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Differentiation of Responsibility for Laser Interference

The article analyzes modern technological threats to aviation security, including the possibility of remote interference with aircraft control using readily available technical means. Special attention is paid to laser exposure to aircraft crews as one of the most common and illustrative forms of such interference. The purpose of the study is to provide a theoretical basis for differentiating liability for interference with aircraft control in the context of evolving technological threats to aviation. Based on statistical and empirical data, the study substantiates the need to distinguish between technological impact and its consequences in the form of interference with aircraft control. The paper examines the problems of determining the point at which such acts are completed and the limits of criminal liability. It demonstrates that not every technological impact reaches a level of public danger warranting criminal-law assessment. In this regard, the article proposes a concept of differentiated liability based on the degree of public danger posed by the act and its consequences. This approach ensures a proportionate legal response and contributes to the effectiveness of law enforcement. The findings may be used to improve legislation and develop measures to prevent technological threats to aviation security.

Keywords: aviation, technological threats, public safety, aviation safety, laser exposure, interference with control, flight safety.

Introduction

Modern civil aviation operates in an increasingly complex threat environment, in which, alongside traditional risk factors, technologically mediated forms of intervention are gaining importance. Previously, flight safety was primarily associated with the human factor, including crew training and compliance with operational standards. However, currently, there is a shift in emphasis towards remote, technically feasible impacts on aircraft control processes.

The relevance of this study stems from the steady increase in incidents involving the misuse of available technical means that can affect flight safety. In particular, the problem of laser exposure of aircraft crews in Kazakhstan has acquired a pronounced practical character, as evidenced by the increase in relevant cases in recent years. This trend indicates the need to rethink existing approaches to the legal assessment of such acts and improve the mechanisms of legal response.

The purpose of the study is to develop a theoretically sound model of differentiation of responsibility for interference with aircraft control, based on the differentiation of technological impact and its actual consequences.

To achieve this goal, the following tasks have been set: to analyze the transformation of the structure of threats to aviation security, to identify the legal nature of technologically mediated interventions, to determine the content of the category “interference with aircraft control”, to establish criteria for differentiating levels of public danger, and to formulate a model for differentiating legal responsibility.

Several contradictions remain in the scholarly literature and law enforcement practice. In particular, the issue of the moment of the end of the act is debatable: whether it is recognized as completed at the time of the act or only when the consequences occur in the form of real interference with aircraft control. There is also no unified approach to defining the limits of criminality of technological impacts, which creates uncertainty in the qualification of relevant acts.

The methodological conflict manifests itself in the confrontation between formal-legal and functional approaches: the former focuses on assessing the action itself, while the latter analyzes its consequences and the degree of interference with flight safety.

Research gaps are evident in the absence of a comprehensive theoretical model that accounts for the multilevel nature of technological threats and enables differentiation of responsibility based on the degree of

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public danger. In existing works, as a rule, there is no clear distinction between potentially dangerous effects and actual consequences.

The author argues that it is necessary to move from a formal approach to a functional and legal interpretation of the acts in question. At the same time, the legal assessment should be based not only on the technical impact's characteristics, but also on its actual impact on aircraft control safety.

Methods and Materials

The empirical and normative basis of the study was made up of: international legal acts in the field of civil aviation and aviation safety, national regulatory legal acts of the Republic of Kazakhstan, including criminal, administrative and aviation legislation, official statistical and informational materials characterizing the prevalence of incidents related to laser exposure to aircraft crews, scientific literature materials by domestic and foreign authors on issues of criminal policy, criminalization, aviation security and technological threats, empirical data obtained during the study of primary inspection materials, analytical and methodological documents of international aviation organizations.

The empirical basis of the study also included an analysis of 4 primary audit materials related to cases of laser exposure to civil aviation crews, which were recorded after the introduction of criminal liability for interference in aircraft control in the Republic of Kazakhstan. The study analyzed the explanations and testimony of the flight crew members contained in the materials of the initial inspections. The analysis was carried out using elements of qualitative content analysis aimed at determining the nature of the impact, its duration, and the presence or absence of actual interference in aircraft control.

The study was conducted in 5 stages: 1) Identification and theoretical understanding of modern technological threats to aviation that can pose risks to aircraft control; 2) Analysis of international and national legal norms governing aviation safety, as well as research on the place of a new criminal law norm in the system of current legislation; 3) Clarification of the content of the category "interference with aircraft control", differentiation between action and consequence, as well as the study of the problem of the moment of the end of the act; 4) Verification of the hypothesis put forward based on the analysis of statistics, materials of primary inspections and comparison of theoretical provisions with practical cases; 5) Formulation of the author's model of responsibility architecture and conclusions on the directions of improvement of legal regulation.

The work uses a set of general scientific and private scientific research methods. General scientific methods: analysis and synthesis, induction and deduction, a systematic approach, and structural and functional analysis.

Private scientific methods:

A formal legal method for analyzing the content of legal norms and their systematic interpretation.

The comparative legal method is used to compare international and national approaches to assessing technological threats to aviation.

Doctrinal analysis examines scientific approaches to criminalization, the differentiation of responsibility, and the qualification of acts.

Content analysis — when studying statistical and analytical materials.

The method of legal modeling is used in building the concept of responsibility architecture.

The research is based on an interdisciplinary approach combining criminal law analysis, a criminological approach, elements of aviation law, and risk-based analysis.

As part of the work, a functional approach was also used, according to which the legal assessment of an act is based not only on the technical means used, but also on its functional role in creating a threat to flight safety.

Due to the limited number of officially documented criminal cases following the introduction of Article 352-1 of the Criminal Code of the Republic of Kazakhstan, the empirical analysis was exploratory in nature and aimed at identifying typical patterns of technological interference and their legal assessment.

Results

During the research, it was found that technological threats to aviation have several specific features. The most common signs are: the remote nature of the impact, the possibility of using publicly available technical means, and the difficulty in identifying the source of the interference. These features necessitate a revision of traditional approaches to the legal assessment of relevant acts.

Based on empirical data analysis, including a review of primary inspection materials, it was found that the necessity of distinguishing between technological exposure and legally significant consequences was established. In some cases, laser exposure is short-term and does not disrupt piloting, which confirms the need to distinguish between exposure and its consequences.

The study proposes a differentiated model of responsibility depending on the nature and consequences of technological interference.

The scientific novelty of the research consists in: substantiating the distinction between technological impact and interference with aircraft control as an independent legally significant consequence, forming a model for the legal stratification of technological threats to aviation, developing criteria for determining the threshold of criminal liability, and proposing the introduction of administrative and legal response mechanisms.

The results obtained are fully consistent with the study's stated goals and objectives, as they allow us to define the boundaries of criminal responsibility and clarify the limits of criminal liability.

The key idea developed in the work is the transition to a functional model of legal regulation, in which legal assessment is based on the degree of actual interference with flight safety, rather than solely on the committed act.

Thus, the proposed model of responsibility differentiation serves as the basis for further development of legal regulation in aviation security and balances the effectiveness of legal impact with the principle of proportionality of responsibility.

Discussion

Previously, ensuring aircraft safety primarily focused on the human factor—the discipline of the crew, the quality of training of aviation personnel, and compliance with the rules of air transport operation—but in modern conditions, the threat landscape has changed significantly. Along with traditional risk factors, technologically mediated interventions are becoming more prominent, which can affect flight safety, the functioning of aviation infrastructure, and aircraft control stability.

Currently, several of the most significant technological threats to aviation can be identified: laser exposure of aircraft crews, the use of uncrewed aerial vehicles near airports and air routes, radio-electronic interference, the substitution of navigation signals, and cyber-interference with the digital infrastructure of the aviation industry.

The unifying feature of these threats is that interference with the safe control of an aircraft can be carried out remotely and covertly, using publicly available technical means that do not require complex professional training or direct penetration into the protected area [1]. Unlike traditional forms of encroachment, such actions are often committed outside the direct control of aviation services and law enforcement agencies, making it difficult to promptly identify and legally assess them.

These features determine not only the high latency of the relevant acts but also their potentially transboundary nature, which affects the stability of international air traffic.

In this context, the International Civil Aviation Organization's activities aimed at coordinating States' actions in crisis and emergencies in airspace are of great importance. ICAO supports Member States by developing and implementing response measures to minimize disruptions to international air traffic while ensuring the required level of flight safety. In the event of conflicts or disruptions to international air traffic flows, ICAO initiates and coordinates regional and interregional cooperation mechanisms, ensuring the implementation of emergency measures within flight information areas in accordance with Annex 11 to the Convention on International Civil Aviation [2].

These provisions indicate that an approach based on coordination and differentiation of response measures according to the nature and degree of threats has already been established at the international level. In this regard, it seems reasonable to apply a similar logic in the national criminal law regulation of technological impacts, including interference with aircraft control.

Despite differences in the technical means and impact mechanisms used, all these forms are united by a single functional feature—the ability to disrupt the safe control of an aircraft and the sustainable functioning of elements of the aviation system. It is this circumstance that allows us to consider them not as isolated episodes, but as manifestations of a single class of socially dangerous technological interventions.

Laser devices occupy a special place among aviation's technological threats. They are the ones that most clearly demonstrate how a relatively simple and affordable technical tool can become an increased public danger if used in an aviation environment.

For Kazakhstan, the problem of laser exposure to aircraft crews is not hypothetical, but of a pronounced practical nature. According to available data, 247 cases of laser blinding of pilots were recorded in Kazakhstan from 2021 to 2024, including 15 in 2021, 22 in 2022, 70 in 2023, and 140 in 2024.

The above dynamics indicate a sharp increase in relevant incidents and objectively confirm the need for a deeper analysis of both the legal nature of such acts and the adequacy of existing legal response mechanisms.

It should be considered that the degree of danger of laser exposure to the organs of vision is determined not only by the radiation power, but also by its spectral characteristics. As a rule, green and blue lasers pose a greater risk to visual perception and orientation, whereas red lasers usually have a significantly lower dangerous exposure distance [3]. However, in the criminal law sense, it is not only the device's physical characteristics that are important, but also the kind of actual interference it can cause in the process of controlling an aircraft.

It is this circumstance that is of fundamental importance for further discussion: not every technological impact is identical to interference with aircraft control.

It is fundamentally important that, for a long time, such cases were considered primarily as aviation incidents, without a subsequent full-fledged criminal response against persons who pointed laser devices, launched uncrewed aerial vehicles, or engaged in other forms of technical intervention.

In many ways, this situation could be due to the absence of a special provision in national criminal legislation explicitly providing for liability for interference with aircraft control.

The situation changed in 2025, when Article 352-1 of the Criminal Code of the Republic of Kazakhstan was introduced, providing for liability for interference with aircraft control. The very fact of the appearance of this norm should generally be assessed positively, since it reflects the recognition by the state of the increased public danger of technological forms of interference in the activities of civil aviation.

However, for this study, the question of what the limit of criminal law response in this area is of fundamental importance. In other words, whether the act in question is subject to criminal assessment already at the time of the impact itself, or only when this impact actually transforms into interference with aircraft control.

It seems that with regard to the category of acts under consideration, the very fact of technological impact is not always the same as interfering with aircraft control, since not every pointing of a laser beam, not every launch of an unmanned aerial vehicle near an airway, and not every other technological impact automatically creates the level of public danger that requires a criminal law response. That is why the issue of the moment of the end of the act and the criteria for its criminal assessment is of particular importance.

From the point of view of the criminal law structure, the issue of the moment of the end of the act in question is debatable. A literal interpretation of the disposition of part 1 of Article 352-1 of the Criminal Code of the Republic of Kazakhstan may give the impression that the crime is recognized as over from the moment the act itself is committed, which may interfere with aircraft control. However, this interpretation is debatable.

This is because the actual public danger of the acts in question is manifested primarily not in the technical impact itself. However, in a real violation or difficulty in the safe control of the aircraft, that is, in the occurrence of a result that objectively affects flight safety.

For a proper criminal assessment of technological threats to aviation, it is fundamental to define the content of the category "interference with aircraft control".

As we noted earlier, interference with aircraft control should be understood as a socially dangerous consequence of intentionally committing illegal actions, posing a threat to flight safety due to violations or difficulties in the normal functioning of the aircraft control system and the crew's activities [4].

Consequently, interference with aircraft control is not identified with the action itself, such as laser guidance, the use of an uncrewed aerial vehicle, radio-electronic interference, or other forms of technological intervention. They are the result of such an impact, which has an independent criminal legal significance and must be established when qualifying an act.

This distinction is of fundamental importance for the subsequent differentiation of legal liability, since it allows us to distinguish between potentially dangerous technological impacts, actual interference with aircraft control and the serious consequences caused by such interference, which most accurately reflects the varying degree of public danger of the relevant acts.

The practical significance of this approach is confirmed by the information obtained from the primary inspection materials, namely, the testimony of civil aviation pilots.

According to the testimony contained in one of the primary inspection materials, during the approach an unknown person on the ground aimed a green laser beam into the cockpit. The impact lasted less than 10 seconds, according to the pilot, causing a short-term distraction but not resulting in a loss of aircraft control, and the landing was completed safely.

Another primary inspection material contained testimony from a pilot describing a similar incident during landing at Astana airport. After the exposure was identified, the crew immediately reported it to the dispatcher. At the same time, the respondent noted that there was no significant interference with aircraft control, and the landing was performed normally.

The International Civil Aviation Organization considers laser exposure of crews a flight safety risk. It has therefore developed special recommendations regarding pilot actions in the so-called laser attack [5].

These cases are of particular interest for criminal law assessment, as they allow us to trace the distinction between impact and consequence in practice.

On the one hand, pointing a laser beam at the cockpit of an aircraft during flight is objectively associated with the risk of interference in the piloting process and therefore cannot be considered harmless behavior. On the other hand, the pilots' testimony indicates that such an impact does not always develop into actual interference with aircraft control.

In the cases studied, the impact was short-lived, did not result in loss of aircraft control, and did not require a change in the landing procedure. That is why it seems reasonable to differentiate such acts according to the degree of public danger.

If a technological impact has actually caused interference with the control of an aircraft, caused a violation of the visual perception of the crew, caused a change in the flight trajectory, caused a second lap, disrupted takeoff or landing, or otherwise jeopardized flight safety, it should receive a criminal assessment.

If the impact did not result in a real violation of aircraft control and did not result in specific consequences, then, despite its potential danger, it seems more reasonable to classify it as an act requiring administrative and legal response rather than immediate criminalization.

The problem that arises in this regard is not limited to the question of the presence or absence of a special provision of the criminal law. More broadly, it affects the methodology of criminalization of relevant acts and the limits of permissible criminal law interference.

The historical evolution of criminal legislation demonstrates a steady tendency to complicate the differentiation of responsibility, making it possible to consider this institution a universal tool of criminal policy [6].

In the science of criminal law, the validity of criminalization is traditionally assessed through a set of criteria, which include:

- the public danger of an act;
- its prevalence;
- exceeding the positive effect of criminalization over its negative consequences;
- consistency with the current system of legislation, including the Constitution and the international obligations of the state;
- compliance with the social and moral principles of society;
- procedural feasibility of criminal prosecution;
- observance of the principle of repressive economy [7].

Regarding interference with aircraft control, these criteria provide a more precise definition of the limits of criminal liability.

Thus, there is no doubt about the public danger of such acts, since they are objectively capable of affecting flight safety, the life and health of passengers and crew members, as well as the stability of the aviation system.

The prevalence of such attacks is also confirmed by both statistics and a steady increase in incidents related to laser exposure to aircraft crews.

At the same time, the criterion of a repressive economy is nevertheless significant, by virtue of which the criminal law should be used only in cases where other means of legal influence are insufficient.

From these positions, the same criminal law response to both acts that actually violated the control of an aircraft and actions that did not go beyond the potentially dangerous impact seems excessive. It does not fully comply with the principle of proportionality.

This approach tends to make the legislator excessively harsh and to expand the scope of criminal prosecution. As a result, there is a risk of a disproportionate criminal law response, which can naturally lead to various legal, social, and economic consequences, including increased social tension [8].

Consequently, the criminalization of interference with aircraft control is generally justified. However, its further doctrinal and legislative understanding requires a more precise definition of the threshold of criminal liability, that is, the distinction between:

- potentially dangerous technological impact;
- real interference with aircraft control;
- severe consequences caused by such exposure.

It is in this part that certain incompleteness in legal regulation becomes apparent. Currently, there is no independent administrative responsibility in Kazakhstan for actions involving, for example, pointing a laser beam at an aircraft, and using technical means of influence, or other technological intervention if such actions did not result in actual interference with aircraft control.

As a result, in practice, situations may arise in which such acts either do not receive an independent legal assessment or cause difficulties in choosing an adequate form of legal response.

This state of legal regulation cannot be considered optimal. From the standpoint of criminal policy, legal technique, and the principle of proportionality in legal responsibility, a differentiated model of legal response based on the nature and degree of public danger posed by the committed act seems more justified.

Similar conclusions regarding the necessity of adapting legal regulation to the rapid development of digital technologies have been reached in studies examining the use of Smart City technologies in forensic and law enforcement activities. Researchers emphasize that the expansion of technological capabilities should be accompanied by the development of appropriate legal mechanisms ensuring both public safety and the proportionality of state intervention [9].

Taking the above into account, it seems possible to discuss not only the presence or absence of criminal liability for interfering with aircraft control, but also the need to differentiate responsibility in this area.

In the theory of criminal responsibility, an approach has been developed according to which the same behavioral action can generate several independent legal consequences if it affects different protected interests. In particular, the Anglo-American doctrine distinguishes between an attempt to commit a crime and its completed result, while each can constitute an independent basis for responsibility.

This approach can be adapted to the analysis of technological threats to aviation security. Within the threat architecture, the impact on the aircraft control system does not always yield a single result: the same intervention can simultaneously interfere with communication, disrupt navigation stability, and create the risk of loss of aircraft control. Therefore, such consequences should not be considered as a single incident, but as a set of legally significant violations.

Similar to the doctrine of “transfer of intent”, in conditions of distributed, nonlinear technological impacts, the subject’s initial intention to create interference may manifest itself across various elements of the aviation system, affecting both manned and automated control components [10].

A similar approach is supported in studies on criminal policy and the principle of proportionality, which emphasize the need to take into account differences in the degree of harm and culpability [11, 12].

Thus, the architectural approach to threats enables the differentiation of responsibility for interference with aircraft control based on the nature of the affected subsystems and the scale of the impact.

In addition, there is often a position that offenses classified as criminal offenses (which include offenses provided for in part 1 of Article 352-1 of the Criminal Code), depending on the presence or absence of a sign of public danger, should be classified either as minor crimes or as administrative offenses [13].

Differentiation of responsibilities is proposed:

1. Administrative responsibility—should be imposed for the very fact of a potentially dangerous technological impact on an aircraft or elements of the aviation infrastructure, if it did not entail the actual creation of interference with aircraft control.
2. Criminal liability should apply only where the relevant interference actually affected the control of the aircraft, resulting in a disruption of, or difficulty in, the safe conduct of the flight.
3. Qualified criminal liability—should be provided for acts that have serious consequences, including: threatening an aviation accident, causing harm to human life and health, disrupting flight operations, and destabilizing the functioning of the aviation system.

This approach is more in line with Kazakhstan’s modern criminal law policy, which focuses on humanizing legislation, reducing excessive criminalization, and respecting the principle of proportionality of crimi-

nal repression. Criminal liability should be used as a last resort, and therefore its use is justified only in cases where the technological impact has really acquired the character of a real threat to flight safety [14].

In this sense, the proposed model allows us to move from a formal descriptive understanding of the ban to its functional and legal interpretation, in which the legal assessment is based not only on the technical impact itself, but also on the degree of its actual interference in flight safety.

It should be noted that one of the main criteria for distinguishing offenses is their public danger, regulated by the legislator through the imposition of punishment [15].

Thus, the analysis results allow us to conclude that the modern model of countering technological interference in aircraft control requires a more precise legal stratification.

Formally, the behavior, which is uniform in appearance, can differ significantly:

In the mechanism of influence.

By the nature of the intervention.

According to the degree of public danger.

By the presence or absence of real interference to control.

According to the severity of the consequences.

That is why the further development of legislation in this area should be based not on the model of total criminalization, but on the model of differentiated responsibility, combining administrative and criminal law means of response.

The category of differentiation of responsibility for interference with aircraft control proposed in the article allows not only for a more accurate interpretation of the current criminal law norm, but also provides a theoretical basis for further improvement of legislation, law enforcement practice, and the system of prevention of technological threats to aviation.

Conclusions

The purpose of this study was to develop the concept of responsibility architecture to address interference with aircraft control in the context of the growing technological threats to aviation. To achieve this goal, formal-legal, comparative-legal, doctrinal, systematic, and empirical research methods were used.

The study found that modern forms of interference with flight safety are increasingly implemented through laser exposure, crewless aerial vehicles, radio-electronic interference, and other technological means available to a wide range of people. It is shown that criminal liability should depend on the actual impact on flight safety. The key is not the technical impact itself, but the presence of a real violation or difficulty in safely controlling the aircraft.

The study substantiates the necessity of differentiated legal responsibility depending on the severity of the consequences.

It is concluded that the further development of legislation should be based on proportionate differentiation of responsibility, but on the model of proportionate differentiation of responsibility, taking into account the degree of realized public danger.

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Лазерлік кедергілер үшін жауапкершілікті саралау

Мақалада қолжетімді техникалық құралдарды пайдалану арқылы, әуе кемесін басқару процесіне қашықтан араласу мүмкіндігімен байланысты авиациялық қауіпсіздікке төнетін заманауи технологиялық қатерлер талданды. Ерекше назар экипаждарға лазерлік әсер етуге — мұндай араласудың ең кең таралған әрі айқын түрлерінің бірі ретінде аударылады. Зерттеудің мақсаты — авиациялық қауіпсіздікке төнетін технологиялық қатерлердің даму жағдайында әуе кемесін басқаруға кедергі келтіргені үшін жауаптылықты саралауды теориялық тұрғыдан негіздеу. Қазақстан бойынша статистикалық деректерге, сондай-ақ азаматтық авиация ұшқыштарымен жүргізілген сұхбаттарды қамтитын эмпирикалық материалдарға сүйене отырып, технологиялық әсер етудің өзі мен оның әуе кемесін басқаруға нақты кедергі келтіру түріндегі салдары арасындағы айырмашылықты ажырату қажеттілігі негізделді. Зерттеуде аталған әрекеттердің аяқталу сәтін анықтаудың, сондай-ақ оларды жасағаны үшін қылмыстық жауапкершілік шектерін айқындаудың теориялық және практикалық мәселелері ашып көрсетілді. Әрбір әсер ету қылмыстық-құқықтық бағалауды талап ететін қоғамдық қауіптілік деңгейіне жете бермейтіні көрсетілген. Осыған байланысты автор жауапкершілікті саралаудың үш деңгейлі моделіне негізделген тұжырымдамасын ұсынады: әлеуетті қауіпті әсер ету, басқаруға нақты кедергілер келтіру және ауыр зардаптардың туындауы. Ұсынылған тәсіл құқықтық ықпал ету шараларының шамаластығын қамтамасыз етуге, артық криминализациядан сақтануға және құқық қолдану тәжірибесінің тиімділігін арттыруға мүмкіндік береді. Зерттеу нәтижелері заңнаманы жетілдіруде және авиациядағы технологиялық қатерлердің алдын алу шараларын әзірлеуде қолданылуы мүмкін.

Кілт сөздер: авиация, технологиялық қатерлер, қоғамдық қауіпсіздік, авиациялық қауіпсіздік, лазерлік әсер ету, басқаруға кедергілер, ұшу қауіпсіздігі.

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Дифференциация ответственности за лазерные помехи

В статье анализируются современные технологические угрозы авиационной безопасности, связанные с возможностью дистанционного вмешательства в процесс управления воздушным судном с использованием технических средств. Особое внимание уделяется лазерному воздействию на экипажи как одной из наиболее распространенных и показательных форм такого вмешательства. Целью исследования является теоретическое обоснование дифференциации ответственности за создание помех управлению воздушным судном в условиях развития технологических угроз авиации. На основе статистических данных, а также эмпирических материалов, обосновывается необходимость разграниче-

ния между самим фактом технологического воздействия и его последствиями в виде реальных помех управлению воздушным судном. В работе выявляются теоретические и практические проблемы определения момента окончания соответствующих деяний, а также пределов уголовной ответственности за их совершение. Показано, что не каждое воздействие достигает уровня общественной опасности, требующего уголовно-правовой оценки. В этой связи предлагается концепция дифференциации ответственности, основанная на трехуровневой модели: потенциально опасное воздействие, создание реальных помех и наступление тяжких последствий. Сформулированный подход обеспечивает соразмерность правового реагирования, исключает избыточную криминализацию и повышает эффективность правоприменения. Результаты исследования могут быть использованы при совершенствовании законодательства и разработке мер предупреждения технологических угроз в авиации.

Ключевые слова: авиация, технологические угрозы, общественная безопасность, авиационная безопасность, лазерное воздействие, помехи управлению, безопасность полетов.

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