

Chosen Operational and Logistic Aspects Determining the Optimizing Space of the Polish Armed Forces Logistic System

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New organizational and technical solutions aimed at optimizing the Polish Armed Forces Logistic System (PAFLS) and national task contingents are due to modern conditions under which military operations, mainly of expeditionary character, are conducted in the allied and international environment. The PAFLS and the Polish Military Contingent's organizational and technical structure is still (notwithstanding the numerous efforts that were made) the vast optimizing space which can be filled when the possibilities created by civil logistics experience are taken into account.

Key words: asymmetric operations, military logistics, optimization

1. MILITARY OPERATIONS CONDUCTED UNDER NEW CONDITIONS

The analysis of the Polish scientists' newest papers dealing with the theory of military art shows that traditional understanding of the armed combat as the field's object of cognition changed significantly at the beginning of the XXI century. For recent scientific debate proves that the adequacy of Clausewitz's theory to appearing new safety conditions doesn't partially stand the test of time. Clausewitz's philosophy on war itself is even questioned, as it refers to wars waged between nations organised in states, whereas the concept of war waged by non-state actors is more and more common nowadays [6]. Modern threats and the ways to counteract them are called "the 4th generation warfare" in the book *The Utility of Force* by American general Rupert Smith who explains their nature in the following way: "This is no longer industrial war: the enemies are no longer the Third Reich or Japan, who posed absolute and clear threats in recognizable groupings, and therefore provided stable political context for operations; as we have seen, our opponents are formless, and their leaders and operatives are

outside the structure in which we order the word and society... They are of and amongst the people - in the flesh and in the media - and it is there that the fight takes place" [8].

Experience gained from military activities in the Republic of Iraq and Afghanistan prove that modern opponent seen as non-state agent can react asymmetrically combining guerrilla warfare and civil strife which are unpredictable, unique (non-schematic) and have precise informational and physical effect. Moreover, asymmetric activity is characterised by moderate forces and means needed to achieve the intended goals.

New conditions under which military operations are conducted mean thus the necessity of leaving the theory of direct, destroying military activities carried out by tight army groups in favour of more refined conceptually maneuverable and indirect activities carried out in a flexible way. Because of that, the contemporary battlefield is subject to a series of transformations with other paradigms and value categories related to new kinds of operations systemically integrated with classical ones. These operations are characterised by precise military reaction, active military presence connected with

patrol and police function, including especially operations aimed at ensuring peace (peaceful operations) and stabilising missions. That's why the Polish Armed Forces, as an integral part of the NATO defense system, must be ready not only to fulfill difficult operational tasks emerging from the Article 5 of the Washington treaty, but also to fulfill peaceful and stabilising tasks as part of authorised international organizations and in the totally new "environment of military reaction" that is based on the concept of European Union Battlegroups creation and operational use. Therefore "the 4th generation warfare", which is in contradiction with technological lightning wars, poses qualitatively-new challenges to the PAFLS and different armed forces subgroups. Nowadays new approaches and contexts of perceiving the Armed Forces Logistic System (AFLS) are being shaped, which definitely transfer the significance accent on the system's ability to act in the allied and international environment, far from armed forces material and service base located in the country. The PAFLS faces an extremely difficult challenge, for it must be entirely able to fulfill key tasks in a specific battle environment regarded as a complexity because of the operation area geographical position, climate and cultural differences, for example in the environment of such states as the Republic of Iraq or Afghanistan. Moreover, logistic speed of reaction and the activity accuracy ("struggle for time" and "struggle for logistic reaction accuracy") are of crucial importance in modern military operations, besides fundamental logistic tasks.

The time to start the operation and the outcome of the operation are largely dependent on whether the armed forces logistic subjects and the Polish Military Contingent logistics are fully able to overcome the space and time gap which divides supply, that is logistic resources, and demand, that is armed forces' material and service requirements while preparing a military operation and during it. That's why armed forces logistic subgroups should be characterised by high mobility, initiative, ability of quick reaction and flexibility.

So how to optimally model the Armed Forces Logistic System in the aspect of present and prospective conditions under which military operations, mainly those of expeditionary character, are conducted?

This question isn't a new one, for scientific, technical and social advance has always influenced the nature of war and posed qualitatively new challenges of its support, as far as communication, as well as production and distribution of armament and military equipment (A&ME¹) and of battle and material means (B&MM) is concerned. Moreover, modern military activities continuously generate needs that are to be met by rendering more and more specialist services, such as medical. Technical, transportation, trans-shipment, energetic, airport support, as well as economic and administrative support of both soldiers operating in geographically and climatically complex operational environment and refugees during humanitarian operations. Józef Piłsudski in the book *Year 1920* observed steadily changing demands of the battlefield of the time and of the prospective one and asked an open question of timeless character: "How one could combine the movement with plenty of equipment needed to feed the war, enormous artillery, countless convoys of military vehicles, lots of equipment without which the war with its modern battle means would be powerless?".

2. GENERAL DESCRIPTION OF THE POLISH ARMED FORCES LOGISTIC SYSTEM

A logistic system is defined as "an arranged set of elements of organizational structure and functional areas the purpose, mutual connections and relations of which make the Polish Armed Forces function efficiently in peacetime, wartime and crisis time" in accordance with "The Logistic Doctrine of the Polish Armed Forces" (DD/4), which is a fundamental logistic document [2]. Elements of the Polish Armed Forces Logistic System are shown graphically on Figure 1.

The logistic system's major task is to meet the Polish Armed Forces developed requirements at material, technical, infrastructural and medical level, as well as at the level of army movement and transportation in peacetime, wartime and crisis time.

¹ Armament and military equipment (A&ME) means technical means of battle, technical equipment, as well as material equipment and means including software and services intended for military purposes because of their requirements or technical and design qualities [1].

In peacetime the logistic system provides the Armed Forces with logistic support, collects and carries B&MM stores in quantities ensuring the material autonomy of the Armed Forces developed due to mobilization until the process of economy (defense industry) conversion to military manufacture is over, and keeps the level of executive potential needed to provide the army with further services.

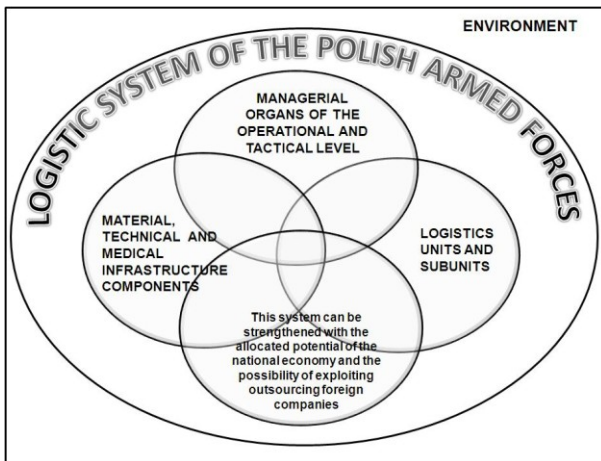


Figure 1. Logistic System of the Polish Armed Forces. Source: drawn up by the author on the basis of [2].

In crisis time or in wartime the logistic system [2]:

1. Gives the army the necessary assistance during the mobilization process and the process of reaching the highest state of combat readiness.
2. Ensures continuous logistic assistance of national forces in the country and outside it.
3. Ensures logistic assistance of allied forces as part of Host Nation Support (HNS²).

The military logistic system consists of [2]:

- *managerial subsystem* – aimed at planning, organising, coordinating and monitoring the Polish Armed Forces logistic efforts, as well

² Host Nation Support means civil and military assistance rendered in peace, emergencies, crisis and conflict by a Host Nation to Allied Forces and organisations which are located on, operating in or in transit through the Host Nation's territory. Arrangements concluded between the appropriate authorities of Host Nations and the "Sending Nations" and/or NATO form the basis of such assistance [2].

as keeping subordinate forces and means ready and able to operate;

- *material subsystem* - aimed at planning, organising, providing the forces with B&MM and special material services;
- *technical subsystem* – aimed at planning, organising and carrying out undertakings connected with A&ME use and technical support in order to keep its technical efficiency up (ready to be used in battle during military operations);
- *army movement and transportation subsystem* – aimed at planning, organising and carrying out undertakings connected with the army and supplies transportation, technical cover and keeping the defensive transport system suitable for driving, as well as managing the army movement;
- *medical subsystem* – comprising aspects of medical evacuation and logistics dealing with the following medical forces and means: medical procurement, evacuating injured, wounded and ill soldiers in the whole operation area;
- *military infrastructure subgroup* – comprising appropriate managerial organs dealing with all the undertakings aimed at maintaining stationary objects needed to quarter soldiers, storing and repairing armament and technical equipment, as well as training the army; in threat time and wartime it also carries out undertakings aimed at procuring and using stationary objects for defensive purposes.

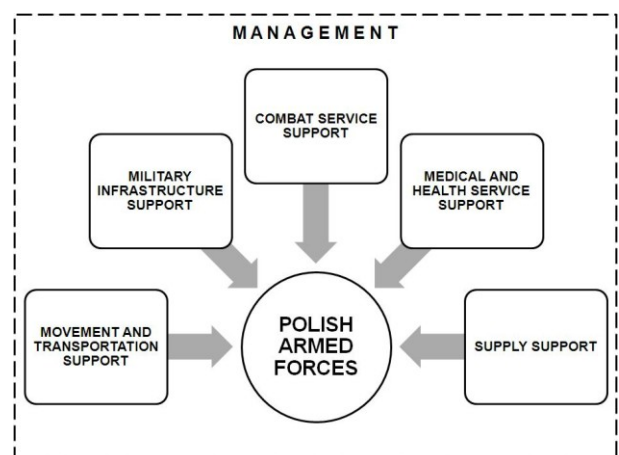


Figure 2. Major Tasks Fulfilled by the Polish Armed Forces Logistic System. Source: drawn up by the author on the basis of [2].

Flows in munitions supply chain and flows of services the army is provided with comprise the following:

- **on the one hand** – A&ME and B&MM deliveries carried out on a so-called macro scale, that is from a manufacturer, through all the phases of their storage until they are handed over to soldiers on the battlefield; special and economic services rendered to the army and prisoners of war, as well as services rendered to refugees by logistic system functional departments during humanitarian operations.
- **on the other hand** – “reverse” flows such as wounded and ill soldiers medical evacuation, killed and dead soldiers' corpses evacuation, unused A&ME evacuation and evacuation of damaged B&MM that need repair of a higher order provided by the Armed Forces stationary service and repairing units.

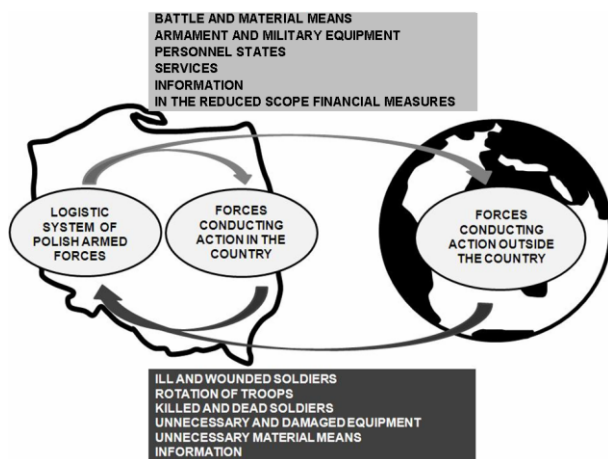


Figure 3. Flows in Munitions Supply Chain and Flows of Services the Army is Provided with. Source: drawn up by the author.

Fundamental flow streams in supply chains and reverse supply chains are characterised by high diversity of intensity which is determined by the following factors:

- types of tasks that are being fulfilled in every single state of emergency or as part of peaceful, stabilising or humanitarian operations;
- frequency with which tactical and operational tasks are changed during one operation;

- distance between the place where the forces operate and the Armed Forces logistic base located in the country;
- battle environment considered from geographical, climate, cultural, tactical and operational perspective – type of ammunition used, parties' quantitative and qualitative advantage, intensity of conducted operations;
- expected time of military operation duration;
- number and equipment of different types of forces fulfilling tactical, operational, peaceful, stabilising and humanitarian tasks in the operation area;
- scope of operational and logistic assistance rendered by allied forces;
- level of logistic interoperability and possibility of contracting munitions delivery and services provided in the operation area or in its direct neighbourhood;
- access to logistic installations in the operation area or in its direct neighbourhood (seaports, airports, linear and point road infrastructure, places of storage, water intake, energy sources).

The AFLS has undoubtedly its specificity which makes it different from civil systems, for its basic task is to enable the two-way physical movement of resources and logistic services aimed at procuring the army with the appropriate B&MM stores needed for its operation and relieving operating combat components from anything that can hinder their highly-maneuverable operations (reverse flows). It should be noted that flow streams in the AFLS take place in conditions of the armed combat³ considered from praxeological point of view as negative cooperation of at least two subjects each of which tries to achieve the goal contradicting that of the other by combat systems mutual destruction. So an armed combat, which is not fully controllable (predictable) in tactical, operational and strategic dimension, an operation⁴ and a war are the AFLS natural environment.

³ A **Combat** is any fight with an enemy on a tactical scale. Physical, psychological, radio-electronic and information influence, which is organised in time and space, on the enemy constitute the nature of a combat. [Compare: 10].

⁴ An **Operation** is the whole range of army activities comprising combats, battles, regroupings and maneuvers taking place at different time and in a considerable area, and having a common purpose and plan [5].

Moreover, the AFLS isn't alienated for its activity is influenced by its environment complex elements, besides tactical, operational and environmental factors such as maneuverability, ammunition, time, territory, climate conditions and information (fig. 4).

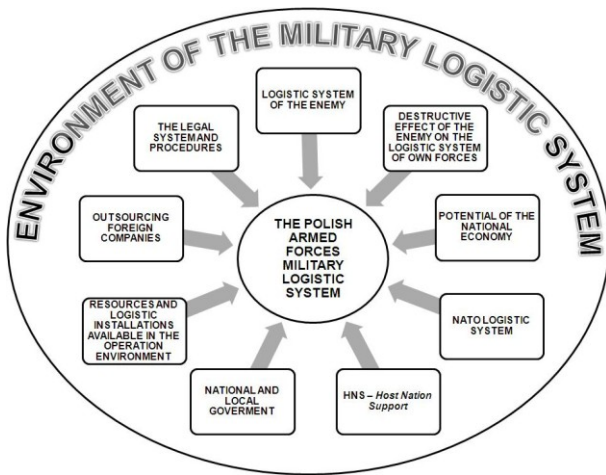


Figure 4. Main Elements of the Armed Forces Logistic System Environment.

Source: drawn up by the author.

Vast spectrum of tasks the AFLS fulfills in favour of forces in the country and outside it during different emergency states and as part of operations of defensive, peaceful, stabilising and humanitarian character enables the system to transit smoothly from minimal (peace state) engagement to maximal (wartime) engagement (fig. 5) and to effectively resist disturbances caused by its environment.

Moreover, the AFLS has an absorption (import) ability to accept allied material and energy support, for example as part of HNS and as part of different types of allied and multinational logistic support⁵ in joint operations⁶.

⁵ Notwithstanding the fact that States are responsible for logistic support of their own forces assigned to NATO, duplication of generally available logistic functions must be minimized. States and NATO commanders are collectively responsible for the support of NATO logistic international operations. It's important to avoid unnecessary, too large and too expensive, forces and means deployment in a theater at the phase of planning and preparing the operation logistic support. Logistic support should be made international only in the case

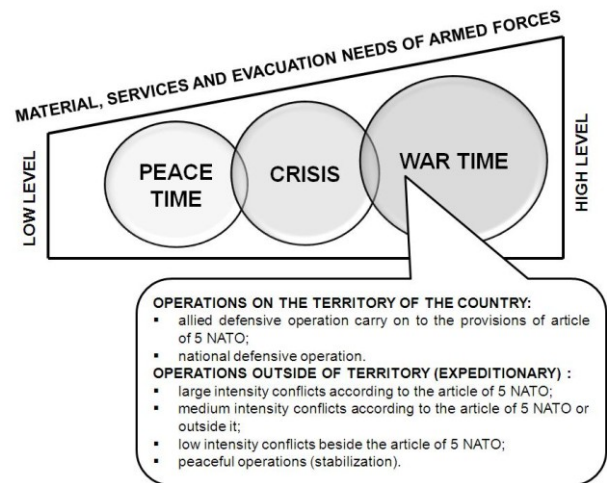


Figure 5. The Military Logistic System Ability to Transit Smoothly from Minimal (Peace State) Engagement to Maximal (Wartime) Engagement.

Source: drawn up by the author.

High and continuously changing requirements regarding the AFLS efficiency, resistance and mobility make it necessary to continuously analyze the undertaken system solutions from the perspective of current and prospective crucial changes in operational and tactical environment in which the system operates. NATO commanders have been recently stressing that the level of logistic support doesn't keep pace with the transformation initiated in the alliance with the beginning of the new millennium. The purpose of the transformation is to definitely change strategic, reactive, regional, massed, imprecise forces using intelligence service information and based on permanent supply points into mobile, active, global, highly maneuverable,

of lower costs, higher efficiency and operational cost-effectiveness. International logistic support option will be determined during the situation logistic assessment and the planning process. It will be dependent on a time factor and available bilateral international agreements signed by Sending Nations [3].

⁶ A **Joint operation** is an action in which at least two types of armed forces are engaged according to the principle of full integration. It's a planned action conducted and controlled by one commander from that type of armed forces which plays the leading role in it. It is planned by the strategic direction and conducted by the Operational Command [4].

precise forces using the NATO intelligence services and, first of all, supported effectively by integrated multinational logistics [7]. So military logicians are constantly searching for new system organizational and technical solutions for they are striving to make widely understood logistic activities fully adequate for needs generated by the army in qualitatively new military reaction conditions while aiming for the synergy effect and economical optimization. Nonetheless, in order to change the structure of particular system elements, its equipment and current decision-making procedures in a way that makes sense, one should define the scope of prospective optimization beforehand taking into account the recognized and not fully-identified system drawbacks, priorities, costs, alliance commitments and development tendencies that are being shaped in other allied armies.

3. IDENTIFICATION OF MAJOR PROBLEMS REDUCING THE AFLS EFFICIENCY

Identification and understanding of the AFLS performance major problems from the perspective of contemporary operational and tactical environment requirements is a necessary condition for outlining a consistent vision of the prospective system from an organizational and technical perspective.

The authors' experience (among other things, participation in the Polish Military Contingents as part of UN, NATO and international missions) and the analysis of the AFLS performance both in the country and outside it shows that fundamental functional areas in particular AFLS subgroups that need optimizing changes are the following:

In the managerial subgroup:

- unsatisfactory modularity in organizational structures of logistics mobile executive potential, which complicates the process of selecting troops and matériel needed to support definite military tasks and makes it difficult to command;
- logistic managerial organs that are not sufficiently equipped with information systems integrated with command ones (the former supporting decision-making processes in operational conditions, especially the prognosis of material requirements, technical losses and personnel casualties).

In material subsystem:

- rather unreliable indexes used to prognosticate B&MM consumption by the fighting army. That often results in supplies being delivered on the “on request from the battlefield” principle, which extends considerably the time of logistic reaction;
- use of modern unit packages (micro units) being insufficiently popularised, especially in the case of ammunition. These packages are light and at the same time highly resistant to physical, thermal and humidity factors, and ensure complete dimensional co-dependence with unit cargoes, transportation means and storage facilities;
- unsatisfactory orientation to the distribution channel being filled with standard supply sets⁷ while introducing unified transportation units into the material subsystem;
- relatively inefficient transport and transshipment equipment used in a supply chain to logistically support the so-called “last mile” [Compare: 9], that is B&MM immediate consumer on the battlefield;
- relatively low level of B&MM military inventory mobility;
- a system, which identifies electronically B&MM particular assortment groups, being insufficiently popularised. That extends and deforms data circulating in the supply chain.

In the technical subsystem:

- A&ME modular structure, which extends the time of damage diagnosis and repair (especially if the latter is carried out in the field conditions), being insufficiently popularised;
- relatively low level of A&ME unification, especially in multi-task vehicle group, which makes it difficult to obtain optimal basic load of spare parts necessary to make field repairs and to model evacuation and repair sub-units from organizational and equipment perspective;

⁷ A *Standard supply set* is a unified transportation unit (a container, a pallet, a swap body) filled with battle and material means the assortment type structure of which is made fit in with a particular military (task) module requirements in a particular kind of military activities.

- field repair system of the Battle Damage Assessment and Repair (BDAR) type being insufficiently popularised, which is due to the fact that at the A&ME modernized repair level and at the new unit design and production level little stress is put on contributing to A&ME reparability with the help of the methods mentioned above.

In the army movement and transportation subsystem:

- insufficient number of air and naval strategic means used to transport definite troop formation personnel, B&MM and A&ME in quantities necessary to meet the army needs on the area of operation at a minimal time slot usually equalling 30 days;
- RFID⁸ technology, which is used to monitor cargoes in a supply chain, being insufficiently popularised in the PAFLS [11];
- driver cabs and cargoes having no sufficient armour in particular vehicle groups used in B&MM transportation system;
- Precision Airdrop System (PADS) being not popularised, especially as far as the delivery of critical class supplies is concerned.

In the medical subsystem:

- insufficient number of helicopters with modern life-saving equipment used during wounded soldiers air evacuation from the battlefield to appropriate medical facilities;
- totally unsatisfactory number of armoured overland transport means used to evacuate wounded soldiers from areas exposed to direct fire on behalf of the fighting parties;
- medical support elements, which are placed at the lowest organizational structure positions (task forces, patrols), having relatively low level of highly specialist life-saving equipment used to save soldiers' life during the first minutes after they suffered severe injuries caused by the Improvised Explosive Device (IED).

⁸ Radio Frequency Identification is a goods flow control system in which data are read and recorded remotely with the help of radio waves. This technology uses special markers (called tags) assigned to cargoes that are being monitored and interrogators which receive signals emitted by tags and send collected data to the server using special software.

4. SUMMARY

In modern military world an efficient logistic system is a necessary condition for minimizing operational risk in order to avoid potential casualties and get the advantage over the enemy according to the “forces proportionate to the threat” principle owing to which the operation aim will be quickly achieved. When system, organizational and technical aspects of the AFLS areas of operation mentioned above are enhanced and diversified solutions in B&MM flow chain, as well as technical diversified solutions (multi-functionality of logistic equipment units), are introduced, the synergy effect (regarding performance efficiency) and the system “operational resistance” can be achieved. Nevertheless, the potential costs are an important issue to deal with in areas mentioned above, for according to the authors, they can be optimized owing to a wide orientation towards the use of diversified solutions, executive potential modular structure and owing to the omission of some indirect links in B&MM and logistic services flow system.

One should take particular care and “sense” the essence of the matter when trying to make potential system changes in modern information age military environment that is dynamically developing. So specialists from various spheres must combine their efforts while defining problems and outlining main directions of change, for only in that way, that is with the participation of scientists and specialists representing the so-called “civil logistics” the Military Logistic System can make optimal use of public means and be logistically and operationally efficient at satisfactory world level.

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