

OPERATIONS IN THE NETWORK-CENTRIC ENVIRONMENT

OPERACJE W ŚRODOWISKU SIECIOCENRTYCZNYM

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Abstract: *Network-centric as the idea of action, through the use of the large scale of modern systems to acquire, transfer, and information management has become a fixture of the effective achievement of the objectives of the military action. To understand the situation on an ongoing basis at occurring changes in its development, and in addition to reasonably manage your potential in achieving the purpose of military action.*

Keywords: *network-centric, armed warfare, armed forces*

Streszczenie: *Sieciocentryzm jako idea działania, poprzez zastosowanie na dużą skalę nowoczesnych systemów zdobywania, przesyłania i zarządzania informacją stał się wyznacznikiem efektywnego osiągnięcia celów działań zbrojnych. Umożliwia orientowanie się w sytuacji na bieżąco podczas występujących zmian w jej rozwoju, a ponadto pozwala racjonalnie zarządzać posiadanym potencjałem w osiągnięciu celu działań zbrojnych.*

Słowa kluczowe: *sieciocentrym, walka zbrojna, siły zbrojne*

1. Introduction

The concept of armed warfare has always been perceived as the organized actions taken by armed forces of opposing parties striving for the adversary's defeat. Conclusions drawn from the evolution of armed warfare prove that in order to discuss the term in contrast with combating crime it is justifiable to identify the conditions of its occurrence. The conditions necessary for the armed warfare occurrence include:

- existence of at least two opposing entities presenting hostile intents to each other;
- opposing parties have armed warfare capabilities;
- opposing parties intend to achieve the armed warfare objective by physical, electronic, and psychological neutralization or elimination of their adversaries;
- the crux of armed warfare is the armed confrontation which results in one party's victory;
- armed warfare takes place between/among armed forces of opposing parties/entities in the international arena or against an armed organization of unrecognized entity presenting political objectives that indicate recognition aspirations;
- armed warfare is conducted in accordance with the rules of international law of armed conflicts;
- armed warfare is always directed against entities of a given organization representing armed force, not against civilians and public service institutions.

The state of war between/among entities in the international arena does not require additional explanations because countries applying physical violence against each other/one another use their armed forces. Whereas in peacetime and crisis, when crisis response operations are conducted, it becomes problematic to determine whether acting armed forces, usually representing only one party, are engaged in the "armed warfare". During crisis response operations, also terrorists-orientated, armed forces conduct armed activities with the respect for the international law of armed conflicts. The opposing party that may be a terrorist organization does not apply the rules of armed warfare targeting objects most vulnerable to the effects of their attacks. Therefore no criminal organization can be conceded a status of legality that a country has in terms of applying force in order to achieve its goals. Despite the same or even higher level of danger and uncertainty than in a war operation, combating a criminal organization, or more precisely its members, cannot have equal legal status concerning forming their objectives. And thus armed warfare may be considered as a legally recognized application of force only if an organization using such methods is a carrier of rights.

The causing of maximum losses has been the key determinant of victory in terms of armed warfare until now and the level of the loss achievement described success. For six thousand years the paradigm of armed warfare has included causing maximum adversary losses and keeping own ones at the minimum level. It

has meant that we destroy whatever we can within the limits of our capabilities. The concept: “target acquired = target destroyed” has been the determinant of modernity and efficiency in armed warfare. Nowadays such an approach is not valid anymore because applying modern reconnaissance and combat assets, even highly precise ones, we would cause mass losses. The paradigm of contemporary Art of War, and armed warfare at the same time, is achievement of operational objective causing minimum (necessary) losses on both sides of conflict.

Although contemporary perception of the term “armed warfare” has not changed, the requirements of the adversary’s defeat also described as armed warfare victory requirements have. *The “victory in war” assumptions determined by Carl von Clausewitz include necessity of destroying the enemy’s army, breaking his will to fight and occupying his territory which used to be perceived as the subject matter of dispute*[3]. Meeting the “victory in war” requirements was conditional on the political goal of a war. Whereas in terms of armed warfare, which was not defined by Clausewitz, there was a necessity of destroying the adversary’s army and breaking its will to fight. In modern conflicts, peace-oriented in fact, the territory is not the subject matter of dispute and thus its occupation is not one of the requirements anymore. It is necessary in the next stage of campaign when crisis response operation takes place. The ultimate criterion of modern operation should be the assumption connected with achievement of the operation objective without “*bloody dimension of armed warfare*”. Nowadays we should wider perceive recommendations of Sun Tzu considering the necessity of the operation objective achievement without fighting a battle¹. The necessity results from the political goal of the operation which is not the annexation of a territory. The opposing party’s army is not perceived as an element posing a threat but as an instrument of non-democratic performance of a country in the international arena. Therefore the opposing army is not the main object of interest but the causative force directing its use is. Thus during future operations *leaders and crucial elements of their organization*² should be the subject of precise engagement in the first place and subsequently their instruments of military influence (armed forces) should be taken into consideration.

Modern armies need to notice dangers other than classic ones and to learn how to eliminate or neutralize them. Classic military imminences result from methods of operation and applied forces comparable to the opposing party. The classic of military operations consists in use of comparable means and methods of operation by parties of armed warfare. Comparability of means and methods follows from

¹ „(...) the acme of skill is to defeat the enemy’s army without fighting a battle, capture his cities without a siege and occupy his country without invasion.” See [15].

² According to the model of COL John Warden, payoff military targets, which should be destroyed or neutralize in order to approach achievement of the political goal of conflict, are as follows: leadership of hostile organizations; organic/system essentials; infrastructure/territory being their operational base; population providing them with moral support; fielded military forces as an instrument of their anti-peace policy.

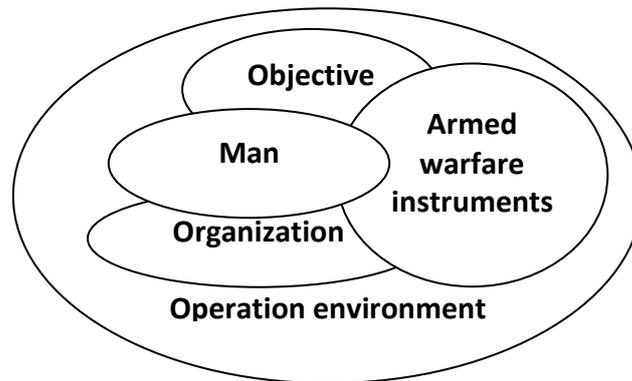
comparable objectives of armed warfare. Such an approach results from assumptions of organized and efficient operation. Nature and content of the objective determines the way of operation and requires selection of corresponding means. Classic dangers and methods of countering them follow from the necessity of accomplishing traditional political goals of conflict. Therefore, till the end of 20th century, in traditional conflicts military operations used to be reduced to destroying the enemy, seizing and holding the area or object of dispute. Today, if a territory is not the subject matter of dispute then it is not justifiable to seize it. *The armed forces of the opposing side are not the object of main engagement because in modern conflicts they are only a passive element, not an active agent, in the process of forming their political goals.*

Changes in politics and culture of people and nations forming them make conflicts similar to those of the first half of the 20th century very unlikely. In future operations application of modern means in conjunction with information should fast and smoothly enable achievement of their military objectives. It means that information and modern assets provide precision of operation. Modern methods of conducting armed warfare describe Network-Centric Approach as a system of information connecting capabilities and effects of all participants' operations in order to focus their efforts on the main objective. The concept of NCA should be noticed early, at the level of forming concept of operation, being the result of the political goal of conflict. Taking the idea into account during future operations will enable reduction of losses on both sides of conflict and fast settlement of dispute by integration and precision of combat assets applied. There are four key levels distinguished by the concept of NCA:

- intent level – stage objectives and their effects necessary for main objective achievement should be determined here;
- human activity level – focused on organizational sphere of human being, his abilities in terms of synchronization and co-ordination of human and weaponry involvement;
- systems level – includes tools supporting decision making and development, and monitoring level of performed tasks;
- material level – consisting of material assets necessary for execution of a given task, results and effects of sensors, platforms and weaponry activities organized within one system [13].

Despite introduction of modernity contemporary armed warfare assumptions confirm previous relations resulting from principles of armed warfare. The principles indicating that course and result of armed combat depends on: relations between method of combat and characteristics of weapon platforms; characteristics of the environment where the combat is conducted; method of command and control; cooperation between assets of a participating party; concentration of efforts [19]. Contemporary interpretation of armed warfare principles requires a different perception of their considerations in terms of a modern paradigm of

victory. The basis for modern perception of armed warfare principles is informing about the results of operation and ability to utilize the effects of other participants for own operation objectives. Generalizing from the abovementioned assumptions one can describe the determinants of armed warfare in the Network-Centric Environment which are as follows: achieved objective; man as an active agent and passive element of armed warfare; weapon and warfare instruments/platforms; organization which achieves given objective by application of its potential and cooperation ability; operation environment perceived as *geospace* (fig. 1).



Source: own development

Fig. 1 Considerations of armed warfare Network-Centric Environment

2. Armed warfare objective

A contemporary objective of armed warfare has evolved. The objective is no longer defined by the category of causing maximum losses. However it does not mean that the objective is achievable without causing any losses or risk of their occurrence. The objective defined as the enemy's defeat and thus achievement of victory is still valid but requires another definition of victory content. Nowadays and in the future armed violence will be acceptable, and even justified, only on condition that its use not cause mass damage and losses. The basis for planning armed actions in Yugoslavia (1999), Afghanistan (2002) and Iraq (2003) was achieving armed warfare objective without causing excessive losses [17]. Such an assumption was possible because of remarkable technological superiority of one side. Whereas in conflicts where armed warfare instruments applied by the sides are alike the abovementioned approach and possibility of objective achievement are controversial.

One should not equate war objective with armed warfare objective because the latter results from the former. Prognoses concerning external security of the country indicate that a global or regional conflict of totalitarian nature is very unlikely. *It does not mean that we can exclude war, including also armed warfare,*

as a method supporting achievement of state policy goals from politics. Armed warfare being a method of armed forces' activity is still applicable but its objective must be achieved at the minimum (necessary) level of losses. It means that armed warfare objectives and methods of achieving them must be changed. So far man has remained the target of destructive impact and in spite of application of different euphemisms the idea has been to take his or her life or to force him or her to surrender by use of threat of death. Systems managed by man should become targets in contemporary armed warfare. Taking into account the necessity of opposing parties' encounter, one should plan their activities in the way placing man outside of destructive impact area. Generalizing, the idea is to destroy or neutralize armed warfare instruments of opposing side before or in the course of the main battle. In modern armed warfare "destruction" should not mean "causing an impact subject to cease to exist. Using modernity we should bring a given subject to such state that for a required time it loses its features or cannot use them to cause losses of opposing party. One should realize that many machines, due to their capabilities, will not stop functioning unless their operators are eliminated. It still indicates the necessity of taking man's life or making him or her incapable of operating the combat means in armed warfare. A sphere of disruption introduction and temporary exclusion of the enemy from activity in the battlefield is possible on condition that actions take place between armies of information age, not industrial or agrarian one. On the one hand asymmetry of armed warfare assets enables unlimited application of modernity, on the other it may turn out that modernity can prove to be hardly efficient against primitive combat means.

It is not justifiable to perceive armed warfare objective meaning defeat of the enemy only as functioning of individual systems but as a comprehensive exploitation of effects of numerous armed warfare participants' activities. It is required to strive for putting a pressure on and posing a threat to the enemy by the skill of other armed warfare participants' capabilities and operation effects utilization, which should not only result in destruction but show the opposing side the pointlessness of its efforts as well.

During armed warfare costs of achieved victory are counted for soldiers' lives, used supplies, combat service materials and damage done to the surrounding. This is the price that cannot be easily estimated because of the first factor – a soldier's life. Therefore it is necessary to use all reasonable endeavours in order to make military operations efficient, which means achieved at minimum losses.

Effective activity requires precise determination of its objective and the understanding of its crux - the state that should be achieved. In conditions of armed warfare planning it is necessary to analyze the objective because it determines a method of operation. The content of the objective analysis is determination of its achievement feasibility in terms of a potential that remains at one's disposal. Beginning the achievement of armed warfare major objective it is required to determine stage/phase objectives or tasks that bring the operation agent closer to its achievement. *It is necessary to determine the conditions of the objective*

achievement by specifying what will bring the operation agent closer to their implementation. As the result of the objective analysis one should identify what needs to be accomplished and make an optimal selection of means. It needs to be determined whether the objective may be achieved by own potential. If its achievement limitations resulting from own limitations occur, then one should seek for cooperating agents. In no case activities should be given up. Optimal solutions need to be looked for within and outside an organization. In case of limitation occurrence a procedural prerequisite for cooperation arises. Having planned an activity and begun its accomplishment, one should perceive effectiveness in the process of coordination. It is necessary to integrate operation effects of independent active agents within organization in such a way that they do not hinder one another's actions and are able to benefit from the effects of joint activities.

One can advance a thesis that combining maximization of effects with minimization of costs is not possible because they are mutually exclusive. They are irrational – one cannot expect that reduced costs will cause heightened effects. The thesis is justifiable if we consider only one factor - potential. Whereas in order to effectively attain a given objective one should take all the factors into consideration: potential, place, time, and even sequence of stage objectives' accomplishment. All that results in the fact that something apparently absurd becomes possible. Implementation of the above-mentioned assumptions is feasible in multidimensional combination:

- *First* – we achieve heightened effects with a change in the way of operation and unaltered costs.
- *Second* – we achieve the same effect with a change in the way of operation and reduced costs.
- *Third* – a change in the way of operation and increased costs result in effects better than those achieved only with increased costs.
- *Fourth* – a change in the way of operation and decreased costs result in lowering effects by less than costs were reduced.
- *Fifth* – a change in the way of operation without any change in potential results in heightened effects. It requires consideration of place, time, potential and sequence of events. It results in the fact that we benefit from the effects of operation of various armed warfare participants, which is an outcome of activities coordination. It brings on occurrence of synergy effect which is available by modification of events sequence.

The above-mentioned assumptions show that many factors have impact on the objective and its effective achievement. The most important include information as knowledge about environment, the enemy and own potential in relation to the major objective and selection of an appropriate method and means to achieve the objective. The modern Art of War pursues the development of such methods of operation where the objective will be met at minimum (necessary) losses (casualties) on both sides of conflict and at optimal costs.

3. Man as an element of armed warfare

All conflicts are related to man as their perpetrator, organizer and participant. Armed warfare is not conducted by instruments, modern combat assets, but people who attempt to solve problems using armed violence. Man plays two fundamental roles in armed warfare: an active agent and a passive element [10]. As an active agent he or she is an armed warfare organizer and coordinator. But as a passive element man is a target and a combat asset engaging other targets. On the one hand man as a soldier is a commander or is commanded by other soldiers, on the other he or she is an object of the opposing side's actions.

Commander has always played a special role in armed warfare because his or her decision has resulted in the operation objective. The consequence of the objective includes gaining victory by destructive influence on the enemy. Importance of each decision of the commander is defined by the value of responsibility for lives of other soldiers. Therefore the commander needs to be an Art-of-War professional characterized by high level of physical resistance to the armed warfare effects. No manager working for a civilian organization intentionally and necessarily organizes his or her activities on the basis of taking other people's lives and for sure the range of caused destruction is not a measure of his or her success. In the modern considerations of the battlefield man, being at the same time the primary active agent organizing and coordinating armed warfare activities and a passive element of armed warfare, is still the major object of the enemy influence and actions.

The term "morale" is usually understood as awareness of duty performance, fierce determination to act, will to fight and conviction about victory. Duty awareness is the effect of internal motivations – human being gets involved in a given activity because it generates his or her interest and results from belief concerning legitimacy of the activity and not from external compulsion [2]. A soldier's participation in armed combat and his or her motivations may be perceived in terms of internal and external motivations. The internal ones result from conscious membership of a given organization and acceptance of its goals achievement. Whereas the enemy creates the external motivations by perceiving us in terms of armed warfare object category. Only one side may win a victory in armed warfare. Therefore aspirations of the parties for the same objective (victory), though characterized by opposite effects, raise the external motivations.

The phenomenon of armed warfare is connected with manifestations of human behaviour resulting from the danger of loss of life and awareness of taking the enemy's life. It causes constant tension and carrying out tasks in a stressful situation. Stress is an inseparable element of the tasks performed by a soldier in the battlefield, causes nervous tension and results from constant threat posed by the enemy. Therefore in order to learn how to deal with stress it is required to be aware of its appearance, to know its cause and to learn how to control the factors causing stress [2].

Stress in armed combat is inevitable but its consequences can be mitigated. A soldier properly equipped with combat and protection means may demonstrate a

favourable stress level, not a high and long-lasting one that causes biological degradation of organism and psyche. Knowledge of the warfare crux and scale of accompanying strain enables development of a preparation concept for soldiers operating in the stressful conditions of the contemporary battlefield. Preparation of a soldier for coping with stress is not completely feasible because of too many variables characterizing the contemporary battlefield. However it does not mean that one should give up preparing him or her for operations in conditions that cannot be precisely determined. Creation of a contemporary battlefield vision may and should be formed during training process in near-combat conditions. It will enable preparation and immunization of a soldier's imagination against various stressful situations. It is essential to identify the situations that are stressful for soldiers. Such situations may be caused by awareness of real danger, lack of information or operating in isolation. Especially operating as a member of independent team or task force may result in conviction that one is forlorn and nobody provides support in case of emergency. Modernity of combat assets and their availability on call from the battlefield eliminate the conviction on condition that such a support is provided. In terms of Network-Centric performance of tasks the conviction that a given team or task force is isolated does not occur because all the system participants are able to and should benefit from operation effects of other combat participants.

Morale has always had a remarkable importance and as a factor positively affecting victory it has been considered by commanders. It has been counted among the most important elements of war. *Morale is the spirit which permeates the whole element of war, and which fasten themselves soonest and with the greatest affinity to the will which puts in motion and guides the whole mass of powers, unite with it as it were in one stream, because it is a moral force itself* [3]. According to the NATO views there is a prevailing belief that overall human features (subjective, personal, biological) related to culture and tradition of a nation, nature of its armed forces and characteristics of its state influence the morale of its armed forces. It is usually emphasized that the crux of morale includes: system of accepted values, motives of operation, attitudes and needs of soldiers. It is justifiable to classify, among other things, all the factors motivating activities, and above all need of performed task security as belonging to the main needs affecting morale. The theory of the issue emphasizes that *the crux of morale manifests itself in relations between internal state of each soldier and external aim – task* [8]. Factors creating a high morale level are: knowledge, skills, motives and possibilities of operation targeted at respective objects of attack.

Each soldier's ability to subordinating oneself is crucial in armed warfare. It is due not only from institutional obedience but mainly from conviction about correctness of a given activity. Obedience does not mean blind subordinating oneself because then in spite of biological substance and minds we would fulfill only the function of tool. In contemporary conflicts obedience and subordinating oneself should fall within the framework of activities allowed by the law. Nothing releases a commander and a soldier from their liability for violating the law of war. Ability to

subordinate oneself with a view of the main objective or the idea of cooperation is one of the factors bringing one side's participants of armed warfare nearer victory. In armed warfare subordinating a subordinate is usually dependent on a superior's behaviour. Therefore the authority and fluffing leadership functions is of a crucial importance. A soldier is obedient to his or her commander when he or she is convinced that the commander wants the common good, is able to properly conduct combat, does the right thing. And thus leadership as appropriate relation between the commander and the subordinates nowadays becomes an element moulding morale. Man is the main factor of armed warfare and knowledge of man's adaptabilities, operational motivation and resistance to stress is one of the major factors conditioning victory in armed warfare.

4. Armed warfare instruments

Armed warfare instruments are a concept very frequently used in literature but there is no unambiguous definition describing them, therefore one should notice the necessity of specifying the concept. The instruments include weapons, materials and substances applied for engaging the enemy in all the environments of his activities. They strike the enemy using kinetic energy, shock wave, heatwave, ionizing radiation, radioactive contamination, toxic chemical and bacteriological effect, and today electromagnetic wave. Combat means are technical instruments, materials and substances having a destructive effect on objects by means of deferent energies and factors. The idea of using and applying combat means has evolved from annihilation of the enemy to temporary exclusion of a soldier from battle without taking his or her life and destruction of material goods [16]. Many factors including level of knowledge (scientific thought), possibility of production (modern technology and access to raw materials) and the opposing party's Art of War have influenced development of combat means. Analysis of combat means development indicates their development is affected by political, technological, economic factors and battlefield requirements.

Political factor means a given country's situation in the international arena, which results in the necessity of, or only enables, a new combat means to be developed. Such factors include: international law restrictions, membership of military alliance, international agreements. International law restrictions affect prohibition of producing, stockpiling or improving prohibited types of weapons³. Membership of military alliances has a great influence on future shape of combat assets. Compatibility of operations between states of the same military treaty is necessary, which results in combat means standardization. International agreements make another political factor playing a significant role in development of contemporary combat assets. Economic relations of the contemporary world are a barrier for ones

³ Geneva conventions prohibit development, production and stockpiling of bacteriological (biological) and toxin weapons (1972), chemical weapons (1993). Moreover they prohibit or restrict the use of booby traps (protocol II – 1980 and 1996), incendiary weapons (protocol III - 1980), blinding laser weapons (1995 - protocol IV to convention of 1980).

and a progress factor for the others.

Until recently the basic problem of battlefield was so called armour-missile race. Today such a statement that there is an armour-missile race is not justifiable anymore [7]. Nowadays the race is against time and quality of transferred information in relation to time of decision made and time of precise action. It is not enough to produce a missile that is able to penetrate each type of armour. It is required to develop weapon systems that on the one hand will protect their operators, and on the other hand are able to precisely eliminate a given adversary. These days one seeks such a weapon that will precisely and at minimum side effects eliminate those elements of the enemy defensive system that are crucial for the own objective achievement. The contemporary battlefield requirements include: precise effects of engagement, minimization of losses and short term effects of destructive impact. Therefore modern weapon means precise weapon that destroys only given target and does not cause extensive damage.

There is an interdependence between development of combat assets and battlefield requirements, which means that on the one hand battlefield gives a reason for development of a new weapon, and on the other hand introduction of a new means results in battlefield changes. New combat asset causes decline of old one, less effective, and occurrence of a new countermeasure. At the same time it implements changes in the Art-of-War area, which requires new methods of operations.

Considering issues of armed warfare in war one should be aware of the fact that war is first of all a legal category determined by policy and war instruments used in support of political goal achievement are subordinate to war itself [3]. Therefore combat assets as war instruments are developed in response to the requirements of solving dispute situations by means of violence in accordance with the goals defined by a state policy. War, as a subject to common reason, does not have to be waged till one of the sides is ultimately destroyed. Assuming that *if motives and tensions are weak; little, hardly felt probability of defeat is enough to induce the opposing party to make concessions* [3]. Therefore nowadays we should not forget that the objective of armed warfare is victory that does not have to be won at the cost of mass damage.

Development of combat assets depends on many factors including: battlefield requirements, technological, economic and political factors. There is an interdependence among them, which means that they affect one another. Introduction of a new weapon results in a change of the factors that formed perpetrating force of its occurrence. Interdependence relations existing among the above-mentioned factors bring about invention and development of new combat assets. Development of new combat means is a complex process requiring comprehensive consideration of all the factors that affect the process and are mutually related. Equipment and weapons of both soldiers and military organizations change as a result of scientific and technological achievements, and above all because of changes in nature of war and armed warfare which is

conducted within that war. Weaponry of the 21st century in many cases differs from weaponry of 20th century in technical parameters but new combat means have been invented as well. Changes in quality of combat assets during 100 years resulted in changes in methods of their application and tactics of operation. Quality of technology is very frequently credited with the perpetrating force initiated only by man's decision and methods of a given means' operation. A combat means and its quality influences the nature of battlefield but is not its creator.

Combat assets demonstrating relevance of their application in global war evolve, which means that we still, in most cases, think using traditional categories of war. If global wars and hundreds-of-kilometres long frontlines are very unlikely, and fundamental objects of political and military activities will not include the pursuance of taking sovereignty away from other countries, then combat means should undergo revolutionary modifications in respect of assumed political and military objectives of war. *Conclusions drawn from analysis of present combat means show that they are modernized relics of previous wars.* Such an approach will not allow building appropriate basis for Network-Centric planning, operations of man and various systems used to support and monitor given objectives' achievement and merging results and effects of different weapon systems. Nowadays it is not enough to modernize because the pace of changes taking place in the battlefield makes an introduced modernization insufficient. Fundamental requirements concerning modern combat assets should still include: mobility; effectiveness and accuracy of strike connected with autonomous system of acquisition and guidance; resistance to detection and strikes; compatibility with other modern systems of combat; multipurposeness of applications in the battlefield; standardization of spare subassemblies. One can advance a thesis that forces possessing combat systems of such values should meet the requirements of the future battlefield. It should be also emphasized that the main environment, where achieving political and military objectives of a conflict takes place, will remain the land environment being a place of social activities of human – originator of all conflicts.

In spite of comprehensive approach to determination of combat means development directions one can propose a thesis that policy is the key determinant of their development. In democratic world quantity of funds allocated to research activities depends on political decisions. Introduction of a given combat means to military units is also dependent on such decisions. Other factors such as level of technology, economic conditions, and battlefield requirements enable combat means to develop.

5. Organization as a determinant of armed warfare

Organization means two or more persons cooperating within certain structure of relations in order to achieve a given objective or a set of objectives [14]. Determinants of an organization include: objective, structure and relations among its members. Armed forces are one of the oldest organizations in the history of

mankind. They form a specialized state organ designated for protection and defence of its interests by means of deterrence against aggression or, if necessary, conduct of armed warfare till the requirements of a political goal are met [21]. Common concept of armed forces includes soldiers – armed, designated for combat and organized in numerous units. Nowadays permanent structures are of great importance in the process of training organization and conduct. They are also crucial for military activities in peace time. Performing tasks in war and crisis, more and more frequently requires establishment of task forces that are adequate to objectives to be achieved and methods of operation.

Basic features of armed forces as a social organization include:

- superiority of formal relations over personal relations,
- bureaucratic nature and hierarchical structure,
- own system of stratification,
- organizing for winning victory in armed combat [18].

The last characteristic shows the purpose of armed forces. At the beginning of 21st century the purpose undergoes a change resulting in their missions being broadened. Methods of activities used in peace operations and crisis response operations do not always require application of armed warfare methods. A crisis response operation and peace operation end state is not defined as a victory but a certain status of changes in social or political relations. In peace and crisis response operations somebody or something is not an object of influence. A situation that requires changes makes such an object. It means that a created organization's paradigm of purpose has changed. Therefore task forces are formed for the purposes of crisis response operations and peace operations. They do not match permanent structures of units and subunits. Because of the changes in achievement of armed warfare objective, task forces are also formed for the purposes of war operations. Whereas permanent structures of units and subunits make modules used for establishment of task structure. The above-mentioned assumptions indicate that permanent structures do not meet requirements of armed forces' functions in armed warfare.

Armed forces perform prophylactic, control, humanitarian, peace and defensive functions in the system of state defence [20]. Prophylactic function in the national dimension expresses itself in sustaining capability of operational activity and thus the idea of strategic deterrence is implemented in conjunction with system of collective security. Control function in the national dimension consists in monitoring integral areas of sovereign country in air, at sea and in cyberspace. Whereas the function manifests itself in the international dimension as participation in various commissions and consists in controlling provisions of agreements concerning level of armament and security. Humanitarian function consists in taking part in non-military actions that aim at protection of population or its property in situation of catastrophe or natural disaster. Peace function has been fulfilled since 1953 in the form of active participation in peace operations under the auspices of the UN. Whereas defensive function consists in organization and

conduct of war operations in order to defend sovereignty of own country or an ally. The performed functions demonstrate the necessity of organizations' establishment in respect of tasks to be carried out. Creation of universal structures for so many different tasks is simply impossible. Therefore "panacea" for organizational structures' requirements seems includes task forces formed on various levels of operation.

Task forces, in both theory and practice of Polish Art of War, are not an invention of the 21st century. At the beginning of the 20th century one used to create tactical groups, operational groups, tactical group formations and operational manoeuvre groups. Their tasks and ways of their performance were the basis for the establishment of the groups [6]. It means that objective and method of operation were the fundamentals for temporarily formed organizations. The most important determinants of task force formation are as follows: objective and method of operation; challenges and threats; technological progress and development of combat means; development of military thought; changes in organization of troops and combat environment.

Forming task forces on different levels of troops' organization, we deal with the group formation of organizational cells into larger modules. In theory of organization and management, considering organizational links, one distinguishes so called classic organizational structures: linear, functional, staff-linear [11]. The crux of linear structure is the subordinating of a subordinate to only one superior. In functional structure a subordinate is subordinated to numerous superiors, which results in dispersion of organizational authority. Both of the features are merged within staff-linear structure where a principle of command authority unity is in force. There are also staff cells present in that structure. They play an advisory role. Continuous search for new structural forms forced the occurrence of squadron structures. Their crux is the establishment of separate segments for performing specific tasks.

Determination of task force purpose is the initial point for its creation. It allows defining key objectives and tasks, type and range of decision making, and respective level of command and control, degree of tasks fulfillment, general framework of task force organizational structure. If one considers internal factors, then size of organization, style of command, type of performed tasks, traditional organizational patterns (established in armed forces) are of significant importance. External factors include: legal, social, geographical, scientific & technological, and political aspects. Not every structure is influenced by external surrounding to an equal extent.

Task forces' creation shows the development of Art of War that departs from common schemes of activities conducted by structures designed for waging a war of the past. Another aspect is diversity of tasks which cannot be performed by a universal organization. Therefore in the area of efficient activity the objective can be gained by the proper operating of potential and method of its application. In theory of the issue one can specify many types of task forces (group formations)

operating on different levels. In an operation the determinants of task force structure include: political goal of conflict; political, geographical, space, material and time restrictions; military objective of operation and method of its achievement. Composition and number of components of operation are changeable and depend on operation's objective and conditions of its achievement. Troops placed at disposal of an operational commander make component force. Responsibilities of service commanders include handing over an equipped and combat-synchronized component. In fact service commanders form task forces designed for operations in their environments. Composition of detached tactical group formation depends on similar factors as all forces in operation do. Political restrictions come into special prominence in multinational crisis response operations. Task groups should be included in compositions of particular components. Number and size of groups in individual components is not limited but their forming should not have a negative impact on efficiency of command and performance of tasks. In considerations of Network-Centric battlefield, task groups should cooperate with one another in horizontal dimension because of the necessity of optimal fulfillment of a task. Formation of organizations for performing various tasks should be based on combat, combat support and combat service support modules. A battalion should play the role of basic combat module and make the core of task group. It does not exclude possibility of a manoeuvre company being an organizational basis. Establishing a task structure one should remember not to lose efficiency of operation.

Concluding, it is necessary to say that operational group formations, being the whole of forces in operation, are formed in order to attain the main objective of an operation. In order to achieve stage objectives in particular environments of an operation, tactical group formations are created. They are formed in accordance with methods of the stage objective's achievement and make composition of particular components' force. Whereas task groups are established for direct performance of tasks in the framework of stage objectives.

6. Geospace as an environment of objective's achievement

The concept of operational environment means geospace that is geographically determined and has its physical and geographical characteristics. Every physical phenomenon takes place in geospace. Importance of operational environment in Art of War has been recognized since its origin. Nobody has had to be convinced that terrain and weather matter a lot in carrying out armed activities. Throughout ages thesis indicating significance of environmental conditions for the course of armed combat have been formulated, for example *get to know terrain and weather conditions and your victory will be complete* [15]. Terrain affects armed combat *as an obstacle to movement, as an obstacle to observation and as a way of concealment from fire* [3]. Each feature of terrain should be respectively exploited for gaining victory. Therefore commanders and planners have demonstrated a need of getting to know the area of future operations. The need has always had a high position in the Art-of-War theory and practice.

Till the end of the 19th century the environment for military purposes used to be perceived in two dimensions – width and length with terrain features. Appearance of modern combat and reconnaissance means in the first half of the 20th century made combat environment accept the meaning of geospace. Combat environment, having land and sea surface dimensions so far, was expanded into airspace and area of underwater activities [4]. Moreover one noticed an information space in the expanded environment. In the second half of 20th century the information space became not only an information carrier but a battlefield as well. Therefore significance of information has assumed the proportion of operational factor. Information has always been of great importance but nowadays relations between identification of information and time of its exploitation give information the leading position.

Modern means of reconnaissance and operation allow breach of the obstacles that were movement, observation, fire and reconnaissance barriers for Clausewitz. Nowadays physical relief of the environment does not present such a great obstacle as products of activity created in order to improve quality of human life. Forests and mountains are no longer obstacles but urbanization of area of operation. Each armed conflict will be conducted in social and physical environment of human functioning. It will target the enemy's state and security management institutions that are located in urban areas. Modernity accepts such challenges and today even unmanned aerial vehicles are able to operate in built up area. However it requires different organization of activities and assets that meet battlefield requirements in urban environment. One of crucial factors affecting transformation of US Army is a conclusion that future operational and tactical tasks (offensive, defensive or peace support operations) will be performed in built up area [1].

In spite of being aware of the fact that operations will also be conducted in information environment, one should admit that it is the least penetrated part of geospace. If information is a basis for any activity, then lack of information results in inertia. *Nowadays the basis for efficient achievement of objective is not air, land or maritime supremacy but supremacy in cyberspace.* The cyberspace supremacy provides us with basis for application of combat assets, which in consequence enables gaining supremacy or domination in a given environment.

Considerations of armed activities' conduct will be situated in a certain theatre of war activities that will have own properties adequate to occupied fragment of geospace. A theatre of war will contain administrative geospace of countries involved in conflict. In high intensity conflicts a theatre of war may comprise one or a few theatres of war activities. A theatre of war activities should be perceived as a part of *geospace*⁴ that has been boxed off a theatre of war. Military objectives of conflict may be attained there. A theatre of war activities may include one or a

⁴ Geospace of a commander's responsibility is an integrated (land, air and maritime) area and electromagnetic space where an operational commander organizes and achieves military objectives of an operation.

several theatre of operational activities. A theatre of operational activities is a boxed-off part of theatre of war activities designated for achievement of operation's military objective. In system of area-of-responsibility allocation that is applied in low intensity conflicts a theatre of war usually directly overlaps with a theatre of war activities that comprises one theatre of operational activities. The theatre of operational activities is usually understood as an area of responsibility allocated to a military commander where he or she has the authority to plan, conduct and coordinate activities. Depending on specific character of activities carried out in area of responsibility, one distinguishes the following areas of operations: deep, close and rear. Close operations area is a geographically designated part of geospace where main objective of an operation is achieved. In deep operations area the enemy is denied efficiency of operation and possibility of influencing the course of operations in close operations area. Whereas in rear operations area one should defend own centres of gravity and create conditions for performing tasks in close and deep operations areas by constant supplying. Particular functional areas of operations and areas of operation's objective achievement mutually affect one another by effects that are achieved in them. In each of the mentioned areas stage objectives are attained by task group formations mutually supporting one another by achieved individual effects. Ability to exploit effects of task group formations' activities in separate areas has an impact on optimal achievement of operation's major objective. Specifying close, deep and rear operations areas is justifiable and feasible in war operations. In crisis response operations and peace operations it is not possible to unambiguously define areas of objectives' achievement because of operational and tactical situations' mutual permeation and achievement of various objectives that are spatially disposed.

Knowledge of operational environment, where areas of responsibility are spatially situated, should be a factor recommending method of operation in relation to achieved objective. Therefore knowledge of environment and ability of affecting its character or leveling its features by appropriate equipment of troops, their organization and methods of activity enable making optimal decisions.

Generalizing, it is necessary to emphasize that knowledge of contemporary armed warfare and its determinants enables the understanding of its crux and conditions of its objectives' achievement.

7. References

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