ISSN 2786–6920 (Print)
ISSN 2786–880X (Online)

MINISTRY OF INTERNAL AFFAIRS OF UKRAINE
KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE

SCIENTIFIC BULLETIN

OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE

Науковий вісник Київського інституту
Національної гвардії України

No 1 (6) 2025

Scientific publication

Kyiv • 2025

UDC [351.743+351.746.1+355/359] (477) (05)

SCIENTIFIC BULLETIN
OF KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE

It was founded by: Kyiv Institute of the National Guard of Ukraine.
It is published since December 2022. Frequency: twice a year.
Certificate of state registration of the printed media KV No. 25202-15142 P dated 03.08.2022.
Amendments to the register of media entities - registrants No. 53 dated 09.01.2023 of the National Council of Ukraine on Television and Radio Broadcasting Register ID – R30-01116.

The publication is included in category "B" of the List of Scientific Professional Publications of Ukraine in the following specialties:
K1 – State Security, K6 – Provision of Troops (Force), D8 – Law (Order of the Ministry of Education and Science of Ukraine dated 20.06. 2023 No. 768); K5 – Military Administration (by types of armed forces) (Order of the Ministry of Education and Science of Ukraine dated 25.10. 2023 No. 1309).

Recommended for publication and posting on the Internet by the Academic Council of the KI NGU, protocol No. 15 of 29.05.2025.

Scientific Bulletin of Kyiv Institute of the National Guard of Ukraine. Kyiv : 2025 No 1 (6). 168 p.

Topics: current issues of development of the security and defence sector of Ukraine; service and combat activities of the NGU: security and defence aspects; ensuring public, state and military security; development of capabilities of the security and defence sector of Ukraine and introduction of advanced technologies; regulatory and legal support and current issues of the security and defence sector of Ukraine.

The Scientific Bulletin of the Kyiv Institute of the National Guard of Ukraine is a peer-reviewed publication that supports the policy of open access to scientific publications. Electronic copies of the Scientific Bulletin are stored in the "Scientific Periodicals of Ukraine" database of the Vernadsky National Library of Ukraine. The editorial board's opinion may not coincide with the authors' views of the materials. The uthors of scientific articles are responsible for accurate facts, quotations, proper names, references to sources and other information. When quoting, reference to the Scientific Bulletin is mandatory.

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Kyiv, 03179, Ukraine.
Website: kingu-visnyk.kyiv.ua

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ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

MILITARY SCIENCES

UDC 355.357:006.3.
DOI 10.59226/2786-6920.1.2025.6-13

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LEGAL NATURE AND SPECIFICS OF THE APPLICATION OF NATO STANDARDS IN THE ACTIVITIES OF THE NATIONAL GUARD OF UKRAINE UNDER MARTIAL LAW

The article examines the issue of legal regulation regarding the implementation of NATO standards in the activities of the National Guard of Ukraine under martial law. Emphasis is placed on the need to adapt national legislation to international standards in order to enhance the state's defense capabilities and deepen cooperation with the Alliance. The article analyzes administrative, operational, and logistical (material-technical) NATO standards and considers key normative legal acts regulating Ukraine's cooperation with NATO in the fields of security and defense.

Differences between the personnel policy and logistical support of the National Guard of Ukraine and NATO standards are identified. Solutions are proposed based on the integration into a unified training system of the security and defense sector, along with the need for the adoption of a comprehensive normative document to clearly define the capabilities of the National Guard of Ukraine in accordance with military standardization processes and interoperability with NATO structures based on specified criteria.

Keywords: *legal regulation; national security; state security; NATO standards; National Guard of Ukraine; doctrine; vision; martial law.*

Statement of the problem. Ukraine currently requires the strengthening of its armed forces and support from relevant international institutions. NATO standards in the field of defense are designed to establish military benchmarks and a foundational framework for the interoperability of the armed forces of NATO member and partner countries with NATO structures.

Through the implementation of administrative, operational, and logistical NATO standards into domestic legislation, Ukraine is expected to achieve an appropriate level of defense capability and deepen its cooperation with the Alliance. This will contribute to strengthening mutual trust and opening new opportunities for support during the period of martial law.

The gradual integration of NATO standards into the activities of the National Guard of Ukraine, taking into account the conditions of martial law, is a pressing issue that must be addressed primarily through the adaptation of the national regulatory and legal framework to international standards. This involves both amending existing legislation and adopting new regulatory documents.

Analysis of recent research and publications. The relevance of improving the legal regulation of NATO standards implementation in the activities of the National Guard of Ukraine is predetermined by the need to enhance the state's defense capabilities during martial law, as well as by the fulfillment of the Guard’s function in the implementation of measures under the legal regime of martial law.

Existing scholarly publications on this issue confirm its significance and the necessity for further research. In particular, attention is given to the analysis of: the legal nature of NATO standards and their impact on the development of national military standards [1]; measures to promote the

interoperability of the Armed Forces with the North Atlantic Alliance [12]; the need to transform Ukraine–NATO relations in the context of the Russian-Ukrainian armed conflict [2]; the role of security and defense forces in the national system of military security and, as a result, the need to adopt a Doctrine of the National Guard of Ukraine [15]; methods for integrating NATO standards into the operations of the Armed Forces of Ukraine [9]; the relevance and features of implementing provisions of AJP-01 Allied Joint Doctrine [27]; the specifics of implementing NATO standards in the testing systems of armaments and military equipment [8]; and issues related to the assessment of provisions of strategic state documents in the field of security and defense [13].

To fully implement NATO standards, Ukraine must develop an appropriate domestic regulatory and legal framework that will allow for the systematic introduction of these standards and enable the achievement of the core objective, namely, the interoperability of the country's armed forces with NATO structures.

The purpose of the article is to conduct a comprehensive analysis of the legal nature and the process of implementing NATO standards in the activities of the National Guard of Ukraine, as well as to identify urgent issues and develop recommendations for further enhancement of its capabilities in the context of ensuring state security, particularly under martial law.

Presentation of the main material. In analyzing the legal nature of NATO standards, scholars [1, pp. 26, 29] rightly note that the processes of military standardization in accordance with NATO standards must take into account international legal characteristics – particularly the fact that Ukraine is not a member of the Alliance and therefore does not participate in the creation of such standards, but may only implement them into its legal system. Accordingly, the introduction of NATO standards and the defense standards of NATO member states must follow separate procedures.

According to O. Kushta [2, p. 152], NATO standards can be divided into the following categories:

1. Administrative standards – standards concerning the management of military documentation and the organization of troop operations;

2. Operational standards – standards for the conduct of military operations within the framework of the *Partnership for Peace* program, the development of military education, and the training of service members by foreign instructors in preparation for alignment with NATO standards;

3. Logistical (material-technical) standards – standards for the provisioning and modernization of weapons, equipment, ammunition, and food supplies.

The implementation of these standards begins with the development of a system of normative legal acts regulating NATO–Ukraine cooperation in the fields of security and defense.

Foremost among these is the 1994 Framework Document "Partnership for Peace" [3], which strengthens the political and military ties of participating countries in the area of security in the Euro-Atlantic region.

At present, Ukraine participates in various areas of the program [4], including: peacekeeping operations; joint exercises; cooperation in the field of armaments and air defense; the Planning and Review Process (PARP); the Operational Capabilities Concept (OCC); Individual Partnership Programs (IPP); the development of defense institutions; the enhancement of military education (DEEP), among others.

This cooperation contributes to the improvement of training for relevant units of the Armed Forces of Ukraine and fulfils the objective of achieving interoperability with NATO member states and participating in multinational formations.

The initiative for military reform in Ukraine and, accordingly, the enhancement of operational and technical interoperability with the NATO armed forces was formalized in the Charter on a Distinctive Partnership between Ukraine and the North Atlantic Treaty Organization (1997) [5].

The recommendations of the parliamentary hearings on Ukraine–NATO relations and cooperation (2002) [6] outlined the need for reforms in armaments and military equipment for Ukrainian military formations.

The decision of the National Security and Defense Council of Ukraine "On the Strategy of Military Security of Ukraine" (2021) [7] provides for

the refinement of defense force operations and reform in light of preparations for conducting network-centric warfare.

Analyzing NATO administrative and technical standards, I. M. Lappo, M. O. Herashchenko, and O. V. Chervotoka [8, p. 59] proposed implementing NATO standards by means of reissuance (adaptation or translation) with the involvement of domestic standardization specialists from the Ministry of Defense of Ukraine. This proposal was based on a comparative analysis of STANAG 4370 and the military standards GOST V 20.39 and GOST V 20.57, where discrepancies were identified in the classification of military equipment and in requirements for resistance, durability, and endurance against external factors.

The resolution of problematic issues regarding the implementation of NATO standards, according to M. S. Sadovskyi [9, p. 42], was seen in the development of a roadmap for the advancement and harmonization of military standardization with NATO standards. In this roadmap, he proposed, first and foremost, the establishment of a unified terminological framework within the Ministry of Defence of Ukraine and the Armed Forces of Ukraine; harmonization with national and international terminological systems; the continuation of the practice of implementing standards of leading countries into the activities of the Armed Forces of Ukraine; and the automation of standardization activities through the development and implementation of an automated military standardization management system.

As a result, the Recommendations following the 2025 committee hearings of the Verkhovna Rada Committee on Foreign Policy and Inter-Parliamentary Cooperation [10] recognized the necessity of reforming the security and defense sectors and law enforcement agencies, legislatively ensuring the implementation of the adapted Annual National Cooperation Programme between Ukraine and NATO for 2024, and identifying the objectives for 2025, including the implementation of the roadmap for achieving interoperability and compatibility with NATO.

Accordingly, the Action Plan of the Cabinet of Ministers of Ukraine for 2025 [11, pp. 22–23] outlines tasks related to the implementation of the Military Standardization Work Programme for 2024–2026, particularly in the area of capability development standards for components of the security and defense sector.

Among the trends in the implementation of NATO standards in the Armed Forces of Ukraine, S. M. Popko [12, p. 61] reasonably highlights the development and improvement within the Ministry of Defence of Ukraine and the Armed Forces of Ukraine of internal regulations, rules, and statutory documents related to operational interoperability with the military units of NATO member states.

The issue of the operational capabilities of the Ukrainian military can be addressed by identifying criteria for assessing such critical aspects as a shared working language between domestic personnel and their NATO counterparts, familiarity with operational planning procedures, and the application of combat tactics employed by NATO forces under various conditions [13, p. 89].

The necessity of implementing NATO standards in the activities of the National Guard of Ukraine, as a military formation, is determined by its participation in enforcing the legal regime of martial law in cooperation with the Armed Forces of Ukraine, aimed at repelling armed aggression against Ukraine and resolving the armed conflict through the conduct of military (combat) operations, in accordance with the Law of Ukraine "On the National Guard of Ukraine" [14].

According to A. O. Kaliaiev [15], the use of National Guard of Ukraine units requires legislative support and improvement, taking into account the need to consolidate the efforts of all components of the security and defense forces in light of the complex threats facing the country.

Pursuant to the Decision of the National Security and Defense Council of Ukraine "On Urgent Measures to Protect Ukraine and Strengthen Its Defense Capabilities" [16], and in accordance with the Law of Ukraine "On the Legal Regime of Martial Law" [17] and the Law of Ukraine "On National Security" [18], the National Guard of Ukraine was engaged in preventing and countering terrorist activities in the territories of Donetsk and Luhansk regions, jointly with the Ministry of Defence of Ukraine and the Security Service of Ukraine, as well as in addressing tasks related to the introduction and implementation of measures under the legal regime of martial law.

The Development Concept of the National Guard for the period up to 2020 [19] identified a list of discrepancies between the National Guard of Ukraine and NATO standards, primarily concerning personnel policy in terms of a contract-based recruitment system; the formation of operational military units, special purpose units; re-equipment with specialized vehicles, modern weapons, special equipment, and communication tools.

To address these issues, it was proposed to align the aforementioned indicators with established NATO standards through the integration procedure into the unified training system of the security and defense sector; the attainment of the required level of combat and mobilization readiness; the provision of armaments, military and specialized equipment; and the introduction of a transparent system for the personnel selection of service members, among other measures.

As a result, according to the Matrix of Core Capabilities of the Defense Forces (Strategic Defense Bulletin of Ukraine, 2021) [20], the institutional capabilities of the National Guard of Ukraine were identified within the following areas: a) determining the levels of military threat to the national security of Ukraine; b) assessing a broad range of current, potential, and future security aspects in the short-, medium-, and long-term timeframes; c) conducting operations to establish control over territorial waters and beyond; d) employing advanced models of medical and special equipment to perform joint medical support tasks.

In 2025, the Government's Priority Action Plan for 2025 [21, pp. 12–13] addressed the issue of enhancing the capabilities of the National Guard solely in the context of providing unmanned systems and counter-UAV assets for operations of joint forces groupings (defense force groupings) during crisis situations of a military nature.

The formation of an effective personnel policy, based on the standards of NATO member states' armed forces, was decided to be implemented through the development of leadership qualities among the personnel of the National Guard of Ukraine. Accordingly, in 2022, by the Order of the Commander of the National Guard of Ukraine [22, pp. 2–4], the *Military Leadership Doctrine of the National Guard of Ukraine* was adopted as a joint project with NATO military structures.

According to the provisions of the Doctrine [22, p. 17], the key approaches to leadership development include motivation and interaction with personnel to ensure effective command and control, maintaining a favorable socio-psychological climate, a sufficient material and technical base, interest in the development of military affairs, and improving the overall performance of the military formation.

The National Guard of Ukraine was recognized among the implementers of the National Action Plan for the implementation of UN Security Council Resolution 1325 *Women, Peace, and Security* for the period until 2025 [23]. The goal of the National Action Plan is to create conditions for ensuring the equal participation of women and men in conflict resolution, peacebuilding, recovery processes, and responses to security challenges. This implies the application of a gender-sensitive approach in appointments, preparation for participation in international operations, improvement of documents regulating corporate ethics, and combating discrimination.

In line with the *Concept of Military Personnel Policy in the Ministry of Defense of Ukraine System for the Period until 2028* [24], it is planned to allow foreign citizens to serve under contract in certain positions in the National Guard of Ukraine, as well as to train officer personnel through operational-level professional military education courses at higher military educational institutions (HMEIs) of the National Guard, and to conduct such training on an ongoing basis.

To comprehensively address the identified inconsistencies between the National Guard of Ukraine and NATO standards, the *Doctrine on the Activities of the National Guard of Ukraine* was developed in 2023 [25].

It is believed that an additional impetus for the adoption of the doctrine was the *Vision of the General Staff of the Armed Forces of Ukraine on the Development of the Armed Forces for the Next Ten Years* [26], according to which interoperability of all components of the defense and security forces means: operational integration, standardization of communication means, armaments and equipment, and unified training of forces and assets across all structures.

Thus, according to the provisions of the Vision, the National Guard of Ukraine must attain the

highest possible level of interoperability with both national and foreign partners (based on NATO guidance documents), which implies the ability to communicate, conduct joint operations, and support allied forces, and is based on a shared understanding of the employment of joint (multinational) forces.

According to A. Yu. Mamzenko [27, pp. 96–97], the doctrine itself was developed within the framework of military standardization processes, the introduction of NATO standards, and the application of best practices in drafting doctrinal documents by military formations of NATO member states.

The key provisions of the *Doctrine on the Activities of the National Guard of Ukraine* aim to ensure [25]:

1. The application of the military standard AJP-01 *Allied Joint Doctrine* [STANAG 2437] with egard to shaping the leadership style in managing subordinate forces, the interaction and conduct of commanders and subordinates (p. 16);
2. The formation of the operational environment based on NATO methodology, encompassing the political, military, economic, social, infrastructural, and informational (PMESII) components (AJP-01), and the prevention of conflicts (p. 27);
3. Operational interoperability of units and subunits of joint and multinational forces across three domains: technical (equipment and systems), procedural (doctrines and procedures), and human (language, terminology, and training).

Conclusions and prospects for further research. The grounds for implementing NATO standards in the activities of the National Guard of Ukraine, as a military formation under martial law conditions, stem from the need to enhance combat readiness, given that NATO standards offer tested methods and protocols across various domains; the presence of operational interoperability that enhances cooperation within the framework of international collaboration among NATO members and partners; the modernization of the National Guard's approaches in terms of introducing new technologies and management methods during martial law; and the improvement of personnel's professional competence through mastering modern skills and knowledge aligned with NATO standards.

The current problems of non-compliance between the National Guard of Ukraine and NATO standards – in particular regarding personnel policy indicators, the formation of operational and special purpose military units, re-equipment with specialized vehicles, modern weapons, special equipment, and communication systems — are proposed to be resolved through integration into a unified security and defense sector training system. This integration should primarily rely on the provisions of such regulatory documents as the *Concept for the Development of the National Guard until 2020*, the *National Security Strategy of Ukraine*, the *Strategic Defense Bulletin of Ukraine*, the *Vision of the General Staff of the Armed Forces of Ukraine regarding the development of the Armed Forces*, the *Military Leadership Doctrine of the National Guard of Ukraine*, and the *Doctrine on the Activities of the National Guard of Ukraine*.

Despite the measures already undertaken, the issue of building the capabilities of the National Guard of Ukraine in the context of ensuring national security during martial law still requires additional regulatory clarification. This concerns the achievement of the required level of operational command, systematic training of personnel, effective equipping with weapons, military and specialized equipment, as well as the introduction of a fully transparent personnel selection system. The existing regulatory and legal acts currently address these matters only in a fragmented manner. Therefore, there is an urgent need to adopt a single, comprehensive regulatory document that would clearly define the development of the National Guard of Ukraine's capabilities in accordance with the processes of military standardization and interoperability with NATO structures, based on defined criteria.

A promising avenue for future scholarly research involves further investigation into the issue of forming an effective mechanism for ensuring national security. This includes determining the optimal organizational and legal frameworks for cooperation between NATO and the National Guard of Ukraine, which would enable the most effective use of international experience and resources to strengthen the state's defense capabilities.

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Received: 20.04.2025
Revised: 30.04.2025
Accepted: 05.05.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 622.691.4.052 DOI 10.59226/2786-6920.1.2025.14-20

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METHODS OF ADJUSTING THE PERIOD OF TECHNICAL MAINTENANCE OF COMPLEX TECHNICAL SYSTEMS DURING LONG-TERM OPERATION

The article examines methods for adjusting the maintenance frequency of complex technical systems with extended service life. These adjustment methods take into account the decline in the reliability of complex systems and, consequently, the increase in the duration of their forced downtimes due to maintenance procedures and the need to address failures and malfunctions. Mathematical models of downtime in complex technical systems due to maintenance are proposed, taking into account the failure flow density, the rate of failure and malfunction elimination, and the economic indicators of operation. Expressions have been derived for calculating the maintenance frequency and the optimal maintenance-related downtime of complex technical systems, the implementation of which will ensure their continued fitness for intended use.

Keywords: *collapsible technical systems; technical maintenance; specification; antiquity; reliability; optimization; frequency and triviality of technical maintenance.*

Statement of the problem. Maintaining the operational condition and functional fitness of complex technical systems (hereinafter – CTS) is ensured through appropriate maintenance and repair systems. These are predominantly systems implementing scheduled preventive maintenance and repair strategies (hereinafter – PMS), or condition-based maintenance and repair models [1]. In most CTS with extended operational lifespans, PMS are typically applied, which involve fixed types, intervals, and durations of maintenance activities based on the system's operating time [2]. Forced downtimes of CTS due to scheduled maintenance, as well as the elimination of failures and malfunctions in their mechanisms, components, and assemblies (hereinafter – subsystems), reduce the overall time the systems are available for intended use and decrease operational profitability.

During prolonged operation, the subsystems of CTS are continuously subjected to operational factors that alter their technical condition. The stochastic nature of these factors' impact on subsystems results in varying actual conditions among identical systems, even under the same operational time or service duration. Consequently, operating hours or calendar lifespan cannot unambiguously characterize the technical state of a system [3]. To maintain a specified level of reliability and to reduce the forced downtime of CTS due to maintenance and repair activities, it is necessary to adjust the frequency and duration of maintenance operations in a manner that ensures (or sustains) the required level of reliability and prevents failures.

Analysis of recent research and publications. An analysis of scientific literature reveals that, in addressing the problem of determining (or adjusting) the optimal maintenance frequency for complex technical systems, the principal approaches include condition-based maintenance, resource-based maintenance, and adaptive maintenance methodologies [4; 5; 6; 7]. Most of these studies focus on one of the critical and yet unresolved issues, ensuring the operational reliability of CTS of both conventional and high-criticality categories [8; 9], as well as systems characterized by high reliability and extended maintenance intervals [10; 11]. In the

context of modern complex technical equipment, the problem is typically formulated and addressed within the framework of condition-based maintenance and repair strategies [7, 10].

In this context, the resolution of the aforementioned tasks is based on the following approaches: the periodicity of maintenance of complex technical systems is determined by developing a list of maintenance operations for their subsystems; the maintenance operations for these subsystems are grouped into specific types of technical maintenance; criteria for the optimality of the technical operation process and coefficients of technical utilization are employed; and an economic approach is applied, which includes the assessment of the economic consequences of forced downtime.

At the same time, the operation of complex technical systems (CTS) is typically considered under the assumption of an exponential distribution of the failure flow with a constant failure rate [12]. To a lesser extent, problems related to the adjustment of maintenance periodicity are addressed and formulated, particularly with regard to the increasing failure rate due to system aging.

The purpose of this article is to develop methods for adjusting the frequency of maintenance operations in a way that preserves (or sustains) the efficiency and quality of functioning of complex technical systems, taking into account their aging processes.

Presentation of the main material. Prolonged operation of any complex technical system is accompanied by an increase in the failure rate and the growing need for preventive measures to compensate for the degradation of subsystem conditions, as well as by an increase in the system's forced downtime due to the necessity of addressing failures and malfunctions.

To address the stated problem, several possible mathematical models of CTS downtime will be considered. Based on these models, methods for determining adjusted (refined) maintenance frequencies or quantities will be proposed, taking into account the decline in the reliability of their subsystems and of the system as a whole.

Maintenance Model No. 1. The total forced downtime of a complex technical system (CTS) due to maintenance can be defined as a function of the number of performed maintenance operations:

$$T_{П}=n\cdot\overline{T}_{TO}+\frac{k\cdot T_{B}}{n}, \quad (1)$$

$T_{П}$ – denotes the total (cumulative) downtime of the CTS over a given period of time;

n – the number of maintenance operations performed over a given period of time;

$\overline{T}_{TO}$ – the mean or planned downtime of a complex technical system resulting from maintenance activities within a specified time interval;

k – a constant coefficient associated with the specifics of maintaining a complex technical system, which accounts for downtime due to fault elimination;

T_{B} – the recovery time of a complex technical system due to failures of its subsystems over a given period.

Let us introduce the following constraints: the function $T_{п}=f(n)$ is continuous and bounded within the domain $t_{пс}<t<t_{жц}$, where t – denotes the operating time of the system during its service life, $t_{пс}$ – is the onset of aging, $t_{жц}$ – is the duration of the life cycle of the complex technical system.

To determine the optimum (minimum) of the function $T_{п}=f(n)$ we shall find its extremum. To this end, we differentiate function (1) to n, obtaining:

$$\frac{dT_{П}}{dn}=\overline{T}_{TO}-\frac{k\cdot T_{B}}{n^{2}}. \quad (2)$$

According to the existence and uniqueness theorem for the Cauchy problem, differential equation (2) has a unique solution for determining the optimal number of periodic maintenance operations for aging complex technical systems [13].

$$\overline{T}_{TO}-\frac{k\cdot T_{B}}{n^{2}}=0. \quad (3)$$

Solving equation (3) with respect to the number of maintenance operations, we obtain:

$$n^{2}=\frac{k\cdot T_{B}}{\overline{T}_{TO}}.$$

Hence, the optimal number of maintenance operations for the CTS is as follows:

$$n^{opt}=\left(\frac{k\cdot T_{B}}{\overline{T}_{TO}}\right)^{1/2}. \quad (4)$$

where n^{opt} – the optimal number of maintenance operations for a complex technical system to maintain its fitness for intended use over a given period.

By substituting expression (4) into expression (1), we obtain:

$$T_{П}^{opt} = \left(\frac{k \cdot T_B}{\overline{T}_{TO}}\right)^{1/2} \overline{T}_{TO} + \frac{k \cdot T_B}{\left(\frac{k \cdot T_B}{\overline{T}_{TO}}\right)^{1/2}}.$$

After transformation, we obtain a formula for calculating the total optimal downtime of the CTS required to maintain its availability for intended use over a given period:

$$T_{П}^{opt} = 2\left(k \cdot \overline{T}_{TO} \cdot T_B\right)^{1/2} \quad (5)$$

where $T_{П}^{opt}$ – the total optimal downtime of the CTS required to maintain its availability for intended use over a given period.

We now consider the impact of CTS reliability on the total maintenance-related downtime and on the optimization of maintenance frequency. To this end, we construct an optimization model of system reliability and average downtime to ensure its fitness for intended use.

The following assumptions and constraints are adopted for the optimization model:

– subsystems of the CTS that fail are replaced with functional ones;

– CTS maintenance is performed every Δt hours, counted from the initial time following the last overhaul.

For the maintenance schedule, the time intervals for maintenance operations are expressed as:

$$t = t_i + \Delta t, \text{ при } i = 0, 1, 2, ...; 0 \le \Delta t < t_i\ , \quad (6)$$

where t – current operating time of the CTS subsystems (in hours); t_i – time of the i-th maintenance operation; i – maintenance operation number, 0 – denotes the initial maintenance after the onset of aging effects; Δt – time interval between CTS maintenance operations, expressed in operating hours.

For i=1 and Δt=0 the system's availability for intended use is maintained through maintenance performed at the optimal interval Δt^{opt}.

The reliability of the CTS can be expressed by the following equation:

$$R_t(t = \Delta t^{opt}) = R\ (T^{opt}), \quad (7)$$

where Δt^{opt} – optimal interval between CTS maintenance operations; T^{opt} – optimal maintenance frequency; $R\ (T^{opt})$ – eliability of the CTS at the optimal maintenance frequency.

As the maintenance interval increases, the reliability of the complex technical system decreases i for $t = 2\Delta t^{opt}$ and Δt=0 we have:

$$R_t(t = 2\Delta t^{opt}) = [R\ (T^{opt})]^2. \quad (8)$$

In this case, the CTS is used in the first hours of Δt^{opt} without failures and malfunctions. Then, during the remaining hours Δt^{opt} c the system is used for its intended purpose after the failures and malfunctions during t_i are eliminated.

For operating time $0 < t_i < \Delta t^{opt}$ the system functions reliably in its intended role. Therefore, the reliability of the CTS is ensured by performing maintenance at the optimal interval Δt^{opt}:

$$R_t(t = 2\Delta t^{opt} + t_i) = [R\ (T^{opt})]^2 R(t_i). \quad (9)$$

In the general form, equation (8) takes the following form:

$$R_t(t = t_i + \Delta t^{opt}) = [R\ (T^{opt})]^i R(T^{opt}), \text{ for } i = 0, 1, 2, ...; 0 \le t_i < \Delta t^{opt}. \quad (10)$$

Average maintenance interval means the frequency of troubleshooting time and periodic maintenance to maintain the availability for purpose of the CTS:

$$\overline{T}_{TO} = \int_0^{\infty} R_t(\Delta t^{opt})dt. \quad (11)$$

Evaluating equation (11), we write the composite period of the range $t_{пт} < t < t_{жц}$, as follows:

$$\overline{T}_{TO} = \sum_{i=0}^{\infty} \int_{t_i}^{t_{(i+1)}} R_t(t)dt \quad (12)$$

In equation (12), composed of equation (11), the time intervals are divided into lengths Δt.

For the time $t = t_i + \Delta t$ replacing into equation (12) reliability in equation (10), we obtain:

$$\overline{T}_{TO} = \sum_{i=0}^{\infty} \int_{t_i}^{\Delta t^{opt}} [R(T^{opt})]^i R\ (T^{opt})dt. \quad (13)$$

In equation (12) for the time $t = t_i + \Delta t$, $dt = dt_i$ the limits will be 0 and Δt^{opt}.

Thus, restructuring equation (13), we obtain:

$$\overline{T}_{TO} = \sum_{i=0}^{\infty}[R(T^{opt})]^i R\,(T^{opt})dt \qquad (14)$$

Since:

$$\sum_{i=0}^{\infty}[R(T^{opt})]^i = \frac{1}{1-R\,(T^{opt})} \qquad (15)$$

equation (13) takes the following form:

$$\overline{T}_{TO}^{opt} = \frac{\int_0^t R\,(T^{opt})d\Delta t^{opt}}{1-R\,(T^{opt})} \qquad (16)$$

where $\overline{T}_{TO}^{opt}$ – is the optimal planned downtime for maintaining the suitability of the CTS at the optimal maintenance interval for a certain period of time; Δt^{opt} – is the optimal period of time between CTS maintenance; $R\,(T^{opt})$ – is the reliability of the CTS at the optimal maintenance interval.

Thus, the need to enhance the reliability of a complex technical system determines its downtime required to maintain availability for intended use.

By utilizing data on CTS reliability and the known distribution of the mean time to failure, it is possible to determine the average maintenance frequency for aging systems to ensure their continued operational availability.

Maintenance Model No. 2. This model can be used to determine the optimal maintenance frequency for a CTS and to minimize its forced downtime due to maintenance activities.

In this optimization model, the total downtime is a function of the system's operating time or the frequency of maintenance operations. Mathematically, this optimization model is defined by the following function:

$$T_{П}(t) = \overline{T}_{TO}(t) + T_B(t) = \frac{t}{\Theta} + \frac{\lambda(t)}{\mu}, \qquad (17)$$

where $T_{П}(t)$ – the total downtime of the CTS per unit of time; $\overline{T}_{TO}(t)$ – the downtime of the CTS due to maintenance per unit of time; $T_B(t)$ – the downtime of the CTS due to failure and malfunction elimination per unit of time; t – operating time of the CTS; $\lambda(t)$ – failure and malfunction intensity of the CTS; μ – rate of failure and malfunction elimination; $1/\Theta$ – coefficient of average maintenance duration (defined as the ratio of the average maintenance duration to its periodicity, i.e., $1/\Theta = \overline{T}_{TO}/\Delta t$, where Δt – is the period between system maintenances.

By differentiating function (17) with respect to t, we obtain:

$$\frac{dT_{П}(t)}{dt} = \frac{1}{\Theta} + \frac{d\lambda(t)}{d(t_i)} \cdot \frac{1}{\mu}. \qquad (18)$$

The necessary condition for the extremum of function (18) yields the following results:

$$\frac{d\lambda(t)}{dt} = -\frac{\mu}{\Theta}. \qquad (19)$$

The maintenance periodicity will be optimal when the left-hand and right-hand sides of equation (19) are equal. In this case, the downtime of the CTS will be minimized.

Let us assume that the failure flow density of the CTS is defined by the following formula [12]:

$$\lambda(t) = f \cdot e^t, \qquad (20)$$

where f – the failure intensity function of the CTS up to $t = 0$.

Replacing the failure rate in formula (19) with the failure rate from formula (20), we obtain:

$$f \cdot e^t = -\frac{\mu}{\Theta}. \qquad (21)$$

Thus, equality (21) provides a formula for calculating the optimal maintenance periodicity of the CTS:

$$\Delta t^{opt} = \ln\left[\frac{f\cdot\Theta}{\mu}\right]. \qquad (22)$$

Substituting into equation (22) in place of the failure intensity function f into equation $\lambda(t)/e^{-t}$, we obtain:

$$\Delta t^{opt} = \ln\left[\frac{\lambda(t)\cdot\Theta}{\mu\cdot e^{-t}}\right], \qquad (23)$$

where Δt^{opt} – optimal maintenance periodicity; $\lambda(t)$ – failure and malfunction intensity of the CTS; μ – rate of failure and malfunction recovery, $1/\Theta$ – coefficient of average maintenance duration.

Maintenance Model No. 3. If the CTS is maintained too frequently, there is a risk that the cost of maintenance may exceed the losses incurred due to downtime from infrequent servicing. This is due to factors such as the loss of productive utilization, increased expenses for operational materials, and labour costs. This maintenance model is derived from the condition of ensuring maximum profit during the

operation of the CTS [2].

In the model, the following rules and constraints will be applied: the operability of the system is restored at each maintenance interval; the failure intensity of the CTS subsystems and the maintenance function are constant values; the time required for maintenance and failure recovery follows an exponential distribution; the distribution of failures and the recovery rate of the CTS are constant values.

To develop the equations of the maintenance model, we will use the following notations: n – the number of maintenance operations performed per unit of time; $1/\Theta$ – the average duration of maintenance; $C_{прб}$ - the profit from operating the CTS excluding the downtime due to maintenance, per unit of time; $\overline{C}_{ТО}$ - the average cost of maintenance of the CTS per unit of time; $\overline{C}_{В}$ – the average cost of failure and malfunction elimination of the CTS per unit of time; $\lambda(t)$ – the intensity of failure and malfunction occurrence in the CTS; μ – the rate of failure and malfunction elimination.

The profit from operating the CTS is determined by the following formula:

$$C_{прб} = C_{дх} - C_{прс} \cdot \overline{T}_{ТО} - C_{прс} \cdot \overline{T}_{В} - \overline{C}_{ТО} - \overline{C}_{В} = \\ = C_{дх} - \frac{C^{пл}_{прб} \cdot n}{\Theta} - \frac{C^{пл}_{прб} \cdot \lambda(t)}{\mu} - \frac{n \cdot S_{ТО}}{\Theta} - \frac{S_{В} \cdot \lambda(t)}{\mu}. \quad (24)$$

where $C_{дх}$ – revenues from the operation of the CTS; $C_{прс}$ – the cost of one hour of CTS downtime; $\overline{T}_{ТО}$ – downtime of the technical system due to maintenance; $\overline{T}_{В}$ – downtime of the CTS due to failure and malfunction elimination; $\overline{C}_{ТО}$ – average cost of performing maintenance; $\overline{C}_{В}$ – average cost of failure and malfunction elimination; $S_{ТО}$ – cost of each maintenance operation of the complex technical system; $S_{В}$ – cost of each failure and malfunction elimination; $C^{пл}_{прб}$ – planned profit from the intended use of the CTS, in UAH per year of system operation.

By differentiating equation (24) with respect to *n*, we obtain:

$$\frac{dC_{прб}}{dn} = -\frac{C^{пл}_{прб}}{\Theta} - \frac{C^{пл}_{прб} d\lambda(t)}{\mu dn} - \frac{S_{ТО}}{\Theta} - \frac{S_{В} \cdot d\lambda(t)}{\mu dn}. \quad (25)$$

Equating expression (25) to zero and performing subsequent transformations yield the following equality:

$$\frac{d\lambda(t)}{dn} = -\left[\frac{1}{\Theta}\left(C^{пл}_{прб} + S_{ТО}\right)\right] \Big/ \left(\frac{C^{пл}_{прб}}{\mu} + \frac{S_{В}}{\mu}\right). \quad (26)$$

The number of maintenance operations n for the CTS will be optimal when both sides of equation (26) are equal. In this case, the profit will be maximized.

Let us assume that the intensity of malfunction occurrence in the CTS is determined by equation (20). Substituting equation (20) into equation (26) yields the following equality:

$$-f \cdot e^{t} = -\left[\frac{1}{\Theta}\left(C^{пл}_{прб} + S_{ТО}\right)\right] \Big/ \left(\frac{C^{пл}_{прб}}{\mu} + \frac{S_{В}}{\mu}\right). \quad (27)$$

Transforming the expression (26), we obtain:

$$n^{opt} = \ln\left[\frac{\lambda(t) \cdot \Theta \cdot \left(C^{пл}_{прб} + S_{ТО}\right)}{\mu \cdot e^{-t \cdot \left(C^{пл}_{прб} + S_{В}\right)}}\right]. \quad (28)$$

where n^{opt} – optimal number of maintenance operations for the CTS over a given period of time; $\lambda(t)$ – failure intensity of the CTS; $S_{ТО}$ – cost of each maintenance operation of the CTS; $S_{В}$ – cost of each failure and malfunction elimination of the CTS; $C^{пл}_{прб}$ – planned profit from the intended use of the CTS, in UAH per year of system operation.

This model can be used to calculate the optimal maintenance periodicity of the CTS, under which maximum profit from its operation will be achieved.

Conclusions and Prospects for Further Research. Maintaining the specified level of reliability and operational fitness of aging complex technical systems, in which scheduled preventive maintenance and repair strategies are implemented, requires further investigation into the issue of adjusting maintenance parameters, specifically, the frequency and duration of maintenance activities.

To address such tasks, it is necessary to develop downtime models for complex technical systems that take into account the impact of system reliability on the total downtime.

Models of downtime for aging complex technical systems have been developed, and analytical formulas have been derived to determine the optimal number and duration of their maintenance operations.

The novelty of the study lies in the fact that many complex technical systems of long-term use require work to maintain their suitability for operation by reducing the frequency of maintenance, and work to

assess the condition of such systems.

Future research may focus on improving the maintenance of complex technical systems during prolonged periods of operation.

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Received: 11.04.2025
Revised: 21.04.2025
Accepted: 30.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 355.442 DOI 10.59226/2786-6920.1.2025.21-28

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RECOMMENDATIONS ON IMPLEMENTING AN APPROACH TO DEFENSE COMBAT PLANNING BY THE NATIONAL GUARD FORCES OF UKRAINE

Defensive combat is one of the main types of combined arms combat, which can be organized and conducted both by the forces and means of a separate unit and by the combined efforts of different branches and types of troops.

The advantage in defensive combat is formed and consists in creating conditions under which the enemy will not be able to continue advancing and (or) will suffer excessive losses during an attempt to break through.

It is necessary to simultaneously calculate a significant number of indicators and criteria for the effectiveness of building defense, which should take into account: the most competent organization of defensive positions and their engineering equipment; use of terrain advantages: heights, natural obstacles, forest areas, deliberate blockages and destruction; information advantage: control over communications, obtaining intelligence data by all available means, organization of close interaction, active cooperation with the local population; high mobility of reserves, rapid response to breakthroughs by maneuvering forces and means; organizing fire ambushes in weak points of the enemy's battle formation or conducting short-term counterattacks; carrying out measures to maximally exhaust the enemy; careful planning, and others.

In order to provide greater independence for the performance of the combat mission of organizing defense, other units may be added or allocated to support the main forces.

The added units (forces), firepower shall be temporarily subordinate to the commander of the main unit and shall perform the tasks assigned by him. Their withdrawal from subordination shall be carried out on the instructions of the senior command.

The supporting units shall remain subordinate to their direct superiors and shall perform the tasks assigned by them, as well as the tasks assigned by the commander of the supported forces, within the resources (team) allocated to him.

In order to improve and increase the efficiency of the defensive battle planning process by the command bodies, an approach was proposed that takes into account the distribution of available forces and means according to the most important combat tasks using the developed table.

The developed approach can allow the commander and the command body to make a rational decision on the

organization of the defensive battle and the formation of the most effective battle formation, as well as to more clearly see possible gaps if they are allowed during planning.

Keywords: *defensive battle; planning of defensive battle; distribution of forces and means; main combat tasks.*

Statement of the problem. At 03:40 local time on 24 February 2022, the Russian Federation (RF) launched a full-scale invasion of Ukrainian territory. Under the false name "special military operation" (SMO), the adversary began a large-scale war. The war began with a broad-front air–ground offensive operation. Massive missile-artillery and aviation strikes were conducted against military targets, their command centers, and critical infrastructure, while mechanized and tank units breached Ukraine's state border.

To repel the attack by RF forces with overwhelming superiority, units of the Armed Forces of Ukraine (AFU), National Guard of Ukraine (NGU), State Border Guard Service of Ukraine (SBGSU), National Police of Ukraine (NPU), Security Service of Ukraine (SSU), and other law-enforcement agencies were mobilized. The local population also took active part, both directly and on a volunteer basis.

In the initial phase of the war, the adversary held a significant advantage in manpower; mechanized units – infantry fighting vehicles (IFVs), armored personnel carriers (APCs), infantry mobility vehicles (IMVs); tanks; artillery; and aviation. On certain days, the initiative remained one-sided. RF and some Western countries' forecasts were highly pessimistic for Ukraine. However, as became clear later, numerical superiority does not always guarantee a swift victory.

Thus, the adversary, exploiting its considerable advantage, penetrated the state border, advanced deep into the country, and deployed a wide front. At that time, Ukraine's defense could not withstand the overwhelming assault. Yet the determination, dedication, and perseverance of all units of the security and defense sector reversed the course of events.

Accordingly, attention must be paid to improving the defense-battle planning process by command authorities, taking into account the distribution of available forces and assets.

Analysis of Recent Research and Publications. Currently, the primary guiding documents regulating planning and conduct of defensive combat by units and formations are the Combat Statutes [1–3]. More up-to-date draft Combat Statutes have been developed [4; 5], but they have not yet been officially implemented for troop guidance.

In each of the listed documents [1–5], the main sections titled "Defensive Combat" and their annexes contain textual provisions on organizing and conducting defensive combat. However, these statutes present all information as prose articles and do not include illustrative examples of force and asset allocation for the most characteristic combat tasks in defensive operations.

Domestic scholars who are recognized experts in military science [6–15] have highlighted fundamental principles for improving combat conduct, including defensive operations. They address capability analyses and prospective approaches to defense planning, but they do not offer concrete planning models that allocate forces and assets according to the primary missions of each unit in defense.

Allied doctrines available in the public domain–NATO doctrines [16–19] – outline approaches to planning defensive operations; yet their examples of force and asset allocation for typical missions are scattered and lack clarity.

It may therefore be concluded that neither the principal domestic guiding documents nor publicly accessible NATO doctrines provide a unified, clearly articulated methodology for planning defensive combat using a tailored allocation of forces and assets to the most relevant combat tasks.

The purpose of this article is to develop an approach and formulate recommendations to the management bodies of the NGU units regarding increasing the efficiency of the defensive battle planning process with the distribution of available forces and means for the most likely combat missions.

Presentation of the Main Material. According to the Combat Statutes, defensive combat is one of the primary types of combined-arms combat and has four main objectives [1; 2]:

– repelling the enemy's offensive; – Inflicting maximum losses on the enemy; – Holding important terrain areas (lines, objectives); – Creating favorable conditions for transition to offensive operations or other actions.

– depending on numerous conditions and factors, a unit may conduct positional or maneuver defense. The transition to defense may be deliberate or forced, in

the absence of or upon immediate contact with the enemy.

According to current guiding documents, the following typical linear–spatial indicators are accepted for organizing defense by AFU units and NGU operational formations:

A squad in defensive combat holds a fighting position up to 100 m on the front and may be emplaced in a single trench.

A standard organizational – staff platoon defends a strongpoint with up to 400 m frontage and up to 300 m depth.

A mechanized company in defensive combat holds a company strongpoint. The width of the company strongpoint for a standard organizational–staff structure may be 1–1.5 km in frontage and up to 1 km in depth.

A battalion is assigned a defense sector. A battalion's defense sector may be 3–5 km on the front and up to 3 km in depth.

A brigade is assigned a defense zone 10–15 km in frontage and 10–15 km in depth.

Depending on the situation, the enemy's strength and assets, and terrain, the frontage and depth of the defense deployment may vary. However, tactical interaction and fire support among all elements of the battle formation, dispersed dispositions, and the ability to maneuver by forces and fires must be ensured [1; 2; 5].

The battle formation in defensive combat is typically built in one or two echelons and may include the following system components: artillery; air defense (AD); strongpoints and fire positions; direct-fire assets; engineer obstacles; and, at the commander's discretion, additional elements may be formed: mobile obstacle detachments; counter-landing, anti-tank, general-arms, and/or other types of reserves.

A standard organizational–staff structure at the brigade level, a variant of which is shown in Figure 1, and at the battalion level includes the command element (headquarters), combat units, and support units.

For headquarters operations, brigade command posts are deployed, and at the battalion, company, and platoon levels, command-and-observation posts (COPs) are established.

To grant greater autonomy in accomplishing the defensive mission, other units may be attached or allocated in support of the main defensive forces.

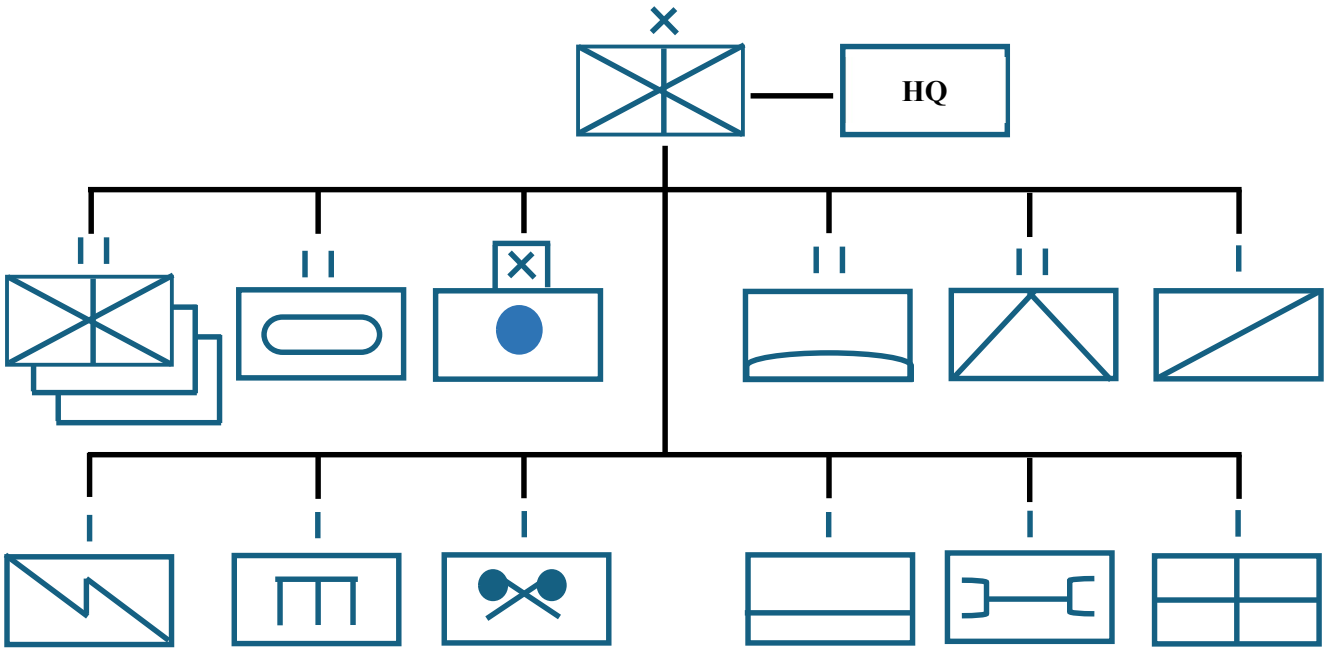


Figure 1. Sample organizational–staff structure of a brigade Source: developed by the authors based on [5]

Attached units (forces) and fire assets are temporarily placed under the operational control of the parent unit commander and execute assigned tasks. Their release from subordination is effected upon orders from higher command.

Supporting units remain under the command of their direct superiors while performing both their designated missions and tasks requested by the supported force commander within allocated resources (tasking allocation).

Units that may be attached or provide support to main forces include:

- Infantry
- Mechanized
- Armored (tank)
- Artillery
- Air Defense (AA)
- Army Aviation (helicopters and/or fixed-wing aircraft)
- Anti-Tank Weapons (ATW)
- Military Intelligence
- Electronic Warfare/Signals Intelligence (EW/SIGINT)
- Communications
- Electronic Warfare (EW)
- Unmanned Aerial Systems (UAS) / Unmanned Aerial Complexes (UAC)
- Combat Engineers
- Nuclear, Chemical, Biological Defense (NBC)
- Medical
- Repair and Recovery
- Logistics (LOG)

Conclusions (based on analysis of key doctrinal documents [1; 2; 5]):

The analysis of requirements and provisions from primary governing documents [1; 2; 5] leads to the conclusion that when organizing defensive operations, inexperienced commanders face the following challenges:

- The material is presented concisely without supplemental explanations;
- Excessive textual information complicates spatial awareness and hinders comprehensive understanding of defensive battle organization;
- Relying solely on doctrinal articles makes it difficult for commanders to account for all potential tasks of each combat formation element that might be created for defensive operations.

Therefore, we propose combining two approaches simultaneously – in accordance with both domestic regulatory documents [1; 2; 5] and NATO doctrines [16-19] – for organizing defensive operations.

Given the number of potential combat formation elements in defensive operations that may be created, along with attached and supporting forces and assets, it becomes particularly challenging to effectively communicate the commander's intent to all subordinate personnel. To address this issue and improve command staff operations, we propose implementing a methodology for allocating available forces and assets according to their designated missions.

A sample of such a distribution is shown in Table 1.

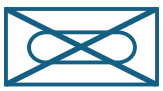
In Table 1, the allocation of forces and assets for defensive combat planning is presented systematically and clearly, taking into account the main combat tasks:

– The "FIND" task (detection forces) is represented by: row 1, columns 1 (military intelligence), 2 (electronic warfare), 3 (use of UAVs and UCAVs).

– The "FIX" task (fixation forces) is represented by: row 2, columns 1 (towed artillery), 2 (wheeled self-propelled artillery), 3 (tracked self-propelled artillery), 4 (rocket artillery); row 3, columns 1 (missile troops), 2 (use of strike UAVs and UCAVs of various types), 3 (army aviation helicopters), 4 (army aviation fixed-wing aircraft).

Table 1

Variant of force and asset allocation for defensive combat planning

No.	Tasks		1	2	3	4
1	FIND	Detection forces				
2	FIX	Fixation forces				
3						
4	STRIKE	Destruction forces				
5						
6	SHIELD	Protection forces				
7						
8	SUPPORT	Support forces				
9						
10	RESERVE	Reserve forces				

Developed by the authors based on data from [1, 2, 5, 16–19]

– The "STRIKE" task (destruction forces) is represented by: row 4, columns 1 (tanks), 2 (IFVs), 3 (APCs), 4 (armored mobility vehicles); row 5, column 1 (infantry).

– The "SHIELD" task (protection forces) is represented by: row 6, columns 1 (anti-tank weapons), 2 (air defense), 3 (engineer-sapper units), 4 (CBRN defense); row 7, column 1 (electronic warfare).

– The "SUPPORT" task (support forces) is represented by: row 8, columns 1 (medical), 2 (repair and technical), 3 (transport), 4 (resupply of ammunition); row 9, columns 1 (materiel-technical

support), 2 (fuel and lubricants), 3 (food supplies), 4 (communications).

– The "RESERVE" task (reserve) can be represented by various force-and-asset options. One key requirement for the reserve is mobility, so it is often formed as a composite unit consisting primarily of combat vehicles—for example, row 10, columns 1 (tank), 2 (IFV), 3 (APC), 4 (armored mobility vehicle). These vehicles can operate independently or with an embarked infantry detachment, either inside the vehicle or "mounted."

Conclusions and prospects for further research. Effective defense relies on a well-orchestrated combination of tactical, operational, and strategic measures. Key elements include not only material-technical support and force strength, but also creativity in using the terrain, adaptability to combat conditions, and the ability to act preemptively.

Therefore, the force-and-asset allocation by task in Table 1 allows a commander to visually identify, assess, and make an informed decision on organizing defensive combat and establishing an effective battle formation.

Each element within that formation is assigned its corresponding combat mission. This makes it possible to immediately spot any gaps in available forces, assets, or tasks that may have been overlooked.

In our view, this approach is highly illustrative, covers the principal missions of troops in defensive combat, and could be adopted by NGU command authorities and other security agencies directly engaged in combined-arms operations.

Future research should focus on analyzing and developing recommendations for NGU command authorities to improve offensive combat planning and organization, drawing on domestic experience and NATO best practices.

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Received: 11.01.2025
Revised: 21.01.2025
Accepted: 30.01.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 355.1 : 355.6 DOI 10.59226/2786-6920.1.2025.29-38

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METHODOLOGICAL BASIS FOR ASSESSING THE CONSIDERATION OF A GENDER APPROACH IN CERTAIN TYPES OF LOGISTICS SUPPORT

The article presents a methodology for assessing the integration of a gender approach across various types of logistical support, enabling the evaluation of the provision of supplies to female servicemembers according to their physiological characteristics and needs. Additionally, the methodology allows for assessing the timeliness of the delivery of artillery-technical and clothing equipment for female military personnel. Using this methodology, management bodies can evaluate the consideration of the gender approach in artillery-technical, clothing, engineering-infrastructure, and food supply sectors and develop proposals for its improvement.

Keywords: *gender approach; material support; food support; artillery and technical support; personal protective equipment; methodology; logistical support.*

Statement of the problem. Military service in the Armed Forces of Ukraine (AFU) and other military formations, including the National Guard of Ukraine (NGU), is associated with the protection of Ukraine's sovereignty and a constant risk to life. Despite this, the number of female servicemembers in Ukraine has been increasing every year. From 2014 to 2024, their share in the AFU grew by 36 percent [1]. Therefore, the issue of women exercising their rights and opportunities on an equal footing with men during military service has become particularly urgent [2]. This, in turn, requires the creation of appropriate conditions for female servicemembers in various types of support (artillery-technical, clothing, engineering-infrastructure, food supply) [3, pp. 90–91], including provision of suitable clothing, body armor, nutrition, and infrastructure. Despite these needs, insufficient attention has been paid at the state level to the living conditions and support for

female servicemembers, as noted by researchers I. Hrytsai and T. Martsenyuk [4; 5]. Problems related to the gender approach are also confirmed by the results of an anonymous survey of NGU servicemembers conducted by representatives of the Gender Integration Service of the Department of Social Work and Gender Integration of the NGU Main Directorate [3, p. 90]. Existing normative-legal documents, such as [6], which regulate the evaluation of military units across all areas of their activities, including the assessment of certain types of logistical support, do not provide for the evaluation of the incorporation of a gender approach within specific types of logistical support. Therefore, in order to assess the integration of the gender aspect in military activities, particularly in logistical support, it is necessary to develop appropriate methodological approaches.

Analysis of recent research and publications. Significant attention is paid to the study of general issues related to the development of the gender approach across various sectors, including the military sphere. Directive [2] outlines the Strategy for Ensuring Equal Rights and Opportunities for Women and Men for the period up to 2030. The methodological recommendations [7] are aimed at implementing the gender approach in territorial communities.

The procedure for conducting a comprehensive gender audit in educational institutions is defined in a document developed by the Reform Support Team, which assists the Ministry of Education and Science in implementing educational and public administration reforms within the framework of the "Ukrainian Reform Architecture" (URA) project [8]. Scholars J. Heikkilä and I. Laukkanen [9] view the permission for women to be conscripted into mandatory military service as an important gender issue. In the scientific works of V. Hlatkyi and L. Obradovic [10; 11], gender integration in NATO military units is supported, and the issue of equal rights for women in occupying military positions during special operations is explored. However, these studies do not address the evaluation of the gender approach in military activities, particularly in logistics support. Researchers O. Alboschii and S. Pavlenko [12; 13] proposed ways to improve supply and food services for military personnel, including women. In other domestic and international scholarly works, logistics support for military units is studied in general terms, without emphasizing the gender approach. This highlights the need to develop methodological foundations for evaluating the consideration of the gender approach in specific types of logistics support within the security and defense forces.

The purpose of this article is to develop a methodology for assessing the integration of the gender approach in specific types of logistical support

Presentation of the main material. The assessment of gender mainstreaming was carried out in the following areas: artillery and technical (provision of female servicemen, taking into account their anthropometric characteristics, with personal protective equipment, such as bulletproof vests of various classes, helmets, as well as special means intended for performing public order tasks, including during mass events and during the suppression of mass disorders), clothing (timely provision of female servicemen with uniforms, special and protective clothing, underwear and bedding, equipment, etc., taking into account their anthropometric characteristics), engineering and infrastructure (creation of necessary living conditions for female personnel, both in stationary and field conditions) and food (organization of catering for female servicewomen, taking into account the rations for women), which are determined by the expert method in [3, p. 90–91] of all its types [14, p. 18]. In order to assess the gender approach to certain types of logistics support, a methodology has been developed, the flowchart of which is shown in Figure 1.

At the first stage of the methodology (Figure 1, Block 1), the initial data are determined:

– the number of vegetarian meals prepared in the unit or the number of vegetarian field rations – N_{rat}^{veg};

– total number of rations – N_{rat}^{num};

– the percentage of vegetarian meals or field rations required by regulations – k_{veg};

– the available quantity of the i type of personal protective equipment designated for female service members – N_i^{avail};

– the available quantity of the j type of quartermaster property allocated for female service members – N_j^{avail};

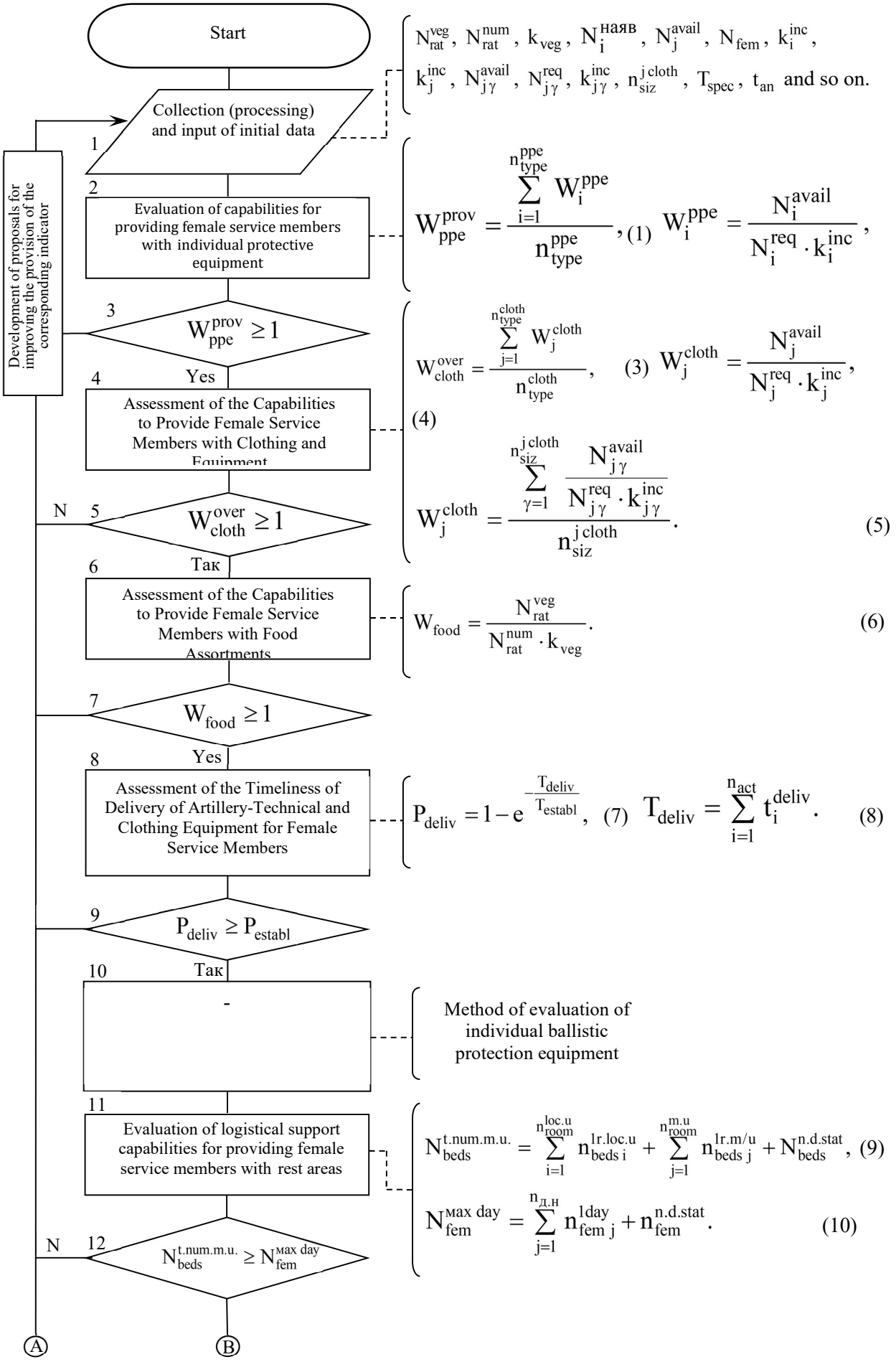
– the listed number of female service members in the military unit – N_{fem};

– coefficient of increase for the required quantity of the i type of personal protective equipment for reserves – k_i^{inc};

– coefficient of increase for the required quantity of the j type of material property for the reserve – k_j^{inc};

– available quantity of the j type of material property designated for providing female servicemembers of the corresponding size γ – $N_{j\gamma}^{avail}$;

– required quantity of the j type of material supply needed to equip all female servicemembers of the military unit (subunit) who have the γ size of the respective supply item – $N_{j\gamma}^{req}$;


Start
Collection (processing) and input of initial data
1
2
Evaluation of capabilities for providing female service members with individual protective equipment
3
$W_{ppe}^{prov} \geq 1$
Yes
4
Assessment of the Capabilities to Provide Female Service Members with Clothing and Equipment
N
5
$W_{cloth}^{over} \geq 1$
Так
6
Assessment of the Capabilities to Provide Female Service Members with Food Assortments
7
$W_{food} \geq 1$
Yes
8
Assessment of the Timeliness of Delivery of Artillery-Technical and Clothing Equipment for Female Service Members
9
$P_{deliv} \geq P_{establ}$
Так
10
-
11
Evaluation of logistical support capabilities for providing female service members with rest areas
N
12
$N_{beds}^{t.num.m.u.} \geq N_{fem}^{max\ day}$
Development of proposals for improving the provision of the corresponding indicator
A
B
N_{rat}^{veg}, N_{rat}^{num}, k_{veg}, $N_i^{наяв}$, N_j^{avail}, N_{fem}, k_i^{inc}, k_j^{inc}, $N_{j\gamma}^{avail}$, $N_{j\gamma}^{req}$, $k_{j\gamma}^{inc}$, $n_{siz}^{j\,cloth}$, T_{spec}, t_{an} and so on.
$W_{ppe}^{prov} = \frac{\sum_{i=1}^{n_{type}^{ppe}} W_i^{ppe}}{n_{type}^{ppe}}$, (1) $W_i^{ppe} = \frac{N_i^{avail}}{N_i^{req} \cdot k_i^{inc}}$,
$W_{cloth}^{over} = \frac{\sum_{j=1}^{n_{type}^{cloth}} W_j^{cloth}}{n_{type}^{cloth}}$, (3) $W_j^{cloth} = \frac{N_j^{avail}}{N_j^{req} \cdot k_j^{inc}}$,
(4)
$W_j^{cloth} = \frac{\sum_{\gamma=1}^{n_{siz}^{j\,cloth}} \frac{N_{j\gamma}^{avail}}{N_{j\gamma}^{req} \cdot k_{j\gamma}^{inc}}}{n_{siz}^{j\,cloth}}$. (5)
$W_{food} = \frac{N_{rat}^{veg}}{N_{rat}^{num} \cdot k_{veg}}$. (6)
$P_{deliv} = 1 - e^{-\frac{T_{deliv}}{T_{establ}}}$, (7) $T_{deliv} = \sum_{i=1}^{n_{act}} t_i^{deliv}$. (8)
Method of evaluation of individual ballistic protection equipment
$N_{beds}^{t.num.m.u.} = \sum_{i=1}^{n_{room}^{loc.u}} n_{beds\,i}^{lr.loc.u} + \sum_{j=1}^{n_{room}^{m.u}} n_{beds\,j}^{lr.m/u} + N_{beds}^{n.d.stat}$, (9)
$N_{fem}^{max\ day} = \sum_{j=1}^{n_{д.н}} n_{fem\,j}^{1day} + n_{fem}^{n.d.stat}$. (10)

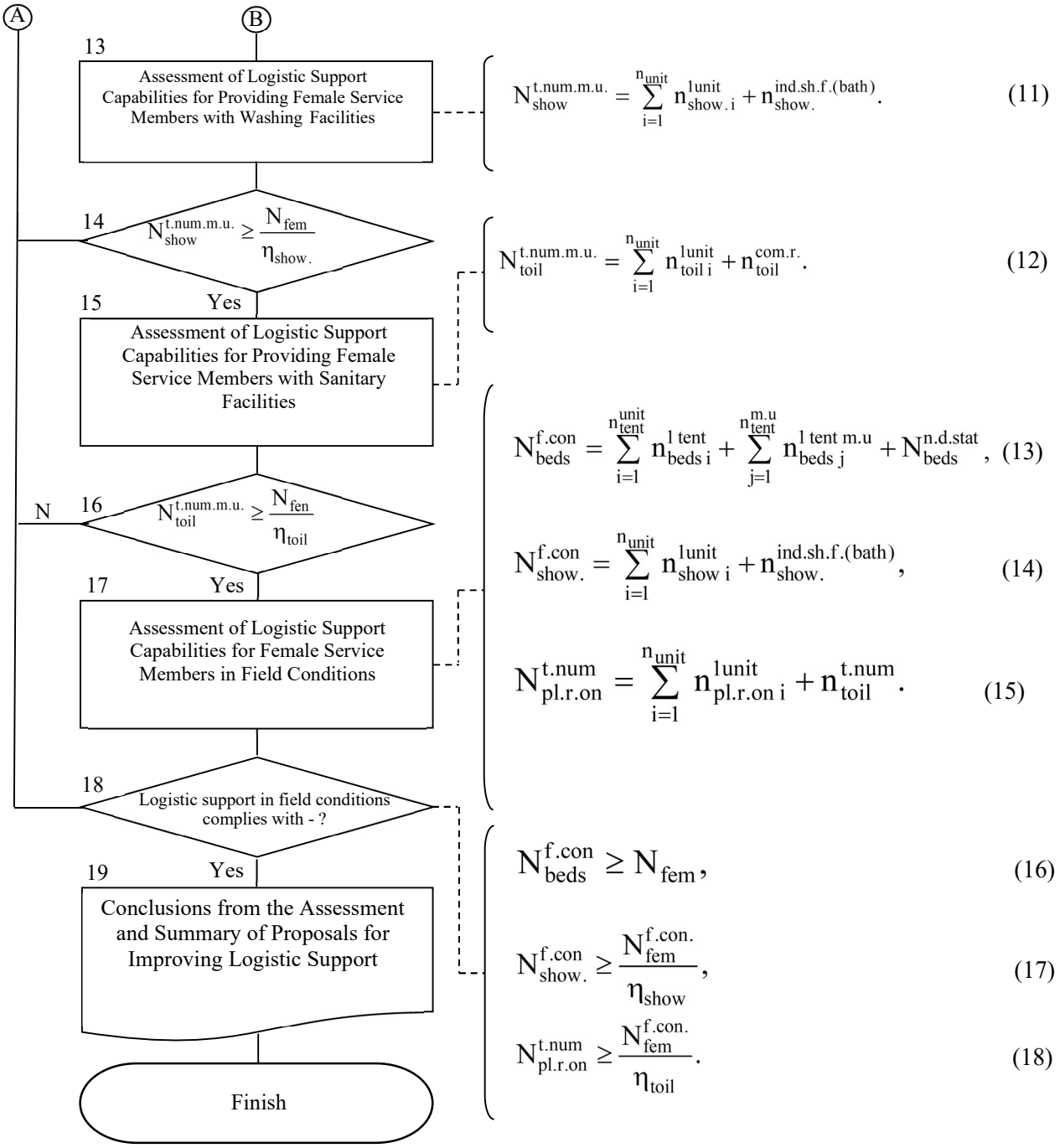


Figure 1. Block diagram of the methodology for assessing the integration of the gender approach in specific types of logistic support Source: developed by the authors based on data from [3]

– oefficient of Increase in the Required Quantity of the j Type of Clothing Item of the γ Size for the Reserve – $k^{inc}_{j\,\gamma}$;

– Total quantity of the γ sizes of the jtype of clothing item required to supply female service members– $n^{j\ cloth}_{siz}$;

– The specified time frame within which the issued, lost, or missing items must be replenished or replaced – T_{spec};

– Time allocated for the analysis of remaining artillery-technical and clothing equipment– t_{an};

– Time required for the submission and processing of a supply request – t_{sub};

– Time for delivery of artillery-technical and clothing equipment from National Guard warehouses

(if available) or from the manufacturer to military units – t_{del} ;

– Production time, including the time required for processing relevant contracts (if necessary) – t_{prod} ;

– time that may be allocated for carrying out other unforeseen activities – t_{other} ;

– ballistic Resistance of Personal Protective Equipment – B_0;

– mass of Individual Protective Equipment – B_1;

– non-impeding deformation of personal protective equipment – B_2;

– protection area of personal protective equipment – B_3;

– comfort of using personal protective equipment – B_4;

– cost of personal protective equipment – B_5;

Number of beds in the *i* room located within the deployment area of the unit (company, battalion) – $n_{beds\ i}^{1r.loc.u}$;

– Number of beds in one j-th room located on the military unit's premises separately from the deployment of subunits (companies, battalions) – $n_{beds\ j}^{1r.m/u}$;

– Number of beds located directly at the duty stations, corresponding to the exact number of these stations – $N_{beds}^{n.d.stat}$;

– Number of female military personnel on a single type of daily watch duty – $n_{fem}^{1w.d}$;

– Number of female service members assigned to daily duty shifts in premises with rest areas – $n_{fem}^{pr.r.ar}$

– Number of shower stalls (taps) with lockable doors for female service members in a single unit – $n_{show.i}^{1unit}$;

– Number of military unit subunits equipped with shower stalls (taps) with lockable doors for female service members – n_{unit} ;

– Quantity of shower heads (faucets) in an individual shower facility (bathhouse) of the military unit – $n_{show.}^{ind.sh.f.(bath)}$;

– Number of persons allocated per one shower stall (tap) according to standards – $\eta_{show.}$;

– Number of toilets for female service members in a single unit – $n_{toil\ i}^{1unit}$;

– Number of military unit subunits equipped with toilets for female service members – n_{unit} ;

– Number of toilets in the common room of the military unit – $n_{toil}^{com.r.}$;

– Number of persons allocated per one toilet according to standards – η_{toil} .

At the second stage, an assessment of the capabilities W_{ppe}^{prov} to provide female service members with personal protective equipment (PPE) is conducted [Fig. 1, block 2, expression (1)] y multiplying the sum of the capabilities W_i^{ppe} to provide female service members with the *i* type of personal protective equipment and the number n_{type}^{ppe} types of personal protective equipment, that must be supplied to female service members. At the same time, the capabilities W_i^{ppe} to provide female service members with the *i* type of personal protective equipment are determined by expression (2) in block 2,

where N_i^{avail} – Available quantity of the *i* type of personal protective equipment designated for female service members;

N_i^{req} – Required quantity of the i-th type of personal protective equipment needed to supply all female service members of the military unit (subunit), corresponding to their total number N_{fem} Female service members of the military unit according to the roster;

k_i^{inc} – Coefficient of increase for the required quantity of the i-th type of personal protective equipment.

Numerical indicators of capabilities W_{ppe}^{prov} The provision of personal protective equipment to female service members must be at least "one" (unit). If the criterion of block 3 is not met, it is necessary to develop proposals for improving the value by making changes to the input data. Otherwise, proceed to the assessment of capabilities to provide female service members with clothing and equipment (Fig. 1, block 4), Overall indicator value W_{cloth}^{over} which (the assessment) is determined by expression (3) of block 4 (Fig. 1),

where W_j^{cloth} – he capability to provide female service members with the j type of clothing and equipment, including personal hygiene items;

n_{type}^{cloth} – Number of types of clothing and equipment that must be provided to female service members,

including personal hygiene items. At the same time, the capability W_j^{cloth} The capability to provide female service members with the j type of clothing and equipment is calculated using expressions (4) and (5) in block 4 (Fig. 1). If the issuance of the j type of clothing and equipment is not affected by the service member's biometric data (size) – for example, when providing personal hygiene items – then expression (4) in block 4 (Fig. 1) is used for the calculations,

where N_j^{avail} – Available quantity of the j type of material assets allocated for female service members;

N_j^{req} – Required quantity of the j type of material assets needed to supply all female service members of the military unit (subunit), matching their headcount.

N_{fem} Female service members of the military unit according to the roster;

k_j^{inc} – Reserve increase coefficient for the required quantity of the j-th type of materiel. If the issuance of materiel takes biometric data (size) into account, expression (5) of block 4 (Fig. 1) is used,

where $N_{j\gamma}^{avail}$ Existing amount of the j item intended for female service members in the appropriate size γ size;

$N_{j\gamma}^{req}$ – Required quantity of the j type of materiel necessary to equip all female service members of the military unit (subunit) who are of size γ of the appropriate clothing ;

$k_{j\gamma}^{inc}$ – Increase coefficient for the required quantity of the j type of materiel γ size for the reserve;

$n_{siz}^{j\,cloth}$ – Total quantity γ size Total quantity of the j type of materiel required to provide to female service members.

If the criterion of block 5 (Fig. 1) is not met, where the numerical indicators of the capabilities W_{cloth}^{over} the provision of female servicewomen with material property should be at least "one", then it is necessary to develop proposals for improving the value by making changes to the input data. If the specified criterion is met (Fig. 1, block 5), we proceed to assess the possibilities of providing female servicewomen with assortments of dishes (Fig. 1, block 6) з використанням виразу (6),

where W_{food} – Capability to supply vegetarian menu options to military personnel;

N_{rat}^{veg} – Number of vegetarian meals prepared on base or number of vegetarian field rations;

N_{rat}^{num} – Total number of meal options;

k_{veg} – the percentage of vegetarian meals or rations that must be provided according to the established standards.

The criterion of block 7 must be met; otherwise, proposals should be developed and changes made to the input data. P_{deliv} – Probability of timely delivery of supplies; T_{deliv} – Anticipated timeframe for resupplying or substituting issued, lost, or deficient equipment; T_{establ} – The established time frame within which the replenishment or replacement of issued, lost, or missing materiel must be completed. At the same time, the estimated time T_{deliv}, during which the replenishment or replacement of issued, lost, or missing materiel is to be carried out is determined by expression (8),

where t_i^{deliv} – Time required for the i activity (e.g., time for analyzing stock levels of artillery-technical and clothing materiel) – t_{an} ;

Time required for the submission and processing of the request – t_{req} ; Delivery time of artillery-technical and general materiel from National Guard warehouses (if available) or from the manufacturer to military units – t_{del} ; Production time, including the time required for processing the relevant contracts (if necessary) – t_{prod} ; Time that may be allocated for carrying out other unforeseen activities – t_{other}); n_{act} – Number of actions undertaken to replenish or replace the quantity of issued, lost, or missing materiel in a given situation. Probability value P_{deliv} The timeliness of materiel delivery must be greater than or equal to the established value P_{establ} determined by experts or governing documents. Failure to meet this requirement (Fig. 1, block 9) entails making changes to the organizational aspects of supplying artillery-technical or clothing materiel. The revised time parameters are entered into the initial data and re-evaluated against the criterion of block 9. Upon meeting the specified criterion, the process proceeds to the next stage – assessment of the available individual ballistic protection equipment for compliance in providing for female service members. For this purpose, we will use an improved evaluation

method for individual ballistic protection equipment, as presented by researchers in [15].

After assessing the availability and suitability of individual ballistic protection means for female service members, the next stage of the methodology is to evaluate the logistical support capabilities for providing female service members with resting places (Fig. 1, block 11). To this end, the total number of beds $N_{beds}^{t.num.m.u.}$ in the military unit designated for the rest of female service members is first determined according to expression (9), of block 11,

where $n_{beds\ i}^{1r.loc.u}$ – Number of beds in the i-th room located within the deployment area of the subunit (company, battalion), i = 1, …, $n_{room}^{loc.u}$;

$n_{beds\ j}^{1r.m/u}$ – Number of beds in the j-th room located within the military unit's area, separate from the deployment locations of subunits (companies, battalions), j = 1, …, $n_{room}^{m.u}$;

$N_{beds}^{n.d.stat}$ – Number of beds located directly at duty stations, which corresponds to the number of those stations $N_{beds}^{n.d.stat} = n_{room}^{n.d.stat}$;

$n_{room}^{m.u}$ – Number of rooms within the deployment area of the subunit (company, battalion);

$n_{room}^{n.d.stat}$ – Number of resting places situated directly at posts of duty. Then, the maximum number of female service members who can be on duty simultaneously during a 24-hour period is calculated (block 11, expression (10)), where n_{day} – Number of daily duty shifts assigned in the military unit;

n_{fem}^{1day} – Number of female service members assigned to one type of daily duty shift;

$n_{fem}^{n.d.stat}$ – Number of female service members assigned to daily duty shifts indoors).

$N_{beds}^{t.num.m.u.}$ The estimated indicators for the total number of beds for female service members' rest must be equal to or greater than the calculated quantity $N_{fem}^{max\ day}$ female service members who can be assigned to a daily duty shift simultaneously during a 24-hour period. Compliance with this requirement (Fig. 1, block 12) allows proceeding to the next stage of the methodology – evaluating the logistical support capabilities for providing female service members with washing facilities. If the inequality of block 12 is not met, adjustments are made to the input data based on the developed proposals, and the calculations are repeated.

For the purpose of evaluating the logistical support capabilities in providing female service members with washing facilities, the total number $N_{show}^{t.num.m.u.}$ of shower heads (taps) in the military unit for female service members is calculated according to expression (11) of block 13,

where $n_{show.\ i}^{1unit}$ – Number of shower heads (taps) with lockable doors for female service members in one subunit, i = 1, …, n_{unit};

n_{unit} – Number of military unit subunits equipped with shower heads (taps) with lockable doors for female service members;

$n_{show.}^{ind.sh.f.(bath)}$ – Number of shower heads (taps) in a separate shower room (bathhouse) of the military unit.

The obtained value is then evaluated according to the criterion of block 14,

where N_{fem} – Number of female service members in the military unit according to the roster;

$\eta_{show.}$ – The number of persons per shower head (tap) is determined by established norms. Upon meeting the specified criterion (Fig. 1, block 14), the methodology proceeds to the next stage – evaluating the logistical support capabilities for providing female service members with sanitary facilities. Otherwise, adjustments are made to the input data based on developed proposals, and calculations are repeated until the inequality is satisfied.

Evaluation of logistical support capabilities for providing female service members with sanitary facilities is carried out using expression (12) (Fig. 1, block 15), where $N_{toil}^{t.num.m.u.}$ – Total number of toilets in the military unit for female service members;

where $n_{toil\ i}^{1unit}$ – Number of toilets for female service members in one subunit, i = 1, …, n_{unit};

n_{unit} – Number of military subunits equipped with toilets for female service members;

$n_{toil}^{com.r.}$ – Number of toilets in the common room of the military unit and the inequality of block 16,

where $N_{toil}^{t.num.m.u.}$ – Total number of toilets for female service members in the military unit;

N_{fem} – Number of female service members in the military unit according to the roster;

η_{toil} – Number of persons per toilet as determined by standards. If the specified inequality (Fig. 1, block 16) is not satisfied, it is necessary to develop proposals for improving the value by making changes to the input data.

The next step of the developed methodology is to evaluate the logistical support capabilities for providing female service members in field conditions (Fig. 1, block 17). For this purpose, the total quantity of the following is assessed:

$N_{beds}^{f.con}$ Beds for female service members' rest in field conditions (Fig. 1, block 17, expression (13)), where $n_{beds\ i}^{1\ tent}$ – Number of beds in one i tent located on the territory of the subunit's (company's, battalion's) deployment, i = 1, …,

n_{tent}^{unit} – Number of tents for women located in the deployment area of subunits (companies, battalions);

$n_{beds\ j}^{1\ tent\ m.u}$ – Number of beds in one *j* tent located on the territory of the temporary deployment of the military unit, separately from the deployment of subunits (companies, battalions),

j = 1, …, $n_{tent}^{m.u}$ – Number of tents for women located separately from the deployment of subunits (companies, battalions);

$n_{room}^{n.d.stat}$ – Number of beds located directly at duty stations, which corresponds to the number of these duty posts. $N_{beds}^{n.d.stat} = n_{room}^{n.d.stat}$); shower heads (taps) $N_{show.}^{f.con}$ for female service members in field conditions (Fig. 1, block 17, expression (14), where $n_{show\ i}^{1unit}$ Number of shower heads (taps) with lockable doors for female service members in one subunit in field conditions, i = 1, …, n_{unit};

n_{unit} Number of subunits of the military unit equipped with shower heads (taps) with lockable doors for female service members in field conditions;

$n_{show.}^{ind.sh.f.(bath)}$ Number of shower heads (taps) in a separate bath tent of the military unit in field conditions);

$N_{pl.r.on}^{t.num}$ Sanitation facilities for female service members in the military unit in field conditions (Fig. 1, block 17, expression (15),

where $n_{pl.r.on\ i}^{1unit}$ – Number of sanitation facilities for female service members in one subunit, i = 1, …, n_{unit};

n_{unit} – Number of subunits in the military unit equipped with sanitation facilities for female service members in field conditions;

$n_{toil}^{t.num}$ – Number of sanitation facilities in a common room of the military unit in field conditions).

Accordingly, the criteria for these indicators are: expression (16) [Fig. 1, block 18],

where $N_{beds}^{f.con}$ Total number of beds for female service members' rest in field conditions;

N_{fem} – Number of female service members present in the field camp area;

Expression (17) [Fig. 1, block 18],

where $N_{душ}^{n.ум.}$ – Total number of shower heads (taps) for female service members in field conditions;

$N_{fem}^{f.con.}$ – Number of female service members of the military unit located in the field camp;

η_{show} – Number of persons per one shower head (tap) as defined by standards;

Expression (18) [Fig. 1, block 18],

where $N_{pl.r.on}^{t.num}$ – Total number of sanitation facilities in the military unit for female service members in field conditions;

$N_{fem}^{f.con.}$ – Number of female service members of the military unit present in the field camp;

η_{toil} – Number of persons per sanitation facility as defined by standards.

The developed proposals for improving logistical support and the revised input parameter values – adjusted according to the criteria of blocks 3, 5, 7, 9, 12, 14, 16 and the results of the individual ballistic protection evaluation method [15] – are summarized at the final stage of the methodology (block 19). Conclusions are drawn regarding the capabilities of the National Guard of Ukraine's logistical support in incorporating a gender-sensitive approach in the provision of clothing and equipment, ballistic protection means, and infrastructure support. Proposals for its improvement are then prepared.

Conclusions and directions for future research. Thus, the developed methodology allows to evaluate: the possibilities of providing female servicewomen with personal protective equipment; the possibilities of providing female servicewomen with material property; the possibilities of providing female servicewomen with assortments of dishes; timely delivery of artillery and technical equipment and material property for female servicewomen; available individual armor protection means for the provision of female servicewomen; the possibilities of providing female servicewomen with medical equipment; and the possibilities of providing female servicewomen with medical equipment.

The above shows that using this methodology, governing bodies can assess the gender mainstreaming of artillery, technical, materiel, engineering, infrastructure and food supply and develop proposals for its improvement.

Further research will be aimed at assessing the overall gender mainstreaming in military units of the security and defense forces using the developed methodology.

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Received: 20.01.2025
Revised: 30.01.2025
Accepted: 10.02.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 351:354.10.1 DOI 10.59226/2786-6920.1.2025.39-46

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METHODS OF ANALYSIS OF LOGISTICS PROCESSES OF FOOD SUPPLY OF THE MILITARY UNITS OF THE NATIONAL GUARD OF UKRAINE

This article presents the development and substantiation of methodological tools for the analysis of logistical processes of food supply to the military units of the National Guard of Ukraine. The scientific novelty of the obtained results is the development of theoretical and methodological principles for the analysis of logistical processes of food supply to military units. In this study, the main stages of the methodology of analysis of logistical processes of food supply of military units of the National Guard of Ukraine are proposed. The essence of various external factors, under the influence of which the implementation of the methodology of analysis of logistic processes falls, is analyzed, in particular in the context of food supply of military units. The article emphasizes the need to highlight such external factors due to the fact that these factors can affect the efficiency and effectiveness of the analysis, as well as the possibility of implementing the recommended changes. Particular attention is paid

to the specifics of military factors, such as military operations and changes in the deployment of military units.

The article systematizes and examines in detail the regulatory requirements, namely the requirements of the legislation on storage, transportation and quality control of food, which can complicate or, on the contrary, improve logistics processes. The key internal factors that determine the possible analysis of changes in the logistical processes of food supply of military units of the National Guard of Ukraine are described and carefully analyzed. In particular, attention is paid to the factor of information systems and technologies supporting logistical processes of food supply to military units in modern conditions. This study presents an economic-mathematical model of overcoming the risks of logistical processes of food supply to military units. A mechanism of influence at risk points of the logistical chains of food supply of military units has been formed. Possible limitations of the implementation of the methodology of analysis of logistical processes of food supply of military units of the National Guard of Ukraine are analyzed. The practical significance of the obtained results lies in the formation of relevant conclusions for the management in order to take into account key risks and factors affecting the logistics processes in the food supply management system of the military units of the National Guard of Ukraine.

Keywords: *logistic processes; food supply; military units; risk points; mechanism; methodology; National Guard of Ukraine.*

Statement of the problem. Food supply is critically important for maintaining the physical and morale readiness of our Defense Forces to carry out combat missions. Service members must receive high-quality, timely rations to remain in peak physical condition. Shortcomings in food logistics can negatively affect the combat effectiveness of National Guard units. Given limited financial and material resources, it is essential to optimize the use of all forms of food provisioning. An analysis of logistical processes helps identify weaknesses in supply, wastage, and other issues, enabling resource savings and their reallocation to other critical needs.

Moreover, under martial law in Ukraine, logistics often face significant challenges due to damaged infrastructure, route blockages, and other factors. Examining current supply chains allows planners to prepare for such disruptions by developing alternative routes and contingency plans, thereby enhancing the resilience of the food-supply system.

Losses of provisions resulting from improper storage, transportation, or other logistical failures can incur substantial financial cost and degrade troop nutrition. Process analysis uncovers the root causes of such losses and supports corrective measures that boost overall system efficiency.

Thus, the foregoing underlines the relevance of researching the logistics of food supply for National Guard units of Ukraine.

Analysis of recent studies and publications. Scientific works by S. Sokolovskyi, M. Naumenko, and I. Morozov, and S. Pavlenko [1; 2; 3] establish methodological principles for managing logistics chains in today's information economy. Practical recommendations for developing and applying analytical algorithms to manage logistics processes are offered by A. Dykyi, N. Butenko, N. Valianska, V. Nikitiuk, I. Ushakova, and Ya. Hrabovskyi in their articles [4; 5; 6]. In studies by M. Naumenko and M. Ptashchenko [7; 8], analyses are proposed for overcoming warehouse management challenges in support of logistical operations, and possible routes for optimizing food-supply logistics for military units are systematized. O. Starkova, D. Bondarenko, and M. Naumenko present analyses of information-support mechanisms for economic analysis and anti-corruption components in managing food-supply logistics for National Guard units [9; 10]. A methodology for planning financial control over procurement of goods, works, and services for National Guard units – relevant to specific conditions encountered in analyzing food-supply logistics – is provided by V. Herasymenko [11].

Thus, to date, the specialized literature does not include a comprehensive, scientifically substantiated methodology for analyzing the food-supply logistics processes of Ukraine's National Guard units.

The purpose of this article is to develop a methodology for analyzing the logistical processes of food provisioning for National Guard of Ukraine units.

Presentation of the main material The effective food supply of National Guard units of Ukraine is a critically important component for maintaining both combat readiness and the morale of personnel. An analysis of logistical processes enables identification of the system's strengths and weaknesses, optimization of resources, and enhancement of supply efficiency.

From this review of current food-supply practice, the following core stages of a methodology for analyzing the logistical processes of food provisioning for National Guard units can be proposed:

1. Data Collection and Preparation

Identify data sources. Gather information from warehouse reports, delivery logs, logistics plans, supplier contracts, etc.

Assess existing data. Verify the timeliness and completeness of information on procurement, transport, storage, and distribution of rations, equipment, and supply-service assets.

2. Mapping Logistical Processes

Create a logistics map. Visualize every step of the food-supply chain – from procurement to issuance to end users in the units.

Pinpoint key nodes. Identify critical hubs such as procurement points, depots, transport routes, and distribution centers.

3. Efficiency and Performance Analysis

Measure time and resources. Quantify the duration of each logistics step and the human, material, and financial resources required.

Evaluate losses and delays. Detect bottlenecks where spoilage or delivery lags occur.

4. Risk and Safety Assessment

Analyze supply risks. Identify threats to uninterrupted provisioning (e.g., supplier delays, transport disruptions, storage-condition breaches).

Ensure quality and security. Implement controls to maintain food quality throughout the chain and to protect stock from damage or loss.

5. Cost Analysis and Resource Optimization

Break down costs. Calculate expenditures at each stage-procurement, transport, storage, and distribution.

Optimize resources. Seek cost-reduction opportunities and efficiency gains, such as introducing automated inventory systems or streamlining delivery routes.

6. Recommendation Development and Implementation

Formulate proposals. Based on the analysis, draft actionable improvements – e.g., revised procurement practices, warehouse upgrades, new technologies.

Execute improvements. Plan, roll out, and monitor optimization measures, and evaluate their impact.

7. Monitoring and Control

Ongoing oversight. Establish continuous KPI tracking for logistical performance.

Audit and feedback. Conduct regular audits of implemented changes and gather user feedback to drive further refinements.

Finally, it is important to recognize that external factors – such as infrastructure damage, security constraints, or funding shifts – can influence both the analysis and the feasibility of recommended changes. A robust methodology will anticipate and adapt to these variables, ensuring the National Guard's food-supply system remains resilient and effective.

The following external factors influence the effectiveness and outcomes of analyzing the food-supply logistics processes for National Guard units of Ukraine:

1. Political Factors

- Shifts in the political landscape. Political changes can alter state-funding priorities, including support for military programs such as food provisioning.
- International relations. Relations with other countries may affect access to imported foodstuffs, supply-service equipment, or logistics technologies. Sanctions or trade restrictions can complicate the execution of efficient supply chains.
- Changes in military strategy. Political decisions to revise defense strategy or tactics can redefine

logistics requirements, forcing the methodology to adapt to new conditions.

2. Economic Factors

- Budgetary constraints. The national economic situation may limit budget availability, affecting resources dedicated to logistics—potentially reducing spending on infrastructure, transport, and other logistics elements.
- Fluctuating food prices. Variations in the cost of food items, fuel, and other resources influence logistical expenses and may require adjustments to provisioning plans.

3. Social Factors

- Demographic shifts. Changes in population structure—such as regional population growth or migration—affect food-supply needs and the labor force available for logistics.
- Public opinion. Society's attitude toward military spending influences political decisions on funding and sustaining logistics programs. Public support or criticism can determine these programs' level of priority.

4. Technological Factors

- Technology maturity. The adoption of modern tools – automation, inventory-management systems, GPS – can greatly enhance logistics, but requires sufficient investment and resources that may be limited.
- Access to innovations. Restrictions on obtaining cutting-edge technologies, whether economic or political, can hinder the improvement of logistics processes.

5. Legal Factors

- Regulatory requirements. Laws governing storage, transport, and quality control of provisions can either complicate or improve logistics. Non-compliance risks legal penalties or product spoilage.
- International standards. Aligning with standards such as ISO may necessitate adapting processes and introducing new practices.

6. Environmental Factors

- Climatic conditions. Climate change and adverse weather can affect food transport and storage, requiring extra safety measures and revisions to logistics plans.
- Natural disasters. Events like floods, fires, or earthquakes disrupt supply chains and demand immediate logistics adjustments.

7. Military Factors

- Combat operations. Active fighting can sever logistics routes and destroy infrastructure, complicating food supply to units.
- Unit relocations. Frequent redeployments or new operational tasks necessitate rapid reconfiguration of logistics support.

These external factors significantly affect the design and implementation of the methodology for analyzing National Guard food-supply logistics. Accounting for them during development and rollout will ensure the methodology's effectiveness, flexibility, and adaptability to changing external conditions.

In implementing the methodology for analyzing the food-supply logistics processes of National Guard units of Ukraine, various types of risks can arise that significantly undermine the effectiveness of the logistics management system. To mitigate these risks, control interventions should be applied to the logistics management system. Such interventions ought to be targeted at the risk points within the food-supply logistics chains of the units, according to the scheme shown in Figure 1.

The conventional symbols adopted in Fig. 1 are as follows:

R_k – Set of risks affecting the *k*-th component of the logistics process;

CM_k – Stabilizing mechanism encompassing a set of risk management methods;

MD – Multiplier-demultiplier, understood as a control element of the logistics management system that increases or decreases the level of risk;

UR_{p-1k-1}, UR_{pk} – Previous and subsequent levels of the logistics process management system for food supply in military units.

Definition of the Logistics Process Component After Stabilizing Mechanism Influence.

The logistics process component after the influence of the stabilizing mechanism should be defined as:

a) If the rate of change of the component is positive – $d_k^{(2)} = d_k^{(1)} \times \alpha \times \beta$,

b) If the rate of change of the component is negative – $d_k^{(2)} = \frac{d_k^{(1)}}{\alpha + \beta}$,

where $d_k^{(1)}$ is the rate before the stabilizing mechanism's influence.

Coefficient α

The coefficient α is determined by the formula:

$\alpha = 1 - r$,

Where r is the risk level.

Thus, when α = 0, the risk is maximal; when α = 1, risks are absent.

Coefficient β

The coefficient β characterizes the level of risk impact compensation and can be determined by the formula:

$$\beta = \begin{cases} 1 + \frac{Y^0}{Y'}, якщо Y' \neq 0; \\ 1 + \frac{Y^0}{1 - Y'}, якщо Y' = 0 \end{cases}$$

where: Y_0 – Number of logistics operations transferred by the stabilizing mechanism to a risk-free or moderate-risk zone;

Y' – Number of logistics operations in the high or unacceptable risk zone.

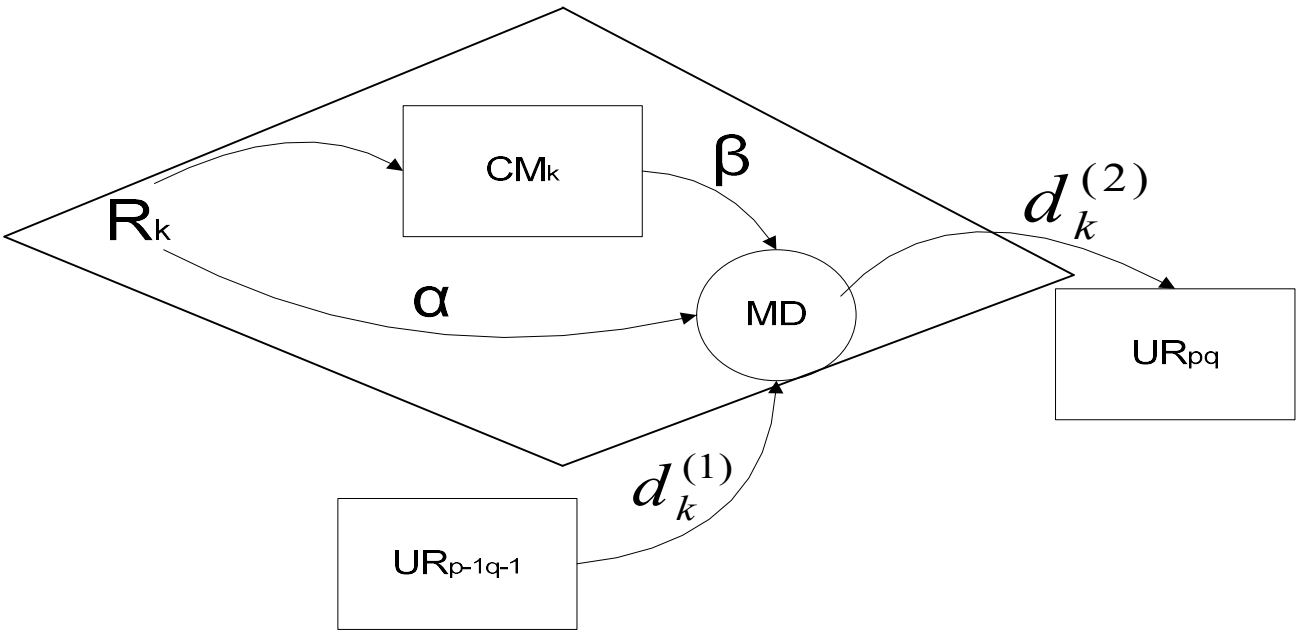

Figure 1. Mechanism of interventions at risk points in the food-supply logistics chains for National Guard Units

If α > 0, the coefficient β ranges within $1 \leq \beta \leq 1/\alpha$

- When β = 1, the stabilizing mechanism is absent.
- When β = 1/α, the mechanism fully compensates for potential risk.

Implementation Limitations of the Methodology.

The implementation of the methodology for analyzing logistics processes in food supply for military units of the National Guard of Ukraine may face certain constraints. Possible limitations include:

1. Resource Constraints.

Financial constraints: Insufficient funding may limit the adoption of modern technologies, personnel training, or infrastructure modernization, leading to ineffective analysis and implementation of recommendations.

Material and technical resources: Lack of or outdated transport, warehouses, and equipment may hinder methodology implementation and cause delays in food supply.

2. Lack or Inaccuracy of Data.

Outdated information: Absence of accurate, up-to-date data may significantly distort analysis results, leading to incorrect conclusions and inefficient decisions.

Data collection challenges: Difficulty in gathering necessary data due to insufficient process automation or lack of standardized data collection procedures.

3. Infrastructure Limitations.

Poor infrastructure condition: Outdated or poorly maintained infrastructure (warehouses, transport, communications) may restrict effective logistics and process analysis.

Lack of modern technologies: Limited integration of information systems or absence of access to modern technologies (e.g., inventory management systems) may reduce analysis effectiveness.

4. Personnel Constraints.

Low staff qualifications: Insufficient training or experience among logistics personnel may lead to errors or delays in analysis and implementation.

Shortage of skilled specialists: Lack of qualified personnel may limit the execution of complex logistics measures.

5. Bureaucratic Obstacles.

Complex administrative procedures: Inflexible management structures or bureaucratic delays may slow the adoption of recommended changes.

Lack of interdepartmental coordination: Poor coordination between units or agencies may result in duplicated efforts or missed critical steps.

6. Time Constraints.

Limited implementation time: Tight deadlines may lead to rushed analysis, reducing accuracy and effectiveness.

Changing circumstances: Unforeseen changes (e.g., combat operations, emergencies) may hinder the execution of developed recommendations.

7. Resistance to Change.

Organizational resistance: Staff or management may resist new methodologies, especially if they require significant process changes or additional effort.

Cultural factors: In some organizations, changes may face cultural resistance if they disrupt established traditions or workflows.

8. Legal and Regulatory Constraints.

Legislative barriers: Legal or regulatory requirements may impede certain aspects of the methodology.

Regulatory risks: Non-compliance with new standards may lead to sanctions or legal issues.

The constraints that may arise during the implementation of the methodology for analyzing logistics processes in food supply for military units of the National Guard of Ukraine require careful planning and adaptation to existing conditions. Addressing these limitations during development and implementation will enhance the methodology's effectiveness and ensure the achievement of planned outcomes.

Conclusions and Future Research Directions. Thus, the conducted research has enabled the

development of a comprehensive methodology for analyzing the logistics processes of food supply for military units.

The analysis of food supply logistics processes for military units of the National Guard of Ukraine serves as a crucial tool for enhancing the efficiency and reliability of the supply system. The proposed methodology allows for the identification and elimination of weaknesses in the logistics chain, optimization of costs, and ensures timely delivery of food supplies with a high level of quality and safety.

The scientific novelty of the obtained results lies in the methodology for analyzing the logistics processes of food supply for military units of the National Guard of Ukraine.

The practical significance of the findings consists in formulating relevant recommendations for military unit command regarding the consideration of key risks and influencing factors in the logistics processes of the food supply management system for National Guard units.

Further research may focus on developing strategies to improve the efficiency of food supply management for military units of the National Guard of Ukraine.

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Received: 21.01.2025
Revised: 31.01.2025
Accepted: 10.02.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 351.746.1 DOI 10.59226/2786-6920.1.2025.47-54

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FEATURES OF THE USE OF FORCES AND MEANS OF A BORDER OUTPOST DURING COMBAT OPERATIONS IN A RIVER

The article examines the experience of employing a border outpost as the principal combat unit of a border detachment tasked with carrying out the missions of military command authorities within its designated defensive sector. It analyzes the specific features of employing the forces and means of a border outpost in accordance with the prevailing operational situation, as well as the particularities of fulfilling combat tasks in a riverine area, where the water obstacle lies directly along the line of contact between opposing forces.

The study highlights the operational environment in which the border outpost conducts defensive actions. It identifies the influence of the physical and geographical characteristics of the terrain on the tactics of both the adversary and the units of the border outpost. The main tasks assigned to the outpost for resolution are defined. The article devotes considerable attention to the organization of the operational and service activities of the border outpost, with due regard to the requirements of regulatory and administrative acts issued by both the Administration of the State Border Guard Service of Ukraine and the Ministry of Defense of Ukraine.

The general procedure of command and control at the border outpost is defined from the moment a combat order is received from the commander of the border detachment for the conduct of defensive operations, to the assignment of tasks to elements of the combat formation. It is noted that the commander of the border outpost must determine the content of their decision regarding defensive combat actions, and outlines the structure of a combat order for the subordinate unit. The article analyzes the specific features of constructing a combat formation, taking into account the available forces and means of the border outpost, the physical and geographical conditions, and the size of the area of task execution. It also outlines the particularities of employing elements of the combat formation during the execution of defensive actions. The summarized combat experience may be applied in subsequent research.

Keywords: *operational and service activity; defensive combat; defensive operations; border outpost; combat formation structure; planning; command and control.*

Statement of the problem. In accordance with the Law of Ukraine *"On the Defense of Ukraine"* [1], the State Border Guard Service of Ukraine (hereinafter – SBGSU) and its units, during the period of martial law, shall be involved, by decision of the relevant military command authorities of the Armed Forces of Ukraine (hereinafter – AFU), in the repulsion of armed aggression against Ukraine in the manner prescribed by law.

The tasks assigned to the SBGSU in the course of repelling armed aggression by another state are defined by the Law of Ukraine *"On the State Border Guard Service of Ukraine"* [2], namely:

– participation, in coordination with the Armed Forces of Ukraine and other military formations, in the elimination (neutralization) of an armed conflict at the state border of Ukraine, in an international armed conflict, and in the repulsion of armed aggression against Ukraine through direct engagement in combat operations;

– participation in measures aimed at ensuring national security and defense, repelling and deterring armed aggression against Ukraine, conducting mine action activities, as well as in efforts to restore territorial integrity within the internationally recognized state border of Ukraine;

– participation in the implementation of territorial defense measures, as well as in actions aimed at maintaining the legal regime of martial law and the state of emergency.

This same Law stipulates that the specified tasks are carried out by border detachments, which may include, among others, border service departments, border outposts, inspector sections of the border service, and other units.

Before the full-scale invasion of the territory of Ukraine by the armed forces of the russian federation, the participation of SBGSU units in the resolution of armed conflict directly on the line of contact was mainly regarded as a means of reinforcing the main units of the Armed Forces of Ukraine or of carrying out separate tasks. Additionally, tasks characteristic specifically of SBGSU units were performed such as the control of the passage of individuals to and from temporarily occupied territories at entry-exit checkpoints, the implementation of regime measures at control posts in areas adjacent to the line of contact, and similar activities.

With the beginning of the full-scale invasion, SBGSU units began performing tasks independently in designated areas and sectors, in cooperation with and with the support of other defense force units. It should be noted that these tasks are assigned not by the central executive authority (the SBGSU Administration), but by the relevant military command authorities of the Armed Forces of Ukraine.

Considering that SBGSU units as a law enforcement agency with special status are inherently oriented toward law enforcement functions, they do not possess the combat experience held by the units of the Armed Forces. Therefore, the issue of studying the specific features of SBGSU unit operations, as well as identifying ways to improve their effectiveness in the course of repelling armed aggression through combat operations, becomes particularly urgent.

Analysis of recent research and publications. Has shown that the issue of participation by SBGSU units in the resolution of armed conflict and the repulsion of armed aggression against Ukraine through direct combat operations has been studied by scholars such as V. Mazur, P. Simchuk [3], A. Maltsev, V. Zalozh [4], D. Karasyov [5], Yu. Ivashkov [6], A. Bratko [7], V. Lemeshko [8], O. Mykhailenko, and L. Balahur [9]. However, it should be noted that these studies do not address the specific features of employing border detachment units during the independent conduct of combat operations within their assigned area. Moreover, they do not examine the particularities of performing tasks under specific physical and geographical conditions.

Given the constantly evolving tactics of combat operations employed by Ukraine's defense forces and russian occupation troops, along with the continuous advancement of weaponry and military equipment, there arises a clear need to study and generalize the combat experience of border detachment units and to identify ways of improving and enhancing the effectiveness of their deployment. Considering that border detachment units operate under varying physical and geographical conditions, this study focuses on the procedure for employing a border outpost as the primary unit of a border detachment in a riverine section of the terrain, specifically the Kakhovka Reservoir area.

The purpose of the article is to analyze the procedure for organizing the operational and service activities of a border outpost in a riverine section and

to identify directions for improving the effectiveness of the use of its forces and means.

Presentation of the Main Material. Border guard units involved in the execution of combat missions under the defense operation plan are subordinated to the relevant military command authorities, the planning and organization of their operational-service activities are carried out on the basis of corresponding combat orders (combat directives) issued by these authorities [10].

Taking into account the combat personnel strength, organizational and staffing structure, and command structure, it is recognized that a border guard detachment corresponds, by these indicators, to a general military unit such as a brigade. Therefore, in accordance with the combat directives of the military command authorities, the border guard detachment performs tasks within the defense zone of the first echelon. Accordingly, a border outpost, in terms of its structure and combat personnel, is equivalent to a company and, during defensive operations, performs tasks within a company strongpoint. A border service inspector squad is equivalent to a platoon and operates within a platoon strongpoint (hereinafter referred to as PSP).

It is important to note that the presence of a water obstacle, such as a river, affects the determination of the combat formation of units as well as the width of the defensive zone and the defensive areas of border guard detachments and outposts. The defensive zone of a border guard detachment may extend from 60 to 70 km, while the frontage of a company strongpoint of a border outpost may reach up to 15–20 km, with a depth of 5–10 km. These figures may increase depending on the specific features of the area in which the defense is being conducted (such as physical and geographical conditions, or regional population density). Accordingly, when constructing a defense, considerations must include the enemy's capabilities, their tactical approach, and the specific physical and geographical features of the area, particularly the characteristics of the river and its shoreline.

At the time of the study, the enemy (russian occupation forces) had ceased active offensive operations, abandoned attempts to cross the water obstacle, and transitioned to positional defense, consisting of airborne assault and motorized rifle units. Their defense was organized along the shoreline in a single echelon through the establishment of company strongpoints. Given the presence of nuclear energy infrastructure within the enemy's defensive zone, units of the federal service of the national guard troops were deployed to secure and defend these facilities.

The presence of high-precision weapons and modern electronic warfare systems in the enemy's arsenal; numerical superiority in personnel, armaments, and military equipment; an established air defense system; significant stockpiles of rocket and artillery weapons; a developed military-industrial complex; the presence of long-range strike unmanned aerial systems; a significant quantity and stable supply of FPV drones — all determine its strengths and advantage in conducting defense. Its weakness lies in: significant losses in both personnel and equipment; the superiority of our forces' weapons and equipment over russian (soviet-made) counterparts; favorable terrain for conducting defense by our forces and the inability of the enemy to conduct offensive actions; the absence of armored vehicles in motorized rifle units.

These factors determine the enemy's tactics, which consist of:

– conducting aerial reconnaissance using unmanned systems (hereinafter – UAS);

– delivering fire strikes on the positions of border outpost units, supporting units, and civilian and critical infrastructure facilities by means of rocket and artillery shelling, the use of FPV drones and other types of strike unmanned aerial vehicles (hereinafter – UAVs), dropping explosive devices, chemical and poisonous substances from UAVs;

– conducting remote mining of terrain using various types of anti-personnel mines;

– possible landing of airborne troops, use of sabotage and reconnaissance groups for the purpose of reconnaissance, sabotage-demolition activities, and creating a foothold for future actions on the opposite bank of the river.

The area of task execution by the border outposts is characterized by the fact that between the forward edge of the defense of our units and the enemy, the natural obstacle is the riverbed; the shore, due to a significant decrease in water level, has numerous shrubs, lakes, and swampy areas, which are almost inaccessible to vehicles without additional engineering equipment. In the rear of the enemy's

defense, there is a moderately populated area and critical infrastructure facilities – the Zaporizhzhia TPP and NPP. The terrain is moderately dissected, with forest belts and a developed system of logistical routes. In the rear of our units' defense, there is a moderately populated area with industrial infrastructure, forest plantations, river features, and hard-to-reach areas.

Given the current situation and the combat directives of the head of the border guard detachment, the following tasks are assigned to the border outpost:

in the event of enemy offensive actions, to constrain its forces in front of the forward edge of the defense, to deliver fire strikes during its movement, deployment, landing, and attack on the forward edge, to prevent penetration into the depth of the defense by inflicting maximum losses, to hold strongpoints and create favorable conditions for counteroffensive or the conduct of other actions through the sequential execution of tactical tasks;

participation in the implementation of counter-sabotage measures, delivering fire strikes using artillery and strike UAVs on identified and planned targets;

countering various types of enemy UAS using available fire and technical means;

conducting surveillance of the airspace, the area adjacent to the forward edge of the defense, and the water surface using available technical means.

Additional tasks include:

improving the engineering fortification and camouflage of positions and deployment lines for reserves;

increasing the number of explosive and non-explosive barriers;

establishing decoy positions;

equipping protective and countermeasure systems against UAS, including FPV drones.

The planning and organization of operational-service activities are carried out by the head of the border outpost for the period of the relevant combat directives (orders), monthly and daily [10].

Upon receiving the combat directive from the head of the border guard detachment, the head of the border outpost must [11]: understand the task; assess the situation; determine the concept and make a decision on conducting a defensive battle (defensive actions); based on this, develop a combat order (combat directive) and communicate it to the commanders (chiefs) of units (elements of the established combat formation); organize coordination, command and control, and comprehensive support of the unit's actions.

In the concept of the defensive battle, the head of the border outpost must determine: the direction of the main effort and the areas (sectors) of terrain (objects), the retention of which ensures the stability of the defense; the method of conducting the defensive battle (the procedure for repelling the offensive and striking the enemy during its deployment, transition to the attack, retention of the defensive area (strongpoint), and destruction of the enemy that has penetrated the defense), with a defined procedure for fire engagement and deception measures; the combat formation and the system of strongpoints and fire positions.

In the combat order (combat directive) for the defensive battle, the head of the border outpost specifies:

1. The situation in the area of task execution:

– information about the enemy (composition, disposition, probable nature of actions, locations of fire assets, possible routes of advance and deployment lines, fire and barrier systems);

– information about adjacent units, attached and supporting units, and their tasks;

– information on the capabilities of own forces, combat personnel strength, and reinforcement means;

– characteristics of the area of task execution (terrain, weather conditions, civilian environment).

2. The task assigned to the border outpost:

– the purpose of the battle, the combat task of the border outpost as indicated by the head of the border guard detachment;

– tasks performed by the forces and means of the senior commander (chief) in support of the unit's actions.

3. The procedure for executing the combat task:

– the concept of the battle (direction of main effort, combat formation, procedure of actions, procedure for delivering fire strikes on the enemy).

4. Combat tasks for the elements of the combat formation:

– tasks for the elements of the combat formation and reinforcement assets;

– combat support tasks (reconnaissance, security, tactical camouflage, engineering support, radiological, chemical, and biological protection);

– organization of air defense, electronic warfare, reconnaissance;

– coordination indicators (time and location of tactical task execution by battle phases, readiness timelines, procedure for reporting);

– evacuation procedure for the wounded.

5. Expenditure of rockets and ammunition for the execution of the combat task (restrictions on the use of weapons, conduct of operations).

6. Command and control, readiness timelines:

– location of the command-observation post;

– control and alert signals, recognition and identification procedures;

– procedure for the use of communication means;

– own position and that of the deputy (person responsible for command in the event of loss of the command-observation post).

Each month, taking into account the activities provided in the calendar plan of the border guard detachment, the head of the border outpost develops a calendar plan for the corresponding month. Planning is conducted considering the forecast of the situation's development and the capabilities of the unit. The plan also specifies the procedure for task execution, the use (deployment) of personnel, weapons, equipment, and technical means.

In the event of changes in the situation within the area of responsibility and the urgent need to involve additional forces and means for the protection of the state border, or a change in the existing procedure for task execution, a shift in the direction of the main effort, or the conduct of special actions to search for and eliminate enemy sabotage and reconnaissance forces, the head of the border outpost refines the existing decision or makes a separate decision. The refined or newly adopted decision is formalized in the form of a combat order (directive).

During the preparation and conduct of combat operations, a diagram of the strongpoint and the working map of the head of the border outpost are prepared. The strongpoint diagram must include: the system of strongpoints and fire positions, the fire system, and the system of engineering barriers. The working map reflects: the composition and combat task; the position of the enemy and own forces; neighboring and cooperating units; the tasks of artillery and aviation; fire initiation lines for primary fire assets; areas of aerial reconnaissance; sectors for the employment of electronic warfare means (hereinafter – EW); and other information necessary for managing the unit's operations.

Control of subordinate forces and means is carried out from the command-observation post (hereinafter – COP) of the border outpost. The following personnel are assigned to the COP: the "COP Duty Officer" (from among the officers), the "Unit Duty Officer," and the "Assistant to the Unit Duty Officer." Other individuals may be assigned to the COP as needed to fulfill designated tasks and ensure continuous duty and security.

Daily, the head of the border outpost carries out planning for the deployment of available and attached forces and means for a 24-hour period. Based on this daily deployment plan, a force allocation for the elements of the combat formation is prepared for actions based on respective commands (signals). The force allocation by elements of the service (combat) formation is communicated to the personnel and kept at the COP of the border outpost.

The accounting of results from the use of the forces and means of the border outpost is maintained in the Combat Log. This log also records all orders, directives, and instructions received from higher command (staff) and those issued by the head of the border outpost. When organizing the execution of complex tasks, a coordination table and other necessary documents may be developed.

Typically, when constructing the combat formation of a border outpost for defense, the following main elements are designated:

– squad positions within the platoon strongpoint (PSP);

– observation posts;

– aerial reconnaissance posts;

– electronic (radar) reconnaissance posts;

– reconnaissance and search groups;

– mobile fire groups;

– reconnaissance-fire complexes;

– checkpoints;

– reserves.

Given the significant length of the border outposts' area of responsibility and the available forces and means, the most dangerous sectors are identified during the formation of the combat formation, those where enemy airborne landings, incursions by sabotage and reconnaissance forces, or offensive operations are most likely. In these directions, squad positions within the platoon

strongpoint (PSP) are established, which serve as the main element of the border outpost's combat formation. It should be noted immediately that the size of the PSP also depends on the characteristics of the area and is generally larger than what is prescribed by the Combat Regulations of the Armed Forces of Ukraine. The classical structure of the combat formation within a PSP, as outlined in those same regulations, is also absent. The inter-positional space between PSPs is covered through the use of reconnaissance-search groups and continuous aerial reconnaissance using UAVs.

The combat formation of the PSP includes: the command-observation post (COP); squad positions; observation post; primary and alternate positions for fire assets; a system of engineering and mine-explosive barriers. A fire system is established. Within or near the PSP, a deployment line for second-echelon reserves is also designated. Technically, the PSP is supported by various types of communication systems (internet, radio, wired), industrial and backup power supply, video surveillance systems (including bispectral cameras), enemy UAV signal frequency analyzers, video signal interception equipment, and various types of electronic warfare (EW) systems. Depending on the assigned tasks, other additional enemy counteraction means may be added.

The primary tasks of the PSP are:

conducting surveillance of the airspace, terrain adjacent to the forward edge of the defense, and the water surface;

delivering fire strikes against the enemy during its movement, deployment, landing, and attack on the forward edge, preventing a breakthrough into the depth of the defense;

countering enemy UAS, including various types of strike UAVs, by suppressing them through EW means or fire engagement.

Personnel in the PSP perform tasks in accordance with the combat order issued by the commander of the border service inspector squad. To manage combat operations, a PSP diagram is developed in accordance with the requirements of the Combat Regulations of the Armed Forces of Ukraine, along with an encrypted table of call signs and covert control signals.

In the absence of fire contact with the enemy, 1/3 of the total personnel of the border service inspector squad are on combat duty at the PSP positions. The rest remain in the first-echelon reserve, usually at a short distance, with a readiness time of up to 20 minutes. The reserve is located in equipped, protected positions. To prevent sudden attacks and to detect and destroy aerial threats (reconnaissance and strike UAVs), a fire group (on-duty fire asset) is assigned daily to the squad's position.

During a defensive battle, the combat formation is constructed in accordance with the PSP diagram, based on the daily fire calculation conducted by 20:00, which must include the assignment of calculations for primary fire assets.

For each PSP and every fire asset, a sector and strip of fire are designated (considering their fire capabilities), along with the direction and areas of concentrated fire, the procedure for fire engagement and destruction of the enemy, all in coordination with a system of combined engineering and mine-explosive barriers.

In the areas of detailed reconnaissance along the directions of the main effort, aerial reconnaissance posts are set up to conduct tactical and analytical reconnaissance and monitor changes in the enemy's condition and disposition. A UAV crew is mandatorily assigned to each post. Service locations are equipped with additional radio-technical reconnaissance equipment. Additionally, areas of special attention may be designated.

The primary task of the electronic (radar) reconnaissance post is to detect enemy aerial targets using more specific and therefore more effective radar observation (detection) systems, to guide UAV interceptor crews and mobile fire groups toward enemy aerial targets, and to support and monitor their operations.

Mobile fire groups from the border outpost perform tasks within the air defense system. They may operate independently but are usually employed under the concept of a senior commander, in coordination with other forces and means. Their primary role is the direct detection and fire engagement of aerial threats—typically strike and reconnaissance UAVs, guided munitions, and other aerial reconnaissance means. They may operate from designated positions or areas, conducting visual, acoustic, and technical surveillance of the air situation, or by patrolling a defined route. Tasks are performed in coordination with aerial and radio-technical reconnaissance posts.

The reconnaissance-fire complex (hereinafter – RFC) is an integrated system that combines artillery means (mortars, tube artillery, multiple launch rocket systems) with reconnaissance, targeting, and command and control assets that ensure their effective fire employment. UAV crews primarily serve as the reconnaissance and targeting element. The RFC is positioned in engineering-prepared locations, with special attention given to camouflage and frequent relocation to alternate or backup positions. The RFC is employed for reconnaissance and engagement of designated targets as they are detected. Its primary targets include enemy artillery and mortar units in firing positions, transport vehicles, personnel concentrations, and electronic warfare assets of command and control systems. Particular attention is paid to detecting and subsequently striking UAV control points. The RFC is generally employed by decision of the head of the border guard detachment.

Checkpoints are established along key communication routes in the rear area of the border outpost sector, where personnel of the National Police of Ukraine carry out duties. The task of the border outpost military personnel is to provide fire support to these positions.

Conclusions and prospects for further research. Thus, this article has examined the specifics of employing the forces and means of a border outpost, as the main subunit of the border guard detachment, during combat operations against russian occupation forces. The exposition focused primarily on the construction of the combat formation of the border outpost. Consideration was given to the particular operational and physical-geographical conditions under which the unit performs its assigned tasks. The article addressed the organization of operational-service activity and the sequence of command functions within the unit's leadership. In the course of the exposition, combat experience from border guard subunits was generalized with the aim of applying it in future research.

Future research may focus on improving the methodology of command and control at the border outpost level in the preparation and conduct of combat operations, as well as in decision-making processes.

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Received: 15.03.2025
Revised: 25.03.2025
Accepted: 05.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 355.24:614.88 DOI 10.59226/2786-6920.1.2025.55-60

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METHODOLOGY FOR ASSESSING THE EFFECTIVENESS OF MEDICAL AND PSYCHOLOGICAL REHABILITATION OF SERVICEMEN OF THE ARMED FORCES OF UKRAINE

The article is dedicated to the development of a methodology for evaluating the effectiveness of medical and psychological rehabilitation of servicemen of the Armed Forces of Ukraine under the conditions of modern combat operations. A comprehensive approach is proposed, which takes into account temporal, resource, and economic factors, as well as psychological aspects. The methodology is based on vector algebra and the Laplace transform for calculating an integral indicator of effectiveness. A numerical example is provided to confirm the viability of the approach. The results may be used to optimize rehabilitation processes and to implement them within the medical support system of the Armed Forces of Ukraine.

Keywords: *medical and psychological rehabilitation; effectiveness; servicemen; vector algebra; Laplace transform; methodology.*

Statement of the problem. The experience of countering the armed aggression of the russian federation convincingly demonstrates that the issue of medical support for the servicemen of the Armed Forces (AF) of Ukraine has become one of the most pressing. However, the discussion must extend beyond timely medical assistance for wounded and injured servicemen to include the restoration of their physical and psychological health following injuries, concussions, and psychological trauma. An effective system of medical and psychological rehabilitation – including preventive measures – for servicemen is a critically important factor in maintaining the combat capability of the AF of Ukraine and ensuring their readiness to perform combat missions. However, the existing methodologies for assessing the effectiveness of medical and psychological rehabilitation systems are limited in that they insufficiently account for the comprehensive nature of rehabilitation, particularly under conditions of martial law.

The modern combat operations associated with repelling the armed aggression of the russian federation have resulted in significant losses among the servicemen of the AF of Ukraine. This makes the issue of effective medical and psychological rehabilitation extremely urgent. Restoring combat capability after injuries, concussions, psychological trauma, and other impairments is a critically important aspect of medical support. Nonetheless, the current methodologies for assessing the effectiveness of rehabilitation efforts have limited applicability in the conditions of martial law, as they do not incorporate a comprehensive approach that considers temporal, resource-based, economic factors, and the specific nature of psychological rehabilitation. This creates the necessity for the development of new methodological approaches that ensure an objective evaluation of the effectiveness of medical and psychological rehabilitation of servicemen in combat conditions.

Analysis of recent research and publications. The issue of medical and psychological rehabilitation of servicemen in the context of modern combat operations is a subject of active scientific discussion both in Ukraine and abroad. Recent studies show significant interest in the problem of restoring the physical and mental health of servicemen who have sustained injuries, concussions, or psychological trauma while performing combat missions. However, most of the existing approaches to assessing the effectiveness of rehabilitation measures are limited by their insufficient consideration of the complex nature of medical and psychological rehabilitation—particularly under conditions of martial law.

In the works of foreign authors, the primary focus is on the use of economic indicators to assess the effectiveness of medical support [1–3]. For instance, in the study by J. Smith et al. [1], a cost-benefit analysis method is proposed, which allows the effectiveness of medical measures to be determined from the perspective of financial expenditure. However, this approach does not take into account temporal, resource-related, and psychological aspects of rehabilitation, which limits its applicability in the military context.

In studies by P. Green, R. Taylor, and others [4; 5], the issue of evaluating the effectiveness of medical rehabilitation is examined in the context of meeting patients' needs. The researchers propose using subjective indicators, such as the level of patient satisfaction with the quality of services provided. Despite the importance of considering the subjective factor, such methodologies have limited applicability in assessing the effectiveness of rehabilitation in combat conditions, as they do not account for objective parameters, including the duration, labor intensity, and cost of the process.

In the context of psychological rehabilitation of servicemen, significant contributions have been made in the research of V. Ivanov, S. Petrov, and K. Anderson [6–8]. In particular, V. Ivanov's work proposes a method for evaluating the effectiveness of psychological rehabilitation based on sociological surveys [6]. The researchers use survey data to calculate coefficients of medical and social effectiveness. However, this approach has a significant drawback: survey results are not always objective, and the sample may not be sufficiently representative to form generalized conclusions.

In domestic research on this issue, the focus is placed on developing methods for assessing the effectiveness of medical support in the military sphere [9–11]. For example, an approach has been proposed for evaluating the effectiveness of medical logistics, which can be adapted for the analysis of rehabilitation processes [9]. However, this approach is limited, as it considers only one effectiveness criterion, while other factors are treated merely as constraints.

Thus, the analysis of recent studies indicates that existing methods for evaluating the effectiveness of

medical and psychological rehabilitation have certain limitations associated with insufficient consideration of the comprehensive nature of the rehabilitation process, especially under combat conditions. This necessitates the development of new approaches that allow for an objective assessment of the effectiveness of medical and psychological rehabilitation, taking into account all key factors, including the psychological condition of servicemen.

The purpose of the article is to develop a methodology for evaluating the effectiveness of medical and psychological rehabilitation of servicemen of the Armed Forces of Ukraine.

Presentation of the main material. Medical and psychological rehabilitation, like most managed technological processes, can be characterized by certain indicators, including:

- the degree of completion of specialized medical and psychological rehabilitation measures (Рмр);
- the duration of the medical and psychological rehabilitation process (tмр);
- the labor intensity of the medical and psychological rehabilitation process (Трмр);
- the cost (primarily financial) of medical and psychological rehabilitation (Смр).

That is, the effectiveness of medical and psychological rehabilitation is a function of the listed indicators:

Емр = F (Рмр, tмр, Трмр, Смр).

In this case, it is assumed that the required effectiveness of medical and psychological rehabilitation is achieved when the degree of completion of specialized rehabilitation measures Рмр reaches its maximum value, while the time, labor intensity, and cost are minimized.

Of the four indicators listed, only the determination of the first presents certain difficulties. The calculation of the second, third, and fourth is relatively straightforward, for which simple and appropriate methods are used. A significantly more complex task is determining the overall effectiveness of medical and psychological rehabilitation—specifically, obtaining its integral evaluation, considering all the listed indicators.

The task is further complicated by the following conditions:

1) The aforementioned indicators have different units of measurement, thus they must be converted into relative units;

2) The first of these indicators (the vector-indicator of the degree of completion of specialized medical rehabilitation measures, *Рмр*) is a stimulator**,** meaning its increase has a positive effect on effectiveness, while the remaining indicators are destimulators**,** whose increase reduces the integral effectiveness of medical and psychological rehabilitation.

The solution to this problem can be found through the application of the mathematical apparatus of vector algebra**.** For this purpose, it is appropriate to represent the process of evaluating medical and psychological rehabilitation as a vector originating from a certain point ***O*** — the starting point of the influence on the current state of medical rehabilitation. The task is thus to determine the magnitude of this vector.

We have 4 vectors:

– $\overrightarrow{OA}$ – the degree of completion of specialized medical and psychological rehabilitation measures $P_{мр}$ ($\overrightarrow{OA}=\vec{a}$);

– $\overrightarrow{OB}$ – the duration of the medical and psychological rehabilitation process $t_{мр}$ ($\overrightarrow{OB}=\vec{b}$);

– $\overrightarrow{OC}$ – the labor intensity of the medical and psychological rehabilitation process $Tp_{мр}$ ($\overrightarrow{OC}=\vec{c}$);

– $\overrightarrow{OD}$ – the cost (primarily financial) of the medical and psychological rehabilitation $C_{мр}$ ($\overrightarrow{OD}=\vec{d}$).

Thus, the problem is reduced to calculating the resultant vector $E_{мр}$ (see Figure. 1).

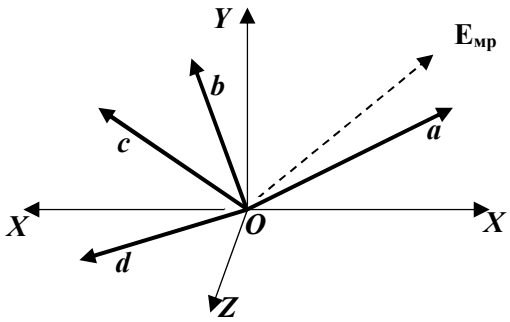

Figure 1. Indicator vectors of medical and psychological rehabilitation (example) Source: developed by the authors

In the general case, the angles between the vectors $\vec{a}$, $\vec{b}$

, $\vec{c}$, $\vec{d}$ may range from 0° to 180°. Moreover, based on the nature of the vectors $\vec{b}$, $\vec{c}$, $\vec{d}$, these vectors should be considered with a sign "–", i.e., the angle between vector $\vec{a}$ and vectors $\vec{b}$, $\vec{c}$, $\vec{d}$ is greater than 90°; the angles between vector $\vec{b}$ and vector $\vec{c}$, between $\vec{b}$ and $\vec{d}$, and between $\vec{c}$ and $\vec{d}$ are less than 90°, but it is not a necessary condition that the vectors $\vec{b}$, $\vec{c}$, $\vec{d}$ are collinear—this means the angles between these vectors equal 0° (collinearity in this case is a particular case).

Given the above initial conditions, the first step in determining the magnitude of the resultant vector is the calculation of the vectors $\vec{b}$, $\vec{c}$, $\vec{d}$. According to the vector addition law, the associative property holds: $(\vec{b}+\vec{c})+\vec{d} = \vec{b}+(\vec{c}+\vec{d})$. In this way, the sum of vectors $\vec{b}+\vec{c}$ is first obtained, and then vector $\vec{d}$ is added to the result $\vec{b}+\vec{c}$.

To determine the angle between vectors $\vec{b}$ and $\vec{c}$, between $\vec{c}$ and $\vec{d}$ the scalar (dot) product rule for non-zero vectors can be used [9]. According to this rule, $\vec{b}\cdot\vec{c} = |\vec{b}|\cdot|\vec{c}|\cos(\vec{b},\vec{c})$, that is, $\cos(\vec{b},\vec{c}) = \vec{b}\cdot\vec{c} / |\vec{b}|\cdot|\vec{c}|$. Note that for collinear vectors, $\cos(\vec{b},\vec{c})=1$.

The sum of vector $\vec{a}$ with the sum of vectors $\vec{b}$, $\vec{c}$, $\vec{d}$ is determined analogously. When performing the calculation, it should be taken into account that the sum $(\vec{b}+\vec{c}+\vec{d})$ has a sign "–", i.e., the expression is: $\vec{a}+[-(\vec{b}+\vec{c}+\vec{d})]$. Thus, the final vector of the effectiveness of medical and psychological rehabilitation $E_{мр}$, is obtained by taking into account all criteria (indicators), their mutual angles, and signs.

To determine the increment (change) in the efficiency of medical and psychological rehabilitation—as a scalar rather than a vector quantity—it is advisable to apply the inverse Laplace transform.

$$f(t)=\frac{1}{2\pi i}\lim_{\omega\to\infty}\int e^{st}F(s)ds \quad , \qquad (1)$$

where $F(s)=\begin{bmatrix} F_1(s) \\ F_2(s) \\ \dots \\ F_n(s) \end{bmatrix}$,

s – Laplace transform variable;

$F_i(s)$ – transformed function corresponding to the i-th component of the vector.

To solve expression (1), the resulting vector of the effectiveness of medical and psychological rehabilitation should be represented as a vector function of partial derivatives in the Laplace domain:

$$F(s)=\partial s^n/\partial t+\partial s^{n-1}/\partial t+\partial s^{n-2}/\partial t+a. \qquad (2)$$

In order to simplify the solution of expression (1), it is advisable to decompose expression (2) and perform the inverse Laplace transform in parts, independently for each component $F_i(s)$:

$F_i(s)=\partial s^n/\partial t$; $F_i(s)=\partial s^{n-1}/\partial t$; $F_i(s)=\partial s^{n-2}/\partial t+a$,

where n is the exponent.

To determine the inverse Laplace transform, it is advisable to use the following formula:

$$L^{-1}\{s^n\} = \delta(m)(t), \qquad (3)$$

where $\delta^{(m)}(t)$ – m-th derivative of the Dirac delta function.

An example of calculating the integral vector indicator of the effectiveness of medical and psychological rehabilitation: $\overline{E_{мр}}$.

Initial Data

Let us assume that the numerical values of the increment for each component of the integral indicator of the effectiveness of medical rehabilitation are as follows:

1. $\vec{a}$ = 0.2 (increase in the degree of implementation of specialized measures from point ***O***, units);

2. $\vec{b}$ = 0.5 (increase in the duration of implementation of specialized measures from point ***O***, units);

3. $\vec{c}$ = 0.7 (increase in the labor intensity of implementation of specialized measures from point ***O***, units);

4. $\vec{d}$ = 0.3 (increase in the cost of implementation of specialized measures from point ***O***, units).

The angles between the vectors are as follows:

$\Theta_{ab} = 30°$; $\Theta_{ac} = 45°$; $\Theta_{ad} = 60°$; $\Theta_{bc} = 15°$; $\Theta_{bd} = 75°$; $\Theta_{cd} = 25°$.

Using the formula for calculating the resultant vector $\overline{E_{мр}}$, we obtain the following expressions:

$$\vec{f} = b + c + d + b \cdot c \cos(bc) + b \cdot d \cos(bd) + cd \cdot \cos(cd),$$

$$\overline{E_{мр}} = a + f + a \cdot f \cos(af),$$

where $\vec{f}$ is a conditional total vector introduced to simplify the calculations;

cos(bc), cos(bd), cos(cd), cos(af) – are the cosines of the angles between the corresponding vectors.

It is assumed that the angle between vectors $\vec{a}$ and $\vec{f}$ is 135°.

$$\vec{f} = b + c + d + b \cdot c \cos(bc) + b \cdot d \cos(bd) + cd \cdot \cos(cd) =$$
$$= 0{,}5+0{,}7+0{,}3+0{,}5 \cdot 0{,}7 \cdot \cos 15° + 0{,}5 \cdot 0{,}3 \cdot \cos 75° +$$
$$+ 0{,}7 \cdot 0{,}3 \cos 25° = 2{,}05.$$

$$\overline{E_{мр}} = a + f + a \cdot f \cos(af) = 0{,}2 + (-2{,}05) + 0{,}2 \cdot (-2{,}05)$$
$$\cos 135° = |-1{,}645|.$$

The calculations conducted demonstrate that an increase of 20 percent in any of the vector indicators *b*, *c*, or *d* leads to a corresponding decrease in $\overline{E_{мр}}$ of approximately the same magnitude, as the processes are nearly linear in nature.

Therefore, it can be concluded that the proposed methodological approach is both operationally valid and consistent with the actual processes, and it does not contradict common sense in the evaluation of the effectiveness of complex, multidirectional processes.

Conclusions and prospects for further research. The article proposes a methodological approach to evaluating the effectiveness of medical rehabilitation within the Armed Forces of Ukraine. This approach is based on the application of vector algebra methods. It enables the formulation of a set of indicators for the formalized description of medical rehabilitation and the determination of an integral value of the selected indicators. The feasibility of using mathematical methods for the integral assessment of the effectiveness of medical rehabilitation under combat conditions is also substantiated. A numerical calculation has been performed, confirming the adequacy and functionality of the proposed approach. The prospects for further research include determining the possibility of applying the proposed methodological approach to the formulation of evaluation criteria for the effectiveness of various hierarchical levels within the medical support system. In addition, in future studies, the proposed approach may be employed to optimize the composition of forces and assets designated for fulfilling medical support tasks.

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Received: 02.02.2025
Revised: 12.02.2025
Accepted: 22.02.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 355 DOI 10.59226/2786-6920.1.2025.61-71

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INTEGRATION OF MODERN TECHNOLOGIES INTO THE COMBAT OPERATIONS PLANNING PROCESS

The article presents an analysis of the prospects for integrating modern technologies into the process of combat operations planning and their impact on the effectiveness of military command and control. The concept of key innovations is examined, including automated command and control systems (ACCS), artificial intelligence (AI), big data, unmanned aerial vehicles (UAVs), satellite systems, and electronic warfare (EW) tools. The role of these technologies in enhancing situational awareness, decision-making responsiveness, and coordination of unit actions in real time is defined. Particular attention is given to issues of cybersecurity, the protection of information systems, and the prospects for employing cloud technologies in military management. Potential threats and challenges associated with the digitalization of combat operations management processes are analyzed.

In the course of research and analysis, members of the scientific research group employed the following methods (at the theoretical level): analysis of scientific literature and documentation, systems analysis, comparative analysis, conceptual analysis, inductive and deductive methods, and methodological analysis. In addition, the study drew upon the experience of combat operations, as well as personal experience in the training of future officer personnel for the needs of the National Guard of Ukraine (other institutions within Ukraine's security and defense sector).

Based on the results of the study, it is concluded that the integration of modern technologies into military planning is a key factor in enhancing the combat readiness of the armed forces and the effectiveness of combat operations. Promising directions for further research are identified, including the development of artificial intelligence, the improvement of data protection, and the refinement of algorithms for combat situation analysis.

Keywords: *automated systems; analytics; combat operations; military command and control; service members; operational art; modeling; decision-making; simulators; technologies.*

Statement of the problem. The relevance of the study is driven by the dynamic development of the military-strategic environment, the necessity to improve the timeliness and efficiency of decision-making, and the growing role of technology in ensuring battlefield superiority. The conduct of modern combat operations requires the use of advanced digital solutions, artificial intelligence, large volumes of data, automated command and control systems, and situational analysis tools. The integration of these technologies allows for the optimization of planning processes, improvement of forecasting accuracy, risk minimization, and enhanced coordination among units.

It is important to emphasize that the process of combat planning based on the military decision-making model used by NATO countries is a complex yet highly effective mechanism. It provides commanders with essential tools to make rational and well-grounded decisions while performing assigned tasks under extreme conditions of operational activity. Given the current challenges in the field of security and defense, research in this area contributes to enhancing the efficiency of military command and control, adapting the Security and Defense Forces of Ukraine to the latest conditions of warfare, and strengthening national defense capabilities.

The research was conducted within the framework of the initiative scientific project *"Technologies for Combat Operations",* involving the Department of Tactics of the Faculty of Operational and Combat Activities of the National Guard of Ukraine and the Department of Physical Education, Special Physical Training, and Sports of the Kyiv Institute of the National Guard of Ukraine.

Analysis of recent scientific research and publications. At the initial stage, a comprehensive analysis of scientific publications by leading researchers was conducted: S. Chupakhin [1], Yu. Repila, O. Holovchenko [2], O. Khatsaiuk, M. Medvid, B. Maksymchuk, O. Kurok, R. Kizian, O. Khatsaiuk, O. Biriukov [4], who addressed the pressing issues of preparing representatives of Ukraine's security and defense institutions for the execution of their duties. The scientific concepts presented by these scholars highlight the importance of defining contemporary vectors in the professional training of representatives of the security and defense sector, which contributes to enhancing the effectiveness of task execution and strengthening national security.

Further review of specialized scientific-methodological and reference literature emphasized the significance of the works of O. Nazarenko, H. Drobakha [5], A. Lunkov, V. Kovch, S. Pokhnatiuk [6], S. Melnyk [7], V. Varakuta, O. Kumpan, M. Tkachenko, and S. Podviaznikov [8]. These studies provide examples of increased efficiency in military command and control within the operational activities of servicemen in Ukraine's security and defense sector. It is essential to underline that enhancing the effectiveness of military command and control during the operational activities of security and defense personnel is a critical factor in ensuring rapid decision-making, coordinated action, and successful task execution. This, in turn, contributes to strengthening the nation's defense capabilities, raising the level of professional training of personnel, and optimizing resource use under modern security challenges.

Equally informative and conducted at a high scientific-methodological level are the studies of O. Morgunov, O. Yareshchenko, O. Khatsaiuk [9], V. Voloshyn [10], O. Markov, Yu. Samsonov, S. Borodin, V. Shemchuk, I. Atamanenko [11], I. Romanov, V. Kochkin, and O. Demchenko [12]. These works identify relevant methodologies (technologies) that ensure the readiness of security and defense sector personnel of Ukraine to employ modern technologies in the execution of assigned tasks under extreme conditions. It is worth emphasizing that such technologies play a vital role in shaping the readiness of security and defense personnel for effective military-professional activity in high-risk environments. They facilitate the enhancement of professional training, adaptation to the dynamic changes in the security domain, effective use of high-tech equipment, and coordinated action in

critical situations. This, in turn, supports national defense strengthening and the safeguarding of national security.

Summarizing the results of the analysis of scientific, methodological, and reference literature, it should be noted that studies comprehensively revealing the features of integrating modern technologies into the process of combat operations planning are relatively rare. This highlights the necessity for further research, affirms the timeliness and relevance of the topic, and underscores the practical significance of the selected direction of theoretical investigation.

Purpose of the article is to conduct a comprehensive analysis of modern technologies used for the planning and real-time adjustment of combat operations, with the aim of determining their impact on enhancing the effectiveness of military command and control.

To achieve this goal, the following research objectives were set:

- to analyze scientific, methodological, and specialized literature on the training of personnel from Ukraine's security and defense institutions for the fulfillment of operational tasks;
- to monitor scientific-methodological and reference sources focused on improving the effectiveness of military command and control in the course of operational and combat activities;
- to identify relevant methods (technologies) that ensure the preparedness of military personnel from Ukraine's security and defense institutions to apply modern technologies while carrying out tasks under extreme conditions.

In the course of research and analytical work, the members of the research group employed the following methods:

1) analysis of scientific literature and documentation a systematic review of publications, reports, normative acts, and methodological materials concerning the application of modern technologies in the planning and operational (adjustment of combat operations).

2) systems analysis (examination of the problem as an integrated system, analysis of interconnections between components of military command and the impact of technologies on their effectiveness).

3) comparative analysis (identification of common and divergent characteristics of modern technologies used in planning and operational correction, in order to determine optimal solutions).

4) conceptual analysis (development of conceptual models illustrating the mechanisms through which technologies enhance the effectiveness of military command and control).

5) inductive and deductive methods (drawing general conclusions from the analysis of specific cases (induction), and verifying formulated hypotheses in the logical sequence of the research (deduction)).

6) methodological analysis (evaluation of methodologies used in modern technologies for planning and operational adjustment of combat operations, aimed at identifying their strengths and weaknesses).

In addition, the study incorporated both combat experience and the personal experience of preparing future officer personnel for the needs of the National Guard of Ukraine (other institutions of the security and defense sector of Ukraine).

Presentation of the main material. During the subsequent stage of the research and analytical activities, based on the analysis of scholarly works by S. Poliakov, A. Kurtov, V. Polikashin [13], V. Vlasiuk, S. Karpenko, V. Hridin [14], M. Adamchuk, A. Semeniuk, and S. Pavlenko [15], it was determined that the development of an effective system of military command and control is a critical task under modern conditions. New-generation warfare is characterized by the use of high-tech weaponry, information technologies, accelerated decision-making processes, and the need for coordination between various military branches and allied forces.

The significance of military command and control systems in the current context lies in: the speed and responsiveness of decision-making, coordination and interoperability, integration of technologies and digital platforms, cybersecurity and information warfare, flexibility and adaptability, logistics and comprehensive support for the troops.

The development of a modern military command and control system is key to increasing the army's combat effectiveness, reducing losses, and achieving strategic objectives. Ukraine, currently engaged in war against the russian federation, has already begun to implement such systems, enabling it to successfully counter the enemy and effectively manage military operations.

The analysis of scientific studies by scholars such as I. Pavlovskyi [16], O. Vorobiov, P. Smolych, and I. Vlasov [17] has led to the conclusion that combat operations constitute complex military actions aimed at achieving strategic, operational, or tactical objectives

within a war or armed conflict. These operations encompass the use of various branches of the armed forces and means of combat, coordination of actions, and the implementation of modern technologies. The main characteristics of combat operations are as follows:

1) goal orientation (each combat operation pursues a clearly defined objective, such as the seizure of territory, destruction of enemy forces, or halting an offensive).

2) complexity and coordination (operations involve the engagement of various branches of the armed forces (land, air, naval, cyber units, artillery, missile forces, etc.), with the synchronization of actions between units being critical to maximizing operational effectiveness).

3) phased execution (planning: situational analysis, task formulation, resource allocation; preparation**:** reconnaissance, supply organization, reserve formation; execution**:** direct engagement in combat actions; post-operation analysis**:** assessment of success and adjustment of future plans).

4) flexibility and adaptability (modern combat operations require rapid responses to dynamic battlefield conditions, including the adaptation of tactics, logistics, and command structures).

5) technological dimension (the use of unmanned aerial vehicles (UAVs), electronic warfare systems (EWS), satellite-based intelligence, and cyber capabilities plays a significant role).

6) information and psychological component (in addition to physically neutralizing the enemy, information warfare, enemy demoralization, and the maintenance of morale among one's own troops are crucial).

Types of combat operations include offensive, defensive, counteroffensive, guerrilla, and special operations, as well as cyber operations aimed at disrupting enemy command, communication, and logistics networks.

Therefore, modern combat operations are complex, multi-level processes requiring thorough planning, technological integration, and high-level coordination. Their success depends on the professionalism of command structures, the mobility of troops, the quality of intelligence, and the efficient use of available resources.

Of particular interest are the scientific works of researchers such as Yu. Samsonov, O. Markov, O. Zabulia, and O. Khatsaiuk (et al.) [18]; Yu. Samsonov, Yu. Belashov, O. Khatsaiuk, K. Zadorozhnyi, V. Tolokhieiev (et al.) [19]; and O. Markov, Yu. Samsonov, S. Borodin, V. Shemchuk, I. Atamanenko [11]. These studies explore the specifics of deploying modern military command technologies within Ukraine's Defense and Security Forces. Modern military command technologies allow armed forces to respond rapidly to changing conditions, effectively coordinate actions, and maintain operational superiority over the adversary. The wars of the future will be defined by the level of technological preparedness of the forces involved.

In our view, effective solutions to the outlined challenges include the active implementation of: automated command and control systems (ACCS), geographic information systems (GIS), artificial intelligence (AI), simulators and modeling systems, surveillance and reconnaissance systems, analytical tools and big data, secure communication systems, virtual and augmented reality (VR/AR), cybersecurity solutions and electronic warfare assets, robotic platforms.

Various countries are actively deploying automated command systems, including: Joint Operational Command System (JOCS) – United Kingdom, TALOS – Israel, Advanced Field Artillery Tactical Data System (AFATDS) – USA, FBCB2 (Force XXI Battle Command Brigade and Below) – USA, Command Post Computing Environment (CPCE) – USA, SitaWare Headquarters – Denmark, Blue Force Tracker – USA, NATO Mission Planning Systems. Russian forces use the BARS system. Ukraine's Security and Defense Forces are actively utilizing systems such as Delta and Kropyva (with ongoing testing of Slavutych, Bazalt, and various UAV systems).

It is important to emphasize that automated command and control systems (ACCS) share common objectives, namely:

1) enhancing the effectiveness of unit command and control under combat conditions;

2) collecting, processing, and analyzing data from diverse sources (intelligence, unmanned aerial vehicles, satellites, geographic information systems, logistics data) in order to generate a comprehensive operational picture of the battlefield;

3) rapid acquisition and processing of information, enabling commanders at all levels to make informed decisions in real time;

4) ensuring interoperability across different levels (tactical, operational, strategic) among various units comprising Ukraine's Defense and Security Forces;

5) providing situational awareness and accurate threat analysis, which helps prevent errors that could lead to casualties among military personnel and the civilian population;

6) utilizing intuitive interfaces and automating routine tasks, thereby reducing the workload on commanders and their staff.

Of particular interest is the fact that geographic information systems (GIS) play a critical role in the military decision-making process. They facilitate the efficient collection, analysis, visualization, and integration of geospatial data, thus contributing to the optimization of military planning, resource management, and tactical operations. This is achieved through the use of advanced mapping technologies and terrain analysis (see Table 1).

In an environment characterized by the active use of artificial intelligence technologies, the military decision-making process advances to an entirely new level. This is a tool that significantly increases the speed, accuracy, and effectiveness of decision-making while simultaneously reducing risks and losses. Artificial Intelligence (AI) provides substantial advantages (see Table 2) in the military decision-making process due to its capacity to analyze large volumes of data, automate processes, and forecast probable scenarios.

During the collection and processing of intelligence data, it is advisable to employ the ISTAR system (Intelligence, Surveillance, Target Acquisition, and Reconnaissance). This system can significantly enhance the effectiveness of military and security operations (see Table 3) by providing advanced capabilities for information collection, analysis, and utilization.

Table 1

Geographic information systems used in NATO member states

Name of the system	General characteristic
ArcGIS (Esri)	Widely used by NATO military forces for the analysis of the combat situation, operational planning, and logistics, it enables 3D terrain visualization, route analysis, and the integration of data from drones, satellites, and radar systems.
SAGA GIS	Analyzes geospatial data for terrain modeling and assessment of natural obstacles, enables detailed terrain analysis, and allows for the construction of a hydrographic model (e.g., calculation of flood probability in specific areas).
QGIS	Used for mapping, analysis of the combat situation, and operational planning; enables integration with data from open sources (e.g., satellite imagery).
ATLAS	Actively used by the Israel Defense Forces, provides the capability for high-precision terrain analysis.
DELTA	Actively used by the units of the Defense Forces of Ukraine, provides the capability to integrate geospatial data from intelligence sources (drones, satellites, radars).

Table 2

Main advantages of artificial intelligence

Components	General characteristic
Analysis speed	AI can instantly process large volumes of data from various sources (satellites, drones, radars); AI algorithms analyze the combat situation in real time, providing commanders with up-to-date information.
Accuracy	AI eliminates the risk of errors related to human factors (fatigue, stress); by analyzing historical data and current events, AI can predict probable outcomes of combat decisions.
Data integration	AI integrates data from diverse sources (intelligence, meteorology, logistics), forming a unified operational picture.
Management of complex systems	Algorithms are used to coordinate between different types of military equipment (drones, air defense systems, tanks).
Situational awareness	AI is capable of detecting threats (e.g., identification of enemy equipment) through the use of computer vision.
Real-time monitoring	Continuous analysis of changing conditions enables better situational awareness in a dynamic environment.
Decision support	AI can propose optimal courses of action based on the analysis of various scenarios.
Scenario modeling	The generation of possible scenarios enables the assessment of the consequences of different strategies.
Resource efficiency	AI assists in the efficient allocation of resources (ammunition, equipment, supplies) within the combat zone.
Adaptability	Thanks to machine learning algorithms, AI enhances its functions by analyzing previous combat operations. It demonstrates flexibility under diverse conditions and can rapidly adapt to changes in the combat environment.
Working in risky conditions	AI allows for the control of equipment without risking the lives of military personnel (for example, drones or robotic platforms).
Loss minimization	The use of autonomous systems reduces the risk to personnel in extreme conditions of service and combat operations.

Table 3

Advantages of the ISTAR system

Components	General characteristic
Increased situational awareness	ISTAR enables operators and commanders to access real-time information about the enemy, objects, or the situation, allowing for rapid and well-founded decision-making
Improving the accuracy and effectiveness of the attack	By collecting data on potential targets, ISTAR assists in locating and identifying targets more accurately, ensuring more effective use of weapons and resources
Minimizing risks for operators	Through remote or autonomous surveillance systems, ISTAR facilitates reconnaissance and provides information on potential threats without exposing operators to danger
Increased coordination and cooperation	The integration of various information sources into the ISTAR system promotes enhanced coordination and cooperation among institutions within Ukraine's security and defense sector (Security and Defense Forces of Ukraine)

Overall, ISTAR can play a dominant role in enhancing the efficiency of operations by providing access to critical information, reducing risks, and improving decision-making processes. Furthermore, ISTAR assists operators and commanders in obtaining real-time access to essential information regarding:

1) surveillance systems (ISTAR encompasses a variety of sensors, such as radars, cameras, thermal imagers, etc., which provide continuous monitoring of the operational environment);

2) data collection and analysis (ISTAR is capable of gathering and processing substantial volumes of data from various sources, including images, video, radio signals, and other types of information);

3) real-time information delivery (thanks to advanced communication technologies, information collected by the ISTAR system can be instantly transmitted to operators and commanders, enabling rapid responses to situational changes);

4) data visualization and representation (the information obtained through ISTAR can be visualized in the form of maps, charts, images, or other formats, facilitating a clearer understanding of the situation by operators).

In general, by increasing situational awareness through ISTAR capabilities, operators, commanders, and their staffs are able to make timely and informed decisions based on current and reliable intelligence about the enemy, key objects, or the operational environment. Additionally, ISTAR tools enable reconnaissance and the collection of intelligence on potential targets, including their location, structure, and characteristics. Due to a variety of sensors and analytical instruments, ISTAR systems can detect and identify targets even under complex conditions, thereby increasing the accuracy of enemy engagement. The intelligence provided by the ISTAR system facilitates precise targeting, ensuring accurate and effective strikes.

Thus, by collecting data on potential targets and accurately determining their location through the ISTAR system, units can plan the use of weapons and means more efficiently and accurately to achieve set objectives. Another significant advantage of ISTAR systems is the minimization of risks to personnel. ISTAR enables reconnaissance and the delivery of intelligence on potential threats without exposing personnel to direct danger. The following section explores how ISTAR helps reduce risks to service members.

It is also noteworthy that ISTAR systems may include remote or autonomous surveillance platforms, such as unmanned aerial vehicles (UAVs) or drones, which allow reconnaissance to be conducted at a safe distance from potentially hazardous objects. Through these remote surveillance systems, military personnel can obtain essential information about the environment and potential threats while remaining outside the danger zone. The use of remote or autonomous systems significantly reduces personnel exposure to risk and hazards during reconnaissance and threat detection. Information received from the ISTAR system can alert personnel to potentially dangerous situations, enabling them to avoid risks and make well-informed decisions.

Hence, through the use of remote and autonomous surveillance systems within the ISTAR framework, reconnaissance units are able to conduct reconnaissance and obtain intelligence on potential threats without endangering themselves. In turn, the integration of diverse data sources (see Table 4) into the ISTAR system contributes to enhanced coordination among units involved in the execution of operations.

Table 4

Main functions of the ISTAR system

Sources of information and nature of actions	General characteristic
Combining information:	ISTAR is capable of integrating information from various sources such as reconnaissance drones, radar systems, satellite assets, and others, enabling the creation of a comprehensive situational picture.
Sharing of information:	All military units operating in the area of combat operations with access to the ISTAR system can receive up-to-date information and jointly analyze it for coordinated decision-making.
Coordination of actions:	Thanks to shared information access, units can better coordinate their actions and collaborate to achieve assigned objectives.
Rapid response:	The joint analysis of information within the ISTAR system allows operators to quickly respond to changes in the situation and make effective decisions.

Thus, the integration of various information sources into the ISTAR system contributes to enhanced coordination and cooperation among all military units, helping to ensure more efficient and coordinated operations in different situations.

As an example, the process of military decision-making using the planning model applied by NATO member states (with the use of modern technologies) may appear as follows:

first stage (upon receiving the task, the input data are the task received from the higher-level military command authority, or a task defined by the command or staff in the form of an operations order, preliminary combat order, or operation execution plan; the output is that the commander must conduct a preliminary time estimate and issue preliminary orders. Communication between the higher military command and subordinate personnel is maintained through secure radio communication channels. To ensure stable and secure communication, units actively implement modern secure communication means, such as Motorola digital radios of the DM4600/DM4601 and DP4400/4800/4401/4801 series, which provide encryption and a high level of information protection. In addition, satellite communication systems such as Tooway are used, enabling the establishment of effective, secure, and interactive high-quality Ethernet communication lines with remote locations. Military telecommunications networks: the Armed Forces of Ukraine have deployed open telephone networks, which allow calls to mobile operator numbers. This provides anonymity, as in the event of call interception, the enemy cannot identify who is calling or from where. Recommendations regarding the use of mobile phones: Service members are advised to minimize the use of mobile phones in combat zones, as even encrypted digital communication may reveal location. It is recommended to use secure messengers, such as Signal, and avoid calls and SMS; it is advisable to use the information and communication system of the official information exchange network – MOSI);

second stage (during task (mission) analysis, unit commanders, having input information on preliminary instructions from the commander, orders (plans) from the higher-level command, intelligence data from the higher military command, refined staff calculations, must develop the output data, based on which the military planning process will be conducted. Modern technologies significantly simplify the process, saving considerable time. The time estimate is refined, updated staff calculations are taken into account, a preliminary reconnaissance plan (schemes, overlays) is developed, the commander's requirements for critical information delivery are clarified, assumptions are made, problem areas are identified along with solutions, criteria for evaluating courses of action are established based on the main objective, the main task is formulated, the commander's preliminary intent is developed, and a task analysis briefing (tactical meeting) is held with key planning guidance from the commander. For the time

estimate, the commander must remember how much time can be allocated to each stage of the military decision-making process from receiving the task to execution (in NATO member states' units, this estimate is conducted according to the rule – one-third for own planning and two-thirds for subordinate planning; this estimate provides percentage-based time allocations for each stage: receiving the task (mission) – 5%; task (mission) analysis – 30%; development of courses of action – 20%; analysis, comparison, decision-making on courses of action – 25%; preparation, issuance, and dissemination of orders – 20%). Knowing the input data, using basic arithmetic formulas and computer software, the commander can perform the time estimate in minutes with simple programs such as TimeandDate.com, Excel / Google, MATLAB, Time Percentage Calculator. Throughout the entire combat planning period, the staff, in accordance with their responsibilities (sections S1, S2, S3, S4, S5, S6), develop their respective plans, actively utilizing systems such as Delta, Kropyva, and Vezha);

third stage (analysis of courses of action takes place, which involves the conduct and simulation of a so-called military game. The commander, having updated calculations, refined instructions, developed courses of action, and revised assumptions, determines the updated courses of action and potential decision points. Taking into account the results of the military game, a briefing (meeting) is held. During the military game, computer simulation programs may be used, such as JCATS, VBS4, SimCentric Mission-Ready Software. The Armed Forces of Ukraine are introducing new software products in information and communication technologies with promising potential, for example, the combat operations simulation tool (COSST) Steel Beasts, a tactical combat simulator that allows the enactment of various scenarios from individual crew level or company to brigade level. A distinctive feature of Steel Beasts Pro is its focus on realism);

fourth stage (during the comparison of courses of action using ordinary calculations and considering defined criteria, the commander selects the optimal course of action, provides guidance on eliminating shortcomings, updates assumptions, and conducts revised calculations);

fifth stage (the commander receives from the staff updated calculations, objective recommendations on the course of action, revised assumptions, and approves the selected course of action, refines requirements for key information delivery, updates assumptions, and provides final planning guidance);

sixth stage (the commander approves the operation plan or combat order and verifies how subordinates have understood the plan or combat order).

A comprehensive analysis of modern technologies used for planning and operational adjustment of combat operations was conducted during the study. It was established that the implementation of automated troop command and control systems (ATCCS), artificial intelligence, big data, electronic warfare tools, satellite and unmanned technologies significantly enhances the effectiveness of military command.

The use of these technologies ensures the promptness of decision-making, accuracy of situational awareness, coordination of unit actions, and adaptability to changes in the combat environment. An important aspect is also the protection of communication and information systems, which minimizes the risk of command disorganization.

Thus, the implementation and improvement of modern military technologies is a key factor in increasing the combat readiness and effectiveness of the Armed Forces of Ukraine under current conditions. Therefore, the tasks set before us have been fulfilled, and the main objective of the study has been achieved.

Conclusions and prospects for further research. As a result of the conducted study, a comprehensive analysis of modern technologies used for the planning and operational adjustment of combat operations was carried out.

The members of the research group identified key innovations, in particular automated command and control systems (ATCCS), artificial intelligence technologies, big data, unmanned aerial vehicles, satellite systems, electronic warfare means, and cyber operations.

It has been proven that the integration of these technologies into military command significantly increases the effectiveness of combat operations by ensuring the accuracy of situational awareness, speed of decision-making, coherence of unit actions, and flexibility in changing conditions of warfare. In addition, special attention is paid to the issues of cybersecurity and the protection of communication channels, which are critically important for maintaining the resilience of the command and control system.

Thus, the development and implementation of modern technologies for managing combat operations is

a strategic factor in increasing the combat capability of the armed forces, allowing for battlefield superiority and effective adaptation to the challenges of modern warfare. The results of the study have been implemented in the tactical training system for cadets of the Kyiv Institute of the National Guard of Ukraine.

Based on the conducted analysis, the members of the research group identified key directions for further research regarding the application of modern technologies for the effective and rational planning (operational adjustment) of combat operations, namely: integration of artificial intelligence into military command; development of electronic warfare and cybersecurity systems; optimization of the use of unmanned systems in combat operations; implementation of cloud technologies and blockchain in military command; development of real-time situational awareness systems; automation of logistics processes and supply under combat conditions.

Further research in these areas will contribute to improving the effectiveness of military command, strengthening defense capabilities, and creating adaptive strategies for conducting combat operations in modern conditions.

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Received: 11.02.2025
Revised: 21.02.2025
Accepted: 28.02.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 654.164.1 DOI 10.59226/2786-6920.1.2025.72-79

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APPROACH TO THE ORGANIZATION OF JOINT INTEROPERABILITY RADIO NETWORKS BUILT USING DMR VHF RADIO STATIONS OF DIFFERENT FREQUENCY BANDS

The article examines the essence of problematic issues regarding the compatibility of standard digital radio communication equipment with the use of trunking communication equipment "Mototrbo" manufactured by "Motorola Solutions" of the DMR standard when organizing joint radio networks of interaction between units of different power structures within one military formation.

For example, the units of the National Guard of Ukraine (hereinafter - NGU) are predominantly armed with radio equipment operating in the UHF frequency range, while the units of the Armed Forces of Ukraine (hereinafter - AF of Ukraine) use radio equipment of the same type, but in the VHF range. Accordingly, the radio equipment cannot be considered compatible in terms of such a technical indicator as the range of operating radio frequencies, which creates problems when trying to unite the specified units into a single information space.

Ways to solve them are revealed and an alternative approach to solving the problem is proposed for consideration, namely: the use of a radio gateway, which is built on two radio stations manufactured by Motorola Solutions of different ranges. In this case, the radio stations are connected to each other in an appropriate way through an accessory port on the radio station housing. Each of the radio stations is programmed with a configuration file of the corresponding unit with channels at the frequencies of its range and keys to the confidentiality parameters. Voice information is relayed between the radio networks of two interacting units via a radio gateway automatically, by group method.

The authors believe that providing the Defense Forces of Ukraine with radio gateways (with the appropriate equipment) as standard means of radio communication for the interaction of units can help in the operational solution of a wide range of communication tasks.

Keywords: *state security; weapons and military equipment; control systems; communication facilities; single infocommunication space; radio communication systems; radio communication facilities compatibility.*

Statement of the problem. In response to the armed aggression of the Russian Federation against Ukraine and in order to restore the state's territorial integrity, various components of Ukraine's Defense Forces have been mobilized. These include the Armed Forces of Ukraine (AFU), the National Guard of Ukraine (NGU), the State Border Guard Service (SBGSU), the Security Service of Ukraine (SSU), the National Police of Ukraine (NPU), the State Emergency Service of Ukraine (SESU), the Main Directorate of Intelligence of the Ministry of Defense of Ukraine (HUR MO), the Foreign Intelligence Service of Ukraine (FISU), as well as volunteer formations of territorial communities.

During joint combat operations involving units subordinated to different government agencies, difficulties often arise in ensuring effective information exchange and coordinated actions. The core issue lies in the use of incompatible communication equipment operating on different frequency bands or utilizing different data transmission protocols. As a result, it becomes impossible to quickly establish secure and stable communication between units, which, in turn, reduces the overall responsiveness of command and control.

All components of Ukraine's security and defense sector rely on radio communications in their operational activities. Radio communication plays a critical role in enabling command and control in complex combat environments, especially when commanders (or headquarters) and their subordinate units are on the move. Given the use of maneuver warfare tactics by Ukraine's Defense Forces, radio communication is considered the primary – and in many cases, the only – means of control at the tactical level.

Moreover, successful combat operations require the use of a unified information space composed of interoperable systems capable of ensuring secure information exchange.

At the stages of planning and organizing radio communications for interaction between units of different branches of the Defense Forces of Ukraine, compatibility issues often arise when attempting to integrate standard-issue radio equipment into shared radio networks. This is primarily due to the different operating frequency ranges of "Mototrbo" trunked communication equipment, manufactured by Motorola Solutions and based on the DMR standard, which are used by different security and defense agencies in Ukraine. For instance, NGU units are predominantly equipped with radios operating in the UHF frequency band, while AFU units typically use similar equipment but in the VHF frequency range. Consequently, these radio devices are incompatible with respect to such a technical parameter as operating frequency range — that is, the frequency band within which the radio station functions. As a result, the integration of such units into a single information space becomes problematic.

The use of radio systems operating in different frequency bands across Ukraine's Defense Forces can be attributed to a combination of historical, technical, functional, and security-related factors.

Typically, interoperability between units equipped with incompatible radio communication devices is addressed by providing the subordinate unit's commander with one (or occasionally several) radios from the senior command's reserve. Alternatively, if the subordinate unit possesses individual radios compatible with the senior command's frequency range, the issue is resolved by supplying appropriate configuration files for programming the devices. Neighboring units (to the left, right, or rear) often establish interoperability through the exchange of individual radios with pre-programmed channels and confidentiality keys between commanders or headquarters. We refer to this approach as the radio exchange method.

However, this method does not allow for direct information exchange between users of two separate radio networks without the participation of commanders. In other words, the speed of communication between units is limited by the commanders' ability to verbally relay information from one network to another.

Thus, the process of integrating units equipped with radios operating in different frequency bands into a unified information space of Ukraine's Defense Forces requires greater attention and the development of more effective solutions.

Analysis of recent scientific research and publications. The shared use of information within a unified information space provides commanders and headquarters at all levels with significant advantages during the planning and conduct of operations (combat actions). It enhances situational awareness, command and control of troops (forces) and weaponry. Such an approach enables the Defense Forces of Ukraine to leverage the benefits of adopting and implementing information technologies.

The effective conduct of operations by the Defense Forces of Ukraine depends on the interoperability of communication and information systems, allowing commanders at all levels to exercise efficient control

over the deployed troops (forces). The levels of standardization, in ascending order, include: compatibility, interchangeability, and commonality.

The procedure for organizing interaction among the components of Ukraine's Security and Defense Sector via radio communication means is governed by the relevant instructions issued by the senior commander [1].

The primary goal of developing the communication system of the Defense Forces of Ukraine is to create a unified information and telecommunications environment based on the implementation of modern information and telecommunication technologies, information exchange protocols, complexes, systems, and special-purpose communication means. This will enable the exchange of all types of information between management bodies and control points (at all levels) with appropriate bandwidth, reliability, and trustworthiness [2].

The main tasks of communication are:

– ensuring timely reception and transmission of combat command signals;

– ensuring information exchange with higher headquarters and subordinate units under any operational conditions;

– ensuring timely reception and transmission of warning signals about the immediate threat of enemy use of weapons of mass destruction, alerts about aerial threats, radioactive, chemical, and biological contamination;

– ensuring information exchange between cooperating units;

– transmitting orders and receiving reports related to the support of combat operations of the troops.

To successfully accomplish the aforementioned tasks, tactical-level communication must meet a range of requirements, the most critical of which are timeliness, reliability, and security of all types of information transmission. Timeliness, in particular, is defined by the time required to establish communication and the speed of information exchange \[3]. VHF radio networks of modern radio devices are organized according to the operating modes supported by these radios \[4].

However, fundamental guiding documents regulating combat organization and communication do not contain information on methods for integrating frequency-incompatible radio communication systems into common radio networks (or a unified information space) [5, 6].

Domestic scientific literature highlights basic principles for improving the communication system of the Defense Forces of Ukraine and creating a unified information and telecommunication environment, including analyses of such systems' capabilities [7–9]. Additionally, methods to enhance the efficiency and responsiveness of information exchange, based on NATO countries' experience, have been proposed for implementation in National Guard units [10]. Nonetheless, solutions addressing communication equipment interoperability are not considered.

Current open-access NATO sources [11–14], which regulate the organization of communication among units during combat, focus solely on planning interaction by using standard systems that are assumed, by default, to be technically interoperable. Constraints related to shortages in available communication equipment are neither addressed nor considered, implicitly assumed to be sufficient.

It can be concluded that existing guiding documents and scientific achievements lack a unified approach for planning and organizing radio communication interoperability between units of various components of the Defense Forces of Ukraine and for resolving the compatibility issues of standard radio communication equipment when attempting to integrate them into a common radio network.

Based on practical experience, the essence of these issues lies in the fact that the use of Motorola Solutions' "Mototrbo" trunked communication equipment by the Defense Forces of Ukraine is a temporary, widespread, rapid, and relatively inexpensive method of transitioning to modern digital communication means. A primary drawback of this equipment is its operation only on fixed frequencies within a relatively narrow frequency band, resulting in low resistance to reconnaissance and electronic warfare (EW) countermeasures. In other words, it is incapable of effectively countering the adverse effects of enemy signals intelligence and electronic warfare.

Currently, the Defense Forces of Ukraine are gradually transitioning to modern communication standards, particularly NATO STANAG. Key roles in this process are attributed to military communication systems such as those produced by Harris, Aselsan, and Elbit. Efforts are underway to establish unified interoperability standards, conduct joint exercises, develop standardized command and communication procedures, and create a shared information space for the exchange of intelligence and tactical data.

The purpose of the article is to justify and implement an approach to the organization of joint interaction radio networks, constructed using DMR-standard VHF radios of different frequency bands, with the aim of improving the efficiency of information exchange processes between units of various components of the Defense Forces of Ukraine.

Presentation of the main material. An alternative approach to solving the above-mentioned problem is the use of a "radio gateway", built using two Motorola Solutions radios operating in different frequency bands, such as the DM4600 (DM4601) models. These radios are interconnected via their accessory ports located on the radio housings. Each radio is programmed with the configuration file of its respective unit, including channels within its operational frequency range and associated privacy parameters.

Voice information is relayed between the radio networks of the two interacting units automatically via the radio gateway, using a group communication method.

As a result, the efficiency of information exchange between units is enhanced due to the capability of simultaneous circular notification of correspondents operating both within the same frequency band and those in the joint interaction network. Furthermore, each correspondent can selectively communicate with any other within the shared radio network, in the presence of all participants.

Using a radio gateway enables units to perform the following communication tasks:

1. Ensuring communication for coordination on local radio channels (including networks for mutual unit interaction), based on the scheme: "VHF radios – radio gateway – UHF radios", enabling interaction between adjacent units (see Fig. 1).

2. Ensuring command and control (or circular alerting regarding various threats) of subordinate units (including attached forces) operating within the coverage area of the radio communication system deployed in the area of responsibility of a given force grouping, following the scheme: "main VHF radio – VHF repeater network – radio gateway – UHF radios".

This scheme also enables the organization of functional interaction radio networks by branches of the armed forces. For example, it becomes feasible to establish a dedicated interaction network for tank units. Similarly, radio networks may be organized for reconnaissance units, engineering troops, artillery, air defense forces, and others (see Fig. 2).

3. Integration of radio users located within the coverage areas of two repeaters operating in different frequency bands into a unified interaction radio network, according to the scheme: "VHF radios – VHF repeater network – radio gateway – UHF repeater network – UHF radios" (see Fig. 3).

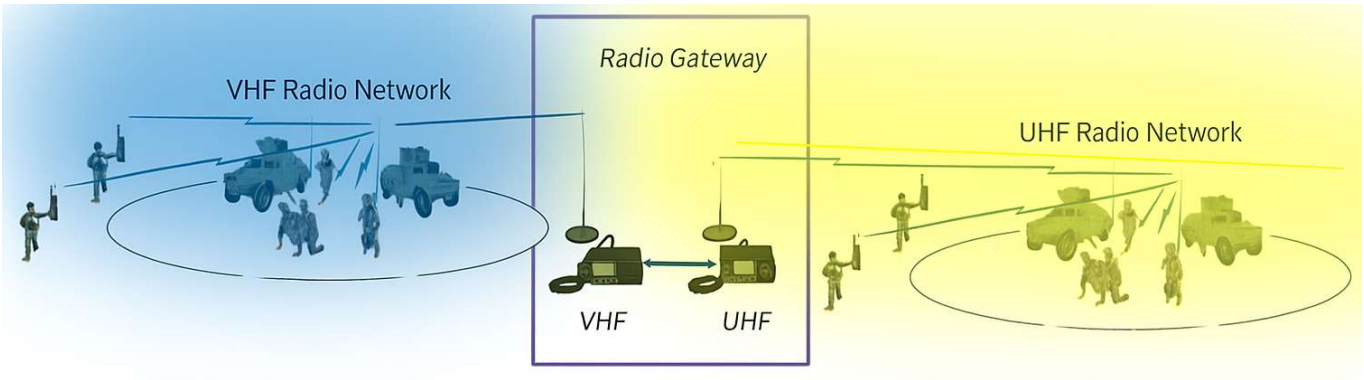

Figure 1. Ensuring interaction communication over local radio channels using the scheme: "VHF radios – radio gateway – UHF radios" between adjacent units.Source: developed by the authors.

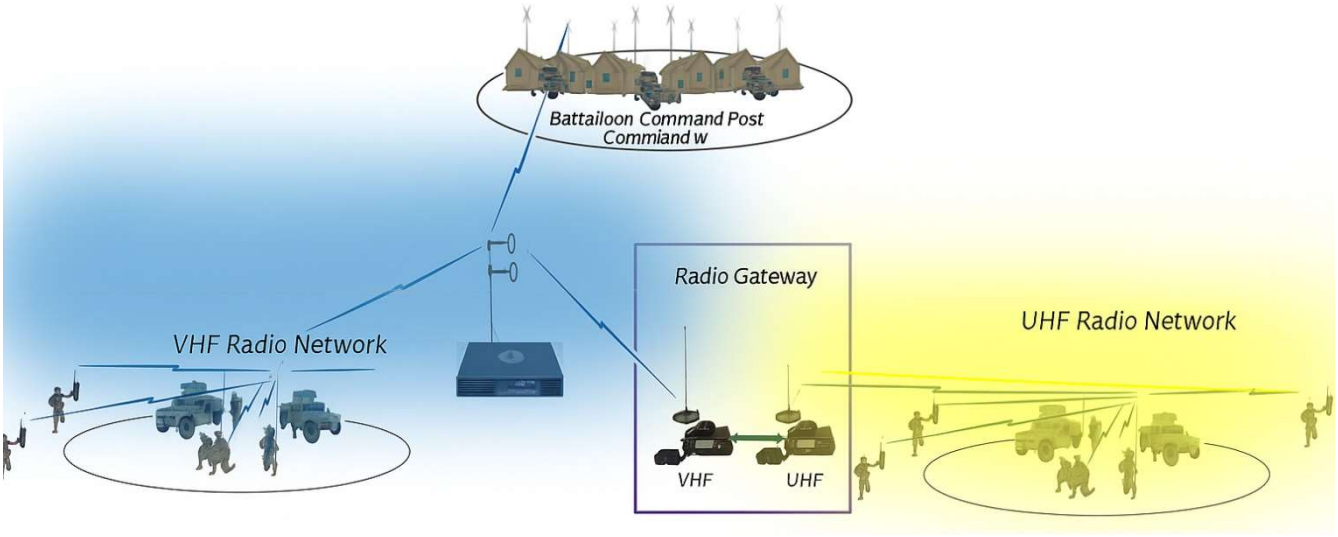

Figure 2. Branch-specific interaction radio networks using the scheme:
"Main VHF radio – VHF repeater network – radio gateway – UHF radios"

Source: developed by the authors

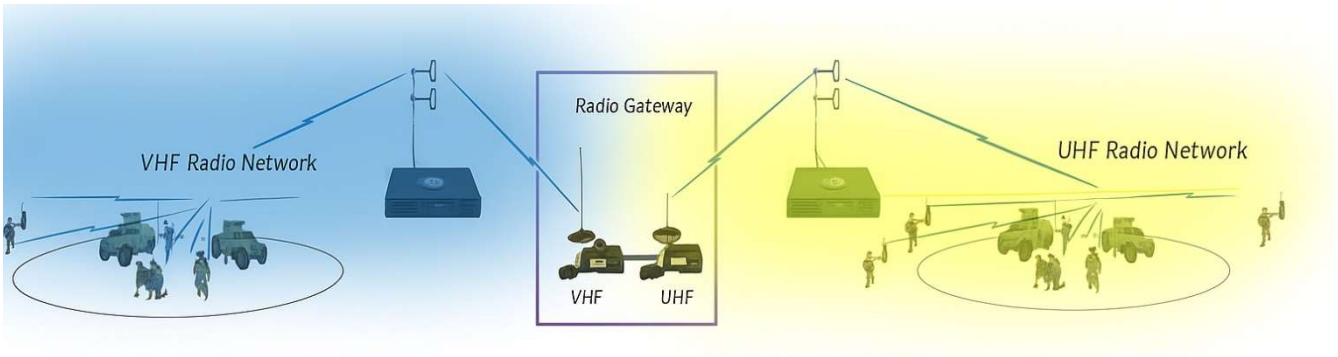

Figure 3. Integration of users within the coverage areas of two repeaters operating in different frequency bands into a joint interaction radio network using the scheme:
"VHF radios – VHF repeater network – radio gateway – UHF repeater network – UHF radio"

Source: developed by the authors

4. Flexibility in the use of existing repeater networks of different frequency bands by units operating within the area of responsibility of a force grouping, within the coverage area of these networks (following the scheme: "main VHF radio – radio gateway – VHF repeater network – UHF radios") (Fig. 4).

5. Extension of VHF radio communication coverage for units operating outside the effective range of existing network repeaters by establishing automatic relay points at the edge of the coverage zone. These points utilize a radio gateway installed on a mobile platform, additionally equipped with antenna-mast systems (including directional antennas) and autonomous power supply units (following the scheme: "main radio – repeater network – radio gateway – unit's local radio network"). The radio gateway may employ radios operating in either different or identical frequency bands. (Fig. 5).

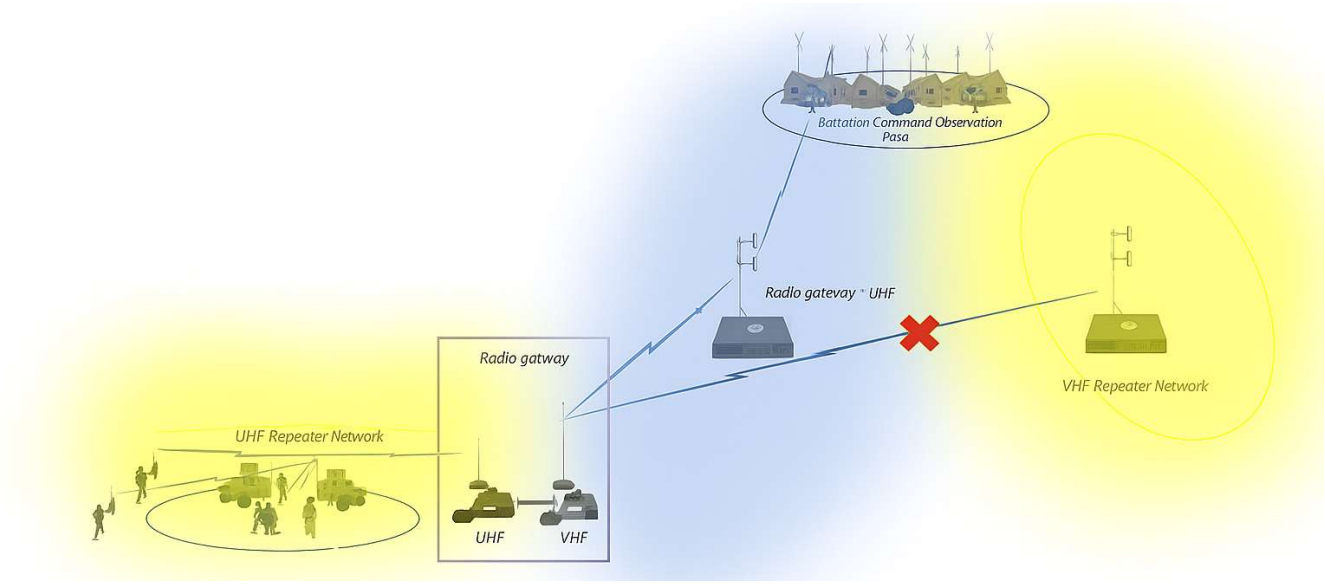

Figure 4. Flexibility in the use of active repeaters of different frequency bands by units deployed within the area of responsibility of a force grouping, following the scheme:
"VHF radios – VHF repeater network – radio gateway – UHF repeater network – UHF radio"

Source: developed by the authors

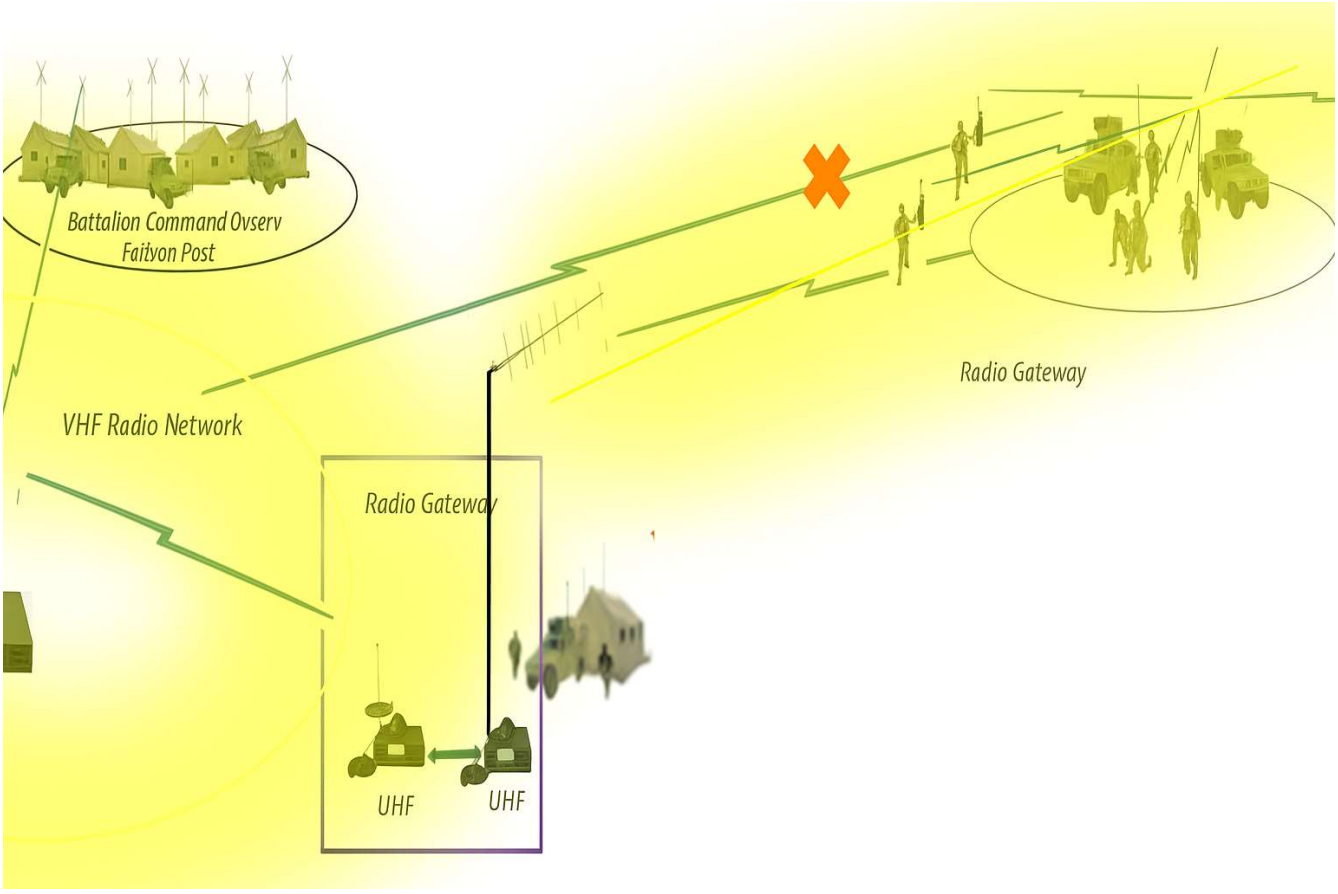

Figure 5. Extension of VHF radio communication coverage for units located outside the coverage area of existing repeaters by establishing automatic relay points at the edge of the coverage zone according to the scheme: "main radio station – repeater network – radio gateway – unit's local radio network on a local channel".

Source: developed by the authors

The majority of the aforementioned tasks can be addressed without using radio gateways, relying solely on standard repeaters operating across different frequency bands by integrating them into a common network via the IP-SITE CONNECT mode. However, this solution requires unified management of confidentiality parameters and timing (which may be lacking) to rework the configuration files of various units, ensuring their alignment to uniform security and privacy settings. Additionally, it is necessary to account for the time, resources, and personnel availability required for reprogramming all radio equipment.

The drawbacks of organizing interaction through a radio gateway include its inability to automatically relay short text messages and to establish voice connections between two radio stations in the “individual subscriber call” mode.

Conclusions and prospects for further research. The method of employing a radio gateway is not new and was previously used solely as a means to unite correspondents of different repeaters into a common radio network to expand the radio coverage area. Subsequently, this method was abandoned in favor of the more efficient IP-SITE CONNECT mode, which requires mandatory departmental management of confidentiality parameters in radio station settings.

Therefore, the approach of using a radio gateway can be recommended to the command authorities of the National Guard units for organizing joint interaction radio networks built using VHF DMR standard radios operating across different frequency bands, as it is more effective than the method of radio station exchange. This will help solve the problem of communication equipment compatibility during the execution of primary communication tasks.

Prospects for further research include analyzing the optimal composition of components for a universal radio gateway as a standard interaction tool for units and developing guidelines for its use.

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Received: 11.04.2025
Revised: 21.04.2025
Accepted: 30.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 336:206.112 DOI 10.59226/2786-6920.1.2025.80-84

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METHODOLOGICAL PROVISIONS FOR PLANNING FINANCIAL PROVISION OF LOGISTICS OF MILITARY UNITS OF THE NATIONAL GUARD OF UKRAINE

The article considers the urgent problem of improving the planning of financial support for logistics of military units of the National Guard of Ukraine (NGU) in conditions of ongoing armed aggression. The author emphasizes that the effective functioning of the NGU, as a key component of national security and defense, directly depends on proper logistical support, which, in turn, requires timely and sufficient funding.

Existing approaches to planning financial support for logistics are assessed, which are often fragmentary and insufficiently adapted to the specific needs of military formations and the dynamic conditions of their activities. This can lead to inefficient use of budget funds, delays in delivery and a decrease in overall combat capability.

In order to solve this problem, the author proposes a comprehensive, step-by-step methodology for planning financial support for logistics of military units of the NGU.

Special attention is paid to the role of modeling in optimizing financial planning for logistics support. The author gives an example of a model that takes into account needs analysis, financial flow planning, budget execution modeling and risk management.

It is emphasized that the proposed methodology is an important step towards increasing the efficiency of budget funds and ensuring the proper level of logistical support for the National Security Service in conditions of armed aggression. The author also identifies prospects for further research, which may be aimed at improving the modeling of the financial planning process and the selection of effective tools for the practical implementation of the proposed methodological provisions.

Keywords: *financial planning, logistics support, National Guard of Ukraine, financial planning modeling.*

Statement of the problem. In the context of ongoing armed aggression against Ukraine, the effective functioning of the National Guard of Ukraine (NGU) acquires particular significance in ensuring national security and defense. One of the key components of the NGU's combat capability is adequate logistical support, which, in turn, directly depends on timely and sufficient financial provision.

At the same time, the existing methodological approaches to planning the financial support for the logistics of NGU military units are often fragmented and insufficiently adapted to the specific needs of this military formation and the dynamic conditions of its operations. This leads to inefficient use of budgetary funds, delays in the supply of material and technical resources, complicates the prompt response to the needs of units, and ultimately reduces overall combat readiness. The financial planning system for logistics support requires consistent efforts aimed at its improvement and optimization, which constitutes the practical problem addressed in this study.

Thus, the practical problem lies in the absence of scientifically grounded, comprehensive methodological principles for planning the financial support of logistics for the military units of the National Guard of Ukraine. Existing approaches fail to fully account for the specific nature of their activities, contemporary challenges, and opportunities for optimizing budgetary expenditures.

Analysis of recent scientific research and publications. The analysis of recent studies,

publications, and practical experience reveals a lack of comprehensive methodological approaches to planning the financial support of logistics for NGU military units. Existing research mainly focuses on individual aspects of financial support and logistics without considering their interrelation or the operational specifics of NGU military units.

Issues related to the financial support of the Armed Forces of Ukraine have been addressed by domestic scholars such as O. Levchuk, N. Blyzniuk, and O. Pohretska, who explored the mechanisms and peculiarities of financial provision for the Armed Forces, as well as the prospects for defense expenditures. These researchers emphasized the need to increase funding volumes to strengthen the country's defense capabilities [1, 2]. A significant contribution to the analysis of financial support and planning issues in the NGU has been made by researchers including Ye. Hrabovskyi, M. Naumenko, V. Nikitiuk, M. Cherkashyna, and Zh. Chukhlyata. Their works outlined mechanisms for financing NGU logistics, theoretical and practical aspects of financial planning in military units, and analyzed factors influencing the financial planning of logistics support for NGU military units [3–5].

However, most of the available scientific works require reconsideration in light of the experience of large-scale warfare on the territory of Ukraine and the operational specifics of military units.

The purpose of the article is to refine methodological principles for financial planning of logistics support for military units of the National Guard of Ukraine. The objective is to enhance efficiency and ensure an adequate level of logistical provision.

Presentation of the main material. The mechanism and organization of financial support for military units, military educational institutions, territorial recruitment and social support centers, institutions, and organizations of the Armed Forces of Ukraine funded from the State Budget of Ukraine are defined by the Resolution of the Cabinet of Ministers of Ukraine “On the Approval of the Rules for Organizing Financial Support for Military Units, Institutions, and Organizations of the Armed Forces of Ukraine” [6]. Since the beginning of the full-scale invasion of Ukraine, several amendments have been introduced to key regulatory documents governing and defining the financial planning of logistics support for the military units of the National Guard of Ukraine [7; 8].

Thus, the financial planning of logistics support for the military units of the National Guard of Ukraine is a process that entails careful determination of the financial resources required to provide military units with material and technical assets, fuel and lubricants, weaponry, medical equipment, transportation, and monetary allowances for personnel, among others. This process encompasses the analysis of current resource needs for each military unit, efficient allocation of financial resources based on urgent needs, and the forecasting of future requirements in accordance with assigned tasks, development plans, and potential security threats [9].

The methodology for planning financial support of logistics for the NGU military units involves the development of an effective financial flow management system. It must clearly describe the stages of optimizing logistics activities that directly or indirectly influence financial flow management. By following the sequential actions outlined in the methodology, a highly efficient system of financial flow management can be developed for the operational support of the logistics system [10].

In our view, the methodology for planning the financial support of logistics for NGU military units should encompass the management of the logistical financial cycle and include the following stages:

1. Organizational Stage of Preparing for the Implementation of Financial Logistics Principles and Financial Flow Management in the Economic Activities of Military Units:

- defining the objectives and tasks of the military unit’s logistics operations in the medium term with regard to working capital. This enables the formation of a strategic vision for financial flow management. The objectives should focus on identifying issues directly or indirectly related to financial flow management. Upon identifying such issues, proposals for implementing measures to improve the financial state of logistics operations are developed;
- determining a set of tools for managing financial flows;
- forming working groups and appointing responsible personnel to ensure effective financial flow management. The responsibilities of relevant units should be clearly defined, including data collection, analysis, optimization, planning, and financial flow control.

2. Analysis of the Financial Flow Status in Previous Logistics Operations:

identifying both external and internal sources of information necessary for financial flow analysis;

applying horizontal and vertical methods of financial flow analysis. The aim of horizontal analysis is to detect

the causes of changes, factors, and patterns influencing financial flows. Vertical analysis focuses on examining structural changes in the movement of financial resources within logistics;

coordinating operational management of financial and material flows (primarily assessing expenditures, such as those associated with transportation of goods);

preparation, review, and approval of the budget (especially in terms of preliminary calculations of expenditure volumes). When calculating the planned budget indicators, the average planned expenditure values are taken into account:

$$\mu x = 1/n \sum_{i=\tau}^{n} x_i , \quad (1)$$

where μx is the total volume of funding,

x_i is the amount of funding in the *i*-th period taken as the basis for calculation;

3. Proposals for Optimizing the Logistics System of a Military Unit Using the Principles of Financial Logistics and Analytical Findings

Within the framework of optimizing financial flows, actions can be taken in the following directions:

- assessing the adequacy of the financial flow;
- calculating the optimal cash reserve, as the net financial flow is the resulting indicator of cash movement, which allows an evaluation of whether the chosen directions of financial flows are appropriate.

In addition, this stage involves the selection of financial logistics principles that are appropriate to the economic activities of a particular military unit, such as: priority, flexibility and adaptability, realism, efficiency, and legality (transparency). A crucial role in this area is played by the use of appropriate models.

Modeling the financial planning of logistics support for the military units of the National Guard of Ukraine is a significant and complex task that requires the integration of various aspects, including budgeting, inventory planning, cost optimization, and more. This enables efficient financial resource planning to support military units and ensures their optimal functioning under limited budget conditions.

An example model of financial planning for logistics support of NGU military units includes the following components:

1. Needs Analysis and Inventory Optimization. This includes identifying the types and volumes of resource needs by conducting inspections and inventory assessments (e.g., fuel, ammunition, medical supplies) over a given time period. It also involves optimizing stock levels to ensure both efficiency and cost-effectiveness of storage, and includes calculating optimal inventory levels.

2. Financial Flow Planning. The next step is determining the prioritization of needs within the overall budget and identifying the available percentage of the budget for logistics support. It covers financing for procurement (of material and technical assets, fuel and lubricants, weapons, medical equipment, etc.), transportation, warehousing, and other logistics expenses. This stage must also take into account deficiencies identified during the previous phase. To this end, a cash flow plan is developed, detailing all financial flows within the forecasted period. This document is typically prepared for one fiscal year, with a monthly breakdown of incoming and outgoing cash flows.

3. Budget Execution Modeling. This is carried out using a model that reflects the relationship between logistics support needs and the budget. The model incorporates various factors and parameters such as delivery time, cost, volume, risk probability, and enables monitoring the implementation of the financial plan over time.

4. Risk Analysis and Management. After the model is developed, various scenarios are analyzed to assess the impact of different factors on the effectiveness of logistics support. This enables informed decision-making.

Accordingly, the logistics efficiency indicator should be considered as the ratio of the achieved result (the state of logistics support) to the amount of funds expended to achieve it. It is calculated using the following formula:

$$E=P(B)/V, \quad (2)$$

where E – efficiency of defense expenditure;

R(B)R(B) – final achieved result of logistics support;

V – volume of defense spending required to accomplish the respective tasks.

5. Monitoring and Adjustment of Results. Monitoring and adjustment are conducted based on newly acquired information and analytical results, including the comparison of actual expenditures with planned figures, identification of deviations, and implementation of corrective actions. This stage may also include risk analysis and the development of measures to ensure timely responses to changes in both internal and external conditions.

This model highlights the importance of various factors influencing the financial planning of logistics support for the military units of the National Guard of Ukraine. It emphasizes the necessity of adapting to environmental changes and improving managerial practices to ensure effective system performance.

Considering the key development areas in the financial planning of logistics support for NGU military units – such as strategic planning, cost optimization, enhanced risk management, and the implementation of sustainable development principles – will enable military units to improve the effectiveness of financial planning and ensure a high level of readiness for fulfilling operational and combat tasks.

Conclusions and prospects for further research.

This article refines the methodological principles for planning the financial support of logistics for the military units of the National Guard of Ukraine, which constitutes a significant step toward enhancing the efficiency of budgetary resource utilization and ensuring an adequate level of logistical support amid armed aggression. The proposed step-by-step methodology – which includes analysis of previous periods, optimization based on financial logistics principles, and the application of modeling techniques – enables a more comprehensive and well-grounded approach to financial planning processes. Future research should focus on improving the modeling of the financial planning process and identifying effective tools for the practical implementation of the proposed methodological framework.

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Received: 12.03.2025
Revised: 21.03.2025
Accepted: 31.03.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

JURIDICAL SCIENCES

UDC 342.951 DOI 10.59226/2786-6920.1.2025.85-92

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TERMINATION OF CIVIL SERVICE AT THE INITIATIVE OF THE APPOINTING ENTITY: CERTAIN PROBLEMS OF LAW ENFORCEMENT

The article examines current problems of law enforcement in the field of termination of civil service at the initiative of the appointing entity. It reveals certain problems that are most typical for this category of legal relations, related to the ambiguity of the interpretation of the concepts of "liquidation" and "reorganization" of a state body, which directly affects the legality of dismissal and provision of guarantees for civil servants. Based on the analysis of judicial practice, in particular the decisions of the Supreme Court, the study proves that the formal use of the term "liquidation" does not always mean the termination of the existence of the body if the functional load is transferred to a newly formed structure. In this case, there is a reorganization of the state body (reduction in the number or staff of civil servants, reduction of civil service positions due to changes in the structure or staffing of the state body), which provides for compliance with additional guarantees for those civil servants whose positions are reduced. The issue of insufficient regulation in the legislation on the state service of guarantees for socially vulnerable categories of employees - pregnant women and women with children – is separately highlighted. It was established that the legislation on civil service does not contain

special norms prohibiting the dismissal of such categories of civil servants, therefore, in practice, the relevant provisions of the Labor Code of Ukraine should be applied. It was concluded that the provisions of the current legislation regarding the termination of civil service at the initiative of the appointing entity require further improvement and more systematic interpretation by the judiciary. Ways to eliminate the identified conflicts and gaps are proposed, taking into account modern standards of legal certainty, the principle of social protection and equality for all categories of employees, regardless of the form of ownership, type of activity and industry affiliation of enterprises, institutions or organizations.

Keywords: *civil service; civil servant; guaranteeing human rights; termination of civil service legal status of women; protection of civil servants; judicial protection; administrative proceedings.*

Statement of the problem. According to the National Agency of Ukraine for Civil Service (NACS), in 2024 the number of civil service positions authorized by staffing schedules in Ukraine was 192,172, while the actual number of serving civil servants was 156,276. Since the beginning of 2024, 35,074 civil servants have been appointed and 37,673 have been dismissed from office [1].

When these figures are compared with the total number of cases concerning dismissal from public service filed in first-instance administrative courts in 2024 (22,370 cases were lodged; 18,703 were adjudicated, of which 15,415 claims were granted [2]), it emerges that in response to roughly every second dismissal a civil servant who disagrees with the grounds or conditions of dismissal brings legal proceedings – and 69 % of such claims are upheld at first instance.

These statistics underscore the need to re-apply a rigorous scholarly approach to the analysis of current Ukrainian legislation on the grounds for termination of civil service. In particular, greater attention should be paid to terminations initiated by the appointing authority.

Analysis of recent scientific research and publications. Termination of civil service at the initiative of the appointing authority is one of those grounds whose application gives rise to numerous disputes, violations of civil servants' rights and, consequently, litigation seeking their reinstatement. It is therefore unsurprising that NACS has addressed this issue in its guidance, striving to summarize the most common errors in law-enforcement practice and improve the dismissal procedure (NACS Clarification No. 132-r/z of March 15, 2021 [3]; NACS Clarification No. 151-r/z of April 21, 2022 [4]). From time to time, the Law of Ukraine "On Civil Service," encompassing the provisions that define the grounds for termination of civil service, attracts the attention of scholarly teams in the form of scientific-practical commentaries [5]. Individual authors – such as A. Hryshchuk [6], V. Kohan [7], and Ya. Fenyč [8] (on the grounds, procedure and consequences of civil-service termination) – also provide a foundation for academic analysis. However, the rapid evolution of the current Ukrainian legislation quickly renders these studies archival in character: useful for generalization, but not fully up-to-date for resolving present law-enforcement challenges. This underscores the need for further scholarly inquiry in this area and for developing timely guidance on the proper application of the existing statutory provisions.

The purpose of this article is to outline specific problems arising from deficiencies in the application of statutory provisions on termination of civil service at the initiative of the appointing authority, and to resolve them through scholarly methods and analysis of judicial practice.

Presentation of the main material. The Law of

Ukraine “On Civil Service” structurally differentiates the grounds and procedure for termination of civil service in Article 83, depending on the circumstances and/or the initiator of termination of these legal relations. Termination of civil service at the initiative of the appointing authority (Art. 87) is part of the comprehensive system of norms that define the grounds and procedure for termination of civil service.

The Constitutional Court of Ukraine affirms that “all labor relations must be based on the principles of social protection and equality for all enterprises, institutions, and organizations, regardless of ownership form, type of activity, or sectoral affiliation, as well as for individuals working under an employment contract, which, in particular, must be reflected in the establishment of an exhaustive list of conditions and grounds for termination of such relations” [9] – a position that reflects the European Court of Human Rights’ jurisprudence on eliminating discrimination of individuals’ rights and embodies the fundamental values enshrined in the Constitution of Ukraine regarding the protection of all employees’ interests, including protection from unlawful and unjustified dismissal. Article 87 of the Law of Ukraine “On Civil Service” plays a key role in ensuring legal certainty in the dismissal process for civil servants (as a specific category of employees), establishing a balance between the interests of the state and those of the civil servants. This provision contains the grounds, guarantees, and certain compensatory mechanisms in the event of circumstances triggering termination of civil service at the initiative of the appointing authority and is intended, on the one hand, to protect this category of employees from arbitrary dismissal and, on the other, to "preserve a professional and stable civil service corps" [5, p. 657], maintaining a stable and optimal mode of operation of the state body by establishing a clear list of grounds for dismissal of those civil servants whose performance or conduct fails to meet the requirements of the position held and/or the principles of civil service.

Authors of one scientific-practical commentary on Art. 87 of the Law of Ukraine "On Civil Service" rightly note: "termination of civil service at the initiative of the appointing authority is a means of unilateral termination of civil service relations, which is possible only on the basis of the grounds defined by law. The appointing authority’s initiative is the result of its forced choice, prompted by changing conditions of activity, or is the authority’s reaction to unsatisfactory performance evaluation of the civil servant" [5, p. 658]. However, unlike termination of civil service due to loss or restriction of the right to civil service, where "the appointing authority is obliged to dismiss the civil servant…" (Part 2, Art. 84), termination at the appointing authority’s initiative is not unconditional – when grounds specified in Art. 87 arise, the legislation leaves it to the appointing authority’s discretion to decide on dismissal of the subordinate civil servant, taking into account objective and subjective factors.

The grounds listed in the article can be grouped as follows:

a) those unrelated to the civil servant’s performance (resulting from reorganization or liquidation of the state body);

b) those not dependent on the servant’s will but indirectly adversely affecting the state body’s efficiency (prolonged absence from service due to temporary incapacity);

c) those arising from negative evaluation of the civil servant’s performance or behavior.

Since the first two groups are not caused by professional incompetence, where grounds under paragraphs 1 and 1–1 of Part 1 and Part 2 of Art. 87 arise, the legislation secures certain guarantees and

compensatory mechanisms to protect the rights of the affected individuals.

The guarantees, when grounds under paragraphs 1 and 1–1 of Part 1 of the commented article exist, include: advance notice by the appointing authority of its intention to dismiss the civil servant; for grounds under paragraph 1, a mandatory offer of another equivalent or, as an exception, lower civil service position; dismissal only where no suitable position can be offered or if the servant refuses the offered position; where grounds under Part 2 arise, retention of the civil servant's post until recovery or determination of disability. The compensatory mechanism provided by law for dismissal under paragraphs 1 and 1–1 of Part 1 of Art. 87 is the state's obligation to pay the civil servant severance pay equal to two average monthly salaries [10].

As case law shows, disputes over termination of civil service at the appointing authority's initiative arise under every ground listed in Article 87. In this article, we focus on several problematic aspects that recur in these disputes.

By design, the legislator separated two grounds for termination at the appointing authority's initiative –reorganization (including staff reductions) and liquidation of the state body – so that each would trigger different dismissal procedures and social guarantees. A close reading of Article 87 confirms that liquidation of the state body, unlike reorganization, carries no additional conditions for dismissal.

Scholar V. Kohan highlights a conflict between the Labour Code of Ukraine and the Law "On Civil Service." Under the Labour Code, the protections of Articles 40 and 49-2 (which apply to employees dismissed under Article 40) are withdrawn both in cases of reorganization and liquidation of an employer. Yet the special civil-service law requires that, upon reorganization of a state body (Art. 87(1)), the appointing authority must offer the affected civil servant an equivalent – or, as an exception, lower – civil-service post consistent with their training and competencies, giving them preferential retention rights under labour law. No such duty arises on liquidation of the body [7, p. 80].

In practice, courts often see parties dispute the very existence or scope of the organizational change – whether the body was truly liquidated or merely reorganized. Liquidation of a public legal entity must be effected by a formal act of the authority empowered to do so and must include sufficient reasoning that its functions are no longer needed or are better handled by another executive organ. Mere reference to "liquidation" without substantiating objective reasons is insufficient. Thus, when courts consider reinstatement claims, they must examine not only the procedural legality of the dismissal but also whether the alleged "liquidation" actually occurred. In case No. 640/15797/21 (judgment of 30 November 2022), the Supreme Court held that a court must determine if the body was in fact dissolved –or simply restructured – before permitting termination on that ground [11].

Similarly, in case No. 160/1643/23 (judgment of 29 November 2023), the Supreme Court explained that "liquidation" as a dismissal ground requires both issuance of the formal liquidation act and evidence that the state relinquished the functions or transferred them to another body (for example, to avoid overlap of powers). In other words, an entry in the Register of Legal Entities indicating liquidation does not itself prove the state body ceased to exist in substance. A merger of several organs into one – granting the new entity the same powers –reflects only a change in form, not true liquidation. Where functions remain intact, a genuine reorganization has occurred, not a liquidation [12].

For example, in its ruling of November 29, 2023 (case No. 160/1643/23), the Supreme Court's panel upheld the first-instance court's approach, which required examining the true nature of organizational changes in the regional Labour Inspectorates – and their legal consequences – before deciding the dispute. The court found that after the so-called "liquidation" of the Labour Inspectorates in Kirovohrad, Dnipropetrovsk, and Zaporizhzhia regions, those bodies were in fact reorganized by merging into the South-Eastern Interregional Labour Service, to which all powers, tasks, and functions had simply been transferred. They had not been liquidated. That legal assessment of what actually happened to the state body was decisive in determining the correct grounds and procedure for dismissing its civil servants. Accordingly, the Supreme Court concluded that the Dnipropetrovsk Regional Labour Inspectorate ceased to exist by reorganization – and therefore, under Article 87(1) of the Civil Service Law, a civil servant there could only be dismissed if no suitable alternative position could be offered, or if they refused a proposed transfer [12].

Another critical issue under Article 87 is the special guarantees for pregnant women and for women with young children when their service is terminated at the appointing authority's initiative. In practice, appointing authorities do not always respect these protections, leading to court challenges. Since the Civil Service Law is lex specialis to the Labour Code, it should govern both entry into and termination of civil service. Although A. Hryshchuk notes that the Civil Service Law provides more detailed grounds than the Labour Code [6, p. 306], it nonetheless fails to specify dismissal protections for these categories (other than excluding maternity leave from the computation of temporary incapacity). Because the special law is silent, courts have correctly applied the general Labour Code provisions. Pursuant to Article 184(3) of the Labour Code, "dismissal of pregnant women and of women with children under three years of age, and of women with children under six if the child requires home care (Art. 179(6)), as well as of single mothers with children under fourteen, or with a child with a disability, at the initiative of the employer or its authorized body is not permitted, except in cases of complete liquidation of the enterprise, institution, or organization, when dismissal is allowed with mandatory re-employment."

In such cases, an additional compensatory mechanism applies: the employer must continue paying the woman's average salary for up to three months following the end of her fixed-term contract [13]. This does not relieve the appointing authority of its obligation to pay severance equal to two average monthly salaries under Article 87(1) and (1–1). As the Vinnytsia Administrative Court held on May 28, 2024 (case No. 120/1639/24), severance is a one-time payment under paragraph 4(b) of the Cabinet of Ministers' 1995 Procedure for Calculating Average Wages (CMU Res. No. 100, as amended) [14]. The Kharkiv Commercial Court similarly explained on January 30, 2024 (case No. 922/2167/23) that severance is a statutory, one-off payment intended to support a dismissed employee while seeking new work, distinct from wages, since it depends solely on the fact of dismissal for specified legal reasons [15]. Meanwhile, Article 184(3) Labour Code's wage-continuation provision remains fully in force for up to three months.

Conclusions and prospects for further research.

In summary, Article 87 of the Law of Ukraine "On Civil Service" is an essential legal tool for regulating the termination of civil service. However, beyond merely delineating the technical grounds for dismissal at the appointing authority's initiative, this provision embodies a balance between the need to

ensure effective functioning of state bodies and the protection of civil servants' rights, by providing clear criteria and guarantees when employment is terminated. This is achieved through: clarity and exhaustiveness of dismissal grounds (the legislator prescribes an exhaustive list of grounds for termination at the appointing authority's initiative, which minimizes subjectivity in dismissal decisions and ensures compliance with legal norms); protection of civil servants' rights (a key aspect is the establishment of procedural guarantees for those facing dismissal, which ensures the possibility of continuing a career in civil service and reduces the risk of unlawful dismissals); guarantees and compensatory mechanisms (the law provides for payment of severance in cases of organizational liquidation or staff/position reductions, which serves as important social protection for civil servants).

At the same time, even from the examples presented in this study (issues arising from distinguishing the foundational concepts that ensure civil-servant protections – reorganization versus liquidation of a state body; guarantees for pregnant women and mothers under dismissal at the appointing authority's initiative), it is evident that neither the legal framework nor its practical application is free from shortcomings. In this context, judicial practice becomes particularly significant for ensuring the balance of interests between civil service and protection of civil servants' rights: analysis of court decisions shows that courts frequently annul dismissals for procedural violations, thereby creating precedents that apply existing legislation in synergy – drawing on administrative, labour, and other related branches of law – to fill regulatory gaps.

Finally, it should be emphasized that further problematic issues arise under other grounds for termination (not addressed in this study), which likewise require application of a scholarly approach and represent a promising direction for our future research.

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Received: 16.04.2025
Revised: 23.04.2025
Accepted: 30.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 34.096 DOI 10.59226/2786-6920.1.2025.93-102

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ESSENTIAL CHARACTERISTICS OF THE PHENOMENON OF ORGANIZED CRIME IN MODERN UKRAINE

The aim of the article is to identify and scientifically generalize the essential (systemic) features of modern organized crime in Ukraine, including those that arose or acquired threatening features for national statehood in wartime conditions. It is proved that organized criminal groups have turned into a symbiosis of shadow economy businessmen, armed groups serving them, and corrupt civil servants of various levels.

The following essential features of organized crime are broken: a high level of organization and conspiracy; a hierarchical structure, with clearly defined functions of organization, management and execution; the presence of corrupt connections in government and administration bodies, law enforcement agencies and the judicial system; the existence of structures that ensure the external and internal security of this structure; politicization of criminal activity, which consists in the attempt of members of criminal structures to enter government and administration bodies or in establishing close relations with representatives of such bodies; regional, interregional and international nature of criminal activity (usually by territorial or sectoral basis); the presence of a separate budget of an organized criminal group; the mercenary and violent orientation of criminal activity and its close connection with the "shadow" economy; the impact of organized crime on the legal sphere of the economy, the financial and credit and banking sectors, etc.

It is noted that the activities of organized extremist groups in Ukraine are becoming more active, and this poses a threat to national security, becomes a factor in the escalation of cruelty and violence, destabilization of the socio-political situation, threatens to disrupt the capacity of state authorities, and undermine the authority of the state among the population. The personal security of citizens is threatened by transnational forms of organized crime - drug trafficking, human trafficking, illegal migration, cybercrime, and environmental crimes.

Keywords: *national security; criminology; security studies; organized crime; organized criminal formations; transnational crime.*

Statement of the problem. The Strategy for Combating Organized Crime, approved by the Order of the Cabinet of Ministers of Ukraine No. 1126-p dated September 16, 2020, emphasizes that "under conditions of armed aggression against Ukraine and attempts to establish terrorist organizations within the country, organized crime poses a direct threat to national security." The document specifies leading factors of organized crime (OC) that directly and destructively affect Ukraine's national (state) security at a strategic level, including: the increase in the number of grave and particularly grave crimes committed by organized criminal groups (OCGs) with the use of firearms; entrenched corrupt relationships between organized criminal elements and officials of state authorities and local self-government bodies; disruption of the functioning of state authorities, compromising the reputation of the state and its law enforcement agencies among the population, destabilizing the internal socio-political situation; exploitation of organized crime by foreign special services as a tool for destabilizing the situation in Ukraine and undermining national security; the use of organized crime by certain public associations as a means of political struggle and suppression of democracy [1].

Considering the actual prevalence of organized crime and the overall criminogenic situation, as well as the complicated security environment surrounding Ukraine, the establishment of a systemic fight against organized crime has been declared one of the priority tasks of state policy, requiring coordinated interagency measures and enhanced international cooperation.

According to leading researchers of this phenomenon, organized criminal groups have transformed into a "symbiosis of shadow economy entrepreneurs, armed groups serving their interests, and corrupt public officials at various levels." The weakening of state control over the internal situation "allows criminal elements to set the tone, dictate their rules of behavior, ideology, and subculture, lobby for legal, organizational, and tactical decisions favorable to them within legitimate authority, and actively counteract law enforcement agencies" [2, p. 58].

Analysis of recent scientific research and publications. Since the late 1980s, when the USSR officially recognized the socially dangerous phenomenon of organized crime, Ukrainian legal science, specialized disciplines, and related fields have developed a substantial research foundation on this issue, including generalized monographic works by scholars from domestic law enforcement and security structures (I. Hrynenko, P. Yepryntsev, M. Korniienko, D. Prokofieva-Yanchylenko, V. Sevruk, Y. Skulysh, and other security experts [3–7]). These studies have collectively established a clear criminological and security-oriented model of organized crime (OC) in Ukraine.

At the same time, contemporary socio-economic conditions in Ukrainian society, changes in criminological characteristics of the modern global order, the armed conflict in Eastern Ukraine (2014–2022), and its escalation into a full-scale Russian-Ukrainian war – with the emergence of new threats and dangerous phenomena within Ukraine and corresponding transformations in the country’s criminogenic situation – have necessitated new research priorities on this issue.

In particular, one current aspect of research into organized crime and combating it under martial law is analyzing recent qualitative transformations in the nature and specific manifestations of organized criminal activity. The study of the contemporary state of OC and the development of comprehensive countermeasures have become central topics of discussion at representative scientific forums dedicated to law enforcement issues [see, in particular: 8–11]. Research by A. Bohatyriov, I. Bohatyriova, P. Bohutskyi, M. Voloshyn, Y. Kovalenko, V. Moroz, Yu. Orlov, P. Tkachenko, O. Shamara, and other scholars has focused on identifying shifts in factors determining the existence and novel essential characteristics of OC and organized criminal groups (OCGs), especially from the

perspective of improving strategies and tactics to combat them in wartime conditions [12–18 and others].

The purpose of this article is to identify and scientifically summarize the essential (systemic) characteristics of contemporary organized crime in Ukraine, including those that have emerged or acquired threatening features for national sovereignty under wartime conditions.

Presentation of the main material. Let us consider the nature of modern organized criminal groups in Ukraine in terms of their criminological characteristics in the context of current threats to Ukraine's national security. Specialized research typically defines organized crime (OC) as a consolidation of criminal elements operating within a specific region, sector of the economy (its production units), or certain administrative spheres through the formation of stable, cohesive, hierarchically structured criminal groups (communities) engaged in long-term joint criminal activity. Their goal is to obtain consistent, substantial income, often by covertly utilizing economic and organizational structures as well as corrupt elements within the state apparatus.

Researchers identify several factors that contribute to the spread of organized crime, including socio-economic (economic crises, collapse of business ties), political (lack of effective state control over national wealth distribution, poor functioning of oversight agencies), moral (deterioration of moral climate, devaluation of spiritual values), and legal (gaps in legislation). At the same time, many scholars emphasize corruption as the central danger in the genesis of OC, as its dominance fosters a sense of impunity among participants in organized criminal activities. The ability to resolve virtually any issue through bribery fuels further expansion and consolidation of OC [17, pp. 100–101].

The key features of modern organized criminal structures include: a high degree of organization and secrecy; a hierarchical structure with clearly defined functions for organization, management, and execution; the presence of corrupt connections in governmental and administrative bodies, law enforcement, and the judiciary; the existence of units that ensure internal and external security (armed guards, enforcers, counterintelligence operatives); the politicization of criminal activity, i.e., attempts by group members to infiltrate state institutions or build strong ties with public officials to influence financial, economic, and criminal policy in their favor and avoid public scrutiny; regional, interregional, and international scope (typically along territorial or sectoral lines); the existence of a separate organizational budget; a profit- and violence-oriented agenda closely linked to the shadow economy; influence on the legal economy, financial and banking sectors; and control over illicit enterprises (e.g., drug trafficking, prostitution) [19, pp. 8–12].

Recent statistics reflect the evolving structure of organized crime in Ukraine. In 2022 alone, the Strategic Investigations Department of the National Police of Ukraine submitted 160 criminal cases involving organized criminal groups (OCGs) to the courts. Among these: 26 had interregional connections, 33 had ties to corrupt officials, 23 were implicated in embezzling budget funds, 24 were formed on an ethnic basis, and 7 had transnational links. A total of 641 individuals involved in the activities of these groups were identified – 174 of them were organizers and 445 were direct perpetrators.

Many essential characteristics of OCGs enhance their effectiveness in resisting law enforcement while simultaneously enabling them to exert increasing influence on the state governance system. These criminal communities are often highly structured (68% of studied groups); demonstrate clear internal division of functions (78%); and show an intentional lack of contact between members at different hierarchical levels, which significantly hampers detection and prosecution (58%). Notably, OCGs tend to develop a "special operations block": they possess extensive information-gathering capabilities; attempt to build their own intelligence and counterintelligence systems (44%); control substantial financial resources (53%);

maintain ties to high-ranking corrupt officials (32%); are equipped with advanced technical means (79%); and actively obstruct law enforcement efforts (61%) [20, pp. 18–19].

The fundamental criminological characteristics of modern OCGs, as identified by researchers, include: – Objective indicators: hierarchical structure (28% of analyzed cases); role distribution (46%); presence of formal structure (59%); both vertical and horizontal communication links (59%); stability (28%); – Subjective indicators: internal regulation of relationships (presence of a leader/organizer in 79% of cases); subordination depending on one's position within the hierarchy (46%); shared purpose (28%); obligation to comply with decisions (56%); shared system of values (28%); internal codes of conduct or "thieves' laws" (54%); secrecy of behavior (29%); – Technological indicators: presence of an operational plan (53% of groups); premeditated conspiracy (29%); at least ten accomplices (46%); existence of a shared criminal fund or "common treasury" (*obshchak*) (79%); and systems for evading detection (56%).

Criminal case materials and law enforcement surveys indicate a high level of public danger posed by these groups, which threaten both statehood and constitutional order. Particularly concerning characteristics include organizational stability, hierarchy, interregional and transnational scope, corruption networks and communication channels, ethnic composition, and socio-economic and criminal influence over certain regions of the country.

Among the basic criminological characteristics of the behavior of individuals belonging to criminal communities, the ideologization of the criminal community is distinguished (in 46% of the studied cases) [20, pp. 18–19]. Attention should be paid to this feature of modern OCGs, as certain important aspects of counteracting organized crime, which in pursuit of its unlawful interests seeks to exploit influential clusters of life activity in the modern information society, are addressed in conceptual documents in the field of ensuring Ukraine's national security. OCGs are capable, through their self-serving engagement with the media, of influencing public sentiment opportunistically, shaping public opinion, promoting corrupt politicians, facilitating or blocking specific state decisions, etc. The Information Security Strategy of Ukraine (2021) acknowledges the imperfection of regulation in the field of information activity and the protection of journalists' professional work. This leads to frequent instances of interference in the professional activities of the media and in individual professional creative activity of journalists, as well as other encroachments on the freedom of information activity, including obstruction of professional activity, threats, violence against them, encroachments on their life and property [21].

A disturbing circumstance, according to leading criminologists, is the activity in Ukraine of organized extremist groups, which pose a threat to national security, act as a factor in escalating cruelty and violence, destabilize the socio-political situation, threaten the viability of public authorities, and undermine the authority of the state among the population. Transnational forms of organized crime—drug trafficking, human trafficking, illegal migration, cybercrime, environmental crimes—pose a threat to the personal security of citizens.

Attention is also drawn to the fact that the inherent features of domestic organized crime are themselves directed toward creating threats to national security, state order, and the governance system. Among them (based on the analysis of criminal offenses committed by organized groups and criminal organizations during 2015–2021): criminal influence on the economy and politics (62.4%); significant profits from criminal business (94.4%); attempts to assume certain state functions (46.5%); broad social base (33.7%); violent methods of resolving conflict situations (79.5%); aspiration for legalization in the economy and social sphere (46.5%); politicization of activity (33.7%) [20, p. 16].

Researchers of the organizational and functional structure of modern OCGs distinguish the following components in their composition: leaders (organizers) of organized groups or criminal organizations;

analytical block (advisors and consultants); security block (intelligence and counterintelligence); cover (protection) block, which includes corrupt officials and representatives of law enforcement agencies, as well as lawyers servicing criminal groups, and the keeper of the common fund; active members block: enforcers, direct perpetrators, guards, scouts and others; technical and auxiliary personnel [22, p. 24].

Modern organized crime, according to criminologists, is distinguished by a high level of adaptability to the environment, secrecy and mimicry, use of management technologies and intellectual resources. According to Europol, the use of corruption and parasitism on legal business structures are key features of organized crime in Europe. Two-thirds of criminals regularly maintain corrupt ties, and over 80% of criminal networks use legal businesses. Accordingly, this expands the opportunities of OC subjects to influence the public administration sphere, turning them into an "alternative contour of power" [23].

It should be emphasized that from the standpoint of forming threats to the national security of Ukraine, transnational and ethnically-linked organized crime becomes extremely dangerous. According to 70% of surveyed operational police officers, it has a real dynamic of growth in Ukraine. This is facilitated by certain essential features of ethnic OC. Among them are: a high level of latency due to the closed nature of ethnic groups and mutual cover-up that exists among their members, national solidarity, the threat of clan sanctions for "defectors". In Ukraine, the latent process of forming so-called ethnic criminal communities of Chinese, Turkish, Chechen, Tajik, Syrian, Romani, Azerbaijani and other groups, which rely on their national diasporas, is accelerating. At the same time, migrants psychologically easily move away from legal forms of activity, forming a separate type of community based on group morality. Criminological features of organized ethnic OCGs include a significant proportion of recidivists and up to 80% of migrants among their ranks [6, pp. 243–253; 25].

Transnational and ethnic organized criminal activity has certain system-forming features that determine its danger to national (state) security. The inherent features of transnational crime are: international scale (from several countries or regions of the world up to global scale); spread across all spheres of the economy, trade, finance; mobility, the ability to use international logistics corridors for rapid movement, transportation and communication; effective communication, rapid adaptation to the economic and legal conditions of particular countries and regions; the ability to bypass international and national law enforcement safeguards; the capacity to infiltrate legal institutions to gain advantages and privileges in implementing criminal schemes; complex structuring and hierarchy; international composition of criminal groups; "criminal innovation": use of advanced informational and technical-technological resources to achieve mobility, effective communication, financial operations and control.

For Ukraine's national security, a threat is also posed by the fact that ethnic OCGs include not only representatives of certain ethnic groups who live in Ukraine and are its citizens. Often, criminals are foreigners who were temporarily staying in the country, may leave after committing serious and particularly serious crimes, and later return to continue committing crimes. This also concerns "criminal authorities," "thieves in law," and "overseers," who exercise control and leadership over the activities of ethnic OCGs without being physically present in Ukraine.

At the same time, there are many definitions of organized criminal groups formed on an ethnic basis: "ethnic criminal formations," "ethnic groups," "ethnic organized criminal groups," "organized groups and criminal organizations formed on an ethnic basis." There is a diverse classification of such OCGs according to their ethno-regional formation base. For example, B. Lysohub, based on the study of global experience in combating organized crime, distinguishes the following: 1) East European groups (Russian, Ukrainian, Polish, Lithuanian, etc.); 2) Italian groups (Sicilian, Calabrian, Neapolitan, Italo-American); 3)

African-American groups; 4) Nigerian groups; 5) Latin American and Central American groups; 6) Colombian groups; 7) Mexican groups; 8) Asian groups (Chinese, Korean, Japanese, Vietnamese, Caucasian, Chechen, Armenian, Azerbaijani, Dagestani, Central Asian, Afghan, Pakistani); 9) "international" [26, pp. 14–15].

At the same time, such classification suffers from flaws and inconsistencies. It has been proven that ethno-religious, cultural-mental, and historical factors largely determine the specifics, criminal specialization and tactics, corporate structure, and ethics of activity of certain ethnic OCGs. In the presented scheme, for example, members of the Chinese "triads" (which originated in the 17th century and transformed into ethnic transnational OCGs), the Japanese "yakuza" (which trace their roots to the disenfranchised samurai-ronin of the Tokugawa shogunate era, 1603–1868), and North Caucasian OCGs with the mental coloring of the Vainakh patriarchal "military-raid" society are placed into the same group. It also appears strange to separately categorize "Negroid" (racially Negro) and "Nigerian" OCGs (also racially Africanoid).

Organized crime constitutes a serious threat to national security and internal stability within the state and society. This occurs, in particular, due to its systemic violations of human rights, its all-encompassing nature and scale, and its transformation into an influential element of the social structure. The consequences include property stratification, "simplification" of social connections, consolidation and restructuring of relations in the system of social stratification. The criminal underworld becomes an active actor in public life and directly threatens national security [13].

Moreover, under conditions of globalization, the threat of OC and its transnational forms leads to the formation of the so-called global criminal space, which causes, in particular, restrictions on the real sovereignty of states, large-scale embezzlement of national wealth, legalization of criminal proceeds, the formation of a symbiosis of international corporatocracy (the replacement of the national state model with the "corporate state" model ruled by powerful transnational corporations), transnational organized crime with its armed groups and intelligence-terrorist structures, international terrorist organizations of the network type, activities of intelligence services and private military companies interfering in the internal affairs of sovereign states.

Among the modern features of OCGs, it is also appropriate to mention their capacity to utilize high technology. A major challenge in the information and communication sphere is the emergence of the so-called Internet of Things (IoT), resulting from the synthesis of technological phenomena such as artificial intelligence and network communications. Systems have emerged that reproduce an imitation of mental functions, are capable of communicating with each other, and are integrated into a unified system operating under a single design. In the field of security and defense, this phenomenon has received the designation Internet of Battlefield Things (IoBT) – the use of special-purpose hardware and software devices and systems during the implementation of defense and law enforcement operations.

It is believed that in the foreseeable future, IoBT will claim the role of a dominant factor in the information support of national security. IoBT encompasses cybersecurity measures for special networks against cyber threats, ensures the security of data exchange, and enhances the effectiveness of communication between law enforcement units, contributing to the better organization of planned operations and activities. It is believed that law enforcement forces and assets, united in networks, are capable of gaining information superiority over criminal groups through accuracy, timeliness, objectivity, and general situational awareness. At the same time, the use of IoBT is associated with emerging risks, the main one being unauthorized access by "high-tech" criminals to critical communication systems, interception of information, damage to and destruction of special law enforcement equipment, which may result in serious complications during planned operations [see: 27; 28].

Clearly, under conditions of wartime and combat operations, the anti-state potential of OCGs contributes to their acquiring openly subversive features, transforming them into a strike tool of foreign intelligence services. Effective instruments used by foreign intelligence services to destabilize the situation and change the state-political system of Ukraine include private military companies, which create and finance corrupt circles and organized violent criminal groups. Thus, a factor threatening national security and defense capabilities during full-scale hostilities has become the involvement of foreign (transnational) OCGs in combat operations and intelligence-subversive activities in Ukraine – in particular, through the formation and military use of private military companies (PMCs).

According to researchers of the problem of combating organized crime, internal factors that determine the establishment of organized crime positions on the territory of Ukraine associated with Russian OCGs include their high level of resilience and secrecy, and the orientation of crime organizers toward extensive corruption and international ties of transnational criminal organizations. It is considered proven that Ukrainian criminal groups maintain direct ties with those Russian criminal organizations fully controlled by Russian intelligence services.

To conduct military operations on the territory of Ukraine, the Russian Federation actively employs private military companies (the most well-known being Wagner, E.N.O.T., Slav Corps, MS Group). The core personnel of such structures are composed of veterans of special operations forces and local conflicts, intelligence services, and military intelligence units; they operate under tight control of intelligence services and carry out their covert intelligence tasks. A specific feature of the Russian-Ukrainian war is the mass recruitment into the ranks of the Wagner PMC of individuals from correctional facilities, including those convicted of committing serious and especially serious violent crimes [29–31].

According to criminologists, the presence of such characteristics as resilience, hierarchy, unification of five or more persons who, by prior agreement, organized themselves for joint activity with the aim of directly committing serious or especially serious crimes provides grounds for considering PMCs as one of the armed forms of organized crime. The provisions of the Criminal Code of Ukraine do not exclude the possibility of qualifying the actions of PMC members involved in military aggression against Ukraine as a terrorist act (Art. 258 of the Criminal Code of Ukraine), creation of a terrorist group or terrorist organization, leadership of such a group or organization or participation therein (Art. 258-3), facilitation of a terrorist act (Art. 258-4), financing of terrorism (Art. 258-5). In some countries, such PMCs have been recognized as international criminal and terrorist organizations.

Conclusions and prospects for further research. Under current conditions, such essential characteristics of organized crime as the attempt to influence the socio-political and informational spheres of the state's existence, the internationalization of their unlawful activity, symbiosis with transnational crime, and cooperation with foreign intelligence services, terrorist organizations, and organized forms of mercenarism (PMCs) have significantly intensified. The positions of ethnic OCGs are also strengthening.

It is also worth noting the increasing technological level of OCGs, which necessitates stronger counteraction against their encroachments on the information security of the state and society. Taking into account the special significance of informational and psychological factors in the strategy of non-conventional ("hybrid") warfare and in the arsenal of modern subversive activity, the importance of resisting OCG attempts to exploit the media sphere and other levers of mass consciousness formation in order to influence the socio-political sphere, to establish their own positions within governmental and local self-government bodies, public associations, and the media, grows substantially.

The task of informational confrontation with OCGs, which aspire to seize instruments of political influence, must be taken into account when defining the functional

priorities and substantive guidelines for the development and operation of the national system of strategic communications (NSC) at its national and departmental levels, with the involvement of the capabilities of the humanities and civil society institutions.

Prospects for further research. First and foremost, researchers should devote increased attention to identifying qualitative changes in the nature of modern OCGs – in their organizational and functional structure, ethnic composition, international connections, forms and methods of unlawful activity – as well as to the latest mechanisms of interaction between organized crime and the corrupt segment of the administrative apparatus under conditions of substantial foreign financial inflows for Ukraine's defense needs.

Further in-depth research is needed on the innovative informational and socio-psychological technologies employed by OCGs to strengthen their influence on the political establishment and society as a whole.

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Received: 05.02.2025
Revised: 15.02.2025
Accepted: 25.02.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 34.096 DOI 10.59226/2786-6920.1.2025.103-110

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ANALYSIS OF LEGAL REGULATION OF BIOLOGICAL SAFETY AND BIOLOGICAL DEFENSE: THE EXPERIENCE OF GERMANY AND FRANCE

The article conducts a comprehensive study of the legal regulation of biological safety and biological defence in Germany and France in order to identify effective mechanisms that can be adapted to Ukrainian conditions. The main legislative and institutional approaches to biological risk management are analysed, including the state control system, regulation of genetic engineering, the work of a network of specialised laboratories, as well as measures to train personnel and respond to biological threats.

Particular attention is paid to French practices in integrating military structures into the biodefense system, which allows for an effective response to biological incidents in wartime or under terrorist threats. Germany, in turn, has demonstrated a high level of legal regulation of biotechnology and a multi-level system for monitoring and containing biological threats.

In the context of full-scale armed aggression against Ukraine and the actualization of the risks of the use of biological weapons, the adaptation of these standards and practices is of key importance for strengthening national security. The proposed approaches to harmonizing Ukrainian legislation with international norms will contribute to increasing the stability of the state biosecurity system, improving interdepartmental coordination mechanisms and developing rapid response capacity. The implementation of these approaches will minimize the consequences of potential biological incidents, protect the population, military personnel and critical infrastructure in martial law.

In conclusion, it is emphasized that the transformation of the Ukrainian biological security system, taking into account European experience, is not only a matter of legislative adaptation, but also a strategic condition for ensuring the sustainable development of the state and its defense capability in the face of hybrid threats.

Keywords: *biological safety; biological protection; biological weapons; biological risks; health protection; national security; implementation of legal standards; civilian population; military formations; military personnel; war; genetic engineering technologies; control system.*

Statement of the problem. Issues of biological security (hereinafter – biosecurity) and biological protection (hereinafter – biosafety) are of paramount importance in the context of contemporary global challenges, which arise in light of scientific and technological advancement, as well as emerging risks associated with the use of biological agents. These concerns pertain to both civilian and military purposes, including the potential development of biological weapons or the production of harmful biological substances. In this context, the protection of military formations becomes particularly relevant, as they may serve both as potential targets and as active agents in responding to biological threats during armed conflict.

The increasing international exchange of goods and ideas, globalization, and pandemics such as COVID-19 underscore the critical importance of preparedness for biological threats and the implementation of effective measures for their prevention and control. Particular attention should be paid to the biosecurity of medical personnel, who stand on the front lines in the fight against biological threats and are at heightened risk of infection (see Fig. 1). This is especially pertinent in combat zones, where they are responsible not only for treating the wounded but also for monitoring the bio-epidemiological situation within military units.

In addition, the advancement of biological technologies increases the potential threat of the malicious use of biological agents, necessitating the continuous improvement of biosafety strategies. In the military context, biosecurity is critically important for the protection of personnel, mobilization resources, medical and logistical units, as well as for ensuring the continuity of combat operations in the event of biological attacks or sabotage involving biological agents. Given that modern warfare encompasses elements of both hybrid and biological threats, a reliable biosafety system within military formations is one of the key factors in maintaining combat readiness and ensuring the safety of the civilian population in conflict zones.

An analysis of the legal regulation of biosecurity and biosafety, particularly in the context of the experiences of Germany and France, reveals effective models that may be adapted for implementation in Ukraine to enhance national security and resilience in addressing contemporary biological threats. Given the rapid advancement of biological technologies, it is imperative for states to develop and implement comprehensive legal and organizational measures for the effective control of biological risks. These measures should include individual protective strategies, preventive programs, and vaccination campaigns, forming an integrated framework for mitigating both intentional and naturally occurring biological hazards.

Figure 1. The image was taken from source [1]

An analysis of recent studies and publications reveals considerable scholarly interest in the legal regulation of biological security and biosafety. This attention is driven by the increasing risks associated with the advancement of biotechnology, globalization, and emerging challenges in the sphere of international security. In both foreign and domestic academic works, biosecurity is highlighted as a key component of national and global security systems. Existing research addresses international legal instruments in the field of biosecurity, such as the Cartagena Protocol on Biosafety, as well as European Union documents that set forth requirements for the control of biological agents and the regulation of innovations in this domain. Issues of biological security and biosafety have also been explored in the context of the National Security of Ukraine. Scholars such as A. Halushka, R. Hrevtsova, O. Ivanko, V. Pashkov, I. Seniuta and others have contributed to this area of research. However, the specific approaches of Germany and France to biological security and biosafety, particularly their legislative regulation of genetically modified organisms, genetic engineering, and mechanisms for the prevention of and response to biological threats, remain underexplored within Ukrainian legal scholarship.

The purpose of the article is to examine the experience of Germany and France in the field of biosafety and biosecurity with a view to adapting these standards and practices into Ukrainian legislation.

Presentation of the main material. It is worth noting that the EU Member States do not have a separate legislative act dedicated specifically to biosafety and biosecurity. Nevertheless, the acts of the European Parliament establish general requirements for biosafety and biosecurity, which each Member State is obliged to transpose into its national legislation.

In the context of comparative approaches to the implementation of EU biosafety and biosecurity requirements by Member States, it is appropriate to refer to the examples of Germany and France, whose legislation, in our view, is among the most developed in this field in Europe.

Germany. Biosafety and biosecurity in Germany are of great importance both at the national and international levels. Germany possesses a high level of technological expertise and considerable experience in this field, and it actively cooperates with other countries to ensure safety and protection against biological threats.

In Germany, the regulation of biosafety and biosecurity issues is carried out in accordance with a range of laws and regulatory acts. In particular, the Infection Protection Act *(*Infektions schutz gesetz) [2] sets out the fundamental rules and procedures for the prevention and control of infectious diseases. This legislative act also contains provisions on biosecurity and establishes guidelines for responding to biological threats. In turn, the Genetic Engineering Act *(*Genetic Engineering Act – GenTG) [3] takes into account ethical values and the importance of protecting human life and health, as well as preserving the environment from the harmful effects of genetic engineering processes and products, and provides for measures to prevent such risks. The National Strategy on Biological Diversity (Nationale Strategie zur biologischen Vielfalt) [4] encompasses a wide range of measures aimed at preventing and responding to threats related to biological agents; the development and implementation of advanced technologies for the detection, monitoring, and elimination of biological threats; and the provision of appropriate training and preparation of personnel for effective response. The Ordinance on Safety and Health Protection at Workplaces Involving Biological Agents (BioStoffV) [5] sets out requirements for safeguarding the safety and health of workers against hazards arising from such activities, as well as for protecting other individuals who may be at risk due to the use of biological agents by employees or self-employed business operators. The guiding module for the Radiation Protection Ordinance (StrlSchV) [6] defines the necessary specialized knowledge in the field of radiation protection for medical purposes and other related contexts.

A variety of legislative acts and regulatory mechanisms are in place to govern biosafety and biosecurity issues in specific sectors such as agriculture, medicine, science, and others. The relevant norms and standards establish requirements for the safe use of GMOs, measures for monitoring their distribution and impact on the environment, as well as define liability for violations of these regulations. This approach enables effective regulation of areas that require special attention from the perspective of biosafety and biosecurity, ensuring a high level of protection for both the population and the environment.

In Germany, the responsibilities for ensuring biosafety and biosecurity are assigned to several

governmental institutions and organizations. The Federal Ministry of Health (Bundesministerium für Gesundheit) is responsible for developing and implementing policies related to the safety and control of food products, particularly those that may be associated with biological threats. The Federal Ministry of Food and Agriculture (Bundesministerium für Ernährung und Landwirtschaft) is tasked with regulating agricultural activities and overseeing the quality and safety of products that may be linked to biological factors; The Federal Ministry of Defence (Bundesministerium der Verteidigung) is responsible for protecting national security, including measures against potential biological threats and conducting research in this area. The Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung – BfR) is tasked with scientific evaluation and risk assessment to ensure food safety, particularly in relation to potential biological threats. The Federal Office of Civil Protection and Disaster Assistance (Bundesamt für Bevölkerungsschutz und Katastrophenhilfe – BBK) is responsible for planning and coordinating emergency response measures, including those related to possible biological threats and epidemics.

These governmental institutions jointly carry out oversight, develop strategies, and implement measures to ensure biosafety and biosecurity in Germany.

The main features of biosafety and biosecurity measures in Germany include: the development and implementation of laws, regulations, standards, and rules governing the use of biological materials, assessing risks to human health and the environment, and establishing safety and control procedures; conducting scientific research, expert assessments, and risk evaluations related to the use of biological technologies and materials; the establishment of monitoring and control systems for the use of biological agents, including systems for the detection of and response to potential threats; conducting educational activities on safety rules, procedures, and protection measures to train personnel working with biological materials; and Germany international cooperation with other countries and international organisations in the areas of information exchange, experience sharing, and technology transfer to ensure biosafety and biosecurity at the global level.

These measures contribute to ensuring safety and protection against potential biological threats across various sectors, including healthcare, agriculture, the military, and others.

At the same time, it should be noted that in the context of military formations in Germany, a special role in the field of biosecurity is played by the Central Medical Service of the Bundeswehr (Zentraler Sanitätsdienst der Bundeswehr) and the Bundeswehr Institute of Microbiology (Institut für Mikrobiologie der Bundeswehr), which specialize in the identification, assessment, and neutralization of biological threats in military settings. Their activities are governed by internal guidelines of the Ministry of Defence, as well as by documents such as the Framework Concept for CBRN Protection (Rahmenkonzeption CBRN-Schutz – chemical, biological, radiological, and nuclear protection), published by the Federal Office of Civil Protection and Disaster Assistance (BBK). This document outlines interagency and interregional principles for organizing CBRN protection in Germany. It defines the necessary capacities and standards for effective response to CBRN threats. In addition, the book CBRN-Schutz in der Gefahrenabwehr by Andreas Kühar and Klaus Ehrmann [7] provides a detailed account of potential threats and protective measures related to chemical, biological, radiological, and nuclear hazards. The book also examines the organizational and technical aspects of CBRN protection, including the training and preparation of personnel.

It is also worth noting that Germany actively participates in NATO initiatives related to CBRN protection. In particular, it leads the CBRN cluster within the Framework Nations Concept (FNC), which aims to enhance the capabilities of European allies in this domain. In 2014, Germany initiated the establishment of the CBRN Defence Cluster, which brings together NATO member states to strengthen cooperation and improve readiness for CBRN threats. This cluster serves as a platform for sharing experience, coordinating exercises, and developing joint standards in the field of CBRN protection.

In addition, Germany supports the project to establish a CBRN Defence Facilities Network, which aims to integrate various CBRN protection facilities, such as training centers and laboratories, into a unified network. This enables participating entities to share resources and enhance overall preparedness for CBRN threats.

Thus, Germany is actively conducting research in the field of biological protection, aimed at developing

new methods and technologies for the prevention and elimination of biological threats. Particular attention is given to cooperation with international organisations and other countries to facilitate the exchange of experience and the coordination of efforts in this area. The experience of Germany in the context of military formations demonstrates a high level of preparedness to respond to biological threats, the integration of civilian and military security mechanisms, as well as a well-defined legal and regulatory framework for relevant actions in emergency situations.

France. In France, legislation on biosafety and biosecurity encompasses a range of laws, regulations, and standards aimed at protecting public health and safety from biological threats. Key aspects of this legal framework include: The Public Health Code [8], which establishes provisions for combating epidemics and specific infectious diseases (Articles L3111-1 to L3116-6), tuberculosis and leprosy (Articles L3112-1 to L3112-2), the international spread of diseases, vaccination requirements, and related matters; National Environmental Health Plans*:* "One Environment, One Health" (Plan National Santé Environnement, PNSE) [9] illustrate the evolving understanding of biosafety and biosecurity. While the first plan addressed primarily environmental risks, by the fourth plan these aspects have been integrated systematically. With each new iteration, the focus has shifted from purely chemical risks to biological ones, reflecting current challenges such as climate change and infectious disease threats; PNSE 4 demonstrates a strategic approach by integrating biosecurity issues with the management of infectious disease risks, climate change, and even potential acts of bioterrorism. It encompasses measures for prevention, emergency response, and coordination among various agencies and organizations; the Order of 29 September 2021 on biosecurity measures applied by operators and professionals working with animals on premises where domestic poultry or captive birds are kept, as part of the prevention of animal diseases transmissible to animals or humans [10] establishes regulations for the prevention of zoonotic and epizootic diseases; it defines biosecurity measures applicable to the operational functioning and physical protection of facilities and the personnel working therein; the Order of 16 October 2018 on biosecurity measures implemented on farms where pigs are kept, in the context of preventing African swine fever and other regulated health hazards [11] establishes provisions for the prevention of African swine fever and other health risks as regulated by the Ministerial Order of 29 July 2013, which defines first- and second-category animal health hazards; it defines biosecurity measures concerning physical protection as well as the operational conditions of farms; the Order of 8 October 2021 on the establishment of technical and administrative measures related to the prevention, surveillance, and medical monitoring of infections in cattle, goats, and pigs, as well as in camelid and cervid farms, by the Mycobacterium tuberculosis complex [12], sets forth technical and administrative measures concerning prevention, collective prophylaxis, and medical control of infections caused by the Mycobacterium tuberculosis complex.

In addition, this order establishes national requirements in accordance with European legislation and repeals the amended decree of 15 September 2003, which set forth technical and administrative measures for collective prophylaxis and health control of cattle and goats; the Order of 11 July 1990 establishes technical measures related to the detection of bovine tuberculosis for the purpose of halting operations, the Order of 13 March 1995 concerns the sanitary conditions required for the trade of certain ruminant animals within the Community, the Order of 11 February 1998 sets sanitary conditions regarding the keeping, movement, and sale of certain ruminants; the Decree of 29 September 2011 establishes specific measures for combating bovine tuberculosis in the departments of Bouches-du-Rhône, Gard, Hérault, and Landes, and the Decree of 18 November 2009 lays down special measures for combating bovine tuberculosis in the departments of Bouches-du-Rhône, Gard, and Hérault.

In France, the responsibilities for ensuring biosafety and biosecurity are entrusted to several organizations and institutions. The Ministry of the Armed Forces of France (Ministère des Armées) is engaged in the development and implementation of strategies and procedures aimed at preventing the emergence of biological threats at both military and civilian facilities; it conducts training activities, exercises, and simulations to prepare military personnel and civilian services for effective response to biological incidents; military research institutions under the authority of the Ministry of the Armed Forces are actively engaged in the development and

refinement of technologies for the detection, analysis, and neutralization of biological threats. The Ministry collaborates with other governmental bodies, agencies, and international
partners to facilitate information exchange, coordinate actions, and enable joint responses to biological threats. The Ministry of the Interior and Foreign Affairs of France (Ministère de l'Intérieur) is responsible for coordinating actions in emergency situations, including responses to biological threats and acts of terrorism; it ensures the coordination and provision of assistance in crisis situations involving biological hazards, such as epidemics or biological terrorist attacks; the police and other law enforcement agencies under the jurisdiction of the Ministry of the Interior are involved in ensuring public safety in the event of biological threats; the Ministry closely cooperates with other national and international institutions to facilitate information exchange and coordinate measures in the field of biosecurity; the National Agency for Food, Environmental and Occupational Health Safety (Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail – ANSES) conducts research and risk analysis related to diseases that can be transmitted from animals to humans (zoonoses), such as viruses, bacteria, or parasites; it performs risk assessments concerning microbiological contamination in food products, such as bacteria, viruses, or fungi that including analysis of potential health impacts on consumers and the development of strategies to ensure food safety; the agency also studies the effects of biological agents, such as microorganisms, on the health of workers across various industrial sectors; it investigates the impact of various environmental factors, such as air, water, and soil pollution, with the aim of assessing their effects on human health and ecosystems; the agency contributes to ensuring biosafety by conducting scientific research, performing risk assessments, and developing recommendations for the protection of public health and the environment; the Pasteur Institute (Institut Pasteur) conducts research on microorganisms, including viruses, bacteria, and parasites, that may pose a threat to human and animal health; it is actively involved in the development of vaccines and immunotherapies for the prevention and treatment of zoonotic diseases (those transmitted from animals to humans), as well as other illnesses with significant public health implications; the Institute maintains a network of laboratories and diagnostic centers that facilitate the rapid detection and diagnosis of diseases, as well as the monitoring of epidemics and viral outbreaks; it conducts research and develops methods of biosecurity, including the
detection and control of pathogens, the creation of safe handling protocols, and the formulation of strategies to prevent accidental or unintended release of hazardous microorganisms; the Institute operates at both national and international levels to prevent and control diseases that may pose a threat to public health and safety; t*he* General Directorate for Civil Security and Crisis Management (Direction Générale de la Sécurité Civile et de la Gestion des Crises – DGSCGC) is responsible for the development and implementation of strategies and measures aimed at protecting the population and property from various hazards, including the prevention of natural disasters, fires, and technological accidents etc.; it plays a crucial role in coordinating biosecurity measures and responding to biological threats, such as disease outbreaks or terrorist acts involving biological weapons.

These authorities cooperate with one another and with international organisations to ensure biosafety and biosecurity in France.

France has a range of instruments and measures in place to ensure biosafety and biosecurity. These include laws, regulatory acts, and international agreements governing biological safety, particularly the control over the dissemination and use of hazardous biological agents, as well as preventive and responsive measures to address biological threats. National and regional action plans are developed and implemented to detect, prevent, and respond to biological threats, including disease outbreaks and bioterrorist acts; a network of specialized laboratories and diagnostic centers performs functions related to the detection, identification, and diagnosis of biological agents, as well as the analysis of their properties and potential consequences; investments are made in the development and enhancement of technological tools and equipment for the detection, analysis, and neutralization of biological threats; training activities, exercises, and simulations are conducted for personnel working in the field of biosecurity to ensure preparedness for effective response to biological hazards. These measures also

have practical implementation within the defense sector. The experience of France in the context of military formations illustrates the integration of biological security into national security strategies. The French Armed Forces are actively engaged in interagency coordination during biological crises and participate in simulations and training exercises that model biological attacks and epidemics.

Through collaboration with civilian structures, particularly the Ministry of Health and specialized agencies, effective response to threats is ensured. Military research institutions, such as the Directorate General of Armaments (DGA), are engaged in the development of innovative detection and protection technologies, while military medical units provide prompt medical assistance and mobile laboratory diagnostics.

Particular attention is devoted to the training of personnel for operations in biologically hazardous conditions, which is fully aligned with the overarching national policy in the field of biosecurity.

Thus, the experience of France illustrates the close interconnection between the legal-regulatory, scientific-technical, and practical dimensions of biological security in both the civilian and military domains.

Conclusions and Prospects for Further Research. An analysis of the legal regulation of biosafety and biosecurity in Germany and France reveals that both countries possess a well-developed and comprehensive legal framework addressing both current and emerging biological threats. Particular emphasis is placed on the regulation of genetic engineering, the control of genetically modified organisms, and the assurance of environmental and food security. At the same time, effective interagency coordination, the availability of specialised laboratories, early warning systems, personnel training, and strategic planning within the defence sector together form an integrated response system to biological incidents.

Against the backdrop of the armed aggression by the russian federation against Ukraine, biological security has acquired particular importance as an element of national security. The full-scale war presents additional challenges, including the risks of bioterrorist attacks, the potential release of hazardous pathogens from combat zones, threats to both the civilian population and military personnel, as well as an increased need to protect critical infrastructure.

In comparison with the experiences of Germany and France, the national legal framework for biological security in Ukraine is still in the process of development and requires further advancement. Existing legal acts possess the potential for improvement in terms of alignment with international standards, strengthening institutional oversight, and expanding technical capacities. A comprehensive modernization of this sector would contribute to enhancing the state's resilience to biological threats amid contemporary challenges.

The scientific findings of this study may serve as a foundation for drafting proposals to implement best practices from Germany and France into national legislation. In particular, this includes: the establishment of a unified interagency response system to biological threats involving the security and defense sectors; the creation of a national biosafety center capable of coordinating actions during emergencies; the enhancement of genetic engineering and biotechnology regulations with consideration for environmental and ethical aspects; the improvement of legal acts concerning the use and storage of hazardous biological agents; the introduction of safety standards for medical and research institutions working with pathogens; and the systematic training of professionals in the field of biosecurity.

The adaptation of these standards and approaches will not only enhance the capacity of Ukraine to counter biological threats in peacetime but also ensure its national security during wartime. This will contribute to better protection of military personnel and the civilian population, reduce the risk of infectious disease spread, maintain the continuity of medical services and infrastructure, and strengthen public trust in state institutions during times of crisis.

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Received: 21.01.2025
Revised: 28.01.2025
Accepted: 07.02.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 335/359 DOI 10.59226/2786-6920.1.2025.111-116

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ART AS A MEANS OF FORMING COLLECTIVE MEMORY AND IDENTITY: METHODOLOGICAL TOOLS OF UKRAINE'S SECURITY AND DEFENSE SECTOR

The article explores the role of art in shaping collective memory amid security challenges and the defense of Ukraine. It analyzes how visual arts, music, and performative genres contribute to societal consolidation, the strengthening of national identity, and countering informational threats. Art is examined as a means of symbolic resistance, a tool for reviving historical memory, and a mechanism for mobilizing citizens in times of crisis. Special attention is given to its role in combating disinformation and fostering cultural resilience.

***Keywords*:** *security and defense sector; collective memory; identity; psychology of artistic creativity; methodology of art research; understanding of the artwork; psychology of artistic creativity; psychology of the impact of art.*

Statement of the problem. Collective memory and identity are key factors in ensuring the stability and cohesion of society, especially in times of war and crisis. Art, as a means of communication, plays an important role in shaping shared perceptions of historical events, preserving cultural heritage, and strengthening national identity. In the current context of military conflict in Ukraine, there is an urgent need to study the mechanisms through which art influences collective consciousness and its use in the field of security and defense.

Art is not only a means of aesthetic expression, but also a powerful tool for influencing public consciousness. It can contribute to the development of patriotic sentiment, support the morale of both the military and civilian population, and counteract informational threats. In this context, studying the role of art in shaping collective memory and identity becomes particularly significant in the conditions of hybrid warfare and information operations.

In the legal framework, an important role is played by the Law of Ukraine "On National Security of Ukraine" [1], which defines the fundamental principles of national security, including the informational and cultural components. According to this law, ensuring the information resilience of society and preserving national identity are key elements of the state's security policy. In this context, art can be viewed as one of the tools for implementing the strategic objectives of national security, particularly in the areas of communication, psychological influence, and the formation of a positive image of the country in the world.

Thus, the relevance of our research is driven by the need to explore the methods of using art in the field of security and defense, its impact on national identity, and the resilience of society under conditions of military conflict.

Analysis of recent scientific research and publications. Collective memory and identity are central themes for contemporary researchers [2]. In her study, Oksana Zabuzhko [3] emphasizes the importance of art in shaping cultural memory, especially in the context of conflict-affected societies. H. Farooq (2023)

[4] highlights the role of artistic narratives in supporting societal resilience in the face of war and crisis.

The study by S. Johnson (2012) [5] on visual imagery in the context of cultural memory allows for viewing works of art as carriers of historical identity. Yaroslav Hrytsak [6] analyzes the formation of the modern Ukrainian nation through cultural and social factors that are directly related to the issue of collective memory. Researcher M. Pazyniuk [7] explores the experience of war in visual arts and its impact on the psychological state of society. At the same time, the study by E. Perzycka-Borowska et al. (2023) [8] demonstrates the socio-educational impact of murals created during the war in Ukraine as an important factor of cultural identity.

The purpose of this article is to define the role of art in shaping collective memory and identity in the context of military conflict, as well as to develop a methodological toolkit for harnessing this potential within Ukraine's security and defense sector To achieve this goal, the following tasks need to be solved:

1. To analyze theoretical approaches to studying art as a mechanism for constructing collective memory and identity.
2. To explore artistic practices and how they contribute to social cohesion and the restoration of psychological resilience during wartime.
3. To identify the specific features of using art in the communication strategies of Ukraine's security and defense sector.
4. To outline practical recommendations for integrating artistic initiatives into national security and defense programs.

Presentation of the main material. Let us consider the theoretical foundations and conceptual approaches to the issues of collective memory and art. Collective memory is a key mechanism in constructing social identity, anchoring shared perceptions of the past through symbolic practices. J. Assmann (1995) [2] defines collective memory as a social phenomenon formed through cultural carriers, particularly art.Artistic images, literary works, architectural monuments, and performative practices serve as channels for transmitting historical narratives.H. Farooq (2023) [4] notes that art functions not only as a means of preserving historical events but also as a mechanism for society's adaptation to social change.

In the context of war, art performs the function of mobilizing society and consolidating it around shared values. E. Perzycka-Borowska et al. (2023) [8], using the example of street art, demonstrate that artistic imagery can become a powerful tool of social communication, activating mechanisms of collective memory through visual metaphors.

Identity in Times of Crisis: The Role of Artistic Symbols. Societal identity undergoes transformations during crises, which triggers the activation of cultural symbols as a means of consolidation. Y. Hrytsak [6] emphasizes that historical myths and cultural narratives play a decisive role in the processes of national self-identification. In the context of war, these mechanisms acquire special significance, as they contribute to preserving unity and shaping new survival strategies.

K. Johnson (C. Johnson, 2012) [[5] analyzes the significance of artistic symbols in constructing cultural worldviews. His research indicates that the use of visual imagery in art helps society cope with traumatic experiences through symbolic representation of events. In this aspect, Zabuzhko's study [3] is important for understanding how literary images and artistic narratives become tools for identity formation amid social transformations.

Art in the Security and Defense Sector. Art plays an important role in improving the moral and psychological well-being of military personnel. In particular, art therapy helps soldiers cope with the psychological consequences of combat, contributing to the restoration of mental health and adaptation to civilian life. As noted by ArmyInform [9], art therapy is an effective rehabilitation tool that combines the promotion of art with the recovery of soldiers' mental health.

Moreover, music and other forms of art are used to support morale and foster patriotic education. For example, the Military Music Center of the Land Forces of the Armed Forces of Ukraine promotes the cultural and aesthetic education of personnel by advocating national art and military-patriotic themes.

Cultural Diplomacy and Information Security. Cultural diplomacy is an important tool of state policy that contributes to forming a positive image of the country on the international stage and supporting information security. Organizing cultural and artistic events helps disseminate information about the country, promote its cultural heritage, and facilitate intercultural dialogue [10].

In the context of information warfare, cultural diplomacy becomes a means of countering

disinformation and propaganda, thereby strengthening national security. As noted in the research, cultural diplomacy plays a crucial role in developing intercultural dialogue and contributes to resolving and preventing conflicts [11]..

Military Art in Communication Strategies and Psychological Support. Military art, particularly music, is used as a means of communication and psychological support. Military musical support is an element of both external and internal communication, contributing to the enhancement of the moral and combat spirit of servicemen and the formation of a positive perception of military service [12].

Overall, the integration of art into the security and defense sector contributes not only to increasing the effectiveness of military units but also to strengthening national identity and cultural values..

Methodological Toolkit. Art as a means of shaping collective memory and identity requires a comprehensive methodological approach to analyze its impact. Let us consider the key research methods applied to evaluate artistic manifestations in the context of Ukraine's security and defense sector:

Methods of Visual Narrative Analysis. The analysis of visual images used in art is an important tool in studying processes of collective memory. The application of visual semiotics and cognitive analysis methods allows uncovering hidden meanings and their impact on community identity [2].

- *Social-Psychological Approaches to Assessing the Impact of Art.* The study of the psychological impact of art is based on the theories of emotional resonance and social identity. Research shows that artworks can act as triggers of emotional memory and contribute to the formation of shared values [3, 4].
- A Comprehensive Approach to the Study of Art in the Context of Security. To assess artistic strategies in the security sector, mixed research methods combining qualitative and quantitative analysis are applied. This approach allows for determining the effectiveness of artistic projects in strengthening the psychological resilience of both military personnel and civilians [8].

Empirical Cases of Art Application in Martial Law Conditions. The use of art in the process of shaping national identity and supporting the morale of military personnel is a common practice in armed conflicts. The experience of Ukraine and other countries facing military challenges demonstrates the effectiveness of artistic initiatives in this context.

One of the most vivid examples is the murals created in Ukraine after 2014. Street art has gained special significance, as it became not only a means of artistic self-expression but also an important tool for communication with society. Images of military personnel, historical figures, symbols of the national struggle, and motivating slogans on the walls of buildings in Kyiv, Kharkiv, Lviv, and other cities shape collective memory and represent the resilience of the Ukrainian people [8].

Another important case is the "Songs of War" project, in which Ukrainian military personnel collaborate with professional musicians to record compositions reflecting their combat experiences. This approach not only helps preserve the personal stories of defenders but also creates a powerful emotional connection between the military and the civilian population.

Similar practices can be found in the history of other countries. For example, during World War II, Britain actively used propaganda posters to boost the morale of both military personnel and civilians. Later, in the United States after the events of September 11, 2001, artistic projects such as memorial installations and murals helped society process the tragedy and restore national unity [5].

Based on the analysis of these cases, it can be argued that art performs not only a decorative or aesthetic function but also serves as an important means of shaping collective memory, supporting psychological resilience, and consolidating society during crisis periods. Further research could focus on expanding the use of artistic initiatives in the security and defense sector, particularly through the integration of digital art technologies in military training and the rehabilitation of servicemen.

As we can see, art plays a key role in the formation and strengthening of national identity, especially during periods of armed conflict. Let us consider several specific examples from Ukraine and other countries that demonstrate how artistic initiatives contribute to societal consolidation and the preservation of cultural heritage during war.

Ukraine:

- *Cinematography*. Ukrainian cinema has become an important tool for reflecting national struggle and cultural identity. Producer Artem Kolyubaiev [13] emphasizes the significance of cinema during martial law, creating films that highlight the

- history, culture, and resilience of the Ukrainian people. For example, the film *Shchedryk* takes viewers back to the times of World War II, showing how Ukrainians survived under the occupation of totalitarian regimes, while emphasizing the importance of preserving culture and national identity as a form of resistance..
- *Exhibition projects.* In Kyiv, the exhibition project *War for Identity [14]. The Power of Cultural Resilience* was launched, telling the story of Ukraine's ongoing struggle — from the Revolution of Dignity to the full-scale war with Russia. This project demonstrates how culture and art become means of resistance and preservation of national identity.
- *Visual Arts.* Ukrainian artists, such as Serhii Burbelo, reflect the realities of war and the aspiration for victory through their paintings. His works, particularly the series *QIRIM. 10 Years of Hope*, have become symbols of resilience and hope, with proceeds from their sale directed to support the Armed Forces of Ukraine. [15].
- *Folk Traditions.* n the Chernihiv region, folk traditions and arts are actively promoted during the war through workshops, exhibitions, and other cultural events. This helps preserve national identity and supports the morale of the population [16].

International Experience:

- *Bosnia and Herzegovina.* During the war of the 1990s, art became a means of preserving national identity and cultural resistance. The Sarajevo Film Festival, founded in 1995 during the siege of Sarajevo, became a symbol of resilience and a platform for expressing national culture.
- *Palestine.* Art is used as a form of nonviolent resistance and the preservation of national identity. Palestinian artists highlight cultural heritage and the contemporary challenges facing their society through murals, exhibitions, and performances.

These examples demonstrate that art in times of war not only reflects reality but also actively shapes national identity, promotes social cohesion, and helps preserve cultural heritage.

Practical recommendations for the security and defense sector. In the modern conditions of war, art can play a key role in shaping the moral and psychological resilience of servicemembers, strengthening national identity, and enhancing the effectiveness of strategic communications. Here is a set of practical recommendations for using artistic initiatives in the security and defense sector.

1. *Integration of artistic initiatives into military training.* Art can play an important role in the training and support of servicemembers. The development of art therapy programs is a key element of rehabilitation for those who have experienced psychological trauma, as it helps them express their emotions and reduce stress levels. Military training can integrate historical and cultural symbols to strengthen national consciousness and the morale of soldiers. Organizing art workshops and exhibitions within military units fosters a space for self-expression, which is crucial for the psychological well-being of servicemembers. Involving artists in the design of military symbols, including patches, flags, and emblems, contributes to the formation of a strong identity and fighting spirit.

2. Use of visual art in strategic communications. Art can become an effective means of communication in the military sphere. Developing artistic campaigns will help disseminate key narratives among both military personnel and the civilian population, while the use of graphic art can counter hostile propaganda and disinformation. Modern technologies such as augmented reality (AR) and virtual reality (VR) open new opportunities for creating interactive historical reconstructions and training simulations that can be used in military education. Additionally, artistic interventions in urban spaces—such as graffiti, posters, and murals—can promote patriotic spirit and support national identity.

3. Application of artistic methods for psychological support of military personnel. Art also serves as a powerful means of psychological support. Psycho-emotional stabilization programs based on drawing, sculpting, and other art forms promote relaxation and help servicemembers overcome the effects of combat. Theater techniques can be used to simulate complex situations, develop communication skills, and reduce stress levels. Military hospitals and rehabilitation centers can establish specialized art therapy centers that become hubs of support for those affected. Special attention should be given to supporting military musical and artistic ensembles, which not only preserve cultural heritage but also boost morale and motivation among servicemembers.

The proposed measures will contribute to enhancing the effectiveness of military training and strategic communications, as well as to building a strong moral and psychological foundation for Ukrainian servicemembers in the context of modern challenges.

Conclusions and prospects for further research. The study confirmed the key thesis on the importance of art as a means of shaping collective memory and identity amid contemporary challenges, particularly war. The analysis of scientific literature, legal and regulatory documents, and empirical data demonstrated that artistic initiatives not only contribute to the preservation of cultural heritage but also play an active role in social cohesion, psychological support for servicemembers, and strengthening information security.

The work identifies areas in which art is used within the security and defense sector. First, it demonstrates the effectiveness of art therapy as a component of psychological rehabilitation for servicemembers, contributing to the reduction of post-traumatic disorders and the enhancement of stress resilience. Second, it reveals the significance of visual art in military communications: artistic narratives, graphic symbols, and murals emerge as powerful tools for identity formation and combating disinformation. Additionally, the role of cultural diplomacy as a means of Ukraine's international positioning in the context of hybrid warfare is highlighted.

The research objective was achieved through an analysis of the key mechanisms by which art influences collective memory and identity. The set tasks were also completed: conceptual approaches to the role of art in crisis conditions were characterized, the experience of using art in the defense sector was examined, and concrete recommendations were proposed for integrating artistic initiatives into military training, communication strategies, and psychological support programs for servicemembers.

Prospects for further research may focus on empirical methods for assessing the effectiveness of artistic initiatives in the security and defense sector. In particular, a more in-depth study is needed on the impact of various artistic methods on the emotional state of servicemembers, as well as an analysis of the long-term effects of using art as a tool in information warfare. Additionally, it is important to consider issues of regulatory framework and institutional support for artistic initiatives within the military sphere, which would enable the creation of effective mechanisms for integrating cultural policy into the national security system.

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ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 343.98+343.148 DOI 10.59226/2786-6920.1.2025.117-124

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PECULIARITIES OF CRIMINAL LIABILITY OF MILITARY PERSONNEL IN NATO MEMBER COUNTRIES

The article examines the peculiarities of the legal regulation of criminal liability of military personnel of NATO member countries. A comprehensive comparative legal analysis of the military-criminal legislation of the leading states of the Alliance has been carried out, and common and distinctive features of the legal mechanisms for bringing military personnel to criminal responsibility have been identified. The legal grounds of responsibility of servicemen for crimes against the order of military service and common criminal offences are considered. It studies peculiarities of the functioning of the system of military justice in NATO countries, the powers of military courts and other bodies of military justice, and the specificity of the differentiation of civil and military jurisdiction.

Particular attention is paid to the legal regulation of criminal liability of military personnel during international operations within the Alliance and beyond. The article analyzes the process of implementation of international humanitarian law into the national legislation of NATO member countries, as well as the system of punishments applied to military personnel for committing criminal offenses.

On the basis of the conducted research, promising directions for improving the national military-criminal legislation are determined, taking into account the standards and experience of NATO member countries.

***Keywords**: criminal liability; military personnel; NATO; military offences; military justice; military courts; international humanitarian law; military criminal legislation.*

Statement of the problem. The issue of legal regulation concerning the criminal liability of military personnel is relevant for ensuring the proper functioning of the armed forces in any country. In the context of expanding military-political cooperation with the North Atlantic Alliance, the study of the military-criminal legislation of NATO member countries gains particular significance. The international military cooperation, joint military exercises, and participation in international peacekeeping operations necessitate the harmonization of national legal frameworks governing the liability of military personnel.

At the same time, the legal systems of various NATO member countries possess distinctive features, which are reflected in their approaches to the formation of military-criminal legislation. This gives rise to certain theoretical and practical issues related to the determination of jurisdiction, the classification of military offences, and the use of punishment against military personnel, which requires a thorough scientific analysis.

Analysis of recent research and publications. The issues surrounding military-criminal legislation and the specific features of criminal liability for military personnel have been examined in the works of numerous domestic and international scholars. Substantial contributions to the development of this field have been made by V. P. Bodayevskyi [1], S. I. Dyachuk [2], M. I. Karpenko [3], and V. V. Pylypchuk [4]. Among foreign researchers, the studies of G. Corn [5], D. Fidler [6], and R. Sloane [7] are particularly noteworthy.

Certain aspects of the legal regulation of criminal liability for military personnel in NATO countries have been addressed in the works of S. M. Melnyk [8], who examined the military-criminal legislation of the United States and the United Kingdom, and M. S. Turkot [9], who analyzed the criminal-law protection of military service in the Federal Republic of Germany.

However, despite the considerable body of scholarly research, a comprehensive comparative legal analysis of the peculiarities of criminal liability for military personnel in NATO member countries remains insufficiently developed. This underscores the need for further academic inquiry in this area.

The purpose of this article is to identify the specific features of criminal liability for military personnel in NATO member countries through a comparative legal analysis of national legislations. It aims to reveal commonalities and differences in the legal mechanisms for prosecuting service members and to formulate recommendations for improving national military-criminal legislation, taking into account the experience of NATO states.

Presentation of the main material. The North Atlantic Alliance encompasses states with diverse legal systems, which directly influences the regulation of criminal liability for military personnel. Broadly speaking, two principal models of military-criminal legislation can be distinguished among NATO member countries:

1. Countries that use codified military criminal laws (separate military criminal codes or military criminal sections of general criminal codes);

2. Countries in which the responsibility of military personnel is regulated by general criminal law with few specifics [10, c. 87].

The first group of countries includes the United States, the United Kingdom, Spain, Portugal, Poland, Turkey, and the Federal Republic of

Germany, all of which maintain separate military-criminal codes. In the United States, this is the Uniform Code of Military Justice (UCMJ), which establishes liability for specific military offences [11, p. 205]. In the United Kingdom, the primary legislative act in this field is the Armed Forces Act, which is periodically updated [12]. In the Federal Republic of Germany, the criminal liability of military personnel is governed by the Military Criminal Code (Wehrstrafgesetz (WStG)) [13, p. 127].

The second group of countries includes France, Italy, Belgium, Denmark, the Netherlands, and Poland, where military-criminal provisions are incorporated into general criminal codes as separate sections or chapters.

It should be noted that, regardless of the model adopted, the military-criminal legislation of NATO member countries must take into account the requirements of the North Atlantic Treaty and other international agreements in force within the Alliance, most notably, the NATO Status of Forces Agreement (SOFA) of 19 June 1951 [14].

An analysis of the military-criminal legislation of NATO member countries reveals certain common features in the definition and characteristics of military offences. In most countries, military offences are defined as unlawful acts committed by service members that encroach upon the established order of military service [15, p. 43].

Under U.S. law, military offences are divided into two main categories: purely military offences, which can be committed exclusively by service members (e.g., desertion, disobedience of orders), and military-connected civilian offences, that are general criminal offences committed by military personnel [16, p. 108].

In the United Kingdom, military offenses are defined as acts specified in the Armed Forces Act. This legislation not only criminalizes specific military offenses but also extends the application of general criminal law to military personnel, incorporating certain distinctive provisions [17].

The German Military Criminal Code (Wehrstrafgesetz) defines military offences in a separate section, treating them as acts such as failure to obey orders, desertion, and breaches of duty related to the security of military installations, etc [18, p. 215].

A common feature of the military-criminal legislation of NATO member states is the criminalization of the following acts:

- disobedience to a commander's order;
- desertion;
- unauthorized absence from a military unit;
- violation of the rules of combat duty;
- mishandling of weapons;
- abuse of authority by a military official [19, p. 74].

NATO member states exhibit diverse approaches to the organization of military justice and military adjudication. Three principal models can be distinguished:

1. Countries with a well-developed system of military courts, such as the United States, the United Kingdom, Poland, and Turkey.

2. Countries in which military courts operate only during wartime or under exceptional circumstances, such as Spain, Italy, and Germany.

3. Countries without military courts, where cases involving military personnel are adjudicated by general courts, including Denmark and Norway [20, p. 138].

The United States operates a multi-tiered system of military courts, which includes courts of first instance (courts-martial), military appellate courts, and the United States Court of Appeals for the Armed Forces [21, p. 57]. U.S. military courts have jurisdiction over all military offences committed by service members, both within the territory of the United States and abroad.

British military justice is administered through the Court Martial system, which adjudicates cases involving military offences. The 2006 reform

significantly restructured the military justice system, aligning it more closely with the civilian judicial model [22].

Following the Second World War, Germany abolished its system of military courts, and cases involving military personnel are now handled by general civilian courts. However, provision is made for the establishment of military courts during wartime [23, p. 92].

A distinctive feature of the military justice systems in NATO states is the existence of specialised military prosecutorial bodies or their equivalents. For instance, in the United States, the function of prosecution in military courts is carried out by Trial Counsel (military prosecutors), while in the United Kingdom, it is performed by the Service Prosecuting Authority of the Ministry of Defence [24, p. 114].

The issue of legal regulation of the criminal liability of NATO military personnel during international military operations holds particular significance. The primary document governing these matters is the Agreement on the Status of the North Atlantic Treaty Organization Forces (NATO SOFA), as well as supplementary bilateral agreements [25].

According to Article VII of the NATO SOFA, the principle of concurrent jurisdiction is established, under which:

- the receiving state has primary jurisdiction over offences committed by military personnel of other NATO member states if such offences are directed against its security, citizens, or property;
- the sending state has primary jurisdiction over offences arising out of the performance of official duties by its military personnel, as well as over offences directed against the security, citizens, or property of that state [26, p. 83].

An important aspect is the implementation of the norms of international humanitarian law into the military criminal legislation of NATO member countries. The majority of Alliance member countries have ratified the Rome Statute of the International Criminal Court and have introduced corresponding amendments to their national legislation, providing for liability for war crimes and crimes against humanity [27, p. 205].

In the United States, which is not a party to the Rome Statute, liability for war crimes is established in the War Crimes Act and the Uniform Code of Military Justice [28].

The system of penalties applied to military personnel in NATO member countries combines general criminal sanctions and specific military punishments. Specific military penalties provided for in the legislation of various NATO countries include:

- reduction in military rank;
- suspension from the performance of official duties;
- service restrictions;
- dismissal from military service with forfeiture of military rank [29, p. 136].

The United States Uniform Code of Military Justice provides for a range of punishments for military personnel, including the death penalty (for a limited number of offenses), imprisonment, fines, discharge from service, reduction in rank, and others [30, p. 74].

In the United Kingdom, pursuant to the Armed Forces Act, both general criminal penalties (such as imprisonment and fines) and specific military punishments (such as discharge from service and reduction in rank) may be applied to military personnel [31].

The German system of penalties for military personnel includes both general sanctions provided for by the Criminal Code of the Federal Republic of Germany and specific military punishments, in particular arrest and dismissal from military service [32, p. 148].

It should be noted that in most NATO countries there is a discernible trend toward the humanization of punishments applied to military personnel, as well as a gradual abolition of such penalties as the death

penalty, except in cases of especially grave offenses committed during wartime [33, p. 97].

Conclusions and directions for future research. The conducted study allows for the following conclusions:

1. The military criminal legislation of NATO member countries is characterized by a diversity of approaches to the regulation of the criminal liability of military personnel, which is conditioned by national legal traditions and the specific features of domestic legal systems. At the same time, there is a clear trend toward the harmonization of legislation within the framework of international military cooperation.

2. Two principal models of military criminal legislation have developed among NATO member countries: countries with separate military criminal codes (e.g., the United States, the United Kingdom), and countries where military criminal provisions are incorporated into general criminal codes (e.g., Poland, France).

3. Despite existing differences, the military criminal legislation of NATO member states exhibits common features in defining the core elements of military offenses, such as disobedience of orders, desertion, and violations of the rules of military service, among others.

4. The military justice systems of NATO member countries are likewise marked by diversity: ranging from well-developed systems of military courts (e.g.,
the United States, the United Kingdom) to the complete integration of military justice into the general judicial system (e.g., Germany, Denmark).

5. Particular significance is attributed to the legal regulation of criminal liability of military personnel during international operations, which is based on the principle of concurrent jurisdiction in accordance with the NATO Status of Forces Agreement.

6. The system of punishments applied to military personnel in NATO member countries combines general criminal sanctions and specific military penalties, reflecting a trend toward humanization and alignment and common standards of criminal law.

Promising directions for further research include:

- a depth analysis of the military-criminal legislation of individual NATO member countries, particularly the Alliance's new members;
- an examination of the specific features of implementing international humanitarian law norms within the military-criminal legislation of NATO countries;
- a study of the practice of applying military-criminal law during international operations involving the armed forces of NATO member countries;
- an analysis of approaches to harmonizing national military-criminal legislation in accordance with NATO standards.

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Received: 11.04.2025
Revised: 18.04.2025
Accepted: 25.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 343.326 : 351.743(477) DOI 10.59226/2786-6920.1.2025.125-132

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CRIMINAL-LEGAL ENSURANCE OF STATE SECURITY IN THE FIELD OF COUNTERING TERRORISM: ROLE AND FUNCTIONS OF THE NATIONAL GUARD OF UKRAINE

The article studies the problem of counteracting terrorism in Ukraine, in particular the role and functions of the National Guard of Ukraine (NGU) in this area. An analysis of the criminal legal support for the fight against terrorism has been carried out, and problematic issues and prospects for the development of NGU activities on these issues have been identified. The need to introduce international experience is emphasized.

A detailed analysis of the causes, forms and methods of terrorist activity, as well as its impact on society and the state, a comprehensive analysis of criminal legal norms governing responsibility for terrorist crimes, has been carried out.

Keywords: *national security; state security; terrorism; criminal liability; terrorist organization; financing of terrorism; recruitment for terrorist activities.*

Statement of the problem. Terrorism, as a global phenomenon, poses a serious threat to international peace and security, undermining the foundations of democracy and human rights. In Ukraine, the issue of terrorism has acquired particular urgency in connection with russian aggression, the occupation of part of its territory, and the increased activity of terrorist organisations. In the context of hybrid warfare, countering terrorism is one of the state's top priorities, requiring the consolidation of efforts by all state institutions and civil society.

The current realities associated with armed aggression of the russian federation against Ukraine, the intensification of terrorist activity, and the use of hybrid warfare methods actualize the need for effective counter-terrorism measures. Despite the existence of criminal legal norms aimed at combating terrorism, there are certain problems in their application and the need to improve them taking into account new challenges.

In particular, the concept of a "terrorist organization" is insufficiently defined, which complicates the qualification of crimes and the prosecution of those responsible. An important problem is also the insufficient level of coordination and interaction between various actors involved in countering terrorism, in particular law enforcement agencies, special services, and the National Guard of Ukraine. It is essential to clearly define the role and functions of the National Guard of Ukraine within the counterterrorism framework, ensure its adequate funding and logistical support, and enhance the professional competence of its service members.

Solving these problems is a prerequisite for effective counteraction to terrorism in Ukraine and protection of national security.

During the scientific research for deep and comprehensive disclosure of the chosen topic, we will find out the key issues the subject matter: criminal legal aspects, the role and functions of the National Guard of Ukraine, international experience, prospects for improving the criminal legislation of Ukraine in the field of countering terrorism, increasing the effectiveness of the NGU in the fight against terrorism.

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Analysis of recent research and publications. The study of issues concerning the criminal law provision of state security in the domain of terrorism prevention and counteraction has been pursued by scholars such as R.M. Dudarets, who explored general questions related to the criminal law safeguarding of state security and counteraction to crimes against the foundations of the National Security of Ukraine, including terrorism. V.P. Yemelianov focused on the classification of terrorist acts, liability for terrorist activity, and the international legal aspects of counter-terrorism. A.V. Korostylenko examined the application of criminal law norms in the context of state security, offering a detailed analysis of

the effectiveness of existing legislation and proposing avenues for its improvement in the area of counter-terrorism.

V.V. Krutova conducted research into the criminological aspects of terrorism, including the causes and conditions conducive to terrorist activity, as well as the development of preventive measures. B.D. Leonov studied issues related to the legal status of entities involved in combating terrorism, particularly the National Guard of Ukraine, focusing on their powers and responsibilities. V.A. Lipkan focused on broader issues of national security, primarily on the criminal law mechanisms for its enforcement. Within the context of terrorism, he examined the matters of intersectoral cooperation in the sphere of counter-terrorism. I.I. Musiienko studied the criminal procedural aspects of investigating terrorism-related offences, including issues of evidence and the procedural particularities characteristic of such cases. D.V. Novikov addressed issues of criminal-executive legislation concerning individuals convicted of terrorist offences, as well as problems related to resocialization and the prevention of recidivism. I.M. Ryzhov studied matters associated with the organizational and legal aspects of the activities of entities engaged in counter-terrorism, particularly focusing on the National Guard of Ukraine, including its structure, functions, and coordination mechanisms.

V.B. Bessarab, in his works, emphasizes the need for a clear normative delineation of the powers of the National Guard of Ukraine under conditions of hybrid threats [1, pp. 45–51]. O.M. Lytvynenko examines the legal aspects of the functioning of the National Guard in the field of counter-terrorism through the lens of the European integration context [2, pp. 33–40].

However, today, there are still contradictory provisions of the criminal law provision of counter-terrorism in Ukraine. This problem requires further research and a comprehensive approach to improve the anti-terrorism legislation of Ukraine.

The purpose of this article is to analyse the criminal law provision of state security in the area of counter-terrorism and to develop proposals for optimising the activities of the NGU in this area.

Expected results: to carry out a comprehensive analysis of the current criminal law provision of the state security of Ukraine in the field of counter-terrorism, to identify problematic aspects of criminal law regulation of counter-terrorism that negatively affect the effectiveness of the NGU, to study the powers and functions of the NGU in the field of counter-terrorism, to analyse the practice of application of criminal law provisions in the activities of the NGU in countering terrorist threats, to develop substantiated proposals for improving the criminal legal support of the NGU activities in the field of counter-terrorism.

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Presentation of the main material. Terrorism, as a socially dangerous phenomenon, constitutes one of the most acute problems of the modern era. In Ukraine, the fight against terrorism has gained particular urgency due to russian aggression, the occupation of part of the country's territory, and the intensification of activities by terrorist organisations. Under these conditions, the effective criminal law framework for counter-terrorism, as well as the precise delineation of the roles and functions of the entities involved in combating this phenomenon, becomes especially significant. One such entity is the National Guard of Ukraine (NGU), which plays a crucial role in ensuring national security and public order. The de-occupation of temporarily seized territories, the stabilization of the security situation in front-line regions, and the fight against hostile sabotage- reconnaissance groups (SRGs) necessitate the active involvement of the NGU as one of the key law enforcement bodies responsible for maintaining public order, ensuring the safety of citizens, and protecting state sovereignty.

Since 2022, the scope of the National Guard of Ukraine (NGU) tasks in the sphere of counter-terrorism has expanded significantly. These now encompass not only the protection of strategic facilities and the maintenance of public order, but also participation in combat operations, stabilisation missions, the enforcement of martial law, and the detection and

neutralisation of terrorist cells in de-occupied territories. The NGU plays a particularly vital role in anti-terrorist operations conducted in coordination with the Security Service of Ukraine (SBU) and the Armed Forces of Ukraine (AFU), especially in front-line areas where the risks of sabotage and attacks on civilian infrastructure are elevated.

At the same time, these developments have underscored the growing need to enhance the criminal law mechanisms for safeguarding state security and to develop specific legal provisions that respond adequately to the challenges posed by war and contemporary terrorism.

A key normative act in the field of counter-terrorism is the Law of Ukraine "On Combating Terrorism" of 20 March 2003, No. 638-IV, which defines the organizational and legal foundations of counter-terrorism efforts, as well as the powers of the entities involved, including the National Guard of Ukraine. According to Article 4 of this Law, the National Guard of Ukraine is designated as a subject of counter-terrorism, authorised to participate in the suppression of terrorist acts, the release of hostages, and the protection of facilities affected by terrorist attacks [3].

The Law of Ukraine "On the National Guard of Ukraine" of 13 March 2014, No. 876-VII, in Article 2 provides that one of the tasks of the National Guard of Ukraine is participation in counter-terrorism efforts and the protection of public order [4]. Following the outbreak of the full-scale war in 2022, the functional responsibilities of the National Guard were adjusted to meet the requirements of martial law in accordance with the Presidential Decree "On the Introduction of Martial Law" [5] (as amended), as well as the Law of Ukraine "On the Legal Regime of Martial Law" [6].

The Criminal Code of Ukraine (CCU) defines terrorist crimes in Articles 258–258-6. In particular, Article 258 of the CCU defines a terrorist act as the use of weapons, arson, explosion, or other actions that pose a danger to human life and are aimed at violating public safety or exerting influence on public authorities [7]. However, the current realities of war necessitate a revision of the approaches to the legal classification of such acts, particularly in the context of massive missile strikes on civilian infrastructure or the use of terrorist methods by enemy sabotage and reconnaissance groups (SRGs).

In the context of counter-terrorism efforts following 2022, the National Guard of Ukraine (NGU) performs a range of critical functions, including:

- the protection and defence of critical infrastructure facilities (such as power plants, transport hubs, and water supply systems);
- escorting humanitarian convoys, controlling checkpoints, and preventing the infiltration of sabotage and reconnaissance groups (SRGs);
- direct participation in combat operations aimed at repelling armed aggression;
- involvement in stabilisation operations following the de-occupation of territories, including the detection of munitions and the identification of individuals involved in collaboration with the enemy;
- participation, jointly with the Security Service of Ukraine and the National Police, in the conduct of counter-terrorism operations.

Article 1 of the Law of Ukraine "On the National Guard of Ukraine" defines the National Guard of Ukraine (NGU) as a military formation with law enforcement functions, which is part of the system of the Ministry of Internal Affairs of Ukraine. It is designated to carry out tasks related to the protection and safeguarding of the life, rights, freedoms, and legitimate interests of the citizens of Ukraine, as well as of society and the state, from criminal and other unlawful encroachments, and to ensure public order. The tasks of the NGU that are directly related to counter-terrorism include:

- participation in special operations aimed at neutralizing armed offenders; in combating sabotage and reconnaissance forces of the aggressor (enemy); in the suppression of the activities of unlawful paramilitary or armed formations (groups), organized criminal groups, and criminal organizations within the territory of Ukraine; as well as in measures related to the cessation of terrorist activities.
- participation in the suppression of mass riots;
- participation in the restoration of constitutional order in the event of attempts to seize state power or to change the constitutional system by force, as well as in the restoration of the functioning of state authorities and local self-government bodies [4].

The main functions of the National Guard of Ukraine (NGU) in the sphere of counter-terrorism include:

- the protection of critical state facilities, which include guarding critical infrastructure, government institutions, diplomatic missions, and other sites that may be potential targets for terrorist attacks;

- ensuring security during mass events, which include maintaining public order and security during mass gatherings where there is an increased risk of terrorist acts;
- participation in countering informational terrorism, which includes implementing measures to combat the spread of terrorist propaganda and disinformation;
- participation in reconnaissance and search operations**,** which include conducting intelligence operations aimed at detecting terrorist groups and uncovering their plans;
- cooperation with other law enforcement agencies, which include exchanging information with the Security Service of Ukraine, the National Police, and other bodies to identify terrorist threats;
- participation in special operations, which include carrying out special missions involving the apprehension of terrorists, the release of hostages, the neutralisation of explosive devices, and related activities;
- **use of force,** which includes the use of firearms and special equipment to suppress terrorist activities and apprehend terrorists [4].

At the same time, the issue arises of legally regulating new tactics, powers, and safeguards for servicemen of the National Guard of Ukraine, as well as improving the mechanism for the use of firearms and special equipment within the framework of counter-terrorism operations, particularly under conditions of active hostilities.

Despite the existence of a basic regulatory framework in the field of counter-terrorism, there remain several significant challenges that hinder the effective performance of the entities involved in counter-terrorism activities, including the National Guard of Ukraine. First, the legal definition of terrorism in the Criminal Code (Article 258) remains overly general and fails to account for the specific features of contemporary hybrid threats, which combine elements of terrorist, informational, and military aggression [7]. Second, there is no specialised mechanism of criminal-law response to the actions of sabotage and reconnaissance groups, which operate using methods characteristic of terrorist organisations, but do not always fall under the legal definition of terrorist formations. Third, there is a lack of clarity regarding the limits of the use of force by the National Guard of Ukraine in the performance of counter-terrorism functions, particularly under conditions of martial law, when the use of weapons may be necessary without prior authorisation from the operation's commander.

Researcher B. Bessarab, in his works, emphasizes the need for a comprehensive approach to the development of the legislative framework governing the activities of the National Guard of Ukraine, which would enable the effective performance of public order protection and counter-terrorism functions under conditions of martial law. He highlights the importance of regulatory clarification of the tasks and rights of National Guard servicemen in the course of counter-terrorism operations, particularly with regard to the prevention of terrorist activities in de-occupied areas [9, p. 96].

Scholar O.M. Lytvynenko emphasizes the necessity of strengthening coordination between the National Guard of Ukraine, the Security Service of Ukraine, and the National Police of Ukraine, as well as the establishment of a unified information system for data exchange on potential terrorist threats. He also advocates for the revision of criminal legislation, taking into account the experience of NATO member states, where military formations analogous to the National Guard possess broader powers in situations involving terrorist threats [10, p. 25].

The definition of "terrorism" in academic literature remains a subject of debate. In the works of Ukrainian scholars, terrorism is generally viewed as socially dangerous activity involving violent actions aimed at influencing public authorities, intimidating the population, or destabilizing the situation within the state. V.Ya. Tatsii considers terrorism to be a form of political extremism that employs violence as a means of achieving its objectives [11, p. 7]. The concept of "terrorism" lacks a unified definition both in Ukrainian legislation and in international law. According to the Law of Ukraine "On Combating Terrorism," terrorism is defined as "socially dangerous activity involving the deliberate, targeted use of violence through acts of explosions, arson, murder, hostage-taking, intimidation of the population and public authorities, or other attacks on the life or health of innocent individuals, or the threat of committing such criminal acts in order to achieve criminal goals" [3]. However, this definition does not encompass all contemporary forms of terrorist activity, particularly those associated with hybrid or informational terrorism.

In international practice, there is likewise no universally accepted definition of terrorism. United Nations documents, particularly General Assembly Resolution 49/60 of 9 December 1994 [12], emphasize the political, ideological, or religious motivation behind violent acts aimed at intimidating the population or influencing governmental authorities. The European Union, in the Council Framework Decision 2002/475/JHA, defines terrorism as acts committed with the aim of seriously intimidating a population or compelling a government or international organization to act or refrain from acting in a particular way [13].

Countries such as the European Union member states, the United States, Israel, and the United Kingdom possess significant experience in combating terrorist threats, with military formations being extensively involved in ensuring internal security. For instance, in France, following the 2015 terrorist attacks in Paris, Operation "*Sentinelle"* was launched, which provides for the patrolling of streets by military units [14].

In the United States, the National Guard constitutes a distinct component of the Armed Forces with clearly defined powers in the sphere of internal security, including participation in responses to terrorist threats. In accordance with the Patriot Act and the Homeland Security Act, specific procedures are established for the deployment of the National Guard in cases of threats to national security [15].

In Israel, the effective integration of the army, intelligence services, and police is implemented through joint operations, enabling rapid response to emerging threats. The legal framework provides broad discretion for military actions within the national territory in situations involving terrorist threats [16].

In the Baltic states, particularly Lithuania and Estonia, the National Guard or reserve forces have clearly defined functions, including support for the police under states of emergency. National legislation provides for the rapid deployment of such formations to carry out tasks related to counter-terrorism [17].

For Ukraine, it is essential to study models of interagency cooperation among security forces and the regulatory experience of military formations' involvement in internal security. It is particularly important to introduce mechanisms similar to those employed in the EU and NATO, such as permanent coordination, joint training exercises, and legislative provisions that ensure effective cooperation.

The practical application of criminal law provisions in the activities of the National Guard of Ukraine reveals critical aspects that require both legal reflection and further refinement. Under conditions of martial law, the NGU carries out measures aimed at preventing and suppressing terrorist acts, identifying members of terrorist organizations, and protecting strategic facilities and the civilian population.

In his work, B. V. Bessarab notes that one of the primary instruments of the National Guard of Ukraine is preventive activity based on the current provisions of the Criminal Code of Ukraine, particularly Article 258 "Terrorist Act" and related articles (Articles 258-1 to 258-5) [9, p. 94]. At the same time, certain practical challenges arise, notably the absence of a clear regulatory framework governing the participation of the National Guard in criminal proceedings.

Researcher O.M. Lytvynenko asserts that the effectiveness of the National Guard of Ukraine in countering terrorism largely depends on interagency coordination with the Security Service of Ukraine and the National Police, as well as access to operational information [10, p. 23]. At the same time, the limited procedural status of National Guard servicemen within criminal proceedings hinders the effective collection of evidence and participation in procedural actions.

According to the analysis conducted in the studies of V. M. Tyshchenko, the legislative framework governing the actions of the National Guard of Ukraine during anti-terrorist operations lacks sufficient detail, which gives rise to legal conflicts in the application of force and means [15]. There is also an existing issue of inadequate coordination with prosecutorial authorities in the documentation of terrorist activities.

Thus, practical experience highlights the necessity of establishing a unified regulatory framework governing the participation of the National Guard of Ukraine in criminal proceedings related to terrorism, the clear delineation of their procedural rights, as well as the establishment of unobstructed exchange of operational information with other security agencies.

The precise definition of terms in the Criminal Code of Ukraine (CCU) is of paramount importance for the effective combatting of terrorism, the avoidance of ambiguous interpretation, and the assurance of the efficient application of criminal law provisions.

"Terrorist Organization". The current definition (Article 258-3 of the Criminal Code of Ukraine) reads: "...a stable association of three or more persons established for the purpose of engaging in terrorist activity..." [7]. The formulation "stable association" is

insufficiently specific, lacking clear criteria for distinguishing a terrorist organization from other criminal groups.

To address this issue, it is necessary to introduce a more detailed definition that encompasses the following elements: structure and organization (the presence of a hierarchical system, division of roles, coordination of actions, and connections among members) according to the purpose: engagement in terrorist activity, with explicit objectives such as intimidating the population, exerting influence on governmental authorities, or destabilizing the situation etc.; methods: the use of violence or threats thereof. The following components should also be considered: availability of funds, weapons, explosives, and other resources for terrorist activities. Possible links with other terrorist organizations, foreign states or special services should also be studied.

Conclusions and directions for future research. Despite the considerable efforts undertaken by the state in countering terrorism, several problematic issues remain unresolved and require further attention. Based on the conducted analysis, it is advisable to propose a refined definition of terrorist offenses in the Criminal Code of Ukraine, taking into account contemporary hybrid threats and the military context, including the activities of sabotage and reconnaissance groups. In particular, the concept of a "terrorist organization" should be more clearly defined. One such formulation may be proposed as follows: "A terrorist organization is a structured association of three or more individuals that possesses a hierarchical framework, role distribution, and coordinated actions, established with the aim of engaging in terrorist activities, manifested through the use of violence or the threat thereof to achieve objectives such as intimidating the population, influencing decision-making by governmental bodies or international organizations, destabilizing or destroying the fundamental political, constitutional, economic, or social structures of the state. The organization also possesses financial resources, weapons, explosives, and other materials necessary for such activities." Clarifying this definition within the Criminal Code of Ukraine would contribute to the elimination of interpretative ambiguity, enhance the effectiveness of legal norms, and improve counter-terrorism efforts in Ukraine.

It is also essential to supplement the core functions of the National Guard of Ukraine (NGU) in the field of counter-terrorism with the following components:

- prevention of terrorism: the implementation of preventive measures aimed at identifying and eliminating the causes and conditions conducive to the emergence and spread of terrorism; conducting awareness-raising campaigns among the population regarding the dangers of terrorism and guidelines for behavior in the event of a terrorist act;
- detection of terrorism: the collection and analysis of information related to terrorist activities; identification of individuals involved in terrorism; detection of terrorist hideouts, weapons caches, and explosives.
- suppression of terrorism: participation in anti-terrorist operations; hostage rescue; neutralization of terrorists; ensuring the safety of the civilian population and critical infrastructure facilities during terrorist attacks.

In addition, it is proposed to develop a separate chapter in the Criminal Code of Ukraine dedicated to crimes related to hybrid aggression, with a particular focus on terrorist acts committed during armed conflict, collaborationism, and informational terrorism. It is also recommended to incorporate into the Law of Ukraine "On Combating Terrorism" specific provisions concerning the powers of the National Guard of Ukraine under martial law conditions, including the right to use weapons without additional authorization within combat zones. Furthermore, the establishment of an interagency coordination body for prompt response to terrorist threats is proposed. This body should include representatives from the National Guard of Ukraine, the Security Service of Ukraine (SBU), the Armed Forces of Ukraine, and the National Police. Additionally, a unified electronic platform should be implemented for the exchange of information regarding terrorist threats among security agencies.

The National Guard of Ukraine (NGU) is a vital component of the system for countering terrorism and sabotage activities. Owing to its professional training, modern weaponry, and effective cooperation with other security agencies, the NGU successfully fulfills its mission in safeguarding national security and the territorial integrity of Ukraine. The further enhancement of the NGU operations in this domain requires a comprehensive approach encompassing legislative support, organizational improvement, the advancement of service members' professional training, and the development of international cooperation.

In further research, attention will be given to the issues of preventing terrorist acts and minimizing their consequences, as well as to the analysis of international counter-terrorism experience and its adaptation to the Ukrainian context.

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Received: 07.04.2025
Revised: 14.04.2025
Accepted: 20.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 355.415.6. DOI 10.59226/2786-6920.1.2025.133-142

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LEGAL ASPECT OF PROVIDING DOMESTIC ASSISTANCE DURING COMBAT OPERATIONS

The article is devoted to the legal aspects of providing pre-medical aid during combat operations. *It outlines the relevance of the issue and possible ways for improvement. The analysis draws on a variety of sources and legislative acts, including scientific publications and reports.*

The article examines international practices and the experience of the Russo-Ukrainian war in the context of organizing the provision of pre-medical aid. *The findings indicate the need to identify existing challenges and develop strategies for improving pre-medical aid, taking into account current realities and the specific conditions of warfare with the russian federation. The study also emphasizes the importance of ensuring legal protection for individuals providing such assistance.*

Keywords: *medical support; combat operations; assistance to the wounded; experience in providing medical assistance; tactical medicine.*

Statement of the problem. Modern warfare conducted in the context of armed conflicts requires not only a high level of military operations' organization but also an effective system for delivering pre-medical assistance. Pre-medical aid is often critical for preserving the lives and health of both military personnel and civilians in combat zones. Within the context of the armed conflict in Ukraine, the issue of providing aid by non-medical personnel and civilians has become particularly urgent.

At present, there are several issues in the legal regulation of this process, including legislative gaps and a lack of clarity regarding the rights and responsibilities of individuals providing pre-medical assistance. Moreover, there is no effective mechanism to protect such individuals from legal liability. It is

essential to ensure that national legislation aligns with international standards, as this would not only enhance the effectiveness of aid provision but also safeguard the rights of both combatants and civilians.

Analysis of recent scientific research and publications. The issue of providing pre-medical assistance at the scene has been explored by scholars such as P. B. Volianskyi, A. M. Hrynzovskyi, and S. O. Huriev, who examined algorithms for solving situational problems related to pre-medical aid [1]. Noteworthy is the work of Z. S. Chernenko, which highlights the rights and responsibilities of medical personnel during armed conflicts [2]. K. V. Hromovenko, M. V. Hrushko, and K. V. Manuilova have addressed the issues of international legal regulation of armed conflicts [3]. H. V. Habrelian has studied the interaction between international human rights law, international humanitarian law, and international criminal law in ensuring the right to health during armed conflicts [4]. The Order of the Ministry of Health of Ukraine No. 441 dated March 9, 2022, defines the mechanisms and scope of pre-medical assistance to victims of hostilities/martial law, provided by individuals without medical education who are required to deliver such aid as part of their official duties [5].

Therefore, given the intensity of modern warfare, which also affects the civilian population, there is a pressing need for legal regulation of the provision of pre-medical assistance in the context of armed conflicts.

The purpose of this article is to examine international legal norms regarding the provision of pre-medical assistance during armed conflicts, to analyze Ukrainian legislation regulating the procedures and conditions for providing such assistance, to identify the categories of individuals authorized to deliver pre-medical aid along with their rights, responsibilities, and potential legal liability, to outline the challenges and gaps in the current Ukrainian legal framework in this area, and to develop recommendations for improving legal regulation in line with international standards.

The following research methods were used: analytical – to study Ukrainian normative legal acts and international treaties (Geneva Conventions, Additional Protocols), assessing the compliance of national norms with international standards; comparative – to examine the experience of other countries in the legal regulation of pre-medical aid; historical – to analyze the historical development of international humanitarian law regarding the protection of victims and regulation of medical assistance provision during armed conflicts; systemic – to study the system of Ukrainian normative legal acts and their interrelation with international norms, analyzing the interaction of state bodies, medical institutions, and international organizations in the field of humanitarian aid; empirical – to study real cases of armed conflicts and the provision of pre-medical aid in Ukraine and abroad, analyzing the practices of international organizations (the Red Cross, the UN) in conflict zones; predictive – to develop proposals for improving Ukrainian legislation and to assess the prospects for harmonizing national law with international standards.

The application of these methods allowed for a comprehensive study of the topic, identification of key issues, and formulation of recommendations for improving legal regulation in the context of armed conflict.

Presentation of the main material. The Geneva Conventions and Additional Protocols: rights and obligations of parties to the conflict regarding the provision of assistance.

The 1949 Geneva Conventions and the 1977 Additional Protocols are the primary international legal documents regulating the humanitarian aspects of armed conflicts. They establish certain obligations for parties to the conflict concerning the protection of the wounded, the sick, medical personnel, and medical facilities, as well as set forth rules for the provision of assistance during wartime. [6].

1. Rights and Protection of the Wounded and Sick. The Geneva Convention on the Improvement of the Condition of the Wounded and Sick in Armed Forces in the Field (First Geneva Convention) establishes the following fundamental rules: all wounded and sick, regardless of their nationality and status (military or civilian), have the right to humanitarian aid and medical care; medical personnel, sanitary units, and medical facilities providing

treatment enjoy immunity and must not be attacked; it is prohibited to persecute persons providing aid to the wounded, even if they belong to the opposing side.

2. Obligations of the Parties to the Conflict Regarding the Provision of Assistance. The Geneva Conventions and Additional Protocols impose the following obligations on the parties to the conflict: each party is required to ensure the provision of medical aid to all wounded and sick, regardless of their status or affiliation; the parties must facilitate the evacuation of the wounded and ensure their care in safety; hospitals, medical transport vehicles (ambulances, ships, aircraft), field hospitals, and other aid-providing establishments shall be under special protection, and attacks on them constitute a war crime.

3. Protective Symbols and Their Significance. The Geneva Conventions introduced protective symbols (the Red Cross, the Red Crescent, the Red Crystal), which are internationally recognized signs protecting medical personnel, transport, and facilities. The parties to the conflict are obligated to respect and refrain from attacking objects marked with these symbols.

The Role of International Organizations (the Red Cross, the UN) in Providing Pre-medical Aid During Combat Operations.

International organizations play a key role in ensuring the provision of humanitarian and medical assistance during armed conflicts. Their activities are based on international humanitarian law, particularly the 1949 Geneva Conventions and their Additional Protocols. The main organizations engaged in this field are the International Committee of the Red Cross (ICRC) and the United Nations (UN).

1. The International Committee of the Red Cross (ICRC) is a neutral, independent, and humanitarian organization operating based on the Geneva Conventions. It is the primary entity responsible for providing protection and assistance to victims of armed conflicts [7].

The main tasks of the ICRC in the provision of aid during armed conflicts:

Provision of medical and pre-medical aid: organizing field hospitals and mobile medical units in combat zones; supporting medical facilities by supplying medications, equipment, and training personnel; providing pre-medical aid to wounded and sick military personnel and civilians.

Protection of medical personnel and facilities: ensuring that parties to the conflict comply with international humanitarian law provisions regarding the protection of medical personnel, transport, and facilities; monitoring the use of the Red Cross emblem as a protective sign.

Training and dissemination of humanitarian law: conducting trainings for military and civilian personnel on providing pre-medical aid in extreme conditions; expanding knowledge about the rights of the wounded and the protection of humanitarian activities.

Evacuation and search for missing persons: facilitating the evacuation of wounded and sick from dangerous areas; coordinating actions for the search and identification of missing persons during combat operations.

Humanitarian support: providing conflict victims with food, water, essential supplies, and psychological assistance.

2. The United Nations (UN) is a global organization that plays a significant role in providing humanitarian support and protecting human rights during armed conflicts. Activities in this field are coordinated by major bodies and agencies [8].

The main UN agencies involved in providing assistance:

WHO (World Health Organization): organizes the provision of medical aid, supplies medications and medical equipment to conflict zones; conducts training for medical personnel and individuals providing pre-medical aid; coordinates responses to medical crises, including epidemics arising from armed conflicts.

The United Nations High Commissioner for Refugees (UNHCR): provides humanitarian assistance to refugees and internally displaced persons; organizes the evacuation of people from active combat zones.

UNICEF (United Nations Children's Fund): provides protection and medical assistance to children and women during armed conflicts; coordinates pre-medical aid programs among the civilian population.

The United Nations Office for the Coordination of Humanitarian Affairs (OCHA): coordinates international humanitarian assistance during armed

conflicts; facilitates cooperation between government bodies, humanitarian organizations, and local structures.

Main tasks of the UN:

- Providing medical services, food, and essential supplies to civilians and military personnel.

– Monitoring parties to the conflict for compliance with the Geneva Conventions.

– Cooperating with governments, international, and local organizations to effectively respond to humanitarian crises.

– During conflicts, the UN coordinates humanitarian missions, facilitates population evacuation, and provides medical assistance.

The experience of other countries in the legal regulation of providing pre-medical aid during armed conflicts demonstrates various approaches to regulating medical assistance in such conditions. Effective legislative frameworks not only enable the organization of high-quality aid but also protect the rights of those who provide it. Let us consider the experience of leading countries in this field.

The United States has one of the most advanced systems for training and legal regulation of medical and pre-medical aid provision in combat conditions.

Pre-medical aid in combat conditions is regulated by military service laws as well as special instructions and the Tactical Combat Casualty Care (TCCC) standards. These standards for pre-medical aid procedures operate in three main zones [9]: Care Under Fire – aid under fire, Tactical Field Care – aid in a safe zone, Tactical Evacuation Care – aid during evacuation.

Military medical personnel and individuals providing pre-medical aid are legally protected and exempt from liability for actions taken under extreme conditions.

In the United States, there are also programs for training civilians to provide medical aid during emergencies and armed conflicts, including the Stop the Bleed program, which establishes basic methods for hemorrhage control [10].

Israel has experience in the legal regulation and organization of medical aid provision under constant armed threats. The Israel Defense Forces (IDF) use a universal training system for soldiers to provide pre-medical aid on the battlefield. Every soldier undergoes a mandatory first aid course, which includes controlling critical hemorrhages, training in tourniquet application, and evacuation of the wounded.

Israeli laws provide absolute protection for medical personnel who have duties toward the civilian population during armed conflicts. Individuals providing aid (military, reservists, civilians) are protected from legal liability if they act in good faith and within the scope of their skills.

Israel operates the National Emergency Medical Service Magen David Adom (MDA), which provides rapid response and pre-medical aid both in peacetime and during armed conflicts [11].

In the United Kingdom, the legal regulation of pre-medical aid is based on a combination of national legislation and international humanitarian law norms. Pre-medical aid is governed by statutes and regulatory acts overseeing military operations and humanitarian activities. Military medical personnel operate according to BATLS (Battlefield Advanced Trauma Life Support) standards, which encompass modern algorithms for care in combat conditions [12].

Significant attention is given to training civilians in basic pre-medical aid skills through programs such as First Aid Training and Emergency Preparedness. During wartime, civilians providing aid receive legal protection and bear minimal liability for potential consequences of the assistance provided.

4. In Germany, the legal regulation of providing pre-medical aid during armed conflicts has a clearly defined structure based on international standards and domestic regulations.

Military medical personnel and trained staff operate according to clear "Sanitätsdienst" protocols, which regulate the provision of aid in combat conditions [13].

German legislation provides legal and professional protection for individuals providing pre-medical aid in extreme conditions, including during armed conflicts.

In Germany, programs actively train civilians in basic first aid methods, including the specifics of actions in wartime conditions.

The experience of other countries demonstrates the importance of establishing a comprehensive legal

framework for the provision of pre-medical aid during armed conflicts.

Its main components are:

– clear legislative definition of the rights and duties of individuals providing aid;

– protection of medical personnel and civilians from legal liability;

– organization of systematic training for military and civilian persons in providing pre-medical aid;

– use of international standards such as TCCC.

The provision of pre-medical aid during armed conflicts in Ukraine is regulated by national legislation and international humanitarian law norms. The main documents concerning this issue include the Constitution of Ukraine, Ukrainian laws, subordinate regulatory acts, and other documents.

The Constitution of Ukraine and its provisions form the basis for establishing the legislative framework for the provision of pre-medical aid during emergencies and armed conflicts.:

– Every person has the inalienable right to life, and the state is obligated to protect it. This includes the right of everyone to receive necessary assistance, including pre-medical aid (Article 27);

– Everyone has the right to health care, medical assistance, and health insurance (Article 49) [14].

The Law of Ukraine “Fundamentals of the Legislation of Ukraine on Health Care” defines the basics of organizing medical care in Ukraine, including pre-medical aid:

– Everyone has the right to receive first (pre-medical) aid in emergencies (Article 37).

– Medical workers and other persons are obliged to provide medical assistance within the scope of their competence (Article 78) [15].

The Law of Ukraine "On Emergency Medical Aid" defines the procedure for providing emergency medical aid during armed conflicts and other emergency situations:

– Definition of emergency medical aid, which includes pre-medical aid for persons in critical condition (Articles 2 and 16).

– Persons who are not medical workers but have received appropriate training may provide pre-medical aid (Article 12) [16].

Criminal Code of Ukraine:

– Provides criminal liability for failure to provide aid to a person in a life-threatening condition (Article 135);

– Protects individuals providing pre-medical aid if their actions are aimed at saving life, even if they do not have medical education (Article 136) [17].

In the context of providing pre-medical aid during armed conflicts, medical personnel as well as non-medical individuals with appropriate training play a key role. Their authority, rights, and responsibilities are regulated by national legislation, international humanitarian law norms, including the Geneva Conventions, as well as Ukrainian regulatory legal acts.

Role of Medical Personnel.

Medical personnel are individuals with appropriate medical education who provide medical care in both military and civilian settings.

Authority of medical personnel: provision of pre-medical and medical aid on the battlefield or in conflict zones; coordination of evacuation of wounded and sick to safe areas for further treatment; assessment of the condition of casualties and taking measures to stabilize their state; use of medical supplies, equipment, and protocols, including TCCC (Tactical Combat Casualty Care), in combat conditions; conducting medical triage in mass casualty incidents.

Rights of medical personnel: the right to protection in accordance with international humanitarian law norms (Geneva Conventions) and national legislation; the right to wear protective emblems (Red Cross/Red Crescent symbols) in combat zones to ensure inviolability; the right to access the wounded and sick to provide necessary aid; the right to be supplied with necessary resources for providing care (medications, equipment, etc.).

Duties of medical personnel: providing aid to all wounded and sick regardless of their nationality, status, or affiliation with a party to the conflict; adherence to medical ethics and humanity in providing care; the obligation to protect the life and health of casualties even under threat to their own safety; compliance with international norms and standards of medical care in combat conditions; non-participation in hostilities and non-use of medical facilities for military purposes.

Role of Non-Medical Personne lNon-medical

personnel are military service members, rescuers, volunteers, and civilians who have undergone specialized training and are capable of providing pre-medical aid before the arrival of medical professionals.

Authority of non-medical personnel: providing pre-medical aid to victims in accordance with their skills; using basic life-saving measures such as stopping critical bleeding, applying tourniquets, clearing airways, and performing cardiopulmonary resuscitation (CPR); evacuating the wounded from danger zones to locations where medical aid can be administered; following instructions from medical personnel during the stabilization of casualties.

Rights of non-medical personnel: the right to receive training and acquire skills in providing pre-medical aid; protection from legal liability for adverse outcomes if actions were aimed at saving lives and were consistent with the acquired skills (in accordance with the Law of Ukraine "On Emergency Medical Assistance"); the right to be provided with essential supplies for delivering aid (first-aid kits, tourniquets, medical equipment); the right to safety while providing assistance in accordance with humanitarian law norms.

Duties of non-medical personnel: providing pre-medical aid to victims in accordance with their level of training; calling for qualified medical assistance and organizing the evacuation of casualties; following pre-medical aid algorithms (including TCCC standards or civilian protocols); being responsible for the use of medical tools only within the limits of acquired knowledge and skills; ensuring a humane approach when providing assistance without discrimination of any kind.

Collaborative work of medical and non-medical professionals

Effective provision of aid during armed conflicts requires close cooperation between medical and non-medical personnel:

– training of military personnel and civilians: non-medical individuals undergo pre-medical aid training based on international protocols (TCCC, BLS, CLS);

– coordinated actions: medical personnel coordinate the activities of non-medical individuals during evacuation and initial care;

– resource provision: it is essential to supply sufficient pre-medical aid equipment to both medical and non-medical personnel.

One of the main challenges in the legal regulation of providing pre-medical aid in combat zones is the lack of clearly defined rules and protocols for both civilians and military personnel. This creates legal uncertainty, which may affect the speed and effectiveness of assistance provided to casualties..

1. Unregulated actions of civilians. Civilians in the combat zone are often the first to provide first aid to victims. However, there are no clear rules that regulate what actions civilians should take, including those without medical education; there is no algorithm for civilians to act in critical situations that could lead to panic or improper assistance; the legislation does not contain rules that would regulate the legal liability of civilians in case of mistakes or unintentional harm; there are no mandatory instructions or training for civilians, especially in frontline areas.

2. Ambiguity of the authority of military medical personnel and non-medical individuals within military units.

In combat conditions, military units often have their own resources to provide first aid, but military personnel without medical education do not always understand the limits of their authority when providing assistance. There are no regulatory documents that clearly define what medical procedures can be performed by military personnel without medical education, but who have undergone special training. Military medics often work in conditions where there is no proper legal protection for their actions, especially when they act outside the established instructions due to unforeseen circumstances.

3. Lack of a unified action algorithm. National legislation does not provide a unified algorithm of actions for all categories of persons providing aid in the combat zone, which leads to discrepancies in the implementation of aid standards between civilians, military medics, and volunteers, insufficient coordination among participants in the process, reducing the effectiveness of aid, and uncertainty regarding the procedure for transferring casualties from civilians to military medics or evacuation teams.

4. Insufficient regulation of interaction between

civilians, military, and medical services. Effective aid delivery in the combat zone requires clear coordination among different categories of persons; however, legislation does not implement mechanisms for interaction between civilians, military medics, and state health services. There is no integrated communication system or coordination center to manage the aid and evacuation process, nor is there a regulation governing information exchange between parties to ensure security and prompt response.

5. Lack of clear criteria for training and certification. Training in first aid is key, but there is no mandatory certification for civilians planning to work in the combat zone, training programs for military and civilians are not unified and often do not meet international standards, and there are no mandatory requirements for periodic refresher training for those working in crisis situations.

6. Insufficient legal protection for those providing assistance. Civilians, volunteers and military personnel who provide first aid often face the risk of legal liability due to the lack of regulations that would protect them from criminal or civil prosecution in cases of unintentional mistakes and the absence of mechanisms to protect them from possible accusations of improper assistance or abuse of power.

Development and adoption of special laws and normative legal acts.

Effective regulation of the process of providing pre-medical aid during armed conflict requires improvement of the legal framework. The current situation necessitates the development of specialized laws and normative legal acts that regulate the implementation of international standards, take into account the needs of both military personnel and civilians, and address the specific characteristics of the armed conflict in Ukraine.

The relevance of developing specialized legislation.

Against the backdrop of modern armed conflicts, new challenges arise that require regulation:

– Insufficient clarity of existing laws regarding the algorithms for providing pre-medical aid;

– Lack of legal provisions protecting civilians and volunteers involved in providing pre-medical aid;

– The possibility of integrating international standards, such as TCCC, into the national legal framework.

The development of new regulatory legal acts allows for ensuring unity among all persons involved in the aid provision process and guarantees their legal protection.

Key Directions for Improving Legislation

Defining the Legal Status of Participants in the Process:

– adoption of a law that clearly regulates the rights, duties, and powers of civilians, volunteers, and military medical personnel during the provision of pre-medical aid;

– introduction of provisions for the protection of persons providing aid from unjustified prosecution in cases of errors made under crisis conditions.

Unification of training and certification standards:

– development of unified training standards for civilian and military personnel, with mandatory integration of TCCC protocols;

– adoption of regulatory legal acts that establish the procedure for certification of instructors and individuals involved in pre-medical aid training;

– introduction of mandatory continuing education for personnel operating in combat zones.

Regulating the use of medical supplies and resources:

– Development of standards for the equipment of military and civilian requirements in accordance with international standards (including NATO standards);

– Establishment of clear rules regarding the use, certification, and provision of medical supplies;

– Adoption of regulations concerning the procedures for evacuation of casualties from combat zones involving military and civilian services.

Implementation of a provision on coordination of actions:

– introduction of a unified coordination mechanism between military personnel, medical services, and volunteers;

– definition of the functions and responsibilities of emergency response centers managing the assistance processes.

Recommendations for the development of new laws and regulations.

– Law “On Pre-medical Aid in Combat Conditions.”

– Establishment of general rules for providing aid in combat conditions.

– Definition of categories of persons authorized to provide pre-medical aid.

– Introduction of provisions regarding training, certification, and liability for actions during aid provision.

Regulatory legal acts in the field of protection of the rights of aid providers.

Development of instructions for the protection of civilians, volunteers, and military medics from unjustified prosecution.

Establishment of legal protection mechanisms for persons operating under conditions of risk or emergency situations.

Adaptation of international standards.

Development of a special subordinate act that formalizes the application of TCCC protocols in the Armed Forces of Ukraine.

Implementation of standards recommended by the WHO, the Red Cross, and other international organizations into national practice.

Expected outcomes of adopting special regulatory acts:

– increasing the effectiveness of providing pre-medical aid in the combat zone through clearly established algorithms;

– strengthening the legal protection of persons providing aid, which will promote the involvement of a greater number of volunteers, civilians, and military personnel providing pre-medical aid;

– ensuring the integration of international standards into the national legal system;

– improving coordination among participants in the aid provision process, including military personnel, volunteers, and government agencies.

Educational activities and training for civilians on providing pre-medical aid play a key role in reducing casualties among victims during armed conflicts. Preparing the population for emergency situations supports the development of a culture of assistance, increases public awareness, and creates an effective response mechanism in crisis conditions.

Relevance of Conducting Educational Activities. The need for training the civilian population is driven by the increasing number of civilian casualties in conflict zones, limited access to qualified medical care, the potential involvement of volunteers and local residents in providing first aid, and the dissemination of international standards such as TCCC (Tactical Combat Casualty Care), which can be effectively used even by civilians.

Main directions of training for civilians. Civilians should acquire basic skills that enable them to provide first aid before the arrival of medical personnel: assessing the condition of the injured person, providing assistance for massive bleeding (use of tourniquets, wound packing), ensuring airway patency, cardiopulmonary resuscitation (if necessary), immobilization in case of injuries.

Specialized knowledge for combat zones that civilians should possess: basics of evacuating the wounded from dangerous areas, use of the IFAK (Individual First Aid Kit), actions during shelling and mortar fire.

Psychological training civilians should have: learning to maintain calm in critical situations, techniques for providing psychological support to the injured.

The introduction of a mandatory training course in first aid skills will strengthen cooperation at all stages of providing first aid, as well as increase the chances of survival and timely, appropriate medical intervention for the injured and wounded.

Conclusions and directions for future research. Analysis of medical support for military personnel during combat operations allows us to draw several key conclusions relevant both to contemporary conflicts and future military engagements. Given the dynamic nature of modern warfare and the ongoing challenges associated with combat, medical support requires continuous improvement, the implementation of innovations, and adaptation to evolving conditions.

1. The necessity of a comprehensive approach to medical support: Successful medical support for military personnel requires the integration of various aspects — from personnel training to logistics organization and the implementation of cutting-edge technologies. Only a comprehensive approach can ensure effective care delivery in the complex conditions of combat operations.

2. The importance of innovations and technologies: Innovations such as telemedicine, biosensors, nanotechnologies, and robotic systems

3. significantly improve the quality and speed of medical care. Investing in advanced technologies is critical for maintaining a high level of medical support during wartime.

4. Resource supply challenges and solutions: Resource shortages remain one of the main problems during combat operations. To address this, it is necessary to maintain reserves, improve logistics, and utilize modern technologies for rapid delivery of essential materials to the frontline.

5. Training of medical personnel: Training must closely simulate real combat conditions and include regular exercises and education using simulation technologies and stress management techniques.

6. Coordination and communication: Effective coordination and communication between different levels of medical support and military units are key to reducing response times and improving care quality. The use of digital systems and automated processes is essential to ensure reliable communication in combat conditions.

7. International cooperation: Collaboration with other countries and international organizations opens new opportunities for exchanging experience, resources, and technologies. Joint international training exercises and research projects can substantially enhance the effectiveness of medical support.

8. Strategic planning and adaptation: Strategic planning that takes into account the specifics of modern conflicts, along with the capacity for rapid adaptation to new challenges, forms the foundation for successful medical support. Continuous analysis and improvement of the medical care system enable timely responses to changing circumstances and increase the efficiency of medical units.

9. Psychological support and rehabilitation: The psychological condition of medical personnel and servicemen is critically important for their ability to provide and receive medical care. Implementing programs for psychological support, rehabilitation, and stress management is a necessary component of the overall medical support strategy.

Prospects for further research may include exploring additional aspects of pre-medical care provision during combat operations.

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ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 343.98 DOI 10.59226/2786-6920.1.2025.143-150

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THREATS TO STATE SECURITY RESULTING FROM THE ACTIVITIES OF SUBVERSION AND INTELLIGENCE GROUPS: LEGAL AND ORGANIZATIONAL ASPECTS

The article analyzes threats to Ukraine's national security arising from the activities of sabotage and reconnaissance groups (SRGs) in the context of modern hybrid warfare. It reveals the main directions of the destructive impact of SRGs—physical, informational, social, and economic in nature. It is argued that Ukraine's legal framework has significant gaps in countering SRGs, which reduces the effectiveness of the state's response to these threats. Problems of coordination between the Armed Forces of Ukraine, the Security Service of Ukraine, and the National Guard of Ukraine in the field of counter-sabotage operations are identified. The article proposes ways to improve legislation and organizational support for countering SRGs, including the establishment of a unified interagency management center and the adoption of a special regulatory legal act. The study is based on an analysis of the national context and international experience, enabling the formation of a comprehensive approach to neutralizing sabotage threats.

Keywords*: national security; sabotage and reconnaissance groups; legal framework; interagency coordination; hybrid warfare.*

Statement of the problem. The modern hybrid war waged by the Russian Federation against Ukraine is accompanied by the active use of sabotage and reconnaissance groups (SRGs). Their activities pose a serious threat to national security, as saboteurs not only inflict physical damage but also destabilize the internal situation through information attacks and psychological pressure.

Since the beginning of the full-scale invasion in 2022, the Security Service of Ukraine (SBU) has repeatedly reported the detection and neutralization of SRGs operating in frontline territories and even in rear regions of Ukraine [1].

The activities of sabotage and reconnaissance groups (SRGs) are aimed at undermining the economy, destroying critical infrastructure facilities, disrupting military command and control systems, conducting information operations, and creating panic among the population. An important element of SRG operations is the use of information pressure and the spread of fake news to undermine the morale of society. The actions of saboteurs in frontline zones pose a particular danger due to limited control and rapid response capabilities in these areas.

Despite active countermeasures, serious problems remain in the detection and neutralization of sabotage and reconnaissance groups (SRGs), related both to legislative gaps and insufficient coordination among security agencies. The Law of Ukraine "On Combating Terrorism" does not contain clear definitions or provisions regarding countering SRGs, creating legal loopholes in the fight against them. Furthermore, although the Anti-Terrorism Center under the Security Service of Ukraine (SBU) performs coordination functions in combating terrorism, the lack of specific focus on SRGs may lead to reduced effectiveness of coordination between the Armed Forces of Ukraine (AFU), the SBU, and the National Guard of Ukraine in the event of a sabotage threat [2].

Analysis of recent scientific research and publications. Between 2022 and 2025, the number of studies dedicated to the threats posed by sabotage and reconnaissance groups (SRGs) in the context of hybrid warfare has significantly increased in both Ukrainian and international academic circles. Special attention is given to the legal regulation of countering SRGs, organizational cooperation among security agencies, and the experiences of foreign countries in combating similar forms of threats..

Specifically, the works of M.O. Borovyk, O.H. Trembovetskyi, and D.Yu. Hulevatyi examine practical aspects of detecting and neutralizing sabotage and reconnaissance groups (SRGs) by the National Police and the Border Guard Service, emphasizing the need for clear coordination among different agencies [3, 4]. The analysis of NATO's "Resolute Support" operation in Afghanistan demonstrates that effective counteraction against SRGs is possible only with the establishment of unified interagency command centers with a clear division of responsibilities [5].

Ukrainian studies in the field of national security (for example, conducted by the National Institute for Strategic Studies and Lviv State University of Internal Affairs) reveal a legal vacuum regarding the definition of sabotage and reconnaissance groups (SRGs) and criticize the fragmented nature of regulatory and legal frameworks. Additionally, publications from the Security Service of Ukraine and the Ministry of Defense provide official statistics on the detection of agent networks and operational information about SRG activities in frontline and rear areas [6].

Y. Mykhalchyshyn concludes that despite increasing awareness of the threat posed by sabotage and reconnaissance groups (SRGs), issues of legal clarification and interagency cooperation remain relevant. Therefore, further scholarly examination of these problems is a necessary prerequisite for developing an effective national security strategy [7].

The research objectives are to assess the state of Ukraine's legislative framework regarding countering sabotage and reconnaissance groups (SRGs) under martial law conditions; identify the main gaps in the legal support of counter-sabotage efforts; analyze the effectiveness of organizational cooperation among security agencies in the field of counter-sabotage; and develop proposals to improve the system for detecting and neutralizing SRGs at the legislative level and through interagency coordination.

The purpose of this article is to identify legal and organizational issues in the system of countering sabotage and reconnaissance groups (SRGs) and to substantiate ways to address them based on international experience and the analysis of current challenges.

Presentation of the main material. *Threats to National Security Posed by the Activities of Sabotage and Reconnaissance Groups (SRGs).* The activities of sabotage and reconnaissance groups (SRGs) represent one of the most serious threats to Ukraine's national security in the context of modern hybrid warfare. Successful sabotage operations carried out by SRGs often have not only tactical but also strategic consequences—ranging from physical damage and casualties to large-scale informational and social crises. Since the beginning of Russia's full-scale invasion in 2022, numerous incidents involving the infiltration and activity of SRGs have been recorded in both frontline and rear areas of the country [8].

The direct physical threat posed by the activities of sabotage and reconnaissance groups (SRGs) is one of the most evident. Saboteurs typically operate swiftly and locally, delivering targeted strikes on military facilities, critical infrastructure, and transportation routes. The destruction of bridges, railway hubs, ammunition depots, and logistics centers often results in delays in the delivery of equipment and supplies to the front lines, significantly affecting combat operations. For example, the destruction of the Kakhovka Hydroelectric Power Plant in June 2023 caused widespread flooding and infrastructure damage, which, according to the Security Service of Ukraine (SBU), bears all the hallmarks of sabotage.

A particular threat is posed by SRG activities aimed at eliminating command personnel and air defense units. Successful attacks on command posts and communication hubs significantly complicate troop command and coordination on the battlefield. In addition, saboteurs frequently install minefields and use explosive devices in rear areas, creating serious risks for military convoys and civilian transportation [9].

Information warfare remains a critical tool in the activities of sabotage and reconnaissance groups (SRGs). The spread of fake news, hacking of official websites, and incitement of panic via social media are all tactics used to undermine the morale of both military personnel and the civilian population. Saboteurs often disseminate disinformation about alleged successes of Russian forces, casualties among the Armed Forces of Ukraine's (AFU) leadership, or supposed betrayal by certain Ukrainian units. These attacks are designed to weaken fighting spirit and create a sense of chaos in the rear. In 2023, a series of cyberattacks on government institutions was recorded, during which malicious actors gained access to personal data of servicemembers and sensitive logistics information related to the AFU.

The social impact of SRG activity is also extremely dangerous. The spread of panic and mistrust toward the government can lead to mass unrest and acts of civil disobedience. For example, in frontline regions, there have been instances of mass protests which, according to the Security Service of Ukraine (SBU), were coordinated through enemy agent networks. Saboteurs actively use social media to coordinate their actions and mobilize the population for anti-government demonstrations.

SRG activities also cause significant economic damage. The sabotage of energy facilities and transportation infrastructure leads to the shutdown of enterprises, disruption of logistics chains, and interruptions in the supply of food and military equipment. Strikes on energy infrastructure in the Kharkiv and Zaporizhzhia regions resulted in prolonged power and water outages. In addition, attacks on fuel depots and storage facilities in the Sumy and Chernihiv regions caused fuel shortages in frontline areas, complicating the movement of equipment and the supply of frontline units.

The combination of these threats highlights the multidimensional nature of SRG activity. It is not only a physical threat to military facilities and infrastructure but also a large-scale source of informational and psychological pressure on society. SRGs operate at the intersection of military, informational, and economic domains, exploiting vulnerabilities in the national security system to inflict maximum damage with minimal resources.

The absence of a unified response center and shortcomings in coordination among the Armed Forces of Ukraine (AFU), the Security Service of Ukraine (SBU), and the National Guard often lead to delays and ineffective actions in the event of a sabotage threat. In addition, insufficient legal regulation of SRG-related activities in national legislation complicates the legal classification of such actions and the determination of liability for those involved.

The activities of sabotage and reconnaissance groups (SRGs) constitute a systemic threat to Ukraine's national security. This threat encompasses physical, informational, social, and economic dimensions, requiring a comprehensive approach to the detection and neutralization of such groups. Achieving this demands a clear legal framework, effective coordination among security agencies, and modern technical means for monitoring and response.

Legal Challenges in Countering Sabotage and Reconnaissance Groups (SRGs). One of the biggest legal challenges in Ukraine is the absence of a clear definition of the term "sabotage and reconnaissance group" (SRG). The Law of Ukraine "On Combating Terrorism" (No. 638-IV dated 20.03.2003) defines terrorist acts as "threats or use of violence for political or ideological purposes," but the activities of SRGs often go beyond this definition. Sabotage and reconnaissance groups perform more complex tasks, combining reconnaissance, subversive activities, intelligence gathering on troop deployments, and even information attacks. This creates legal ambiguity,

causing SRG actions to often be classified as "treason" or "illegal armed activity," which significantly complicates the legal prosecution of saboteurs and members of their agent networks.

In many cases, individuals detained for participation in sabotage and reconnaissance groups (SRGs) are charged under articles of the Criminal Code of Ukraine that do not accurately reflect the nature of their activities. For example, members of a sabotage group uncovered in the Kharkiv region in 2022 were charged with treason, although their activities focused on gathering intelligence for artillery targeting and organizing sabotage on logistics facilities. The absence of a specific legal mechanism to combat SRGs leads to detainees often avoiding maximum penalties due to gaps in crime classification.

The insufficient adaptation of legislation to modern hybrid threats only exacerbates this problem. Contemporary warfare has long surpassed traditional combat operations—SRG activities now include information operations, cyberattacks, creating social tension, and economic disruption. Ukrainian legislation still relies on the classical definition of terrorism as an act of violence. The lack of legal tools to combat hybrid threats creates significant difficulties in responding to such attacks. For example, the Law of Ukraine "On National Security of Ukraine" (No. 2469-VIII dated 21.06.2018) recognizes the information and cyber domains as key elements of national security but contains no provisions addressing countermeasures against agent networks and information attacks coordinated by SRGs [10; 11].

Another serious issue lies in the gaps regarding the delineation of authority among security agencies in countering sabotage and reconnaissance groups (SRGs). The Law of Ukraine "On Combating Terrorism" designates the Security Service of Ukraine (SBU), Armed Forces of Ukraine (AFU), Ministry of Internal Affairs (MIA), State Border Guard Service, and National Guard as the main actors in counterterrorism. However, there is no clear division of responsibilities specifically concerning SRG counteractions. For example, while the SBU is responsible for counterintelligence and detecting agent networks, the elimination of saboteurs during combat operations remains within the competence of the AFU and the National Guard. This creates conflicts within the command chain, complicating the making of timely operational decisions in crisis situations.

In 2022, in the Kharkiv region, an incident was recorded involving the detection of an SRG engaged in artillery targeting. However, the agent network supplying the saboteurs with information remained undisclosed due to a lack of coordination between military structures and the Security Service of Ukraine (SBU). This is a direct consequence of legal gaps in regulating the actions of security agencies in the fight against SRGs.

The activities of sabotage and reconnaissance groups (SRGs) are partially regulated through existing counterterrorism measures but lack a dedicated legal framework. In 2022, the National Security and Defense Council of Ukraine (NSDC) initiated the development of the Law "On Countering Sabotage and Reconnaissance Groups," but as of 2025, this draft law has yet to be adopted. The absence of this legislation creates a legal vacuum, causing security agencies to often operate based on internal orders and temporary directives, which limits the effectiveness and speed of response to threats posed by SRGs.

The issue of coordination between security agencies in countering sabotage and reconnaissance groups (SRGs) requires particular attention. In practice, the Anti-Terrorism Center under the Security Service of Ukraine (SBU) performs the coordination role among agencies, but due to the lack of clear procedures for information exchange and a unified response system, delays often occur in decision-making between military structures and the SBU. In cases of SRG infiltration into frontline areas, operational intelligence from military reconnaissance may not be transmitted to the SBU in a timely manner, reducing the effectiveness of counter-sabotage efforts.

Resolving this problem requires the establishment of a unified interagency command center under the direct leadership of the National Security and Defense Council of Ukraine (NSDC). This center would ensure coordination among the Armed Forces of Ukraine (AFU), SBU, National Guard, and Border Guard Service in countering SRGs. Such a command center should be granted authority to make operational decisions in real-time and provide direct communication links between units at the command level.

Therefore, to effectively counter sabotage and reconnaissance groups (SRGs), it is necessary to amend the legislation, develop a dedicated legal framework specifically addressing SRG countermeasures, clearly define the powers of security agencies, and establish a unified coordination system at the level of the National Security and Defense Council of Ukraine (NSDC).

Without systematic changes in the legal and organizational spheres, efforts to combat SRGs will remain fragmented and insufficiently effective.

Organizational Challenges in Countering Sabotage and Reconnaissance Groups (SRGs). Countering sabotage and reconnaissance groups (SRGs) requires a high level of coordination and responsiveness from security agencies. However, in practice, there are organizational challenges that significantly reduce the effectiveness of responses to SRG threats. Chief among these are the absence of a unified command center, weak cooperation between different agencies, and insufficient preparedness to act in critical situations.

One of the main problems lies in the absence of centralized management of operations to counter sabotage and reconnaissance groups (SRGs). The Law of Ukraine "On Combating Terrorism" assigns primary responsibility for coordinating counterterrorism measures to the Security Service of Ukraine (SBU) through the Anti-Terrorism Center. However, in practice, the SBU mainly performs counterintelligence functions and the detection of agent networks, while the physical elimination of SRGs and conducting clearance operations remain within the competence of the Armed Forces of Ukraine (AFU) and the National Guard of Ukraine.

Such a division of powers leads to conflicts of interest and duplication of tasks during actual combat operations. For example, in 2022, an SRG engaged in directing artillery fire at Ukrainian Armed Forces (AFU) positions in the Kharkiv region was neutralized by the National Guard. However, the Security Service of Ukraine (SBU) was unable to promptly access the captured equipment and communication devices because, legally, the operation was classified as a military action rather than a counterintelligence one. This situation highlights the absence of a mechanism for joint management of operations between different security agencies [12].

Another problem is the limited level of information exchange between the Security Service of Ukraine (SBU), the Armed Forces of Ukraine (AFU), and the National Guard of Ukraine (NGU). Operational data about saboteur movements, enemy group plans, and agent networks often remain within departmental circulation and are not shared in real-time between agencies. For example, in 2023, in the Donetsk region, Ukrainian forces intercepted a sabotage group planning to blow up a bridge over the Siverskyi Donets River. The military received information about the planned attack from local residents; however, due to the absence of an operational communication channel with the SBU, this information was not promptly transmitted to the Anti-Terrorism Center. This delay resulted in postponed decision-making and created a risk of mission failure.

Insufficient coordination also becomes evident in the process of operational response to threats in frontline zones. Special forces units (SBU, AFU, NGU) often operate independently, without clear information sharing or coordinated actions. In frontline areas, especially in urban environments, this can lead to "friendly fire" incidents, where units from different agencies lack effective interaction and situational awareness on the battlefield. A notable example occurred in Mariupol in early 2022. During the clearing of the city, a group of National Guard fighters engaged in a firefight with an SBU unit because both operated under different operational plans and lacked a unified coordination channel.

The absence of a unified command center for operations also affects the logistical support and technical assistance of security forces. During prolonged operations to detect and neutralize sabotage and reconnaissance groups (SRGs), units of the Armed Forces of Ukraine (AFU) and the National Guard (NGU) often face shortages of communication equipment, ammunition, and armored vehicles due to the lack of a single supply channel. Logistics units of the AFU are supplied through one system, while the NGU and Security Service of Ukraine (SBU) units are supplied through others, complicating coordination of deliveries and the rapid deployment of equipment to combat zones.

A separate issue is the lack of a unified database on the activities of sabotage and reconnaissance groups (SRGs) and agent networks. The Security Service of Ukraine (SBU) and the Armed Forces of Ukraine (AFU) maintain separate operational data systems that are not integrated into a single information network. This complicates the identification of saboteurs operating under the cover of civilian populations. For instance, in 2023, an SRG operated in the Kharkiv region for two months using forged documents. Military intelligence provided information to the AFU, but due to the lack of an operational communication link with the SBU, the group continued its activities until it was accidentally discovered during a checkpoint inspection.

Another significant problem remains the absence of a unified system for accounting and coordinating agent activities in rear areas. Sabotage and reconnaissance groups (SRGs) often receive support from local agents who provide shelter, information about movement routes, and logistical assistance. In practice, the Security Service of Ukraine (SBU) and military intelligence operate separately in this sphere, leading to duplicated efforts and a loss of a comprehensive picture of the operational environment.

In summary, the key organizational problems in countering sabotage and reconnaissance groups (SRGs) remain the absence of a unified command center, weak coordination between agencies, lack of an operational communication channel, and fragmented logistical support. To address these issues, it is necessary to establish a single interagency center under the leadership of the National Security and Defense Council (NSDC), which would ensure continuous information exchange, operational planning, and real-time coordination of actions among security agencies. Integrating databases between the Security Service of Ukraine (SBU), the Armed Forces of Ukraine (AFU), and the National Guard of Ukraine (NGU), creating a unified communication channel, and centralizing logistical support will significantly enhance the effectiveness of countering SRGs and enable rapid response to threats in frontline zones.

Improvement of the Legal and Organizational Framework for Countering Sabotage and Reconnaissance Groups (SRGs). Effective counteraction against sabotage and reconnaissance groups (SRGs) requires not only the improvement of operational and tactical training of security forces but also the establishment of a reliable legal and organizational foundation. Currently, the legal framework for countering SRGs remains fragmented and insufficiently adapted to the realities of modern hybrid warfare. The lack of a clear definition of SRGs, legal norms regarding the use of force, as well as weak coordination between agencies, significantly complicate the fight against saboteurs at the operational level.

First and foremost, it is necessary to amend the current legislation to provide a clear legal classification of the activities of sabotage and reconnaissance groups (SRGs). The Law of Ukraine "On Combating Terrorism" should include a definition of SRGs as organized groups acting under the direction of foreign states or non-state entities with the purpose of gathering intelligence, conducting sabotage, and destabilizing the internal situation in the country. Such a classification will enable clear determination of response mechanisms and the procedures for the use of force upon detection of SRGs.

In addition, it is advisable to enact a separate law titled “On Countering Sabotage and Reconnaissance Groups,” which should establish the procedures for detection, neutralization, and criminal liability of SRG members. The law should also provide a clear framework for coordination between the Armed Forces of Ukraine (AFU), the Security Service of Ukraine (SBU), and the National Guard of Ukraine (NGU) during counter-sabotage operations. It is important to define a legal mechanism for the use of force against SRGs that protects service members from risks of exceeding their authority or legal liability.

Besides legislative changes, it is necessary to establish a unified command center for countering sabotage and reconnaissance groups (SRGs). Currently, the Anti-Terrorist Center under the Security Service of Ukraine (SBU) primarily performs a coordinating function but does not possess direct operational authority to respond to threats in frontline areas. To ensure timely response to sabotage threats, it is advisable to create a Joint Counter-Sabotage Center (JCSC) under the direct leadership of the National Security and Defense Council of Ukraine (NSDC). The JCSC should have direct authority to coordinate operations among the Armed Forces of Ukraine (AFU), the SBU, the National Guard of Ukraine (NGU), and other security agencies, including territorial defense units and the State Border Guard Service.

The center must operate in real time, ensuring uninterrupted information exchange between agencies. To achieve this, it is necessary to create a unified electronic database on the activities of sabotage and reconnaissance groups (SRGs), agent networks, and intelligence on enemy operations. Integrating data from military intelligence, counterintelligence, and operational services will allow for identifying connections between agent networks, tracking the movements of saboteurs, and preventing future attacks on critical infrastructure.

Particular attention should be given to improving the system of operational response to SRG threats in frontline zones. Currently, the Armed Forces of Ukraine (AFU) and the National Guard operate in the combat zone based on their own operational directives, which often leads to uncoordinated actions. The establishment of a unified operational headquarters within the Joint

Counter-Sabotage Center (JCSC) will enable conducting comprehensive operations involving special forces, unmanned aerial vehicles (UAVs), and electronic warfare (EW) assets.

Special attention should be given to the legal regulation of the use of force during counter-sabotage operations in peacetime. Currently, the use of weapons against SRGs is governed by general rules on the lawful use of force, which creates legal uncertainty. To address this issue, it is necessary to adopt a regulatory act that will establish the procedure for the use of weapons and electronic warfare (EW) means in the event of detecting an SRG. This will allow servicemen to act within the law without the risk of prosecution for exceeding their authority.

In addition to legal reforms, it is necessary to strengthen the personnel support and material-technical base of the units involved in countering SRGs. This is especially true for special forces units (SBU, Armed Forces of Ukraine, National Guard), which play a key role in detecting and neutralizing SRGs. Enhancing the level of training and supplying modern communication equipment, night vision devices, and strike UAVs will significantly improve the effectiveness of combat operations against SRGs.

The informational component also requires improvement. SRGs often use social networks and messengers to coordinate their actions and recruit agents among the local population. To counter these threats, it is advisable to establish an information unit within the Joint Counter-Sabotage Center (JCSC), which would be responsible for detecting and blocking information channels related to SRG activities. Additionally, monitoring of suspicious financial transactions and online activities of suspected individuals should be implemented.

Thus, the improvement of the legal and organizational framework for countering sabotage and reconnaissance groups (SRGs) should include the adoption of a dedicated law on SRGs, the establishment of a unified operations management center under the National Security and Defense Council (NSDC), the enhancement of regulations regarding the use of force, and the strengthening of the material and technical support for security agencies. A comprehensive approach that combines legal, organizational, and technical measures will enable the creation of an effective counter-sabotage system and protect Ukraine's national security from threats posed by SRGs.

Conclusions and directions for future research. Analysis of current challenges in Ukraine's national security sphere demonstrates that the activities of sabotage and reconnaissance groups (SRGs) represent one of the greatest threats in the context of hybrid warfare. The identified issues in the legal and organizational support for combating SRGs require a systematic approach to their resolution at the levels of legislation, interagency coordination, and technical provision of security forces.

Among the key problems are legal uncertainty regarding the activities of sabotage and reconnaissance groups (SRGs), the lack of a unified coordination system between the Armed Forces of Ukraine (AFU), the Security Service of Ukraine (SBU), and the National Guard, as well as weak integration of information databases and communication channels. The absence of a clear legal framework for the use of force against SRGs during peacetime also complicates the response to threats in frontline areas.

To improve the legal framework, it is necessary to amend the Law of Ukraine "On Combating Terrorism" by establishing a clear definition of sabotage and reconnaissance groups (SRGs) and mechanisms for holding individuals accountable for participation in their activities. The adoption of a separate law "On Countering Sabotage and Reconnaissance Groups" will regulate the use of force and coordination between agencies during counter-sabotage operations.

In the field of organizing counter-sabotage efforts, it is necessary to establish a Joint Counter-Sabotage Center (JCSC) under the leadership of the National Security and Defense Council of Ukraine (NSDC). The center should ensure the operational exchange of information between agencies, integration of databases, and centralized management of operations to detect and neutralize sabotage and reconnaissance groups (SRGs) in frontline zones.

Special attention should be given to the technical support of special forces units, including electronic warfare systems, unmanned aerial vehicles (UAVs), and modern communication systems. Strengthening intelligence operations and improving methods of informational counteraction will enable more effective detection of enemy agent networks and disruption of sabotage and reconnaissance groups (SRGs) activities at the preparatory stage of their operations.

Thus, effective counteraction against sabotage and reconnaissance groups (SRGs) requires a comprehensive approach that combines legal

regulation, organizational coordination, and technological support of security forces. Implementing these measures will enhance Ukraine's national security and ensure prompt response to SRG threats both in the combat zone and rear areas.

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Received: 08.04.2025
Revised: 16.04.2025
Accepted: 26.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC [323: 93/94]: 355.45 DOI 10.59226/2786-6920.1.2025.151-159

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THE POLICY OF HISTORICAL (NATIONAL) MEMORY IN THE CONTEXT OF UKRAINE'S SECURITY CHALLENGES

The article substantiates the relevance of studying the issues of historical memory and the policy of historical (national) memory today, in the period of the armed aggression and information warfare waged by Russia against Ukraine. A manifestation of this confrontation is the transference of the conflict into the sphere of public consciousness and collective historical memory.

The main approaches to the concept of historical memory are analyzed, and the author proposes its interpretation as the knowledge and reflection concerning events, traditions, ideas, and theories, reflected in the collective consciousness, through which a people (ethnic community) comprehends and preserves its past.

The article proposes an understanding of the policy of historical (national) memory as a set of social practices aimed at representing (modifying) particular images of the shared past, actualized by the contemporary political context. It is argued that, in modern democracies, the formation (construction) of memory policy constitutes one of the directions of state policy. It is demonstrated that the policy of historical (national) memory is objectified in the form of legislation, strategies, and concepts that define the means of reproducing past events or memory in society, being incorporated into political declarations, governmental programs, commemorative practices, and memorial objects. The purpose of memory policy is to form a collective interpretation of the past and to determine certain events, symbols, or individuals that are to be honored in society.

It is substantiated that the current state of crisis in historical memory in Ukrainian society, coupled with the shortcomings and gaps in the past implementation of the policy of historical (national) memory – especially under conditions of information warfare and hostile propaganda – may hinder societal unity and pose a serious threat to public cohesion and national security.

Keywords: *historical memory; policy of historical (national) memory; national security; public consensus; consolidated model.*

Statement of the problem. Historical memory has always played one of the key roles in the processes of shaping national consciousness, national unity, and ensuring societal and national security. The phenomenon of historical memory acquires particular significance during periods of socio-political upheaval – such as the armed aggression of the Russian Federation against Ukraine has become for Ukrainian society. This war, in addition to the extreme brutality of the aggressor, is characterized by its hybrid nature

and the transfer of confrontation into the sphere of public consciousness, one of the components of which is historical memory. Attempts to disseminate the concept of the "Russian world" through appeals to shared fragments of historical heritage are most vividly manifested in the enemy's efforts to distort the historical past. However, it is precisely the historical memory of Ukrainians, as a component of their national consciousness, that obstructs Russia's long-standing attempts to finally draw Ukraine into its sphere of influence. The imperial and Soviet past, along with the tragic mass crimes committed by Russia against Ukrainians – such as the Baturyn massacre, the destruction of the Sich, the war against the Ukrainian People's Republic (UNR), dekulakization, the Holodomor, the "Executed Renaissance," Russification, and, undoubtedly, the current russo-ukrainian war – have had a profound impact on the national consciousness of the Ukrainian nation, its collective self-identification, and the perception of political, cultural, and ideological phenomena both in the past and in the present.

The importance of studying the problems of historical memory and the policy of historical (national) memory in contemporary Ukrainian society is conditioned by the role these phenomena play in the context of self-identification and state-building processes, ensuring internal and external national security, and determining the political future of the Ukrainian state and the Ukrainian nation. The security-related dimension of historical memory remains insufficiently conceptualized and studied. However, in the context of the full-scale armed aggression of the Russian Federation against Ukraine, national memory intensifies its identifying, consolidating, and mobilizing functions. In the process of implementing an appropriate memory policy, it becomes a significant factor in strengthening Ukraine's national security system.

Analysis of recent studies and publications. Historical memory is studied by specialists in various sciences: philosophers, psychologists, historians, and sociologists. The theory of historical memory was developed by French sociologists of the first half of the 20th century, Henri Bergson and Maurice Halbwachs, who proved the interconnection between space, time, and people's ability to retain certain events in their consciousness, and also developed the concept of "collective memory." Researcher T. Vasilevska [1, 2] proved that the basis for conceptualizing national memory in modern democracies is the titular nation, which forms the nation-state as an imaginary political community, and also substantiated the leading role of the state in constructing a model of historical memory and implementing a policy of national memory. The phenomenon of historical memory, its place and role in the system of social values was studied by L. Nahorna in her works "Historical Memory: Theories, Discourses, Reflections" [3] and "Historical Culture: Concept, Information Resource, Reflective Potential" [4]. The relevance of forming a national memory policy through the prism of national security is highlighted in the analytical report "The Policy of Historical Memory in the Context of Ukraine's National Security" [5], which examines the problem of national identification in the context of historical memory policy. The researchers highlighted the humanitarian expansion of the Russian Federation in the field of Ukrainian national history, religion, and assessment of the past as one of the methods of forming anti-Ukrainian sentiments in the eastern regions of Ukraine, and identified the priority role of education, science, and culture in shaping the historical memory of Ukrainian society and overcoming the destructive influence of the Russian factor**.**

In addition to those mentioned above, problematic aspects of historical memory and memory politics were developed by O. Hotra [6], N. Dichek [7], I. Kovalskaya-Pavelko [8], A. Pugach [9], N. Kuzminets [10], and other researchers. Thanks to the works of these authors, the foundations for understanding the concepts of historical memory and historical (national) memory policy have been laid, and it has been proven that historical memory shapes national consciousness, which is a means of national self-identification and can either promote or, conversely, not contribute to understanding between representatives of different segments of society and be

used as a tool in infowar.

At the same time, the problems of forming a policy of national memory in Ukraine that would best meet the needs of a society that has been resisting an aggressor country for more than ten years remain understudied.

The purpose of this article is to explore the concept of historical (national) memory policy and determine its place in the structure of public and national security concepts. To this end, the following tasks must be accomplished: 1) to explore the concepts of historical memory and historical (national) memory policy; 2) to establish the main directions of the interconnection between the state of historical memory and the content of historical (national) memory policy with the components of national security; 3) to reveal the tasks of historical (national) memory policy in the current military-political realities of Ukraine.

Presentation of the main material. Despite its prevalence in scientific and journalistic circles, the concept of historical memory is characterized by a multiplicity of interpretations. It is most often understood as a socio-psychological phenomenon, the ability of the human mind to preserve individual and collective experience of interpersonal relations and, on this basis, to form ideas about the course of the historical process and one's place in it. The concept of collective historical memory is generally considered to be close to the concept of national memory, which is worth agreeing with. Accordingly, within the scope of this study, the concept of collective historical memory is equivalent to the concept of national memory, and the concept of historical memory policy is equivalent to the concept of national memory policy.

The terminological and conceptual reference book “Historical Science” defines historical memory as "the ability of human consciousness to reproduce the past. Without ‘historical memory,’ it is impossible to reproduce the history of society. It is the inheritance of past experience, which is embodied in appropriate cultural forms (traditions, monuments, memoirs, etc.), and also exists in the form of the historical consciousness of a people" [11, 281]. In the Encyclopedia of Ukrainian History [12], the concept of historical memory is presented as a set of purposefully constructed, relatively stable, interrelated collective ideas about the past, standardized and codified in society, culture, and political discourse, myths, symbols, mnemonic and commemorative practices. It also defines the key function of historical memory as the transmission of experience and knowledge about the past as the basis for self-identification.

With this in mind, we propose to understand historical memory as knowledge and reflections on events, traditions, ideas, and theories reflected in the collective consciousness, through which a people (ethnic community) realizes and preserves its past.

As researcher N. Yakovenko notes, historical memory is a collective representation of the past, the foundation of national identity [13]. This memory not only records a significant number of events, but also synthesizes and weaves them into a single context of national history, where each fact and event occupies its own value niche. Through the mechanism of historical memory, the experience acquired by a nation or people is sorted into positive experiences that must be learned and multiplied, and negative experiences that serve as warnings. Thus, in this assessment, we can identify the main function of historical memory, which is to preserve and transmit the experience of the past of one's social community or nation as a whole as a basis for further determining one's place in it, which is, in essence, social or national identification.

Emphasizing the nation-building potential of historical memory, in a situation where Russia is not only conducting an aggressive war against Ukraine but also appropriating Ukrainian history and culture, we believe that Ukrainians now, more than ever, must demonstrate their civic achievements to the world, defend historical values and historical memory, and cultivate historical culture and historical science.

The concept described above constitutes the essence of historical (national) memory policy—a set of social practices aimed at representing (modifying) certain images of the past (images of a shared past) that are actualized by the current political context. In modern democratic countries, the formation (construction) of memory policy belongs to one of the areas of state policy—a purposeful activity of state authorities aimed

at solving societal problems and achieving and implementing generally significant development goals of society or its individual spheres. Such a policy is materialised in the form of relevant legislation, strategies, or concepts that define the ways of reproducing past events or memory within society, being incorporated into political declarations, government programs, commemorative practices, and memorial objects. The purpose of memory policy is the formation of a collective interpretation of the past and the determination of specific events, symbols, or individuals that should be honored in society. Key measures in the implementation of memory policy include: the establishment of national holidays by the state; the formation of a pantheon of national heroes; the commemoration of historical events; honoring heroes; the introduction of appropriate concepts for the teaching of history, etc.

Analyzing the concept of memory policy, V. Artiukh rightly emphasizes that "historical memory in the context of politics is a function of power, which determines how the community should imagine the past. Memory policy is always aimed at creating a 'necessary' synthesis of the present with the past […]. In fact, through the identification of a certain mass of individuals with a constructed model of historical memory in the process of their socialization, the phenomenon of the nation itself is constituted" [14, p. 5]. The subjects responsible for determining and implementing memory policy in contemporary Ukraine include: a) the state and its agencies, as commissioners and directors of the process; b) scientific institutions – as institutionalized reconstructors and creators; c) civil society – as a subject of the production of historical memory and a subject of interaction.

Back in 2006, leading scholars and experts in the field of history and social practices proposed a set of strategic directions for cooperation between the state and society in shaping the most acceptable model of historical memory for Ukrainian society. In particular, these include: a) achieving a shared vision of Ukrainian history by Ukrainians and a societal consensus around its key events, as well as the "reconciliation" of opposing views of the past; b) the public demonstration by the state, political forces, and national elites of respect for Ukrainian history and a commitment to restoring historical memory and justice; c) the proper commemoration of significant historical events and figures and the consolidation of public opinion around them; d) the modernization of the Ukrainian historical narrative, state support for domestic historiography, and enhancing the prestige of the historian's profession; e) the integration of Ukrainian historiography into the European and global academic context; f) the promotion of the development of domestic archaeology, historical archives, and museum work; g) the revival and preservation of national shrines and historical monuments; h) the improvement of standards for teaching the course of Ukrainian history in educational institutions [15, p. 44]. Despite a fairly clear and objective vision of memory policy that should have been implemented by the respective agencies and institutions, the achievements in its realization have been rather limited. State institutions, certain political forces, and opinion leaders have not always demonstrated unity regarding the construction of a model of historical memory that corresponds to the tasks of building the Ukrainian state. This has led to an amorphous state of the historical memory of the Ukrainian nation, which has become an additional factor in the Russian dictator's decision to initiate armed aggression against Ukraine. Among the main manifestations of the crisis phenomena within the structure of Ukrainians' historical memory, we also identify the following: a lack of coordination between the all-Ukrainian and other forms of collective identification; discrepancies between national and regional interpretations of historical events and figures; the absence of a general consensus regarding the foreign, anti-Ukrainian nature of imperial and communist rule imposed from outside; the success of manipulations concerning the language issue; and the presence, within a segment of society, of nostalgia for the Soviet past.

Thus, the crisis state of historical memory in society, combined with the amorphous nature of memory policy, under conditions of ongoing information warfare against the state and society, may

hinder societal unity and pose a threat to social harmony and national security.

It should be noted that, in accordance with the Law of Ukraine "On National Security" [16], national security of Ukraine should be understood as the protection of the state's sovereignty, territorial integrity, democratic constitutional order, and other national interests of Ukraine from real and potential threats. Threats to Ukraine's national security are phenomena, trends, and factors that hinder, complicate, or may hinder or complicate the realization of national interests and the preservation of national values of Ukraine. In the academic field, national security is most often considered as a concept that characterizes the degree of protection of vital interests, rights, and freedoms of the individual, society, and the state from external and internal threats, or the degree of absence of threats to human rights and freedoms, as well as to the fundamental interests and values of society and the state [17, 18]. One of the most authoritative experts in the field of national security, V. Lypkan, interprets this concept as a set of officially recognized views on the goals and state strategy in the sphere of ensuring the security of the individual, society, and the state from external and internal threats of a political, economic, social, military, technogenic, environmental, informational, and other nature, taking into account available resources and capacities [19].

Thus, it can be stated that the absence within society of a clear understanding of symbols that are significant for the entire nation, an undefined and often mutually exclusive policy of historical (national) memory, and the lack of concrete guidelines regarding historical, national, and societal values—in the conditions of information warfare and armed aggression—can create a direct threat to national security. There is no reason to disagree with T. Vasylenko and T. Bevz in asserting that the relevance of a consolidated model of historical (national) memory policy is particularly urgent for our country in connection with the ongoing process of political nation-building and the war that has continued for over ten years. This war is being waged not only on the battlefield, but also on the informational, educational, and intellectual fronts, and manifests itself, in particular, in the form of "memory wars" [2, p. 137]. The key objective of the aggressor state is the dismantling of Ukrainian statehood. To this end, the manipulation of historical facts, the destruction of citizens' identity and values, and the imposition of foreign cultural standards are used. Under such conditions, the silencing or insufficient respect for the heroism of defenders who died defending Ukraine's state sovereignty and territorial integrity is unacceptable. Accordingly, now more than ever, it is vital to implement a memory policy strategy that does not allow fallen Heroes to become mere statistics, but preserves the historical significance of each individual act of bravery and sacrifice for present and future generations.

Emphasizing the state's priority task of forming a consolidated model of historical (national) memory in Ukraine, it must be stated that such a policy should be balanced, take into account contemporary realities, and be based on a solid legislative framework. According to Article 11 of the Constitution of Ukraine: "The State promotes the consolidation and development of the Ukrainian nation, its historical consciousness, traditions and culture…" [20]. Significant for the formation and implementation of historical memory policy in Ukraine are the following legislative acts: – the Law of Ukraine "On the Prohibition of Propaganda of the Russian Nazi Totalitarian Regime, the Armed Aggression of the Russian Federation as a Terrorist State against Ukraine, and the Symbols of the Military Invasion of the Russian Nazi Totalitarian Regime into Ukraine" [21]; – the Law of Ukraine "On the Condemnation and Prohibition of Propaganda of Russian Imperial Policy in Ukraine and the Decolonization of Toponymy" [22]; – the Law of Ukraine "On Amendments to the Law of Ukraine 'On Geographical Names' Regarding the Improvement of Activities Related to the Establishment, Regulation, Registration, Use, and Preservation of Geographical Names" [23], among others.

In the Vision *"Vision of Ukraine: Reform and Restoration of the Socio-Humanitarian Sphere in the Perspective Until 2030"*, adopted in 2023 within the framework of the Reanimation Package of Reforms, it

is stated that "national memory policy shapes a favorable social and media environment for a continuous process of critical reflection on the lessons of both distant and recent history, prevents the use of complexes of national inferiority or superiority and exceptionalism in foreign and domestic policy, facilitates mutual understanding with European neighbors regarding historical traumas, preserves, honors, and promotes the memory of Ukrainians' struggle for freedom and resistance to misanthropic imperial regimes" [24].

These legal acts and visionary documents allow us to affirm that even under conditions of war, the Ukrainian state continues its efforts to implement historical (national) memory policy. In particular, during 2022, Ukraine renamed 9,859 toponyms associated with Russia and dismantled 145 monuments related to "the propaganda of Russian imperial policy" [25].

In this context, we agree with T. Vasylevska and T. Bevz that "the challenges of today, especially in the conditions of Russia's full-scale war against Ukraine, require a rethinking of the past, a rejection of Soviet clichés of idealization and victimization of history. Memory policy must become a powerful foundation for the development of a new post-war national and civic identity of Ukrainians" [2, p. 153].

We argue that the implementation of memory policy under current conditions, as one of the directions of state policy in Ukraine, should be carried out comprehensively, taking into account the real state of historical memory in Ukrainian society and based on the results of scholarly research. We concur with the view of V. Kryvosheia that the foundation of such a policy must be the principle of equality and the opposition to all forms of discrimination against models of memory, regardless of the ethnic, political, ideological, or religious origin of those models [26, p. 35]. Furthermore, following A. Sushko [27, p. 45], we consider the following to be essential principles of memory policy in Ukraine: a) alignment with the goals of societal development; b) coherence in implementation strategies among various actors of the political process; c) consideration of the state of collective consciousness and the informal level of historical memory; d) consideration of the objective achievements of historical science. In addition to the above, we believe that the key event that should shape the content of memory policy for all subjects involved in its definition and implementation under current conditions must be the heroic resistance of the Defense Forces and the entire Ukrainian people to the armed aggression of the Russian Federation against Ukraine, as well as the commemoration of the heroes of this war.

In general, considering the wartime realities of today, it is rather difficult to draw definitive conclusions regarding the success of national memory formation in Ukraine in recent years. However, it is important to emphasize the need for continued efforts and new educational initiatives to promote and objectively represent the history of Ukrainian statehood.

Conclusions and prospects for further research

This article presents the following:

1. The importance of studying the issues of historical memory and historical (national) memory policy is substantiated, particularly in the current context of Russia's armed aggression and information warfare against Ukraine, which has resulted in the transposition of the conflict into the realm of public consciousness and collective historical memory. It is demonstrated that this importance stems from the critical role played by historical memory and historical (national) memory policy in national identification processes, nation- and state-building, national security, and the determination of Ukraine's political future.

2. The main approaches to the concept of historical memory are analyzed. Historical memory is proposed to be understood as the body of knowledge and reflection embedded in collective consciousness concerning events, traditions, ideas, and theories through which a people (ethnic community) becomes aware of and preserves its past.

3. The concept of historical (national) memory policy is proposed as a set of social practices aimed at representing (modifying) particular images of a shared past, actualized by the current political context. It is demonstrated that in modern democracies, the

formation (construction) of memory policy is one of the directions of state policy. Historical (national) memory policy is materialized in the form of legislation, strategies, and concepts that define ways of reproducing past events or memory in society, being incorporated into political declarations, government programs, commemorative practices, and memorial objects. The purpose of memory policy is the formation of a collective interpretation of the past and the identification of certain events, symbols, or individuals that should be honored in society.

4. It is substantiated that the existing crisis state of historical memory in contemporary Ukrainian society, combined with past deficiencies and gaps in the implementation of historical (national) memory policy, particularly under conditions of information warfare and hostile propaganda, may hinder societal unity and pose a serious threat to social cohesion and national security.

5. The priority of the task of forming a consolidated model of historical (national) memory for both state authorities and civil society is emphasized. It is stated that such a policy should be well-balanced, grounded in contemporary realities, and supported by a solid legislative foundation. It is proven that, under the ongoing war with the Russian aggressor, historical (national) memory policy must be based on both historical and recent experiences of the Ukrainian people's struggle against Russian colonialism and aggression. It should also rely on historical facts, events, figures, and symbols considered important by Ukrainian citizens in the context of state-building and ensuring national security, regardless of the historical, political, or social context in which they emerged. The importance of honoring and showing respect for the heroes and heroines of the ongoing war is particularly emphasized as a key component of national memory policy.

Prospects for further research include the expansion of scholarly approaches to studying the characteristics of the historical memory of the Ukrainian nation and the historical (national) memory policy in Ukraine in order to accelerate the development of consolidated, objective, and non-contradictory models. In particular, further research is needed into the main strategies and mechanisms used to construct national memory, as well as an assessment of their impact on national and state security.

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Received: 16.03.2025
Revised: 23.03.2025
Accepted: 30.04.2025

ISSN 2786–6920
SCIENTIFIC BULLETIN OF THE KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE No 1 2025

UDC 355.45

DOI 10.59226/2786-6920.1.2025.160-166

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DEVELOPMENT OF THE MILITARY SECURITY SYSTEM OF UKRAINE: CURRENT PROBLEMS AND WAYS TO SOLUTIONS

The article clarifies the functions of the military security assurance system, among which are goal-setting, goal-definition, goal-implementation, informational, informational-analytical, programmatic-practical, organizational-management, integrative, diagnostic, prognostic, planning, programmatic-adaptive, scientific-adaptive, coordination, informatization, and monitoring of actors responding to threats to military security and crisis situations in the military sphere.

It is substantiated that the design and construction of the military security assurance system should be carried out within the framework of the theory of war, theories of international and national security, the theory of state military governance, and the theory of crisis response, taking into account the general and organizational principles of functioning of the aforementioned system, as well as the principles of social design of national security systems.

Keywords: *military security; military security system; threats to military security; crisis situations in the military sphere; russian-ukrainian war; response to threats to military security; Defense Forces of Ukraine.*

Statement of the problem. In the context of the russian-ukrainian war, Ukraine's military security system faces the urgent problem of developing and immediately implementing a new paradigm of national security policy within the practice of military-political activity that provides reliable guidelines for organizing effective responses to dangers and threats to military security. This concerns the interrelation between the urgent task of guaranteeing military security and the study of the theoretical and practical issues related to the development of Ukraine's Defense Forces. The insufficient elaboration of approaches to the above aspects, the imperfection of ongoing reforms, and the lack of systematic scientific analysis hinder the creation of a coherent, flexible, and effective system for ensuring military security capable of adequately responding to current and future challenges.

In this regard, a scientific problem emerges, connected with the study of the further development of Ukraine's military security assurance system and the justification of proposed pathways, taking into account current geopolitical realities, the experience of resisting aggression, and the state's strategic priorities.

Analysis of recent studies and publications. indicates that the issue of developing Ukraine's Defense Forces has been addressed in scholarly works by domestic researchers such as S. S. Huta [1], O. M. Zhytnyk [2], A. O. Pelykh [3], H. M. Perepelytsia [4], A. I. Semenchenko [5], A. K. Pavlikovskyi [6], V. A. Chygrynskyi [7], and M. M. Shevchenko [8; 9], among others. These works emphasize problems within the theory of military security and the practice of its provision. Based on an analysis of research results [3; 5; 7; 8], it can be stated that the design and construction of Ukraine's military security assurance system should involve ideas from the theory of war, theories of national and military security, the theory of state military governance, and the theory of crisis response.

Despite the considerable number of studies on the theory and practice of military security provision in Ukraine, there is a notable lack of research specifically devoted to the theoretical and methodological foundations of designing and constructing the military security assurance system.

The purpose of this article is to conduct a comprehensive analysis of Ukraine's current military security assurance system, specifically to clarify its functions and propose pathways for improvement, primarily through the development of a forward-looking model of the national security assurance system.

Presentation of the main material. According to the Strategic Defence Bulletin of Ukraine [10], one of the conditions for achieving the prospective model of the Armed Forces of Ukraine and other components of the Defence Forces is the constant situational awareness and the attainment of a unified understanding by all components of the Defence Forces of existing and anticipated threats in the military sphere at the strategic, operational, and tactical levels. This is necessary to conduct proactive actions and ensure an adequate response to counter the aggression of the russian federation and its allies.

It should be noted that ensuring Ukraine's military security in general, as well as responding to dangers and threats to military security and crisis situations in the military sphere, is a specific function of state military governance. The implementation of this function requires appropriate informational and analytical support for the military-political activity of the leadership of the Ministry of Defence (the recipient system), namely: appropriate situational awareness regarding dangers and threats to military security, and crisis situations in the military sphere; comprehensively justified assessments and forecasts of the emergence and development trends of threats, crisis, and emergency situations of a military nature; options for state-governance decisions for responding to them; recommendations regarding reactive and proactive measures for responding to threats and crisis and emergency situations of a military nature; and coordination of the Defence Forces with security forces during the said response.

Currently, a system for ensuring Ukraine's military security has been formed and is functioning. It consists of a set of state authorities, military governance bodies, as well as legal, political, social, and other connections between them, and the mechanisms, instruments, and technologies through which military security is ensured.

The results of assessing the current state of Ukraine's military security assurance system provide grounds to state that today, the main problems in the functioning of the mentioned system are:

1) at the methodological level of the activity of entities responsible for ensuring Ukraine's military security:

- lack of systematized knowledge regarding hybrid threats and crisis situations endangering national security, and insufficient knowledge regarding responses to the mentioned threats and crisis situations;
- absence of methodologies for diagnosing and forecasting crisis situations threatening national security, as well as potential cascading and synergistic effects of military-related crisis and emergency situations;
- prioritization, in practice, of reactive response technologies to threats to military security and crisis situations in Ukraine's military sphere, and lack of proactive response technologies;
- uncertainty regarding the prospective information model of the military security assurance system of Ukraine;

2) at the institutional level of the activity of entities responsible for ensuring Ukraine's military security:

- imperfection of the mechanisms for ensuring military security;
- imperfection of the mechanisms for organizing interaction and coordination among the entities responsible for ensuring military security;

3) at the organizational level of the activity of entities responsible for ensuring Ukraine's military security – a low level of interaction and communication between structural subdivisions of the Ministry of Defence of Ukraine in matters of responding to crisis situations in the military sphere [1–4; 8; 9].

The next step in the development of Ukraine's military security assurance system is the modelling, designing, and constructing of the mentioned system, which, in turn, involves the development of a prospective model of this system in the context of the following requirements:

a) ensuring military security and national resilience under a dynamic security environment, determined by the transformation of warfare and interstate confrontation;

b) timely and adequate response to threats to military security and crisis situations in Ukraine's military sphere;

c) standardization of the response process to identified and anticipated threats to military security in accordance with the norms of NATO crisis response protocols;

d) technologization of the response to threats to military security and crisis situations endangering Ukraine's national security.

In the process of modelling, designing, and constructing Ukraine's military security assurance system, it is necessary to take into account the general and organizational principles of the functioning of the mentioned system, as well as the principles of social design of national security systems [7].

The general principles of the functioning of Ukraine's military security assurance system are as follows:

– legality, integrity, accountability, and responsibility;

– optimal combination and balance of interests in the sphere of national and military security of Ukrainian society;

– unity of approaches in the development and implementation of measures aimed at performing tasks related to responding to threats to military security and crisis situations in Ukraine's military sphere;

– scientific character and a system-based, comprehensive approach to the development of Ukraine's military security assurance system [7].

The specific (organizational) principles of the functioning of Ukraine's military security assurance system include:

– the principle of subordination of the mission, functions, and tasks of the system for responding to crisis situations in Ukraine's military sphere to the provisions of national legislation in the field of national security and defence, and to national goals defined in the Military Security Strategy of Ukraine. This ensures the integrity of the system, which is unified under a single strategic concept for defending national interests in the military sphere;

– the principle of optimal correspondence between the goals of the system for responding to crisis situations in the military sphere of Ukraine, its structure and functions, and the tasks of reactive and proactive responses to crises threatening military security, as well as the logic of organizational-management processes

– involved in the interaction of subjects of such response;

– the principles of planning and consistency in the implementation of state-governance influence on the processes of reactive and proactive responses to crises that threaten military security;

– the principle of timeliness, which implies the adequacy and promptness of response measures to crises. This is linked to the volatility of the external and internal security environment and the potential cascading effects of threats of various types and the escalation of crises [7].

The principles of social design of the system for responding to crisis situations in the military sphere include:

– orientation – subordination to the defined goal and tasks of crisis response;

– effectiveness – the ability to achieve the defined goals of crisis response;

– reliability – the ability to ensure the attainment of the planned results of crisis response with greater probability;

– efficiency – the ability to produce results with minimal time and resource expenditure;

– the principle of consideration of universal interconnections [7].

The mission of Ukraine's military security assurance system is to ensure a certain level of the state's military security that guarantees its sovereignty, territorial integrity, and inviolability of borders. The **purpose** of this system is achieved through the implementation of its main function: the identification of military threats and dangers to national interests and their neutralization [3].

The mission of Ukraine's military security assurance system is achieved through the implementation of specific functions of this system, namely [3]:

– goal-setting, which realizes one of the fundamental principles of the systems approach—the meaning-making content of the practice of responding to military security threats. It encompasses goal-definition and determines the necessity of goal-implementation;

– goal-definition, which involves identifying the objectives for responding to military security threats;

– goal-implementation, which involves constructing appropriate mechanisms for ensuring military security;

– fundamental (regulatory), which governs measures in the field of military security assurance;

– informational, which involves communicating to the leadership of the Ministry of Defence of Ukraine the results of primary analysis in the field of international security, national security, and defence of Ukraine, as well as crisis situations threatening national security;

– informational-analytical, which involves communicating to the leadership of the Ministry of Defence of Ukraine the results of secondary analysis in the field of international security, national security, and defence of Ukraine, as well as crisis situations threatening national security;

– programmatic-practical, which ensures the participation of analytical experts in the preparation of proposals for responding to threats to military security and crisis situations threatening national security;

– organizational-management, which ensures the organization of response measures to crisis situations threatening national security;

– integrative, which governs the interaction between the Defence Forces and the security forces in the process of responding to threats to national security and crisis situations that endanger it;

– diagnostic, which ensures the identification and assessment of threats to military security and crisis situations in the military sphere;

– prognostic, which ensures the forecasting of trends in the development of threats to military security and crisis situations in the military sphere;

– planning, which governs the development of the military security assurance system in the context of the evolving strategic directives of national security and military policy;

– programmatic-adaptive, which regulates the development of the legal and organizational framework of the military security assurance system in the context of the evolution of challenges and threats to national interests in the military sphere, as well as the improvement of instruments for state response to national security threats;

– scientific-adaptive, which governs the development of the scientific-methodological support subsystem of the military security assurance system in the context of the evolution of challenges and threats to national interests in the military sphere;

– coordinational, which ensures the interaction among military governance bodies responsible for responding to threats to military security;

– informatization, which guarantees the creation of conditions for the use of informational and analytical technologies in the interest of ensuring military security;

– monitoring, which is aimed at identifying challenges, threats, and dangers to military security and crisis situations in the military sphere;

– communication among response entities to threats to military security and crisis situations in the military sphere, which is aimed at creating conditions for informational interaction focused on the exchange of necessary and relevant analytical information on the security situation among the entities involved in such response.

The main subjects of responding to threats to military security and crisis situations in the military sphere are the structural units of the Ministry of Defence of Ukraine and other components of the Defence Forces, such as: the General Staff of the Armed Forces of Ukraine, the Ground Forces, the Air Forces, the Naval Forces, the Air Assault Forces, the Special Operations Forces, the Territorial Defence Forces, the Unmanned Systems Forces, the Support and Logistics Forces, the Medical Forces, the Signal and Cybersecurity Troops.

Given the specific tasks legally assigned to the Defence Forces of Ukraine, as well as the specificity of the methods and means of their implementation, special attention should be paid to military interaction. This form of interaction encompasses the execution of combat, special, service-combat, and service tasks. Military interaction is defined as coordinated actions of troops (forces), aimed at achieving the goals of the tasks, time, place, and methods of task implementation to achieve the goals of the service and/or the purpose of the operation. Depending on the scale of military actions, one distinguishes tactical, operational, and strategic interaction, which are associated with certain goals of military operations. The procedure of interaction, the powers of officials, and the forms of interaction are defined by the order of the Commander-in-Chief of the Armed Forces of Ukraine [11].

Improving the military security assurance system of Ukraine under current conditions involves the development and implementation into the practice of state military governance of a prospective model of the military security assurance system, which includes the following components: functional, informational, and institutional models.

The prospective functional model of the military security assurance system provides for the functioning of the mentioned system in two modes [9]: proactive response to threats to military security, crisis situations in the military sphere;

reactive response to threats to military security, crisis situations in the military sphere.

This model structurally includes three blocks:

Reflective block: social and psychological mechanisms for understanding the issues of responding to threats to military security and crisis situations in the military sphere; informational-analytical mechanism and scientific-methodological support mechanism for responding to threats to military security and crisis situations in the military sphere.

Organizational-management block: legal, organizational, institutional mechanisms, development mechanism and control mechanisms of the system for ensuring response to threats to military security, namely: mechanisms for personnel, administrative, technical, and resource support.

Instrumental block: mechanisms for cybersecurity assurance, mechanisms for interaction between the subjects of response to threats to military security and crisis situations in the military sphere, mechanisms for reactive and proactive response to threats to military security and crisis situations in the military sphere.

The prospective informational model of the military security assurance system provides for:

1) comprehensive application in the interests of reactive and proactive crisis response to threats to military security and crisis situations in the military sphere of primary, advanced, mass, military and security, strategic, and situational analytics;

2) development of passports of threats to military security and response technologies to them;

3) development of passports of crisis situations in the military sphere and technologies for them.

The prospective institutional model of the military security assurance system structurally includes the following mechanisms: informational and informational-analytical support for responding to threats to military security and crisis situations in the military sphere; ensuring management interaction between the subjects of response to threats to military security and crisis situations in the military sphere; ensuring communication among the subjects of response to threats; ensuring military interaction of the Defence Forces components; mechanism of scientific-methodological support of response; informational-technological support; cybersecurity assurance of the response subjects.

The directions for implementing the prospective model of the military security assurance system of Ukraine are: political and legal design – development/improvement of the regulatory and legal framework in the field of military security assurance; structural-functional design – creation of new elements, structures, subsystems, and mechanisms for ensuring the military security of Ukraine and establishing connections between them; spatial and temporal design – placement and creation of new elements, structures, subsystems, mechanisms for ensuring the military security of Ukraine within the structure of the security and defence sector; organizational design – formation of algorithms for the functioning of the military security assurance system of Ukraine; operational-activity design – development of rules and principles of activity in the field of military security assurance of Ukraine [7; 9].

The expected results of implementing the prospective model of Ukraine's military security assurance system are:

– the creation of institutional capabilities at the strategic, operational, and tactical levels, which will ensure timely and adequate reactive and proactive responses to threats to military security and crisis situations in the military sphere;

– comprehensive application, in the interests of reactive and proactive responses to threats to military security and crisis situations in the military sphere, of primary, advanced, mass, military and security, strategic and situational analytics;

– the development of passports of threats to military security, crisis situations in the military sphere, and the technologization of responses to them;

– an implemented organizational structure of the military security assurance system that will comply with NATO standards in the field of crisis management;

– the technical equipment of relevant units for effective implementation of the functions of the military security assurance system of Ukraine is ensured and integrated with other forces of the security and defence sector;

– the mechanism of informational-analytical support of military security, mechanisms of communication support, and military interaction of

Defence Forces components function and are integrated into the security and defence sector.

Conclusions and prospects for further research. The conducted study made it possible to state that the relevant theoretical and methodological problems in the development of Ukraine's military security assurance system are: the absence of systematized knowledge on the issue of hybrid threats and crisis situations threatening national security, as well as the lack of corresponding knowledge on responding to such threats and crisis situations; the absence of methods for diagnosing and forecasting crisis situations threatening national security, as well as potential cascading and synergistic effects of military-related crisis and emergency situations; the prioritization in the practice of responding to threats to military security and crisis situations in Ukraine's military sphere of reactive response technologies and the absence of proactive response technologies; the uncertainty of the prospective informational model of Ukraine's military security assurance system; the imperfection of mechanisms for ensuring military security; the imperfection of mechanisms for organizing interaction and coordination of actions among actors in the military security assurance system; the low level of interaction and communication between structural subdivisions of the Ministry of Defence of Ukraine in matters of responding to crisis situations in the military sphere.

The prospects for further research lie in the theoretical and methodological substantiation of the mechanisms for ensuring communication and military interaction among components of Ukraine's Defence Forces.

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Received: 13.03.2025
Revised: 21.03.2025
Accepted: 31.03.2025

ЗМІСТ

ВОЄННІ НАУКИ

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Scientific publication

SCIENTIFIC BULLETIN
OF KYIV INSTITUTE OF THE NATIONAL GUARD OF UKRAINE

Scientific journal (semiannual)

№ 1 (6) 2025

Responsible for the publication V. Halai
Editor A. Pugach
Cover designed by M. Komissarov

Signed for publication 30.06.2025
Format 60x90/8. Offset paper. Approx. printed pages. 19.5
Edition of 50 copies. Order No ___
Founder and publisher: Kyiv Institute of the National Guard of Ukraine.
Certificate of registration of a publishing entity to the State Register of Publishers, Manufacturers and Distributors of Publishing Products
Series DK No 7696 dated 8.11.2022.

Printed at the Image and Publishing Center of the
National Guard of Ukraine