

# ВСЕБІЧНЕ ЗАБЕЗПЕЧЕННЯ СКЛАДОВИХ СИЛ ОБОРОНИ

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## LOGISTICS AND NATIONAL SECURITY

*In article are presented role and meaning of the logistics in national security system and national security system within their sub-systems. In addition, the characteristics of the national security system was made and its functional subsystems. Proposed new look for logistics in the area of national security. Also shows a simplified model of logistics on national security.*

**Keywords:** *logistics, national security system, modelling.*

### Introduction

Security term is a multifaceted concept and in the current rapidly changing times difficult to uniquely define.

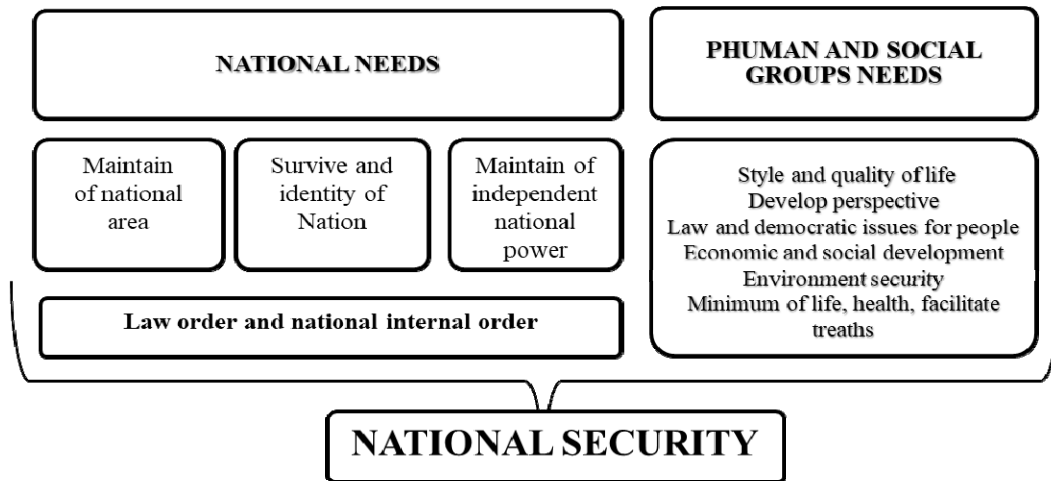
Is derived from the Latin language, from the noun securitas, which comes from the words of sine – without, and cura – worry, fear [3, pag. 11]. This can be explained as the lack of worry and fear. In the sense of general safety is the inner confidence, peace of mind and certainty, actually or falsely justified under the circumstances having comparable basis for concern. There is also the belief, for better or worse the legitimate, that face different difficulties, weaknesses, challenges and risks, or at least their symptoms, the state of things – in which there is a specified entity – allows him to feel safe.

Security is the need to subject, this means that you can apply to various types of entities, from the units, after the great social groups, including organisational structures (institutions) that represent individual people and various social groups (the states, society, nations, international system). Security is the existential need, that is associated with the existence of the entity. This need is complex and involves meeting specific needs such as: duration, whole, identity (identity), independence, peace, and assured functioning and development [9, pag. 935–953]. National security can be viewed on many levels. This may be information security, environmental security as well as economic. In each of these areas security is related to the lack of exposure in relation to: properties, external and internal links, and users.

### **Presentation of the main material of the study with a full justification of the obtained scientific results**

National security system.

Based on W. Kitler national security is a term and behind it, the concept of the each state, national security extends the essence of national security with a value and needs of unit and different social groups, and consequently the action for their implementation, appropriate for a national democratic. The perception of national security presented in figure 1.



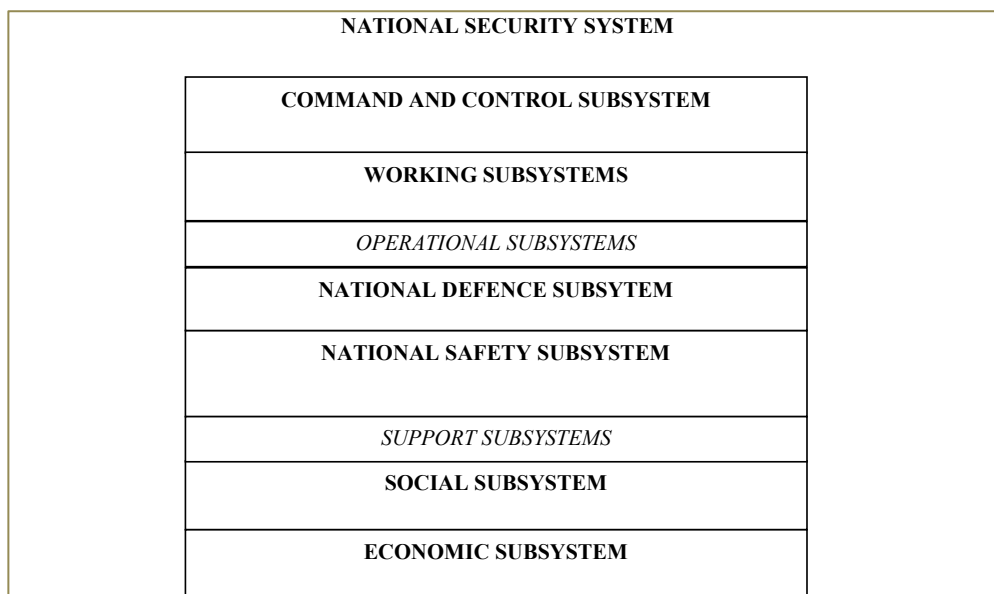
**Fig. 1. National security**

Source: adopted from [5, pag. 23]

National security is the most important value, national request, a priority objective of the nation activities, individuals and social groups, and at the same time process involving a variety of measures to ensure sustainable, interference-free existence and development of nation, the protection and defence of the nation as a political institution and the protection of individuals and society as a whole, their goods and the environment from the risks that significantly restrict its functioning or undermine values that are subject to special protection [5, pag.25].

National security system shall take into account the evolution of the inside of the nation and its relationship with external stakeholders and their different spheres and levels: political, legal, military, economic, social, cultural, scientific, etc. [1, pag. 87].

National security system includes the forces, means and resources allocated by the nation to carry out tasks in this area, properly organized, maintained and prepared. It consists of a command and control subsystem and working subsystems, including the operational subsystems (defence and safety) and support subsystems (social and economic) [7, pag.13]. The national security system presented in figure 2.



**Fig. 2. National security system**

Source: adopted from [7, pag. 43-54].

National security system must be equipped with appropriate materials and energy if wants to function properly. Without these items, the system will not properly perform its tasks, which does not achieve the objectives.

To prevent such an occurrence, in the structure of the system is necessary to comprehensive and reasonably organized logistics, capable of ensuring the effective and efficient operation.

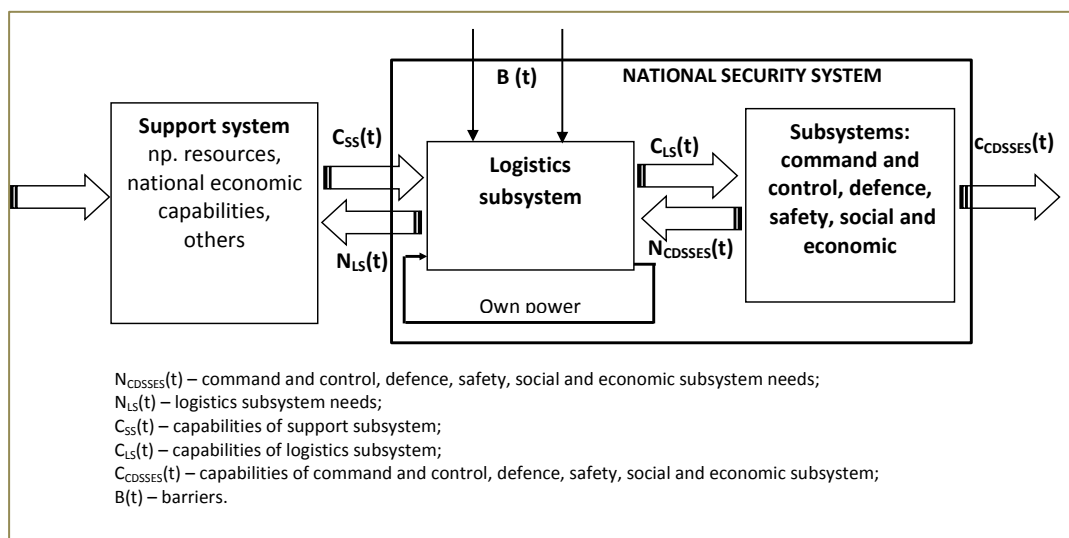
Logistics in national security system.

The importance of logistics has been noticed also in the broad area of security. In the literature of the subject is called «logistics», although the more reasonable it seems the term «logistics of national security system». If the logistics we treat as an integral part of the national security system – logistics subsystem-the logistics of national security system we can present as a collection of connected relationships designed to deliver supplies and provide logistics services to all subsystems forming part of the national security system. Logistics subsystem must function under certain conditions. The objective of the action must be the result of strategy national security system and the rules of law. Should have adequate material resources, technical, energy, financial and human. It should be based on the appropriate structures, decision-making rules, etc.

The role of logistics subsystem is to fulfil needs of logistics functional subsystems on national security system (fig. 3).

The main tasks carried out by the logistics on the national security system are the following:

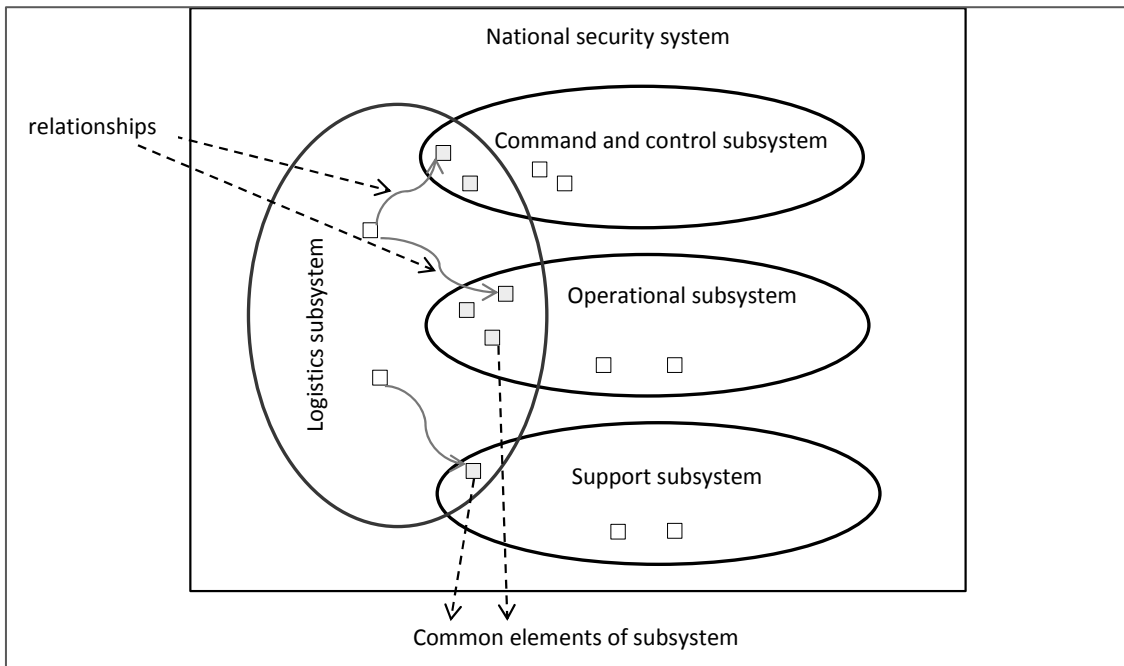
- supply of supplies necessary to the functioning of the individual subsystems;
- planning, gathering and appropriate placement of stocks of material resources, including strategic reserves;
- ensure the continuity of production, including the production of a special relation with the operation of the armed forces, police, fire brigade, rescue system units, etc.;
- maintenance and technical efficiency of the playback equipment and machinery necessary for the implementation of measures by the national security system, including military equipment, equipment used by the police, fire and other safety and rescue services, etc.;
- maintaining and restoring efficiency technical infrastructure (construction, equipment and installations), especially critical infrastructure (energy supply, fuel, communications and telecommunication networks, transport and communication, the supply of food and water, etc.);
- implementation of social services;
- meet medical needs;
- provide transportation;
- waste management; ect.



**Fig. 3. Logistics in the national security system**

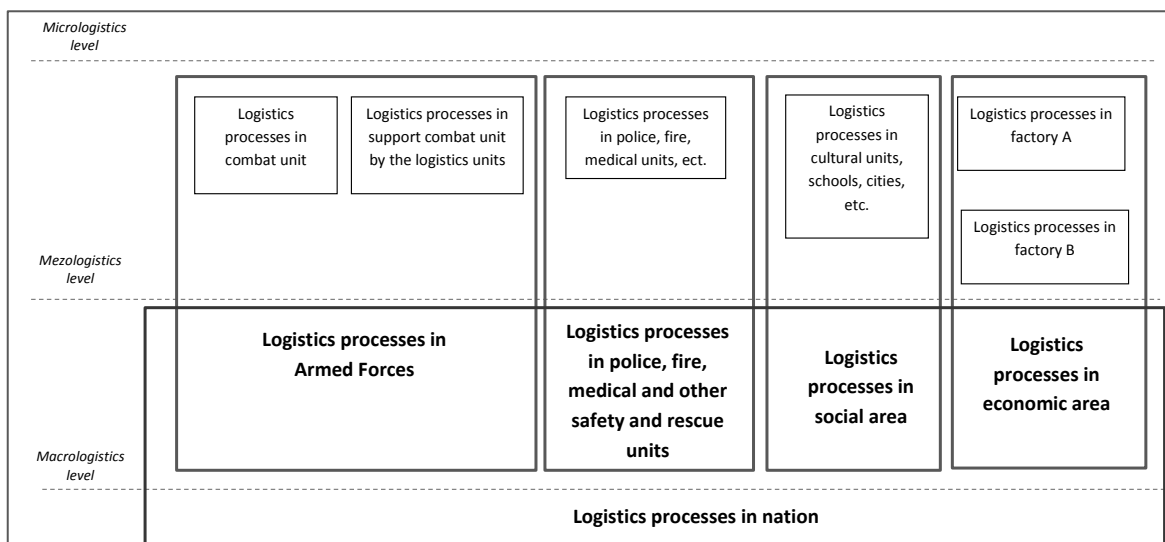
Source: [6, pag.283].

To support the implementation of these tasks, logistics subsystem should have an appropriate structure. Of course the logistical elements of the subsystem will occur also in the structure of the other subsystems (fig. 4) as the creation of a single and integrated logistics in national security system is a very difficult, but possible to achieve.



**Fig. 4. Logistics and other areas in national security**  
Source: [6, pag. 284].

Levels of integration of logistics processes presented in figure 5, and examples of common elements subsystems in logistics area – figure 6.



**Fig. 5. Examples of integration various logistics elements in national security system**

Most of the authors defined functioning of the logistics system of national security to the area of crisis management, narrowing its meaning. In my opinion, the logistics system of national security is a collection of connected material, financial, personal and information relationships, intended for the delivery of supplies and the provision of logistics services to all the subsystems forming part of national security system which makes the task to achieve, maintain or restore the desired level of security.

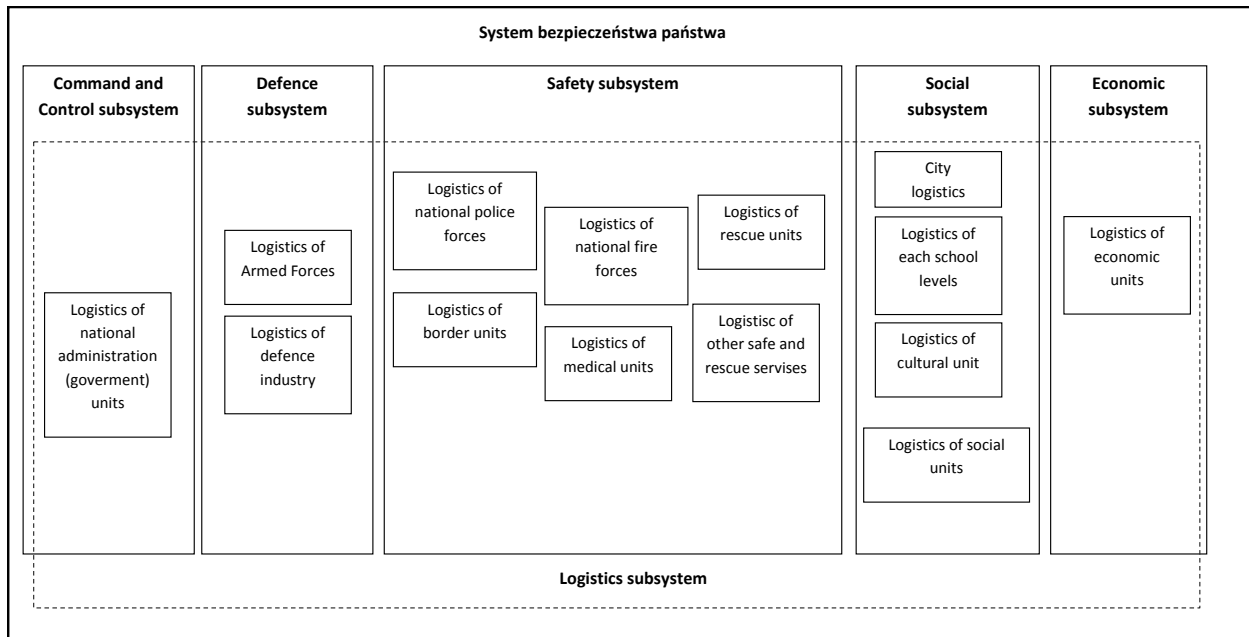


Fig. 6. Example of common subsystems elements in logistics area

- This system may consist of the following subsystems [8, pag.125]:
- supply;
- social services;
- rescue;
- production;
- transport;
- recycling;
- environment security;
- protection.

Elements of logistics model in national security system.

In terms of the system theory logistics system (SLS), we can define it as a coherent, hierarchically organized structure focused on the needs of the logistics system-generated by national security system (NSS). You can save it in the following way [2, pag. 359-385]:

$$SLS \text{ I } SNSS = \langle ELS, ELS \times ELS \rangle = \langle ELS, \{RLS\} \rangle \tag{1}$$

where:

SSL – logistics system;

SNSS – national security system;

ESL – set of logistics system elements;

RSL – set of logistics relations and tasks in national security system.

The functional concept of logistics system says that it's sorted hierarchically structure entitled to the comand and control authorities and logistics units for the delivery of supplies and the provision of logistics services for national safety components system, what can we define as:

$$S_{LSP} = \{ [CC_i \in H_i \in R_i], (D_i \cup L_i) \} \Rightarrow S_{NSS} \tag{2}$$

where:

CCI – comand and control cells;

UI – logistics units;

EI – logistics equipment;

Dg – delivery of goods;

LSI – logistics services.

Logistics system transformation the logistics security capabilities for needs of national security system:

$$S_{LS}: C_{LS} \rightarrow N_{NSS} = \begin{cases} P_{NSS}^{W} & \text{war} \\ P_{NSS}^{C} & \text{crisis} \\ P_{NSS}^{P} & \text{peace} \end{cases} \quad (3)$$

where:

CLS – capabilities of logistics system;

NNSS – logistics needs of national security system;

PNSSW – logistics needs of national security system in war time;

PNSSC – logistics needs of national security system in crisis situations;

PNSSP – logistics needs of national security system in peace time.

Model of logistics system (SLS) we can provide in the form of cyber as:

$$S_{LS} \subseteq \{P_{SBD} \times D_{SL}^{SBD} \times M_{SL}\} \xrightarrow{f_{ZL}(t)} F_{SL} \quad (4)$$

where:

NNSS – logistics needs of national security system;

DLNSS – decision in logistics system;

CLS – capabilities of logistics system;

fLS(t) – logistics support function;

FLS – aim function (effectiveness) of logistics support;

by what:

$$f_{ZL}(t): P_{SBD} \times D_{SL}^{SBD} \rightarrow M_{SL} \quad (5)$$

$$F_{SL}: D_{SL}^{SBD} \times M_{SL} \rightarrow R^+ \quad (6)$$

where:

$R^+$  – quality indicator of logistic support (set of real).

In the functional sense, the main task of the logistics system is to prepare and maintain the defined logistics potential, which are transformed to needs of national security system. Balance equation of the national security system potential in terms of logistics support can be written as follows:

$$\Omega(t) = \Omega_0 - \Pi(t) + \Pi(t) \quad (7)$$

where:

$\Omega(t)$  – actual potential of national security system in period t;

$\Omega_0(t)$  – beginning potential of national security system in period t0;

$\Pi(t)$  – spent potential of national security system from t0 to t;

$\Pi(t)$  – renewing potential of national security system to period t.

One of the main problems in the calculation of the potential logistics is to distinguish its elements and the construction of a mathematical model that reflects its components. The essence of the model is:

- the construction of the function (or functional) arguments, which are the main components of the logistics potential;
- standardization method of components in order to eliminate the impact of different units of measure;
- define measures of individual components of the logistics potential;
- method for determining weights of individual components.

As is apparent from (7) function of operational potential  $\Omega(t)$  is a function of, on the one hand, the intensity of the consumption logistics potential  $\Pi(t)$ , on the other hand, the intensity of his renewing in the

form of a stream  $\Pi(t)$ . The third independent variable (or constant) that function is the starting value of the operating potential  $\Omega_0(t)$ , that is:

$$\Omega(t) = f(\Omega_0, \Pi(t), \Pi(t)) \quad (8)$$

Operational potential  $\Omega(t)$  of logistics system is always expended. This results in the need for its restoration and replenishment in the logistics support process. This process is an ongoing process and must be carried out with the appropriate intensity, reliability, efficiency and available material (NM), time (NT) and financial (NF) expenditures.

Those conditions and needs require logistics system requirements and constraints that must be satisfied in the changing conditions of its functioning.

The logistics support (PPL) for national security system can be formally defined as a transformation of the logistics potential  $\Pi(t)$  to operational potential  $\Omega(t)$ , which is the highest form of potential  $\Psi(t)$  as the ability to perform a specific tasks by the operational elements of national security system:

$$P_{LS} | N_M, N_T, N_F: \Pi(t) \rightarrow \Omega(t) \rightarrow \Psi(t) \quad (9)$$

where:

PLS – logistics support process of national security system;

NM – material expenditures;

NT – time expenditures;

NF – financial expenditures;

$\Psi(t)$  – potential of operational elements of national security.

In accordance with the General objectives of the system analysis model of logistics system (MLS) consist of the following two models:

- descriptive identification model – MIWSL;
- optimization decision - making model – MDLS;

$$MLS = \langle MI_{LS}, MD_{LS} \rangle \quad (10)$$

### Summary

Logistics on national security system fulfils tasks associated with the creation of conditions to achieve and maintain an adequate security level. To support implementation of tasks by the logistics system for the national security system, it should have an appropriate structure. Elements of logistics system will be at the following levels [4, pag.176]:

- micrologistics – covering all logistic processes within individual organizations;
- mezologistics – which is the integration of micrologistics subsystems, such as logistics of Armed Forces;
- macrologistics – which is the expression of the integration of logistics processes in the national economy).

Identification model (MILS) begins the process of mathematical modeling logistics system (SLS), whose main aim is to work out at the stage of the decision-making modeling (MDLS) optimal strategies and procedures for practical action due to the adopted criterion for assessing the quality of functioning of real system. The decision-making model (MDLS) provides scientific methods and tools to improve the functioning of the identification model (MILS), and in the end of logistics system model.

Logistic system is a dynamic system, which must keep up with the changes, often very violent, the logistical requirements of national security system, according to the situation in which the system is located. The rational evolution of its structure is difficult and responsible, therefore, consistent, hierarchical and organized structures should be sought.

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## ЛОГІСТИКА ТА ДЕРЖАВНА БЕЗПЕКА

Ш. Мітков, Д. Крупник

У статті представлені роль та значення логістики в системі національної безпеки та системі національної безпеки в їх підсистемах. Окрім цього, було складено характеристики системи національної безпеки та її функціональних підсистем. Запропонований новий погляд на логістику у сфері національної безпеки. Також показана спрощена модель логістики щодо національної безпеки.

**Ключові слова:** логістика, система національної безпеки, моделювання.

## ЛОГИСТИКА И ГОСУДАРСТВЕННАЯ БЕЗОПАСНОСТЬ

Ш. Митков, Д. Крупник

В статье представлены роль и значение логистики в системе национальной безопасности и системе национальной безопасности в их подсистемах. Помимо этого, были описаны характеристики системы национальной безопасности и ее функциональных подсистем. Предложено новый взгляд на логистику в сфере национальной безопасности. Так же показана упрощенная модель логистики по отношению к национальной безопасности.

**Ключевые слова:** логистика, система национальной безопасности, моделирование.