

UDC 347.8:355/359

DOI <https://doi.org/10.24144/2307-3322.2025.91.3.31>

CONCEPTUAL APPROACHES TO IMPROVING THE ECONOMIC AND LEGAL MECHANISM FOR DEVELOPING SPACE CAPABILITIES OF THE SECURITY AND DEFENSE SECTOR OF UKRAINE IN THE CONDITIONS OF MODERN CHALLENGES

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Semenyaka V. Conceptual approaches to improving the economic and legal mechanism for developing space capabilities of the security and defense sector of Ukraine in the conditions of modern challenges.

The article presents a systematic analysis of the economic and legal foundations of the formation and development of space capabilities in the security and defense sector of Ukraine through the prism of the coherence of strategic, program-targeted and budgetary planning. It is shown that space capabilities are a key element of the state's critical potential, as they ensure the effective functioning of intelligence systems, early warning of a missile attack, navigation and time support of military operations, global secure communication, remote sensing of the Earth and environmental monitoring.

It is noted that despite the adoption of a wide range of regulatory and legal acts aimed at modernizing the space industry, the practical implementation of tasks to build national capabilities, create domestic dual-purpose or military spacecraft remains problematic. It is proven that the main reason is the systemic inconsistency of space programs, strategies, concepts and plans for the production of space equipment with the real financial capabilities of the state, which leads to the formation of an excessive number of declarative documents without a proper resource base.

It is emphasized that the approval of program-target documents should be considered legally sound only if there is an agreed financial model that covers all sources of financing, determines the share of state budget expenditures and guarantees the resource feasibility of the planned measures.

As a result of the study, the need to transition to a resource-based structure of legal regulation of space activity, focused on ensuring the sustainable development of the defense and space sector, is substantiated. It is proposed to develop a national space doctrine as a comprehensive regulatory act of the strategic level, which will integrate legal, defense, organizational and financial aspects of space activities into a single conceptual model. Such a doctrine should become the foundation for the balanced development of the national space infrastructure, effective use of economic resources and ensuring the technological independence of Ukraine in the conditions of martial law and post-war recovery.

Key words: space capabilities, security and defense sector, space doctrine, financial and economic resources, strategic planning

Семеняка В. Концептуальні підходи до вдосконалення економіко-правового механізму розвитку космічних спроможностей сектору безпеки і оборони України в умовах сучасних викликів.

У статті здійснено системний аналіз економіко-правових засад формування та розвитку космічних спроможностей сектору безпеки й оборони України крізь призму узгодженості

стратегічного, програмно-цільового та бюджетного планування. Показано, що космічні спроможності становлять ключовий елемент критичного потенціалу держави, оскільки забезпечують ефективне функціонування систем розвідки, раннього попередження про ракетний напад, навігаційно-часової підтримки військових операцій, глобального захищеного зв'язку, дистанційного зондування Землі та екологічного моніторингу.

Відзначено, що попри ухвалення широкого спектра нормативно-правових актів, спрямованих на модернізацію космічної галузі, практична реалізація завдань із нарощування національних спроможностей, створення вітчизняних космічних апаратів подвійного або військового призначення залишається проблемною. Доведено, що головною причиною є системна неузгодженість космічних програм, стратегій, концепцій та планів виробництва космічної техніки з реальними фінансовими можливостями держави, що призводить до формування надмірної кількості декларативних документів без належного ресурсного підґрунтя.

Наголошено, що затвердження програмно-цільових документів слід вважатися юридично виваженим лише за умови наявності узгодженої фінансової моделі, що охоплює всі джерела фінансування, визначає частку видатків державного бюджету та гарантує ресурсну здійсненність запланованих заходів.

У результаті дослідження обґрунтовано необхідність переходу до ресурсно обґрунтованої конструкції правового регулювання космічної діяльності, орієнтованої на забезпечення сталого розвитку оборонно-космічного сектору. Запропоновано розробити національну космічну доктрину як комплексний нормативно-правовий акт стратегічного рівня, який інтегруватиме правові, оборонні, організаційні та фінансові аспекти космічної діяльності в єдину концептуальну модель. Така доктрина має стати фундаментом для збалансованого розвитку національної космічної інфраструктури, ефективного використання економічних ресурсів і забезпечення технологічної самостійності України в умовах воєнного стану та післявоєнного відновлення.

Ключові слова: космічні спроможності, сектор безпеки і оборони, космічна доктрина, фінансово-економічні ресурси, стратегічне планування

Introduction. Modern challenges caused by armed aggression against Ukraine and a profound transformation of the international security system highlight the need for a qualitative update of economic and legal mechanisms for ensuring the state's defense capability. In the conditions of the growing role of technologies, the use of space capabilities in the security and defense sector as a component of the state's strategic potential is of particular importance.

One of the key priorities identified by the Military Security Strategy of Ukraine [1] is the formation of a unified leadership for the preparation and implementation of comprehensive defense of the state. Accomplishing this task is impossible without the systematic integration of the latest space technologies into the management processes of military structures, because these technologies provide the necessary level of efficiency, accuracy and synchronization of management decisions.

The primary objective of state policy is to guarantee the access of defense forces to information resources coming from dual-purpose space systems. Such access will contribute to a significant increase in the efficiency of intelligence activities, monitoring of the space situation and operational management of troops. In the long term, a comprehensive re-equipment of the security and defense sector with high-tech systems capable of integrated interaction with satellite technologies and other elements of space infrastructure.

However, the development of space capabilities in the military sphere is possible under the condition of effective legal regulation of space relations, which ensures the coordination of defense needs with the available resources of the state and forms an appropriate strategic basis for the functioning of the security sector in the conditions of martial law and post-war reconstruction. It is legal certainty in the field of space activities that is a necessary prerequisite for the sustainable development of defense potential capable of responding to modern security threats.

The purpose of the article is the legal substantiation of the role of the state's economic resources in the formation of the legal basis for the development of the space capabilities of the security and defense sector of Ukraine, the identification of the main problems of the current regulatory and legal regulation and the development of conceptual approaches to overcome them, taking into account the latest trends in the national security system.

Status of the issue. In recent years, especially after the beginning of the full-scale armed aggression of the Russian Federation against Ukraine, the issue of the development of space capabilities in

the field of national security and defense has gained exceptional urgency. The existing scientific developments were mostly focused on certain aspects - from the analysis of certain legal norms and mechanisms of their application [2] to the consideration of technical solutions and the possibilities of practical use of space technologies for military purposes [3]. At the same time, the integration approach, which would combine legal and economic factors into a single conceptual model, has not yet been properly reflected in the modern doctrine of space law. In this context, the need for an in-depth systematic legal analysis of the problem of harmonizing the legal regulation of the relevant relations becomes particularly significant.

Presentation of the main material. A fundamental element of state policy in the field of national security is the implementation of the constitutional duty of the state to ensure defense, protect sovereignty and territorial integrity. In view of this, the leading function of state administration is defense planning as a component of strategic planning, aimed at determining priorities for the development of defense forces, the formation of conceptual principles, programs and plans taking into account military threats and the financial and economic capabilities of the state.

In the context of armed conflicts and hybrid threats, space capabilities are a key element of a state's strategic advantage, providing: intelligence activities; early warning systems for missile attacks; navigation and time support of military operations; global secure communication; remote sensing (RS) and environmental monitoring as the basis of situational awareness.

Currently, access to space data and services is mostly provided through interaction with international partners and commercial providers, which limits the state's autonomy in defense planning and implementation of the space component of national security. According to the Budget Declaration for 2026-2028 [4], in 2024, 278,814 units of RS information were processed and 42,228 communication sessions with spacecraft were conducted. For 2025-2028, a stable volume of RS data processing is forecast at 40,200 units annually, and the number of communication sessions is planned to increase from 25,120 to 28,870.

Under such circumstances, the development of national military-space capabilities occupies a central place in the space policy of Ukraine. This is evidenced by the adoption of a number of strategic documents aimed at increasing defense capabilities through the modernization of the space industry. In particular, the draft Strategy for the Development of Space Activities for the Period Until 2033 [5] identifies strengthening defense capabilities as one of the priority areas. The project provides the creation and implementation of domestic space systems, equipment models and information products focused on the needs of national security in 2026-2027.

In addition, a project of the Concept of the National Targeted Scientific and Technical Space Program for 2026-2030 was developed [6]. The document details the expected results, including: development of new models of space technology; creation of RS technologies, critical for intelligence, monitoring and management of defense operations. At the same time, the project of the Concept of the State Targeted Defense Program for the Development of Space Capabilities of the Security and Defense Sector «KOMETA-2030» [7] was prepared, aimed at reducing dependence on external sources of space information, forming a national innovation and technological base, and integrating Ukraine into the European and global security architecture.

Instead, an important policy tool is the program-target method of budgeting for the space industry. Through the mechanisms of the National Targeted Scientific and Technical Space Programs of Ukraine (hereinafter - Space Programs), which are developed for a five-year period, the needs for civil, defense, and dual-purpose space technology are determined as a prerequisite for technological independence and strategic sustainability.

The legal regulation of space activity financing in the defense sector of Ukraine should be based on the principles of efficiency, priority and resource justification. The constitutional imperative of budget balance (Article 95 of the Constitution of Ukraine) means that expenditures must correspond to available financial resources, which, in turn, ensures budgetary discipline and legality of financing defense programs, including the space component. The requirement of efficiency and effectiveness of budget expenditures (Article 7 of the Budget Code of Ukraine [8]) necessitates the need for proper justification of the feasibility of each defense program.

The provisions of Articles 3 and 4 of the Law of Ukraine "On Defense Procurement" [9] establish that defense procurement planning is carried out in accordance with national security priorities and the financial capabilities of the state. Additionally, part two of Article 12 of the Law of Ukraine «On Space

Activities» [10] provides for the financing of space activities for the purposes of defense and security of Ukraine at the expense of the State Budget of Ukraine within the limits of the state defense order.

In the structure of space activity program planning, the key financial and legal importance is the verification of the resource feasibility of planned activities and projects. Part three of Article 2 of the Law of Ukraine “On State Target Programs” [11] allows the development of such programs only if there are real opportunities for their financing. The corresponding approach is reproduced in the Procedure for the development and implementation of state target programs [12] (hereinafter - the Procedure): initiation of the program is possible under the condition of resource provision; at the stage of approving the project concept of the program, the real possibilities of budget financing are taken into account (clause 16 of the Procedure); The Ministry of Finance, when drafting the Law on the State Budget of Ukraine, takes into account expenditures for the implementation of program tasks and activities within the budget limits (paragraph 42 of the Procedure). Therefore, the connection between strategic planning and actual resources is institutionally ensured - a prerequisite for the effectiveness of defense and space projects.

In view of the stated regulatory and legal requirements regarding the resource security of programs, the financial and economic factor is a prerequisite for the sustainable development of the space capabilities of the security and defense sector of Ukraine. It determines modernization, the scale of implementation of the latest technologies, and the level of implementation of national space programs in the military sphere in the long term.

The successful implementation of strategic tasks directly depends on the economic development of the state, which ensures the ability of the defense-industrial complex to develop, mass-produce and supply the defense forces with the latest models of weapons and equipment. Therefore, concepts, programs and plans should be based not only on the assessment of threats, but also on the basis of an objective analysis of the financial and economic capabilities of the state for the rational distribution of resources and the strategic effectiveness of defense planning. Aligning goals with resources prevents formalism and guarantees the practical feasibility of defense and space programs.

Despite the adoption of a wide range of strategic documents - from state targeted space programs to strategies for the development of space activities and plans for the production of space equipment - the implementation of the task of building national capabilities and creating domestic space vehicles for dual or military purposes remains problematic. Among the projects of strategic importance for the security and defense sector that have not been implemented, it is worth noting:

- creation and launch of the satellite Sich-2M (Space Program for 2008-2012), which was to be equipped with filming equipment for the needs of defense, environmental monitoring and response to emergency situations;

- the Lybid geostationary telecommunications satellite project, designed to ensure Ukraine's independence in the field of secure government and military communications;

- a number of dual-purpose research and applied projects, including the modernization of the control and communication system, provided for by the Space Program for 2013-2017.

A significant factor holding back the effectiveness of the implementation of the program-target method in the budget process of Ukraine is the inconsistency of programs with budget resources, the lack of systematicity and completeness of funding [13]. The lack of a systematic approach to financing, the fragmentation of budget planning and insufficient resource provision give Space programs a formal character and complicate their practical implementation, in particular in the defense and space sector.

The empirical experience of the implementation of Ukrainian space programs shows that ignoring budget constraints has negative consequences. The Space Program for 2003-2007 [14] was partially funded, as a result of which most of the planned tasks, including the creation of RS satellite systems, were not completed. Similar results were observed during the implementation of the following acts of program planning: the Space Program for 2008-2012 [15] and the Space Program for 2013-2017 [16], which were approved but not fully implemented due to a lack of funding. Thus, there is a persistent gap between strategic intentions and the resource capabilities of the state, which prevents the achievement of the declared goals of space policy.

The program and target documents of the space industry were adopted without correlation with the available resources, which violates the principles of budget transparency, efficiency and effectiveness. In addition, the strategic goals had a declarative nature and did not contain specific indicators of their

achievement. As a result, an objective evaluation of the effectiveness of the execution of documents becomes impossible, and strategic planning acquires a formal character, losing its practical impact.

Normative project activity preserves the tendency to «build up» the strategic space industry in the absence of proper integration of strategic and budget planning processes. As a result, such institutional disproportion leads to the fact that strategic planning, without a realistic assessment of the state's financial capabilities, generates ambitious, but unfeasible space projects that do not contribute to strengthening defense capabilities and technological autonomy.

These circumstances determine the transition from declarative to a resource-based structure of space industry development, focused on the needs of national security. Economic and legal principles should ensure equivalence between state tasks and real economic capabilities, because financial potential determines the legal and practical limits of defense procurement in the field of space activities. Therefore, the approval of program and target documents is legally balanced in the presence of an agreed financial model that covers all sources of financing and determines the share of state budget expenditures.

Conclusions. The development of space capabilities in the security and defense sector of Ukraine is a complex task that requires proper legal, organizational, and financial and economic support. Its effective implementation is possible only under the condition of institutional coordination of strategic priorities with real financial and economic capabilities of the state, which will ensure the integrity of the system of strategic, programmatic and budget planning in the field of space activities.

In this context, an integral element of the implementation of the concept of comprehensive defense of Ukraine and the guarantee of sustainable development in the war and post-war periods should be the formation of the national space doctrine as a basic regulatory and legal act of the strategic level. Such a doctrine should integrate legal, defense, organizational, technological and financial dimensions into a single conceptual system focused on meeting the needs of the security and defense sector. Its implementation will contribute to the coordination of strategic goals with the economic potential of the state.

The development and implementation of the mentioned doctrine should be based on a systematic analysis of economic and legal factors that determine the limits of the legal feasibility of state space programs, as well as on the principle of resource validity of management decisions. This will allow creating an effective mechanism for legal regulation of space activities, which will combine defense needs with the financial resources of the state, ensuring the effectiveness of the program-targeted approach.

The implementation of the proposed conceptual approaches will become the basis for increasing the technological independence of the state, developing the national innovation and production base and strengthening the defense capability of Ukraine. The system of legal regulation of space activities formed on these principles will ensure not only adaptation to modern challenges, but also create stable legal and economic prerequisites for the sustainable development of the defense and space sector in the long term.

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