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Development Strategy of International Cooperation of Forensic Science Institutions of Ukraine with Foreign Experts in Prevention of Terrorist Attacks on Critical Infrastructure

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Abstract

The issue of using modern foreign experience of preventive activity in criminological work of forensic science institutions of Ukraine has been considered in this study. Peculiarities of the main organisational forms of forensic science activity have been analysed through specialised (forensic science) institutions and through specific specialists, namely: forensic experts (for example, practice of the institute of sworn experts: specialists who took the oath or received a license for forensic examination). Analysis of international standards used in forensic science activity has been carried out. Necessity position of legislative introduction of international standards in process of forensic examination has been revealed and substantiated. The main emphasis is on highlighting problems of cooperation of forensic institutions of Ukraine with foreign experts in preventing terrorist attacks on critical infrastructure.

The research aim is to study the use of modern foreign experience in preventive activities in criminological work of forensic expert institutions of Ukraine.

The result of the study provides evaluation of the problems of cooperation of forensic institutions of Ukraine with foreign experts in preventing terrorist attacks on critical infrastructure.

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Based on this evaluation, a proposal is put forward for the improvement of normative regulations.

Keywords: forensic science, forensic expert, international standards, prevention, critical infrastructure facilities.

Introduction

One of the main work directions of all public authorities in Ukraine on integration into the European and world community is preparation of proposals on international legal relations and Ukraine joining international treaties and conventions, signing agreements on legal cooperation with relevant foreign bodies and international organisations, interaction with them within their powers, etc. Therefore, the current trend is to expand participation of forensic science institutions in such international cooperation, increasing their role in development of theory and practice of criminalistics and forensic science (Filipenko, et al., 2021).

This issue has received due attention in other international documents in particular in the Global Counter-Terrorism Strategy (A/RES/60/288) adopted by the General Assembly in 2006. United Nations Member States recognised that capacity-building in all States is a core element of the global counter-terrorism effort (UNODC, 2014).

This is especially true in responding to the complications of criminological situation, as well as in emergencies, including prevention of terrorist attacks on critical infrastructure. This is reflected in the official position of the state, expressed in a number of recently issued legal acts. In particular, they emphasise that priority in achieving the goals of crime counteraction and eliminating external and internal threats to Ukrainian national security belongs to all state bodies that should have appropriate forces and means capable of performing specific tasks (On the Strategy of Military Security of Ukraine, 2021).

Thus, it can be argued that today there is a lack of research on criminological activities of forensic science institutions of Ukraine to prevent terrorist attacks on critical infrastructure, cooperation of forensic science institutions of Ukraine with foreign experts in these issues increasing the relevance of the chosen direction and prospects determining effective practices for improving such activity.

Scientists indicate that forensic experts should note circumstances identified via the facilitated examination by the commission of offenses and develop recommendations to prevent certain crimes including terrorist attacks on critical infrastructure (Nechyporuk et al., 2021).

Main Content Presentation

Important part of Ukrainian modern criminal law policy is countering various terrorist threats. The most dangerous and devastating consequences are terrorist acts related to encroachment on critical infrastructure, as they pose a real threat to stable

operation of such facilities that threatens human life and health, violates work of enterprises, institutions and organisations, industrial and economic facilities, etc. (Spitsyna & Filipenko, 2019).

According to the provisions of the Law of Ukraine “On the Fight against Terrorism”, terrorism is a socially dangerous activity that utilises deliberate use of violence by taking hostages, arson, murder, torture, intimidation of the population and authorities or other encroachments on life or health, or threats of committing criminal acts in order to achieve criminal goals (On the Fight against Terrorism, 2003).

As a criminal phenomenon, terrorism is an illegal, criminally punishable act expressed in the use of weapons, explosion, arson or other acts that endanger human life or health or cause significant property damage or other serious consequences, if any actions were committed for the purpose of violating public safety, intimidating population, provoking a military conflict, international complication, or in order to influence decisions or acts or omissions of public authorities or local governments, officials of these bodies, associations of citizens, legal entities persons, international organisations, or drawing public attention to certain political, religious or other views of perpetrator (terrorist), as well as the threat of committing these acts for the same purpose (Criminal Code of Ukraine, 2001).

Terrorism includes ideology of violence and terrorist activities in various forms. Terrorist activities include planning and (or) creating terrorist structures, involvement in terrorist activities, financing or any other assistance to these activities, propaganda of violent methods to achieve social and political goals, as well as the actual commission of terrorist acts.

Terrorism is a multi-object crime, the main purpose of which is public safety, as well as encroachment on citizen lives and health, critical infrastructure facilities, air transport facilities, natural environment, information environment, public administration bodies, statesmen and public figures, etc.

Experts in crime counteraction identify about 200 types of modern terrorist activities. The main ones are: political terrorism, nationalist terrorism, religious terrorism, technological terrorism, etc. The most dangerous is technological terrorism that is the use or threat of use of weapons of mass destruction, including nuclear, chemical and bacteriological, radioactive and highly toxic chemicals, biological substances, as well as threat of seizure of critical infrastructure, increased danger to human life and health. An act of international terrorism was observed during the seizure of the Chernobyl nuclear power plant by the troops of the Russian Federation, shelling of the territory of the Zaporozhye nuclear power plant. World leaders have accused Russia of endangering safety of an entire continent, and the president of Ukraine Volodymyr Zelensky accused Russia of “nuclear terror”. US President Joe Biden urged Moscow to stop its military activities around the site, while the Prime Minister of Canada Justin Trudeau insisted the “horrific attacks” from Russia “must cease immediately”. UK Prime Minister Boris Johnson said the “reckless” attack could “directly threaten the safety of all of Europe”. All three leaders spoke to the President Volodymyr Zelensky by phone. Mr Zelensky, meanwhile, said the attack

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could have caused destruction equal to six Chernobyls, the site of the world's worst nuclear disaster in 1986 (Ukraine nuclear plant: Russia in control after shelling, 2022).

Analysis of domestic and foreign sources makes it possible to attribute the following to the main current trends in the evolution of terrorism:

- 1) consolidation of local terrorist groups and their rapid internationalisation;
- 2) strengthening mutual influence of various internal and external social, political, economic and other factors that contribute to emergence and spread of terrorism;
- 3) increase of the level of organised terrorist activities, creation of large terrorist groups with developed infrastructure;
- 4) strengthening the link between terrorism and organised crime;
- 5) growth of financial and logistical support of terrorist structures;
- 6) desire of terrorism subjects to master the means of mass destruction of people;
- 7) attempts to use terrorism as a tool for interfering in internal affairs of states;
- 8) development and improvement of new forms and methods of terrorism aimed at expanding the consequences of terrorist acts and increasing the number of victims, etc. (UNODC, 2019).

The degree of danger of threats of terrorist acts is determined by the improvement level of forms, methods, forces and means of terrorist activity, tactics of its implementation, as well as efficacy of anti-terrorist measures of national and international systems of terrorism counteraction.

The purpose of countering terrorism in Ukraine is to protect individuals, society and the state from terrorist threats and prevent such manifestations.

The main tasks in achieving these goals are:

- 1) identification and elimination of factors that contribute to emergence and spread of terrorism;
- 2) detection, prevention and cessation of actions of persons and organisations aimed at preparation and commission of terrorist crimes and (or) assistance in such activities;
- 3) bringing to justice the subjects of terrorist activity in accordance with the current legislation of the state and international community;
- 4) cessation of attempts to transfer activities of international terrorist organizations to the territory of Ukraine, involvement in this process of the potential of the international anti-terrorist coalition;
- 5) constant improvement of the national system of terrorism counteraction, maintenance in a state of readiness for the use of forces and means designed to detect, prevent and stop terrorist acts and minimise their consequences;
- 6) ensuring effective anti-terrorist protection of critical infrastructure, livelihoods and places of mass stay of people;
- 7) counteraction to the spread of terrorism ideology, implementation of active information and propaganda measures of anti-terrorist orientation (Nechyporuk et al., 2021).

National system of terrorism counteraction is a set of organisational structures (subjects of terrorism counteraction), which, within the powers established by laws and regulations issued on their basis, carry out activities to combat terrorist threats, develop and implement a set of measures to prevent terrorist threats, including detection and cessation of terrorist activities, minimisation and elimination of possible consequences of terrorist acts.

Subjects of terrorism counteraction are authorised bodies of state power and local self-government responsible for conducting anti-terrorist measures, non-governmental organisations and associations, as well as individual citizens who aid in implementation of measures in this area. One of the central authorities that protect not only life, health, safety but justice in general is the state forensic science institutions of Ukraine.

Therefore, consideration of the strategy of international cooperation development of forensic science institutions of Ukraine with foreign experts in prevention of terrorist attacks on critical infrastructure is of great practical and scientific importance. The strategy is based on the principles of international law, the main international documents that determine the conditions and procedure for cooperation between states in the field of international forensic science cooperation. The basis of strategic planning should be science, since only relying on scientific knowledge it is possible to assess the real state of affairs and existing opportunities in determining strategic and tactical goals and trajectory of their achievement.

The main purpose of state forensic science institutions is to protect interests of the state, rights and freedoms of citizens and rights of legal entities by conducting objective, scientifically sound forensic examinations and forensic research. International cooperation of forensic science institutions is important for implementation of the rule of law, improving forensic activities and quality of forensic science as one of the main forms of using specific expertise in modern justice, as well as formation of preventive recommendations for law enforcement agencies. Proactive activity in the field of international integration of Ukraine into the world legal space puts a wide range of tasks for state forensic institutions to establish international cooperation and expand cooperation with foreign specialised forensic science institutions.

One of the main directions of work of all public authorities in Ukraine on its integration into the European and world community is preparation of proposals on international legal relations and Ukrainian accession to international treaties and conventions, signing agreements on legal cooperation with relevant foreign bodies and international organisations, interaction with them within their powers, etc. Consequently, the current trend is to expand the participation of forensic institutions in such international cooperation, increasing their role in the development of theory and practice of forensic science and criminalistics (Dmitrieva, 2020). International cooperation of expert institutions is necessary for exchange of experience, advanced training of specialists of forensic institutions, considering modern achievements of science and technology, creation of standardised forensic methods, profile forensic directions (Zakovyenko, 2018).

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It difficult to perform its law enforcement functions without integration with the international community. Therefore, international cooperation of expert institutions is necessary in order to exchange experience considering modern achievements of science and technology, prevention of terrorist attacks on aerospace and critical infrastructure, elimination of duplicating scientific and methodological support of regional distribution of tasks between forensic science institutions and creation of specialised forensic directions (Nechyporuk et al., 2021).

However, the area related to strengthening preventive activities of forensic institutions is not mentioned or highlighted as a priority that is an incomplete reflection of criminological potential of these entities (Filipenko et al., 2021).

It should be noted that in recent years creation of international forensic networks has intensified. Currently there are five such networks that unite scientific reserves of forensic science institutions of different countries:

- 1) European Network of Forensic Science Institutes, existing since 1995, is the most developed and strong network;
- 2) South African Regional Network of Forensic Science, since 2008, covers the entire African region;
- 3) Asian Network of Forensic Science, existing since 2008;
- 4) International Forensic and Environmental Expert Network, existing since 2008, to assist forensic experts in the field of ecology and environmental offenses;
- 5) Traced evidence forensic environmental network, existing since 2006, is a non-governmental organisation to assist in conducting forensic examinations in cases of crimes against wildlife and to preserve biological diversity of flora and fauna (de Kinder, 2011).

For example, within the European Network of Forensic Science Institutes (ENFSI), one of the most important conditions for effective operation of forensic institutions is validation (assessment of suitability) of forensic methods. Validation of methods is an important system element of ensuring quality control of forensic research results, and its practice is widespread in forensic science institutions around the world.

As innovative mechanisms for improving the quality of forensic activities in recent years, validation and certification of methodological materials for forensic examination should be included in cooperation plans of forensic science institutions. In addition, standardisation (unification) of forensic methods, common terminological standards, unified requirements for forensic experts and professional forensic expert education programmes will solve another problem – conducting forensic examinations on the basis of a single scientific and methodological approach.

European Network of Forensic Science Institutes has existed since 1995 (official site ENFSI). It consists of 54 forensic science institutions, 41 of which are located in EU Member States. The purpose of ENFSI is enshrined in its Constitution: to be at the forefront of the world to ensure the quality of development and conduct forensics throughout Europe.

The main activity of ENFSI is to strive to achieve a high reputation of the organisation in the field of forensic science in Europe and the world by developing the quality of forensic services at all stages of the proceedings from the scene to the court, provided by the following principles:

- 1) ENFSI membership combines production, scientific and methodological capabilities of forensic science institutions;
- 2) ENFSI membership expansion strengthens trust of this organisation by law enforcement agencies and judges;
- 3) Business relations with other organisations related to forensic science and criminalistics are established and maintained in an organised manner;
- 4) Activities of all ENFSI member institutions are actively encouraged to implement modern research methods and international standards in forensic practice and ensure high competence of experts in specific types of forensic science.

Within international cooperation, this is important for combating crime, in particular for combating illegal migration, human trafficking, arms and drug trafficking, smuggling, spread of transnational and cross-border crime, search for criminals wanted internationally, search for missing persons, etc. It should be noted that the European Union recognises the leading role in provision of judicial assistance by ENFSI; in particular, in December 2011 at a meeting of the Council of Europe on Justice and Home Affairs a Decision on the Strategy for European Forensic Science until 2020 providing for a European Forensic Science Area and development of forensic infrastructure in Europe was adopted (ENFSI held the 10th conference of the working group of experts on documents, 2018).

What is the vision of the European Forensic Science Development Strategy? Thus, in order to improve police cooperation with forensic institutions throughout the European Union and create a European forensic space by 2020, member states and the National Forensic Commission (NCFs), seeking to ensure the effective administration of justice and security of citizens, agreed to achieve success in relevant areas, among which, given the focus of this study, the following should be highlighted:

- 1) accreditation of forensic institutes and laboratories;
- 2) approval and use of best practices and their use in the work of forensic science institutions;
- 3) determination of optimal ways to create, update and use forensic databases;
- 4) use of forensic science achievements terrorism counteraction, organised crime and other types of crimes (Nechyporuk et.al, 2020);
- 5) research and implementation of projects for further development of forensic infrastructure, etc.

The above allows to claim that this document only indirectly traces the tendency to strengthen the preventive capabilities of forensic science institutions of the European Union.

Simultaneously, another international document emphasises strengthening of international cooperation between forensic science institutions of foreign countries for

administration of criminal justice. Thus, in 2010, at the 19th session of the Commission on Crime Prevention and Criminal Justice of the UN Economic and Social Council, Resolution 19/5 *International cooperation in the field of forensic science* was discussed and adopted. This document notes that the role of forensic science in the administration of criminal justice and the need to further develop international relations of forensic science institutions within the existing regional networks of forensic institutions to ensure a global exchange of forensic knowledge, information and data (International cooperation in the field of forensic science. Report of the Executive Director of the Commission on Crime Prevention and Criminal Justice, 2012).

Thus, it should be noted that the international community is constantly interested in the field of forensic science and use of its capabilities in combating crime and ensuring administration of justice. In order to exchange information, improve forensic expert methods, form common standards of forensic science, solve practical problems of law enforcement, train and improve staff skills and solve other important tasks, currently more than thirty international organisations are successfully operating.

The next thing to pay attention to is the fact that both in Ukraine and in foreign countries it is important to introduce the latest information technologies in the preventive activities of forensic institutions (due to digitalisation processes). In forensic activities, use of latest information technologies (hereinafter referred to as IT) and computer technology, achievements of various sciences — mathematics, semiotics, modeling theory, algorithm theory, use in expert research of integrated automated database (hereinafter referred to as AD), intelligent interactive (dialogue) information systems and the formation of automated information systems (hereinafter referred to as AIS) of the new generation allow timely receipt and processing of relevant information, record illegal activities of individuals and organised criminal groups, prevent illegal activities of “authorities” and “leaders” of criminality, to organise work on active search of criminals and other persons, to identify and eliminate causes and conditions that contribute to commission of crimes, thereby effectively implementing requirements of current legislation to protect the rights and interests of individuals, society and the state as a whole from criminal encroachment (Filipenko, 2019).

Creation of international and regional reference and information databases of international forensic institutions, foreign forensic science institutions is an urgent area of international cooperation of forensic science institutions of Ukraine with foreign professionals in preventing terrorist attacks on aerospace facilities and critical infrastructure (Filipenko et al., 2021). These problems could be tackled and the full potential of point-of-care and mobile forensic analyses could be realised if measurement devices could be operated in an integral forensic network. Through the network, the necessary calibration and quality control measures could be taken that would enable deployable forensic instrumentation to yield robust findings that can directly be used as evidence. The network would allow forensic experts to assess data generated outside the forensic laboratory and to provide direct assistance to the operators on location. From these activities, it also becomes apparent for which samples a more detailed follow-up investigation is required

at the forensic laboratory. The forensic expert capacity is thus used more effectively and findings can be fed into the platform creating a continuous cycle of platform and data development. This approach would combine central data gathering allowing forensic intelligence and knowledge management with rapid and efficient decentralised forensic analysis. This novel concept, although technologically challenging, could lead to a step change in efficiency and efficacy of the forensic information gathering process. It could also cause a paradigm shift in the role of forensic institutes and forensic experts in the criminal justice system: a shift towards a new role for forensic institutes and laboratories as custodians of the forensic platforms and point-of-care and portable equipment and methods. It would also allow forensic institutes to develop powerful forensic intelligence tools to reveal potential case and evidence connections, to better understand criminal activities, to monitor and optimise policing, to improve the efficiency of forensic investigations and to assist in crime prevention and disruption (Kloosterman et al., 2020).

Use of the latest devices and equipment, such as unmanned aerial vehicles (UAVs), has a powerful potential in countering terrorist attacks. With their help, in particular, it is possible to ensure various preventive measures: round-the-clock monitoring of the territory adjacent to the objects of critical infrastructure and aerospace; monitoring activities of ground safety equipment and protecting the data they integrate and transmit. According to researchers, there is far more technology developed and ready for the war on terror. Unmanned aerial vehicles, ranging from the small quad copters to the large military UAVs, have surveillance potential that should be exploited to its fullest. Aerospace and defense systems integrators should be always thinking about how they could be using current off-the-shelf technologies in cutting-edge new ways to detect, track, and deter potential terrorists (The growing role of technology in the global war on terrorism, 2015).

The United States has sent 600 more AeroVironment Switchblade drones to help the Ukrainian military counter Russia's invasion. That is a major increase from the 100 drones the US sent at the onset of war. Drones are "loitering munitions" that can circle above a battlefield before in effect becoming missiles that attack specific targets. Those are included in the Pentagon's new \$800 million in military aid to Ukraine, a package that brings the country's total contributions to \$2.6 billion in security assistance. The US also has sent an undisclosed number of AeroVironment Puma drones, which can circle for hours above a battlefield and help soldiers direct Switchblades toward their targets. Drones in Ukraine are changing the nature of war, providing a relatively cheap way for soldiers to follow the ongoings and launch attacks against expensive armored vehicles. Ukrainian troops are using everything from small commercial drones to the large military Turkish-built Bayraktar TB2 (US Military Sends Another 600 Switchblade Drones to Ukraine, 2022).

Current stage of forensic science development is characterised by high dynamism, active influence on its development of scientific and technological progress, purposeful and active search for effective ways to improve forensic expert practice on a fundamental theoretical basis. The main features of forensic research at the present stage include its high science intensity, use of cybernetics integrating into forensic science and

criminalistics that serve as a catalyst for further development of its traditional tools and methods based on achievements of natural, technical and human sciences.

Conclusions

For development and effectiveness of international cooperation of forensic science institutions of Ukraine with foreign experts in preventing terrorist attacks on critical infrastructure, it is necessary to do the following:

1. Develop the Strategy for the development of forensic institutions of Ukraine until 2030 that provide:

- 1) Improving efficiency of forensic activities and quality of forensic examinations in Ukraine, creating favourable conditions for international exchange of scientific achievements and practical experience in this field;
- 2) Creation of an effective model of interaction of state forensic science institutions of Ukraine and domestic forensic experts with international associations of forensic experts and foreign forensic institutions and professionals;
- 3) Promoting development of integration processes in the field of forensic science activities in the European Union and other international and regional organisations with participation of Ukrainian forensic experts;
- 4) Creation of scientific, methodical and organisational bases of forensic expert support of prevention and investigation of terrorism with use of domestic and international experience. The main types of examinations required in the investigation of acts of terrorism are forensic explosives, ballistics, forensic aeronautical, DNA testing, computer forensics, forensic examinations of radioactive materials, forensic speech and audio analysis;
- 5) Use of international cooperation results in creating scientific, methodological and organisational bases of forensic support for crime investigation in the field of information technology including the illegal use of outsider personal data. In addition to computer forensics in investigation of such crimes, it is important to conduct other engineering and technical examinations, as well as forensic economics, forensic linguistic, forensic intellectual property examination;
- 6) Use of international cooperation results in creating scientific, methodological and organisational bases of forensic support for investigation of transnational and international financial crimes. Investigation of such crimes should make full use of results of forensic economics, computer forensics;
- 7) Management of practical implementation of long-term strategic projects for development of international forensic cooperation, as well as monitoring their implementation;
- 8) Training of highly qualified forensic experts who are fluent in foreign languages and have received additional training in the field of international forensic cooperation and necessary basic knowledge in the field of international law and other international legal subject matters.

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2. It is also important to harmonise the Strategy with the documents of the UN, the European Union, Interpol and Europol, which define the goals and objectives of international cooperation in the field of forensic science.

3. Creation of a new forensic association (such as the International Forensic Association for Combating Aerospace Terrorism), which will deal exclusively with cooperation in the crime investigation in the aerospace sector, is equally important. Members of the Association can be domestic and foreign forensic organisations; forensic science institutions, higher education institutions that provide training and retraining of forensic experts; specialised higher education institutions that train professionals in aerospace industry; editors of professional periodicals, etc.

Co-founders of the Association can be two powerful intellectual centers: National Aerospace University – “Kharkiv Aviation Institute” (NAU “KhAI”) of the Ministry of Education of Ukraine and National Scientific Center “Hon. Prof. M. S. Bokarius Forensic Science Institute” of the Ministry of Justice of Ukraine.

The main theoretical and applied tasks, which will be dealt with at a high professional level by representatives of this association can be presented as follows:

- 1) Development of scientific and methodological recommendations to eliminate causes and conditions that contribute to emergence and spread of terrorist attacks on objects of aerospace industry and critical infrastructure;
- 2) Drawing up short-term and long-term forecasts on occurrence and spread of terrorist threats, informing domestic and foreign specialised bodies about them in order to take measures to their neutralisation;
- 3) Development and improvement of regulatory framework of activity of anti-terrorist bodies;
- 4) Development and introduction into activity of forensic science institutions of latest achievements of science and technology, equipment including those produced by domestic industry;
- 5) Development of a list of anti-terrorist measures at aerospace facilities and critical infrastructure;
- 6) Development and implementation of scientific and methodological recommendations on anti-terrorist protection of potential aerospace industry and critical infrastructure;
- 7) Conducting cultural, educational and informational and advocacy activities for formation of socially significant values in Ukrainian society;
- 8) Improving measures of interaction and coordination of forensic science institutions of Ukraine with foreign professionals in prevention of terrorist attacks on aerospace and critical facilities in order to develop a common strategy for international cooperation in the field of terrorism counteraction.

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