, a fast track for insurance claims in the low-altitude economy should be established to simplify the claim procedures and shorten the claim time. The supervision of the insurance market should be strengthened to standardize the business operations of insurance companies and protect the legitimate rights and interests of policyholders and insureds. Low-altitude economy enterprises should be encouraged to actively purchase insurance to improve the risk resistance capacity of the industry.

G. Standardizing the Legal Procedures for UAV Search and Rescue and Accident Investigation

Clear legal norms for UAV search and rescue and accident investigation should be formulated to clarify the responsible subject, process, and standards of search and rescue work. Professional search and rescue teams and institutions should be established, and necessary search and rescue equipment and technical personnel should be equipped to improve the search and rescue efficiency. In terms of accident investigation, special investigation institutions should be set up, professional investigation personnel should be allocated, and scientific investigation methods and technical standards should be formulated. The procedures and time limits for accident investigation should be clarified to ensure the standardization and timeliness of the investigation work. A system for disclosing the results of accident investigations should be established to timely announce the causes of accidents and handling results to the public and accept social supervision.

CONCLUSIONS

At present, China's low-altitude economy is rising rapidly with UAVs and general aviation as the core, and the market potential and policy support form a dual driving force. The state and local governments have also issued a series of supporting policies, providing a good policy environment for the development of the low-altitude economy. However, the above-mentioned legal dilemmas faced in its development process are still restricting the pace of industrial upgrading.

Although the introduction of the Civil Aviation Law of the People's Republic of China (Revised Draft) has made breakthroughs in key areas such as airspace coordination, safety responsibilities, and international connection, laying a solid legal foundation for the low-altitude economy, the Draft has not yet been formally implemented. Moreover, it needs the support of supporting detailed rules and cross-departmental coordination mechanisms to truly solve the problem of "lagging regulation".

PROSPECTS

With the gradual improvement of the legal system, China's low-altitude economy will surely break free from the existing constraints and move towards a broader development space. Through the legal optimization in the fields of market access, airspace management, and safety supervision, it can not only clear the obstacles to the current industrial development but also inject lasting impetus into the high-quality development of the low-altitude economy. The in-depth integration of new-quality productive forces and the low-altitude economy will also give birth to more new business forms such as "UAV + smart agriculture" and "low-altitude logistics network", which requires the legal system to maintain dynamic innovation and keep up with the pace of industrial transformation.

In the future, only by continuously paying attention to the development dynamics of the low-altitude economy, adjusting legal provisions in a timely manner, and actively learning from advanced international regulatory experiences to promote the integration of China's low-altitude economy legal system with international standards, can China take the initiative in the global low-altitude economy competition. It is believed that with the triple support of policy guidance, legal guarantee, and market vitality, China's low-altitude economy will achieve a leap from "rapid development" to "standardized leadership", become a new engine for driving economic growth, and inject a steady stream of momentum into the sustainable development of the economy and society.

References

[1] J. Liu Wei, “Interpretation of the Revised Draft of the Civil Aviation Law of the People’s Republic of China,” China Civil Aviation, no. 3, pp. 12–18, 2025.

[2] M. National Air Traffic Management Committee, Guidelines for Classification and Management of Low-Altitude Airspace. Beijing: China Civil Aviation Press, 2024.

[3] J. Wang Jing and Li Qiang, “Research on Market Access and Regulation of Drone Logistics,” Journal of Transportation Research, vol. 2, pp. 45–52, 2024.

[4] J. Chen Ming and Zhang Hua, “Construction of Safety Responsibility and Insurance System in Low-Altitude Economy,” Insurance Studies, no. 5, pp. 78–85, 2023.

[5] Zhao Lei, "Research on the Relationship Between General Airport Construction and Low-Altitude Economic Development," Urban Planning, no. 1, pp. 60–67, 2024.
[6] S. General Office of the State Council, "Guiding Opinions on Promoting the Development of General Aviation Industry," Document No. [2022] 36, 2022.
[7] S. People's Government of Guangdong Province, "Action Plan for Promoting High-Quality Development of Low-Altitude Economy in Guangdong Province (2024–2026)," Document No. [2024] 5, 2024.
[8] R. Federal Aviation Administration (FAA), Small Unmanned Aircraft Systems Rule (Part 107), Revised Edition, 2023.
[9] R. European Union Aviation Safety Agency (EASA), Regulatory Framework for Unmanned Aircraft Systems, 2024.
[10] J. Li Xiao and Zhou Tao, "Legal Issues and Protection Mechanisms of Infringement in Low-Altitude Economy," Law Review, no. 4, pp. 112–120, 2024.