

Збірник наукових праць Національної академії Державної прикордонної служби України імені Богдана Хмельницького. Серія: військові та технічні науки № 1(67)/2016

Adamchuk O. V., Oleksiienko B. The main provisions of the border details service organization at the control points of entry and exit on the temporarily occupied territory of Ukraine

The article deals with the basic provisions of the border details service organization at the control points of entry and exit on the temporarily occupied territory of Ukraine. We analyzed the regulatory requirements for the activity and objectives of the control points of entry and exit.

The border details service at the control points of entry and exit is organized according to the technological scheme of border crossing by persons, vehicles and goods, which is separately developed and approved for each control points of entry and exit. Control points of entry and exit are not appointed for crossing the state border of Ukraine, but in terms of security measures applied close to the state border protection.

The border details service at the control points of entry and exit is aimed at organized border crossing by persons entering the temporarily occupied territory of Ukraine and leaving it, and vehicles, cargo and other property according to the laws of Ukraine.

Border details at the control points of entry and exit control the movement of people, vehicles, cargoes (goods); check cars going through the checkpoint to detect the forbidden substances and items (weapons, explosives, drugs, etc.); control the movement of vehicles and goods for the prohibited items and substances; identify and arrest persons suspected, accused of committing criminal offenses or fleeing from the pre-trial investigation, trial or evading criminal punishment, and stolen vehicles; preventing release of prohibited goods from the temporarily uncontrolled territories and to that territory; check documents identifying personality; prevent the release of terrorists from the area of Antiterrorism operation execution; prevent the commission of terrorist acts, other illegal acts; temporary restrict or ban the traffic of cargo (goods) and the people.

Basing on the analysis of the legislation we made the conclusion that current regulations deal only with the general provisions of border details service organization at the control points of entry and exit.

Keywords: *state border protection, control points of entry and exit, protection of the border with the temporarily occupied territory of Ukraine, the State Border Guard Service of Ukraine, border security.*

Bratko A. V. Model decision-making process on the use of reserves in the protection of the state border

The paper studies the necessity and possibility of implementation in the work of the State Border Service Management system to support decision-making to make decisions on the use of reserves during the operational performance of state

border protection case approach and developed a model of decision-making with its use.

Keywords: *case-approach the state border, threshold, control deviations, reserves.*

Gorodnov V. P., Kyrylenko V. A., Petrov V. M. *Indicators and criterion for assessing the effectiveness of border control in automobile border checkpoints across the state border of Ukraine*

One of the main objectives of the "Strategy of the State Border Service of Ukraine (SBSU)" is "improvement ... risk analysis ... with real and projected situation at the state border ... implementation of European norms and standards in the border control ..." which should provide a stable and comfortable work of automobile checkpoints across the state border of Ukraine for law-abiding citizens with simultaneous detection and prevention of crime.

In case of a sharp increase in traffic, "when the waiting time at the checkpoint becomes excessive, officials of the SBSU may introduce simplification of border control". The above simplification "is a temporary refusal to perform certain actions, and border measures".

To predict the expected load and for the timely preparation of the necessary resources in terms of range, we must have appropriate criterion for assessing performance and forecasting tasks of border control capabilities of ABC, including taking into account the information system data on possible risks.

As a result, there is the problem of determining measurable indicators and criteria for evaluating the effectiveness of border control in automobile border check points across the state border of Ukraine, based on the data information system about potential risks.

Unsolved problems and goal of the work. The problem of determining measurable indicators and criteria for evaluating the effectiveness of border control in automobile border checkpoints across the state border of Ukraine should be solved with the requirements of comfort[1] for law-abiding citizens can be expressed by reducing the time for citizens and cars in control system. At the same time, the process of control should provide valid identification of law-abiding citizens and offenders, must take into account data information system about possible risks and the interests of preparing recommendations for decision-making on the organization of the entire range of ABC intensity flow of cars and people.

In this context, the aim of this work is to develop measurable indicators and criteria for evaluating the effectiveness of border control in automobile border checkpoints across the state border of Ukraine based on the data information system about potential risks.

Conclusions and directions for further research. The tasks to implement "European standards in border control system" [1] periodically encounters the need to assess the efficiency and search for measures to ensure the stable operation of automobile border checkpoints in terms of intensity fluctuations flow of cars and people.

Such measures include changing the number of working lanes, switching to simplified control, the abolition of controls, evaluation of current risks and accounting offenses accounting data on the risks for external sources of information. The list of measures requires coordination can be planned in advance and used efficiently, ensuring stable operation when quantify the current and expected performance.

Prevailing indicators (4), (6), (7) is measurable, can quantify the current and expected performance BC and apply criteria (8) to identify the required level of effectiveness of border control in ABC and selection of rational values of the parameters (k_i , $K_{TxOch.i}$, $T_{cp.i}$, μ_i , ρ_i) of border control in relation to the existing ABC staff for each lane.

The set of derived parameters (4), (6), (7) and criterion (8) the effectiveness suggest the problem of defining measurable indicators and criteria for evaluating the effectiveness of border control in automobile border check points across the state border of Ukraine, based on the data information system on risks-solved, and the goal-reached.

Directions for further research may be the use of the results, in conjunction with research results:

*Management organizational structure ABC[7],
defining moment of transition to a simplified control,
the definition of information content and structure of controls that are canceled[8],*

to assess the risks in the current border measures[14], to develop models, methods and algorithm of requirements to the structure of ABC in terms of implementing the concept of Integrated Border Management. This category of "ABC structure" includes composition, relationships and functions of ABC units, elements of technical equipment and procedures used in the implementation of border control.

Keywords: *indicator, criterion, the effectiveness, border control.*

Gorodnov V. P., Pavlenko S. O., Ovcharenko V. V. *Indicator and criterion for assessing the impact of the financial providing opportunities for formations national guard Ukraine*

The limited funding reduces the opportunities available compounds (military units) of the National Guard of Ukraine (NGU), due to the need to "unproductive" activities of personnel in the implementation of SCM. Formed indicator provides a measure of the impact of underfunding on the ability of the compounds of the NGU, and creates the conditions for selecting the best ways to attract additional funds (the formation of a special fund) and determination of priority directions of their application, in order to maximize conservation opportunities NGU connection.

Keywords: *indicators, criteria, elements of financial support.*

Zaharchuk D. O. Features of modeling of operational and service activity of border guard detachment in the sea area of the state border

The topicality is determined by lack of a unified methodology for constructing of the model of operational and service activity (OSA) of border guard detachment in general and in the sea area in particular.

Research Methodology. The expediency of modeling of operational and service activity of border guard detachment, the features of modeling at the marine area have been analyzed through theoretical analysis of research papers on the organization and implementation of operational and service activity of border guard detachment at the marine area, regulations of State Border Guard Service of Ukraine (SBGSU) and service experience. Recommendations on the content of individual functional subsystems have been proposed, their problems have been highlighted.

The result of the analysis is determination of a common approach to forming of models of operational and service activity of border guard detachment at the marine area, which should be organized similarly as on the land area, but will have a number of features that are reflected in the article.

The model of operational and service activity should provide: the continuous extraction of pre-emptive information and its timely implementation; permanent deep modeling of border protection; readiness and integrated usage of diverse capabilities, their effective interaction; maneuver of forces and means, secretiveness and unexpectedness of actions; automated and continuous process of management of forces and means and detailed providing of operational and service activity.

The practical significance. Areas for the future research might be development of methods and general algorithm of creation of operational and service activity model of border guard detachment at the marine area and recommendations for its use.

The feature of novelty of the article is that the concept of "model of operational and service activity of a border guard detachment" has been formulated for the first time. The specific features of operative and service activities of a border guard detachment at the marine sector of the state border have also been specified for the first time ever.

Keywords: state border protection, the border guard detachment, marine area, operational and service activity model.

Ivashkov Yu. B., Hluzdan O. P., Vychavka V. I. Methodical recommendations on the operation procedure of state border guard unit authorities in the process of organization of operational and service activity

The article represents elaborated recommendations for large border units of the State Border Guard Service of Ukraine on the procedure of operational and service activity organization in subordinate border guard units for one year term. The authors have considerably raised the level of personal responsibility of unit commander for organizing operational and service activity. Thus, during the first phase of this activity all the events are carried out not by a group of staff officers

of a border guard unit, but by its leader independently. The volume of documents worked out after the measures were taken has been reduced. In particular, the model of operational and service activity of the unit (with appendices) is no longer required. The guideline paper governing the operational and service activity of subordinate units is the Regulation "On the operational and service activity at the sector of a border guard division (separate border guard division of type "C", mobile border unit, separate border combat unit (border guard task force) in 20__.

Keywords: *state border guard unit, organization of operational and service activity.*

*Ivashkov Yu. B., Shynkaruk O. M., Ivashkova T. O. **International peacekeeping and security operations of the Armed Forces of Ukraine abroad***

The prerequisites for Ukraine's participation in international peacekeeping and security operations as one of important components of foreign policy have been scrutinized in the article. The issues of Ukrainian Armed Forces' involvement in peacekeeping operations and the role of state leadership in their support have been brought into focus. It has been found that the priority missions of Ukraine's participation in international peacekeeping activities are: keeping and expanding strong presence of Ukraine in international activities aimed at maintaining of peace and security; enhancing international standing of Ukraine and confirmation of its aspirations for integration into European and Euro-Atlantic security space; ensuring of national interests' realization.

A comprehensive analysis of Ukrainian peacekeepers' participation in international missions has been conducted using chronology and statistics methods. In particular, participation of Ukrainian peacekeepers in Iraq has been analyzed; basic methods of countering enemy formation used by Ukrainian servicemen as preventive precautions have been reviewed.

It has been found that Ukraine, as one of the founding members of the UN and responsible member of international community, continues to play an important role in peacekeeping missions together with other countries, making an important contribution to peace and stability, resolving of armed conflicts and prevention of new trouble spots emerging.

It has been concluded that nowadays global changes in political, economic and social spheres bring up the issue of developing a rational program of international community activities both at the international and regional levels as well as innovative approaches in establishing and maintaining peace in the areas suffering from terrorism and armed conflicts. Besides, a policy of close interaction in maintaining the stability should be pursued in cooperation with other countries; pre-conditions of possible crises have to be analyzed and the ways to overcome them must be anticipated on the basis of the experience of military organizations which actively participate in international operations.

Further research are stipulated by the urgent need for studies of military and political experience of military personnel's participation in international peacekeeping and security operations in order to conduct strategic planning in the defense sector and to expand cooperation with the EU in the security domain.

Keywords: international operations, maintenance of peace and security, peacekeeping operation, national security.

Katerynychuk I. S., Krivii I. V. Advance preparation of border guard units to function in emergency situations

During a year the protection of the State border in the area of responsibility of Border guard department of State border guard service of Ukraine is carried out on the basis of the model beforehand operational service activity, and in terms of threats and emergencies of natural origin according to the order of the chief of Border guard department. However, since natural disasters cannot be predicted the character and work of the department personnel will be limited by time and rapid situation change, therefore, there is a need for timely preparation unit to function in emergencies that are typical for this area.

This article examines one of the possible approaches to improve preparedness of departments of the State border guard service of Ukraine to act in terms of threats and emergencies due to their advanced preparation for functioning in this conditions, the composition of the beforehand preparation and content of work of the chief of department of the border guard service, and higher authorities in modeling of operational service activity in the area of possible defeat disasters were identified.

To advance preparation activities we should include the development of appropriate passport of real and potential threats in the sector of border department and plan of transition of department to function in terms of emergencies, and timely clarifying the situation with threat changes, modeling of operational activity of border department in emergency situation, training of management and department personnel for action in emergency situation, constant monitoring of emergency centers in zone of possible defeat and tracking conditions at high risk area of department, preparation of area in zone of possible defeat in the engineering actions against for complications of offenders actions and provide the security of borderguards and protection of elements of border infrastructure.

Proposed approach will help to optimize the building of existing and added capabilities and means of border guard department, to ensure the safety of personnel, to reduce significantly the time for organization of department functioning in emergency situation, to counteract the damaging factors of environment and illegal activities.

Keywords: border department, operational service activity, emergencies of natural origin, zone of possible defeat, preparedness of departments to act, beforehand preparation for functioning in emergency situation.

Kosik S. M. Theoretical aspects of operational service activity organization on the Ukraine-Moldova state border sector

The article analyzes the sequence of operational service activity events and SWOT-analysis of operational activity on the Ukraine-Moldova state border sector.

The analysis allows to formulate strategic directions of operational service activity.

Further comparative analysis of definitions and content of operational service activity major categories management have been carried out.

The only approach to determine the main categories related to the border agency body (unit) management, providing proper understanding and usage of these categories and the only approach to operational service activity planning and organization and border agency bodies (units) management as well has been defined.

Keywords: *state border protection, regional directorate, Ukraine-Moldova state border sector, operational service activity organization.*

Kravchuk V. V. Implementation to the modern logistics system «Tactical Medicine» – as an innovation in training of servicemen-border guards

The article describes the basic elements of implementation to the system of tactical medicine during the training of border guards to provide assistance in conditions of warfare. We have analyzed the essence of the tactical medicine as a component during the training of servicemen- border guards, particularly in the logistics department of the National Academy of the State Border Guard Service of Ukraine.

Tactical Medicine can be defined as both emergent and non-emergent care provided to victims of illness or injury related to law enforcement or military operations. In real life, a military medic is part of a team of highly trained medical specialists who have the mission of keeping the soldiers alive and healthy both on and off the battlefield.

We have determined that it is very important to use theoretical training in teaching the discipline "Tactical Medicine". It is useful to provide practical training in usage of the modern tactical first aid kit, to provide premedical assistance in the areas of fire and shelter, ways of evacuation of the wounded.

The analysis of foreign literature indicates that every soldier of the country of alliance knows perfectly methods to provide premedical assistance in combat conditions except of having skills of weapon usage, physical and tactical training. Moreover, the soldier of the country of alliance is always sure that his friends will also know what to do in case of injury and will provide assistance as soon as battle conditions will permit. Ukrainian servicemen also must be sure in the qualification of their colleagues and they should know and be able to be ready to give the first aid when it is needed. We should understand that a serviceman who doesn't have knowledge of tactical medicine is dangerous to himself and his comrades.

The implementation to the modern logistics system "Tactical Medicine" in the training of servicemen, especially border guards is essential to save lives in the battle. Training of servicemen in tactical medicine involves obtaining of the basic skills to give them self and mutual assistance in conditions of combat actions to provide the first premedical and medical assistance in the areas of fire and shelter, and the stages of the evacuation of the wounded. Conducting of practical training of personnel provide a great chance to rescue the soldiers in the case of injury.

Keywords: tactical medicine, logistics system, premedical assistance, evacuation, injury, serviceman, ATO.

Kupriyenko D. Recommendations to the border security subjects regarding strategic management of the border area organizational capacity

Depending on the characteristics of the social relations within the border areas, and due to the development of new identification practices and public views regarding the state border and its perception influenced by political, socio-economic, socio-cultural and other factors the nature of the influence of the border to ensure border security is determined. Considering the extreme cases, it can serve either as a "powerful shield" to protect national and regional interests, or vice versa – as the source of initiation and propagation of crime, aid base for cross-border criminal activity, without appropriate sustainability as for the information and psychological influences while resolving military conflicts on the state border by an external enemy.

Therefore, the study and solution of the problem of effective management of the border area organizational capacity is important for border security.

The article aims at development of recommendations to the subjects of border security regarding the strategic management of organizational development in the border area.

The proposed strategic (integrated) management of organizational capacity of the border area means creating conditions for the realization of the vital interests of the population, strengthening of trust to the subjects of border security, increasing participation of the population in its support, neutralize/reduce the negative impact of risks associated with the functioning of borders.

The recommendations to the subjects of border security have been developed to implement the proposed approach on the western border of Ukraine.

Keywords: border security, border area, integrated border management, synergy, organizational capacity, strategic management.

Maistrenko O. V. Factors aggregate influencing the process of fire for effect on enemy also as its index values determination grounding: general approach

The results of analysis of rocket troops and artillery military formations application during the process of fire for effect on enemy has shown that one or more unaccounted factors, in particular regarding equipment technical condition, personnel combat readiness, physiogeographic conditions of mission execution, enemy and our troops protection resulting in degradation of rocket troops and artillery capability realization degree. Overall units capability index degradation in some instances may decrease by 50 %. But when determining capabilities mentioned factor are not considered. Moreover, even in existing approaches only a part of currently important factors are considered. Thus, the level of personnel preparation is considered, but the readiness (including moral and psychological) for task accomplishment. Also provision is made for task execution on mountain terrain, but for forest and urban terrain the capabilities degradation level has not

been determined, although judging by the results of rocket troops and artillery application this level is considerable. Besides, through current approaches the object of fire protection is considered insufficiently, and even than only the protection of the object by means of military engineers and fortification, but doesn't account for camouflaging, maneuver, restoration.

Recent publications and research analysis concerning factor aggregate determination influencing combat application of military formations during the fire for effect on enemy shows that the main tendency of recent research is specification of analysis and description of existing factors. Of course, there are some researches describing in a way new factors and its importance during combat application, but most of them are incomplete and fragmentary and doesn't determine the role of the factor or group of factors on the whole.

Considering all above mentioned the article specifies the factors aggregate influencing the process of fire for effect on enemy, also as the general approach to its index values determination is grounded. Factors aggregate specification is conducted based on analysis and generalization of existing factor values (norms) in directing and methodical documents, specified factor groups mutual influence research and its structuring. There is a proposition in the article to take into account those factors through corresponding standardized coefficients allowing taking into account the influence of necessary factors on various levels (research specification stages). Besides, proposed approach to factors aggregate and its values determination may permit to consider those factors, which may gain actuality without change in methodological apparatus used during researches connected with military formations combat application during fire for effect on enemy. In general, proposed approach to factors aggregate influencing the process of fire for effect on enemy also as its index values determination may increase the degree of military formation capabilities realization during fire for effect on enemy due to more qualitative organization of fire for effect on enemy process.

Keywords: *military formations, the process of fire, factors, index values .*

Martynyuk V. P. Various subordination forces and means coordination under the problems joint solution

The article describes the main methodological aspects concerning the different subordination forces and means coordination, simultaneously solving finding out problems essence and content types, forms and methods, as well as the methods of organization and implementation of the coordination activities in order of action interacting subjects, their laws and principles. This article provides a critical analysis of the known results in the interaction of forces in order to separate those that can be used directly or to adapt to the State Border Service of Ukraine units interaction bases theoretical development and other state security agencies in the State Border of Ukraine protection tasks performance.

The power and law enforcement agencies interaction is considered as a category of martial arts, and as a category of military theory and practice. The solution in today's complex conditions of combat missions, it is possible due to the low efficiency of uncoordinated fighting forces and coordinate the actions of the

troops at all levels of governance. The different subordination forces interaction is defined as the coordinated actions of law enforcement and security departments, as well as the mutual influence of their joint actions to achieve the objectives of the operation.

Interaction – is a pre-agreed actions of the interacting entities (formations, units, divisions), conducted with the combat (operational performance) problem aim, with the consumption of their own resources, to perform the job interaction between the parties at the appropriate consumption of its resources to the interaction of the opposite entity.

This definition is not intended to be comprehensive and complete, and is provided in this article as an alternative. The article also reflects the principles of cooperation, such as the their opponents records completeness; advance the interaction organization; information continuous exchange organization about the situation between the interacting forces and headquarters; the implementation continuous monitoring establishment of its subordinate tasks and assisting associations, formations and units in keeping their continuous interaction; different parts views content command and control unity, the role and place of interaction; organizing and maintaining interaction between the senior command link in strict regulation regarding the interaction of the parties and the subordination relations priority between them during the joint protection and defense of the State Border; organization of cooperation in the best interests of associations, connections and parts, to solve the main problem; matching tasks and functions of command units; ensuring full cooperation. This result leads to the conclusion that the co-ordination of forces and means of heterogeneous subordination under the joint problem solving is defined as a system of relations, varying between interdependent elements, the essence of which is the exchange process. In the center of this process is a process of mutual expenses of its own resources in the interest of cooperation between the parties in order to increase the efficiency of its own decision-operative service tasks. At the same time, this process involves and achieves the common goal of a well-defined action.

Properly coordinated action of interacting units should be seen as a separate component of martial arts, and as a category of military theory and practice. By itself the interaction of diverse forces and means of force should not be understood as a concerted effort to achieve the overall objectives of the operation. It is necessary to distinguish the mutual, coordinated action and joint action.

Thus, the coordination of forces and means - this agreement (update) the actions of subjects interaction (formations, units, divisions), conducted with the aim of the combat mission by spending its own resources for the job interaction between the parties at the appropriate flow it of its resources in the interests of the opposite subject interaction.

Keywords: *coordination, the operational activity, decision-making methods, action of forces and means of solving problems.*

Myronchuk V. A. , Mysyk A. B. Analysis of the elements of operational order of a border operation as objects of resource support

The article researches the impact of resource support on the efficiency of border operations. The parameters of resource support and their interrelation with the parameters of the system and the process of border operation have been determined. The problems of resource support capacity substantiation have been provided.

The results of operational and service activity of manpower and resources deployed in border operations depend on a number of factors, including validity of operation plan and compliance of logistic support plan and resource management during the operation.

The task of resource management is to select the best possible parameters available for resource support, thus achieving a set level of efficiency of operational and service activities' tasks completion.

Analysis of the importance of operational system elements is determined by the methods of the state border situation complexity assessment, directions of efforts' concentration, distribution of manpower and resources. It is carried out during the elaboration of suggestions for the head of regional directorate before conducting border operations. A head of operations and a leader of an element, depending on the place and role of an element in the operational structure as well as available strength and means, determine their tasks, ways of action and corresponding resources.

Analysis of the ways of actions of the elements of operational system has enabled us to determine the list of material and technical resources required for accomplishing of their routine tasks.

Analysis of border operations' planning process allowed outlining the following typical administrative tasks for resource support substantiation:

analysis and forecasting of the use of resources by each element of operational system;

analysis and forecasting of capabilities in terms of resources usage for the whole operation;

distribution of means between the elements of operational system;

determining of the amount of the stock (reserve) of resources;

resources stock allocation and their redistribution during the operation;

substantiation of the most efficient system and the process of transporting of material and technical means, taking into account supply sources and logistic support system capabilities.

The cost of material resources has been used as a criterion for evaluation of resource support system functioning in order to ensure proper level of operational and service activities' efficiency.

Each set task is focused on finding the ways of achieving the aim with different results and use of resources. Common methodology aimed at finding the best options and ways to achieve the goal of operation objectives is needed to solve these tasks.

Keywords: resource support of operational and service activities, resource support efficiency.

Pechorin O. M., Bocharov M. M. The evaluation of the psychological resilience of the personnel in the administration of rapid reaction airmobile troops

In the article was analyzed the common experience of the psychological support of airmobile forces of armed forces of the USA, Canada and Germany.

Also were introduced the examples of dependence force's fighting capacity level (and shortcomings as well) of the different well-known methodics of its definition. As well, were shown the contents of automated techniques of psychological level definition techniques of armed forces of the USA and Canada, Germany and Russian Federation in the battle conditions.

In addition, the methodic of the psychological resilience evaluation was opened. As first and foremost, the usage of the mentioned methodics will optimize the definition process of the military unit's fighting possibilities.

Author analyses the results of actual domestic scientific researches in the mentioned issue. One should note here that in the article were offered some ways of implementing mentioned methodics in the activity of the military control system, as well, as in the Ukrainian airmobile forces control system with the future perspectives of NATO standarts achievement.

Keywords: rapid reaction airmobile troops, methodic, psychological resilience.

Pravdivec A. Analysis of factors that affect the functioning of the military registration of citizens of Ukraine

The factors that affect the functioning of the military registration of citizens of Ukraine were, analyzed and author gave suggestions how to improve it

Keywords: military registration of citizens of Ukraine, the system of military registration of citizens of Ukraine, the functioning of the system of military registration of citizens of Ukraine, reservists, conscripts.

Trembovetskyi O., Oleksiienko B. Actual problems of the State Borderguard Service of Ukraine in conditions of armed aggression of Russia against Ukraine

In modern conditions, which could be seen in approaches to organizing operational and service activities of border security departments and divisions, question of protection and defense of the state border in the armed conflict in the east of our country arises. Primarily, threats to national security and sovereignty are connected with the aggression of Russian Federation, which does not stop attempts to extend zone of destabilization in Ukraine and fire of posts and Ukrainian positions where borderguards perform missions. Nowadays a large number of border infrastructure objects, machinery and equipment were destroyed and captured in battles and armed oppositions. In this struggle the State

Borderguard Service is at the forefront in the restoration of sovereignty and territorial integrity of Ukraine.

Therefore finding ways to ensure the implementation of the law enforcement function of the State Borderguard Service of Ukraine , identification issues of protection of national interests on the state border and searching ways to solve them , also introduction of modern scientific views and approaches in the field of border security are urgent parts of the problem. So the modern , well-equipped and effective State Borderguard Service is crucial for strengthening national interests of Ukraine.

The article is devoted to studying individual approaches to the definition of the phenomenon of “hybrid war”; the essence and the general features of “hybrid war” have been determined; issues of protection of national interests on the state border have been analyzed; basic measures to strengthen border agency on the eastern border area have been summarized.

Practice shows that confrontation to Russia in “hybrid war” is extremely difficult. However , borderguards must learn how to face the challenges of “hybrid war” on the state border. This is possible due to the development and further reformation of the State Borderguard Service and also by comprehensive reformation of the entire system of military organization and law enforcement activities in the country.

Keywords: *«hybrid war», national security , the State Borderguard Service of Ukraine , armed aggression.*

Androshchuk A. S., Andrushko V. Z. *Analysis approaches for forecasting activities department border guard checkpoint*

Prediction of at checkpoints is quite a challenge. The complexity of this prediction is caused by lots of factors that affect the implementation of illegal activity. These factors include: the socio-economic situation in the border regions of Ukraine and neighboring countries, the existence and size of the difference in the prices of certain goods in Ukraine and neighboring countries, employment border, density of population of border areas, the presence and severity of liability (criminal, administrative , material) for certain types of offenses, the state border and more. Most of these factors is difficult to assess and describe. In addition, these factors may change, requiring prediction of change.

Based on the practices currently in the sector and the nature of possible illegal activity in the main forecast is based on the experience of personnel and information activities in prior periods. However, it does not fully take into account the trend of the situation, not projected changes in individual factors that may affect the activities at checkpoints.

In this paper, the necessity of the development of scientific and analytical tools of decision making on the basis of forecasting performance of the checkpoints on the state border. Revealed shortcomings of existing approaches to qualitative prediction of the state border for making rational decisions in the operational performance of departments Border Service. The necessity of further development

of the theory of forecasting at the state border checkpoints, scientific and practical tasks, objectives, tasks partial object and subject for research.

For the decision-making of the state border value are all types and kinds of predictions. Prediction illegal activity enables the adoption of operational, tactical and strategic decisions to counter offense and also enables to identify the factors that have a significant impact on the process of illegal activity.

Keywords: *prediction model, method of decision-making.*

Babenko B.I., Myronov O.V., Korniiichuk O.A. *Functional abilities of video analytic systems in customs affairs*

State Fiscal Service of Ukraine realizes state custom affairs according the Ukraine's course of association with European Union and international rules and standards are well-known at the all world. These rules and standards obligate authorities of State Fiscal Service of Ukraine to use purposeful approaches to the risk management to facilitate passing of stages of custom control by vehicles at automobile crossing points at the custom border of Ukraine. Video analytic equipment of modern video analytic systems are using among another instruments to facilitate passing of stages of custom control by vehicles and to improve safety of automobile crossing points at the custom border of Ukraine. But, the problem of insufficiency of video analytic systems at the custom border of Ukraine is a barrier to realize tasks of the Intellectual Video Control System. That's why the object of video analysis became as well as topical to State Fiscal Service of Ukraine, and demand on video analytic systems increased. Moreover, almost all producers of video analytic systems propose modern video analytic components for these systems. There is an essence of appearance of demand to detect abilities of these video analytic components to control safety of executing of local tasks; to identify and to prevent terroristic threats; to prevent to removal of vehicles and goods through the customs border with the customs offenses etc.

So, the article is devoted to updating of: existing functionality by the help of which the functioning of means of security of automobile crossing points is automatic; specific of functions of video analytic (such as prototypes of images of dangerous situations) as additional means to develop an efficiency of providing of automatic video control in the customs control zone. The object of the research is the next implementing of the Intellectual Video Control System is projecting into video analytic systems.

The history of development of video analytic means and forming of the theory of identify of optic images is recreated in the article. There is determined that the modern video analytics is implemented on the program level and could be integrated into the Intellectual Video Control System (with following to industrial standard of ONVIF (2.2 version) by producer). Thereby, there are technological perspectives to increase abilities of video analytics or video analytic systems, which are projecting to expand their basic functionality as well as they are program algorithms (the built, the server and the distributed computer technologies of analyze of video situations. The detectors (individual modules), which can be launched as well as by personal computers, as by video cameras, are

the base of these program algorithms. There are determined, that in conditions of realization specific functions by video analytic program and their identifying in the process of customs control at automobile crossing points at the custom border, the next functioning of video analytic systems will be related with different activities of Intellectual Video Control System such as: to start video record; to sent a signal to operator; to display the image on a separate monitor etc. So, relevant detectors will provide a separation from the video stream such events, which can include interest to provide a safety (to identify of offenders and to detect of stage of events). At the moment a record of video events into video archive begins and it will be continues during some time. A part of video stream, which was separated as a very important by the detecting system with the next analysis of it, will be kept in this video archive. Ways of improving of video analytic algorithms are showed. They are: decrease of false triggering; acquiring of new intellectual functions (“algorithms of recognition of optic images of offenders (facts of undesirable activities)”); fundamental processing of existing algorithms of processing of video to provide timely transforming into megapixel analytics).

Novelty of theoretical results is related with consolidation of efforts of State Fiscal Service to provide all day long, transparent video control on passing of stages of customs control by vehicles and on safety of separated objects of automobile crossing points at the custom border of Ukraine.

Keywords: *recognizing of images, video and analitic functions, warning video situations, Intellectual Videocontrol Systems*

Baranov A. M. Substantiation of criteria to evaluate the effectiveness of using methods of determining the range and quantity of spare parts for repairing of machines of engineering armament

The problem of availability of spare parts in the maintenance departments is one of the most important, because timely supply or availability of required number and nomenclature of spare parts to repair units the ability to quickly conduct maintenance work and remote machines engineering equipment and, accordingly, their effective use in measuring time and in combat. This is particularly an issue in conditions of carrying out anti-terrorist operation in the East of our country, when the time for recovery of equipment affects the readiness of units and the task.

Therefore, the aim of this article is the substantiation of criterion of minimum total cost for evaluating the effectiveness of the methods of determining the range and quantity of spare parts for repairing of machines of engineering armament.

One of the main criteria that will determine the effectiveness of the proposed method of determining the range and quantity of spare parts to conduct maintenance and repair of machines of engineering armament, you can choose cost savings.

In determining the range and quantity of spare parts to conduct maintenance and machine engineering equipment for the optimality criterion to accept the minimum total cost that can be obtained in connection with the storage of the

appropriate stock of spare parts and organization of the order and delivery of the necessary range and quantity of spare parts in a repair Department, as well as additional unexpected downtime of machines of engineering armament, which arose from-for absence of necessary quantity of spare parts to repair divisions of the engineering troops.

The proposed approach takes into account all kinds of costs associated with inventory management of spare parts. Therefore, the target function, which characterizes the total costs for provision of repair of units of cars engineering and weapons necessary number of spare parts the relevant items

So we can conclude that the result of this work, it was found that one of the main criteria that will determine the effectiveness of the proposed method of determining the range and quantity of spare parts to conduct maintenance and repair of machines of engineering armament is the cost savings. The use of a criterion cost savings to ensure the necessary number of spare parts corresponding to the items will allow to compare existing and proposed methods of determining the range and quantity of spare parts to repair divisions of the engineering troops.

Keywords: *maintenance system, the range of spare parts, spare parts, machine engineering equipment*

Bashynsky A. L., Ostashevsky S. A. Method for determining specific roll rate of vehicle

Data analysis of traffic accidents relating to accidents of vehicles that occurred in the US, Europe and Japan shows that the electronic stability control is quite effective in reducing accident risk of separate vehicles. Thus, in the case of separate cars 34% reduction of accidents is observed and 59% reduction in case of 4 wheel drive SUVs. Studies conducted in the US have shown the effectiveness of stability control for prevention of traffic accidents resulting in rollover for these types of vehicles by 71% and 84% respectively. Traffic accident involving rollover is a complex case, which includes the interaction of the driver, road, vehicle and surrounding factors. According to the research conducted in 2004 in the US 33% of the total number of drivers' and passengers' deaths were caused by the rollover of cars during this year. Forty-four per cent of traffic accidents that occurred in Ukraine in the period from 2006 to 2012 were the result of breaking the rules of maneuvering. The number of rollover accidents is not less than 4,700 cases per year. This statistic confirms the importance of providing lateral stability of the vehicle as part of active vehicle safety.

The traditional method of calculation of the values of the static lateral stability of vehicles has a considerable inaccuracy (up to 20%) because it does not take into account the sprung mass roll (inclination) and tire deformation.

Elastic (reversible) deformation of suspension and tires is calculated according to the formula of experimental determination of the angle of the transverse static stability of the vehicle on the vehicle overturning stand as the expression for calculating of the vehicle mass center height, but there are no analytical dependence for such calculation which is a significant obstacle to the

use of this method in practice. Furthermore, conditions for applying of this method have not been defined yet (possibility of replacing the actual two-mass vehicle scheme by the one-mass scheme).

The research proved that the two-mass scheme is equivalent to the one-mass scheme in case if height of roll center and unsprung mass center are equal. This provided an opportunity to find the formulas for determining of the banking (rolling) angle, lateral deformation of tires and banking line height that previously could only be determined experimentally. Based on the results of the analysis of the static lateral roll of vehicles performed by the author it has also been determined that the relation of roll stiffness to vehicle weight (specific roll rate) for overturning moment varies for particular model of vehicle within a narrow range and it can be considered as constant. Taking into consideration this data for new cars with spring suspension, the value of this parameter lies within the following limits (m/rad) for:

<i>biaxial vehicles</i>	<i>2.4-2.8;</i>
<i>triaxial vehicles</i>	<i>3.2-4.4;</i>
<i>four-axle vehicles</i>	<i>3.2-5.0;</i>
<i>trailers</i>	<i>4.2-6.5.</i>

It is suggested to consider a car as a system of elastically attached solid objects, which conventionally include sprung and unsprung masses. The movement of such system during rolling is characterized by the following coordinates: vertical movement of the center of sprung masses; vertical movement of the center of unsprung masses; sprung masses roll relating to the longitudinal axis; sprung masses roll relating to the transverse axis. The overall process of rolling is regarded as consisting of two not connected processes (longitudinal and transverse roll) during which the distribution of vehicle masses and elastic coupling stiffness are symmetric. This approach to solving the problem neglects the moving of the sprung masses center, which certainly will influence the frequency of vehicle natural roll.

This pattern allows using the specific roll stiffness for calculation of lateral roll of a vehicle during rollover because, as practical calculations showed, inaccuracy does not exceed 2.5% with probability of 0.90-0.95.

Of course, in order to prevent sidewise skidding the normal reactions of road pitch to the wheels relative to the horizon must lie within the cone of friction between the road surface and tires. Then the value of the arctangent of friction coefficient determines the critical pitch of road surface in the transverse direction at which the movement is stable. However, the value of the module of frictional forces can be significantly reduced or even be equal to zero in the case of transverse rolling (banking) of the vehicle. The frequency of natural rolling depends on the relation between the roll stiffness and vehicle's mass moment of inertia. The roll stiffness is directly proportional to the moment that turns the car in the road's plane. The research also shows that the frequency of natural rolling depends of the width of the vehicle base. Thus, movement will be stable when the frequency of disturbing rolling is less than the frequency of natural rolling; further increase of disturbing rolling will result in decreased stability.

These conditions are also valid for vehicles with variable center of mass as the shift of sprung mass in the transverse direction changes the torque, which directly influences the frequency of vehicle's natural rolling. Accordingly, its change may cause the loss of grip between the tires and the road surface which may lead to sidewise skidding or even rollover. Rotational speed of torque change is crucial for determining whether skidding or rollover will occur.

These findings are especially important in cases when speed, safety and continuity of movement of fully loaded vehicles play a crucial role in accomplishing of logistical issues. This is one of the most important conditions for survivability of individual vehicles and successful completion of combat missions in general.

Analysis of these interrelations showed a close relationship between the roll stiffness, friction force, coefficient of tire grip to the road surface, torque and coefficient of lateral stability of the vehicle.

The conclusions and recommendations for determining the calculated roll stiffness can be used as a methodical base for more precise method of determination of transverse static stability of vehicles.

Keywords: *stability, the car, the static stability, the design scheme.*

Hashchuk M. P. Recommendations on the required level of spare parts for automotive vehicles of state border guard units in modern conditions

The article aims to substantiate analytically the role of methods of the theory of forecasting with optimization of volume of spare parts during maintenance of vehicles in conditions of integrated border management.

The content of the article. The efficiency and reliability of vehicles significantly depends on its material resources. They are the following: fuel; lubricants; spare parts and maintenance materials; units of exchange funds; tires; and other materials. Consumption of fuel consumption, lubricants, and tires functionally depends on the vehicle mileage. The latter one affects the consumption of spare parts and exchange units. It is well-known that their reliability determines the reliability of the vehicle, and, consequently, its mileage. Therefore, the methods and models of reliability of assessment should be interrelated. The main determining factor connecting these methods is the flow intensity of failures of spare parts, units and vehicle in the whole. The needs of border guards units in spare parts are determined primarily by the reliability of vehicles (units, parts), intensity of operation and the age of vehicle structure.

Vehicle reliability is assessed in accordance with the parameters or the function of flow intensity of failures which are determined by failures of parts. The intensity of exploitation of vehicles is characterized by their mileage during the planned period. The age structure of the vehicle fleet is determined by the mileage of the car since the beginning of its operation. According to this scheme, the forecast of demand for spare parts is based on the calculations of characteristics of the recovery processes of parts, units and vehicles, the modelling of changes of coefficient of their readiness regarding age groups and forecast of mileage for the planned period.

Implementation of functions of logistics management in units requires optimization of nomenclature of spare parts included in the storages of border guard units. To fulfill this task it is necessary to create the system of supply of spare parts considering the factors mentioned above. The nomenclature of spare parts is the list of names of structural vehicle parts which are composed in the certain sequence according to the manufacturer's technical documentation. Nomenclature catalogues which are used to order spare parts provide 700-800 items of spare parts for each model of vehicle. The real needs of spare parts should be organized on the basis of observations on vehicle groups during operation. The results of research of operational reliability of the vehicle indicate that a real need for spare parts mainly consists of a limited number of parts that fail more often and, therefore, are crucial for vehicle reliability and its operation and material costs to maintain the car in good condition.

In the case of achieving the objectives of the study we expect the following results: theoretically – further development of the theory of vehicle exploitation; in practically – rationalization of the process of selection of nomenclature and number of spare parts for border guard units in the existing conditions as well as in the conditions of prospective systems of maintenance vehicles with regard to the operation peculiarities of vehicles in the specific region where border guard units are located. The prospects for further research are the following: improvement of the correction methods of rules of the operation time of vehicles according to the coefficients depending on the category of road conditions, climatic conditions, types of vehicles and peculiarities of their exploitation.

Keywords: *automotive vehicles, technology, optimization, forecasting.*

Holovnia S. B., Kupelskiy V. V. *The method of managing the provision of technical vehicles of the border guard detachment*

The developed method, which allows control of auto technical provision of vehicles border detachment by determining the level of technical efficiency of transport means of border detachment. The article concerns the approach of determination of the particular reliability level of transport means of border detachment in order to find out indices of reliability of transport means. Also the author supposes that determination of reasons of possible decrease of technical efficiency level and he explains how to make appropriate management decisions for improvement of technical.

Operation and service activity of border detachment units is characterized by dynamics and fast changes of surrounding. Timeliness of reaction upon situation changes within the area of border detachment is ensured owing to supply of border units with reliable and highly mobile means of transport. Capabilities of transport means to stay in the state of permanent availability is realized by functioning of the system of technical maintenance of transport means.

The efficiency of technical maintenance of transport means is determined by its capability to maintain and restore vehicles and to ensure specified level of mechanical availability of transport means in the case of optimal time spending, labour expenditures and costs. It is necessary to have appropriate technique in the order to determine and correct the level of efficiency of the system of technical maintenance of

transport means of border detachment. This technique will allow us to maintain mechanical availability of transport means at the specified level and to optimize costs of technical maintenance.

The offered technique establishes the connection between values of technical availability and expenses on maintenance of specified level of availability. Such connection will allow to determine conformity and expediency of financing of technical maintenance of border detachment. Obtained results can be used during the procedures of estimation of mechanical availability of transport means of border detachment and efficiency of functioning of the system of technical maintenance of transport means of border detachment. As a result of the research we offered the technique estimating efficiency of the system of technical maintenance of transport means of border detachment. The given technique allows to determine timeliness of supply with spare parts, quality of repairing works by service technicians, expediency of number of technicians regarding transport means being maintained, level of reliability of transport means, etc. Complex consideration of indices of technical maintenance system is possible as a result of using enhanced coefficient of technical application.

Keywords: *technical efficiency, efficiency coefficient, refusal index, transport means.*

Sivak V. A. Method of information support of operational safety of vehicles on the main modes of technical exploitation

The article reveals the essence and content of the improved method information to the exploitation safety of vehicles on the main modes of technical exploitation in the departments and agencies of the state border guard.

To ensure the efficiency and mobility of tasks on protection of state border, used a sufficient number of modern vehicles of various modifications. However, in the process of using data from vehicles to destination, current Affairs to ensure their exploitation safety on all of the major modes of technical exploitation.

The sad statistics of road traffic accidents and accidents with vehicles in the past six years, both at official and at private transport, testifies to the imperfection of the process of ensuring operational safety of vehicles of staff SBSU.

In addition, the need for the development of this method is the lack of reliable information about the technical condition of vehicles, competence of drivers, as well as control over the quality and timeliness of carrying out of organizational-technical measures on vehicles.

Method of information provision developed by the author improvement of existing methods and ways of doing technical documentation in the technical divisions of auto components parts, compounds and the administration of the SBSU.

The scientific novelty of the improvement of this method is to create a common information space and an electronic database of vehicles and technical and operational personnel provide their supervisors with technical support in the operation, for timely decision-making about how to move equipment or fixing the drivers for the machine.

When designing this method, used such a scientific methodological tool, as automated filing of information about the technique and the personnel who it operate. The method consists in creating a single information space and databases on vehicles and piecemeal data about registering and movement during the major modes of technical exploitation. As well as continuous monitoring and control of the technical condition of vehicles, competence of drivers and technicians, the correctness of technical documentation.

The introduction of this method into the system of technical exploitation of vehicles will result in:

to raise awareness of officers who are responsible for the safe exploitation of vehicles;

to improve the system of control of technical condition of vehicles, which come from border detachments parks and garages of the divisions of the border guard service to perform operational and combat missions;

to monitor the skill of the drivers and the competence of officers responsible for the safe exploitation of vehicles.

Keywords: *method, safe exploitation, vehicle, information support.*

Khytriak O., Sorokaty M., Petruchenko O. Certain implementation of differential equations in military field

Novadays the development of cadets professional competence from higher military educational institutions (HMEI) is one of the main tasks in the preparation of highly qualified specialists. Often officers-graduates are faced with a question of the skillful management of military. An important goal for achieving this purpose is deep and comprehensive knowledge of war laws, and also ability to apply the knowledge obtained at HMEI in practical activity in the army.

One of the most powerful tools of learning and using the war laws in theory and practice of military affairs is mathematics. In general HMEI education program the mathematics is important component. During the mathematics learning the military interpretation of basic mathematical concepts and problems is important. This approach allows cadets acquire mathematical concepts, methods and extend their knowledge in military affairs at the same time. Although the problem of professional orientation of mathematics teaching was raised in several papers, existing research does not cover exactly the question of military professional mathematics orientation and don't give any recommendations on implementation of this task.

The purpose of the article is to demonstrate the methods of mathematics teaching as a tool that gives wide possibilities for analysis of complex processes essentially of armed confrontation and choosing the best options of warfare. Also illustration of how to apply differential equations to study the laws of armed conflict on concrete examples is sprovided.

The section "Differential equations" is the most suitable to adapt the tasks with military context for teaching mathematics. Development and maintenance of armed confrontation doesn't flow chaotically, but it flows logical in a specific order. This is the basis for building mathematical models, which are often

described by differential equations. The research offers to consider the differential Lanchester equations in the study of higher mathematics course. They describe the relation of loss armies on their concentration when using different types of weapons. In other words they describe the dynamics of military battles. These enable us to build long-term prognosis of military decisions, make analysis any possible solutions, define the most effective ways to achieve the ultimate goal of military actions and operations.

The article contains a number of practical problems which can be solved by using Lanchester model. In particular we can analyze a battle of tanks, that are characterized a certain rate of fire and protection for a given initial number. Also the required number troops to achieve military objectives can be defined, when number and combat effectiveness of the enemy are provided. This model takes into account the speed with which the warring parties suffer losses from disease and other factors. These factors are not directly related to combat operations and to speed of reinforcements finding. In this paper the Mathematical model of regular troops armed confrontation is presented, case of fighting between guerrilla units and mixed model case combat operations are considered. The basic model of fighting, can be used by the cadets in the study of theme the students' system of differential equations" because of its simplicity and accessibility.

The issue of general education subjects adaptation, especially of mathematics, for Military Education is important. Therefore certain sections allow the study of the basic principles and methods of mathematics through the perspective of military orientation outlook. Differential equations can be attributed to such sections that can be mathematical models of specific military situations. It is shown that the study of differential equation is the important part of future officers-commanders preparing. It is proposed to introduce into the educational process specific examples, which formalize processes of the armed conflict on the Lanchester models and also represent main dependence of the armed conflict progress and outcome from the elements of this process in the form of mathematical models. The above said is important for improving the military education.

Keywords: *higher mathematics, military science, differential equations, Lanchester equation, the dynamics of combat operations.*

Chesanovskii I. I. Targets recognition in incoherent radar systems with narrow-band signals

A significant decline in developers interest to the pulsed radar systems is due to its potential limitations. Low efficiency of narrowband probe signal in both frequency and energy domain are one of them. Pulsed SHF devices have a number of advantages. One of them is pulse radar techniques potential "winning" in high clutter intensity. Despite this, there is no ability to construct a coherent channel on their basis. That makes narrow-band radars uncompetitive. The way out of the situation that emerged may be unconventional approach based on pulse radar method features. It consists in stable signals correlation in adjacent sensing periods. Applying this feature together with adaptive signal processing methods it

is possible to implement the algorithm of formation radar target portraits. The one that not depends on the coherence radar channel.

The method of radar target portraits forming in active radar systems based on adaptive signal processing algorithms is presented in the article. The proposed method is based on using radar signals correlation in adjacent sensing periods. Particularly, the nature of amplitude-frequency transformations that acquired in signal reflection. The use of dynamic algorithm that dealing with reference signal prior forming is proposed and shown its advantages. It makes this method applicable for use in pulsed radar systems low-stable microwave oscillators.

Keywords: model, radar, coherence, correlation processing, the pulse signal.

Chmyr V. M. Methods of selection of composition of vehicle fleet of border guard units according to their service life period in contemporary conditions of protection and defense of state border of Ukraine

The article touches upon the solving of topical scientific and applied problem of substantiation of recommendations on selection of vehicle fleet composition of border guard units according to their service life period in contemporary conditions of new system of protection and defense of the state border of Ukraine. The re-equipment of fleets with new vehicles, the necessity of tight economy of material resources for border guard units, the reduction of material bases to conduct extensive repairs of vehicles require the correction of various methods of selection of vehicles for the formation of rational composition and quality of vehicle fleet of border guard units.

The author generalized and substantiated the methods of calculation of appropriate number of vehicles within vehicle fleet according to their service life period taking into consideration the dynamics of changes of initial data in the planned period.

In accordance with the given methodical approaches the selection of composition of vehicle fleet of border guard units considering their service life period a number of new vehicles which were replaced or supplemented to composition of vehicle fleet of border guard units can be determined. In case of increasing the volumes of transportation, the vehicle fleet should be enlarged and equipped with new vehicles or some vehicles should be replaced or repaired and written off. And on the contrary if the volumes of transportation decrease some vehicles within vehicle fleet are transferred to reserve stock (conservation stock) as not used currently.

Keywords: vehicles, maintenance units, service life period of vehicles, methods, volumes of transportation.