

Legal Regulation of National Security Protection in the Low-Altitude Economic Format from the Criminal Law Perspective

Changjian Lin *

School of Law, Shanxi Datong University, Datong, Shanxi, 037009, China

* Corresponding author Email: LCJ1919810@outlook.com

Abstract: The present era witnesses the vigorous development of the low-altitude economy. As an emerging phenomenon, the low-altitude economy inevitably has certain practical defects and deficiencies, which are likely to cause harm to national security in practice. Due to its nature as a new thing, insufficient discussions have been conducted in current research, and existing papers mostly focus on the impact of the low-altitude economy on individuals' private rights, while to a certain extent neglecting its impact on national public interests and the corresponding regulatory issues. In the author's opinion, the impact of low-altitude economic activities on national economic, social, military security and other aspects must be incorporated into the consideration of criminal law. Criminal law should carry out normative and innovative legislation and practical operations based on factors such as the degree of excess and specific conditions of low-altitude economic acts. This research topic is closely related to the national economy and people's livelihood, affects national development, conforms to the development trend of criminal law in the present era, and is in urgent need of in-depth discussion. This paper mainly discusses the maintenance and regulation of criminal law in the field of national economic security related to the low-altitude economy.

Keywords: Low-altitude Economy; National Economic Security; Specific Dangerous Crime; Criminal Law; Economic Order.

1. Background and Preface

From the steel jungles of cities to the green fields of rural areas, from the busy transportation industry to the vibrant service industry, low-altitude aircraft can be seen everywhere. As a consensus in the low-altitude economy industry goes: the 21st century is the era of the low-altitude economy. This development trend of the times has been recognized by an increasing number of people. At the same time, it means that the law, especially criminal law which regulates major social relations and decides conviction and sentencing, is facing challenges from science and technology and the times.

Different from the traditional aviation industry and its derived economic forms that have long received attention, criminal legislation in the low-altitude economic field is relatively inadequate, with most legal regulations concentrated in other national public laws and local legislative fields except criminal law. The 20th National Congress of the Communist Party of China pointed out that it is necessary to foster a new development pattern and promote high-quality economic development[1]. As an important link in high-quality economic development, the low-altitude economy is inevitably prone to situations that seriously endanger national economic security in the process of its development. In such cases, the absence of national criminal legislation poses great potential risks.

2. Current Development of the Low-Altitude Economy and the Necessity of its Criminal Legislation

The low-altitude economy refers to a comprehensive economic form formed by driving the innovation of related industries and scenario applications relying on low-altitude aviation activities. Specifically, its core activity space is below an absolute altitude of 1,000 meters, and its extension can be

expanded to below 3,000 meters in a broad sense[2]. The core carriers include civil unmanned aircraft, manned aircraft, etc. Under the current economic format, China presents a development state of the low-altitude economy featuring low-altitude and unmanned aircraft as the main body, and manned and high-altitude aircraft as the supplement. By the end of 2025, there are a total of 3.28 million real-name registered low-altitude unmanned aircraft in China, with an annual active duration of 45.3 million hours; 801 low-altitude manned aircraft operating enterprises, with a total annual active duration of 1.218 million hours[3], with an average active duration of 800 hours per carrier. In contrast, traditional high-altitude civil aircraft have characteristics opposite to those of low-altitude civil aircraft to a certain extent. In 2025, the total number of in-service and operational carriers of traditional general aviation and transport aviation in China was 8,960, with an active duration of 15.769 million hours[4], and an average active duration of 56,800 hours per aircraft.

From these data, it is not difficult to conclude the characteristics of low-altitude economic carriers: small, numerous, fast and dense. "Small" here refers to the small size and quality, which is quite obvious and thus no data are listed for illustration. "Numerous" refers to the large quantity. "Fast" does not mean high absolute speed, but that low-altitude economic carriers can quickly complete a series of steps from pre-takeoff preparations such as charging and maintenance to takeoff and recovery. "Dense" refers to the randomness in geographical space. Despite the existing constraints such as administrative regulations, a large number of people still illegally fly low-altitude unmanned aircraft outside the scope stipulated by the regulations, which is difficult to detect and regulate in a timely manner.

The inherent characteristics of the above low-altitude economic carriers make regulation from the criminal perspective necessary. Moreover, the safety of traditional civil

aviation has been greatly improved benefiting from sound regulatory laws, systems and internal industry norms, which, as historical experience, also proves the necessity of criminal legislation for the low-altitude economy. In the relevant international criminal theoretical research and legislative process, great attention has been paid to the legislation in the field of low-altitude aircraft. As early as 2016, the European Union launched a unified drone supervision procedure, adopting a relatively rigorous dual-track supervision model, namely, administrative law as the precondition and criminal law as the post safeguard. The Criminal Law on Low-Altitude Aircraft issued by its member states has initially improved the dual-track supervision for low-altitude civil aircraft and provided a feasible solution to the standardization of drones [5]. The author believes that it is an efficient practice that balances the crackdown on crimes in new fields by criminal law and its own modesty to use administrative law for preliminary regulation while formulating final norms for low-altitude economic carriers through relatively unified special legal provisions, which is worthy of China's reference. Meanwhile, as a country with a solid foundation in civil aviation, the draft of the FAA Cluster Rules in the United States stipulates that unlicensed clustering without obtaining relevant special exemptions may result in a maximum imprisonment of three years and a fine of 250,000 US dollars without aggravating circumstances[6]. In a series of subsequent documents, the standard for drone clusters was set at three or more carriers. The main purpose of the relevant documents is to solve the problem of defining the harmfulness of low-altitude drones and provide a relatively clear answer. The author believes that it is rather too late to consider that drone cluster operation poses great risks worthy of criminal law intervention. In China's low-altitude economic practice, a single low-altitude aircraft may have great potential harm in most cases. The simple conclusion that three or more aircraft pose great risks seems too absolute in China and difficult to implement in practice. It is hard for grass-roots law enforcement officers to confirm whether there are more than three drones in a relatively vast airspace to decide whether to take further actions. However, the handling of relevant acts in the draft is worthy of reference.

It is worth mentioning that France adopts a conviction standard of "weight exceeding 5 kg and airfield disturbance or weight exceeding 4 kg and clustering" when dealing with drone crimes, which combines the relevant provisions of other mainstream countries[7]. This mixed provision has the advantages of comprehensive consideration and refined handling, but at the same time, it is inconvenient to operate and somewhat divorced from China's actual situation. Although the quality of aircraft will affect its potential harmfulness, convicting only based on quality and quantity neglects other important factors such as speed and operation mode.

Moreover, under the current operation mode of China's low-altitude economy, there are many aircraft with quality just at this threshold. How to define the quality required for conviction so as not to expand the crackdown scope is a difficult problem.

3. Potential Risks and Real Cases of the New Low-Altitude Economic Format

Drones of various types are the most well-known carriers of the low-altitude economy to the public. They were initially invented and applied in the military field, from unmanned target drones and missiles in World War II to the aggressive drones active on the Russia-Ukraine battlefield today. Their

initial application scenarios determine their inherent danger. In the 21st century, the rise of artificial intelligence and the further simplification of drone operation have made the use of drones without criminal law norms full of risks, even only in the civil field. For example, the drone incident at Chengdu Shuangliu Airport in 2025 affected the scheduling of multiple flights, but the relevant authorities only imposed administrative detention on the involved personnel, and the potential danger caused by the relevant acts is obviously disproportionate to the punishment received. Moreover, this incident was caused by negligent operation, and the consequences would be unimaginable if there was subjective intent.

Comparing with the international handling of similar situations, the effect is evident. After the drone incident at Gatwick Airport in the UK in 2018[8], the relevant British authorities urgently legislated, with a maximum penalty of 5 years' imprisonment and an unlimited fine for similar acts. Since then, only one large-scale drone incident endangering public economic security has occurred in the UK. It can be said that the current handling methods and systems for improper low-altitude economic acts do not match their danger level, and such inadequate handling further aggravates the potential risks of relevant acts.

In response to the above various explicit or implicit risk factors, professionals in relevant fields have conducted certain research and thinking. Scholars Li, Yalong and Xu, Jinhao pointed out in *Dilemmas and Countermeasures of Criminal Law Regulation on Aviation Safety of Low-Altitude Intelligent Connected Aircraft* that it is difficult for low-altitude intelligent connected aircraft to make appropriate responses to the ever-changing actual flight conditions and irregular flight behaviors of operators under the background of imperfect flight navigation and management systems and immature algorithm modules[9]. Scholar Bai, Haijuan stated in *Criminal Law Regulation and Charge Application of Crimes Involving Low-Altitude Intelligent Connected Aircraft* that it is necessary to impose criminal penalties on relevant personnel who provide equipment to illegally invade drone systems to commit crimes, and this situation can be regulated by the existing Articles 285 and 286 of the Criminal Law[10].

At the same time, *Criminal Law Regulation on Drunk Driving of Drones from the Perspective of Low-Altitude Economy* proposed to add the crime of drunk driving of drones to the criminal law by referring to drunk driving of motor vehicles, or incorporate it into the crime of endangering public security by dangerous means in the form of judicial interpretation[11]. This suggestion has considered the necessity and possibility of establishing separate charges for low-altitude drone-related carriers. The above researches raise a question: how to bring the activities of low-altitude aircraft back on the right track by improving the flight system under the condition of relatively low scientific and technological level. As the highest-level normative system in the flight standard system, the criminal law normative system naturally needs to change and take action to better serve China's economic construction under the background that low-altitude economic carriers and new low-altitude economic formats have potential risks and international relevant legislation has achieved initial results.

4. Legislative Proposals for the Low-Altitude Economy from the Perspective of Criminal Law

First of all, the question is why it is not recommended to

continue using the existing criminal law methods and legal content to handle relevant issues, that is, to classify them into other charges such as the crime of endangering public security. The author believes that there are the following deficiencies: 1. Lack of pertinence. Establishing special legal provisions in the criminal law can demonstrate the legislator's attention to crimes in relevant fields, thus attracting widespread attention from the whole society and achieving the effect of popularizing law and prevention. At the same time, in the application of judicial practice, such provisions also make it more convenient for judicial personnel to operate. 2. The sentencing range of the existing criminal laws (taking the crime of endangering public security by dangerous means as an example) is too wide, and in practice, there is insufficient subjective distinction between misoperation, occasional intentional illegal flight and professional black flight, which is prone to the situation where the criminal responsibility and punishment are not adapted to the crime.

After solving the problem of why special legislation is needed, the next step is how to carry out criminal legislation. On this issue, Lawyer Huang, Rong believes that there should be a prerequisite of "violating relevant administrative regulations". This statement is relatively reasonable but also has deficiencies, because a considerable number of low-altitude drone pilots are often unaware when violating administrative regulations. Direct criminal punishment at this time cuts off the possibility of correction to a certain extent. Moreover, in the context of the active low-altitude economic activities in China, directly using criminal punishment to penalize illegal low-altitude economic activities will undoubtedly greatly reduce the vitality of the low-altitude economy and fail to balance the social and economic benefits of the law well. Adopting a handling method similar to the crime of tax evasion, that is, giving administrative sanctions first as a warning, may be a better choice. Professor Wang, Hong from East China University of Political Science and Law put forward the concept of criminalizing "drunk driving and drug driving" of drones[12]. His viewpoint fully considers the complex situations in practice, and relevant situations can be included in conditions such as "sufficient to endanger public economic security". After all, the potential risks of current low-altitude economic carriers ultimately come from the operators. In the general direction, this is a dangerous crime, which needs to be limited by the condition of "sufficient to endanger public economic security".

The definition of this condition is as follows: sufficient to cause harm or potential risks to the normal and effective operation of economic activities. Normal and effective operation means that various economic entities engage in economic production and business activities in an orderly and efficient manner in accordance with their independent will and relevant national laws and industry regulations. Harm or potential risk means that the possibility of causing actual damage reaches a specific threshold and above. This threshold needs to be considered in specific situations. For example, in agricultural operations, the threshold is reached only when pesticides sprayed on one's own farmland are highly likely to cover other farmlands with crops intolerant to such pesticides due to changes in wind speed, wind direction and other factors, while around large comprehensive passenger transport hubs, the threshold is reached only when there is a medium possibility of causing abnormal development of passenger transport activities. The above conditions are the constituent elements of the basic crime.

To achieve appropriate sentencing, the crime should also add conditions for the upgrading of statutory punishment, namely "actually causing the abnormal development of economic activities", "endangering major public economic security" and "engaging in activities by improper use of low-altitude economic carriers as a profession". The economic activities in the first condition include the inefficient operation and abnormal consumption of the production facilities, processes, production-related resources and even the economic entities themselves as mentioned in the above basic conditions. The second condition does not require actual consequences, and like the basic condition, it is a dangerous crime, and logically, the achievement of this condition is based on the achievement of the basic crime condition.

"Major" refers to two situations: the degree of endangering economic security is relatively high, so that it implicates the personal safety of other subjects; the degree of endangering economic security is relatively high, which may cause extremely heavy economic losses. The former includes illegally using low-altitude flight equipment in the air traffic control area of civil aviation ports, illegally carrying out low-altitude economic operations along high-speed railway lines, etc. The latter includes improper use of low-altitude aircraft to mistakenly spray agricultural chemicals, illegal peeping of citizens' privacy by using low-altitude aircraft, etc. In practice, these two situations may coexist in the case caused by the same act. For example, using drones in the air traffic control area near the airport may cause harm to passengers and also cause abnormal operation of airport facilities. The third condition refers to engaging in illegal activities by using low-altitude economic carriers as the main source of income or with the purpose of regular illegal professional activities. The establishment of this condition is to better distinguish between occasional offenders and habitual offenders and fully consider subjective malignancy, and its standards can refer to the relevant standards of the crime of illegal medical practice.

The general prerequisite for the above conviction and sentencing is that the operator has been punished or warned by the relevant authorities for violations when operating low-altitude economic carriers. If this condition is not met, the case shall be convicted in accordance with other charges, and if the circumstances are minor, it shall be handled in accordance with relevant administrative regulations. Adding this prerequisite is to distinguish between occasional operation, misoperation and regular intentional operation, uphold the modesty of criminal law while dealing with acts that indeed cause major harm, leave appropriate fault tolerance space for low-altitude economic activities, and encourage the healthy development of the low-altitude economy.

5. Significance of Relevant Legislative Regulation

In practice, the application of drones, low-altitude fixed-wing aircraft and helicopters in various industries of the civil economy has attracted widespread attention in various fields. For the country, the criminal law standardization of the low-altitude economy can undoubtedly protect national economic security in the fields of national economic production, sales and so on, and ensure the smooth development of economic activities; for the society, the order of the air space can promote the order on the land, increase people's sense of security in low altitude while promoting employment, and become a catalyst for economic security and development; for individuals, it can

protect people's travel safety and stabilize personal income to a certain extent by increasing people's employment stability in the low-altitude economy and related fields; finally, for special social groups and industries, taking the civil aviation industry and the drone pilot industry as typical examples, the standardized operation of the low-altitude economy can reduce invasive accidents of civil passenger and cargo aircraft during takeoff and landing stages, promote drone pilots for various purposes to perform their own duties without interfering with each other, and operate industry affairs efficiently.

6. Conclusion

At present, China's criminal legislation related to the low-altitude economy has problems such as overall lag in progress, slow development and unbalanced regional development. Through the comparative understanding of the potential danger of low-altitude economic carriers and the legislative status of this field at home and abroad, it can be seen that legislation in relevant fields is urgent. Under the background that the risks of the low-altitude economy cannot be completely controlled by technical supervision, criminal legislation control is particularly important. Controlling risks through criminal law norms conforms to the general trend at home and abroad and the national macroeconomic strategic policy of "promoting the high-quality development of the low-altitude economy".

Independent legislation on the operation carriers of the low-altitude economy can better improve the efficiency of criminal law application and the accuracy of conviction and sentencing, and better distinguish different degrees of subjective malignancy and objective harmfulness in practice. Through the reform of the criminal law normative system, China's criminal law system can be better integrated into the world development trend, and a stable and reliable "safety net" can be built for the development of the low-altitude economy.

References

- [1] Xi, J. P. (2022). *Report to the 20th National Congress of the Communist Party of China*. The 20th National Congress of the Communist Party of China. (pp. 28–33).
- [2] National Development and Reform Commission. (2025). *Statistical classification of low-altitude economy and its core industries (Trial)*. (pp. 1–2).
- [3] Civil Aviation Administration of China. (2026). *Circular of the 2026 National Civil Aviation Work Conference*. Presented at the 2026 National Civil Aviation Work Conference.
- [4] Civil Aviation Administration of China. (2026). *Work report of the 2026 National Civil Aviation Work Conference*. Presented at the 2026 National Civil Aviation Work Conference.
- [5] European Parliament, & Council of the European Union. (2018). Regulation (EU) 2018/1139 on common rules in civil aviation and establishing the European Union Aviation Safety Agency. (pp. 45–48). Brussels.
- [6] Federal Aviation Administration. (2025). *Normalizing unmanned aircraft systems beyond visual line of sight operations*. (pp. 38256–38261). Baltimore.
- [7] Direction Générale de l'Aviation Civile. (2025). *Guide des catégories de drones civils*. (pp. 12–15). Paris.
- [8] Gatwick Airport Limited. (2021). *Operation Trebor: Structured debrief report*. (pp. 3–8). London.
- [9] Li, Y., & Xu, J. H. (2025). Dilemmas and countermeasures of criminal law regulation on aviation safety of low-altitude intelligent connected aircraft. *Journal of Nanjing University of Aeronautics and Astronautics (Social Sciences Edition)*, 27(6), 57–67.
- [10] Bao, H. J. (2025). Criminal law regulation and charge application of crimes involving low-altitude intelligent connected aircraft. *Jiangxi Social Sciences*, 45(3), 69–83.
- [11] Yang, T. L. (2025). Criminal law regulation on drunk driving of drones from the perspective of low-altitude economy. *Journal of Beijing Polytechnic College*, 24(3), 100–103.
- [12] Wen, H. (2025). Standardization and governance of crimes in the low-altitude field. *Shanghai Rule of Law News*, June 16, p. 6.