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Голова оргкомітету – Стрілець Л.К., завідувач кафедри іноземних мов, Національна академія Національної гвардії України

Заступник голови оргкомітету – Кумпан С.М., к. філол.н., доцент, доцент кафедри іноземних мов Національної академії Національної гвардії України

Відповідальний секретар – Старченко Я.С., к. філол.н., доцент, доцент кафедри іноземних мов Національної академії Національної гвардії України

Члени оргкомітету:

Єманов В.В., начальник інженерно-технічного факультету Національної академії Національної гвардії України, кандидат військових наук, старший науковий співробітник, полковник

Овчаренко В.В., начальник командно-штабного факультету Національної академії Національної гвардії України, кандидат військових наук, доцент, полковник

Павлов С.П., начальник факультету економіки та менеджменту Національної академії Національної гвардії України, кандидат технічних наук, доцент, Академік АНПРЕ, полковник

Сердюк К.М., начальник відділу кадрів Національної академії Національної гвардії України, підполковник

Черкашин О.Д., вчений секретар секретаріату вченої ради Національної академії Національної гвардії України, кандидат педагогічних наук, старший науковий співробітник, полковник

Адреса оргкомітету: 61001, м. Харків, площа Захисників України 3, Національна академія Національної гвардії України, кафедра іноземних мов
Телефон: (057) 3792662; (057) 3792686

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BIOLOGICAL WEAPONS IN MODERN COMBAT

Maksym Antoniuk, Kharkiv

The study presents the background of the biological weapons, their development throughout the history of the mankind and the ways they are used in modern combat.

Biological warfare is the use of any bacteria, virus or other disease-causing organism or toxin found in nature, as a weapon of war to incapacitate or kill an adversary. The use of biological agents for military purposes is not new, but before the 20th century, biological warfare took two main forms. The first is deliberate poisoning of food and water with infectious material and the second is the use of microorganisms, toxins or animals, living or dead, in a weapon system.

Biological warfare has been practiced repeatedly throughout human history, reaching the 6th Century B.C., when the Assyrians poisoned enemy wells with a fungus that would make the enemy delusional. Historical accounts from medieval Europe detail the use of infected animal carcasses by Mongols, Turks and others, to infect enemy water supplies. Modern research and production of such weapons include human experimentation on thousands, mostly Chinese led by the Japanese army during the Second World War. They used biological weapons on Chinese soldiers and civilians. There is a report of over 600,000 victims, largely due to plague and cholera outbreaks.

In 1972 the Biological and Toxic Weapons Convention, which was signed by over 100 states, banned development, production and stockpiling of microbes or their poisonous products except in amounts necessary for protective and peaceful research. Oddly enough, the convention prohibits only creation and storage, but not usage, of these weapons.

As a strategic weapon, biological warfare is militarily problematic, because unless it is used to poison enemy civilian towns, it is difficult to prevent the attack from spreading, either to allies or to the attacker, and a biological warfare attack invites immediate massive retaliation, usually in the same form.

That is why biological weapon is militarily of little use except in the context of bioterrorism, which is the main concern nowadays.

The most common diseases known to be weaponized are anthrax, Ebola, bubonic plague, cholera, tularaemia, brucellosis, Q fever, glanders, melioidosis, Rocky Mountain spotted fever, typhus, psitticosis, yellow fever, Japanese B encephalitis, and smallpox. Naturally-occurring toxins that can be used as weapons include Ricin, SEB, Botulism toxin, and many Mycotoxins, etc.

Keywords: biological agents, biological warfare, bioterrorism, disease, toxins

ANALYSIS OF THE STATE OF DEVELOPMENT OF INTEGRATED INERTIAL-SATELLITE NAVIGATION SYSTEMS

Yuriy Artabaiev, Kyiv

One of the directions of implementation of the most integrated developing inertial satellite navigation systems today is the creation of navigation equipment (navigation systems), namely the creation of a precise integrated navigation system using the Inertial Navigation System (INS) and the Satellite Navigation System (SNS) (GPS \ GLONASS). The appearance of free-form inertial navigation systems (BINS) is an important achievement. Today, the full transition from platform inertial navigation systems to the BINS has been completed, because they have several important advantages, for example:

- smaller sizes, mass and energy intensity;
- increased reliability due to the lack of complicated mechanics;
- high resistance to vibration and shock effects
- no restrictions on the corners of the reversal;
- reduction of the time of the initial exhibition;
- high informative and versatile;
- high accuracy of the formation of the initial information;
- high speed of information issuance.

Complex systems based on the INS and the SNA allow combining the benefits and offset the disadvantages inherent in each system separately. The main national manufacturers of navigation systems are the State Enterprise “Orizon Navigation”, the State Enterprise of Special Instrumentation “ARSENAL”, the public joint-stock company “Scientific and Production Association” Kyiv Plant of Automation named after G.I.Petrovsky, scientific-industrial enterprise HARTRON-ARKOS LTD.

Among foreign manufacturers in Ukraine, several companies of world-class navigation systems are represented by Sagem and iXblue (France), Honeywell (USA).

The comparative table shows that national enterprises are fruitfully working towards the creation of samples of an integrated navigation system using the inertial navigation system, which, by their characteristics, are approaching the samples of world industry leaders.

Comparative Characteristics Table

№ п/п	Name of characteristics	Values for “УКННС” (SE SI «ARSENAL»)	Values for «ADVANS VEGA» (iXblue, France)	Values for «БІНС на БОГ» (S.I.E HARTRON- ARKOS LTD)
1.	Horizontal position (CEP 50)	0,05% DT	0,1% DT	0,07% DT
2.	Vertical position (EP50)	0,05% DT	0,1% DT	0,07% DT
3.	Heading accuracy (RMS)	0,3 mil	0,3 mil	0,4 mil
4.	Roll / pitch accuracy (RMS)	0,2 mil	0,2 mil	0,4 mil

5.	Static set-up time	< 5 mn	< 4 xB.	< 6 xB.
6.	Typical dynamic set-up time	10 mn	10 mn	10 mn
7.	Fast alignment (stored values)	30 sec	30 sec	30 sec
Physical Characteristics				
8.	Size (L x W x H)	200x240x402 mm	180x180x160 mm	317x270x160 mm
9.	Weight	19 kg	4,5 kg	5,8 kg
Interfaces				
10.	Power consumption	36 W	18 W	22,5 W
11.	Power input range	18.....36 DC	12.....32 DC	12.....32 DC
12.	Input /output format	RS232/422	RS232/422 Ethernet TCP/UDP	RS232/422
13.	Compatible with any standard GNSS	NMEA0183	NMEA0183	NMEA0183
14.	Update rate	200 Hz	200 Hz	200 Hz
Environmental factors				
15.	Standard operation temperature	- 40...+64°C	-35...+71°C	-35...+70°C
16.	Storage temperature	-40...+80°C	-40...+80°C	-40...+80°C
17.	Angular rates	350°/s	> 200°/s	180°/s
18.	Shocks (without dumpers)	45g.11ms	40g.10ms	40g.10ms
19.	Mechanical environment	Vibration – crawler and wheeled vehicles	MIL STD 810	Vibration – crawler and wheeled vehicles

20.	Electrical environment	-	MIL STD 1275	-
21.	EMC	MIL STD 461	MIL STD 461	MIL STD 461
22.	Orientation	Can be mounted in any orientation	Can be mounted in any orientation	Can be mounted in any orientation
23.	Roll & pitch	No limitation	No limitation	No limitation
24.	MTBF	Up to 20.000 h	Up to 80.000 h	Up to 20.000 h
DT (Distance Travelled) without GNSS – Typical values with VMS (Vehicle measurement sensor)				

***Keywords:** Inertial Navigation System, integrated navigation system, satellite, comparative table*

УДК 355.5

WARFIGHTING IN URBAN TERRAIN

Roman Bakun, Kharkiv

Urban environments (with dense populations, narrow streets, subterranean passages, and multistory buildings that serve as enemy defensive position) has traditionally been avoided when at all possible. The effective methods of combat operations were not developed completely. Only a few researchers have addressed this problem. The objective of this study is to identify the comparative advantages and disadvantages of employing light and mechanized infantry in urban combat.

The main method of this research is studying the best historical and international practices on warfighting in urban environments. The most important result of this research is developing the characteristics of conducting warfighting in urban terrain as well as combat building assault and clearing.

This study has shown that urban combat operations have historically been among the most arduous challenges an army can face. This research suggests that the increasing urbanization of the planet only seems to ensure that urban combat is

in the National Guard of Ukraine's future. The case that had been looked at reveals important gaps in the National Guard's capabilities to succeed in urban combat and provides suggestions on how to address it. This paper has highlighted that the first step forward to realizing the capabilities is to understand and communicate the problem, both within and outside the National Guard, and to do the analysis and experimentation to determine what must be done. This study in has proved that in many cases, combat in urban environments will require a careful balance of armored, mechanized forces to seek out and destroy the enemy while protecting our forces and non-combatants from harm.

***Keywords:** urban terrain, warfighting, light and mechanized infantry, clearing, assault*

УДК 355.23

INTERNATIONAL COOPERATION: THE WAYS TO INCREASE COMBAT READINESS OF TNE NATIONAL GUARD OF UKRAINE

Yuriy Besedin, Kharkiv

The objective of the research is to determine the role of the international cooperation of the National Guard of Ukraine with the armed forces and law enforcement units of different countries to increase combat readiness of the National Guard of Ukraine.

Since March 13, 2014, the official date of foundation of the National Guard of Ukraine, there have been a number of international events, which demonstrated an increasing role of international cooperation in training, equipping and reforming the National Guard of Ukraine.

To meet the aim of this study, international projects and training exercises have been singled out, among them:

1. Twinning projects
2. «Fearless Guardian»

3. The Ukraine-Romanian projects “Strengthening an institutional capacity of the National Guard of Ukraine”

4. Project of Physical Nuclear Security system of Ukraine inclusion to the structure of the global Physical Nuclear Security system

5. International military exercises “Rapid Trident”, “Sea Breeze”

6. Multinational Joint Committee

7. European Union Police Service Training (EUPST)

A core problem of the research is the lack of the information from the officers that got international experience after participation in international projects. But there are international organizations that provide necessary assistance and support for NGU.

The main directions of the international cooperation of the NGU are the following:

1. Joining FIEP association

2. Cooperation with NATO

3. Participation in international peacekeeping operations under aegis of UN

4. Cooperation with the similar foreign structures

The NGU actively develops cooperation with the similar military and law enforcement structures of EU, NATO Member States and other foreign countries. The main goals of the cooperation cover experience exchange in the sphere of professional development and implementation of the best world practices and methods in the day-to-day activities and combat operations of the National Guard of Ukraine.

Keywords: *international cooperation, international training, share experience, professional development*

PECULIARITIES OF BTR-4 «BUCEPHAL»

Maksym Bidnenko, Kharkiv

It is well known that the first demonstration of BTR-4 was introduced to the public in June 2006 in Kyiv. Finally it was adopted for using in the Armed Forces of Ukraine. Body BTR-4 is modular, completely sealed, armored, made of steel rolled sheets and is a supporting structure, which is installed on all units and mechanisms of the machine.

The armored personnel carrier is able to boost water obstacles with the drive of two water jet drives installed in the stern part of the body on the sides. To overcome the water obstacle, the driver activates a water-repellent shield and includes a water-discharge pump and controls the armored vehicle with an open hatch.

The engine-transmission unit (MTV) installs an engine with a transmission and distribution box, as well as other subsystems. Between the right side and the partition of the MTV is a boat from the control division in the landing combat, which allows the BTR to leave the commander and driver through the front door in emergency situations.

The battleship door is located in the landing-combat unit. On the roof of the airborne compartment there are upper hatches. In the upper hatches there is also a loophole. Individual paratroopers' seats are attached to the roof of the landing compartment and can be arranged along the sides opposite each other or in the center of the car towards the sides. Fast-moving places allow the landing unit to be transformed under various tasks, in particular for the carriage of goods.

The main benefit is the low cost of BTR-4, ranging from 1.1 to 1.6 million US dollars depending on the weaponry and the level of protection. The main disadvantage is absence of the wedge-shaped bottom of the armored personnel carrier, which reduces its protection.

Keywords: *BTR-4, the Armed Forces of Ukraine, armored personnel carrier, engine-transmission unit*

УДК 355.02+355.356

**SOME CURRENT PROBLEMS OF THE FORMATION OF STATE
MILITARY-TECHNICAL AND DEFENSE-INDUSTRIAL POLICY IN
UKRAINE**

Igor Chepkov, Kyiv

The work reveals the main contradictions existing in the military-technical and defense-industrial spheres in the current political and economic environment, formulates topical problems of the formation and implementation of the state military-technical and defense-industrial policy at the present time.

Some significant contradictions in the current legislative framework are demonstrated concerning the content, basic principles, objectives, subjects, procedures and conditions for the formation and implementation of the state military policy and its components (military-economic, military-technical, defense-industrial policy).

The situation with regard to enhancing cooperation with NATO and achieving the criteria for Ukraine's membership in this organization is critically assessed.

From the standpoint of the classical laws of the market economy (equality of all forms of ownership etc.) the existing difficulties with the improvement of public-private partnership in the military-technical and defense-industrial spheres are comprehensively analyzed. These difficulties are the result of underestimating the differences in the motives for the economic activity of public and private entities engaged in the development and manufacture of weapons and military equipment.

The existing concepts on the direction of modern military-technical and defense-industrial policy, their correlation are expanded: on the one hand, from the needs of the Armed Forces of Ukraine – to the capabilities of the domestic defense-industrial complex for their satisfaction (traditional option), on the other hand, from emerging breakthrough technologies in the industries portfolios which enable to create up-to-date types of weapons with new consumer qualities – to the

defense and security forces perspective which is being driven by revolutionary innovations in the sphere of weapons and military equipment (innovative option).

Specific proposals for addressing the existing contradictions, ensuring further improvement of state military-technical and defense-industrial policy are developed from the perspective of the urgent internal and external challenges which our country is currently facing.

Keywords: *weapons, military equipment; Armed Forces of Ukraine; defense-industrial complex; military-technical policy; defense-industrial policy; NATO; market economy; forms of ownership; public-private partnership*

УДК 231.4

GOALS AND OBJECTIVES OF TEACHING SERVICEMEN

A FOREIGN LANGUAGE

Olexander Chulkov, Kyiv

The general objective of teaching and learning a foreign language at the secondary school is to prepare students for effective communication in foreign environment. Qualitative language competences that are formed during the studies are to be used effectively in the professional field in the future. Perspective motivation, i.e. awareness of the remote goal of learning, quite often is very weak, and, thus, it becomes difficult to support students during the whole period of study.

The main objective of teaching a foreign language in modern higher military educational institutions is to develop the ability of the servicemen to use a foreign language as a means of communication, the desire to participate in communication process in the language that they study without the help of an interpreter. Besides, 'foreign language' as an academic subject contributes to the development of personal qualities of officer cadets.

Analysis of international experience in training specialists at specialized and military departments shows that the leading countries have developed active,

comprehensive and systemic policy which consistently provides linguistic support for their national security.

Characteristics of modern foreign-language training of security sector specialists in different countries are the following:

- heterogeneity, which manifests itself in the formation of different courses of training different levels of professional communicative competence (general communication needs, professional terminology, coordination activities with different departments, translation of technical or diplomatic documents, etc.);

- complexity, aimed at professional, social and personal rapid development of employees in teaching foreign languages through formation of respective competences in accordance with the task;

- systematization, which is ensured by the consistent introduction of professional-oriented learning of foreign languages at all levels, taking into account the peculiarities of the organization and content of training, specific purposes (sphere of economic, military, informational, ecological safety);

- financial and technical support of foreign-language agencies training the employees, expanding the range of educational services (courses, reference books, seminars, trainings).

So, foreign language training of military specialists should be optimized within the model of military education in the nearest future.

***Keywords:** education, foreign language, communication, language competence, terminology, training.*

УДК 355.54 – 614

TACTICAL MEDICAL TRAINING FOR NATIONAL GUARD

Oleksandr Fediay, Kharkiv

Tactical medicine is one of the most important parts of soldiers training for carrying tasks under conditions of combat actions.

The "Country defense fund" volunteers conducted training on tactical medicine for military aidmen from one of the National Guard units.

In addition to the standard TCCC program (Tactical Combat Casualty Care), the militaries have been explained the procedure of using special tools in order to restore breathing, make intravenous infusions, cardiopulmonary resuscitation, transportation of casualties etc.

They have been also demonstrated some techniques to sustain life of injured or heavily wounded soldiers in battle situations while awaiting medical personnel to arrive or heading to a hospital.

For the entire period of combat actions in the east of Ukraine more than 90% of deaths of militaries occurred at the prehospital phase. The current situation or conditions in the field usually leaves no time to bring them to hospital.

National Guard medics admitted the value of such trainings for they allow to master their skills and to receive the needed knowledge. This training provided a good theoretical and practical basis for further work in the ATO area.

Keywords: *ATO, medicine, medical training, medical skills, National Guard, soldiers.*

УДК 355.1 – 658.7

PROVISION OF WATER SUPPLY IN COMBAT ENVIRONMENT

Artem Frolov, Kharkiv

Supply, especially water supply, and shape of healthy environment, are the most important issues to consider when accommodating military personnel to maintain high combat potential. Safe, reliable, affordable, and easily accessible water supply is essential for good health, but for military personnel it is paramount.

As a key resource for achieving full-spectrum superiority, the water source and its relationship to arranging operations has impact on what type and amount of force structure will be planned and deployed to conduct the mission. It will have impact on how soon logistics units can get the proper capability to manage, supply,

purify, transport, and protect the water sources needed to support the operation. The proper synchronization and deployment of capabilities in the right arrangement will provide the optimal capabilities when focusing on his mission.

The Army traditionally relied on centralized water supply, but as technology has progressed, especially with highly efficient filtration membranes a number of systems are now available, which pushes the ability to generate potable water down to sub unit and individual level. The British company Lifesaver Systems has developed a number of interesting and innovative systems. The basic concept of the Lifesaver Bottle (in service) has been extended to fit in a man portable system designed to be integrated with existing load carrying backpacks.

The principle behind the Lifesaver concept is that water is carried dirty and topped up little and often with purification taking place on demand to avoid recontamination and shelf life issues. It also dramatically reduces resupply transportation needs because an infantry patrol for example, would top up from any convenient river, canal or irrigation ditch. At a small unit level, the Lifesaver systems have a potential transformative impact, saving significant quantities of fuel and reducing the security and logistic overhead associated with water supply.

Keywords: *water supply, military camp, wastewater recycling, environmental protection*

УДК 355.17

ARMY TRADITIONS

Dmitriy Goncharov, Kharkiv

The Army is an organization that instills pride in its members because of its history, mission, capabilities, and the respect it has earned in the service of the Nation. A reflection of that pride is visible in the customs, courtesies, and traditions the Army holds.

The Army has its own customs, both official and social. Military tradition is an interesting and often amusing subject. It gives a soldier a feeling of pride.

Traditions are expressed in the things the military do, the uniform they wear, and the things they say. Many of the words they use in the Army are unique and have been added to their vocabulary from different parts of the world and at different times in history.

Courtesy among members of the Armed Forces is vital to maintain discipline. The distinction between civilian and military courtesy is that military courtesy was developed in a military atmosphere and has become an integral part of serving in uniform. Enlisted personnel are expected to be courteous to officers and likewise officers are expected to return the courtesy.

Army traditions are an important part of servicemen military life. Military traditions are really the “army way” of doing and thinking. The customs, courtesies, and traditions of the Army provide a connection with soldiers throughout the history of the Nation. As the serviceman continues in his service, he remembers that these also help in unit and self-discipline, building the team and demonstrating professionalism.

Keywords: army tradition, custom, discipline, honor position, military, uniform.

УДК 355.69

THE EXPERIENCE OF THE US ARMY IN PROVISION OF MOVEMENT AND MANEUVER BY HELICOPTERS

Oleksandr Halata, Kharkiv

The US Army is the world’s leader in term of the size and capability of its helicopter fleet. Foreign and US attack and medium-lift helicopters alike have increased in sophistication. They are all built with composite materials and all-glass cockpits with liquid-crystal display (LCD) screens and multifunctional displays.

The US attack helicopter platforms have exhibited dominant target system capability due to their ability to receive and transmit unmanned aerial system

(UAS) feeds and their use of third-generation FLIR. However, foreign attack and medium-lift helicopter platforms do have some niche advantages. For example, some foreign attack helicopters have avionics compatible with American standards, some have longer-ranged weapons, and foreign aircraft are less expensive than their U.S. counterparts. Some foreign medium-lift helicopters have higher payloads and longer maximum ranges because they use auxiliary fuel tanks.

The Army's heavy-lift helicopter, the CH-47F, has greater digital connectivity than its foreign counterparts, but it has a lower payload than the equivalent foreign systems. This is also the case when the CH-47F is compared with the Marine Corps heavy-lift helicopter, the CH53K, which has a higher payload capacity and greater range, albeit at substantially greater cost, both to acquire and operate, compared with the CH-47F.

Compared with foreign helicopters, both US services have cutting-edge tactical digital connectivity that surpasses their foreign counterparts.

***Keywords:** medium-lift helicopters, capability, foreign counterparts, target system capability*

УДК 62.192

**MATHEMATICAL MODEL FOR THE CHANGE OF THE TECHNICAL
STATE AND FORECASTING THE BOUNDARY RESOURCE
PROPERTIES OF AAV**

Artem Ivanchenko, Kharkiv

Among the main factors that affect the high readiness of parts and units of NMU is the technical condition (TC) of auto-armored vehicles (AAV). One of the unresolved issues is the possibility of an accurate assessment of this condition.

At present, the technical readiness of the AAV fleet in the National Guard of Ukraine is characterized by a coefficient of technical readiness, which is the ratio of the number of normal AAVs to the total number of AAVs. The main disadvantages can be considered as follows: assessment of the technical condition

occurs only at the time of inspection, that is, there is no prediction of the state; assessment of technical condition does not depend on age and run of AAV; the assessment of the technical condition does not reflect changes in the resource of the main aggregates of AAV.

From the analysis of the tasks performed in the ATO zone with the use of AAV by units under constantly changing conditions, it is not always possible to carry out planned maintenance and repair, as well as to identify the degree to which the technical state of the equipment has changed, and to predict the limit of time and mileage before the next preventive inspection. That is why the further change and prediction of the technical condition is not reflected in the numerical indicators of the technical readiness coefficient. The lack of the ability to predict the change in the technical state of AAV may adversely affect the mission completion and thus lead to loss of equipment and personnel.

Therefore, the development of scientific regulations and practical recommendations for the improvement of existing methods for assessing the technical condition and predicting the residual resource is an important scientific task.

This problem can be solved by experimentally studying the recovery time from the factors influencing it, obtaining the dependence of the probability of failure-free operation of the AAV on the total fuel consumption, improving the mathematical model of changing the technical condition of the AAV and the residual resource, taking into account the conditions and characteristics of the operation of AAV, developing a maintenance methodology operational reliability of AAV.

Keywords: *AAV, mathematical model, technical condition, technical readiness, technical state.*

**APPLICATION OF OXIDE-METALLIC CATALYSTS ON VALVE
METALS FOR ECOLOGICAL CATALYSIS**

Ann Karakurkchi, Kharkiv

At the present stage of development of civilization, chemical pollution is considered to be one of the major ecological problems. The main sources of chemical pollution of the air are the enterprises in power engineering, ferrous and non-ferrous metallurgy, chemical industry, motor transport. Among the most widely-spread air pollutants that should be noted are carbon and nitrogen oxides, sulfur compounds and hydrocarbons. The most effective instrument for detoxification of pollutants from gas emissions and wastewater to the level of maximum permissible concentrations is the catalytic reactions. Consequently, the development of highly efficient catalytic materials to neutralize substances that pollute the environment is a promising research.

It is shown that a promising technique for obtaining oxide-metallic catalysts is the plasma-electrolytic oxidation (PEO) of valve metals, particularly aluminum and titanium alloys. Such a mode of synthesis makes it possible to form catalytically active materials with a developed surface, high content of dopants, and a broad scope of application over a single-stage technological process. The d-metals, in particular, manganese and cobalt are most promising as the dopants for oxide-metallic catalysts.

Employing results of the experimental studies, we demonstrated pathways to control the composition and degree of surface development of the mangan- and cobalt-containing oxide-metallic systems by using complex electrolytes. It is established that the obtained oxide coatings are characterized by high catalytic activity in the model conversion reactions of carbon (II) oxide. The use of manganese-and cobalt containing oxide-metallic coatings of the piston in an internal combustion engine leads to lower fuel consumption and a reduction in the toxicity of gas emissions.

Keywords: ecological catalysis, oxide-metallic catalyst, plasma-electrolytic oxidation, catalytic activity.

УДК 621.35

INCREASING THE EFFICIENCY OF INTRA-CYLINDER CATALYSIS IN DIESEL ENGINES

Ann Karakurkchi, Yuriy Krasnoshapka, Kharkiv

The achieved level of ecological indices of diesel engines was provided due to the multiple investigations done to improve the operating process by increasing the efficiency of fuel supply systems and gas–turbine supercharging system, specifying the values of compression degree and gas distribution phases, improving the fuel characteristics, and using flue gas neutralizing, purification and recirculation agents. A promising approach to a further improvement of the ecological indices of diesel engines is considered to be the realization of the opportunities of intra-cylinder ecological catalysis.

The intra-cylinder ecological catalysis presupposes an increase in the rate of redox reactions under the influence of the catalytic layer (coating) that is applied directly on the combustion chamber surface. Catalytic processes result in a more perfect fuel combustion and conversion of the products of incomplete combustion and the toxic components of solid particles into innocuous substances and also a reduction in the emission of nitrogen oxides.

Obtained research data give us an opportunity to assume that the application of oxide coatings for the combustion chamber using base metals and the composite oxides of transition metals may allow us to influence physical and chemical processes in the diesel engine cylinder, create the conditions for complete fuel combustion and control the reaction rates in order to reduce the amount of formed harmful substances.

Chemical, physical and technological factors should be taken into account when selecting scientific fields and rational practical ways of an increase in the efficiency of intra-cylinder catalysis in the diesel engine.

Keywords: diesel engine, intra-cylinder ecological catalysis, combustion chamber, piston, catalytic activity, toxic substances.

УДК 658.7

THE PROBLEM OF FORMATION OF INTEGRATED LOGISTIC SYSTEM IN THE CONTEXT OF CURRENT SITUATION IN UKRAINE

Andriy Kodatskyi, Kharkiv

The purpose of this research is to identify the challenges the integrated logistic system of the National Guard of Ukraine should be able to meet in conditions of continuous threats to sovereignty and integrity of Ukraine. Creating a unified logistics management system of all forces, involved in war, and improvement of medical support according to the NATO standards are the main two directions to form up the integrated logistic system in Ukraine.

There have been a number of studies in this field; still the mechanism of compatibility between the logistic systems of the Armed forces, the National Guard units and regional economic base during the time of war is still not fully clarified.

Integrated logistic support covers developing material and support strategy that optimizes functional support, leverages existing resources, and guides the whole of logistic support system. The analysis of existing logistical support has been done by examining the materials and resources of task forces and military units. It shows that the flawless work of military supply system requires five interconnected systems: engineering, manufacturing, repair, logistics, and management.

The experience of combat operations in the east of Ukraine shows the increasing necessity to integrate the overall logistic processes in support of mission objectives.

***Keywords:** the National Guard of Ukraine, integrated logistic system, compatibility, mission support*

УДК 355.69

AUTOMOTIVE ELECTRONIC SYSTEMS IN ARMY VEHICLES

Oleksiy Kolisnyk, Kharkiv

The electronic system of a modern vehicle is essential to achieve a successful automotive product. Vehicle development is performed by integrating components that include embedded electronics from several suppliers. This work presents results on the subject of integration of automotive electronic systems. The aim is to provide knowledge on how to integrate automotive electronic systems successfully in a setting where vehicles are developed based on existing platforms.

We focus on early phases of automotive electronic system development and in particular on the decisions taken in integration of electronic sub-systems. The contribution is the presented support for making decisions to successfully integrate electronic systems for modern vehicles. The contribution includes an overview of driving factors of automotive electronics system design, a validated set of success practices for the integration of electronic components, and the proposal and demonstration of a decision model. The influential factors and the validated set of practices stems from case studies of products and projects while the proposed decision model is a result of combining two general models for architecture analysis and decision making.

We demonstrate that choices in strategy and design preceding integration are central to achieve a successful integration. The studies show that problems arise from omitted strategy decisions and we provide a checklist for decision making in the areas; functionality, platform, integration design, and assigning responsibilities.

We provide a recommendation that we validate in a multiple cases study where fulfillment of recommendations is demonstrated to affect project success in integration projects. The potential gain lies in achieving more solid foundations for design decisions. Designers and managers could potentially find central decisions on integration strategy early that, if omitted, could cause delays. Thus, applying the result could avoid pitfalls and enable successful integration projects.

Keywords: automotive electronic system, component, design, development, problem, vehicle.

УДК 533.6

COMPUTATIONAL AERODYNAMICS

Ihor Kovtoniuk, Kharkiv

Aerodynamics is the branch of dynamics that treats the motion of air (and other gaseous fluids) and the resulting forces acting on solids moving relative to such fluid.

Aerodynamic results will fall into different categories of behavior depending on velocity range (slow speed, high speed, supersonic, hypersonic), depending on size and shape of the object (large, small, complex 3D solid) and the physical properties of the fluid (dense, rarefied, viscous, inviscid). Many different aerodynamic situations can be analyzed using a range of available theories.

The important steps:

- flow field definition,
 - calculation of velocity field around the object,
 - calculation of flow pressure and shear distribution,
 - integration of these distributions on the surface of the body
- are the tools used for most theoretical aerodynamic prediction.

The aim is to be able to predict the lift, drag, thrust and moments acting on objects or vehicles in motion.

Unsteady or non-steady flow is one where the properties do depend on time. It is needless to say that any start up process is unsteady. Many examples can be given from everyday life- water flow out of a tap which has just been opened. This flow is unsteady to start with, but with time does become steady.

Unsteady flows are undoubtedly difficult to calculate while with steady flows, we have one degree less complexity.

Concept of a uniform flow is very handy in analyzing fluid flows. A uniform flow is one where the velocity and other properties are constant independent of directions. We usually assume a uniform flow at the entrance to a pipe, far away from aerofoil or a motor car.

Eularian and Lagrangian approaches seem to be the two methods to study fluid motion. The Eularian approach concentrates on fluid properties at a point. Thus it is a field approach. In the Lagrangian approach one identifies a particle or a group of particles and follows them with time. This is bound to be a cumbersome method. But there may be situations where it is unavoidable. One of such situations is that the two phase flow involves particles.

The keywords: aerodynamics, flow, fluid, motion of air, method, particle, solid.

УДК 355.65

BRITISH 24 HOUR RATION PACKS

Yevhen Kutovenko, Kharkiv

The purpose of this research is to analyze the effectiveness of dry rations in a battle. Currently, due to the combat operations in the east of Ukraine, the physical conditions of military personnel can make a difference between success and failure. To complete combat missions, soldiers must always be fed in any conditions and in any place, which is possible only with the help of dry ration.

Dry rations should meet all the safety requirements and have all the necessary components of protein, fat and carbohydrates. It is necessary that a

soldier can quickly and easily open it and eat. Only then, when these basic requirements for dry rations are met, we can see the effectiveness of dry rations in a battle.

The British dry ration has proved excellent components and safety for a soldier, who is deployed in the field or combat environment. The British Army uses a ration called the 24-Hour Operational Ration Pack. Previous versions of this ration were called the ration packs (GS for General Service). Those rations included a lot of food in cans. By 1999, the GS rations were phased out and the newer GP (General Purpose) ration packs became the primary operational ration pack.

British ration packs come in several different varieties: standard ration pack, meat dishes, vegetarian menus, lightweight dehydrated ration, designed for consumption in hot or cold climates, etc.

The results of this analysis can be used to introduce innovations in dry ration of military personnel to improve conditions of the Ukrainian Army. Taking as an example the British dry ration, using it as a base with some specific requirements of Ukrainian cuisine, suitable for military personnel, we could get much better results with our domestic dry ration.

Keywords: battle, British, combat operations, dry rations, military

УДК 355.6

BACKGROUND OF LOGISTICS

Ivan Kysliak, Kharkiv

The term "logistics" is in use by the military all over the world for not more than a century. For most of this period, military professionals, as well as military historians and theorists, had difficulties in reconciling with the precise definition of the concept of this word, which is somewhat inaccurate despite its frequent use in military dictionaries and studies.

In a broad sense, logistics is called the economy of war. Including the concept of logistics includes industrial mobilization; research and development; financing; purchases; recruitment of volunteers and their training, as well as testing. And, in fact, logistics deals with virtually everything related to military activities, with the exception of strategy and tactics.

Thus, the 20th century began with logistics systems basically unchanged compared to traditional forms. Armies, lived mainly from the countryside, purchases or requisition. When armies moved, military transport was able to meet food and fodder needs only for short distances.

The experience of the history of wars and military conflicts shows that in every successful military company, operation, battle, as in every defeat, it is necessary, along with other reasons, to look for positive and negative aspects in the rear – its organization, opportunities and methods of logistics.

Consequently, for future logistics officers, who are trained to deal with food and commodity supply, transport management, supply and storage management, ammunition supply and storage management, management of the construction of military facilities, management of the storage of military property, repair and restoration management, it would be more expedient to study together, and not at different departments, and therefore the comprehensive centralization of logistics and logistics services will lead to a reduction in the number of logistics and engineering services and their more cohesive and high-quality work.

Keywords: logistics, supply, management, military, departments

УДК 355.65

DRY RATIONS IN THE US ARMY

Oleksandr Lantsman, Kharkiv

The purpose of this study is to analyze the experience of US Army in the field nutrition. The study emphasizes a big role of dry rations for military units in the field. It covers different types of dry rations that are classified as follows:

- Meal Ready-to-Eat - the most custom-made in the US Armed Forces. There are 24 menu options, designed for use within 21 days of deployment in combat conditions.

- First Strike Ration - is designed to supply soldiers performing tasks in isolation from the unit, in conditions that cause increased physical activity and intensive movement. Ration is designed for food for 72 hours.

- Long Range Patrol - is designed to power military personnel operating in isolation of the main forces during long operations with intensive movement. The main course of the diet is in dried form.

- Meal Cold Weather - is intended for feeding servicemen operating in conditions with a low temperature in the separation of the main forces during long operations with intensive movement. The main course of the diet is frozen.

Relying on combat experience, we can conclude that American dry rations are better than the Ukrainian one due to variety of dishes and rich calories, which makes it possible for each serviceman to choose food in accordance with their tastes, preferences and health requirement.

Keywords: *field nutrition, dry rations, US Army, designed*

УДК 623.44

COMPARATIVE ANALYSIS OF SNIPER RIFLES IN SERVICE WITH THE NATIONAL GUARD OF UKRAINE

Yehor Levda, Kharkiv

The report gives the comparative analysis of sniper weapons of the Ukrainian Army. Three sniper rifles are considered, namely Dragunov SVD Military Sniper Rifle, *Sniper Rifle “Zbroyar” Z-008*, and Barrett M82.

The Dragunov SVD Military Sniper Rifle 7.62x54Rmm is a squad support weapon optimized for medium-range rapid fire combat. It is considered as a sniper rifle; however it is inferior in terms of performance to most Western sniper rifles. It

is more a tactical rifle, than a true sniper weapon. The SVD was not designed for highly trained sniper teams, but for designated marksmen to extend a fire reach of a squad. It can engage targets beyond the reach of Kalashnikov assault rifles. The whole concept behind this weapon is that an average individual with some simple instructions can successfully engage targets.

The SVD is a gas operated semi-automatic weapon. It has a higher rate of fire and can make much more aimed shots comparing with bolt-action rifles. However there are some drawbacks of semi-automatic design. Spent cases are ejected sideways and can disguise the shooter.

Considering the challenges of present day, which demand more innovations and hi-tech engineering solutions for weapons, military snipers are turning today to a newer sniper rifle of Ukrainian production “Zbroyar” Z-008. Compared with the heavier, traditional Ukrainian rifle SVD which the army inherited from Soviet times, this weapon is only 4.5 kg comparing with 5-7 kg of the SVD, but has a greater sighting range of 900 m

Some samples of sniper weapons were purchased from other countries, including the USA, which in December 2017 approved a license for the \$41.5 million commercial sale of Barrett M82 sniper rifles for the use by the Ukrainian army. Despite its designation as an anti-materiel rifle, Barrett M82 is used by some armed forces as an anti-personnel rifle.

Considering the critical situation in our country due to the military operations in the east of Ukraine, development of sniper weapons is an important aspect of upgrading the Ukrainian army.

Keywords: Dragunov SVD Military Sniper Rifle, “Zbroyar” Z-008, Barrett M82 sniper rifles

**THE CHALLENGES OF LOGISTIC SUPPLY
OF UKRAINIAN CONTINGENTS IN THE UNITED NATIONS
PEACEKEEPING MISSIONS**

Roman Makarenko, Brody

The paper gives an analysis of major challenges in logistic supply system, Ukrainian contingents are currently facing in the UN PK missions. Different types of logistic supply of national contingents in the United Nations missions are identified, and their characteristic features are singled out.

The first type – the UN missions provide all equipment which is used by national contingents. The second type – all equipment is provided by national contingents and the nation receives reimbursement. The third type is combined.

It's been a common practice for Ukraine to use the third type. It has some financial advantages for the nation; however the most challenging for Ukraine issues are related to shipment of materials to the mission contingent. The problems arise due to extremely cumbersome procedure in order delivery of materials and equipment.

Every national contingent is attached to the brigade in UA. After getting a request from the contingent for materials, another request is forwarded to the Main Directorate for Operational Support. If the requested materials and equipment are available, then it's on brigade logistic officers to go to receive them. For example, the unit stationed in Congo is attached to the brigade which is based in Brody, Lviv region. To complete the order logistic officers have to go to Kiev and sometimes even to Kharkiv, then return to Brody to ship the cargo to Congo by air. Ukrainian army can send there some timber, cement, paint and other materials for building maintenance.

Taking into consideration that some materials and equipment Ukrainian contingent can buy on the spot, the whole logistic procedure is not feasible. It will be much more cost-effective to purchase all the necessary items in the mission, than to ship them from Ukraine. Moreover, on completion of the mission, the

contingent must bring back to Ukraine every single used and broken piece of equipment for inventory, which in most cases will make scrap metal, because disposal of any materials beyond the borders of Ukraine is not authorized by Ukrainian legislature.

***Keywords:** Ukrainian contingents, logistic supply system, shipment, Main Directorate for Operational Support*

УДК 623.44

COMPARATIVE CHARACTERISTICS OF PISTOLS PM AND FORT-12

Yaroslav Maliarchuk, Kharkiv

The purpose of this study is to compare the pistols PM and Fort, which are adopted into service in the National Guard of Ukraine, analyze their advantages and disadvantages and outline the conditions and ways of their best performance. The main specifications and constructive differences of this weapon were identified.

These pistols are designed as peace-time weapons and are intended primarily for law enforcement units. Both PM and Fort-12 have traumatic variants of pistols. The guns have the same caliber of 9mm.

The principle of action of the Makarov pistol and the Fort is similar. They are self-loading pistols with a double-action trigger. But the essential difference is the way of removing case containers for bullets and their volume. In Fort-12 there is the plunger button pin fixing the container in most modern pistols. In the PM the container is extracted by pressing the lower button with simultaneous extraction.

In comparison with PM the volume of the container in the Fort is significantly increased. The difference is 4 cartridges. Also, if necessary, the Fort can be completed with containers having a capacity of 24 cartridges. Both pistols have a shutter delay. It is believed that Fort is less reliable, unlike the time-tested

Makarov gun. So, in response to some shooters it is necessary to shorten the reflector of the gun to prevent its deformation and the gate wedge.

The main advantages of the Fort in comparison with the PM: convenient grip, modern look, improved ergonomics, the presence of a button for the release of the store, a large capacity of the cartridges, increased precision firing, lower efficiency and high speed rate.

The advantages of PM are: reliability, fewer parts, ease of wear, smaller size and weight of the pistol, easy disassembly and cleaning.

Keywords: advantages, efficiency, Fort-12, PM, principle of action, reliability

УДК 358.132.+358.36

THE USE OF THERMAL IMAGERS AS THE WAY TO IMPROVE EFFICIENCY OF BORDER GUARD SERVICE

Olexandr Marchenko, Lviv

Among the tasks assigned to the State Border Guard Service of Ukraine are ensuring the inviolability of the state border and protection of the sovereign rights of Ukraine in its exclusive (maritime) economic zone.

To effectively perform tasks, the units of the State Border Service need a variety of special equipment, including high-tech equipment. Frontier outfits equipped with thermal imagers have become more efficient.

The first samples of portable thermal imagers began to come into service to border guards in 2007. Most of the portable thermal imagers were supplied by foreign partners of Ukraine in the framework of various international programs. By the time of the beginning of war in the east of Ukraine, the military units of the State Border Service had more than five hundred portable thermal imagers. Unfortunately, during 2014 dozens of devices were destroyed or got out of order.

By 2017, the specialists of the State Border Service managed not only to fully restore the pre-war potential, but also to multiply it. Still, a lot of challenges need

to be addressed in the nearest future to ensure high quality work of the Border Guards, among them insufficient number of different types of thermal imagers, lack of spare parts and training aids.

Keywords: thermal imager, military units, war, portable, state border, Ukraine.

УДК 623.437.093

APC-4 BUCEPHALUS

Artem Martynenko, Kharkiv

The BTR-4 Bucephalus is a modern Ukrainian armored personnel carrier that is not a modernization of the old Soviet armored personnel carrier BTR-70, developed under the leadership of I.S. Mukhin in the 60s of the last century. APC-4 is designed to transport personnel of motorized infantry units and their fire support in combat.

The BTR can be the basic vehicle for equipping the special rapid reaction forces and marines. BTR is able to conduct combat operations in various conditions, including in conditions of the enemy using weapons of mass destruction. It can perform the assigned tasks both during the day and at night, in different climatic conditions, on roads with different coatings and in conditions of total impassability. The development of the armored vehicle was started in 2002. The demonstration prototype of the armored personnel carrier was first demonstrated at the exhibition "Aerosvit-XXI" in 2006. At the end of November 2008, work on the production of the first serial BTR-4 began. In February 2009, the BTR -4 was introduced. Until the end of 2014, 45% of Ukrainian production, 45% of parts manufactured in Russia and 10% of imported parts produced by foreign countries were used in the production of BTR -4; in 2015, 35% of imported parts were used in the production of BTR -4 (parts of Russian production were not used). In 2017, 88% of the Ukrainian and 12% of foreign production were used in the production of BTR -4. Load capacity of the chassis of the armored personnel

carrier allows to create not only variants of performances but also to install additional armor protection against automatic small-caliber guns.

This type of technology has a lot of modifications, which allows tactically and efficiently produce combat vehicles. Thus, it will allow the National Guard troops to effectively perform combat missions. Producers do not stop and continue to amaze the army with their technological progress.

Keywords: BTR-4, Bucephalus, combat operations, National Guard, personnel, units, weapons.

УДК 629.7.016

**NATIONAL DEVELOPMENT OF UNMANNED AERIAL VEHICLES
IN CONDITIONS OF WAR IN THE EAST OF UKRAINE**

Vadim Mudrik, Kharkiv

Nowadays, there is an urgent necessity for both the Armed Forces and the National Guard of Ukraine in the airborne prospecting, the observation of the battlefield, as well as in target purposes, other manned and unmanned aerial facilities.

At the moment, the field of development and production of unmanned aerial vehicles (UAV) is very promising. UAVs can detect piloted combat aircraft as a high-risk vehicle for pilots while the individual combat operations are held. The absence of a pilot and pilot cabin with all the equipment significantly reduces the dimensional characteristics of the UAV and, accordingly, the cost and vulnerability of the UAV. Another issue to be mentioned is the training of highly skilled personnel for managing such a complex technique as well as for its maintenance.

In 2014-2015, the first privately owned UAV companies appeared in Ukraine. They were founded by people from the air-model sport, entrepreneurs and some military volunteers. At present, at least 11 Ukrainian enterprises are developing and producing unmanned aerial vehicles. Nine of them work on drones of military design, it is about the collection of dozens of articles in a few months.

In order to achieve high performance in the development of UAVs, our developers should take into account the experience of such countries as Israel, the United States, etc., that skillfully use them to plan and conduct military operations against the enemy's superior forces.

In conclusion, we can say that the development of the UAV in Ukraine requires not only the improvement of technical means, but also the studying of the activities of UAV control operators, the development of programs for their preparation and professional selection.

Keywords: unmanned aerial vehicle, production, operator, drone, development, war.

УДК 623.437.093

WHAT MAKES THE BTR4 THE MAIN APC IN THE NATIONAL GUARD OF UKRAINE

Oleksiy Osinniy, Kharkiv

The paper analyzes rationale behind an idea the BTR-4 APC can be deployed as an armored vehicle in infantry units in the army or as a wheeled infantry fighting vehicle to provide fire support in combat situations. The vehicle can accomplish its jobs in varied climatic conditions throughout the day and night.

The design of the vehicle is inspired, but different, from the Russian series of BTR 8×8 wheeled APCs. The conventional layout of BTR-4 depicts western designs, such as the German APC.

The layout of the BTR-4 APC is segmented into three compartments. The front compartment is meant for the driver and commander. The middle compartment is reserved for the engine and transmission, while the rear compartment is built for troops.

The vehicle's wheel arrangement includes eight large road wheels, with four provided at the hull side. Each suspended wheel is coupled along individual axles.

For direction and heading, the front pair is connected by an auto-style steering wheel.

The BTR-4 is fully amphibious and can cross water obstacles at a maximum speed of ten kilometers per hour. The maximum speed of the vehicle on hard surface roads is 110 km/h. Crew capacity of the vehicle is three.

The BTR-4 APC variants include several variants, such as BTR-4K is a command vehicle, the BRM-4K is designated as reconnaissance armored vehicle, BREM-4K is a repair and recovery vehicle, BSEM-4K is a medical support vehicle, MPO-4K is a fire support vehicle fitted with a 120mm gun.

Keywords: *variants, APC, compartments, wheel, gun.*

УДК 355.6

ON THE BASIC SCIENTIFIC CATEGORIES OF LOGISTICS

Volodymyr Osypchuk, Kharkiv

Logistics has eleven major scientific categories:

I. Logistic system is an adaptive feedback system, which is performs logistic functions, consists of subsystems and has connections with the surrounding business environment. Logistic systems are divided into: industry; regional; functional.

II. Logistic operation – this is a set of actions for the transformation of logistics flow such as transportation, storage, warehousing, unloading, load.

III. Logistic flow is an integrated commodity-information-financial flow that connects logistics system participants. Its basis is material flow, which includes flows of goods, raw materials, semi-finished products etc.

IV. Logistic function - is a collection of logistics operations, which fulfills a certain logistical task. There are three main logistics functions: supply; production; marketing.

V. Logistic costs: consist of transport, warehouse and administrative costs (sometimes added to the cost of the order). The ability to significantly reduce the

logistics costs of an enterprise is one of the main advantages and advantages of logistics.

VI. The logistical channel is an organized, ordered collection of participants in logistics operations. Logistics channel shows how participants are related in logistical actions - directly (direct channel) or indirectly (through intermediaries).

VII. The logistics chain is a set of participants in logistics operations, which are territorially arranged with the definition of their exact geographic requisites

VIII. Logistics network is a scheme for placing logistical participants' operations, which shows the interrelationships between them.

IX. Logistic cycle is the time of logistics operations. Goal logistics - the maximum reduction of this cycle.

X. Logistic coordination is a close interconnection between the actions of all participants or elements of the logistics system. In modern terms, logistics coordination takes the form of an integrated logistics stream.

XI. Logistic interface is a software that unites work of participants in the logistics system.

Keywords: *logistic system, logistic network, logistic interface, participants*

УДК 355.6

CURRENT PROBLEMS OF FOOD SUPPLY SERVICE IN UKRAINE AND NATO ARMIES

Vadym Pestunenko, Sumy

The purpose of the research is to analyze the systems of food supply service of the National Guard of Ukraine and NATO armies.

The study focuses on the similarities and different approaches in provisions of food supply service for servicemen in Ukraine and NATO.

There have been a number of studies in this field still the issue of tending to the need for a moderate copying of the food supply system and applying only those

positions that most fully correspond to the functioning specifics of the National Guard of Ukraine.

The results of the study show are not fully verified by empirical research in this area and need more deeply analyses in using outsourcing for the organization of high-quality food provision of the National Guard of Ukraine in combat conditions

Keywords: National Guard of Ukraine, food supply system, servicemen, NATO armies

УДК 504.05/.06: 502.175

**IDENTIFICATION AND ASSESSMENT OF FACTORS OF THE
MILITARY-TECHNOGENIC LOAD INFLUENCE IN THE
ENVIRONMENTAL SAFETY CONTROL SYSTEMS**

Serhii Petrukhin, Leonid Pisnya, Kharkiv

The relevance of research in this area is determined by the practical need to reduce environmental hazards of military facilities and areas around them through the identification and assessment of military factors of anthropogenic impact in the environment within adaptive control system of ecological safety.

The aim of this work is to develop the information and logical models to create a knowledge base of ecological portrait of military facilities territories, in order to ensure the person-in-chief with the necessary and sufficient information in the tasks of managing environmental safety military facilities.

To develop information and logical model assessment of environment and knowledge base for making ecological portrait of military facilities territories it is offered to use the functional-structural approach to build models at which the network structure is formed deliberately describing the subject area as a system of logical equations in predicates algebra language, hereinafter this mathematical model is realized as appropriate predicate-algebraic structures.

Thus, the paper used the method of comparing identification, the mathematical algebra of predicates and predicate operations for the development of information and knowledge based logical models of ecological information systems. The model of the knowledge base for creating the ecological portrait of military facilities territories to ensure the person-in-chief with necessary and sufficient information in the tasks of managing environmental safety of military facilities. The structural and logical scheme of environmental safety of military facilities.

So as a result of research in this area:

It was developed the model of the knowledge base of ecological portrait of military facilities territories as information and analytical decision support system based on functional-structural approach and online analytical processing, which led to a unified mathematical model of efficient information support of the person-in-chief in the system of socio-ecological-economic monitoring.

Keywords: *environmental safety, ecological portrait of military facilities territories, predicate-algebraic structures, comparing identification*

УДК 658.7

TRANSFORMING MILITARY SUPPORT PROCESSES FROM LOGISTICS TO SUPPLY CHAIN MANAGEMENT

Dmytro Polichko, Kharkiv

The paper analyzes the ways of transforming military support processes from logistics to supply chain management. Logistics management means activities that plan and control the flow and storage of goods, services, and related information between the point of origin and the point of consumption to satisfy customers' requirements.

Originally introduced by consultants in the early 1980s, SCM became viewed as extending logistics management outside the company to include suppliers and customers. However, SCM is more than that. SCM encompasses all

activities involved with procurement and manufacturing, including collaboration with suppliers, service providers, and customers. It also includes supply and demand management.

Although there are many similarities, commercial chains are much different from military supply chains. The main difference is a very different ultimate goal. The commercial sector seeks maximum profit, while the military sector seeks maximum supply support to military units.

In essence, the military goal is to meet readiness goals while minimizing overall costs. Furthermore, the military must have a supply system that effectively responds to battlefield needs under the constraints of force capabilities, the combat environment, enemy capabilities, threats, and doctrine.

Today most military logistics units use predictive, linear supply chains that operate in traditional, military structures. Logistics managers tend to ignore parts of the supply chain they cannot see or control.

Keywords: *logistics management, requirements, supply service, military logistics units*

УДК 355.4 - 623

**TACTICS METHODS OF THE INTELLIGENCE PLATOON
DEPARTMENT ON VIDEO DOCUMENTING
AND ROBOTIZED COMPLEXES**

Klim Poludennyi

The key issue of the research is innovative inclusion of intelligence departments into the staff of the National Guard units in order to enhance the effectiveness of the maintenance or re-establishment of public order. Until now the methods of such type of departments acting in the case of civil unrests and mass disorders were not developed. Only a few researchers have addressed this problem. Previous works have only focused on the fact that the legal basis of intelligence departments as parts of the National Guard of Ukraine units is absent.

The main method of this research is studying of the best international practices on intelligence technical means using by military structures with the law enforcement functions in the leading countries of the world. In addition the experience of servicemen involved in activities to cease mass disorder was used.

The primary results of the study demonstrate the effectiveness of unmanned aerial vehicles using. The unmanned aerial vehicles as well as robotized complexes provide the opportunity to record different size of human formations movement as well as forecasting their further actions.

Our work has led us to the conclusion that innovative inclusion of intelligence departments with high-tech facilities into the staff of the National Guard of Ukraine units gives the possibility to enhance the maintenance of public order. Using of high-tech equipment helps to neutralize armed offenders, to stop activity of illegitimate paramilitary or armed gangs, organized groups and criminal organizations inside Ukraine, as well as to ensure the effectiveness of all kind of measures related to counterterrorism activities.

***Keywords:** intelligence, maintenance of public order, high-tech equipment, robotized complexes*

УДК 359+623.8

**COMBAT PATH OF A FRIGATE «HETMAN SAHAYDACHNIY»,
THE FLAGSHIP OF THE UKRAINIAN NAVY**

Ihor Poprotskyi

“Hetman Sahaydachniy” – is a frigate and a multimission ship of the Ukrainian Navy. The identification number is **U130**. The ship was named after Petro Sahaydachniy. It is the flagship of the Ukrainian Navy.

The vessel was commissioned to the operational strength of the Ukrainian Navy on 2 April 1993. On 4 July 1993 “Hetman Sahaydachniy” solemnly hoisted the flag of the Ukrainian Navy. The flag of the ship was given to the captain of the

ship lieutenant commander Volodimir Katushenkov by the commander of the Ukrainian Navy vice admiral Boris Kozhin.

The vessel is the update of 1135M project. In the late 70s the necessity of offshore waters control among the exclusive economic zone of 200 nautical miles arose. Due to that, a new technical project of the patrol coastal ship with the identification number 11351 was designed on the basis of 1135/1135M project. The hull, power plant, main mechanisms and equipment were the same as in 1135M project. The designers kept the reaction engine-bomb installation RBU-6000 (anti-submarine weapon rocket launcher) and torpedo launchers. On the foreship the AK-100 naval canon was installed. On the stern the take-off site and the hangar for helicopter basing were constructed. The surface-to-air missile system "Osa-M" was kept only on the bow of the ship. The rear part of the superstructure was fitted with two AK-630M fully automatic naval close-in weapon systems. Sound Navigation and Ranging stations as "Titan" and "Vega" were replaced by "Platina" and "Bronza". As a consequence of the changes the displacement of the ship increased by 300 tones, but she became a multimission vessel with the well-balanced characteristics.

In June 1994 "Hetman Sahaydachniy" set sail for France with official visit; in 1995, she visited Abu Dhabi during the "Idex-95" weapon exhibition. In 1996 she made her first transatlantic voyage to the port Norfolk in the USA. Between 1996 and 2004 the vessel visited ports of Turkey and Bulgaria as a member of ship groups or independently. During three months in 2008 "Hetman Sahaydachniy" took part in NATO antiterrorist operation "Active Endeavour" in the Mediterranean Sea.

According to the completed agreement concerning military partnership between Ukraine and NATO, during September 2013 and January 2014 the vessel was appointed to fulfill tasks in NATO anti-piracy operation "Ocean Shield". Among the operation the frigate together with the shipborne helicopter Ka-27 and the Special Forces group (monitoring group) were conducting the patrol tasks of the operational area.

Keywords: frigate, NATO, Navy, weapon, missile, patrol tasks.

УДК 623.437.093

ARMORED VEHICLES IN THE UKRAINE'S ARMY

Illia Pyntiy, Kharkiv

The past five years have seen increasing technological advances in armored vehicles production in Ukraine.

After successfully passing the tests the armored vehicle "Kozak-2" was adopted for service in the National Guard of Ukraine.

In March 21, 2017 the Armed Forces of Ukraine accepted the adoption of the armored vehicle "Kozak-2". About 100 vehicles can defend our homeland. In fact, this is the first armored vehicle of this class that was adopted by the army in the history of Ukraine's independence.

"Kozak-2" has a specialized protection grade 5. This armored vehicle was designed to transport personnel, armament, military cargos and property at all types of roads and terrain; conducting tactical operations such as patrolling, escort vehicles while performing specific tasks; troops fire support in battle and to protect the crew, cargo and personnel from small arms 7.62 mm ammunition and mines.

In fact, "Kozak-2" is more powerful and better protected than its predecessors. "Kozak-2" is built on the basis of frame with additional armor. The total weight of the chassis is 15 tons. The armor of the "Kozak-2" is 12-mm armor steel.

Any weapon can be mounted on the turret. The only minus of this armored vehicle is that on high speeds it is not steady on the road.

But the production of vehicles of such class as "Kozak-2" is not churned out. It is possible that this situation will be better in the nearest future because the National Guard of Ukraine and the Armed Forces of Ukraine need more reliable armored vehicles that really work. The production of armored vehicles may have a serious impact on the development of our army.

Keywords: Armed Forces of Ukraine, armored vehicle, army, Kozak-2, military, National Guard of Ukraine.

УДК 623.44

THE MODERNIZATION OF THE AK-74

Serhiy Riznyk, Kharkiv

The armament of the National Guard is an important component for ensuring effective service, performance of combat missions and defense capabilities of Ukraine, its territorial integrity.

The army is a very expensive structure for the country's budget thus it is very important to rationally allocate funds for the development and modernization of the National Guard of Ukraine.

The modernization of the existing AK-74 is still relevant as it is more economically effective than purchasing new models of weapons.

The Kalashnikov design bureau developed a universal kit for the weapon, the installation of which allows to improve the effectiveness of weapons in terms of "frequency of injury" at a range of up to 300 m "at any time of the day and in different climate conditions." The kit is installed in 15-20 minutes for any AK.

According to the developers, this upgrade kit makes it possible to install additional equipment on the weapon, such as modern optoelectronic aiming devices, laser target designators, gun lights, low-noise shooting devices and an effective flame arrestor. In addition, it is possible to install a 40 mm grenade launcher and bayonet knife. The representatives of the company explained that the kits are intended for installation on submachine gun of the caliber of 5.45 mm and 7.62 mm previously produced weapons can be carried out both at the enterprises of industry and directly in the troops. The shooting complex, equipped with a new kit of upgrades for the Kalashnikov can be tuned to any tactical task and will significantly expand the possibility of using weapons.

Keywords: AK-74, combat missions, device, kit, modernization, weapon.

УДК 623.437.093

DIFFERENT TYPES OF ARMORED VEHICLES IN THE ARMED FORCES OF UKRAINE

Vladyslav Safonov, Kharkiv

From the moment of independence of Ukraine there have been many changes in different spheres of life, including the army. The paper gives an analysis of the current state of the armored vehicles of the Armed Forces of Ukraine.

Present-day armored divisions are not cost effective due to the high cost of maintenance and service of armored vehicles, as well as attempts to upgrade the fleet and modernize them to meet the requirements of modern combat. These factors led to the situation, when by the beginning of combat operations in the east of Ukraine, the army suffered a critical shortage of armored divisions.

While conducting combat operations the army became much stronger and was refreshed with a great number of new types of armored vehicles and platforms. They are divided into several categories.

The most common type of armored vehicles in the army is an armored personnel carrier, represented by BTR-60, BTR-70, BTR-80, BTR-3, BTR-4 with different specifications. Armored personnel carriers are intended for fast and safe delivery of infantry and fire support to the battlefield. Unfortunately, the models BTR -60 and BTR-70 have already become outdated and don't conform to current army requirements, and they are rapidly replaced by BTR-4 and BTR-3. BTR-3 is created on BTR -80 base, and the main difference between them is the replacement of a turret into the fighting module.

Another type is represented by armored vehicles, like Coguar or Spartan. They are similar to armored personnel carriers, still there are some obvious differences. Armored personnel carriers are completely independent vehicles while armored vehicles, are made on the basis of car production, for example, Coguar is constructed on the basis of Toyota Land Cruiser 79, and Spartan on the basis of Ford 550.

Tanks make the most powerful and less numerous type of armored vehicles. These vehicles have the thickest and strongest armor, and at the same time the most powerful type of weapon - the gun.

Keywords: army, armored vehicles, armored personnel carrier, BTR, combat operations.

УДК 658.7

THE ANALYSIS OF LOGISTICAL CHALLENGES IN EU OPERATIONS

Yevhen Shevchenko, Donetsk

The aim of this study is to identify the main logistical challenges in EU military crisis management operations.

Logistics is essential for the success of crisis management operations. The timely and adequate provision of services is a crucial element of logistics. An operation will from the start struggle to fulfill its mandate if the troops and equipment are not in the area of operation in time, if the force cannot be moved once deployed or if supplies such as food and drinking water are not delivered in time.

Moreover, sustainability is an important aspect: the flow of goods and services needs to be guaranteed. Logistics implies a chain of services whose interruption has immediate consequences on the efficiency and overall effectiveness of an operation.

The main challenges in the field of logistics are often summarized in the so-called 4D formula: demand, duration, distance and destination. These aspects need to be taken into account when planning the logistics of an operation and anticipating challenges. The logistical parameters differ for each crisis management context and need to be adjusted to the realities in the area of an operation and to frictions in the support chain.

While distance and destination are two aspects that can be rather easily assessed and integrated into the logistical planning process, these two points present nonetheless significant challenges: some destinations are not easily accessible, lack basic infrastructure and are in the midst of a warzone. Moreover the transportation of troops, equipment and services over a long distance is challenging and costly. The issues of demand and duration are often difficult to evaluate.

Keywords: crisis management operations, logistical planning process, 4D formula, international partner organizations

УДК 623.44

THE PROBLEM OF ADOPTING OF THE M4A1 RIFLE INTO SERVICE IN UKRAINE

Oleksandr Shpyliovyi, Kharkiv

The paper analyzes rationale behind an idea to adopt the M4A1 rifle into service in Ukraine.

The M16 rifle, or rather its modified version M4A1 belongs to the standard firearms armaments of the US Army and NATO countries, among which are Denmark, France, Italy, Great Britain, Turkey.

Turkey, Malaysia and Belgium are the only countries in the world that have got an American license to manufacture the rifle. In late 2016, Ukraine officially joined them.

Still, the main problem in the production of the M16 in Ukraine is the rifle cartridges. In the "Ukroboronprom" they say that rifles will be manufactured for Soviet cartridges of caliber 7.62 X 39 mm, which are still stored in warehouses. However, the caliber of 7.62 does not comply with NATO standards, therefore, in the design of the rifle barrels will be provided for the replacement for the standardized caliber of the Alliance – 5.56 mm. But these cartridges, when the stock of Soviet ammunition is over, will still have to be taken somewhere: either to

purchase them at world prices or to establish our own production. The company's executives assure that it is possible to build their own ammunition production plant on condition of Ukraine financing them for 18 months, but military experts point out that no changes with rifle calibers can be effective.

The M4A1 rifle does not excel the Kalashnikov assault rifle. And it does not matter what kind of assault rifle they fire: Kalashnikov assault rifle, SVD rifle or M16 rifle. Mass use of rifles M16 rifles will not change the situation on the battlefield.

Keywords: M16 rifles, NATO countries, Kalashnikov assault rifle, standardized caliber

УДК 355/359

IMPROVING THE PRINCIPLES OF THE STATE POLICY IN THE DEFENCE SECTOR

Olexandr Shtogrin, Odesa

Ukraine turned out to be in the most difficult situation since the proclamation of its independence. Deliberate prolonged intervention of the Russian Federation in internal affairs of Ukraine, support to terrorist activities of illegal armed groups in certain areas of Donetsk and Luhansk regions resulted in violation of territorial integrity, inviolability of Ukraine's borders and escalation of situation in the east of the state. The arisen conflict has already claimed the lives of thousands of our citizens and led to enormous destruction of infrastructure in the temporarily occupied territories.

The non-block status of Ukraine, which was enshrined in 2010 by the Law of Ukraine "On the Foundations of Domestic and Foreign Policy", has proved to be ineffective in the context of state security from external aggression and pressure. International commitments to respect the independence, sovereignty and inviolability of borders of Ukraine were not those sufficient tools able to guarantee the external security of our country.

As a result, in 2014 the need arose for radical changes in the approaches to develop principles of the state policy in the defence sector, namely:

- the non-block status of Ukraine was abolished, which made it possible to implement more effective mechanisms to protect the independence, sovereignty and territorial integrity of the countries given the irreversibility of the external course aimed at the membership in the European Union.

- the execution of the activities of the State Complex Program for the Reform and Development of the Armed Forces of Ukraine for the period till 2017 was suspended, as such, which does not meet modern political and military situation and does not provide the direction of the available state resources at priority directions of the Armed Forces development.

- legislative frameworks for implementation of constitutional authorities by the National Security and Defence Council of Ukraine were improved.

- ensuring readiness of the Security and Defence Sector, economy and society to repel the armed aggression against Ukraine was defined as the main strategic direction of the state policy implementation in the defence domain.

Parliamentary hearings entitled “The Defence Capacity of Ukraine in the XXI Century: Challenges, Threats and Ways to Overcome Them”, conducted in July 2014, were relevant and timely.

The parliamentary participants commented upon the necessity of taking systematic measures for radical improvement of the situation in the national security and defence sector; adjusting work of the military-industrial complex of the state; priority providing the Armed Forces and other components of the Security and Defence Sector with logistical, financial resources and materiel; improving social protection of the Anti-Terroristic Operation’s participants and their families.

Keywords: *security, Armed Forces, protection, Ukraine, conflict, foreign policy.*

The KrAZ COUGAR

Ihor Shuliak, Kharkiv

The current topic is devoted to the armored vehicles of the National Guard of Ukraine because of the war in eastern part of Ukraine. Therefore, the issue of equipment modernization for technical support of the troops is so crucial. KrAZ Cougar is one of the solutions for accomplishing these tasks.

Cougar or is an armored vehicle produced by the Kremenchug Automobile Plant under the license of the Canadian-Emirate company. The armored vehicle is designed for fighting in the city. The first demonstration of Cougar was presented in February 2013. The KrAZ Cougar is based on the Toyota Land Cruiser 79 chassis.

The armored vehicle has a front engine position, a control unit in the middle of the car, an airborne conventional layout compartment located in the stern of the vehicle. The crew consists of two persons, it is possible to transport several infantrymen. The body of the armored vehicle is welded, made of steel armored sheets, located at an angle. Various combat modules can be installed on the roof of the combat division, such as: 7.62 mm machine gun; 12.7 mm machine gun; 40-mm automatic grenade launcher. In the upper part of the airborne compartment, there are fire extinguishers for firing small arms (three on each side). The price of this armored vehicle is \$ 215,000. KrAZ Cougar can be equipped with the six-cylinder inline engines.

Thus, due to its brilliant tactical and technical characteristics, it allows to clearly and confidently perform the set of military-combat tasks.

Keywords: *armored vehicle, chassis, combat task, grenade launcher, KrAZ Cougar, mission, National Guard of Ukraine.*

MAIN BATTLE TANKS

Vitaliy Shuparskyi, Khmelnytsky

For many years Ukraine occupies leading positions in the production and development of most advanced main battle tanks and armoured vehicles. The development of the new generation of main battle tanks such a T-64 BM Bulat and BM Oplot. Since T-64 BM Bulat and BM Oplot tanks have a number of common engineering solutions.

The Bulat series tank is equipped with a 850 horsepower multi-fuel diesel engine. It tactical cruising range is approximately 385 km. The tank has a combat weight of 45 tonnes. The armor of tank can provide protection from attacks of the up-to-date anti-tank weapons. It has a three-man crew. The Bulat has a 125mm smoothbore gun with an automatic loader.

The BM Oplot main battle tank is the digital battlefield combat vehicle developed Kharkiv Morozov Machine Building Design Bureau. It is equipped with six cylinder multi-fuel two-cycle diesel engine. The tactical cruising range is approximately 450 km. The tank has a combat weight of 51 tonnes. Maximum road speed is 70 km/h. Major improvement include the integration of new gun-and-fire control system.

The KrAZ Kuguar (cougar) light armored personnel carrier is produced in Ukraine. Kuguar has a shielded weapon mount on the roof. It can be armed with 7.62-mm, 12.7-mm machine guns or 40-mm automatic grenade launcher. Vehicle accommodates up to 9 troops, including the driver. It has a 4x4 configuration with full-time all-wheel drive capability.

Keywords: *main battle tank, armoured vehicle, the Bulat, the Oplot, the KrAZ Kuguar*

УДК 355.1 - 811.111

**THE ROLE OF FOREIGN LANGUAGE ACQUISITION IN
INCREASING OF INTEROPERABILITY BETWEEN MILITARY UNITS**

Serhiy Titov, Kharkiv

The purpose of this study is to highlight the importance of learning English as one of the conditions for the formation of functional relationships between the troops of our country and the NATO countries in order to achieve one goal – PEACE.

Taking into consideration the requirements of new geopolitical situation in the world, meeting the standards of NATO has been identified as the main direction of development and construction of modern Armed Forces of Ukraine, the National Guard of Ukraine, and other military formations in Ukraine, thus placing a good command of English as one of the first priorities for Ukrainian servicemen of tactical and operational-tactical level.

Regular contacts and cooperation between Ukraine and NATO on a permanent basis began after signing “Partnership for Peace” by Ukraine as a framework document. Ukraine sees the program as an important element of the overall structure of European stability and security, which seeks to further and practical deepening of NATO’s relations with the member countries of the Euro-Atlantic Partnership Council in the defense, military-social spheres and peacekeeping operations.

Ukraine must commit itself to gradually improving its defense capability, implementing standardization and achieving interoperability.

In addition to the great work done on compatibility between Ukrainian Armed Forces with NATO counties in planning, management and interaction, we still need to learn to speak one language. It is hard to imagine the success of the military commander of the operational-tactical, strategic level, which does not link his future with English, become a military professional at the international level, or a representative of our state in NATO.

Thus, the study of English should give the opportunity to communicate freely, get rid of language barriers, and achieve mutual understanding and respect.

Keywords: Ukrainian Armed Forces, NATO countries, command of English, interoperability

УДК 355.02

BLACK KNIGHT: THE U.S. REINTRODUCED PROTOTYPE UNMANNED GROUND COMBAT VEHICLE

Volodymyr Toloknieiev, Kharkiv

Unmanned ground combat vehicles can be used at any time of the day missions deemed too dangerous for manned ground vehicles, including forward scouting, intelligence gathering, and investigating hazardous areas.

The aim of this paper is to highlight the characteristics of one of the U.S. latest vehicle innovations, namely the Black Knight which is a prototype unmanned ground combat vehicle (UGCV) designed by BAE Systems. Actually, this UGCV was designed in 2006, but in March 2017 it was reintroduced as the Armed Robotic Combat Vehicle (ARCV).

The Black Knight weighs approximately 12 tons and can be airlifted by military transport aircraft. Similar in appearance to a tank, it is armed with a turret-mounted 30 mm gun and a 7.62 mm coaxial machine gun. The vehicle is fitted with a 300-horsepower Caterpillar Inc. diesel engine.

The Black Knight is capable of being used off-road meaning that it go through any type of terrain such as rocks or water. Because of its autonomous and semi-autonomous components this helps operators plan an efficient plan of attack as well as avoiding obstacles while finding its way from point A to point B. The Black Knight can be controlled by soldiers safely from inside a manned fighting vehicle giving them protection.

The technology driving Black Knight is still a work in progress, with limitations in its GPS, sensors, and wireless communication.

Thus, unmanned ground combat vehicles is an example of constant search for innovations that contributes to the development of new armament and equipment and to the personnel's safety improvement in the battlefield.

Keywords: armament, Black Knight, combat vehicles, equipment, machine gun.

УДК654.1 – 654.9

**MODERN TRENDS IN THE DEVELOPMENT OF MEANS OF
ELECTRONIC WARFARE IN THE WORLD**

V. Tverdokhlibov , M. Telepa, Kyiv

The analysis of military operations and local conflicts of the last decades is carried out. The analysis of the participation of the Armed Forces of Ukraine in the antiterrorist operation in the east of Ukraine is carried out. Therefore, conducting combat operations with the help of radioelectronic means (REM) and electronic warfare (EW) is very important.

Means of EW are developed to fulfill the task of radio electronic and their impact on:

- a new generation of satellite, microwave, shortwave and ultrashort wave communication systems;
- satellite navigation systems;
- high-precision weapons (HPW) guidance systems, radar stations of reconnaissance-strike complexes;
- optical, optoelectronic and radar homing heads of HPW;
- multi-functional airborne radar on aircraft;
- computer radio networks Wi-Fi, Wi-MAX;
- mobile communication systems.

Modern trends in the development of the EW consist in the transition from a single use of the means of the EW to a massive application of them together with conventional weapons. This is the transition to conducting the combat operation of

the EW. To do this, it is necessary to create an automated control system by means of radio electronic reconnaissance and EW. Such a system will allow the reception, processing of intelligence information and distribute this information between the means of the EW and conventional weapons.

In the progressive countries of the world, the means of the EW are developed and applied on new physical principles, namely:

- electromagnetic weapons (weapons of electromagnetic impulse);
- software and computer weapons: viruses, Trojans, exploits, etc.

At the same time, electromagnetic weapons damage REM and enemy soldiers.

Software and computer weapons carry out unauthorized access to confidential information; destruction, distortion, delay of information; conducting disinformation of the enemy.

In modern combat operations, the use of means of electronic warfare can reduce the effectiveness of the enemy's use of HPW and the system of command and control of troops.

Keywords: *radio-electronic means, aircraft, electromagnetic weapons, electronic warfare, reconnaissance, radar.*

УДК 355.02

REFORMING NATO LOGISTICS INFRASTRUCTURE FOR OFFENSIVE OPERATIONS

Vladyslav Veprev, Kharkiv

The analysis of the latest events demonstrates that North Atlantic alliance is getting ready large – scale combat operations. No combat can be waged without logistics. Most changes was be evident in logistics war preparations are not limited to weapon systems deployments.

NATO is transitioning from being focused on assurance through engagement to being a war fighting command postured for deterrence and defense. The rapid

creation of logistics infrastructure and some other factors, such as militarization of the Scandinavian Peninsula, fit into a bigger picture of NATO war preparations in East Europe and the Baltics. These are not steps of defensive nature. The goal is to acquire the ability to move substantial forces to the areas close to Russian's borders gearing up for offensive operations in an armed conflict.

The conclusion is given that reforming NATO logistics infrastructure positively affected on the opportunity rapid movement troops for offensive operations all over Europe.

***Keywords:** NATO, logistics, infrastructure, offensive operations, combat operations.*

УДК 355.5

THE PROBLEM OF UNEXPLODED ORDNANCE IN THE PRESENT-DAY WORLD

Serhiy Vorobiov, Kharkiv

Unexploded ordnance, sometimes abbreviated as UO, unexploded bombs (UXBs), or explosive remnants of war are explosive weapons that did not explode when they were employed and still pose a risk of detonation, sometimes many decades after they were used or discarded. When unwanted munitions are found, they are sometimes destroyed in controlled explosions, but accidental detonation of even very old explosives also occurs, sometimes with fatal results.

The analyzed statistics proves the scope of the disaster, related to UXO. Seventy-eight countries are contaminated by land mines, which kill 15–20,000 people every year while severely maiming countless more. In recent years, mines have been used increasingly as weapons of terror against local civilian populations specifically. In addition to the obvious danger of explosion, buried UXO entails can cause environmental contamination.

Unexploded ordnance, however old, may explode. Even if it does not explode, environmental pollutants are released as it degrades. Once recovered,

explosives must either be detonated in place – sometimes requiring hundreds of homes to be evacuated – or transported safely to a site where they can be destroyed. North Africa, and in particular the desert areas of The Sahara, is heavily mined and with serious consequences for the local population. Land mines and other explosive remnants of war are not limited to North Africa,

Ukraine is contaminated with UXO from WW I, WW II, former Soviet military training and the current Ukraine Crisis, including the War in Donbass. The UXO from the recent military conflicts includes both landmines and cluster bomblets dropped and set by both Ukrainian, anti-government and Russian forces. Ukraine reports that Donetsk and Luhansk Oblast are the regions mostly affected by unexploded submunitions. Proper, reliable statistics are currently unavailable. However, 600 deaths and 2,000 injured due to UXO in 2014 and 2015 alone have been accounted for. So, as far as you can see, there is still much work for deminers in Ukraine.

Keywords: *Unexploded ordnance, UXO, unexploded bombs, UXBs, shells, naval mines, cluster munitions, land mines*

УДК 65.011

THE WAYS TO IMPROVE PERFORMANCE OF MARKETING DEPARTMENT

Hennadiy Yarovoy, Kharkiv

The solving of the effectiveness` evaluation problem of the marketing department at enterprises of different forms of ownership is quite crucial. Nowadays, ineffective work of the marketing department of any enterprise leads to a decrease in its competitiveness and, ultimately, to the end of its existence.

The paper identifies the reasons of marketing activities failure as following: an incorrect assessment of the influence of the factors of the marketing environment on the activities of the organization, unreasonable policy of promotion and pricing, etc.

To achieve the goal, it is necessary to accomplish the following tasks: - to study the concept and role of marketing activities of the enterprise; - to get acquainted with the organizational structure of the company, enumeration of the tasks and services performed; - to analyze technical and economic indicators of company's activity, financial condition.

One of the leading sectors of modern economy is service industries. At present marketing of non-material sphere as an economic category is still forming. Special attention needs to be paid to the marketing activity in scientific institutions that cannot be excluded from market processes. Unfortunately at the present time there are no known works that provide a comprehensive consideration of the problem of implementation of marketing approaches in strategic management of scientific institutions, so the author used works on marketing activity in higher education sector as an example. Being in fact social organizations, education and research institutions cannot operate as commercial enterprises. Nevertheless in market conditions education and science must develop, find ways to improve their work, keep it up to date.

The implementation of certain marketing principles will positively influence the work efficiency. This is not only about commercial benefit but about forming and securing a certain reputation of the institution in the public perception. Without doubt the main task of a scientific institution is conducting of research in its field. This research is a core of work, around which the institution carries out other activities. However in recent times one can hear accusations that science is ivory-towered. It is necessary to make it clear that research is done in the public interests and to realize that activity assessment of each institute, including a regional one, affects the assessment of science in general. Here when we need to use marketing principles.

Keywords: assessment, economic indicators, enterprise, marketing activities

MAJOR REFORM IN UKRAINIAN ARMY'S SUPPLY SYSTEM

Volodymyr Yurchenko

Russian aggression and the resulting need in new weapons, equipment and supplies made military procurement a priority at the time. But no less important is the reform of the military logistics system. After all, logistics goes the first in all western armies.

Leading European armies prepare for operations at bases or permanent posts, with well organized logistics according to these needs. Once the decision is made to deploy units, a different supply system is used. For example, a joint operational command is formed that is in charge of different types of troops. This body plans the operation and the logistics for it.

Radical changes are needed to fix the shortcomings in the army supply chain. The main principle is being violated – sole management. That is, when commanders and other officials don't take any steps beyond their scope of authority, performing duties solely within their own responsibility areas. Although this is not a violation per se, organizing work in this way seldom produces the necessary results. Responsibilities are “muddled”, making it difficult to identify those at fault. But a soldier's readiness, meanwhile, depends on many services working together to provide them with food, clothing, weapons, and other supplies they need.

The creation of an integrated logistics system, as provided in the Strategic Defence Bulletin and other governance documents, is an attempt to integrate supply processes across the board, with all participants responsible for results.

Keywords: *integrated logistics system, military procurement, Strategic Defence Bulletin*

IMPLEMENTATION OF MINE ACTION STANDARDS IN UKRAINE

Yevhen Zubarevskyi, Kyiv

According to International Mine Action Standards (which were implemented as national regulations of Ukraine in 2016) Mine Action means activities which aim to reduce the social, economic and environmental impact of mines, and explosive remnants of war including unexploded sub-munitions. But it is very important to understand that Mine action is not just about demining; it is also about people and societies, and how they are affected by landmine and explosive remnants of war contamination.

The objective of mine action is to reduce the risk from landmines and explosive remnants of war to a level where people can live safely; in which economic, social and health development can occur free from the constraints imposed by landmine and explosive remnants of war contamination, and in which the victims' different needs can be addressed. Mine action comprises five complementary groups of activities:

- a) mine risk education;
- b) humanitarian demining, i.e. mine and explosive remnants of war survey, mapping, marking and clearance;
- c) victim assistance, including rehabilitation and reintegration;
- d) stockpile destruction;
- e) advocacy against the use of antipersonnel mines.

Ukraine is a signatory of the Ottawa Convention and other international legal acts ratified by Parliament. Ukraine has committed to the international community for the implementation of mine action activities.

The Ministry of Defence was empowered by President Decree to provide function as national authority for mine action and to implement in Ukraine the International Mine Action Standards.

The main stakeholders of Mine Action in Ukraine today are Ministry of Defence, Special transport service, State emergency service, Ministry of Health.

To implement the activities of mine action Ministry of Defence cooperates with international non-governmental organizations.

Keywords: mine action, health, explosive remnants, mines, Ministry of Defence, remnants, war.

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COMBATING GLOBAL TERRORISM

Serhiy Zuiev, Lviv

Terrorism is a real stigma on the conscience of mankind. It has existed since the birth of life on our planet. But in different times it manifested itself in different forms. So, what is terrorism? Terrorism is the use of violence and intimidation, especially for political purposes. There exist some forms of terrorism: ideological, ethnic, religious. Terrorist attacks are perpetrated by terrorists – people who support or participate in terrorism. Today terrorism has acquired the most extreme forms. Examples are not far to seek. The most terrifying of them that shook today's world is that of September 11, 2001.

First, after Pearl Harbor it happened again on September 11, 2001, and its terrible lessons will be learned anew. The terrorist attacks that destroyed the World Trade Center towers and damaged the Pentagon found the United States – and the world – in a situation with striking parallels to the 1941 Japanese surprise attack. Once again, civilized nations had to stand together, for they face an enemy no country could confront alone. Law enforcement officials in Washington speculate that the attack was perpetrated by a worldwide network of people bent on terror. Finding them, punishing them, and preventing the next attack will take the support of nations big and small, developed and developing.

Just as World War II led to the United Nations and a new U.S. Department of Defense, this new era demands new priorities, structures and national security plans. The U.S. government moved too slowly to prepare for the growing threat of terror, a mistake politicians and military leaders already are struggling to correct.

Other nations that watched the TV will follow. Governments around the world already are declaring intentions to beef up defenses, exchange information and increase vigilance. A significant exception is Israel, which plans no systemic changes. It has long approached terrorism with the rigor other nations reserve for war.

The problem of terrorism affects all states of the world, Ukraine as well. We need to pay attention to this aspect and our government. Terrorists are also in the ranks of the Russian Federation, and this is confirmed by Syria.

Keywords: *terrorism, political purposes, terrorist attacks, together, Department of Defense, change, war.*

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