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Non-lethal weapons and their application possibilities in some military operations
other than war of the Hungarian Defence Forces

(PhD) thesis

AUTHOR'S REVIEWER

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Actuality of the topic. Description of the scientific problem

Nowadays the military operations get wide publicity due to the rapid growth of the role of the accelerated telecommunication and mass media. The news and reports relating to combat missions and military operations have become part of everyday life. There is a considerable social and political sensitivity all over the world in connection with military operations. More and more social, political, diplomatic, and economic demands have been formulated recently which require that military operations minimize the casualties particularly in respect to civilians, non-combatant persons, civilian objects and environment.

In the last decade the reports about military operations significantly dealt with those operations which belong to military operations other than war (e.g. peace support operation, humanitarian assistance). Although these operations are not recent; nevertheless it can be revealed that their frequency increased and their nature changed in the last two, three decades.

After the Cold War the demand for peacekeeping had particularly been increased because many latent tensions went over into conflicts. The participation in peacekeeping operations has become the most important task for European Defence Forces, among other for NATO, in the last decade. According to military and political experts beyond the general tasks of collective defence the preservation of peace, handling of crises and prevention of wars and conflicts will be the tasks of NATO Defence Forces in the future. These tasks can be seen in the government resolution about National Security Strategy of Republic of Hungary as well.

In keeping with these after our joining NATO, but before that as well, the Hungarian Defence Forces have very frequently got greater and greater roles in different military operations other than war.

One essential feature of military operations other than war is that the military missions are generally performed close to numerous civilians and often together with civilian organizations. This feature raises an essential question, namely the question of application of the armed forces.

The application of armed forces in military operation other than war is always a sensitive issue and it gives great responsibility for commanders and soldiers alike. The unjustified, maybe exaggerated or unlimited application of armed forces can lead to unpredictable consequences regarding both the authenticity of military force and the success of mission.

A basic problem then and there comes up when the soldiers beyond their conventional – so-called lethal – weapons do not have any other weapons, which can be used efficiently and are able to provide the success of the mission without the risk of exaggerated using of armed forces. In the last decade – mainly based on experience gained in peace support operations – in military circles it has been recognized that there is an „intermediate” possibility in the hands of commanders between the compelling without using armed forces and using lethal weapons that in certain case can be applied with success to achieve the aims. These are the so-called non-lethal weapons.

The non-lethal weapons – beside the conventional, lethal weapons – provide alternative possibility for commanders and soldiers in military operations. The roles and importances of non-lethal weapons there and then come to the limelight when using of conventional, lethal weapons is not possible, not justified, not practical or/and their possible using would be exaggerated or would result in unpredictable consequences. On the other hand without weapons the soldiers would not have the possibility for self-defence or the successful accomplishment of the task would not be provided.

Non-lethal weapons, which not only supplement but also extend the diplomatic and military options, have important role in such cases when the avoidance of casualties is of particular importance but at the same time the „hard” behaviour is necessary.

My research results proved, that these weapons have insufficiently come into the limelight of the domestic military persons dealing with planning. In consequence of this both the notoriety of weapons and concrete conceptions concerning their using are basically incomplete. In this field the domestic literature is insufficient, the topic has not scientifically been worked up. In the literatures

and publications many different versions, being inconsistent with each other, can be found concerning the definition and the classification, which are disturbing in many cases.

In the tasks of the Hungarian Defence Forces, mainly after joining NATO, a stress displacement can be seen in the direction of military operations other than war. This stress displacement gives reasons for investigating of non-lethal weapons which are relatively new and not well-known as well as studying of literatures; furthermore the systematization and analysis of experience gained by the Hungarian Defence Forces in military operation other than war. Besides I consider it necessary to systematize and analyze those non-lethal weapons and their application possibilities that are being used in some military operations other than war in different defence forces all over the world as well as determine the research directions and developmental tendencies. Furthermore I thought it also necessary to investigate the present non-lethal weapons of the Hungarian Defence Forces and their application possibilities as well as to make proposals on how to enlarge the variety of these weapons in the mirror of the present and the future tasks of the Hungarian Defence Forces.

I focused my research work on peacekeeping operations. My investigation was partially extended to the operations of defence against terrorism as well.

Research objectives

According to the facts mentioned above I determined the following research objectives:

- to analyze the military operations other than war – particularly peacekeeping operations and defence against terrorism – and their features as well as to investigate the relationship between non-lethal weapons and military operations other than war;
- to demonstrate and critically analyse those important versions of definition that can be found in different literatures and based on revealing their deficiencies specifying and redefining the definition of non-lethal weapons. The aim is to provide a new definition which expresses the essence of non-lethal weapons more precisely;
- to systematize and to classify the non-lethal weapons based on a new approach;
- to demonstrate those non-lethal weapons which can be used in military operations other than war and which are being operated in different principle as well as to analyze their efficiencies and application possibilities;
- to analyze the research directions and to determine the probable developmental tendencies of non-lethal weapons;
- to investigate the present non-lethal weapons of the Hungarian Defence Forces and their application possibilities as well as to make proposals on how to enlarge the variety of these weapons in the mirror of the present and the future tasks of the Hungarian Defence Forces.

Research methods

To fulfill my research objectives I used the following methods during my research work:

- I explored, studied, systematized and analyzed laws, legal rules, national and international literature, issued publications, essays and latest research results in relation with the topic;
- I summarized the common and opposing facts of scientific publications and documents, and I drew my own conclusions based on these;
- I consulted the military experts of Joint Operation Center, Civil-Military Cooperation Center, HDF Joint Logistic and Support Command (Armament Technical Department, Engineering Technical Department, Chemical Protection Department), as well as the teachers and professors of Miklós Zrínyi National Defence University with whom I compared the results of my research work;
- I made researches and consulted the experts of different departments of the Hungarian Border Guards and Institutes of Prison Service;

- I analyzed the practical experience of those military persons and experts who served IFOR/SFOR missions;
- I participated in the training and capstone exercise of 1. Light Cavalry Regiment' staff who had been assigned as a Crowd and Riot Control unit to SFOR/MSU mission. During the training and exercise I summarized and analysed my personal experience and the former experience gained by the regiment's staff during their earlier missions;
- I investigated the experience gained by 5th Bocskai István Light Infantry Brigade in KFOR missions and Hungarian Transport Battalion in Iraq;
- I participated and held presentations in different national and international conferences, symposia and lectures of which themes were in connection with my research area;
- Between 2002-2004 as a national expert I participated – in the work of NATO Research and Technology Board SAS (Studies, Analysis and Simulations) panel SAS-040/LTSS working group. The working group elaborated a long term scientific study (titled „Non-Lethal Weapons and Future Peace Enforcement Operations”) for NATO political and military leaders;
- I searched the World Wide Web for special material and publications related to my topic;
- I appraised the results of my researches, experiments and observations continuously.

Description of the performed work

I divided the dissertation into 6 chapters

In chapter one I investigated the military operations other than war in the system of military operations and reviewed their classifications. I analysed the purpose and features of military operations other than war and investigated their environment. By means of cases I proved that the purpose and features of military operations other than war as well as the principles used in military operations demand that the military forces have to have non-lethal weapons beside their conventional, lethal weapons. I interpreted and analysed the important versions of the definition of non-lethal weapons which can be found in different – domestic and foreign – literatures and on the bases of my analysis I drew up a new version of the definition which expresses the essence of non-lethal weapons more precisely. At the same time I investigated the features and criteria of non-lethal weapons.

In chapter two I performed the systematization of non-lethal weapons based on a new approach. I dealt with and analysed those non-lethal weapons which can at present or in the future be used in different peacekeeping operations or in the missions of defence against terrorism. I examined the application possibilities of non-lethal weapons

In chapter three having examined the research directions I defined the probable developmental tendencies of non-lethal weapons as well as I predicted when the appearance of the non-lethal weapons being under development are expected in operational areas;

In chapter four I analysed the city as the most important theatre of the peacekeeping operations and the missions of defence against terrorism, the crowds with whom the military forces very frequently have contacts as well as the relationship of the city, the crowd, the military operations and the non-lethal weapons. I showed some cases that can happen during the military operations other than war and where the non-lethal weapons can be of decisive roles. I investigated the continuous range of the armed force, the protective equipment necessary during the application of non-lethal weapons as well as legal and ethical aspects of non-lethal weapons. Analysing the arguments and counter-arguments I found the motives that affect towards and against the spreading of these weapons.

In chapter five I examined the present non-lethal weapons used by the Hungarian Defence Forces in military operations other than war as well as their further developmental possibilities. I pointed out the necessity of the application principles and practical issues of non-lethal weapons in doctrinal level as well as the necessity of the establishment of non-lethal capability sets. I made

suggestions on different possible versions of non-lethal capability sets that provide the successful accomplishment of peacekeeping operations and missions of defence against terrorism.

In chapter six I drew summarized conclusions and formulated my new scientific results. I made recommendations for the applicability of the dissertation and the further research directions.

Summarized conclusions

1. In consequence of new security risks the military forces faced new challenges all over the world. In the roles and tasks of armed forces significant stress displacements happened. The number and significance of the military operation other than war increased. The participations in peacekeeping operations came into the limelight. At the same time the terrorism and the combatting against terrorism also has become highly importance. The resulted stress displacements affected the application principles as well as the applied weapons alike. After our joining NATO additional expectations and requirements had been formulated regarding the application possibilities, capabilities and tasks of the Hungarian Defence Forces which affected towards stress displacement. The increased and stable international roles of the Hungarian Defence Forces in the last decade made the definition of military operations other than war as well as the precise determination and explanation of those activities which belong to these operations and the scientific research of their theory and practice necessary.
2. The aims and the applied principles of military operations other than war depart from the aims used in wartime. As a consequence the military forces can be put into action more limited than in operations during wartime. The military operations other than war require different methods and weapons than the traditional war operations.
3. In military operations other than war not the lethal weapons have the leading role. The purpose, the features and the applied principles of military operations other than war demand that the military forces have to have such new type of weapons beside their conventional, lethal weapons, which can efficiently be used when the application of conventional one is not possible, not practical or their application can lead to unpredictable consequences. Such new type of weapons are the non-lethal weapons.
4. Future military operations will be conducted in cities and their surroundings. Due to the dominance of the city character of the operations the military forces will be brought to new challenges and tasks which make the revision of the applied procedures and weapons necessary. The complex character of the city and its surroundings, the permanent presence of civilians, the often developing crowd as well as the feature and purpose of certain military operation demand that commanders emphatically manage the appropriate arrangement of military units participating in mission, the preparation for subtle managing of the situations as well as the adequate choosing of weapons and equipment. The military forces have to prepare themselves for taking over the role of local authorities – if necessary – for the sake of keeping public security and the statutory order. These tasks may contain the essential components of police work as well. The tasks of crowd management and crowd and riot control will appear as an important task mainly in peace support operations. These tasks can not be fulfilled in every case with clearly conventional, lethal weapons. It will be necessary that the military forces have non-lethal weapons beside their conventional, lethal weapons.
5. The non-lethal weapons have not yet come into the limelight of the Hungarian military planners because they are relatively new items, so both the knowledge about them and the concrete ideas for their application are basically insufficient as a result. In this field Hungarian literature is fairly incomplete and this area is not worked up scientifically properly. The research of this field is justified both theoretically and practically.

6. The literatures regarding the name, definition and classification of non-lethal weapons are not unified. There are many versions concerning the definition which either are too simplified or too complicated in many cases they are unmanageable or inaccurate. These make the clarification of the definition necessary. The classification can be accomplished in many ordering/arranging principles. As far as the topic is concerned it is important to classify the non-lethal weapons according to the making principle of the primary effect, which affects the object as well as the feature of the object. The approach of the making principle of the primary effect, which affects the object, makes more precise and more unambiguous classification possible differently from the former classifications.
7. The non-lethal weapons – beside the conventional, lethal weapons – provide alternative possibility for commanders and soldiers when the application of conventional, lethal weapons is not possible, not justified, not practical or/and their possible application would be exaggerated or would result in unpredictable consequences. The weapons can be put in action without the risk of the exaggerated using of armed forces. They make a multilevel control possible about a certain situation for the military forces and provide the possibility of efficient intervention in the early stage of the situation when it is not so dangerous. Using the weapons the commanders have the opportunity to enforce the principle of the application of minimum force, on the other hand they also have the opportunity to accomplish the mission when the avoidance of the casualties is particularly important but in a certain situation „hard” behaviour is necessary.
They provide flexibility and freedom for the soldiers and increase the options regarding the application of military force. Non-lethal weapons can provide the possibilities of self-defence and the real deterrent.
8. The presence of non-lethal weapons does not mean, can not mean the total waiver of the application of conventional, lethal weapons. During the operations the inalienable right to self-defence and the necessity of the fulfilment of the task make the application of non-lethal weapons necessary. That is why lethal and non-lethal weapons must be present at the same time in certain missions. Non-lethal weapons do not substitute but supplement lethal weapons. They have to be used beside the lethal weapons not instead of them
9. The ongoing research programmes have already gone beyond non-lethal weapons of low technological level which are widely spread today. At new developments the purpose is to achieve capabilities providing an efficient applicability from a long range anywhere and under any circumstances. At the ongoing researches and developments the main purpose – beside the increase of effective range – is to increase the effectiveness and the accuracy as well as to reduce the collateral damages. The technical designers endeavour to increase the effects of certain non-lethal weapons with the combination of other effects of non-lethal weapons. In the future the development of more and more agents are expected which are able to influence the cognition, the comprehension, the perception, the recognition capability, the feeling, the state of mind, the will, the body control, the watchfulness or the precaution. Relatively dynamic progress can be seen in the field of development and application of chemical and directed energy weapons. The tunable weapons come into the limelight. The effects of these weapons can be better controlled.
The progress is less dynamic in the field of kinetic energy weapons. At the development of new weapons the technical designers endeavour that the lethal and the non-lethal capabilities will be provided in one weapon at the same time.
10. In the military operations other than war the view of continuous range of the military force and the non-lethal weapons jointly provide that the military force be proactive, keep the initiation and more quickly recognize those situations which require lethal weapons.
11. The military spreading of non-lethal weapons has been hindered by ethical and legal problems above all and not by technical issues. That is why that in the process of development the investigation of ethical issues and the consideration of existing legal rules and regulations can not be avoided.

12. The appropriate training and the psychic preparation of the soldiers are also very important by the application of non-lethal weapons. The users must be aware of the effect and the effectiveness of the weapons.
13. All units of the Hungarian Defence Forces have to prepare themselves for the new challenges stressed for the peace support operations as well as the tasks of defence against terrorism. This preparation demands the enlargement of the number of applicable tactical procedures and the deployable weapons and equipment.
14. In the last decade the Hungarian Defence Forces have not followed that stress displacement that shown in their tasks regarding the applied weapons. The existing weapons still fit decisively into the conventional lethal warfare. In certain fields hardly, while in other fields the Hungarian Defences Forces do not have non-lethal weapons at all. Concerning the variety of the existing non-lethal weapons in the world a decisive backwardness can be revealed in the Hungarian Defence Forces. Our existing non-lethal weapons are too one-sided, they include mostly kinetic energy weapons.
15. In order to eliminate the insufficiencies mentioned above it is necessary to the shape the non-lethal capabilities among the aims of the ongoing reform processes in the defence sphere. Depending on the present and upcoming tasks of the Hungarian Defence Forces and taking them into consideration, military leaders must start the shaping of the different module-principle, non-lethal capability sets. Firstly, as a minimum aim, the Hungarian Defence Forces have to prepare themselves and start to shape the non-lethal capability sets in the fields of peacekeeping operations (crowd and riot control, guard and security) as well as operations of defence against terrorism. It is also necessary to launch the establishment of the application principles and practical issues of non-lethal weapons at doctrinal level which must involve the land forces and the air force alike. The doctrinal establishment of the application principles and practical issues have to be performed before any acquisition or technical development is set up.
16. The planning of the application of non-lethal weapons must be done together and integrated with the conventional, lethal weapons. Beside the shaping of the required capability sets the preparation and the training concerning the application of the weapons have to be handled seriously. It is indispensably necessary to involve other organizations (e.g. police) in this work which have deep and practical experience in the application of these weapons.

New scientific results

After summarizing the results of my research work I esteem the followings as new scientific results:

1. Based on the critical analysis of the important existing versions of the definition of non-lethal weapons which can be found in different – domestic and foreign – literatures and by means of their integration I redefined the definition of non-lethal weapons completing it with the intentions of technical designers and the user and I also extended the applicability of non-lethal weapons to the infrastructure.
2. Based on the making principle of the primary effect which affects the object as a new approach I created a new classification approach which makes a more precise and more unambiguous classification possible different from the former classifications. It can also be used in case of those non-lethal weapons, which have combined effects.
3. Based on the analyses of the features of non-lethal weapons to be found I determined the developmental tendencies to be expected.

4. Revealing the current status and insufficiency of non-lethal weapons in the Hungarian Defence Forces I proved and established the necessity of shaping the module-principle, non-lethal capability sets. I determined those areas and tasks which primarily demand the updating and I also elaborated four possible versions regarding the shaping of the capability sets.

Applicability of the research results, proposals

As a result of my research work I recommend the Ministry of Defence and the Hungarian Defence Forces to use my dissertation because:

- the dissertation serves as a basis for experts dealing with the topic for their further research works;
- it may be used for military scientists and experts working in the field of research and technology;
- the analyses and proposals which can be found in the dissertation can be sources for those experts who are planning the application of non-lethal weapons;
- the dissertation is recommended to the trainers and commanders who are assigned to prepare the staff for different military operations other than war;
- the dissertation can be a source for the elaboration of doctrines and military regulations;
- the dissertation gives a starting-basis in military schools to the determination of the subjects, parts of subjects and to the establishment of the educational topics as well as the creation of the coursebooks and lecture notes.
- I recommend:
 - o the shaping of non-lethal capabilities to be assumed among the aims of the ongoing reform processes in the defence sphere;
 - o the elaboration of the application principles and practical issues of non-lethal weapons at doctrinal level;
 - o to start the shaping of the different, module-principle, non-lethal capability sets depending on the actual and the upcoming tasks of the Hungarian Defence Forces.
- Finally I recommend inserting the topic of non-lethal weapons into the military education.

Author's publication released in the subject of the thesis

1. **Bartha** Tibor: The application possibilities of non-lethal weapons in the Hungarian defence Forces with special regard to military operations other than war (Nemzetvédelmi Egyetemi Doktorandorum – 2002. 4. szám 1. kötet)
2. **Bartha** Tibor: Military operations other than war – Non-lethal weapons I. (Nemzetvédelmi Egyetemi Közlemények, 2003/2)
3. **Bartha** Tibor: The cities as battlefield of the future, the crowd management (KARD ÉS TOLL, 2003/2)
4. Tibor **Bartha**: Non-lethal Weapons in Peace Support Operations – AARMS, Academic and Applied Research in Military Science - 2nd International Conference on Robot Warfare – special issue, 2004
5. **Bartha** Tibor: Non-lethal weapons applicable in military operations other than war (KARD ÉS TOLL, 2004/1)
6. **Bartha** Tibor: Acoustic weapons used against personnel as non-lethal weapons (HADTUDOMÁNY, 2004/2)
7. **Bartha** Tibor: The developmental tendencies of non-lethal weapons (HADTUDOMÁNY, 2005/2)
8. **Bartha** Tibor: Non-lethal weapons (enforcement means) used by the Hungarian Border Guards and and Institutes of Prison Service (KARD ÉS TOLL, 2005/1)

9. **Bartha Tibor**, Dr. Padányi József, Rázsó Sándor, Zelenák János: The possibilities of the Hungarian Defence Forces of XXI. Century in the defence against terrorism (0086/2004 Országos Kiemelésű Társadalomtudományi Kutatások pályázat – 2004)
10. **Bartha Tibor**: Non-lethal weapons as new type of weapons in the defence against terrorism (Magyar Hadtudományi Társaság 2004. évi pályázatára benyújtott tanulmány)
11. **Bartha Tibor**: Non-lethal weapons and their application possibilities in the military operations other than war of the Hungarian defence Forces (under publication) (A Honvédelmi Minisztérium 2004. évi tudományos munkatervében a 7. számú – haditechnikai és technológiai fejlesztések – program-bizottság által meghatározott és elkészített tanulmány)

Author's biography

Birth: 27.08. 1959 (Debrecen)

Educations: Armament (weapons and ammunition) executive engineer (ZMKMF-1985)
Dipl. mechanical engineer (BME-1994)

Languages: Russian – basic level (1985)
English – medium level (1994)
German – medium level (1998)
English – STANAG 3333 (1999)

Rank: Colonel (2005 -)

Place of work: Technology Agency MoD

Duties:

1985-1987 - Armament executive engineer (Nyíregyháza repairing battalion)
1987-1990 – chief of armament service (Debrecen mechanized infantry brigade)
1990-1991 – deputy commander of logistical storage (Hajdúhadház)
1994-1996 – development engineer (Budapest – Institute of Military Technology)
1996-1999 – deputy chief of weapons and ammunition department (Inst. of Mil.Tech.)
1999-2000 – chief of weapons and ammunition department (Inst. of Mil.Tech.)
2000-2005 – chief of engineering office for mechanics (Budapest – Technology Agency)
2005 – deputy director general for technology mechanics (Budapest – Technology Agency)

Relationship:

National representative and experts of NATO RTB SAS-040 working group (2002-2004)
National representative of NATO AC/327 SG/C (Technical procedures and specifications) (2004 -)
National coordinator of EDA Captech GEM-03 (2005 -)
Member of the Hungarian Military Science Association (2003 -)
Founder member of the Hungarian Ballistic Association (2000 -)